Synthetic Cultural Resource Overview of the Bureau of Land Management's Royal Gorge Field Office, Eastern Colorado

by

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INTRODUCTION

The administrative boundary of the Royal Gorge Field Office (RGFO) of the Bureau of Land Management (BLM) encompasses the entire eastern half of the state of Colorado (Figure 1). Within this vast area, the RGFO directly manages 665,500 acres. The RGFO also oversees federal mineral rights over an additional 6.34 million acres. A total of 3,587,688 acres within the administrative boundary of the RGFO has been inventoried for cultural resources (Figure 2). This number, however, includes lands outside the jurisdiction of the RGFO. Much of the land over which the RGFO has jurisdiction lies within the foothills and valleys along the eastern margin of the Southern Rocky Mountains and in some cases extends well into the interior of the mountain region. These areas have been shown to have the potential to contain an amazing variety of cultural resources, including prehistoric sites of every known time period, and historic Euroamerican sites related to mining, farming and ranching, transportation, and settlement. In the following archaeological and historical summaries, the full administrative boundary of the RGFO is referred to as the *RGFO study area*, whereas lands under the direct management of the BLM are referred to simply as BLM or RGFO lands.

The sections that follow present brief synthetic summaries of the prehistoric and historical archaeology of the RGFO study area. These syntheses are intended as reference tools for professional and avocational archaeologists, historians, and interested members of the public. Comprehensive synthetic contexts describing the known prehistoric occupations of the Arkansas and Platte river basins (Figure 3), which span the entirety of the RGFO study area, were published in 1999 (Gilmore et al. 1999; Zier and Kalasz 1999). The discussions of prehistory presented here are greatly condensed summaries of the material presented in the 1999 context documents and are organized by time period. For each time period, the information presented in detail in the 1999 contexts is concisely summarized, followed by descriptions of important work conducted after 1999 and its implications for advances in archaeological research. Discussions of history and historical archaeology are organized somewhat differently. A context for historical archaeology in Colorado was published in 2007 (Church et al. 2007), but is organized thematically rather than geographically. Therefore, the synthetic discussions of historical archaeology in the following sections are likewise organized thematically, focusing upon historical background, descriptions of site types, and the potential for encountering various types of historical sites within the RGFO study area in general and on BLM lands in particular.

Environmental Setting

Covering more than half of Colorado, the boundary of the RGFO encompasses a multitude of environmental and topographic settings. From the lofty peaks that tower over 14,000 ft. in elevation to the prairies that are below 3,300 ft., elevation is arguably the greatest factor that influences the many environmental zones found within the RGFO. As a result, the area, and the following discussion, can broadly be divided into two main sections: the Southern Rocky Mountains physiographic province and the Great Plains physiographic province. These two larger provinces are separated by the foothills corridor, which follows a generally north–south direction and is relatively narrow (Gilmore et al. 1999). The small foothills region is not discussed in detail here, but more exhaustive descriptions of the foothills belt, as well as in-depth discussions of the RGFO's modern environment, complex geology, and paleoenvironment, can be found in Zier and Kalasz (1999), Gilmore et al. (1999), Gilmore (2008), and Chronic and Williams (2002).

Southern Rocky Mountains

Covering the western side of the RGFO, the Rocky Mountains extend from Alaska to New Mexico, and have been broadly divided into three sections: the Northern, Central, and Southern Rocky Mountains. Colorado is within the Southern Rocky Mountains, which is separated from the Central Rocky Mountains by the Wyoming Basin, which is slightly farther north in southwestern Wyoming (Gilmore et al. 1999). Although the Colorado Rockies include approximately 12 distinct

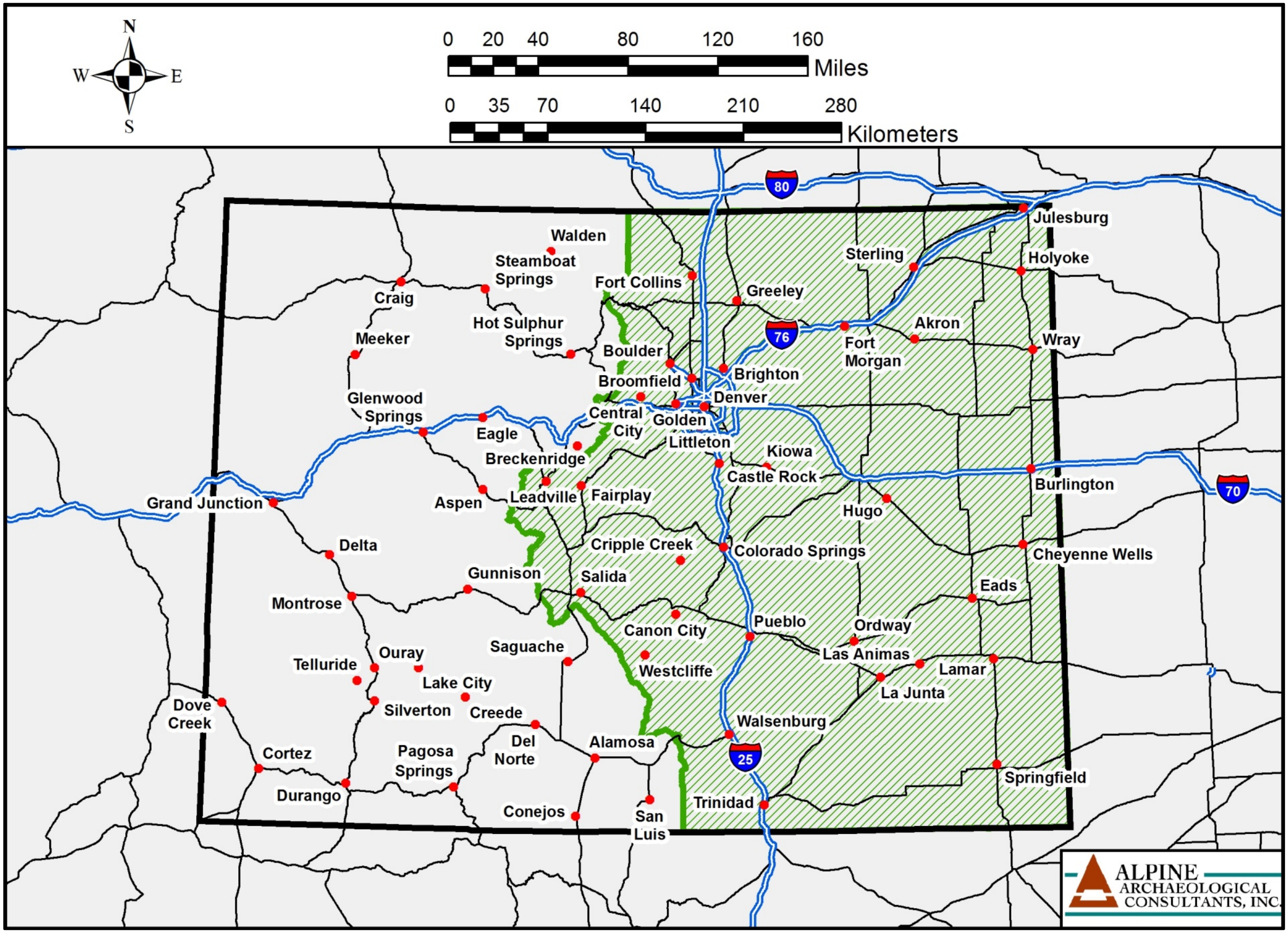

Figure 1. Map of Colorado showing the RGFO study area (green hachure), encompassing the entire eastern half of the state.

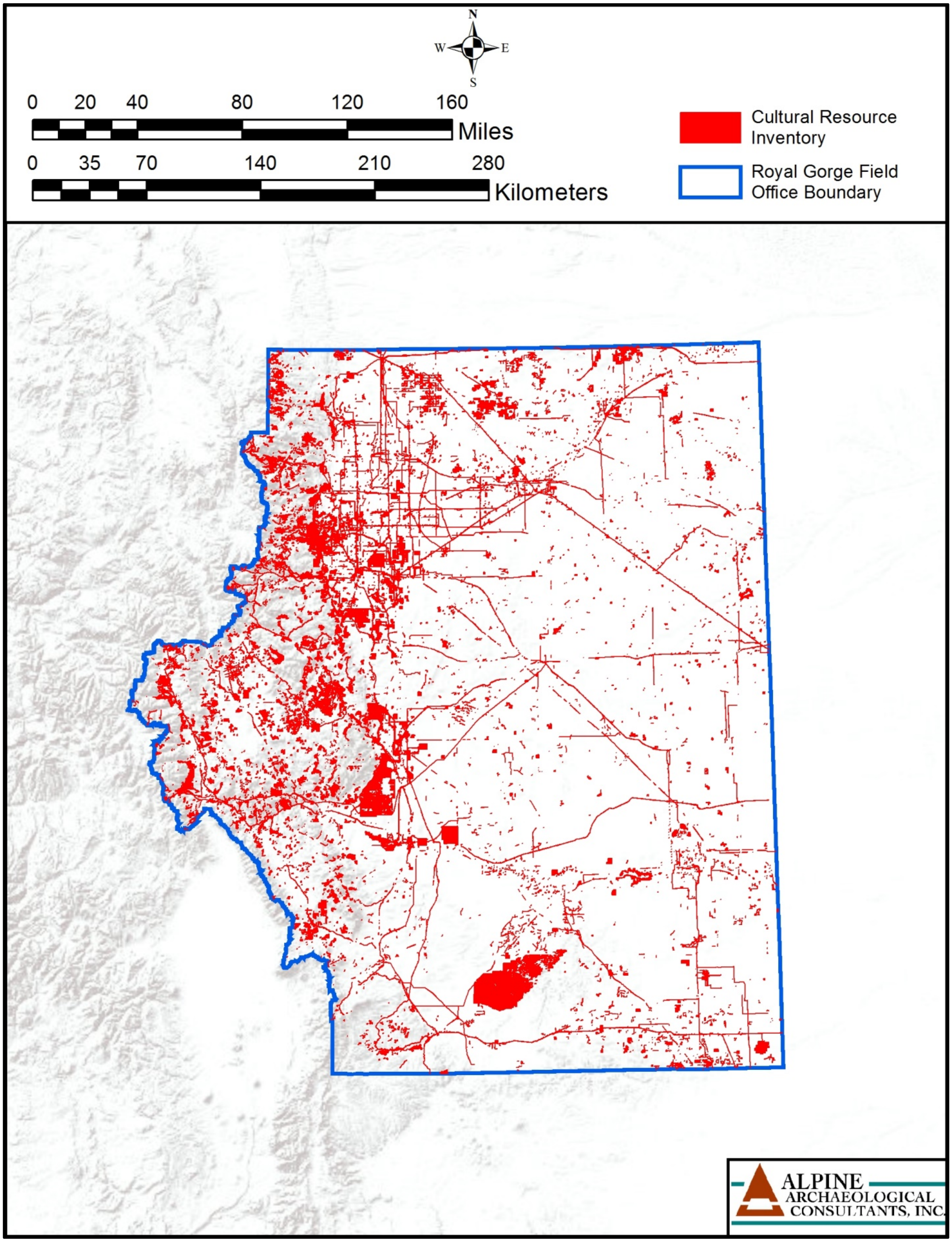

Figure 2. Map of eastern Colorado showing all cultural resource inventories as of 2015 within the RGFO study area.

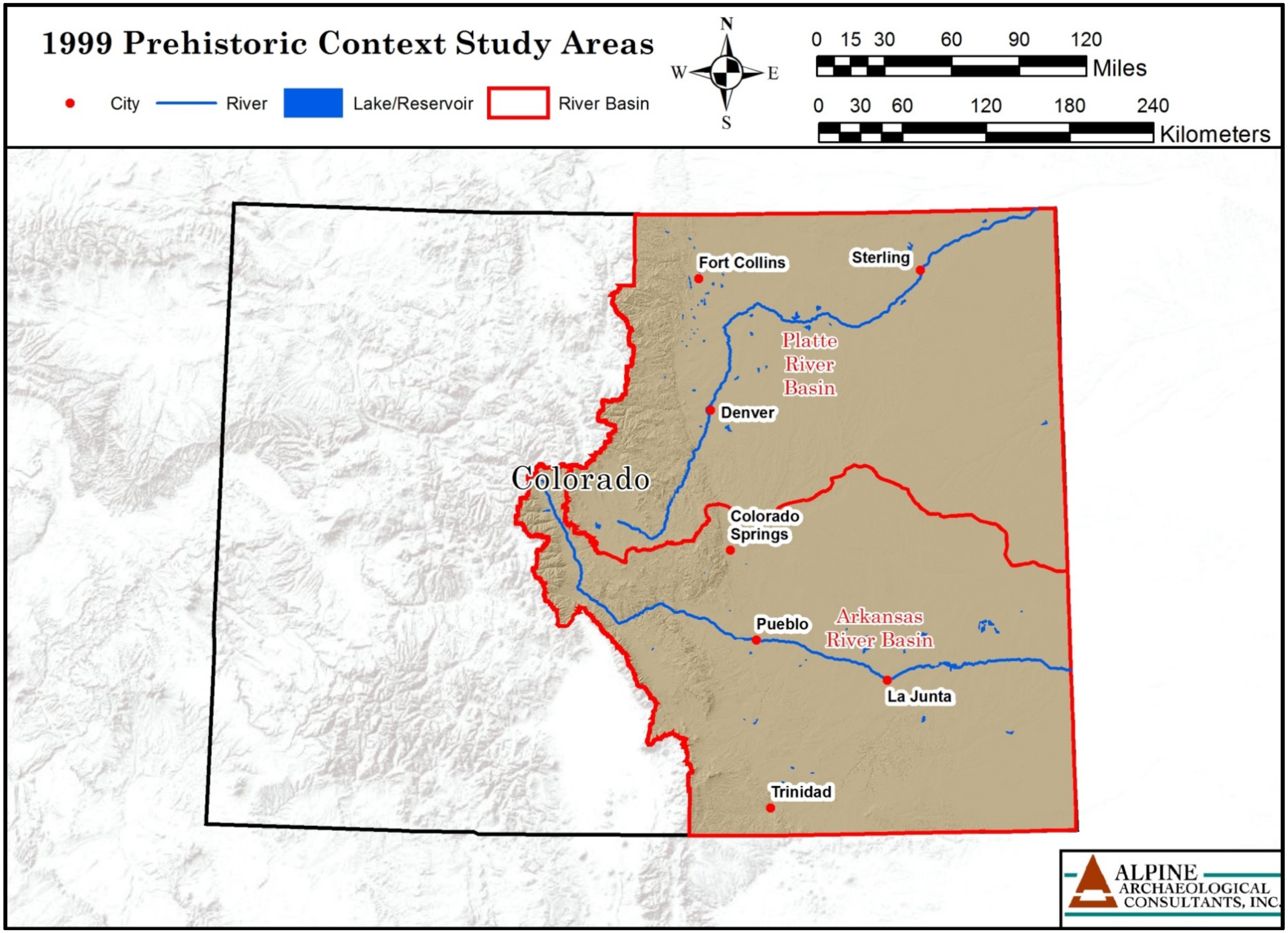

Figure 3. Map of Colorado showing the Platte and Arkansas river basins—the study areas of the 1999 prehistoric context documents (Gilmore et al. 1999, Zier and Kalasz 1999, respectively)—within the RGFO study area.

ranges (Chronic and Williams 2002:113), not all of these are within the RGFO. The largest ranges within the RGFO include, but are not limited to, the Front Range (which incorporates Mummy Range, Indians Peaks, and the Kenosha Mountains, among others), the Wet Mountains, and the Sangre de Cristo range (including the Culebras). Structurally, the Southern Rocky Mountain physiographic province is marked by north–south belts of granite anticlines that have been deeply eroded and are flanked by steeply dipping sedimentary formations. A series of erosional cycles, most notably within the Pliocene, reduced the relief of the Rocky Mountains to an often uniform level. Subsequent cycles of uplift have created the pediments and terraces seen along the stream valleys (Fenneman 1931:93, 96; Gilmore et al. 1999:13). Ultimately, the Rocky Mountains fractured and uplifted the sedimentary formations that extend eastward onto the Plains, causing the formation of hogbacks seen along the fault lines at the bases of the mountains.

Several major rivers—including the South Platte, Arkansas, Clear Creek, and Cache La Poudre—begin in the mountains and follow the terrain to lower grounds, before eventually reaching the Great Plains. Each major river is fed by smaller creeks and streams that have formed steep, rocky canyons, which are frequently prone to flooding, mudslides, and rock falls (Chronic and Williams 2002:113). Mountain lakes are also present, as are numerous man-made reservoirs.

Vegetation in the mountains varies by forest community, but common trees include ponderosa pine, pinyon-juniper, aspen, spruce-fir, cottonwood, willow, and lodgepole pine. Various types of shrubs, grasses, and forbs are also present. Wildlife species include large artiodactyl species such as elk, moose, and mule deer; large mammals, such as bear and mountain lion; small mammals, such as porcupines, rabbit, woodchuck, and weasels; and a variety of birds, including various hawks, woodpeckers, and jays (Tate and Gilmore 1999:29).

The Great Plains Province

The Great Plains is an expansive area that extends from Canada to Texas. Within eastern Colorado, the Great Plains can be divided into three distinct sections: the High Plains, the Colorado Piedmont, and the Raton Basin (Figure 4). From Colorado's eastern border westward, the terrain is expansive and flat. This area is within the High Plains section of the Great Plains physiographic province, which represents remnants of a great fluvial plain that once extended from the Rocky Mountains eastward to the Central Lowlands (Fenneman 1931). From the eastern border of Colorado to the western edge of the Great Plains, elevation increases by over 1,000 ft. The western half of the Great Plains province is divided in two sections; the Colorado Piedmont to the north and the Raton Basin to the south. The Colorado Piedmont differs from the adjacent High Plains in "…that the Tertiary mantle still blanketing those sections has been stripped away by the Arkansas and South Platte rivers and their tributaries" (Zier and Kalasz 1999:5). The Colorado Piedmont consists of both sedimentary rock of Tertiary and Mesozoic Age, with some unconsolidated deposits of Quaternary Age. In comparison, the more southerly Raton Basin is largely covered by sedimentary rock formations of Mesozoic Age. The dissected upland characterizing the western part of the Raton Basin is known as the Park Plateau.

Surface water is generally scarce in eastern Colorado; however, major rivers that cross the Great Plains include the South Platte River, Arikaree River, South Fork of the Republican River, the North Fork of the Smoky Hill River, Big Sandy Creek, the Arkansas River, and the Cimarron River. The Great Plains province is almost entirely within the Grasslands of the Plains community, which is dominated by blue grama, western wheat grass, galleta, alkali sacaton, four-wing saltbush, sand drop seed, three-awn, sand reed, bluestem, side-oats grama, and yucca. Farther south, near the New Mexico border, small patches of the Woodlands of the Intermountains community can be found. These areas typically support pinyon-juniper with wheatgrass, Indian rice, and blue grass mixed with shrubs and forbs. Pinyon and juniper woodlands are also common in Cucharas Canyon and other canyons and drainages at or near the margin of the Plains and mountains.

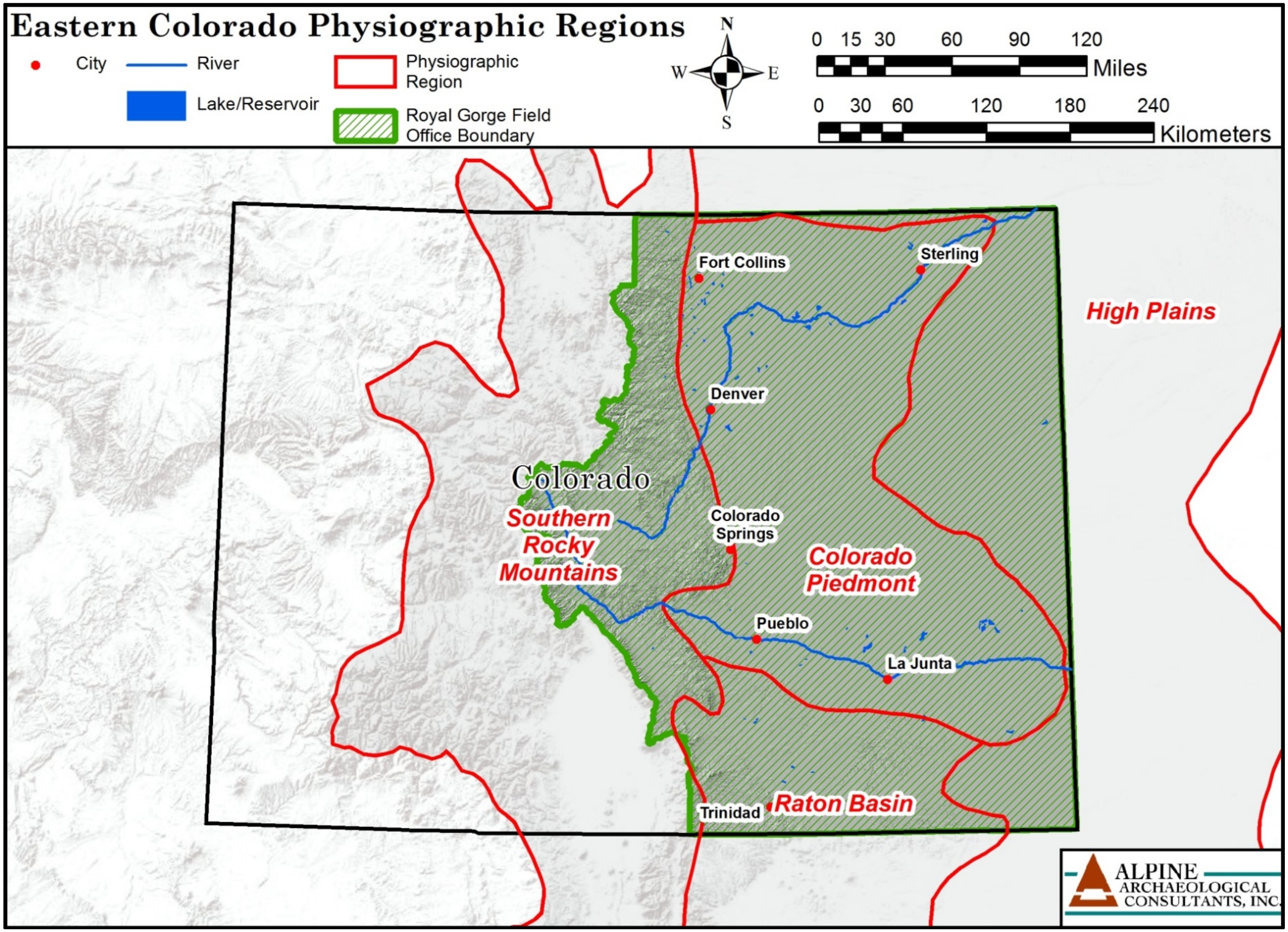

Figure 4. Map of Colorado showing physiographic regions of eastern Colorado: High Plains, Colorado Piedmont, Southern Rocky Mountains, and Raton Basin (after Fenneman 1931).

The grassland communities support a wide diversity of mammals that include jackrabbit, cottontail, skunk, raccoon, coyote, mule deer, white-tailed deer, beaver, ground squirrel, squirrel, and prairie dog. Prehistorically, and well into the historic era, large herds of bison were present. Birds in the area include numerous migratory species as well as some that are considered to be either threatened or endangered species. Reptile populations include a variety of lizards, garter snakes, and rattlesnakes. Intensive settlement and agricultural use of much of the project area within Colorado have reduced the available range to many of the above animal populations (Brown 1976; Zier and Kalasz 1999).

Climate

Climate in eastern Colorado in general is largely determined by elevation and topography, as it is elsewhere in the state. Precipitation in the project area is highly variable and is roughly correlated with elevation. The higher mountains tend to receive greater amounts of precipitation than the lower valleys. The correlation between elevation and precipitation is not exact, however. Pueblo, Colorado, at about 1,421 m (4,662 ft.) receives about 300 mm (11.8 in.) of precipitation per year, whereas the town of Salida, at 2,159 m (7,083 ft.) elevation, receives about 260 mm (10.1 in.) of precipitation per year. Salida is cooler than Pueblo, so receives a greater amount of snowfall. Table 1 lists the mean annual precipitation of eight towns located throughout the RGFO that are roughly representative of the diverse environmental settings found in the RGFO, ranging from the high mountains to the Plains (http://www.wrcc.dri.edu/summary/climsmco.html).

Table 1. Mean Annual Precipitation at Key Locations Within or Near the RFGO Study Area.

Location	Elevation	Inches of Annual Precipitation
Boulder	5,430 ft.	19.14
Cañon City	5,332 ft.	12.77
Cheyenne Wells	4,291 ft.	15.68
Colorado Springs	6,035 ft.	16.10
Denver Airport	5,431 ft.	15.48
Julesburg	3,478 ft.	16.92
Lake George	7,992 ft.	12.10
Sterling	3,935 ft.	15.22
Trinidad	6,010 ft.	15.07

THE PALEOINDIAN STAGE

Introduction

This synthesis presents a summary of the information regarding the Paleoindian stage from the 1999 Colorado prehistory cultural contexts for the Arkansas River Basin (Zier 1999a) and the Platte River Basin (Chenault 1999), as well as research conducted after 1999. The combined geographic extent of the area covered by these contexts encompasses the management boundary of the RGFO field office. The majority of the data presented here comes from the Platte River Basin, as relatively few Paleoindian sites had been excavated within the Arkansas River Basin prior to 1999. The research questions presented in the 1999 contexts are not reiterated here; the reader is referred to those documents for a complete list.

Recent work has expanded the database of the early occupation in the area, addressed many of the research issues identified in the Arkansas River Basin and Platte River Basin research contexts, and led to the development of new research questions. This work includes excavations, multi-year survey and research projects, data synthesis projects, and compliance projects. A summary of the work conducted after the publication of the Colorado prehistory contexts is presented at the end of each section in this synthesis. The majority of this new research has focused on the high-elevation and intermountain areas of eastern Colorado. As such, the quantity of new data is skewed towards these areas, with less work in the Plains.

Chronology

The discussion of the early research of the Paleoindian stage in eastern Colorado is based upon the chronology used in the Colorado prehistory contexts covering the region (Chenault 1999; Zier 1999a). Both contexts present dates in uncalibrated years before present (B.P., with "present" referring to A.D. 1950), which is continued here. The Paleoindian stage is separated into four periods, though each context uses slightly different chronological breaks (Table 2).

Table 2. Paleoindian Stage Chronology.

Paleoindian Period	Arkansas River Basin Chronology	Platte River Basin Chronology
Pre-Clovis	> 11,500 B.P.	> 12,000 B.P.
Clovis	11,500–10,950 B.P.	12,000–11,000 B.P.
Folsom	10,950–10,250 B.P.	11,000–10,000 B.P.
Plano	10,250–7800 B.P	10,000–7500 B.P.

Chronology: Current Research

Researchers in eastern Colorado, as well as the across the United States, are continuously revising the Paleoindian cultural chronology, based upon new information and the reanalysis of existing collections (e.g., Collard et al. 2012; Fiedel 1999; Pitblado 2003). Much of the new data within the RGFO study area comes from several high-elevation survey projects. In a synthesis of research from within the southern Rocky Mountains of north-central Colorado, Brunswig (2007a) developed a chronology applicable to the mountain regions of the RGFO study area. It should be noted that other researchers (e.g., Kornfeld et al. 2010; Pitblado 2003) use slightly different divisions in their discussions of the Paleoindian occupation of the Rocky Mountains, though the date ranges assigned to each technological complex are generally similar.

In terms of temporal breaks, Brunswig's chronology closely matches those used in the Colorado prehistory contexts (Table 3). However, two important differences are present in the more recent classification. First, the Paleoindian era is split into two periods: Early Paleoindian and Late

Paleoindian. Early Paleoindian includes the temporally overlapping technological complexes of Clovis, Goshen-Plainview, and Folsom. Secondly, the Late Paleoindian period is further split into an Early Phase and a Late Phase.

Table 3. Mountain Paleoindian Stage Chronology (Brunswig 2007a).

Paleoindian Period	Technological Complex	Uncalibrated Date Range
Early Paleoindian	Clovis	11,300–10,900 B.P.
	Goshen-Plainview	11,100–8000 B.P.
	Folsom	10,900–10,000 B.P.
Late Paleoindian	Early Phase	10,250–8500 B.P
	Late Phase	8500–7500 B.P.

Pre-Clovis

The pre-Clovis human presence in North America is a topic rife with debate and, though addressed in both contexts, no unambiguous evidence for pre-Clovis is present within the RGFO boundary. Researchers have recovered animal remains, including mammoth, horses, and camels, at three excavated sites that date to the pre-Clovis period within the Platte River Basin—the Selby site (5YM36), the Dutton site (5YM37), and the Lamb Spring site (5AD83). Green spiral fractures on bone and possible flaked bone that might be bone tools, as well as possible choppers, were found at the Selby and Dutton sites. Researchers consider these materials to have been modified by natural processes, and the very small amount of debitage found at the deepest levels of the Dutton site are thought to have originated from the Clovis occupation documented at the site. Archaeologists recovered mammoth bone that yielded a bone collagen date of 13,140 ± 1,000 B.P from the lower levels of the Lamb Springs site. However, no associated artifacts were present within that geologic stratum to suggest that the mammoth remains were the result of human activity (Chenault 1999; Stanford et al. 1981; Zier 1999a). None of these sites present solid evidence for pre-Clovis occupations within the RGFO. Research since the publication of the Colorado prehistory contexts has also provided no tenable evidence for a pre-Clovis occupation within the study area.

Clovis

The Clovis period represents the oldest undisputed human occupation of the RGFO and, at a greater scale, North America. Archaeologists still debate the origin of the Clovis culture. The available evidence shows that Clovis populations quickly spread across North America, but were likely very sparsely distributed across the landscape. Clovis subsistence evidence suggests that these groups preferred large game, although a wide variety of faunal remains, including mammoth, bison, bear, horse, caribou, camel, deer, pronghorn, peccary, sloth, wolf, rodents, rabbits, birds, and fish, have been recovered during investigation of Clovis sites. The cooperation required to take down megafauna such as mammoth suggests a band level of social organization. Archaeologists presume that Clovis groups were highly mobile (Chenault 1999; Zier 1999a).

The Clovis point is the most common marker of the Clovis period. These are large lanceolate points, usually between 8–15 cm (3–6 in.) long, with parallel or slightly convex lateral edges. The proximal end of each side of the point was usually fluted, with one or more flakes removed. Grinding is often present along the bases and proximal edges. The large size of these points is believed to be reflective of their likely use on megafauna. Other artifacts common in Clovis toolkits include large, sometimes triangular retouched flakes, flake blades, hammerstones, worked bone, and bone shafts. Caches of Clovis artifacts, including points, bifaces, and other tools are present on sites across North America, including eastern Colorado (Chenault 1999; Zier 1999a).

Clovis sites are rare in the RGFO study area, and much of the early work suggested that Clovis sites are primarily found in the Plains. Surface sites with Clovis artifacts and isolated Clovis points make up the majority of the Clovis dataset within eastern Colorado. Archaeologists have recovered Clovis points and faunal remains, such as mammoth and horse bone, from localities such as the Dent (5WL269) and Klein (5WL1338) sites, though a direct association between the points and animal remains could not be shown at the Klein site. Of particular note is the Drake Clovis Cache (5LO24), which consists of 13 complete Clovis points, a hammerstone, and ivory fragments found near Greeley, Colorado (Chenault 1999; Zier 1999a).

Clovis: Current Research

Recent research indicates that Clovis sites are a bit more common within the RGFO study area than previously thought and that their distribution is not limited to the plains of eastern Colorado. Clovis points found at high elevations suggest that the earliest occupants of the RGFO area were familiar with the geography and resources of the mountainous areas of the region and utilized them at least intermittently (Brunswig 2004, 2007a), perhaps in the form of short, warm-season logistical forays.

Much of the new data regarding the Clovis occupation of eastern Colorado comes from reexaminations of previously gathered data. For example, a recent reanalysis of the materials from the Dent site confirms that the mammoth bones at the site had been displaced from their original location and that they are the result of hunting activities rather than a natural death of the animals. The mammoth kill probably took place in the fall or early winter, and there is evidence for two or more closely spaced kill events. Examination of cut and processing marks suggests that several episodes of butchering took place after the kill events (Brunswig 2007b; Fisher and Fox 2007; Saunders 2007).

Goshen-Plainview

The Goshen-Plainview complex was first identified at the Hell Gap site in southeastern Wyoming (Kornfeld et al. 2010; Larson et al. 2009). Evidence of the complex is uncommon within the RGFO boundaries, though work outside of the study area depicts Goshen-Plainview as a transitional technological complex with a temporal range that overlaps both the late Clovis and early Folsom periods. Archaeologists currently know little about the lifeways of Goshen-Plainview groups, though it is known that they made unfluted, basally-thinned lanceolate projectile points that bear similarities to both Clovis and Folsom points. Goshen points from the Hell Gap site in Wyoming and in the Mill Iron site in Montana were found to be morphologically similar to Plainview points from the Southern Plains. Current researchers generally group Goshen and Plainview points together into the Goshen-Plainview complex, though there is a degree of temporal and morphological variation between the two point types (Brunswig 2007a; Kornfeld et al. 2010; Larson et al. 2009; Pitblado 2003).

Goshen or Plainview projectile points are associated with only five sites in the RGFO study area. These are all open campsites, none of which have been excavated. Research near the study area, particularly in Middle Park, has identified a small number of other Goshen-Plainview sites, including the Upper Twin Mountain site (5GA1315), a kill site with the remains of several bison and four Goshen-Plainview projectile points. Analysis of the faunal materials indicates it was a late-season or winter kill (Brunswig 2007a; Kornfeld and Frison 2000). This limited evidence suggests that the Goshen-Plainview adaptation within the study area may have included year-round occupations of high elevations within the RGFO.

Folsom

Following the Clovis period, the adaptations of the Folsom period seem to have been a response to the changing environment at the end of the Pleistocene and the beginning of the Holocene. Researchers have a better understanding of the Folsom period than the Clovis period because of the greater quantity and variety of excavated Folsom sites. It is unclear if the increase in known Folsom sites can be attributed to increased population in the area or to better site preservation. The Folsom adaptation is largely a Plains phenomenon, and appears to have derived directly from Clovis culture. Folsom groups were likely organized at the band level and were, like Clovis populations, highly mobile. Some Folsom camps, however, do appear to have been occupied for extended periods. Unlike during the Clovis period, there is little evidence for communal hunting at Folsom sites. Bison were often the targets of Folsom hunting, with small numbers of the animals being taken at a time. Other animals and plants were also a regular part of Folsom subsistence, including horse, camel, elk, pronghorn, deer, rabbit, rodents, turtle, and birds (Chenault 1999; Zier 1999a).

Like Clovis sites, Folsom sites are often identified by their distinctive artifacts. Folsom points are smaller than those associated with Clovis cultures—which is possibly related to a reduction in prey size—and have bifacial fluting that extends nearly the entire length of the tool. Contemporaneous Midland points have similar morphology, but are not fluted. Folsom lithic artifacts often show a bifacial reduction strategy, with flake blades being relatively rare. Points, bifaces, flake tools, side and end scrapers, gravers, and drills are all present in the Folsom toolkit, and are often well-crafted and made of very high-quality, nonlocal lithic raw material. Bone tools, such as awls, needles, fleshers, and discs, are also common. Ground stone is present, but rare at Folsom sites (Chenault 1999; Zier 1999a).

Numerous Folsom sites are present within the RGFO study area, and are most common in northeastern Colorado. Like Clovis, Folsom sites are more common in the Plains, but unlike Clovis, they are also found in the foothills and mountains. Archaeologists have excavated several Folsom sites in the RGFO study area. Excavations at the well-preserved Lindenmeier site (5LR13), an extensive campsite, have provided wide-ranging information regarding Folsom subsistence and lifeways (Wilmsen and Roberts 1978). Other excavated Folsom sites include the Fowler-Parrish bison kill site (4WL100), the Powars site (5WL1369), and the Johnson site. The Powars and Johnson sites were poorly preserved, but yielded Folsom artifacts (Chenault 1999:65-68).

Folsom: Current Research

Recent work indicates that Folsom groups within the RGFO study area made extensive use of both Plains and mountain environments. Some Folsom groups appear to have primarily occupied the Plains, with forays into the mountains during the summer. Other groups likely had lengthier, or even permanent, mountain occupations. Evidence for year-round Folsom occupation of the mountainous regions of Colorado have been found at sites such as Barger Gulch in Middle Park (5GA195 and 5GA3827) and the Mountaineer site near Gunnison (5GN2477). Folsom groups also appear to have occupied South Park during summer months (Kornfeld and Frison 2000; Larmore and Gilmore 2006; Stiger 2001, 2006; Surovell and Waguespack 2007). However, Folsom groups may not have extensively used high-elevation areas in the RGFO because of environmental conditions associated with the Younger Dryas. Work within and adjacent to the study area suggests that there is greater variability in Folsom sites in terms of site types, resources exploited, and length of occupancy than previously thought (Andrews et al. 2008; LaBelle 2005).

Late Paleoindian/Plano

The authors of the Colorado prehistoric contexts refer to the time period following the Folsom period as the Plano period. This designation was based upon an assumption at the time that post-Folsom adaptation in the RGFO study area was associated with the Plano groups who occupied the

Great Plains. The results of recent research indicate that several adaptations existed in the study area after the Folsom period. For continuity, this synthesis uses the term Plano when presenting a summary of the Colorado contexts and the term Late Paleoindian when discussing the recent research in the area.

The Late Paleoindian/Plano period is the best represented of the Paleoindian periods within the RGFO. The increase in sites within the region during this period may be the result of increased populations, longer occupation of the area, or better site preservation. Plant and faunal data from excavated Plano sites indicate that these groups continued the Folsom-period trend of an increased subsistence base. Two somewhat distinct lifeways appear to have developed during the Plano period. Identified Plano sites on the open plains are primarily bison kill and butchering sites, with assemblages that suggest the groups were highly mobile. In contrast, Plano sites in the mountains show evidence for a semi-sedentary adaptation with a broader subsistence base and increased use of local lithic sources (Chenault 1999; Zier 1999a).

Plano lithic technology is distinguished by a series of overlapping projectile point types. The points in these complexes are not fluted, but are usually large lanceolate forms with basal and edge grinding. Plano point types found on sites in the RGFO study area include Agate Basin, Cody, Firstview, Hell Gap, Kersey, and those associated with the Foothill/Mountain adaptation. The Plano toolkit included a wide variety of formal and expedient tools and, like Folsom, were often made of high quality lithic raw material from distant sources. Bone tools, such as awls, atlatl hooks, and engraved bone, were also used by Plano populations. Ground stone is found more frequently on Plano-period sites, suggesting an increased reliance on plant resources (Chenault 1999; Zier 1999a).

Archaeologists had fully excavated relatively few Plano-period sites in eastern Colorado by the time of the publication of the Colorado contexts, despite the fact that they are more numerous than Clovis and Folsom sites. Such sites include evidence of bison kill and butchering activities (Olsen-Chubbuck, Frasca, Jones-Miller and Jurgens). Multicomponent sites with Plano components (Runberg) and less-reliable surface isolated finds are also present in the RGFO. The reader may find details about these, and other Plano sites, in the Colorado prehistory contexts (Chenault 1999; Zier 1999a).

Late Paleoindian: Current Research

Based in part on a growing recognition that the post-Folsom Paleoindian occupation of eastern Colorado includes more sedentary mountain and foothill-based populations, as well as Plains-based groups, the current research generally refers to this time period as the Late Paleoindian. Based upon the frequency of both radiocarbon dates and projectile points diagnostic to the period, the Late Paleoindian is the best represented Paleoindian period within the RGFO study area. Technological complexes included in the Early Phase of the Late Paleoindian include (chronologically): Agate Basin, Cody, Lovell Constricted, James Allen-Frederick, and Angostura. The Late Phase of the Late Paleoindian period includes a continuation of the Lovell Constricted, Jimmy (James) Allen-Frederick, and Angostura complexes, as well as the Pryor Stemmed, and Concave-Based Stemmed complexes.

Evidence for both a "classic" Plano adaptation of mobile Plains-based groups utilizing the mountain regions for brief incursions and Foothill/Mountain groups occupying the mountains year-round have been found during recent work in the study area. The Foothill/Mountain adaptation may have been more similar to that seen in the Archaic, with a broader subsistence base that consisted of semi-sedentary seasonal rounds throughout the foothills and lower mountain slopes of the Rocky Mountains, as well as forays into the mountain interiors and higher elevation areas (Brunswig 2007a, 2013; Kornfeld et al. 2010; Larmore and Gilmore 2006; Pitblado 2003, 2007). Pitblado's (1999, 2003) analysis of projectile points also suggests that Plains and Great Basin groups may have sporadically occupied the lower elevations of the Rocky Mountains.

Much of the recent data for the Late Paleoindian in eastern Colorado has come in the form of the analysis and reanalysis of previously collected projectile points. Pitblado (1999, 2003, 2007) has observed a series of trends during her analysis of Late Paleoindian projectile points recovered from the Rocky Mountains, Great Plains, and Great Basin. Plains points tend to be made of chert, often from distant sources, and exhibit parallel, horizontal pressure flaking more often than is seen in points from mountain contexts. Mountain points are more typically made of quartzite from locally available sources. According to Pitblado (1999, 2003), parallel-oblique pressure flaking is also more commonly seen on mountain points.

Data Gaps and Directions for Future Research

The recent Paleoindian research relevant to the RGFO study area has built upon the data presented in the Colorado prehistory contexts (Chenault 1999; Zier 1999a) and expanded our understanding of the earliest inhabitants of the region. The new evidence shows that groups from all phases of the Paleoindian period were more diverse than previously thought in terms of geographical areas occupied and resources exploited. Ongoing and future projects have the potential to provide additional information that may address data gaps discussed in the prehistory contexts as well as those brought to light by research since their publication. These data gaps include, but are not limited to:

- Can diachronic patterns in lithic raw material choice and lithic reduction strategies be seen across the study area, particularly in the Plains versus mountain areas?

- What is the evidence for Paleoindian bone tool technology within the study area?

- How intense were the Clovis and Folsom occupations of the high-elevation mountain areas?

- Is the relative abundance of Late Paleoindian radiocarbon dates indicative of increased populations within the study area or the result of other factors?

- What is the geographic distribution of the Late Paleoindian technological complexes within the study area?

THE ARCHAIC STAGE

Introduction

This section addresses the Archaic stage within eastern Colorado. Organized largely by research domain, it summarizes what was known as of the publication of the 1999 Colorado prehistoric contexts for the Arkansas River Basin (Tate 1999; Zier 1999b) and the Platte River Basin (Tate 1999; Zier 1999b), as well as subsequent advances in our understanding of the Archaic stage. It does not attempt to synthesize all data known about each Archaic-stage period, nor does it address all research questions and data gaps identified by Tate and Zier; the existing contexts (Tate 1999; Zier 1999b) should therefore continue to serve as a cohesive narrative of lifeways throughout the stage. Many of the research questions articulated by Tate by Zier in 1999 are still relevant. The section closes with a discussion of some of the major research questions that remain unanswered. Details of select recent projects and research that have contributed significantly to our understanding of the Archaic stage are presented in Appendix A.

Chronology

Tate (1999) and Zier (1999) divide the Archaic stage within Eastern Colorado into three consecutive periods: the Early Archaic period (7800–5000 B.P.), the Middle Archaic period (5000–3000 B.P.), and the Late Archaic Period (3000–1850 B.P.). The start of the Early Archaic has generally been recognized by the transition from groups using Paleoindian stage lanceolate points to using side-notched points and, in the Southern Rocky Mountains, to stemmed and corner-notched point forms. As of 1999, Early Archaic points were found with more frequency at sites in the mountains and foothills and were almost absent from sites on the Plains (Tate 1999:102; Zier 1999b:102, 104). Dating this transition has been problematic, as very few Early Archaic chronometric dates within the RGFO study area have been recovered (Tate 1999:102; Zier 1999b:102, 104).

Both prehistoric contexts define the onset of the Middle Archaic period (5000–3000 B.P.) based upon the widespread introduction of the McKean complex into the region around 5000 B.P. While it is common for Middle Archaic sites to contain other types of projectile points, almost all Middle Archaic sites in the RGFO study area contain at least some McKean complex artifacts. The McKean complex includes both lanceolate and indented-base stemmed points, the latter of which are usually classified as Hanna or Duncan variants (Zier 1999b:117). Middle Archaic Mallory points are also found at some McKean sites. These large, side-notched, concave-base points appear to have originated in the Southern Rockies. Middle Archaic sites are also much better represented in the archaeological record across the RGFO study area than are sites dating to the Early Archaic. The greater number of identified Middle Archaic sites may reflect a larger population following the end of the warm and dry period known as the Altithermal, which took place between roughly 7500 and 5000 B.P. (Benedict 1979; Tate 1999:118; Tate and Gilmore 1999:34).

While the onset of the Middle Archaic was defined largely in relation to the appearance of the McKean complex, the transition to the Late Archaic was defined largely by the disappearance of McKean projectile points (Zier 1999b:101). The beginning of the Late Archaic in the Arkansas River Basin was set at "…3000 B.P., a somewhat arbitrary date that marks the approximate disappearance of McKean-style projectile points from the archaeological record" (Zier 1999b:101). The primary characteristics of the Late Archaic in the Platte River Basin context area include the increased presence of rock-filled or slab-lined hearths, the use of a wider variety of lithic and bone tools, and the increased use of ground stone (Tate 1999). The increased presence of these feature and tool types likely suggest an increase in population from the Middle Archaic, increased reliance on and processing of plant resources, and a potential decrease in group mobility. Characteristic point styles of the Late Archaic are corner-notched or stemmed, but a variety of other types, such as Besant, Pelican Lake, and Park Stemmed are also observed (Tate 1999:151; Zier 1999b:130). Note also that while paleoclimatic shifts correlate with the transition from Early to Middle Archaic, the same is not true of the transition between Middle and Late Archaic. The Middle to Late Archaic transition is associated with less fluctuation in paleoclimate and a greater continuity of cultural traits from the previous time period. The disappearance of the McKean complex presently remains an important indicator of the transition between the two periods.

Tate (1999) and Zier (1999) both define the ending date for the Late Archaic as 1850 B.P., although the technological developments marking the termination of the Archaic stage vary between the regions. The end of the Late Archaic in the Arkansas River Basin is defined by the widespread adoption of the bow and arrow (Zier 1999b:101), whereas the transition to the Late Prehistoric period within the Platte River Basin is marked primarily by the introduction of ceramics and secondarily by the adoption of the bow and arrow—two innovations that appeared at approximately the same time (Gilmore 1999). These issues are addressed in the Late Prehistoric chapter that follows.

Chronology: Recent Research

A primary research aim for the Platte and Arkansas river basins is to further refine the Archaic-stage chronology (Tate 1999; Zier 1999b). While the number of dated Archaic-stage components within the RGFO study area has increased, overall, the data collected since 1999 do not suggest any major revisions of the Archaic-stage chronology. The quantity of sites dating specifically to the Early Archaic period has increased since 1999, as have the number of identified Early Archaic points, but none of the data support a redefinition of Early Archaic chronology.

The most significant new insights relevant to the chronology presented in the prehistoric contexts are in terms of how the beginning of the Middle Archaic is defined and, potentially, in our understanding of when the transition to the Late Archaic occurred. Tate (1999:95) and Zier (1999b:117) both emphasize the importance of the McKean complex in identifying the Middle Archaic, with the latter noting that McKean complex points are "…critical to the definition of temporal boundaries for the Middle Archaic period." Thus, at that time, modification of Middle Archaic chronology was largely dependent upon continued refinement of when the McKean complex was adopted across eastern Colorado. Subsequent research has reconsidered the basis of this definition. The primary marker of the Middle Archaic inception is now largely correlated with a paleoclimatic shift following the end of the Altithermal that allowed large-scale occupation of the Plains. Advances in our understanding of this climatic shift are discussed later in this section. Thus, while the adoption of McKean complex points is still a factor in identifying the period, the emphasis has shifted to the aforementioned climatic changes that allowed the spread of the McKean complex.

Recent examinations of McKean points from dated contexts include those of Larmore (2002) and Gilmore (2012). Larmore's work (2002:17) suggests a persistence of the McKean complex along the Colorado foothills between 4500 and 3000 B.P. In contrast, Gilmore (2012:58) suggests that the McKean complex persisted for much longer, between 6800 and 2800 cal B.P. and that the Middle Archaic period lasted from 5800–3800 cal B.P. The majority of Gilmore's McKean samples date between 5300 and 3500 cal B.P. These examinations, and other post-1999 research suggesting that the florescence of the Middle Archaic and McKean complex do not perfectly align, do not necessarily indicate that the date of transition between the Early and Middle Archaic should be revised. Instead, they highlight an avenue of future study and possible revision.

Although they do not agree on a beginning date for the McKean complex, Gilmore (2012) and Larmore (2002) do agree that the transition away from the McKean occurred at roughly the same time; around either 3000 cal B.P. or 3000 (uncal) B.P., respectively. Gilmore (2012:63) notes that by 3000 cal B.P., very few people in Colorado were using McKean complex points. Larmore's transition date supports the established 3000 B.P. (uncal) beginning date of the Late Archaic period. Overall, a large-scale transition away from McKean complex points occurring close to Gilmore's (2012:58) Middle Archaic end date of 3800 cal B.P. seems convincing.

The end of the Late Archaic is still generally recognized as the point when the technologies and lifeways characteristic of the Late Prehistoric period are adopted. These innovations include the bow and arrow, maize horticulture, and the presence of pottery and substantial domestic architecture. Within the Arkansas River Basin, the transition was defined as occurring around A.D. 100 (1850 B.P.), whereas the transition was dated to around A.D. 150 (1800 B.P.) within the Platte River Basin (Gilmore 1999; Kalasz et al. 1999). This transition is discussed in greater detail in the Late Prehistoric section of this synthesis.

Radiocarbon Chronology

One way to increase our understanding of the Early Archaic is to increase our knowledge of the dynamics of the Early Archaic population and intensity of use of the RGFO study area. Archaeologists have wondered whether the relative paucity of cultural materials and dates for the Early Archaic noted in the 1999 contexts reflects an abandonment of the Plains as suggested by the mountain refugium model (Benedict 1979; Benedict and Olson 1978), a low-density population, or whether this paucity could be explained through various site preservation processes. Radiocarbon data from the RGFO study area compiled by the Colorado Radiocarbon Database Project (RCGraph) provide an insight into the frequency of dated Archaic stage contexts (RCGraph 2015) (Figure 5). Within the dataset there are 80 radiocarbon dates whose two-sigma calibrated median probability date (calibrated with Calib 7.0.2) is within the Early Archaic period. The dataset also includes 178 Middle Archaic period dates and 188 Late Archaic dates (RCGraph 2015). Of the Archaic radiocarbon dates within the RCGraph dataset, only three Late Archaic dates come from BLM-managed lands. The number of dated Early Archaic sites within the broader RGFO study area is increasing, however, and includes three Early Archaic dates (including one from an architectural feature) recovered from the Raton Expansion project (Anderson et al. 2013).

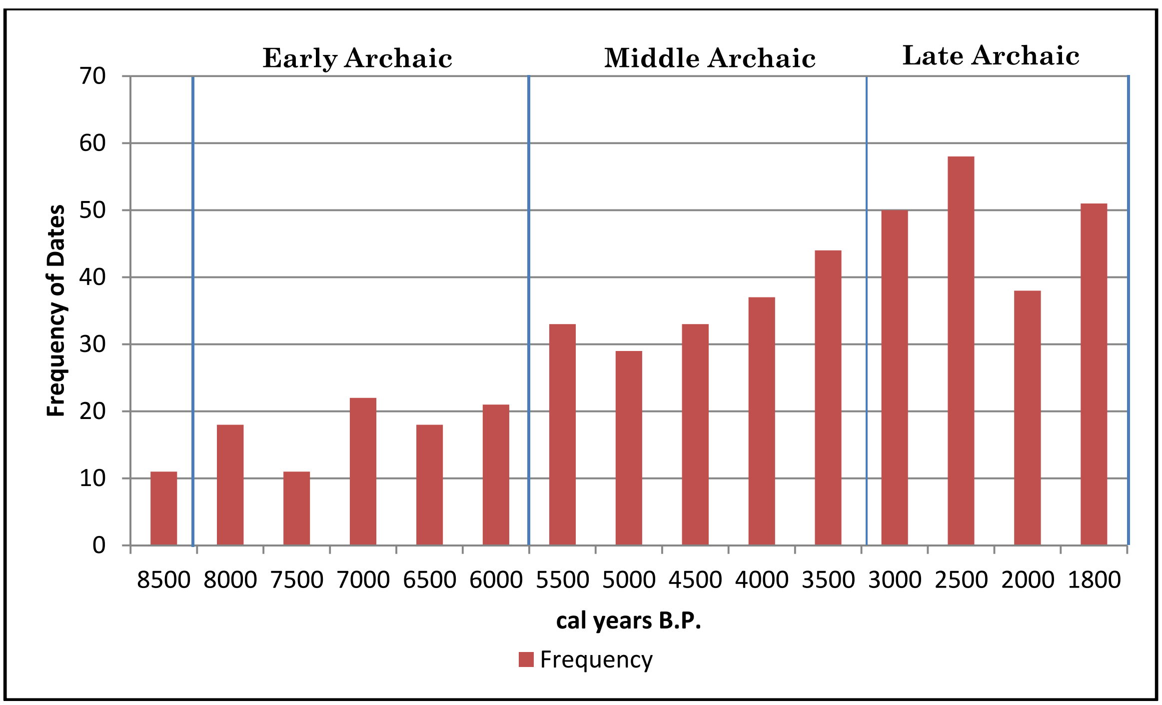

Figure 5. Frequency of Archaic-period radiocarbon dates available in RCGraph.

Radiocarbon Calibration

One issue that has substantially increased in importance since 1999 is the manner in which dates are reported. Calibrated date ranges are becoming increasingly prevalent in archaeological literature, but the lack of a calibrated chronology results in an admixture of calibrated and uncalibrated ranges. No comprehensive conversion of the Archaic-stage periods from uncalibrated to calibrated ranges appears to have been undertaken to date for eastern Colorado.

Millward et al. (2015:14–15) utilized the calibrated dates that Kornfeld et al. (2010:36, Table 1.2) used to develop their Northern Plains chronology to calibrate the ranges of Archaic periods, also calibrating data in Calib Rev 6.1.1, as necessary. The Northern Plains demonstrates a large degree of cultural overlap with the Colorado Plains Archaic, and thus may serve as a valid starting point towards a calibrated RGFO study area cultural chronology. Similarly, Omvig's (2014) calibration of the Wyoming Basin cultural phases proposed by Thompson and Pastor (1995) may also be useful in refining a calibrated RGFO chronology. Kornfeld et al.'s range for the Early Archaic spans 7500–5000 B.P. (8300–5770 cal B.P.), and is similar to, but slightly shorter than the 7800–5000 B.P. range for the Archaic in eastern Colorado (Tate 1999; Zier 1999b). The Northern Plains Middle Archaic spans from 5000–3000 B.P. (5770–3200 cal B.P.) (2010; Millward et al. 2015), which represents an identical uncalibrated range as the Colorado Plains Archaic. Finally, Kornfeld et al. date the Late Archaic between 3000–1800 B.P., almost identical to the 3000–1850 B.P. range within Colorado. The calibrated range for the Late Archaic in the Northern Plains spans 3200–1730 cal B.P. (Millward et al. 2015). Given the relative similarity between the two regions, and the near-identical uncalibrated Archaic age spans, Millward et al.'s (2015) calibrated ranges of Kornfeld et al.'s data (2010) may well serve as a starting point to convert existing Archaic stage chronologies in Colorado into calibrated radiocarbon years (Figure 6).

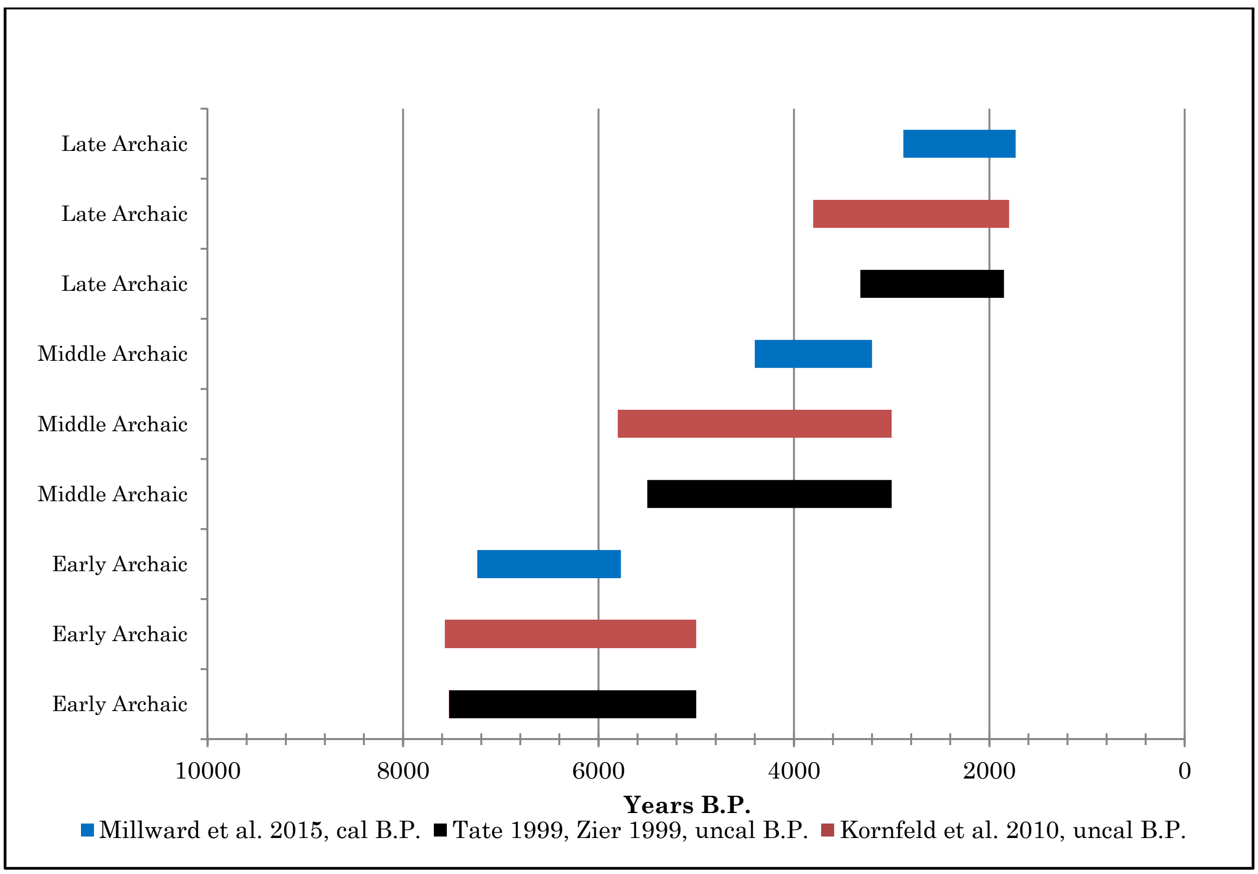

Figure 6. Comparison of Archaic period ranges between the Northern Plains and Eastern Colorado.

Technology

The paucity of definitively-dated Early Archaic sites within the RGFO study area has led to difficulties in identifying trends in the associated lithic industries and subsistence strategies. Ground stone is present at Early Archaic sites, but is generally informal, consisting of stream-cobble manos and tabular sandstone metates with little evidence of intentional shaping (Zier 1999b:106). Likewise, few bone artifacts or perishable materials had been recovered from Early Archaic contexts, as of 1999. Thus, artifactual identification of Early Archaic sites has often relied upon those point complexes defined as diagnostic of the stage.

The Middle Archaic lithic industry includes the almost exclusive use of local raw materials—as opposed to exotic and nonlocal materials—and core reduction practices that ranged from intensive reduction that completely exhausted the cores to unintensive core reduction that resulted in the removal of needed flakes followed by discard of the core. Unintensive core reduction was likely made possible by the abundance of locally available lithic material. Bifaces are the dominant formal tool observed at Middle Archaic sites, although expedient tools were much more frequent (Zier 1999b:117–118). Ground stone artifacts are more common at Middle Archaic sites and include manos, metates, shaft abraders, hafted mauls, and pallets. Bone and shell artifacts are occasionally encountered at Middle Archaic sites (Zier 1999b:118–119).

Tate (1999) and Zier (1999) define the beginning of the Late Archaic as the point when McKean-style projectile points disappear, rock-filled or slab-lined hearths become more prevalent, a wider variety of lithic and bone tools come into use, and the use of ground stone increases (1999; Zier 1999b:101). The lithic industry, in general, matches that of the Middle Archaic, including variation in the intensity of core reduction, variability in bifaces, tool kits dominated by expedient flaked stone tools, and a focus on locally available raw materials (Zier 1999b:131).

Projectile Points

Early Archaic

The identification of the Early Archaic stage has often relied upon relative dating methods such as lithic cross-dating using projectile points. Some Early Archaic tool types appear to have been used by Middle and Late Archaic populations, with some corner-notched complexes even bearing similarities to Late Archaic points. Ultimately, Early Archaic points were described in the contexts as having few attributes that could be consistently and exclusively tied to the phase (e.g., Zier 1999b:105–106). Table 4 lists the primary Archaic-stage point types identified in the contexts, including those that have been identified as diagnostic of the Early Archaic. A large number of point complexes were defined, several of which have overlapping characteristics. Thus, while the shift from Paleoindian points is evident, identification of point styles characteristic of only the Early Archaic was—and continues to be—problematic.

Middle Archaic

McKean complex points are the hallmark of the Middle Archaic and include both lanceolate and indented-base stemmed forms, the latter which are usually classified as Hanna or Duncan or variants of those types (Zier 1999b:117). Middle Archaic Mallory points have been found at some McKean sites, but appear to have developed initially within the Southern Rockies. However, the presence of terminal Early Archaic Mallory-like points at the Albion Boardinghouse site (5BL73) also potentially indicates a regional development of the complex (Tate 1999:153; Zier 1999b:117).

Late Archaic

The beginning of the Late Archaic is defined in the Arkansas River Basin as the time at which McKean-style projectile points disappear from the archaeological record (Zier 1999b:101) and the disappearance of McKean is one of several markers of the Late Archaic within the Platte River

Basin. Characteristic Late Archaic point styles are corner-notched or stemmed, but include a variety of other complexes, such as Besant, Pelican Lake, and Park Stemmed.

Table 4. Diagnostic Archaic Stage Point Types Identified in the 1999 Colorado Prehistoric Contexts.

Point Type	Diagnostic Interpretation	General Region	Context
Corner-notched	Archaic	All	Both
Elko	Archaic	All	Platte
Hawken-like	Archaic	All	Both
Magic Mountain complex	Archaic	Plains and foothills	Platte
Mount Albion corner- and side-notched	Archaic	Mountains	Platte
Mountain Complex side- and corner-notched	Archaic	Mountains	Platte
Serrated points	Archaic	Mountains	Arkansas
Side-notched	Archaic	All	Both
Stemmed	Archaic	All	Arkansas
Albion Boardinghouse side-notched	Early Archaic	Indian Peaks area, Plains	Arkansas
Altithermal side-notched	Archaic	All	Platte
Bitterroot	Early Archaic	All	Platte
Duncan-like	Early Archaic	Plains and foothills	Platte
Fourth of July lanceolate and stemmed	Early Archaic	Indian Peaks area	Arkansas
Hawken Side-Notched	Early Archaic	Northwest Plains	Arkansas
LoDaisKa complex D	Early Archaic	Plains and foothills	Platte
Mallory-like	Early Archaic	Plains and foothills	Platte
Mount Albion	Early Archaic	Southern Rockies	Arkansas
Pahaska	Early Archaic	All	Platte
Pinto-like	Early Archaic	Plains and foothills	Platte
Simonsen	Early Archaic	All	Platte
Hawken	Early and Middle Archaic	All	Platte
Tear-drop shaped points/Magic Mountain complex teardrop-shaped	Early and Middle Archaic	Foothills and Plains	Arkansas
Duncan	Middle Archaic	All	Both
Hanna	Middle Archaic	All	Both
Mallory	Middle Archaic	All	Both
McKean lanceolate	Middle Archaic	All	Both
Yonkee	Middle Archaic	All	Platte
Magic Mountain Apex complex	Middle to Late Archaic	All	Platte
Park stemmed	Middle to Late Archaic	All	Platte
Besant	Late Archaic	All	Platte
Coney Lake corner-notched	Late Archaic	Coney Lake site	Platte
Pelican Lake	Late Archaic	All	Platte

Technology: Recent Research

Research subsequent to the publication of the 1999 Colorado prehistoric contexts has not significantly altered the projectile point chronology of the Early or Late Archaic periods. Most available recent projectile point research has focused on the Middle Archaic and specifically on the McKean complex. In a study of unprovenienced points from private collections, presumably from the Palmer Divide area, Hays (2008) found that a third of them were Early Archaic. This observation runs counter to expectations, as both Tate (1999) and Zier (1999) postulated very low regional populations during the Early Archaic period.

Origin of the McKean Complex

Following the publication of the 1999 Colorado prehistoric contexts, archaeologists continued to debate the origin of the McKean complex. Subsequent researchers have variously posited Northern Plains, Colorado, and Great Basin origins. Larmore (2002:169, 206), in the vein of earlier research (Syms 1969; Tratebas 1998), has argued that the spatiotemporal distribution of McKean complex points indicates an origination in the Northwestern Plains in the early part of the Middle Archaic, with subsequent diffusion into Colorado later in the Middle Archaic period. Others that favor a Northwestern Plains genesis have suggested that the McKean complex originated in the Bighorn Mountains in Wyoming and the Yellowstone River headwater region in Wyoming and Montana.

Benedict (1990) and Benedict and Olson (1973) argue that slightly older transitional points found in the Colorado mountains, which resemble McKean points, may indicate a Colorado Mountain origin of the McKean complex, that subsequently expanded to the north. Recently, Gilmore (2012:58–59) also suggested that the point complex originated in the Colorado mountains, arguing that the complex spread north from Colorado into the Bighorn Mountains and Yellowstone River headwaters, later expanding into the northern foothills and Plains of Colorado.

Kalasz et al. (2003c: 136) argue that the Colorado Rocky Mountain origin proposed by Benedict and Olson (Benedict 1990; Benedict and Olson 1973) fails to account for the "…widespread and earlier occurrences of stemmed indented-base points west of the Rocky Mountains." They suggest, as did Tratebas (1998), that the timing and distribution of the point type within Colorado is indicative of a slow but progressive expansion of stylistic forms that originated within the Great Basin. Several researchers have previously noted the stylistic similarities and overlap between McKean complex points and Great Basin forms, such as Pinto and Little Lake-series points (Kalasz et al. 2003c:135–137; Larmore 2002; Syms 1969). Kalasz et al. argue that indented-base points reached the Continental Divide by as early as 6000 B.P., expanding into the Colorado Plains during the Early-to-Middle Archaic-period transition. Thus, for the East Plum Creek site, and for other mountain sites, they argue that the appearance of McKean-style points likely represents adoption of the expanding Great Basin points by stable, indigenous Mountain-tradition populations, rather than an influx of McKean complex populations from the north or the development of a new culture group during the Middle Archaic (2003c:135–137).

Mallory Points

The 1999 Colorado prehistoric contexts sought also to explore the relationship between McKean and Mallory points, hoping to assess whether Mallory points display a unique geographical or temporal distribution or origin, as compared with McKean points. Recent research seems to largely suggest that Mallory points should be considered part of the McKean complex (Frison 1978; Larmore 2002). Kornfeld and Frison (2010:122) note that the Mallory point is likely a chronologically later development than the other McKean complex points, with McKean Lanceolate representing the oldest point style within the complex and Mallory the youngest. Mallory points are also identical to San Rafael Side-notched points that occur west of the Rocky Mountains, which may provide further evidence of a westward expansion of Great Basin point styles into the Rocky Mountains and eastern Colorado Plains.

Settlement and Transhumance Patterns

Tate and Zier viewed the paucity of identified Early Archaic sites on the Plains as stemming from adaptations following the Altithermal, as the warm and dry period made the higher elevations more attractive to occupation (Zier 1999:104). This abandonment of the Plains had been formalized years earlier by Benedict and Olson's (1979; Benedict and Olson 1978) mountain refugium model. Benedict hypothesized that this abandonment resulted in a cultural hiatus on the Plains, perhaps interrupted by a brief break in the Altithermal drought between 6500 and 6000 B.P. Benedict's model is one potential explanation for the distribution of Early Archaic sites in the Platte River Basin (Tate 1999:92). Zier (1999b:104), conversely, argues against wholescale abandonment of the Plains in the Arkansas River Basin; while occupation was thought to be limited and low density, the potential for Early Archaic sites to be obscured and thus excluded from the archaeological record (through being deeply buried, poorly preserved, or misclassified) raised doubt about region-wide abandonment (Zier 1999b:104). Thus, while the extent of abandonment was interpreted differently between the Arkansas and Platte river basins, it is clear that Early Archaic occupation was focused on the foothills and mountains. Conversely, Middle and Late Archaic occupations appear to have been much more consistent and present throughout the full extent of eastern Colorado, with few large gaps in the radiocarbon record that could be taken as indicative of any sort of cultural hiatus (Zier 1999b:101).

The Mountain Tradition describes a possible mountain-based lifeway present by the Early Archaic in the foothills and mountains of Colorado, potentially representing a separate phenomenon from the general Early Archaic settlement system described above. Black (1991:20) and Zier (1999b:131) argue that the Mountain Tradition was in place by the beginning of Altithermal (ca. 7500–8000 B.P.) and persisted to around 5000–4500 B.P. in much of the project area, and as long as 1000–700 B.P. in the southern Rockies and uplands of the Platte River Basin. The Mountain Tradition is thought to have given way to the McKean culture. Prehistoric groups within the Mountain Tradition are recognized by a separate suite of traits from those groups that utilized both the mountains and the foothills and Plains, as described by the grand circuit model or the up-down model of transhumance (Tate 1999:93). The Mountain Tradition is defined by year-round occupation of the mountains, including the use of both short-term and over-wintering habitation structures. The lithic industry was characterized by split-cobble core reduction and tools, along with microtools. The diverse suite of projectile point styles exhibits similarities to Great Basin complexes. Distinctive rock art, with similarities to Great Basin types, is also occasionally found at Mountain-tradition sites (Black 1991; Tate 1999:93). Tate (1999:95) and Zier (1999:131) both note an observed increased in the frequency of serrated projectile points within mountain sites throughout the RGFO study area, as compared to similarly aged Archaic sites within the foothills and Plains. Neither postulate as to why serrated points are more common in the mountains, so the pattern can be considered as a worthwhile topic for future research. Tate and Zier list the evaluation of the validity of the Mountain Tradition as a direction for future research.

Settlement and Transhumance: Recent Research

In 1999, most research tended to suggest that the region contained both groups whose lifeways were centered in the mountains (e.g., the Mountain Tradition) and Plains-based seasonal users of the mountains. Tate (1999) and Zier (1999) suggest that the latter group likely exploited the mountains utilizing either an up-down or a grand circuit model of transhumance, as developed by Benedict and Olson (1978). In their examination of the Olson game drive site (5BL147), LaBelle and Pelton (2013) provide a useful evaluation of models of transhumance as they may have influenced use of the site and of the mountains in general.

A variety of factors influence settlement and transhumance patterns. The grand circuit and up-down models are based largely on assumptions of seasonally predictable resources. As pointed out by LaBelle and Pelton (2013:60), however, climatic fluctuations may have negatively impacted both the use of the Plains and the mountains. As there is a large degree of heterogeneity in landscapes and available resources in different mountain ranges within Colorado, groups occupying different areas of the state would have had access to a different suite of resources, and thus are expected to have made cultural adaptations specific to a region. Additionally, while seasonal aggregation of populations appears to have been fairly widespread, especially in the fall, individual bands of prehistoric people would have had to occupy individual niches and territories to reduce conflict for finite resources. Benedict and Olson (1978) describe a grand-circuit model in which groups moved in a counter-clockwise circuit north along the Front Range, into the Laramie Basin, and then south/southwest into North Park and Middle Park, finally moving east toward the continental divide to communally hunt large game, prior to returning to the Plains to overwinter. While this grand circuit may describe the movement of some of the prehistoric occupants of eastern Colorado (and southern Wyoming), it is likely that other groups practiced up-down or other circuit models based on their group territory, local landscape, and seasonally available resources. For example, Kalasz et al. (2003c:138) argue that occupants of the Ridgegate and East Plum Creek sites, and likely occupants of the Rock Creek, Cass, and Box Elder-Tate Hamlet sites, utilized the Colorado Piedmont and high-elevation areas, and probably undertook a large degree of lateral movement along the Rockies as well. Kalasz et al.'s (2005) later work at the Monument Creek site (5EP211) argues that this settlement pattern was practiced through the Late Archaic and into the Late Prehistoric Period. Larmore and Gilmore (2006:19–20) argue a relatively simple up-down model of use for South Park and the foothills and Plains to the east, via a travel corridor along the North Fork of the South Platte River. They base their model upon an examination of raw-material distributions from data recovery collections from the Columbine Ranch sites.

Models regarding annual rounds can be evaluated in a variety of ways, including through the examination of raw-material distribution, assessing seasonality (when possible), and calculating the costs associated with a group's annual rounds. An understanding of how the costs and expectations of these models fit the archaeological landscape can help archaeologists evaluate settlement patterns more fully. Zeanah (2000:8) calculates the variation in costs of walking and transporting goods over a variety of grades, demonstrating that the caloric costs of transporting a burden exponentially increase when transporting materials uphill. The use of mountainous terrain is clearly economically viable, in part demonstrated by the length of occupation and number of game drive sites in Colorado, but also as demonstrated through a cost-benefit model examining mountain sheep hunting in Utah's Pahvant Range (Morgan et al. 2012:36–39). Unnecessary traversal across mountain landscapes, especially when transporting a large amount of materials, was likely avoided as much as possible. LaBelle and Pelton argue that, for the Olson site, use of the site was likely influenced by relative depletion of resources at lower elevations, which would have made upland use more attractive (2013:60). Reed (2009) also developed an annual round model for northwestern Colorado, and many assumptions of his model are expected to be applicable to the Front Range and adjoining mountain ranges. Primary assumptions developed by Reed (2009) and applicable to the RGFO study area include the following: first, aspects of optimal foraging theory (e.g., Smith 1983) are applicable to evaluating group settlement and seasonal rounds; second, that most areas within Colorado would not have had resources available in sufficient quantity to allow prehistoric sedentism; and third, that residential bases were likely situated in centralized areas from which logistical forays into higher or lower elevation bands could transport materials back to the residential base in a fairly efficient manner. Metcalf and Black (1991) suggests that residential centers within the mountains were most likely in mid-elevation pinyon-juniper zones. Groups in eastern Colorado would also have been able to retreat to the foothills and Plains.

Recent Research on Mountain Occupations

Evaluating the Mountain Tradition

As noted above, assessment of the validity of the Mountain Tradition construct is considered an important research question. LaBelle and Pelton (2013) argue a middle ground between researchers who maintain that groups occupied the mountains year round (e.g., the Mountain Tradition) (Black 1991; Metcalf and Black 1991) and those who hold that the mountains were marginal settings only used during periods of resource stress (e.g., Aldenderfer 2006). LaBelle and Pelton argue that the idea of an Early Archaic mountain refugium oversimplifies resource availability. While drought during the Altithermal is thought to have reduced resource availability and prompted reduced population within the Plains during the Early Archaic, there would also have been many years, especially following consecutive harsh winters, where resources in the mountains would also have been severely diminished or inaccessible. Thus, there would have been periods where the lowlands, such as the foothills and Plains, would likely have had more abundant and accessible resources, even during the Altithermal. LaBelle and Pelton (2013:60) contend that such seasonal and spatial variability in resource distributions likely drove settlement systems to include the use of both low- and high-elevation resources, rather than focusing on only those available in the mountains and high parks.

Several Colorado mountain sites have been the focus of additional research since 1999. LaBelle and Pelton (2013:45) provide a thorough examination of high-elevation communal hunting within Colorado, focused on the Olson Game Drive site (5BL147), which is within the Rollins Pass game-drive complex. They provide a review of available evidence, suggesting that the site, which demonstrates periodic occupation from the Early Archaic to the Late Prehistoric/Protohistoric, clearly represents the seasonal communal hunting of large game. The repeated occupation of the Olson site across prehistory, and the similar use of other mountain sites within Colorado, continues to support the idea that the mountain-based Archaic lifeway represented a fairly stable and consistent adaptation that made use of reliable, seasonally available fauna and flora. The size and complexity of game-drive systems at large sites, such as the Olson site, suggest the aggregation of multiple prehistoric hunter-gatherer bands for hunting. Although the surplus yield would have been sufficient to share and make the communal hunt profitable for the individual bands, LaBelle and Pelton (2013: 45–46, 57, 61) think that the aggregation also served important social purposes. Larmore (2002) and Gilmore (2008) also suggest that prehistoric groups within the region had a shared sense of identity and community.

In another recent study, Larmore and Gilmore (2006:9) examined OAHP site data that was made available in 2000 to consider how mountain regions were used throughout the Archaic. They used these data to compare the prehistoric occupational intensity of Park County and Platte River Basin and found that the Early Archaic occupation of Park County was similar to that of the Platte River Basin as a whole, a finding at odds with the idea of a mountain refugium during the Altithermal. The Middle Archaic occupational intensity of the Platte River Basin was higher than that within Park County, while Park County appears to have been more heavily utilized during the Late Archaic, possibly relating to increased aridity and eolian activity on the Plains between roughly 3400 and 2000 B.P. (Larmore and Gilmore 2006:9). Their research largely suggests a continued use of settlement rounds that brought people and materials between the uplands in Park County and the foothills and Plains.

Evaluating the Relationship between the Mountain Tradition and the Mount Albion Complex

Another research goal suggested by the 1999 Colorado prehistoric contexts is to seek to further understand the relationship between the Mountain Tradition and the Mount Albion Complex. The distinction between the Mountain Tradition and the Mount Albion Complex is, in part, based on differences in material culture. As mentioned above, the Mountain Tradition was defined by groups utilizing split-cobble core and tool production, microtools, and points that, while similar to Great Basin types, are more likely to be serrated than similar points found in the foothills and Plains (Tate 1999:95; Zier 1999b:105–106). Conversely, the Mount Albion Complex was largely defined through the presence of corner-notched Mount Albion points, which almost always display grinding of the bases and notches (Benedict 2012:81).

Benedict (2012:82–83) suggests that the people of the Mount Albion Complex occupied a niche extending from the eastern flank of the Continental Divide to the lower extent of the spruce and fir forests on the western flank of the Divide. Benedict also suggests that the complex had smaller seasonal migrations than other regional groups, which he argues could indicate recent arrival into the region (and thus a lack of familiarity with farther-out resource patches), competitive exclusion from adjoining regions, or Middle Holocene paleoclimatic conditions that precluded use of other areas (Benedict 2012:82–83). Overall, Benedict's data (2012:84–85) on the Mount Albion Complex, stemming largely from four high-altitude sites east of the Continental Divide, suggest that the Mount Albion Complex persisted for only several hundred years during a period of increased aridity in the Front Range, roughly between 5800 and 5300 cal B.P. The consistency in the point styles, site types, and greater than expected use of quartz and argillite for tool production suggest that the group was fairly insular (Benedict 2012:85).

Relatively few sites associated with mountain-based groups have been examined since 1999; no evidence has surfaced to support a fusion between the Mount Albion Complex and the Mountain Tradition. Data suggest that use of the mountains was not limited to the potential Mountain-based peoples, with groups centered in the Plains and foothills utilizing transhumance patterns that took advantage of both high- and low-altitude elevation bands. Thus, at present, it seems that the Mount Albion Complex remains unique from both the Archaic-period hunter-gatherers who made seasonal use of the Colorado Rockies and the Front Range and from the Mountain Tradition. Benedict's later work (2012) does seem to lean away from the Mount Albion Complex as representing a culture indigenous to the region, although no research was encountered during this study that strongly suggests where the complex originated or what caused its decline.

Subsistence

Archaic-stage groups utilized a fairly large subsistence base that expanded over the course of the Archaic stage (Tate 1999; Zier 1999b). Ground stone is found at Early Archaic sites, although the tools are often relatively informal with little evidence of shaping (Zier 1999b:106). Utilization of faunal resources in the Early and Middle Archaic seems to have focused on medium artiodactyl (such as deer or pronghorn), lagomorphs (such as hares and rabbits), and small rodents, as bison became rare during the Altithermal. Small-band level of social organization present during the Paleoindian stage appears to have continued into the Early Archaic, although evidence of multi-band communal hunting is not as frequently observed (Zier 1999b:108). Tate and Zier both argue that groups within the Middle Archaic increasingly utilized plant resources (Tate 1999:134; Zier 1999b:122), although Zier (1999b:121) cautions that the apparent increase in subsistence diversity could be unduly influenced by the little that was known about the subject. Overall, little change in group organization seems to have occurred between the Early and Middle Archaic.

The hunting and gathering-focused subsistence strategy of the Middle Archaic also continued through the Late Archaic, with an increase in the geographical distribution of Late Archaic sites. While subsistence patterns continued to be focused on medium artiodactyl, lagomorphs, and small rodents, increased evidence of bison hunting is seen in comparison to the previous periods (Tate 1999:151; Zier 1999b:133). The overall breadth of resources utilized expanded from the Middle Archaic, as did the degree to which resources were processed: rock-filled and slab-lined hearths are increasingly observed, along with increased variety in bone and lithic tools. The greater number of Late Archaic sites in the region is taken as indicative of continued population growth following the Middle Archaic period (Zier 1999b:130, 132).

Subsistence: Recent Research

Research subsequent to the publication of the 1999 Colorado prehistoric contexts does not suggest significant changes in our understanding of Archaic period subsistence. Notable projects that yielded evidence of Archaic-period subsistence include the Late Archaic bison kill at the Kaplan-Hoover bone bed (Todd et al. 2001), excavations at the East Plum Creek site (Kalasz et al. 2003c:139), and excavations at the Hess and Oeškeso sites (Gantt 2007). Archaeologists are increasingly using analysis methods at excavated sites that can refine our understanding of prehistoric subsistence. While these do not always alter our perceptions of the identified regional subsistence patterns, they do allow for valuable site-specific analyses. Such methods include macrobotanical, pollen, starch, phytolith, and protein analysis.

Excavations at the Late Archaic Kaplan-Hoover Bison Bonebed site (5LR3953) recovered an assemblage of over 4,000 bison bones, representing a minimum number of individuals of 44, but with an estimated 200-plus bison present in the assemblage (Todd et al. 2001:135). Antelope, deer, elk, and bison-sized remains, along with a ground stone assemblage that indicated a heavy reliance on floral resources, were recovered from the Middle Archaic component at the East Plum Creek site (Kalasz et al. 2003c:139). A mano recovered at the Oeškeso site suggests at least some degree of Early Archaic plant processing (Gantt 2007:807–808). The Middle Archaic components at the Hess and Oeškeso sites indicated that site occupants consumed lagomorphs, medium artiodactyls, bison, charred cactus, and Cheno-Am, with a lesser reliance on floral species, including cactus, goosefoot, grass seeds, purslane, pigweed, and sunflower (Gantt 2007:805–807).

Seasonality

Determining the seasons site occupations and kill events can be key in evaluating data regarding settlement strategies and transhumance patterns, and has been long identified as a key focus of research for Eastern Colorado (Eighmy 1984; Tate 1999:172). Within the region, the degree to which seasonality indicators are being examined has increased since 1999, through increased application of macro- and microbotanical studies and detailed faunal analysis. Evaluating seasonality often remains limited to sites that have undergone data recovery, however, and can be hampered by factors such as poor preservation, prehistoric storage practices, and background pollen contamination.

Two studies of note have gained insight into the seasonality of kill sites and butchering locales. Excavations at the Late Archaic Kaplan-Hoover Bison Bonebed site (5LR3953), mentioned above, recovered a very large assemblage of bison bones, including bones from several juveniles. Based upon the eruption and wear patterns of calves and juvenile specimens, Todd et al. estimate that the site represented a single kill event that occurred in September or October (2001:134, 137). The recovery of a neonatal bison humerus at the Hess site (5DA1951) suggests a possible spring/early summer occupation during at least one of the Middle Archaic occupations, although the interpretation is tenuous, given that the humerus was the only recovered indicator of seasonality for the component (Gantt 2007:401, 805). Kill sites generally align more with expectations regarding seasonal use of the landscape and periods of intensive hunting and communal hunting in the fall. At least some reliance on stored goods would have been necessary in Colorado, so groups would have had good reason to focus on hunting large numbers of animals in the fall, a time that also corresponded with the time during which animals put on fat stores for the winter (Binford 1990; Reed 2009). Kill sites corresponding to other periods of the year are not uncommon, as game was likely hunted (at least on an encounter basis) year round.

Rock Art

Two recent studies have advanced our understanding of Archaic-period rock art. A study of rock art in the PCMS documented that use of rock art motifs first observed in Middle Archaic contexts continued into the Middle Ceramic Period (Wintcher 2005:166). Some Late Archaic rectilinear motifs saw continued use into the Middle Ceramic period. The persistence of motifs from the Middle Archaic, through the Late Archaic, and into the Late Prehistoric period suggests some degree of cultural continuity throughout the periods. The 1999 Colorado prehistoric contexts argue for cultural continuity throughout these periods based on similarities in settlement patterns, material culture, and economic practices. Wintcher's work on rock art motifs (2005) provides additional support of this continuity.

A recent book by Lawrence Loendorf (2008) includes descriptions and synthetic discussions of rock art in southeastern Colorado for all time periods, including the Archaic. Loendorf examines Archaic rock-art styles defined for the central and southern High Plains and discusses their chronology as it is currently understood. Archaic rock art of all periods is characterized by abstract forms, with quadrupeds appearing in substantial numbers only toward the end of the Archaic. Anthropomorphic figures are lacking, except for possible highly stylized examples late in the Archaic stage. Loendorf employs a simple typology borrowed from Sally Cole's (1987) work in western Colorado, which classifies abstract elements and motifs into three basic types: discrete and tightly composed (e.g., spirals, concentric circles, starbursts, etc.), indefinite loosely composed linear, and extended tightly composed linear connected to discrete motifs. During the Early Archaic period, discrete and tightly composed motifs dominated. Such rock art is typically found at elevations of 8,000 ft. or higher, or at permanent water sources such as springs. Loendorf (2008:64-67) suggests that these distributions are related to climatic conditions during the Altithermal, when higher elevations were more favorable for occupation, but reliable water sources were critical for those groups who occupied lower elevations.

During the Middle Archaic, extended tightly composed linear elements connected to discrete motifs comprised the dominant type of rock art. Some of the discrete motifs employed during the Early Archaic disappeared and some new ones appeared, but most persisted. Like Early Archaic petroglyphs, Middle Archaic rock art is often found near water sources, but compared with rock art of the earlier time period, it is more frequently found at lower elevations. Late Archaic rock art retained many of the abstract features of Middle Archaic petroglyphs. It is often difficult to distinguish the rock art of these periods, especially if they overlap or form palimpsests on rock surfaces. However, a shift from curvilinear to rectilinear elements and motifs took place during the Late Archaic period. Even more significantly, simple quadrupeds—often connected to abstract elements—became common for the first time in the region (Loendorf 2008:70). The final chapter of Loendorf's book presents a brief summary of the more important archaeological implications of his rock art chronologies, some of which are quite relevant to BLM lands in the RGFO study area and might be formulated as hypotheses to be subjected to testing as more data are obtained. For example, the idea that Early Archaic abstract rock art is primarily present at higher elevations or near reliable water sources has implications that go well beyond traditional rock-art studies and could potentially be investigated using data present on BLM lands in the RGFO study area.

Architecture

Basin Houses

Basin houses are rarely identified on the eastern slope of Colorado. In 1999, no Archaic-stage basin houses were known within Platte River Basin (Tate 1999:100, 155), and they were very sparse within the Arkansas River Basin. Those identified in the Arkansas River Basin include the Late Archaic structure found at the McEndree Ranch site (Shields 1980) and the Middle Archaic structure excavated at site 5LA2190 (Rood 1990). No Early Archaic structures were known within the Arkansas River Basin, although Zier (1999b:107–108) thought it was likely that they were present, but not yet identified. While several additional architectural features have been documented since 1999 as described below, basin houses are still infrequently encountered in the RGFO study area.

Two basin houses were encountered during data recovery at site 5LA11555 (Anderson et al. 2013:59). Feature 1 dated to the Early Archaic (6190–5990 cal B.P.) and measured 3.1-x-1.58 m, with a relatively shallow basin. Feature 2 was adjacent to Feature 1, measuring 1.48-x-1.3 m, and was dated to the transitional Early Archaic to Middle Archaic (5040–4860 cal B.P.) (Anderson et al. 2013:62). Neither structure contained identified intramural thermal features. A small number of artifacts was found in the structure fill, with Cheno-Am found in both structures (Anderson et al. 2013:59–62).

Two subsurface anomalies were detected with ground-penetrating radar at the Venado Enojado site (5CF555). Based on the manner in which the anomalies intruded into noncultural sediment, they were interpreted as representing pithouses (as opposed to basin houses) (Watkins et al. 2012). Although these structures were not excavated, an adjacent hearth (Feature 1) was dated to the Middle Archaic era (3240 ± 40 B.P.; cal 3670–3450 B.P.), and the structures are assumed to be contemporaneous (Watkins et al. 2012: 10). Pithouses outside of the Southwest are rare, which would make these structures not only rare within eastern Colorado, but also rare within the state as a whole (excepting the southwestern portion of Colorado).

Two partial basin houses were excavated in a Middle Archaic component at the Hess site (5DA1951) and another, contemporaneous, basin house was excavated at the nearby Oeškeso site (Gantt 2007:810). The basin houses appear to have had conical superstructures covered with Ponderosa pine, Douglas fir, and pinyon pine, and seemed to have been at least partially covered with daub. Two of the structures ranged from 3.5–4.5 m in maximum dimension, while one of the Hess site structures (Feature 3) was nearly 7 m long. The Feature 2 basin house at the Hess site was interpreted as a residential structure. The structure contained a central hearth and was ringed with storage pits that might have also served as postholes, at some point in their use-life. The Feature 3 basin house at the Hess site was nearly twice as large as the Feature 2 basin house, with internal features that appear to have been more randomly placed and were possibly used for food-processing (Gantt 2007:814). Finally, Gantt (2007:814) interprets the Feature 4 basin house at the Oeškeso site as a lithic-reduction workshop, based upon the volume of heat-treated debitage within the structure. While the basin houses at the Hess and Oeškeso sites that ranged from 3.5–4.5 m in diameter are within observed ranges of basin houses documented in northwestern Colorado and Wyoming (whose average diameters are generally between 3 and 4 m, see 2011; Reed 2014; 2003; 1995), the 7-m-long basin house would certainly constitute an outlier, and the author suggests it may have been similar to, but larger than, Paiute or Bannock lodges (Gantt 2007:814).

Paleoclimate and Geomorphology

As touched on briefly above, much of the discussion of Archaic paleoclimate and geomorphology as of 1999 was related to the Altithermal. Researchers have interpreted the Altithermal as possibly driving Early Archaic people out of the Plains until harsh conditions subsided in the Middle Archaic. Zier (1999) also posits that the paucity of Early Archaic materials in surface contexts might be due to significant deposition of sediments after the Early Archaic. Thus, it is possible that more Early Archaic sites are more frequent than they have been estimated to be, but are deeply buried and undocumented.

Recent Research

Researchers have conducted a variety of work refining the relationship between the paleoclimate and Archaic-stage occupations across eastern Colorado since 1999. A strong contribution in this vein was made by Gilmore (2012:58–62) who, in an expansion of the work he conducted for his dissertation (2008), evaluated late Paleoindian- and Archaic-stage paleoclimates for eastern Colorado. Gilmore focused on the Middle Archaic as it related to McKean populations, through the examination of pocket fen sediments and paleoclimatic data gleaned from the GISP2 ice core (Alley 2004). Large-scale regional data suggested major peaks in aridity centered at 8400 cal B.P., near the transition between the Late Paleoindian and Early Archaic period, and at 5800 cal B.P., during the transition between the Early and Middle Archaic periods. These peaks in aridity were on top of a lengthy period of increased eolian activity and aridity that occurred between 9000 and 4900 cal B.P. (late Paleoindian to mid-Middle Archaic) (Gilmore 2012:60–62). The Burnt Creek Fen, a focus of Gilmore's work, contained data for 7,600 years of environmental conditions more specific to the Arkansas River Basin (Gilmore 2012:62). Gilmore's data from the Burnt Creek Fen suggest increased rates of eolian deposition during 7150–6600 cal B.P. and 6300–5300 cal B.P., along with a less substantial period of increased eolian deposition between 4500 and 3990 cal B.P. These periods of increased eolian deposition indicate increased aridity and drought. Gilmore's data generally indicate more mesic conditions during the Late Archaic, although the data do suggest that periods of high variability in temperature occurred across the Archaic stage, including the Late

Archaic period. Periods with notable increases in variability of effective moisture appear to have occurred primarily during the Early and Middle Archaic (Gilmore 2012:62).

Gilmore (2012) argues that the periods that McKean points are most frequently associated indicate that the greatest expansion of the McKean complex was between 5300 and 4800 cal B.P. This interpretation was based on his paleoclimate reconstructions and the median calibrated range of McKean points from 71 McKean-complex sites. The period between 5300 and 4800 cal B.P. corresponds to an era characterized by moderate temperatures and moderate effective moisture (Gilmore 2012:59, 63–65). Gilmore maintains that the expansion of the complex was hampered in the Northern Plains during periods of significant cold (4800–4500 cal B.P.), while expansion in Colorado and Wyoming was more likely to be hindered by periods of drought, such as during the period between 4500 and 3900 cal B.P. (Gilmore 2012:63, 65).

Gilmore's data generally support the notion that climatic conditions during the terminal Paleoindian period and the Early Archaic period inhibited prehistoric use of the study area, especially on the Plains. Gilmore's data are also useful in relating periods of increased deposition to the drought. It is not unreasonable to expect that sites that were occupied and abandoned prior to periods of increased deposition are more likely to have been preserved than sites occupied prior to periods of erosion, although preservation in sandy and silty soils is often weighted heavily towards nonperishable cultural materials. Further, Gilmore's data suggest a prolonged period of increased eolian activity that persisted from the terminal Paleoindian into the middle of the Middle Archaic (Gilmore 2012:61). Several thousand years of depositional aggradation processes occurred following the Late Paleoindian period. Thus, as was put forward in the Arkansas River Basin context, the absence of identified Early Archaic sites may be due to the rate of deposition and the unlikelihood of encountering deeply buried sites during surface inventories (e.g., Zier 1999:104).

Rockshelter Occupation

Zier (1999b) questions whether rockshelter occupations first came into prominence during the Middle Archaic period and, if so, why this might be the case. Similarly, he questioned whether the potential increase in the Archaic use of rockshelters, compared to the Paleoindian stage, was related to an increased need for food storage. There is currently little data on recently excavated Archaic-stage rockshelter occupations in the RGFO study area, with much of the available recent work focused on reexamining previously excavated rockshelter sites, such as Franktown Cave (Gilmore 2005) and Trinchera Cave (Zier 2015). Excavations at Franktown Cave identified an Early Archaic component consisting of several Mount Albion and Magic Mountain variant MM3 point types. The component was not radiocarbon dated, but was relatively dated to 6400–3800 cal B.C. (ca. 8350–5750 cal B.P.) and was stratigraphically below cultural materials radiocarbon dated to 3350–2880 cal B.C. (ca. 5300–4850 cal B.P.). Limited Archaic-stage datable material was recovered from Trinchera Cave; likewise, no clearly Archaic rock art was observed at the site. Most of the well-dated site components date to the Late Prehistoric and later (Zier 2015:75–77). Zier (1999:121) warned of assuming a greater diversity of Middle Archaic subsistence practices as compared to those of the Early Archaic, given the meager amount of Early Archaic data that was available. Middle Archaic groups appear to have increasingly occupied rockshelters. As with subsistence, it is possible that the apparent increase in Middle Archaic rockshelter occupation is reflective of scant Early Archaic data.

Summary

While Archaic peoples' cultural traits and lithic technologies shifted over the course of the Archaic, the stage generally represented a stable, persistent era that had continuous trends in terms of lithic industries, hunting and gathering-based subsistence practices, and lifeways (Zier 1999b:100). The florescence of the Archaic was generally understood to follow necessary lifeway shifts following the advent of the Altithermal and the replacement of Pleistocene fauna with modern

Holocene species. These changes necessitated an increase in diversity of subsistence practices, compared to the preceding Paleoindian Stage (Tate 1999:91). The Early Archaic transitioned to the Middle Archaic in both context areas following the introduction of McKean complex projectile points, which become widespread in the region around 5000 B.P. The subsequent shift from McKean points to a variety of predominately corner-notched and stemmed dart points ushered in the Late Archaic around 3000 B.P. (Tate 1999:151; Zier 1999b:101, 130). The transition to the Late Prehistoric period in both regions followed the appearance of the bow and arrow, although the introduction of ceramics is the primary marker of the end of the Late Archaic within the Platte River Basin.

Recent research has largely served to clarify our understanding of the Archaic stage, rather than suggesting any drastically different paradigms. Eastern Colorado appears to have been more consistently occupied during the Early Archaic than was argued by some at the time the 1999 Colorado prehistoric contexts were published, although the population still seems to have been higher and more dense along the mountains and foothills. The transition to the Middle Archaic has been clarified by our increased understanding of the paleoclimatic shifts correlated with the end of the Altithermal, allowing researchers to have a greater comprehension of some of the forces that drove the spread of the McKean complex throughout the RGFO study area. Recent paleoclimate and projectile point studies have also suggested that a slight revision in the beginning date of the Late Archaic may be in order, based on greater understanding of when the McKean complex disappeared regionally.

Data Gaps and Directions for Future Research

A large amount of work has been conducted in the RGFO study area since 1999. Despite this, the majority of the research questions identified in the 1999 contexts remain incompletely answered. A select few are no longer relevant, given advances in our archaeological understanding of the Archaic era that have either answered the questions or have suggested stronger alternatives. As is the case with archaeology, new questions and new answers will arise as additional work is done in the RGFO study area.

- Since1999, it has become increasingly clear that the RGFO study area was populated, albeit in low densities, throughout the Archaic stage. Thus, models such as the mountain refugium model are no longer applicable to entire populations, but continue to be relevant in terms of relative trends, as populations reacted to environmental stresses. Additional work needs to be done to accurately date sites throughout the RGFO, to continue refinement of our understanding of the Archaic-period use and occupation of the study area.

- Archaeological research is increasingly utilizing calibrated radiocarbon ranges. The lack of defined calibrated ranges for the Archaic stage presents challenges in terms of easily and accurately comparing uncalibrated and calibrated data. A calibrated chronology for the span of the Archaic stage would be a useful endeavor, perhaps building off of the calibrated chronology proposed by Omvig (2015; 2014) for the Wyoming Basin and Northern Plains in Wyoming.

- Additional work needs to be conducted to evaluate the mountain-focused cultural adaptations that the Mount Albion Complex and Mountain Tradition represent.

- Gilmore's (2012:61–62) data regarding the paleoclimate of the Archaic indicate that a long period of increased eolian activity occurred between the end of the Paleoindian period and the middle of the Middle Archaic period (ca. 9000–4900 cal B.P.). If depositional processes are at all to blame for the paucity of known Early Archaic sites, then not only should Early Archaic sites in the Plains be outnumbered by observed terminal Paleoindian sites (given law of superposition), but Gilmore's data should also predict that sites dating to the early portion of the Middle Archaic should be buried in greater numbers as compared to sites in the latter half of the Middle Archaic. Further work evaluating the paleoclimate and geomorphology of the RGFO study area would likely elucidate this specific issue and benefit our general understanding of the Archaic stage.

- While a fair amount of work has been conducted since 1999 evaluating the origin of the McKean complex, several conflicting ideas remain regarding the origin, extent, and degree of shared cultural identity for those people who utilized McKean complex points. Additional research into the timing, range of morphological variation, and cultural traits of the McKean complex is still needed.

- The increased frequency of serrated points from mountain sites within the RGFO area has been noted (Black 1991: 11; Tate 1999:95; Zier 1999:131). Little work has been found that evaluates whether the increase serrated points in mountain sites, as opposed to contemporaneous sites of the foothills and Plains, represents functional variation between the points, cultural-stylistic variation, or both.

THE LATE PREHISTORIC STAGE

Introduction

The following discussions, organized by research domain, summarize the Late Prehistoric-stage chapters in the Prehistory of Colorado context documents for eastern Colorado, primarily Chapter 7 in *Colorado Prehistory: A Context for the Arkansas River Basin* (Zier and Kalasz 1999), but also Chapter 6 in *Colorado Prehistory: A Context for the Platte River Basin* (Gilmore et al. 1999). As such, this summary represents the state of archaeological knowledge available to researchers in the eastern half of the state just prior to the turn of the millennium. Because the great majority of BLM lands within the Royal Gorge Field Office (RGFO) are within the Arkansas River Basin, correspondingly more attention is given to this region. This summary is intended as a refresher for those who may have read the contexts in their entirety in the past, or as a substantially condensed introduction to the material contained within the 1999 contexts. As such, the 1999 documents present considerably more detail than this synopsis; the reader is referred to the chapters cited above for more comprehensive information not presented in this summary.

To bring the material up to date, each section is followed by a synthetic summary of research conducted after the publication of the context documents up to as recently as 2015. The discussions focus on Late Prehistoric research questions or issues where progress has been made through acquisition of the new data, as well as data gaps that remain or that may be addressed through continued analysis of the new data. For readers desiring to know more specific details of recent projects and other recent research relevant to the Late Prehistoric stage, selected summaries are presented in Appendix A.

Chronology and Database

The taxonomic scheme for the Arkansas River Basin used in the 1999 context document is shown in Table 5. The Late Prehistoric stage largely corresponds to the Ceramic stage and the early part of the Protohistoric stage as defined by Eighmy (1984). Ceramics were not present in the earliest part of the Late Prehistoric stage. The Late Prehistoric stage as defined by Kalasz et al. (1999) also replaces the Las Animas tradition defined by Gunnerson (1989), because the Las Animas tradition construct, purportedly restricted to southeastern Colorado, actually includes elements indicating relationships to sites present in the South Platte River basin and in northeastern New Mexico. It is also recommended that the terms "Plains Woodland" and "Woodland" be discarded, because they misleadingly imply close relationships with cultures to the east. Kalasz et al. (1999) further recommend that other cultural taxons that have been used in the region—including phases or foci such as Graneros, Parker, Hogback, Franktown, and the Colorado Plains Woodland Regional Variant (South Platte and Arkansas phases)—all be discarded. The Late Prehistoric stage as defined by Kalasz et al. (1999), therefore, is a more generic concept that bridges the period of time between the ancient Archaic hunter-gatherer adaptation and the "appearance of historically known cultures." The first two periods of the Late Prehistoric stage (Developmental and Diversification) are equivalent to the Formative stage as defined elsewhere in Colorado (e.g., the Northern Colorado River Basin, Reed and Metcalf 1999). The final period of the Late Prehistoric stage as defined by Kalasz et al. (1999) is the Protohistoric period, which is covered elsewhere in this synthesis and is not considered in this discussion. The Developmental and Diversification periods correspond to the Early and Middle Ceramic periods, respectively, as defined by Eighmy (1984).

The taxonomic scheme for the Platte River Basin used in the 1999 context document is shown in Table 6. The Late Prehistoric stage is subdivided into the Early and Middle Ceramic periods, which are roughly coeval with—though slightly later than—the Developmental and Diversification periods as defined in the Arkansas River Basin. The Early Ceramic period is represented by the Plains Woodland culture, which on the Colorado plains is regarded as an "attenuated version" of the Plains Woodland in Kansas and Nebraska, particularly the Keith phase (or Keith variant) (Gilmore 1999:178). The succeeding Middle Ceramic period is characterized by the

Central Plains tradition, particularly the Upper Republican phase (or culture), representing changes in subsistence, settlement systems, and material culture that likely came about, at least in part, in relation to increased moisture associated with broad climatic change.

Table 5. Cultural Periods and Phases for the Late Prehistoric Stage (A.D. 100–1450) in the Arkansas River Basin (Kalasz et al. 1999).[1]

Cultural Periods and Phases	Temporal Span
Developmental period	A.D. 100–1050
Diversification period	A.D. 1050–1450
Apishapa phase	*A.D. 1050–1450*
Sopris phase	*A.D. 1050–1200*

[1] Although Kalasz et al. (1999) include the Protohistoric period (A.D. 1450–1725) in their Late Prehistoric Stage construct, it is excluded from this summary and discussed elsewhere.

Table 6. Cultural Periods and Phases for the Late Prehistoric Stage (A.D. 150–1540) in the Platte River Basin (Gilmore 1999).

Cultural Periods	Temporal Span
Early Ceramic period	A.D. 150–1150
Middle Ceramic period	A.D. 1150–1540

The period of time spanned by the Late Prehistoric in both river basins was typified by the introduction of new technologies overlain on the entrenched Archaic lifeway. As time passed, there were major changes in settlement, subsistence, technology, trade, and demographics. Most dated sites in the region date to the Late Prehistoric period. Because of this wealth of information, the 1999 Arkansas River Basin context was able to formulate very detailed syntheses at each hierarchical level in its taxonomic scheme, from the "stage" unit to "period" to, finally, "phase" (but only for the Diversification period).

The beginning of the Late Prehistoric stage has been variously tied to the appearance of the bow and arrow, pottery, substantial domestic architecture, and maize horticulture. However, all of these innovations appeared at different times in different parts of both the Arkansas and Platte river basins. It is important to recognize the variability in the timing of the adoption of new technologies across the study area; for example, it is likely that ceramics made their appearance in the Arkansas River Basin two centuries or more after the introduction of the bow and arrow (Kalasz et al. 1999:Table 7-1). Moreover, the adoption of new technologies is not necessarily well dated in every case, either because not enough data have been acquired or because dating methods used in the past may not have been up to the task (e.g., problems with old wood and/or cross-section effect in radiocarbon dating). This has led to the concept of a lengthy transition between Archaic and Late Prehistoric lifeways as a way of glossing over the paucity of the data that might indicate the precise timing of the transition within each area. It is possible that the transition between the Archaic and Late Prehistoric *was* gradual, but it also may have been much more abrupt in some areas.

Kalasz et al. (1999) reviewed the radiocarbon evidence for early Late Prehistoric occupations in the Arkansas River Basin and adjacent areas, focusing on the onset of the stage as indicated by radiocarbon dates associated with arrow points, pottery, and masonry architecture. The sites discussed include Metate Cave (5LA211), the Belwood site (5PE278), 5EP576, 5EP935, Davis Rockshelter (5EP986), Recon John Shelter (5PE648), and 5HF1109. They concluded that the chronometric data indicate bow and arrow technology predated ceramic technology in the region; the former was likely introduced between 90 B.C. and A.D. 400, whereas the latter seems to have come into the region between circa A.D. 400 and 650. A review of the distributions of regional radiocarbon data also revealed a striking increase in dates after approximately 2000 B.P., apparently reflecting more intensive occupation and associated population increase after A.D. 1. However, the authors acknowledge that the higher visibility, shallower nature, better preservation, and greater accessibility of Late Prehistoric sites may have resulted in overrepresentation of dates from this period.

On the Park Plateau in the Arkansas River Basin, early researchers all noted the essentially Puebloan character—as represented by architecture, ceramics, and maize—of the prehistoric occupations dating to the period of time encompassed by the Developmental period. Most of these sites, however, are in the New Mexico portions of the Park Plateau; relatively few Developmental period architectural sites are known from the Trinidad district. Despite indications of relationships between some parts of the Arkansas River Basin and the Puebloan Southwest, there was considerable region-wide homogeneity during this period in terms of "settlement, economy, and material culture" across the Park Plateau and adjoining Plains (Kalasz et al. 1999:163). Near the end of the Developmental period, variability increases between the archaeological records of the Park Plateau and the adjacent Plains region. Despite the importance of architecture, ceramics, and maize horticulture during the Developmental period—both as indicators of increasing technological diversity and as diagnostic attributes of the period—many Developmental period sites contain no evidence of these traits, and are only identifiable as such because of projectile points or chronometric dating. The increasing variability seen during the late Developmental period seems to have accelerated, then crystalized during the ensuing Diversification period. Two phases defined for the Diversification period, Apishapa and Sopris, capture much of the marked variability between the Plains and Park Plateau sites, respectively, of this period. In short, Apishapa phase sites exhibit Plains Village tradition influences, whereas Sopris phase sites show evidence of relationships with Puebloans of the northern Rio Grande River basin. The phases were contemporaneous, but Apishapa seems to have persisted longer. Many Diversification period sites, however, cannot be assigned to either phase and are difficult to distinguish from Developmental period sites.

Kalasz et al. (1999) review the evidence for the use of high elevations during the Late Prehistoric occupation of the Arkansas River Basin, noting that this was poorly understood at the time of their writing because few high elevation sites of this period had been dated. However, high elevation Late Prehistoric occupations have been investigated in Chaffee and Lake counties at the Runberg site (5CF358), the Water Dog Divide site (5CF373), Trout Creek Pass quarry (5CF84), and site 5LK6. In general, the dates acquired from these sites indicate occupations throughout the Developmental and Diversification periods.

The end of the Archaic stage and the beginning of the Early Ceramic period in the Platte River Basin is heralded by the introduction of new technologies, including cord-marked pottery and small, corner-notched arrow points (for examples of the latter, see Gilmore 1999:Figure 6-1), though large dart points continued in use for some time after. In 1999, Gilmore noted that the earliest dates associated with the Early Ceramic period in the Platte River Basin are from three Colorado Plains Woodland burials (the Hutcheson [5LR97], Michaud A [5AH2], and Kerbs-Klein [5WL47] sites), citing radiocarbon assays that yielded calibrated midpoint dates falling within the period A.D. 200–300 (Gilmore 1999:262). In the mountains, the earliest dated Early Ceramic site is 5CC389, which yielded a small corner-notched point and a cord-marked sherd and produced a radiocarbon date with a calibrated midpoint of A.D. 473.

The timing of the transition from the Early to the Middle Ceramic period in the Platte River Basin is problematic because it seems to have occurred at different times in different areas, or even to have barely occurred at all in some areas. The Middle Ceramic period is demarcated by the appearance of diagnostic materials associated with the Central Plains tradition, including cord-marked pottery types of the Upper Republican phase and small, unnotched and side-notched arrow points (Gilmore 1999:180, Figure 6-1). As of 1999, the earliest dated Upper Republican components in Colorado (the Friehauf [5MR472], Peavy Rockshelter [5LO1], and Happy Hollow Rockshelter [5WL101] sites) had yielded radiocarbon ages with calibrated midpoints between A.D. 1150 and 1220, and components at the Rock Creek and Bayou Gulch sites that Gilmore describes as transitional between Early and Middle Ceramic yielded calibrated midpoint dates of around 1150 (Gilmore 1999:263). However, relatively minor change between the Early and Middle Ceramic periods is evident on the hogbacks, foothills, and piedmont, compared to areas farther east. Middle Ceramic sites along the Front Range and on the piedmont exhibit only "minor changes in technology" and "lack the classic Upper Republican collared rim ceramics" (Gilmore 1999:245), suggesting that the basic Plains Woodland culture of the Early Ceramic period may have persisted in these areas well past A.D. 1150. In contrast, Middle Ceramic sites located on or close to the margin between the piedmont and the High Plains exhibit the material culture associated with the Upper Republican phase, leading Gilmore to speculate that these sites might represent immigrant populations that moved into the region from the east, whereas Middle Ceramic period sites farther west represent indigenous groups that acquired limited ceramic technology and other technological innovations from the newcomers but otherwise continued to live the same way as they had for centuries (Gilmore 1999:245). The Middle Ceramic period in the Platte River Basin ends with Coronado's A.D. 1540 entrada into the Central Plains, ushering in the Protohistoric period.

Apishapa Phase

The Apishapa phase was originally defined by Arnold Withers (1954) and subsequently expanded to include all Diversification-period sites in eastern Colorado that seem to represent a sort of attenuated version of the Plains Village pattern. Radiocarbon data available in 1999 suggested that the Apishapa pattern of aggregated room architecture was in place by approximately A.D. 900–1000. Larger architectural sites with extensive and diverse artifact assemblages were established by the period A.D. 1150–1250. Smaller, more functionally diverse sites were present throughout the span of Apishapa, which lasted until approximately A.D. 1450.

Sopris Phase

The Sopris phase was originally defined by Herb Dick, subsumed within a larger construct called the Upper Purgatoire complex (Dick 1963). The latter taxonomic unit was later discarded and the Sopris phase came to refer to a particular set of early Diversification-period archaeological phenomena in the upper Purgatoire River valley (Kalasz et al. 1999:222). Such sites are typically identified on the basis of "rectilinear stone masonry architecture or Taos Incised or Taos Black-on-white sherds," though other ceramic types are also associated with Sopris sites (Kalasz et al. 1999:222).

Early chronologies for the Sopris phase initially relied on dates for northern Rio Grande black-on-white trade wares, and were later (i.e., late 1960s–early 1980s) revised using archaeomagnetic and radiocarbon dates (Kalasz et al. 1999:224). These early data lacked precision (e.g., the radiocarbon dates had large standard deviations) and later research using more reliable radiocarbon and ceramic data (e.g., Mitchell 1997) suggest that Sopris-phase occupations—at least in the Trinidad district of the Park Plateau—date to the period A.D. 1050–1200. There is evidence that the Trinidad district was occupied considerably earlier (i.e., late Developmental period) by populations who may have been ancestral to Sopris-phase peoples, and may have been reoccupied during the thirteenth century by groups descended from Sopris-phase peoples. Sopris-phase occupations may have persisted longer in the Cimarron district of New Mexico.

Chronology: Recent Research

The data obtained from projects conducted since the publication of the prehistoric context documents in 1999 suggest that no substantial reorganization of the Late Prehistoric chronological schemes for either the Arkansas River Basin or the Platte River Basin is needed. Perhaps the most significant contribution of the recent projects is the corpus of new radiocarbon dates from the investigated Late Prehistoric components in the RGFO study area. Many of these new dates are incorporated into the bar graph shown in Figure 7, which was generated from data downloaded from RCGraph (RCGraph 2015).

Some recent radiocarbon data have yielded insights into the Late Archaic-Late Prehistoric transition. For example, the early Developmental (A.D. 135–310) component at the Monument Creek site produced dart points but no ceramics; it resembles an Archaic occupation except for the radiocarbon dates (Kalasz et al. 2005). Site 5LA12661 produced a Late Archaic-Late Prehistoric transitional or early Developmental-period date (A.D. 60–220), but no associated artifacts (Anderson et al. 2013). The other Developmental-period components excavated during the Raton 2010 Expansion project produced assemblages that, with the exception of a single arrow point, resembled Archaic occupations. Component 3 at Franktown Cave dates to the period A.D. 130–430, spanning the transition from the Late Archaic to the Late Prehistoric (Early Ceramic period). This component exhibited none of the hallmarks of a Late Prehistoric occupation; that is, it yielded no ceramics or arrow points, suggesting that two of the key technological innovations of the Late Prehistoric stage had not yet arrived on the Palmer Divide. These and other projects have revealed examples of sites dating to the Late Archaic-Late Prehistoric transition or to the early Developmental period that, aside from their associated radiocarbon dates, are practically indistinguishable from Archaic occupations. Although Kalasz et al. (1999) noted that the attributes that define the Late Prehistoric stage appear at different times across the region, such sites suggest the possibility that the persistence of an Archaic lifeway during the first two or three centuries of the Developmental and Early Ceramic periods was the rule rather than the exception, or at least that the transition from Archaic to Late Prehistoric lifeways was subtle, gradual, and geographically variable.

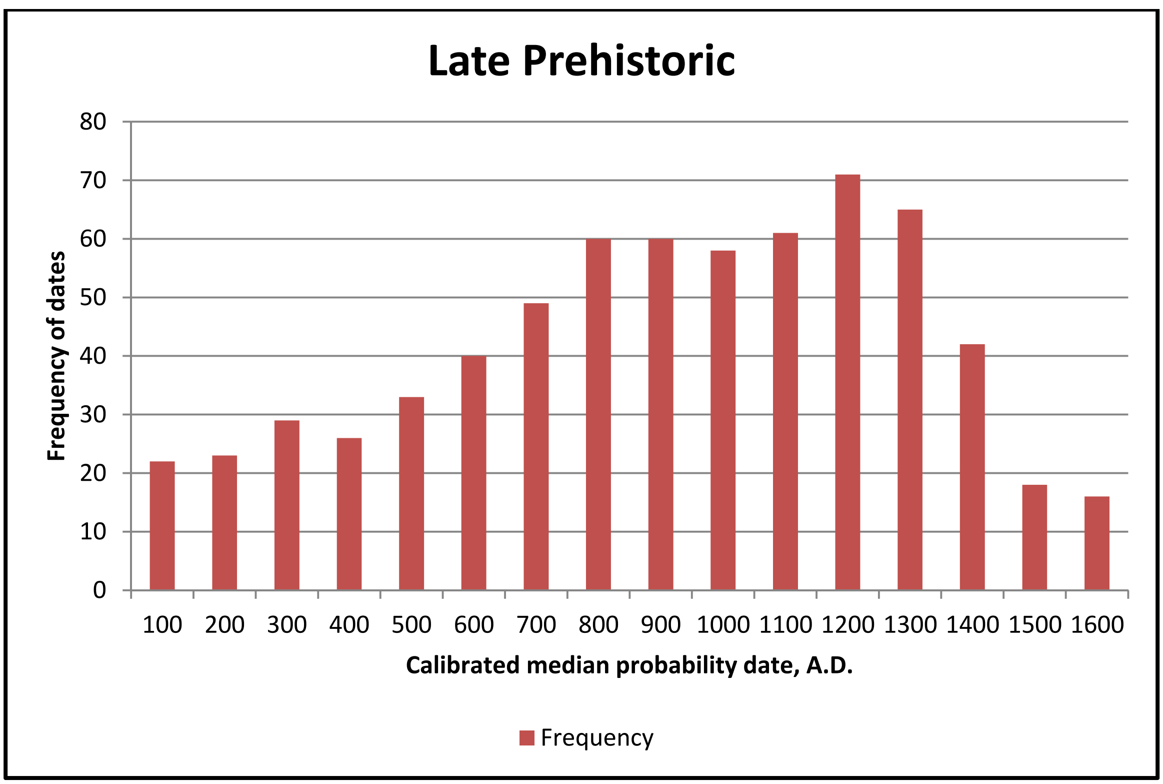

Figure 7. Histogram of the midpoints of the two-sigma calibrated ranges of Late Prehistoric radiocarbon dates for the RGFO study area, A.D. 100–1600 (RCGraph data).

Another research issue connected with the transition from Archaic to Late Prehistoric lifeways concerns the timing of the introduction of the bow and arrow. The authors of the Arkansas River Basin context noted that bow-and-arrow technology was adopted as many as two centuries earlier than pottery, as early as A.D. 100. However, it is still not well dated. The presence of both dart points and small corner-notched arrow points at site 5HF1201 in Huerfano Park within contexts radiocarbon dated to the period A.D. 345–540 suggests the simultaneous use of the atlatl-and-dart and bow-and-arrow during the early Developmental period (Burnett et al. 2007). Similarly, the presence of dart points but no arrow points at the Monument Creek site in a component radiocarbon dated to the period A.D. 135–310 suggests the continued use of atlatl-and-dart technology into the Developmental period. Clearly, more research is needed before this important issue is resolved.

A number of sites investigated in the Arkansas River Basin after 1999 have yielded dates with calibrated ranges spanning the end of the Developmental period, the Developmental–Diversification transition, or the beginning of the Diversification period. Others have yielded evidence of occupations during both the Developmental and Diversification periods. These sites are good candidates for producing additional information about the differences between the two periods. In the Platte River Basin, Franktown Cave also contained Early and Middle Ceramic occupations, making it a good site for comparisons between the material culture attributes of these periods.

The Lopez Ranch site is relevant to questions concerning the transition from the Developmental to the Diversification period (Slessman et al. 2003). In particular, the site produced data that partly fills a research gap identified in the Arkansas River Basin context regarding whether early Diversification occupations are characterized by mixtures of Apishapa- and Sopris-phase attributes. The site yielded an AMS date with a two-sigma calibrated range of A.D. 770–970, or late Developmental period. Cord-marked and Taos Gray pottery were recovered during the excavations. The Taos Gray Ware suggests a post-1050, Sopris-phase date for the occupation. Even if the radiocarbon date is somewhat too early because of the old wood effect, the component still represents either a transitional Developmental–Diversification or relatively early Sopris-phase occupation. The presence of both Puebloan trade ware and cord-marked pottery indicative of the neighboring Apishapa culture suggests complex interregional relationships. In the Picket Wire Canyonlands, radiocarbon dates recovered from sites 5LA5838 and 5LA6493 suggested to the excavators the possibility of Apishapa-phase occupations commencing as early as A.D. 900 (Gardner and Lammers 2015b). At site 5DA1936 in the Platte River Basin, the author notes that there are no significant differences in the use of the site from the Early to the Middle Ceramic period, possibly indicating continuity in settlement patterns and subsistence (Gantt 2007). The above examples illustrate the fact that the timing and nature of the transition from the Developmental to the Diversification period in the Arkansas River Basin and the Early to the Middle Ceramic period in the Platte River Basin is a research issue that is far from being resolved.

Kevin Gilmore's Ph.D. dissertation explores the paleoenvironmental conditions and shifting climatic regimes of the time periods spanning the transitions from the Late Archaic to the Late Prehistoric, and the Developmental/Early Ceramic period to the Diversification/Middle Ceramic period in eastern Colorado (Gilmore 2008). As such, it seeks explanations for why the innovations associated with the inception of each new cultural period were adopted, with attendant changes in settlement and subsistence. Investigating the major underlying causes of these critical periods of culture change shifts the focus from "when" to "why," but in the process more sharply defines the temporal and social contexts of these transitions. No revisions to the generally accepted starting and ending dates for the Early and Middle Ceramic periods are suggested, but the model and the data on which it is based have the potential to inform future adjustments to the chronology of the region.

In a study relevant to cultural affiliation, Lindsey and Krause (2007) maintained that the occupants of sites such as the Barnes site at the PCMS were not Upper Republican Plains Villagers, but rather more mobile, indigenous peoples. It seems unlikely that many researchers would disagree with this interpretation, but to the extent that it may be a contentious issue, the authors present a good case that these Diversification-period groups represented permanent local populations rather than Plains Village hunters using the region on a seasonal, logistical basis.

The projects and studies described above suggest avenues for future research into Late Prehistoric chronology. Few, if any, researchers attempted thermoluminescence (TL) dating of ceramics. Direct dating of ceramics can circumvent problems with sherd-date association and has the potential to yield important new data on the adoption of ceramic technology. Similarly, no researchers appear to have attempted obsidian hydration dating. Although fraught with obstacles, regional obsidian hydration chronologies have the potential to reveal important information on diachronic patterns of trade and procurement.

A major problem evident throughout the discussions in the 1999 context is the poor correspondence between high-confidence chronometric dates and diagnostic artifact types, and between good chronometric dates and architecture. These problems can be remedied in the future by more careful selection of radiocarbon samples from excavated contexts. Most of the excavation projects prior to 1999, as well as those described above, produced dates from wood charcoal, which is well known to be plagued by problems associated with the cross-section effect and the use of old wood for hearth fuel (Baker et al. 2008; Reed and Metcalf 1999; Smiley 1985, 1998). Reliance on wood charcoal for radiocarbon dating can result in dates that are as many as several centuries older than the targeted event. Several of the recent projects appear to have such problems; e.g., cases where radiocarbon dates are contradicted by diagnostic artifacts that suggest more recent occupations. Selection of samples should focus on annuals, cultigens, short-lived plant species, or even faunal bone collagen. Poor dating can confound attempts to define attributes that characterize particular periods or phases. In contrast, good dating is critical to future refinement of regional chronologies.

Population Dynamics

Most researchers believe that Late Prehistoric populations in the region descended from indigenous Archaic hunter-gatherers. Stratified rockshelter deposits in the Arkansas River Basin support this interpretation; deposits have been identified and dated that span the end of the Late Archaic and the beginning of the Late Prehistoric stage, and which exhibit continuity in "material culture and adaptation" (Kalasz et al. 1999:146). Although there is no compelling evidence that new populations arrived, it seems clear that a "regionwide demographic expansion" took place during the Developmental period (Kalasz et al. 1999:171). Populations may have peaked during the Diversification period, as evidenced by a proliferation of multiroom architectural settlements, largely clustered along the Apishapa and Purgatoire rivers. It should be noted, however, that the larger settlements may reflect population aggregation as much as increase.

Population increases throughout the Developmental and Diversification periods in the Arkansas River Basin are indicated by increased radiocarbon date distributions, greater density of cultural materials in stratified deposits, and greater numbers of multiroom masonry structures during the Diversification period. An exception includes greater densities of materials in Late Archaic deposits compared to Late Prehistoric deposits in some sites (e.g., Gooseberry Shelter, 5PE910); although it is possible that decreasing artifact densities may have been affected by sediment accumulation rates and do not necessarily reflect decreased intensiveness of occupation or lower populations. This caveat may have affected either Archaic or Late Prehistoric deposits, so artifact densities should be used cautiously as evidence of population increase or decrease.

A rather dramatic increase in regional populations within the Platte River Basin seems to have occurred during the Late Prehistoric period. This is indicated by an "almost exponential" increase in radiocarbon dates beginning near the end of the Late Archaic period (Gilmore et al. 1999:276). Based on radiocarbon date frequencies, population growth appears to have taken place during the Early Ceramic period, followed by declining populations during the Middle Ceramic period. The radiocarbon data are bolstered by regional mortuary data; the great majority of prehistoric burials in the Platte River Basin have been dated to the Early Ceramic period, whereas only a few have been dated to the Archaic stage or the Middle Ceramic period.

Apishapa Population Dynamics

Interregional Relationships

In general, Apishapa phase settlements are present across the Arkansas River basin from just south of Colorado Springs into northeastern New Mexico. Archaeologists' perceptions of Apishapa interregional relationships over the years has vacillated between the view that Apishapa groups were closely related to Plains Village peoples and may even represent the result of migration from those areas, to the view that Apishapa represents an in situ development. The latter interpretation assumes that native people absorbed knowledge and technologies from neighboring groups through some sort of process of diffusion, but were essentially culturally isolated. Kalasz et al. assessed this question in 1999 and concluded that a more likely scenario is an in situ development of farming groups who retained close relationships with distant and more sedentary neighboring populations, including trade relationships and, possibly, alliances. The interaction between Apishapa-phase populations and adjacent regional groups who occupied the southern Plains Villages in the Texas and Oklahoma panhandles and other Plains Village tradition sites to the east remains an important research issue.

Social Organization

Archaeological views of the degree of Apishapa residential organization and social complexity range from Campbell's (1969) interpretation that true villages and communities are represented, to Lintz's (1989) assessment that village-level social organization did not exist among the Apishapa, based on the apparently random placement of habitation structures, the lack of specialized (communal) structures, and the lack of evidence for contemporaneity among structures. Attendant upon each of these views are the ideas that Apishapa populations were, respectively, either fairly sedentary and heavily reliant upon maize horticulture, or more mobile than their stone houses would suggest, and not particularly dependent upon maize. In 1999, the view of the authors of the Arkansas River Basin context fell somewhere in the middle of these two extremes, suggesting that the available lines of evidence indicated that Apishapa settlement was "characterized by considerable social organization," but fell short of the sedentary village pattern advocated by Campbell (Kalasz et al. 1999:207).

Abandonment

The Apishapa phase began to disappear as a recognizable archaeological pattern during the fourteenth century, a process that apparently lasted well into the fifteenth century. The degree to which this represented an actual abandonment of the region by Apishapa populations is not well understood. However, the evidence for population aggregation late during the Apishapa phase, followed by apparent abandonment, seems to correlate with the possible effects of region-wide drought at the same time that similar phenomena occurred in the Southwest. Competition for dwindling resources and resulting warfare may explain the presence of apparent defensive sites in some areas, although some have speculated that incursions of Athapaskan migrants may be the cause of apparent regional conflicts. As to where Apishapa peoples may have gone, the dominant hypothesis is that they moved east and became, or melded into, Caddoan groups who became the historic Pawnee, Arikara, and Wichita tribes. This idea is based on "informed speculation" and has not been rigorously tested with archaeological data (Kalasz et al. 1999:208).

Sopris Population Dynamics

Interregional Relationships

Sopris phase sites are restricted to the Park Plateau and extend well into—and possibly are better represented in—northeastern New Mexico. The prevailing opinion in 1999 was that the Sopris phase in Colorado was the outcome of in situ growth from a late Developmental period culture in the upper Purgatoire River valley, rather than the result of Ancestral Puebloan migration or expansion (Kalasz et al. 1999:230-231). Some researchers have attempted to link Athapaskan migration to the Sopris phase, but the data are inconsistent with this interpretation. Interestingly, the arrival of Ancestral Puebloan groups into the upper Rio Grande valley in the eleventh century is nearly coeval with the appearance of Puebloan trade wares such as Taos Gray and Taos Black-on-white ceramics on the eastern slope of the Sangre de Cristo Mountains, suggesting that a trade network between the two areas was already in place by this time. It is not known what the Sopris people traded for Puebloan pottery, but the existence of a well-established trade network between the two regions may have also created alliances that allowed the exchange of ideas, technologies, and possibly even marriage partners, accounting for many of the similarities between Sopris-phase material culture and lifeway and those of Ancestral Puebloans of the upper Rio Grande valley. There is even evidence (e.g., Taos Pueblo origin stories) suggesting that at least some Sopris-phase groups permanently reestablished themselves in the upper Rio Grande valley following abandonment of the upper Purgatoire River region. The relationship between Sopris-phase groups and Ancestral Puebloans of the northern Rio Grande Valley remains an important research problem.

Ceramics also suggest trading and possibly other relationships with contemporary Apishapa-phase peoples. Given the likelihood of expansive interregional trade networks during the Diversification period, it seems possible that Sopris-phase groups may have even acted as middlemen between far-flung groups such as Ancestral Puebloans to the west and southwest and Apishapa and Plains Village peoples to the east and northeast. Such a role might even partially explain the evidence for an increasing need for storage exhibited at later Sopris-phase habitations.

Demographics

In the 1999 Arkansas River Basin context, the evidence for population increase in the Trinidad district during the Sopris phase was reviewed (Kalasz et al. 1999:228-229). There are three lines of evidence: greater number of radiocarbon dates and sites attributable to the Sopris phase compared to those from the preceding Developmental period, greater numbers of stone habitation structures and the trend for larger structures through time during the Sopris phase, and rising food storage capacity throughout the phase as represented by increasingly larger and more numerous storage facilities. All of these lines of evidence seem to point toward a substantial increase in population during the Sopris phase, at least within the Trinidad district.

Other interpretations are possible, however. The apparent increase in population from the Developmental period to the Sopris phase (and from the early to the late Sopris phase) as evidenced by increasing numbers of sites may instead reflect the geographical concentration of existing populations, who began to aggregate in the Trinidad district from outlying areas, such as higher elevation settings. The apparent increase in habitation structures may only reflect a shift in architectural technology, the result of the adoption of highly visible stone masonry architecture and the abandonment of earlier types of structures (e.g., semisubterranean house pits) whose remains are less archaeologically visible. Increases in structure size may partially reflect increases in storage capacity rather than a need to accommodate more people; that is, structures became larger because storage rooms were added. Increases in storage capacity likely reflect the increased production of storable foods such as maize, but the role of maize in the Sopris diet is poorly understood and, in any case, more maize does not necessarily mean larger populations. In short, while the evidence for population increase is thought-provoking, it falls short of clearly demonstrating that populations actually increased substantially during the Sopris phase.

Social Organization

As inferred from the available evidence in 1999, habitation structures during the Sopris phase served as the residences of distinct households (Kalasz et al. 1999:229). Mortuary data consisting of the discovery of human interments within or beneath habitations suggest the existence of "household-based lineage groups" and the importance of ancestors (Kalasz et al. 1999:228-229). Moreover, the continual modification and enlargement of some structures over time is argued to represent the continuation of labor investment in a particular place that in turn reflects a persistence of the social relationships that both necessitate and enable such investments. On a larger scale, the evidence for contemporaneity of households or groups of households across the district suggests levels of suprahousehold organization such as hamlets or rural communities (Kalasz et al. 1999:230). This might be contrasted with the seemingly more dispersed settlement pattern exhibited by contemporaneous Apishapa groups.

Violence, Social Collapse, and Abandonment

The upper Purgatoire River valley was essentially abandoned by A.D. 1200, though Sopris-phase occupation continued into the thirteenth century in the Cimarron district to the south. The causes for abandonment have not been determined, but seem to have been accompanied by conflict and the ensuing collapse of Sopris society. The evidence for conflict consists of human remains exhibiting signs of violence, as well as widespread destruction of habitation structures by "catastrophic fires" (Kalasz et al. 1999:230).

Population Dynamics: Recent Research

Studies of prehistoric demographics typically rely on large, region-wide datasets that include numerous radiocarbon dates, frequencies of dated occupations, measures of occupational intensity, habitation structure or room counts, and similar proxy data. As such, new paradigms for population dynamics are beyond the scope of this synthetic summary and may only be possible when recently acquired data are incorporated into previously existing datasets and then used to reexamine region-wide demographic patterns. That said, some data obtained from post-1999 projects are relevant to studies of population dynamics, and at least one recent study (Gilmore 2008) has presented a revised model for regional Late Prehistoric demographic shifts. Gilmore's model and the contributions from the other projects are summarized below.

Kevin Gilmore's Ph.D. dissertation "examines the interplay between prehistoric population dynamics and paleoenvironment, and to what extent these factors influenced culture change over the last 3,000 years on the western High Plains of Colorado" (Gilmore 2008:1). To that end, Gilmore marshaled numerous lines of evidence and combined them with paleoenvironmental data newly obtained from eastern Colorado pocket fens to construct an explanatory model of shifting demographics from the Late Archaic through the Late Prehistoric stages. As integral parts of the model, he proposed possible explanations for the adoption of new technologies (e.g., pottery and the bow and arrow) and the introduction of maize horticulture, and presented a thorough discussion of the evidence for demographic change in eastern Colorado.

Gilmore's model seeks to explain how climatic shifts affected prehistoric population growth and decline; how these changes affected settlement systems and burial practices; and why the bow and arrow, ceramic technology, and maize horticulture were adopted to varying degrees during the Late Prehistoric stage. Therefore, the model is underpinned by population increases and decreases driven by climate change. The key climate events include the Terminal Archaic Drought (TAD), the Early Ceramic Drought (ECD), the First Millennium Amelioration (FMA, a period of increased effective moisture following the ECD), and the Medieval Climate Anomaly (MCA) (Table 7). Immediately following the ECD, the evidence suggests that population growth rates peaked. Population pressure resulted in decreased residential mobility and smaller group territories during the FMA. This, in turn, necessitated more efficient use of available resources within the smaller territories, the use of greater numbers of different resource types (including lower ranked resources such as grass seeds and small mammals), and the intensity with which resources were processed. Bow and arrow technology was fully embraced at this time because it allowed more efficient capture of a wider variety of prey. The use of pottery proliferated because it allowed more efficient processing of the types of resources that were becoming more important, such as small seeds. Maize horticulture was adopted by some groups probably because it provided a partial solution to the problems presented by a shrinking resource base. Changes in mortuary ritual at this time are seen as an outcome of an increasing need to employ ritual as a way to reinforce group identity and emphasize the importance of controlling a specific territory and the critical resources it contained. These developments continued into the MCA, which was characterized by decreased effective moisture and increased temperature. Around 150 years into the MCA, regional populations began to level off and then decline. Near the end of this climatic episode, there is evidence that Middle Ceramic-period groups in both the Platte and Arkansas river basins began to migrate out of eastern Colorado; Athapaskan immigrants coming into the region from the north took advantage of this situation by expanding into the resulting sparsely populated landscapes.

Table 7. Key Climate Events.

Climate Event	Period
Terminal Archaic Drought	250 B.C.–A.D. 100
Early Ceramic Drought	A.D. 300–550
First Millennium Amelioration	A.D. 550–975
Medieval Climate Anomaly	A.D. 975–1450

Data or insights relevant to research into population dynamics were generated by several recent projects, including the Rueter-Hess Reservoir excavations (Gantt 2007), a predictive model for the PCMS (Owens 2007), a study presenting an Athapaskan migration scenario (Gilmore 2004b), the analysis of materials from the Jarre Creek site (Gilmore 2004a), and a study focusing on the use of high elevation game drives along Colorado's Front Range (LaBelle and Pelton 2013). At the Oeškeso site, which was excavated during the Rueter-Hess project, Gantt suggested that the abundance and density of artifacts and features constituted evidence for a rebounding population during the Early Ceramic period (Gantt 2007:810). This interpretation would seem to be consistent with Gilmore's (2008) model. Owens' (2007) predictive model for architectural sites at the PCMS is relevant to local population shifts. In particular, he posited that the evidence for the defensive placement of habitation structures near the end of the Developmental period and during the Diversification period (Apishapa phase) may be related to several demographic factors, including population pressure during periods of resource stress caused by drought, and the influx of new populations (Owens 2007:44). Two papers by Kevin Gilmore (2004a, b) that were written before his 2008 dissertation contained data and ideas that were ultimately worked into the model of paleoclimate and population fluctuations described in his dissertation. Certain aspects of the Jarre Creek site are put forth as evidence that indigenous groups may have relocated to the Palmer Divide as a consequence of displacement by Upper Republican groups, with subsequent population pressure resulting in higher, less mobile populations, a settlement pattern made possible by the greater carrying capacity of the Palmer Divide. In a discussion of the conditions preceding Athapaskan migration into eastern Colorado, Gilmore suggested that large Late Prehistoric populations prevented Athapaskan groups from migrating into the region until Middle Ceramic populations began to decline in the twelfth century. A study of high elevation game drives in the Front Range of Colorado by LaBelle and Pelton (2013) links to concepts of Late Prehistoric population expansion derived from Gilmore's (2008) work. Specifically, LaBelle and Pelton (2013) comment that one result of increased population pressure in the foothills was an expansion of diet breadth and ensuing increased use of nearby Alpine environments, including more frequent or more intensive use of high elevation game drive systems.

The data pertaining to population dynamics in eastern Colorado, and the larger study focusing specifically on the underlying causes of demographic changes during the Late Prehistoric period (Gilmore 2008), are relevant to nearly all parts of the RGFO study area to one degree or another. In the context for the Arkansas River Basin, Kalasz et al. (1999) present an array of research questions under the heading "Population Dynamics." Nearly all of these questions remain relevant, though recent data may have partially answered some of them. For example, the 1999 context asks if shifting "population density patterns rather than overall population volume" were responsible for giving the appearance of population increase during the Late Prehistoric stage (Kalasz et al. 1999:241). Relevant to this question, Gilmore's (2008) model suggests that populations during this period of time substantially increased across eastern Colorado, though group aggregation in some areas may give the impression of greater population growth than actually occurred.

Research questions pertaining to population dynamics presented in the 1999 context for the Arkansas River Basin that are especially relevant to BLM-managed lands in the RGFO are those that address the extent and intensity of Apishapa- and Sopris-phase occupations (Kalasz et al. 1999:240-241). The western extent of occupation of both groups during the Diversification period, the degree to which each group exploited higher elevation environments, and the possibility of the existence of Diversification period groups unrelated to either the Apishapa or Sopris are particularly important research issues; data relevant to these questions may be present on BLM lands on the Park and Chaquaqua plateaus, the Arkansas Valley, and in the foothills and valleys of the Sangre de Cristo and Wet mountains and the Pikes Peak Massif.

Technology

Important technologies during the Late Prehistoric stage in eastern Colorado include ceramics, flaked and ground lithic tools, and bone and antler industries, all of which are discussed below. Significant new data relating to ceramic and lithic technologies accumulated by projects postdating 1999 are also discussed.

Ceramics

Late Prehistoric pottery in the Arkansas River Basin comprises cord-marked, plain, incised, polished, micaceous, corrugated, and painted wares, with rare vertically indented and wiped wares reported from one site. Developmental period pottery was restricted to cord-marked and brown wares, with the former influenced by or traded from Central Plains Woodland groups and the latter apparently locally manufactured in the upper Purgatoire River area. In contrast, all of the pottery types noted above were present during the Diversification period. The major Late Prehistoric ceramic influences or sources were Puebloan, Plains Village, and, very late in the period, possibly Athapaskan.

Most Developmental period cord-marked pottery contains crushed-rock temper and represents conoidal-based jars constructed by the paddle-and-anvil technique. Attempts by Campbell (1969) and Ellwood (1995) to chronologically order cord-marked wares on the basis of deep versus shallow cord marks have not been verified, and this distinction is likely not tenable. Developmental period brown wares are typically sand tempered, thick, and oxidized.

During the Diversification period, Sopris-phase sites exhibit numerous northern Rio Grande trade wares along with small quantities of cord-marked pottery. In contrast, most of the pottery associated with Apishapa phase sites contains crushed-rock temper and are cord marked, indicating relationships with the Plains Village tradition, though small amounts of Puebloan trade wares are also present. Some Apishapa-phase sites have also yielded Upper Republican trade wares. Polished wares in both phases require additional research. Sites of both phases can contain large numbers of ceramics, though some Apishapa-phase sites have few ceramics. Micaceous wares in the region are typically ascribed to Apachean (i.e., Athapaskan) groups, though some may have originated from the eastern Pueblos such as Taos. Puebloan polychrome trade wares in the Carrizo Creek area have been tied to Apachean groups.

Late Prehistoric pottery in the Platte River Basin is dominated by cord-marked wares, representing a technology that likely arrived in the region along with other Plains Woodland traits and technologies near the beginning of the Early Ceramic period. Ceramic technology throughout the Early Ceramic period is described as "remarkably stable," with most pottery exhibiting clays and temper available along the Front Range and on the Colorado Piedmont and Plains, suggesting that indigenous ceramic traditions grew out of the original pottery-making skills first introduced to the region over 1,500 years ago (Gilmore et al. 1999:274, 289). This stability in some cases extends through the Middle Ceramic period, with many wares exhibiting only minor differences from Early Ceramic pottery. These differences are typically expressed in surface treatments (e.g., obliteration of cord marks), though some ceramic analysts have evidently noted diachronic changes in temper, clay, or paste. True Upper Republican pottery types with collared or flared rims seem to be restricted to only two sites in the Colorado Piedmont (represented by only one sherd from each site) and a series of sites along the margin of the piedmont and the High Plains (Gilmore et al. 1999:290).

Apishapa Ceramics

As noted above, Apishapa-phase ceramics are dominated by cord-marked wares similar to those known from Plains Village contexts, though Puebloan trade wares are not uncommon on Apishapa sites. Quantities of pottery are relatively small compared to Sopris-phase sites. Major research questions surrounding Apishapa ceramics as identified in 1999 include typological issues—such as sorting out the confusing plethora of type names and definitions for the various known cord-marked, plain, polished, and incised wares—and exploring issues related to manufacture, particularly differentiating between locally produced versus trade wares. Regarding the latter issue, the differences between the wares of different local production areas and the patterns of pottery trade that might elucidate interregional relationships represent two poorly understood problems.

Sopris Ceramics

Ceramics are perhaps the most intensively studied material culture class of the Sopris phase. They include trade wares from the upper Rio Grande valley and either Apishapa or Plains Village groups, as well as several indigenous pottery types, most of which represent local versions of Taos culinary wares. Sopris-phase ceramic types and technologies comprise a complex topic, and the reader is referred to the 1999 Arkansas River Basin context and Mark Mitchell's 1997 Master's thesis for fuller descriptions and discussions than can be presented here (Kalasz et al. 1999:230; Mitchell 1997).

The two major ceramic types encountered on Sopris-phase sites include large ollas of Taos Incised or Taos Plain ware and locally made Sopris Plain Ware jars manufactured in the style of, and using similar (but not identical) methods to, Taos Plain and Incised. The local pottery can be reliably distinguished from the imported wares, according to Mitchell (1997). Other pottery found on Sopris sites includes Taos Black-on-white bowls, polished jars and bowls, and cord-marked jars. The polished pottery does not appear to be locally made, though it is not clear where it was manufactured. The cord-marked wares were likely obtained in trade from either Apishapa or Plains Village groups.

Data recovered from Sopris-phase sites reveal a substantial increase in the use of pottery during this period. This suggests an increase in the intensity of resource processing and the importance of food resources that were reliant upon preparation in ceramic pots. The diversity of pottery types seems to reflect the complexity of Sopris-phase society and regional interactions.

Ceramics: Recent Research

Perhaps the most ambitious recent study of ceramics in the RGFO study area was a 2002 analysis by Richard Krause, which presents detailed technological descriptions of ceramics recovered from Late Prehistoric sites at Fort Carson and at the PCMS (Krause 2002). The analysis attempted to identify the materials used in ceramic production and to describe each step in the manufacturing process. Two assemblages were examined; one from Fort Carson and the other from PCMS. The Fort Carson assemblage comprised 1,052 sherds from 56 sites. The examined ceramics mainly represent conoidal bottomed vessels; some are high-shouldered and some are globular. In terms of manufacturing methods, coiled outnumber mass-modeled specimens by a considerable margin. Nearly all the sherds were made of local mica-bearing clays that were tempered with finely crushed granitic stone. Krause noted that "both fingers and oval stone anvils were used to support the interior surfaces of mass-modeled vessels while opposing exterior surfaces were being cord impressed" (Krause 2002:34). Coiled vessels were scraped and floated prior to cord impressing them. Krause was able to infer that mass modeling predated coiling on Fort Carson, and was likely learned from pottery-making groups to the north and east. He believed that coiling technology arrived later from sources to the south and west. The analyzed PCMS sample consisted of 585 sherds from 46 sites, representing vessel forms similar to those at Fort Carson. The majority of the specimens were made from mica-bearing local clays and grit temper (i.e., "finely ground granitic stone"), though there was also one example of a "coiled, sand tempered, round lipped, black on white bowl" (Krause 2002:56.67). The great majority were coiled, though a few mass-modeled specimens were identified. Surface treatments included "cord roughened, smoothed, check stamped, or simple stamped" (Krause 2002:55). Both interiors and exteriors were scraped before the interior was dried and before the exterior was stamped or cord impressed. All the mass modeled specimens are cord impressed, whereas the coiled specimens exhibit all of the identified surface treatments. Coiled (both cord impressed and stamped) were scraped, and then floated, prior to surface manipulation. Krause notes that in both the Fort Carson and PCMS samples, the stamping/cord impressing seems to have been a decorative rather than a manufacturing technique. In terms of the temporal sequence of the various PCMS types, sites yielding only mass-modeled pottery are regarded as the oldest, followed by sites containing both mass-modeled and coiled wares, with sites producing only coiled wares the most recent.

Ceramic indicators of trade or interregional relationships have been identified during several recent projects and these instances add to the growing database for such evidence. At site 5LA3189 at Burke's Bend at the PCMS, the excavators suggested that the collared rims exhibited by cord-marked vessels from Rockshelter 8 represent some sort of interaction between Apishapa-phase groups and Plains Village populations, even though the ceramics were thought to have been locally manufactured (Kalasz et al. 2007:333). Other wares recently found on regional sites seem to reflect trade. For example, a survey of the area around Trinchera Cave yielded Sopris Plain and Puebloan gray wares, both likely obtained through trade by the local population (Black 2000, 2003). However, because the eastern extent of Sopris-phase groups is not well defined, local manufacture of the Sopris Plain pottery cannot be entirely ruled out. At the Sopris-phase Lopez Ranch site on the upper Purgatoire River, excavations recovered two distinctively different types of plain wares, a cord-marked variety resembling Plains Village pottery and a Puebloan ware identified as Taos Gray. The former likely reflects interaction with Apishapa groups to the east, whereas the latter indicates relationships with northern Rio Grande Puebloans. Another example of trade with Rio Grande Puebloans, but from a probable Apishapa occupation, is the recovery of black-on-white ceramics from site 5LA12995 at the PCMS (Mueller et al. 2012). Nevertheless, taken as a whole, the evidence seems to indicate that most Late Prehistoric ceramics represent local manufacture. For example, Instrumental Neutron Activation Analysis (INAA) was conducted on cord-marked pottery recovered from the Oeškeso site near Parker. The analysis resulted in the determination that the pottery was made from clay and temper types commonly available along the Front Range and was likely made locally.

Lindsey and Krause (2007) described three distinct, locally manufactured, ceramic types from the Barnes site at the PCMS: Barnes Plain, Barnes Red Slipped, and Barnes Tool Decorated. The wares are compared to other "Upper Republican-type" pottery in the region. Based on these data combined with evidence from lithic material types and a strand of shell beads found on the Barnes site, the authors argue that the groups who occupied this and similar base camps in the region were not Upper Republican villagers using the area for logistical resource procurement forays, but rather highly mobile indigenous groups who may have shared some ancestral ties with "Central Plains farmers" (Lindsey and Krause 2007:104). Of interest to ceramic technology, the descriptions of the Barnes site ceramics are quite detailed, characterizing the vessel bodies as mass modeled, with high rounded shoulders and broad mouths to which was affixed a "single clay strap" forming a "gently out-flaring rim… topped with a rounded or flattened lip coil" (Lindsey and Krause 2007:100). Surface treatment consisted of vertical fiber stamping; the Red Slipped variety exhibits a "faux slip" created by the application of red ochre prior to being floated (Lindsey and Krause 2007:102). The authors note that examples of Barnes pottery have been found on at least two other sites in east-central Colorado, but otherwise they are quite rare. Barnes Red Slipped sherds were identified at nearby site 5LA13014 at the PCMS (Mueller et al. 2012), but the identification is problematic because the pottery seems to be cord marked rather than fiber stamped, and the single rim sherd does not seem to match the description provided by Lindsey and Krause. It is possible that the red-slipped ceramics from 5LA13014 were made in emulation of "authentic" Barnes Red Slipped pottery.

The proliferation of the use of ceramic vessels in eastern Colorado is hypothesized to be related to intensification of resource processing, as posited for ceramics at the Burke's Bend sites (Kalasz et al. 2007). Gilmore (2008) likewise considered pottery to be a technological response to resource stress caused by drought and population pressure because it allowed more efficient and intensive processing of lower ranked resources such as small seeds. The role of pottery within the settlement and subsistence systems of Late Prehistoric groups in eastern Colorado continues to be an important research issue. One goal of this line of research should be to determine how pots were used at functionally different sites within a group's settlement system. For example, at some sites they may have served primarily for particular types of processing (e.g., boiling maize or small seeds, bone grease rendering), whereas at others they may have been more important for storage. The degree to which pots were cached versus carried around by mobile groups is also important. The presence of ceramics at higher elevation sites in the foothills or mountains may reflect foraging by people based in the immediate area who only carried vessels short distances. Alternatively, ceramics at higher elevations may reflect seasonal exploitation of these environments by groups whose lower-elevation residences are much more distant and who cached pots on sites to which they planned to return. Some recent projects have yielded data that may be relevant to such questions. For example, several sites in the foothills or mountain valleys have produced ceramics, including the Lopez Ranch site on the upper Purgatoire River (Slessman et al. 2003), 5CF719 in the upper Arkansas Valley (Bargielski Weimer 1993), 5FN2516 along the Arkansas River (Gantt et al. 2010), 5HF1291 in Huerfano Park (Burnett et al. 2007), and three sites in Apishapa Canyon (5LA11557, 5LA11561, and 5LA12102) found during the Raton 2010 Expansion inventory (Kinneer et al. 2009).

Conversely, the factors that resulted in the lack of pottery at some Late Prehistoric sites are not fully understood. Many of the Late Prehistoric sites investigated during the Raton 2010 Expansion project in the valleys that dissect the Park Plateau below the Spanish Peaks yielded no pottery (Anderson 2012a; Anderson et al. 2013; Kinneer et al. 2009). Most of the excavated Late Prehistoric sites in Huerfano Park in the Wolf Springs Ranch/Stanley Creek land exchange (Burnett et al. 2007) likewise produced no ceramics. The Leef Ranch site along the upper Purgatoire River (Slessman et al. 2003), the mid-Developmental component at site 5LA3188 at Burke's bend (Kalasz et al. 2007), the Monument Creek site (Kalasz et al. 2005), 5DA1936 at Rueter-Hess (Gantt 2007), and Early Ceramic-period Component 3 at Franktown Cave (Gilmore 2005) are additional examples of regional Late Prehistoric sites or components that yielded no ceramics. Keeping in mind the element of randomness that determined where a pot ended its uselife and entered the archaeological record, it would seem that ceramic vessels were not crucial for many procurement and processing tasks carried out by Late Prehistoric people. However, the functional differences between ceramic and aceramic sites are not clear.

The ceramic data associated with the projects and studies cited above underscore the continued importance of most of the research questions and data gaps noted in the 1999 Arkansas River Basin context (Kalasz et al. 1999:183-185, 242-244). In particular, important research topics relevant to ceramic technology include the following:

- Tighter chronologies for all Late Prehistoric ceramics.

- Determining the differences between Developmental and Diversification cord-marked pottery.

- The mechanisms and contexts underlying the introduction of pottery and the transmission of ceramic technologies.

- Defining local production versus imported wares.

- Identification of production centers or regions.

- The role of pottery within settlement and subsistence systems.

- Patterns of ceramic exchange and the implications for interregional relationships.

Recent surveys and excavations have yielded abundant data that might be more closely studied to address some of the research questions posed in the 1999 context (Kalasz et al. 1999:243-244). Surveys, testing, and data recovery projects at the PCMS and Fort Carson, in particular, have found and investigated many ceramic sites, resulting in curated ceramic assemblages that are available for study. Ceramics from Trinchera Cave have never been adequately analyzed (Zier 2015). In light of Black's (2000, 2003) findings from an inventory of the surrounding area, it is interesting to speculate how the ceramic assemblages from Trinchera Cave might compare. All of the above research issues are potentially relevant to Late Prehistoric ceramic-bearing sites on BLM-managed lands within the RGFO.

Lithics

Understanding of flaked stone technologies in both the Arkansas and Platte river basins has been limited by the highly variable methodological approaches employed in lithic analyses conducted across the region. However, within the Arkansas River Basin, most researchers conclude that lithic reduction strategies and technologies during the Late Prehistoric stage reflect considerable continuity from the preceding Archaic stage, likely because Late Prehistoric populations carried on the lithic traditions of their Archaic ancestors. At most sites, both bifacial and expedient (i.e., flake tool) technologies are represented. During the Developmental period, both local and nonlocal (or exotic) materials were exploited, with the former used primarily for expedient tools and the latter for finely made bifacial and other formal tools. Most investigated Developmental period sites have yielded debitage assemblages reflecting the later stages of tool manufacture and rejuvenation. This suggests that early reduction stages were conducted elsewhere, but few such sites have been identified or investigated. Diversification-period lithic reduction techniques and strategies seem to represent a continuation of those employed during the Developmental period.

In the Platte River Basin, Gilmore (1999) noted that Early Ceramic populations relied heavily on expedient flake tools, though they also manufactured formal, shaped flaked stone tools using bifacial reduction techniques. He also noted that at least some Archaic groups in the region seem to have been even more heavily reliant on expedient tool technologies than Early Ceramic groups, a finding that seems to conflict with the assertion of a positive correlation between sedentism and reliance on expedient tools (Parry and Kelly 1987; Sullivan and Rozen 1985). Gilmore makes two other important points. One is that there is a need for greater consistency in debitage analytical methods and the other is that research into the relationships between assemblage composition and "other aspects of archaeological components" holds forth the promise of revealing information about settlement systems and the interplay between culture and environment (Gilmore 1999:271-272).

Projectile points exhibit clearer temporal trends than do general reduction strategies. A transition from the large corner-notched dart points of the Late Archaic period to the small corner-notched arrow points of the Developmental and Early Ceramic periods is well-evidenced in both the Arkansas and Platte river basins, respectively, though the presence of both types of points in some Late Prehistoric stage contexts suggests that the atlatl and the bow were in use simultaneously for a period of time. Moreover, some Archaic dart points recovered from Late Prehistoric contexts exhibit use wear and resharpening suggesting that they were collected and reused as knives and scrapers.

Small, triangular, corner-notched arrow points, such as the Scallorn type, were used during the Developmental period in the Arkansas River Basin. During the ensuing Diversification period (especially later in the period), small, triangular, side-notched arrow points such as the Reed and Washita types came into general use, especially by Apishapa-phase-affiliated groups. Sopris phase people continued to use corner-notched arrow point types that were common during the preceding Development period. The eventual dominance of the Reed/Washita type late in the Late Prehistoric stage may be related to their posited technological superiority for hunting bison.

Small corner-notched arrow points in the Platte River Basin include the Magic Mountain Corner-notched and Bayou Gulch Corner-notched types. The inception of the former type may date earlier than the latter, but both types span all or most of the Early Ceramic period. There are some indications that a high incidence of serrated points may typify occupations of the hogbacks/foothills (the purported "Hogback phase"), but it is not clear what this pattern means, because serrated points are not restricted to the hogbacks/foothills; rather, they have been found region-wide (Gilmore 1999). A variety of small side-notched and unnotched arrow points were used during the Middle Ceramic period, most of which were interregional in their distributions (see Gilmore 1999:Figure 6-1). These go by various names, most of which correspond to types that are well known outside the Platte River Basin.

Few meaningful chronological trends in ground stone use and form have been identified in the Arkansas River Basin for the Late Prehistoric stage or even between the Archaic and Late Prehistoric stages. Expedient forms of metates comprising minimally modified sandstone slabs were commonly used, though manos tended to be more uniform and exhibit greater modification. Most manos were the one-hand variety, though two-handed manos are known from Sopris-phase contexts. Similarly, more elaborate examples of metates, including the trough type resembling those used in the Southwest, have been found at Sopris-phase sites. Early attempts to define ground stone typologies at sites such as Magic Mountain have not withstood the test of time.

Based on morphological changes in manos from the Magic Mountain site through time, it initially appeared that ground stone might have the potential to be a temporally and functionally diagnostic artifact class within the Platte River Basin. Subsequent work, however, has not borne out this early promise. For example, although there were some differences in frequencies of mano types from Archaic versus Late Prehistoric contexts at the Bayou Gulch site, these differences could not be distilled down to simple morphological variations that held temporal meaning. The best that could be said at this site is that Archaic strata yielded more diverse manos, which Gilmore suggests might be a reflection of greater specialization in processing during the Archaic, compared to more generalized processing during the ensuing Late Prehistoric period (Gilmore 1999:274).

Apishapa Lithics

The general observations concerning Late Prehistoric and Diversification-period lithic technology discussed above hold true for the Apishapa phase. The later stages of lithic reduction are better evidenced on Apishapa-phase sites than are quarrying and early stage reduction. Apishapa peoples used both formal and expedient flaked stone tools. The most diagnostic lithic implement of the Apishapa phase is the small, side-notched type of arrow point known as Reed or Washita points.

Ground stone tools are common at Apishapa sites but tend to comprise very generalized and variable forms, such as unshaped, or minimally shaped, one-hand manos and simple sandstone slab metates. These tools likely served multiple purposes, including floral and faunal food processing but also hide-working, lithic reduction, and processing of non-food materials. Other types of ground stone include bedrock grinding slicks, shaft-smoothers, and ornaments.

Sopris Lithics

Sopris-phase lithic technology did not differ appreciably from that of other Late Prehistoric groups in the region. A variety of expedient and formal tool types were manufactured and used, with a particular emphasis on minimally modified flake tools. Local materials were heavily exploited, including argillite and basalt. Exotic materials indicative of interregional trade are also present in small quantities, such as Alibates dolomite from Texas and obsidian from northern New Mexico.

Diagnostic lithic tool types are restricted to projectile points and include a preponderance of corner-notched arrow points of the Scallorn type, with lesser numbers of unnotched triangular points. Side-notched arrow point types (i.e., Reed and Washita points) that were common among Apishapa groups are uncommon in Sopris contexts. Large dart points have been found on Sopris sites, but it is unclear whether they represent a continuation of the use of atlatl and dart technology or if they were used as knives or other nonprojectile implements.

Ground stone tools used by Sopris-phase groups exhibit more diversity and formal (i.e., patterned) types than are seen at Apishapa sites. Metates include slab, basin, and trough types, the former two types representing the processing of wild floral and faunal resources, whereas the latter type is assumed to reflect maize grinding. Similarly, manos reflect simple types used for wild food processing and larger, more carefully shaped handstones used in tandem with trough metates for milling corn.

Lithics: Recent Research

The 1999 Arkansas River Basin context identified numerous research issues and data gaps relating to lithic technology (Kalasz et al. 1999:183-185, 242-244). The research questions called out as important are quite specific but collectively they can all be subsumed into the following broad categories:

- Lithic material types (local versus nonlocal, differential uses, patterns of interregional exchange).

- Organization of lithic technology, including the use of expedient versus formal tool technologies on functionally different site types.

- The relationship between lithic reduction strategies and settlement systems.

- Diachronic change in lithic reduction strategies, including the shifting emphasis on expedient versus formal tool technologies.

- Temporal patterning of projectile points and the chronology of the replacement of the atlatl with the bow.

- The relationship between ground stone tools and subsistence.

Based on both the synthetic summaries of lithic technology presented in the 1999 context documents and the review of recent projects, two general observations can be made. The first is that the descriptions of Late Prehistoric lithic technology presented in the contexts are still quite valid. The second is that recent projects have yielded data that might be used to refine and revise some of the ideas concerning lithic technology presented in the contexts and to address the research issues listed above. Such detailed research is beyond the scope of this study. The discussion below, however, identifies some of the more significant findings of recent projects and their possible implications for refinement of current lithic technology paradigms in the study area.

Many recent projects have produced data relevant to research questions regarding lithic material types, demonstrating that Late Prehistoric people in eastern Colorado exploited a wide variety of local and nonlocal toolstones. In general, these data indicate that groups made heavy use of local materials where available, but tended to rely upon them primarily for expedient tools. In contrast, nonlocal or exotic materials (e.g., obsidian, Alibates chert/dolomite, Bridger Formation "Tiger" chert) were typically used to manufacture formal tools such as bifaces and projectile points. Projects reporting the presence of Alibates chert (more accurately, silicified dolomite) include Black's (2000, 2003) Trinchera Cave area survey, a large inventory at the PCMS (Karki et al. 2006), and the Saint Charles River project (Evans 2012). Kalasz et al. (1999) pose two research questions concerning Alibates dolomite, neither of which can be settled with recent data. One of the questions asks whether some of the identified Alibates dolomite in eastern Colorado is actually a local material that merely resembles Alibates. This is an important question; identification of lithic materials based on casually observed macroscopic attributes may be accurate in many cases, but it seems there is much potential for misidentification of materials that resemble famous named toolstones but are actually from unidentified local sources.

The same large PCMS inventory cited above (Karki et al. 2006) reported finding Black Forest petrified wood, Edwards Plateau chert, Flattop chalcedony, Hartville chert, Niobrara jasper, Tiger chert (Bridger Formation), and Trout Creek chert, commonly referred to as jasper. Another PCMS project (Schiavitti 2003) also found Bridger Formation Tiger chert. If all of these identifications were accurate, this represents an amazing diversity of nonlocal materials coming into the area from great distances. Most recent projects, in contrast, have found that Late Prehistoric populations relied primarily on locally available lithic raw materials. For example, sites documented during the Raton 2010 Expansion survey and testing project (Kinneer et al. 2009) yielded locally available fine-grained basalt, in addition to chert, chalcedony, and quartzite that were all thought to be local. The data recovery phase of the Raton 2010 Expansion project mostly yielded basalt and hornfels from sites along the Apishapa River (Anderson et al. 2013). The Raton 2010 Expansion sites produced no examples of exotic or nonlocal stone. At the Leef Ranch site along the upper Purgatoire River (Slessman et al. 2003), the Developmental-period component reflected the use of local materials for early stage reduction, but exotic imported materials for bifacial reduction and formal tools, with evidence that the Late Prehistoric occupants relied more on local materials than the preceding Archaic site occupants. The sites investigated in Huerfano Park for the Wolf Springs Ranch/Stanley Creek Land Exchange (Burnett et al. 2007) mostly exhibit similar lithic signatures consisting of early stage reduction and expedient tool manufacture using local lithic materials such as quartzite. Ostensibly nonlocal materials including argillite, chert, chalcedony, petrified wood, and "silicified sediment" were also reduced, though the authors concede these may actually have been acquired from local sources.

Trout Creek chert is a well-known material found within Leadville/Manitou Formation limestone that was highly valued and widely traded prehistorically. The large type site, 5CF84, is centered on Trout Creek Pass in Chaffee County, approximately 7 mi. east of the town of Buena Vista. Another major source of what is likely the same material has been identified at the Bear Creek Quarry (5FN72), a lithic landscape about 22 miles south of the Trout Creek type site (Brechtel 2014). The Bear Creek Quarry is characterized by probable Trout Creek chert in a primary geological context associated with exposures of limestone bedrock. According to Larmore and Gilmore (2006), Trout Creek chert is the most prevalent lithic material in South Park, with Kremmling chert the second most commonly encountered lithic material in archaeological contexts. A dendritic chert said to be similar to Trout Creek chert—although not definitively identified as such—was found at several sites in the foothills along the Arkansas River (Gantt et al. 2010), and the same project also identified Kremmling chert. As noted above, Trout Creek chert has also been identified at the PCMS (Karki et al. 2006). The procurement, associated reduction strategies, exchange, and distributions of this material type are important research issues.

Obsidian has been found on many eastern Colorado sites. There are no known obsidian sources in the RGFO study area; therefore, all obsidian is considered an exotic or imported lithic material. The source of the obsidian used prehistorically in the region is an important research issue. Most has been geochemically traced to one of several sources in northern New Mexico (Kalasz et al. 1999). Recent data reinforce this pattern; nearly all recently reported sourced obsidian is from northern New Mexico sources such as Cerro del Medio and Polvadera Peak. This includes obsidian from the PCMS (Bamat et al. 2007; Kalasz et al. 2007; Karki et al. 2006; Owens and Loendorf 2002), Fort Carson (Anderson 2008), the upper Purgatoire River (Slessman et al. 2003), the Park Plateau (Kinneer et al. 2009), Huerfano Park (Burnett et al. 2007), and the Saint Charles River (Evans 2012).

Several other recent projects have yielded insights into research issues associated with spatial distributions of lithic material on the landscape and the implications of those patterns. Brunswig's analysis of lithic material types in Rocky Mountain National Park suggested that Middle Ceramic groups were wider-ranging than Early Ceramic groups, based on the greater diversity of material types from multiple regional sources used by the later groups (Brunswig 2005). According to Anderson (2012b) two sites along the Cache la Poudre River near Windsor exhibit heavy use of mountain-derived lithic materials, which speaks to the mobility of Late Prehistoric groups who lived along the margin of the foothills and the piedmont. Another study relevant to mobility and the transportation of lithic materials across the landscape is Basham and Holen's (2006) analysis of the Easterday II Cache. The distinctive flake cores in this prehistoric cache illustrate one mechanism for the transport of a regionally desirable lithic material, Flattop chalcedony. The flaking pattern on the majority of the flake cores suggest they served for the manufacture of side-notched arrow points during the Middle Ceramic period. This example of caching behavior likely reflects planning depth (sensu Binford 1986) and has implications for research into mobility, settlement systems, and the organization of lithic technology.

A research question reiterated several times in the Arkansas River Basin context pertains to the demonstrated association of late-stage lithic manufacture with both Developmental and Diversification residential sites (Kalasz et al. 1999:184, 243, 245). In other words, many investigated Late Prehistoric habitation sites in southeastern Colorado lack evidence for the early to middle stages of lithic reduction, exhibiting only the later stages of tool manufacture, finishing, and maintenance. Recent datasets have the potential to yield further insights into this pattern, and seem to include cases that contradict it. For most residential sites, it seems likely that the missing early stages of lithic reduction will be found at nearby lithic quarries or procurement areas, or at short-term camps associated with lithic procurement areas. Models focusing on transport costs (e.g., Metcalfe and Barlow 1992) suggest that prehistoric people would have attempted to remove as much low-utility waste from lithic products as possible to reduce the energetic cost of transporting heavy materials across the landscape. Clarifying Late Prehistoric patterns of toolstone procurement, early stage reduction, and transport should be considered an important goal for future research.

Several major research problems are associated with the chronology of projectile technology. In particular, better understanding of the persistence of the atlatl and the introduction of the bow is needed. Regarding the former issue, the Monument Creek site in Colorado Springs yielded only dart points from the early Developmental occupation (dated to A.D. 135–310), leading the excavators to suggest that the atlatl and dart remained in use during this period (Kalasz et al. 2005). Other sites have produced evidence of simultaneous use of the atlatl and bow. For example, site 5HF1201 in Huerfano Park—which was occupied during the period A.D. 345–540—produced both dart and arrow points, suggesting that both technologies may have been used at the same time (Burnett et al. 2007).

In general, Developmental and Early Ceramic period components are dominated by small corner-notched projectile points (Kalasz et al. 1999), but side-notched points are found in components dating to this time period as well. Many of these are not of the Reed/Washita type common during the ensuing Diversification/Middle Ceramic period, but rather small points with wide, shallow side notches. During the Diversification/Middle Ceramic period, Reed/Washita and other small side-notched points are prevalent except in Sopris-phase contexts. Even within Apishapa and northeastern Colorado Middle Ceramic period contexts, however, the use of corner-notched arrow points continued, albeit in lower frequencies. The recent data do not contradict these well-known regional paradigms. One research question posed in the 1999 context concerns the association between side-notched Reed/Washita points and Apishapa-phase bison procurement (Kalasz et al. 1999:243). To provide just two examples, recent investigations at sites 5LA6595 and 5LA3189 at the PCMS (Kalasz et al. 2007; Schiavitti et al. 2001) have recovered additional data confirming this association, and close inspection of other recent excavated data will likely reveal additional examples.

Recent research explicitly focusing on ground stone technology is rare. The research questions posed in the 1999 Arkansas River Basin context focus on the degree to which Developmental-period ground stone assemblages represent an expedient rather than formalized technology, if there is a correlation between ground stone form and the processing of specific economic items, and whether Sopris-phase ground stone assemblages exhibit more formally patterned tools than those of the Apishapa phase (Kalasz et al. 1999). It seems unlikely that recently acquired datasets can resolve such questions, although their careful analysis might produce additional insights. Two examples of possible formal ground stone technologies include the identification of a metate at site 5LA7421 at the PCMS with a “nutting” area adjacent to the grinding surface (Schiavitti 2003) and the recovery of examples of two-hand manos in the Developmental-period component at the Leef Ranch site (Slessman et al. 2003).

Bone Tools and Ornaments

Numerous sites across the Arkansas River Basin have yielded evidence of a long-standing tradition of bone tool and ornament manufacture from both Archaic and Late Prehistoric contexts, with some indications of temporal, spatial, and cultural variability. There is some evidence that these industries were more intensive during Late Prehistoric times compared to the Archaic stage, at least at some sites. Beads were manufactured from cottontail, jackrabbit, and bird bones. Awls and tools, such as shaft wrenches, spatulas, scrapers, and digging sticks, were made from medium and large mammal long bones and ribs. Diversification-period architectural and rockshelter sites, in particular, exhibit greater quantity and variability of bone tools and ornaments compared to earlier periods. The use of substantial quantities of bison bone at some Apishapa-phase sites has been noted, a trend that is not evident at Sopris-phase sites, where deer remains are more prevalent. Bone tools and ornaments are not explicitly addressed in the discussion of the Late Prehistoric period in the Platte River Basin. Although recent projects present some new data pertaining to bone and antler tools, in general these data are consistent with the summaries of bone and antler artifacts presented by Kalasz et al. (1999) for the Arkansas River Basin.

Apishapa Bone Tools and Ornaments

Apishapa-phase sites have produced robust assemblages of bone tools and ornaments. Common bone tools by function include hide and leather-working implements, shaft wrenches, pressure flakers, and digging tools. The list does not include bison scapula hoes, which are typical of Plains Village sites. However, as noted above, bison bone does seem to be a favored material for tool manufacture during the Apishapa phase. Bone ornaments were commonly made of bird bones and small to medium mammal bones.

Sopris Bone Tools and Ornaments

A variety of bone and antler tools have been recovered from Sopris-phase sites, including awls, wrenches, pressure flakers, gougers, and other implements. These tools are primarily made from deer and cottontail rabbit bones. Bone tools common among Plains Village groups, such as bison scapula hoes and tibia digging tools, are lacking. Bone ornaments include beads made from cottontail and large bird bones.

Miscellaneous Materials

Apishapa Miscellaneous Materials

Apishapa-phase sites have yielded a variety of utilitarian and decorative items such as shell and stone ornaments, pigment stones, and perishable materials. The latter include fire-making kits (wood basins and drills), reed cigarettes, bows, arrow shafts, basketry, skin bags, sandals, mats, cordage, rabbit fur blankets, and feather bundles.

Sopris Miscellaneous Materials

Ornaments, including beads and pendants from stone and imported marine shell, have been recovered from Sopris-phase sites, in addition to bone beads as noted above. Marine species represented by the shell ornaments include *Glycymeris* and *Olivella*, both of which indicate long-distance trade networks.

Settlement Patterns

Settlement systems and subsistence strategies during the Late Prehistoric stage throughout the Arkansas River Basin are largely understood through survey data. Much survey work had been done prior to 1999 in Fort Carson, the Piñon Canyon Maneuver Site (PCMS), and Picket Wire Canyonlands, but comparatively little work had been done on the Park Plateau and in the foothills areas of the Arkansas River Basin. Excavated data from a limited number of pre-1999 excavation projects supplemented the inventory data and allowed for greater understanding of subsistence and site function. The best data for settlement research are associated with the Developmental period and the Apishapa phase. Less is known about the Sopris phase, which has been more intensively investigated in northeastern New Mexico, and is therefore better understood in that region. In the Arkansas River Basin, the Sopris phase is primarily represented by architectural sites on the Park Plateau, comprising homesteads and hamlets on terraces above the Purgatoire River and its tributaries (Mitchell 1997).

The first substantive research into Late Prehistoric settlement patterns was conducted by Campbell (1969) on the Chaquaqua Plateau. Campbell devised a site typology and examined the distributions of sites by time period and site type. His conclusions regarding settlement patterns immediately prior to and during the Late Prehistoric are summarized below. According to Campbell's analysis, Late Archaic peoples primarily occupied rockshelters within canyons. During the ensuing Developmental period, bison hunting forays increasingly emanated from the canyons onto the adjoining Plains. At the same time, Developmental period peoples gradually constructed and occupied stone structures in upper and lower canyon settings. This trend progressed through time, resulting in late Developmental-period groups settling more intensively into lower, wider canyons and, presumably, becoming more reliant on maize farming. During the succeeding Apishapa phase, open stone architecture became even more prevalent—especially multiroom structures on canyon rims that were presumed to be defensive in nature—and farming more intensive. Populations likely peaked during this period of time. Gradual abandonment of the region began in the 1300s and, one or two centuries later, the appearance of tipi rings suggests the arrival of Athapaskan groups.

More recently, large inventory projects have generated considerable information about Late Prehistoric settlement patterns in their respective study areas. In the PCMS, Andrefsky (1990) suggested that the data indicated no real changes in settlement patterns through time. Surveys at Fort Carson and in the Picket Wire Canyonlands in the early to mid-1990s focused on significantly different topographic settings. The former area is characterized by large drainages and shallow canyons near the foothills of the Rocky Mountains, whereas the latter area comprises the deep canyons of the Purgatoire River. These projects revealed that Late Prehistoric stone habitation structures are far more prevalent in the Picket Wire Canyonlands, though a few were found at Fort Carson. Since these long-term residential sites probably reflect a greater degree of sedentism, it would appear that the occupants of Picket Wire Canyon and its tributaries were more settled and likely more reliant on maize horticulture than their contemporaries in the Fort Carson area, roughly 85 miles to the northwest.

Taylor Arroyo, within the PCMS, is a tributary of the Purgatoire River. A study of settlement patterns within the Taylor Arroyo drainage basin focused exclusively on architectural sites (Kalasz 1988, 1989, 1990). It was found that these sites—even large multiroom structures—were not restricted to canyon rim locales, and there was little evidence they had a defensive function. In fact, stone architectural sites were found in every physiographic zone within the study area except for mesa tops. Nevertheless, the great majority of the stone enclosure sites were associated with canyon settings.

In toto, the studies described above demonstrate that Late Prehistoric occupations were especially intensive within and adjacent to canyon settings, but that other physiographic zones were also exploited. They further demonstrate that, although maize horticulture was important during the Late Prehistoric, the presence of many different site types from this period reflects diverse regimes of subsistence and resource procurement. Substantial variability among Developmental period rockshelters and open architectural sites suggests that these sites served a variety of functions in addition to being residential bases. Nonarchitectural open sites likely functioned as specialized—possibly logistical—procurement or processing locales. On the Park Plateau, many Developmental period sites are on terraces or canyon rims above stream floodplains, suggesting the importance of proximity to areas suitable for both horticulture and gathering of wild edible seeds. As such, at least some groups of this period would seem to have been semisedentary.

During the Diversification period, sites associated with both the Apishapa and Sopris phases encompass a wide range of types, including residential sites with architecture, nonarchitectural sites representing resource extraction and processing locales, and rockshelters that served as residential bases or seasonal camps. The full range of site types for both phases is the key to understanding their respective settlement systems, but much more excavation at all site types is needed before such understanding is achieved.

Gilmore (1999) prefaced his discussion of settlement patterns in the Platte River Basin with a caveat about the quality and quantity of the database. Abundant, high-quality inventory data, coupled with substantial data from excavated contexts, are clearly necessary for the construction of tenable settlement system models. When the context document was written, the combined evidence from survey and excavation in the Platte River Basin did not constitute a sufficiently robust dataset for building strong settlement models. Nevertheless, some general observations about settlement patterns during the Early and Middle Ceramic periods can be made. Gilmore (1999) noted that Early Ceramic period settlement patterns resembled those of the preceding Archaic stage. The entire river basin was occupied, but the larger, more intensive occupations were on the piedmont and in the hogbacks/foothills. Water was a critical variable in the placement of camps. Sites are found on ridges, hills, and terraces overlooking valleys with permanent and intermittent streams. Rockshelters along the hogbacks and foothills were also heavily utilized, and this physiographic zone has also yielded the most numerous habitation structures for the Early Ceramic period. Few long-term campsites—and no habitation structures—are known from the mountains, but there is substantial evidence for seasonal use of mountain environments. Benedict's "grand circuit" model is characterized by seasonal use of high elevations by populations who wintered in lower elevation settings along the Front Range (Benedict 1992). Overall, Early Ceramic-period groups seem to have engaged in some version of a collector strategy (sensu Binford 1980), in which intensively occupied residential sites served as bases for logistical forays targeting resources that would be stored for winter consumption.

Less is known about settlement patterns during the Middle Ceramic period because fewer sites are known. In general, Middle Ceramic occupations on the piedmont and along the hogbacks/foothills are smaller, exhibit sparser and less diverse material culture, and were less intensive, compared to the preceding period (Gilmore 1999:247). Unlike the pattern of aggregated horticultural villages seen in the heartland of the Upper Republican culture in present-day western Nebraska and Kansas, the Colorado sites—which lack architectural features—seem to represent a continuation of the lifeway of the Early Ceramic period, albeit with a smaller, more residentially mobile population. It is possible that regional populations were declining and groups began to practice a less logistically based settlement system emphasizing foraging over collecting. As Gilmore (1999) notes, however, such inferences do not take into account the possibility that a settlement shift during the Middle Ceramic period resulted in the placement of sites in areas that were subsequently subjected to geologic processes that obscured or destroyed them. Farther east, more numerous Middle Ceramic-period sites are found along the margin between the piedmont and the High Plains. These often single-component sites exhibit materials suggesting a closer relationship to Upper Republican groups of the High Plains than sites to the west typically exhibit. Moreover, more of these sites seem to have been residential bases, suggesting that a different settlement system was practiced compared to Middle Ceramic groups along the Front Range.

Apishapa Settlement Patterns

The question of the geographic distribution of Apishapa-phase occupations is complicated by the diverse range of site types associated with the phase and by the frequent lack of temporally diagnostic artifacts used to infer Apishapa cultural affiliation. That is, many sites may represent Apishapa occupation, but they may not be recognizable as such if they are simple, nonarchitectural sites that lack temporal and cultural diagnostics. Nevertheless, current data suggest that the northern extent of Apishapa occupation was "well north of the Arkansas River but south of the Palmer Divide," whereas the southern boundary extended into the Dry Cimarron River valley of northeastern New Mexico (Kalasz et al. 1999:213). The eastern extent is demarcated by the Carrizo Creek area in extreme southeastern Colorado and possibly Kenton Cave in the Oklahoma panhandle. The western extent is poorly defined, but may lie along the foothills of the Rocky Mountains or possibly a short distance into the mountains.

Current views continue to emphasize the importance of canyon or valley settings within Apishapa-phase settlement patterns. Such settings range from the shallow upper reaches of major regional drainages, such as the Arkansas and Apishapa rivers, to the deeply incised canyons of the Picket Wire Canyonlands and its tributaries. Many, if not all, Apishapa settlement systems seem to have been tethered to such settings, likely because of the protection they afforded, the raw materials for the construction of habitations that were occupied for much of the year, relatively abundant floral and faunal resources, and the availability of arable land for maize farming. Yet it is equally clear that Apishapa peoples exploited the entirety of the surrounding region, likely venturing seasonally into the open prairies and the adjoining Rockies to hunt big game and to obtain important wild plant foods. A variety of functional site types has been posited, including large open architectural sites that may have been occupied year round, small single-structure habitation sites, rockshelters with or without architecture, and open artifact scatters that likely represent campsites or procurement locales. Sites within canyon settings may be associated with farming or foraging, whereas those in other settings may be associated with foraging or hunting. An important goal of future research will be to find better ways to assign dates and cultural affiliation to the entire range of Apishapa sites and to parse out their variability in terms of their roles within the settlement system, thereby fleshing out the full settlement and subsistence systems of Apishapa-phase groups.

Sopris Settlement Patterns

A fuller understanding of the geographic distribution of Sopris-phase sites is hampered by the difficulty in recognizing occupations of this period, which is typically accomplished by identifying the presence of rectilinear stone masonry architecture or Taos pottery (decorated or culinary). Sites that exhibit these traits extend across the southern Park Plateau. Sopris-phase sites have been found throughout the Trinidad district: west of the town of Trinidad in the vicinity of Trinidad Lake, along the upper Purgatoire River and its tributaries, east of Trinidad on the eastern side of Raton Mesa, and on both sides of Raton Pass (Kalasz et al. 1999). In the New Mexico portion of the Park Plateau, there has been some uncertainty in identifying Sopris-phase sites because of the use of other taxonomic schemes. However, the contemporaneous Ponil phase defined by Glassow (1980, 1984) is regarded by the authors of the 1999 Arkansas River Basin context as an equivalent cultural construct (Kalasz et al. 1999:234-235), and the succeeding Cimarron phase likely represents a continuation of the lifeway characterizing both the Ponil and Sopris phases (but persisting longer than the Sopris phase in Colorado). In summation, it is clear that a fairly cohesive cultural phenomenon that included the use of aboveground masonry habitation structures, Taos culinary and Black-on-white trade wares, and a mixed economy based on both horticulture and foraging existed during the period A.D. 1050 to 1200 or later along the eastern slope of the Sangre de Cristo Mountains.

Research conducted in the New Mexico portion of the Park Plateau suggests that a settlement shift toward lower elevations occurred near the beginning of the Diversification period. Habitation sites shifted from upland settings to alluvial bottomlands, terraces, benches, and side canyons along major drainages. This is interpreted as a reflection of the increasing importance of horticulture and the need for arable land. On the Colorado portions of the Park Plateau, survey work as of the writing of the 1999 context document was more geographically restricted, and it was more difficult to discern Sopris settlement patterns over broad areas encompassing different elevation zones and topographic settings. Nevertheless, the available data support the idea that Sopris-phase settlement was concentrated within major regional drainages in areas where maize horticulture was possible, with the caveat that some Sopris habitations have been found in locations not conducive to maize growing, such as rocky promontories. There is abundant evidence for seasonal use of the uplands during this period, however, even though it is typically difficult using survey data to distinguish lithic sites of the Sopris phase that lack structures and pottery from those of other time periods or cultural traditions. Like other semisedentary cultural groups, Sopris-phase peoples likely exploited the full range of elevations and environments within their territories to maximize their success in hunting and gathering and horticulture. It will be important to continue to focus research on the full settlement and subsistence systems of Sopris-phase groups and to understand all of their variability and range of site types.

Among structural Sopris-phase sites, two distinct patterns have been discerned. One is for the presence of single habitation structures in a wide variety of settings. The other consists of the presence of multiple contemporaneous structures near permanent streams or rivers. The first site type has been referred to as homesteads, implying single household occupations. However, some researchers, employing a site typology borrowed from the Puebloan Southwest, have proposed that these sites represent field houses. The second pattern seems to reflect the existence of hamlets or small villages.

Settlement Patterns: Recent Research

The numerous recent inventories conducted in the present study area have yielded abundant data that might be used to refine existing settlement system models as presented in both the Arkansas and Platte river basin contexts. Overall, these surveys neither contradict existing settlement pattern models nor fully answer the research questions presented in the contexts; rather, they fill in details pertaining to local variations in topography, resources, and settlement. For example, an archaeological survey of Welsh Canyon within the PCMS confirmed existing settlement pattern models for this area by revealing that although all parts of the canyon settings were used by prehistoric peoples, the distributions of artifacts, architecture, and other features indicate that habitations were most frequently associated with canyon rims, particularly in rockshelters with good access to adjoining uplands and canyon bottoms (Loendorf and Loendorf 1999). Excavations at Burke's Bend at the PCMS produced data relevant to settlement patterns during both the Developmental-period and Apishapa-phase occupations (Kalasz et al. 2007). The authors suggest that Late Prehistoric populations aggregated during the winter to occupy residential sites in canyon settings. Other less substantial sites in the area represent seasonal field camps near important resources. Thus, the model reaffirms the importance of canyon settings for residential bases, but also incorporates base camps in steppe settings that were important during warmer seasons. In a study comprising a predictive model for architectural sites at the PCMS, Owens (2007) found that site locations changed through time, with Developmental-period sites found near permanent water and more abundant resources, and Diversification period sites found in areas that seem to reflect a concern with viewshed or seclusion. Architectural sites are associated with canyon rims, ridges, and prominent points, and mostly exhibit southern exposures suggesting cold weather occupation. A significant number of habitation sites, however, have northerly exposures that suggest seasonal occupation and probably exploitation of nearby seasonally available food resources. This settlement pattern is similar to that posited for Burke's Bend (Kalasz et al. 2007), as described above. Owens also addresses the possibility that some sites had a defensive function, concluding that defense of resources and territory may have been an important determinant of residential site placement during certain periods.

Elsewhere in the region, based on an inventory of the area surrounding Trinchera Cave, Black commented that settlement systems were locally oriented, with no obvious evidence for use of mountain areas to the west (although there was evidence for trade relationships with groups to the west) (Black 2000, 2003). In the upper Purgatoire River valley, sites such as the Developmental-period Leef Ranch site and the Sopris-phase Lopez Ranch site—both likely seasonal short-term camps—are important for studies that seek to understand all site types within Late Prehistoric settlement systems, an important goal because past studies have been weighted heavily toward residential sites (Slessman et al. 2003). Similar sites on the Park Plateau and in the major drainages below the Spanish Peaks were investigated for the Raton 2010 Expansion Pipeline project (Anderson 2012a; Anderson et al. 2013; Kinneer et al. 2009). These sites probably represent seasonal, short-term, logistical camps or specialized task locales. Other projects have yielded similar data; for example, sites investigated in Huerfano Park likely represent seasonal short-term camps reflecting the more mobile aspects of Late Prehistoric settlement patterns (Burnett et al. 2007). The authors suggest that Late Prehistoric use of Huerfano Park consisted of seasonal hunting and gathering by groups whose residential bases were in northern New Mexico (based on the presence of obsidian sourced to the Jemez Mountains). It seems more likely that the sites were created by foragers who lived closer to the area, perhaps to the south or southeast along the Purgatoire River or east along the margin of the foothills and the Plains. Projects and sites such as these are particularly relevant to future research on BLM lands within the RGFO, which likely contain many similar sites that have the potential to yield data that can increase our understanding of the full range of Late Prehistoric settlement patterns.

An interesting M.A. thesis project involved the documentation of architectural sites along the Saint Charles River near Beulah (Evans 2012). This study includes an argument that architectural features in canyon settings along the river represent warm-season Apishapa occupations used by mobile hunter-gatherers within a logistically organized settlement system, and refutes the alleged defensive purpose of the structures. Evans argues that the structures and their placement were linked to the efforts of prehistoric hunters to monitor and ambush game animals that followed established routes to access the river. The importance of such studies is that they compel us to think about alternative interpretations of Late Prehistoric architecture and settlement patterns.

Elsewhere, several projects have yielded data applicable to settlement pattern research or discuss Late Prehistoric settlement patterns. These include the Monument Creek site excavation report (Kalasz et al. 2003b), an M.A. thesis that uses lithic materials as evidence for Late Prehistoric mobility (Anderson 2012b), inventories conducted in Rocky Mountain National Park that revealed evidence of Late Prehistoric use of interior mountain valleys and high elevations (Brunswig 2005), and a study of the Olson Game Drive site that addresses how the site may have fit into Late Prehistoric settlement systems (LaBelle and Pelton 2013).

Perhaps the recent study that is most important in terms of its ramifications for understanding Late Prehistoric settlement and subsistence systems in eastern Colorado is Kevin Gilmore's Ph.D. dissertation (Gilmore 2008). Although this study is primarily concerned with paleoenvironmental change and its effects on demographic change, these forces had drastic effects on settlement patterns throughout the Late Prehistoric, as they are likely responsible for demographic expansions that resulted in a chain reaction, played out over decades or centuries, of population pressure, decreased residential mobility, and smaller group territories. These factors dictated settlement strategies by reducing the size of resource catchments, which in turn forced more efficient use of available resources and the intensification of resource processing. The study links these factors to the adoption of the bow and arrow, ceramic technology, and maize horticulture.

Rock Art

Rock art, which is not addressed in the discussion of the Late Prehistoric period in the Platte River Basin, has been a major focus of research in the Arkansas River Basin. Rock art sites associated with the Late Prehistoric stage are numerous across the Arkansas River Basin, but because dating of these sites is problematic, it has proven difficult to demonstrate affiliation with particular periods or phases. Rock art styles defined in the region include the Pecked Representational, Purgatoire Petroglyph, Purgatoire Painted, and the Rio Grande (or "Regional") styles, although the latter is associated with Protohistoric occupations. The earliest Pecked Representational Style petroglyphs likely date to the Archaic stage, whereas the Purgatoire Petroglyph and Purgatoire Painted styles are most closely linked to the Developmental and Diversification periods. The dominant type of rock art in the region is the Purgatoire Petroglyph Style, which consists of anthropomorphs with digitate hands and knobby knees and sometimes horns or headdresses, in addition to quadrupeds with rectangular bodies, straight legs, and poorly defined heads with or without antlers. Other motifs in this style include meandering lines and atlatls. Rock art panels, particularly of the Purgatoire Petroglyph Style, are most numerous in the dissected canyons of the lower Purgatoire River area.

Rock Art: Recent Research

Many inventories and other projects conducted since 1999 have accumulated data on rock art, primarily within the PCMS, Picket Wire Canyonlands, or the tributaries of the Purgatoire River. However, recent research or synthetic studies focused solely on rock art are not numerous. One author considers rock art sites within a particular area of the PCMS (Wintcher 2005). This study employs archaeological and ethnographic evidence to examine the relationships between rock art and landscape. Using the possible link between the archaeological Apishapa culture and later Caddoan-speaking peoples, the author invokes Caddoan mythology and spiritual worldview in an attempt to interpret rock art. The significance of boulders and canyon interiors where rock art panels are emplaced are explained, at least in part, through the concept of spirit homes. The author also describes the use of rock art to control access to important locales.

Larry Loendorf's (2008) recent book, *Thunder and Herds,* provides a comprehensive treatment of rock art at the PCMS and in the adjoining Picket Wire Canyonlands. The book presents detailed descriptions of the various rock art styles and evidence for their chronological ordering. Importantly, the social milieu of central High Plains rock art is stressed, and various lines of archaeological evidence are pulled together to place rock art within an anthropological context. In the final synthetic chapter of the book, Loendorf summarizes important research problems such as the differences between the rock art traditions of the central High Plains versus the Park Plateau. He presents some intriguing ideas, including the representation of hunting ceremonies in some Apishapa rock art panels and the possible role of rock art as social boundary or group territory markers. Many of the ideas discussed throughout the book, and especially in the final chapter, might be recast as questions to be pursued through future research. Such research questions are described below.

- Loendorf asserts that, during the late Developmental and Diversification periods, the rock art of the Park Plateau and central High Plains exhibits striking differences and a "clearly defined boundary" (Loendorf 2008:225). He characterizes the former as having Puebloan origins, and the latter as having originated among Caddoan groups. These claims would seem to be in general agreement with existing archaeological paradigms. However, he also contends that the differences in rock art—particularly, the absence of quadrupeds in the Park Plateau tradition—indicates that there was "never an established relationship between the two regions" (Loendorf 2008:225). This conclusion might be perceived as an overreach, especially since it is based almost solely on rock art. Although interactions between the two regions may not have been deep and enduring, other archaeological data suggest that it occurred, and may well have been important for trade and the exchange of ideas and technologies. Additional research should be focused on this issue, primarily using explicitly archaeological lines of evidence.

- Loendorf (2008:225-226) invokes the principles of social geography to propose a possible explanation for the spatial distributions of rock art on the landscape. Briefly stated, he posits a relationship between the placement of particular rock art symbols and the territorial boundaries of cultural groups. Distinctive rock art at the margins of a group's territory may have been easily recognizable by neighboring groups and served as boundary markers that warned outsiders against entering the territory. This hypothesis might be investigated more thoroughly by comparing the geographic distributions of particular rock art symbols against other archaeological data, such as the spatial patterning of diagnostic artifacts, architecture, and particular site types across the landscape.

- The meaning of Apishapa phase rock art that incorporates quadrupeds, some of which appear to have projectiles embedded in them or are being driven in some fashion, is not well understood. Loendorf (2008:229-231) argues that such panels were part of a proto-Caddoan hunting complex that were likely accompanied by shamanic or sympathetic magic rituals with the goal of increasing success in the procurement of big game. He further notes that this idea is supported by ethnographic and ethnohistoric evidence, as well as archaeological data (Loendorf 2008:230-231). He cites positive correlations demonstrated by the locations of game drive sites, rockshelters containing faunal remains, and rock art panels depicting game drives or the pursuit of game. Additional research at archaeological sites associated with such rock art might clarify these patterns.

Economy and Subsistence

The degree of reliance on maize horticulture versus hunting and gathering during the Late Prehistoric stage in both the Arkansas and Platte river basins is a major research issue. Evidence of cultigens in the Arkansas River Basin—consisting of the remains of maize and beans—has been recovered in small quantities from Developmental period sites, and is even more common at Diversification-period sites. Despite the rather consistent presence of maize on Late Prehistoric sites, the general consensus among archaeologists who have worked extensively in the region is that maize horticulture was a relatively minor part of Late Prehistoric subsistence. There are some areas where maize horticulture seems to have played a more important role, such as the Park Plateau. Maize growing was also more important in Apishapa- and Sopris-phase sites compared to other Late Prehistoric sites. Yet, abundant macrobotanical evidence has been recovered indicating the importance of wild floral resources during the Late Prehistoric, such as goosefoot, pigweed, dropseed, beeweed, Indian ricegrass, purslane, pea family, sunflower, cactus (hedgehog, prickly pear, and cholla), skunkbush, chokecherry, pinyon pine nuts, juniper berries, and yucca. Some researchers have even suggested that goosefoot was cultivated. At least one prominent researcher, however, has maintained that maize horticulture was more important during the Sopris phase than is indicated by the macrofloral data (Mitchell 1997).

Developmental period maize exhibits considerable morphological variability, suggesting that there was little selection for particular seed types. In fact, it appears that maize growers of this period may have simply planted the seeds in favorable areas and did not invest much time in care and weeding. Given the regional evidence for increased reliance on maize during the Diversification period, it is likely that the casual attitude toward maize horticulture during the preceding Developmental period was gradually supplanted by more attentive and deliberate production methods during the Apishapa and Sopris phases.

In the Platte River Basin, evidence for maize horticulture is even sparser. A low number of Early Ceramic-period sites in the hogbacks/foothills and the piedmont have yielded maize macrofossils or pollen, and one site of this period in the Pawnee National Grassland (Three O'Clock Shelter, 5WL1997) produced two kernels of corn (Gilmore 1999:270). Maize at Middle Ceramic sites as of the writing of the 1999 context was restricted to one kernel of corn recovered from the Agate Bluff I site, 5WL1478, and it was not even clear that the macrofossil was associated with the Middle Ceramic component. Excavated Early Ceramic components in the Platte River Basin have yielded a variety of wild floral resources, such as seeds of goosefoot, sunflower, various grasses, purslane, yucca, dropseed, bulrush, cocklebur, amaranth, saltbush, evening primrose, smartweed, ponderosa pine, pinyon pine, bedstraw, and tansy mustard, in addition to the fruits or other edible parts of wax currant, wild grape, prickly pear, chokecherry, acorns, wild plum, hackberry, and juniper. In general, exploitation of wild fruits is more common in the hogbacks/foothills, whereas seeds seem to have been more intensively collected in areas to the east. Data from Middle Ceramic components are less abundant, but sites of this period have yielded similar macrofloral remains, dominated by goosefoot and similar seeds, and also including wild rose, flat sedge, nut grass, raspberry, buffaloberry, spiderwort, and some type of starch, possibly from edible roots or tubers (Gilmore 1999).

Considerable faunal data have been accumulated from excavated sites in the Arkansas River Basin. At Fort Carson, a trend was identified in which rockshelters produced higher ratios of leporid and other small mammal bones, whereas open sites yielded higher ratios of artiodactyl bones. However, the trend is not well represented at some sites. Bison remains tend to dominate the faunal assemblages of large architectural sites of the Apishapa phase, but are not as well represented on Sopris-phase sites (where deer and rabbits dominate) or sites of other time periods. Little data exist for high elevation subsistence economies, though intensive hunting is indicated at some sites, such as an extensive game drive at Monarch Pass (Hutchinson 1990). In the Platte River Basin, bison and pronghorn were the most commonly hunted big game on the Plains during the Early Ceramic period, whereas deer and bison dominate at Early Ceramic sites in the hogbacks/foothills. In both areas, elk and bighorn were also taken, and there is evidence that small mammals such as prairie dogs and rabbits were important food sources. No Early Ceramic kill sites representing the simultaneous procurement of multiple animals have been investigated, and no game drive systems in the Plains or hogbacks/foothills are known. However, Benedict documented several game drive systems in the mountains that likely were in use throughout the Late Prehistoric (Benedict 1992, 1996, 2000a, b; Benedict and Olson 1973). During the Middle Ceramic period, hunting focused on the same species, in roughly the same proportions, as the Early Ceramic period. One bison kill site in the northern hogbacks/foothills is known from this period, the Roberts Buffalo Jump (5LR100). Overall, mountain sites of both periods have yielded only sparse faunal remains, likely because of poor preservation conditions (Gilmore 1999).

Food storage in the Arkansas River Basin during the Developmental period is represented by the presence of cists and subfloor pits within habitation structures. During the Diversification period, storage facilities became larger and more numerous. In particular, small rooms attached to larger, multiroom habitations are thought to have been used for storage. The increased storage capacities seen at Apishapa-phase sites and, especially, Sopris-phase sites may be a reflection of more intensive food production, greater sedentism, higher populations, a need for greater control over stored resources, or all of these factors.

Although the context for the Platte River Basin presents considerable detail regarding excavated sites in the region, few of the descriptions mention any sort of potential storage facilities; only two sites (the Box Elder-Tate Hamlet [5DV3017] and the George W. Lindsay Ranch site [5JF11]) are noted as having storage pits (Gilmore 1999). Nevertheless, the "nature and prevalence" of food storage during the Late Prehistoric period is acknowledged as an important research question (Gilmore 1999:305).

Apishapa Economy and Subsistence

Current models of Apishapa phase economy suggest a subsistence strategy that incorporated a mixture of maize horticulture, hunting of large and small game, and gathering of wild plant resources. The degree of reliance on maize and possibly other cultigens versus hunting and gathering is an important research concern. There is little evidence that cultigens other than maize (e.g., beans and squash) were widely grown by Apishapa groups, and it does not appear that maize was produced in large quantities—although the argument advanced by some researchers that most maize found on Apishapa-phase sites was obtained by long-distance trading is not convincing. Therefore, most researchers have concluded that farming was a relatively small part of Apishapa subsistence (contra Campbell 1969), though possibly important at certain times and in certain places. The authors of the 1999 context are likely correct when they note that physiographic and biotic variability across the region, coupled with short-term climatic fluctuations, probably resulted in the emphasis of "certain options" over others with regard to year-to-year subsistence decisions (Kalasz et al. 1999:217). Regardless of how important maize horticulture may have been during some periods of time and in some areas, the archaeological evidence clearly indicates that hunting and the gathering of wild floral resources were always important among Apishapa groups. In particular, bison were a major food resource.

Sopris Economy and Subsistence

Sopris-phase groups seemed to have relied on both hunting and gathering and maize horticulture. Evidence for the latter consists of the relative ubiquity in archaeological contexts of maize kernels, cobs, and cupules, in addition to limited evidence for beans and squash. Wild plant foods, including the seeds of ruderal plants, cactus pads and fruits, berries, and a variety of other edible plants (see Kalasz et al. 1999), were also collected and are assumed to have been important in the diet. Ground stone implements reflect the dietary dichotomy: small manos and simple grinding slabs and basins likely served to process small seeds and other edible wild plant parts, whereas two-hand manos and trough metates were used to grind corn. Projectile points and faunal remains are common at investigated sites, indicating that Sopris phase hunters took a variety of large and small game by bow and arrow and likely other methods. Deer and rabbits were favored game species, but many other animals were hunted less frequently, including bison, pronghorn, and a variety of small mammals. It should be noted that the degree of reliance on one subsistence strategy over the other (i.e., horticulture versus hunting and gathering) may have varied from one household or hamlet to the next. Nevertheless, it is clear that, in general, Sopris-phase groups were more reliant on maize growing than their contemporaneous Apishapa neighbors.

Storage was important from the beginning of the Sopris phase, based on the presence of intramural and extramural storage pits and aboveground rooms likely used for storage. There are indications that storage capacities increased over time, suggesting the possibility that food surpluses were generated. As the authors of the 1999 Arkansas River Basin context noted (Kalasz et al. 1999:237), the existence of surpluses probably had significant social consequences in terms of their use and allocation, although without additional research, this is a presently a matter of speculation.

Economy and Subsistence: Recent Research

Like technology and other research domains, advancing our understanding of Late Prehistoric subsistence and economies is reliant on large datasets comprising data accumulated from many excavated sites and, to a lesser extent, inventory projects. Many recent projects have produced data that might profitably be combined with existing datasets to explore new avenues of research into subsistence. The research questions and issues presented in the 1999 prehistoric contexts, particularly the context for the Arkansas River Basin (Kalasz et al. 1999), remain important, as none of them have been fully or satisfactorily settled over the past decade and a half. Some recent projects, however, have made obvious contributions to our knowledge of Late Prehistoric subsistence.

Recently excavated sites have produced evidence for the consumption or other use of a wide variety of wild floral resources during the Developmental and Early Ceramic periods, including panic grass, Cheno-Am, goosefoot (*Chenopodium),* indeterminate grass seeds, purslane, bulrush, juniper berries, cattail, mustard family, cactus (prickly pear pads and fruit, hedgehog-type, and cholla), groundcherry, sunflower, chokecherry, and hackberry (Anderson et al. 2013; Burnett et al. 2007; Gantt 2007:810; Gardner and Lammers 2015a, b; Kalasz et al. 2003a; Owens 2008; Schiavitti 2003; Sherman and Zeidler 2011; Slessman et al. 2003). Faunal remains recovered from sites of this period include frog, small mammals, rabbit, dove, lark, pronghorn, deer, medium to large artiodactyls, bison, and (from one site in Picket Wire Canyonlands) fish (Anderson et al. 2013; Anderson 2008; Burnett et al. 2007; Gantt 2007:810; Gardner and Lammers 2015b; Schiavitti 2003; Schiavitti et al. 2001; Sherman and Zeidler 2011; Slessman et al. 2003). One site at the PCMS (5LA6568) produced evidence of on-site processing of prickly pear cactus (Schiavitti et al. 2001). Evidence for maize, consisting of either pollen or macrofossils, has been recovered from several Developmental/Early Ceramic sites (Gardner and Lammers 2015a, b; Schiavitti 2003). Evidence for early maize was identified from Feature 3 at site 5LA7548, which was radiocarbon dated to A.D. 340–650 (Schiavitti 2003). However, the date may reflect the use of old wood for hearth fuel, and consequently, may be one or more centuries too early.

Direct subsistence data recovered from recently excavated Diversification and Middle Ceramic-period sites include a variety of wild plants and animal resources, as well as maize. Recently investigated sites of this time period have yielded Indian ricegrass, cactus, knotweed, goosefoot, tansy mustard, sunflower, skunkbrush (sumac), indeterminate grasses, and "Processed Edible Tissue" (possibly from berries) (Kalasz et al. 2007; Schiavitti et al. 2001). Faunal remains from recently investigated sites include squirrel, rodent and other small mammal, cottontail rabbit, artiodactyl (probably deer or pronghorn), and bison (Kalasz et al. 2007; Schiavitti et al. 2001). Maize has been recovered from many sites of this period, particularly in southeastern Colorado (Kalasz et al. 1999). It is not, however, found on all Diversification/Middle Ceramic-period sites. Among Apishapa-phase groups, bison hunting was apparently more important and intensively practiced than during the preceding Developmental period or compared to contemporaneous Sopris-phase groups.

The degree of reliance on maize and possibly other cultigens during the Late Prehistoric stage in eastern Colorado is a major unresolved research question (Kalasz et al. 1999). As indicated by the lists of wild plant resources found on archaeological sites presented above and described in the prehistoric contexts for the Arkansas and Platte river basins (Gilmore 1999; Kalasz et al. 1999), wild and ruderal plants were critically important food resources, as were many animals ranging from frog, rodent, and dove on one end of the size spectrum to bison and elk on the other. Most researchers seem to agree that maize horticulture during the Developmental/Early Ceramic period was a fairly minor component of subsistence, though possibly significant during particular times of the year or for particular groups. During the ensuing Diversification period in southeastern Colorado, maize farming became more important and more intensively practiced. However, it was likely never the primary means of subsistence for Apishapa-phase groups. Among Sopris-phase groups, the cultivation of maize and other cultigens (e.g., beans and possibly squash) seems to have been more important. For both groups, the physiographic and biotic variability across the region, coupled with short-term climatic fluctuations, probably resulted in the emphasis of certain modes of subsistence (i.e., farming versus foraging) over others on a year-to-year basis (Kalasz et al. 1999:217). A similar subsistence strategy has been proposed for the Fremont peoples of the Great Basin and northern Colorado Plateau. Termed "adaptive diversity," the strategy is characterized by spatial and temporal variability in subsistence that ranges from full-time farming to full-time foraging, and every option in between these two extremes, depending on local conditions (Madsen and Simms 1998; Simms 1986). Thus, the debate over whether farming among the Apishapa was a critically important part of subsistence or a minor contributor to the food supply may be somewhat specious, because it likely was important during some periods and in some locations, and of relatively minor importance in other times and places.

As should be apparent from the above discussion, subsistence and settlement systems were inextricably linked and research into one necessarily includes consideration of the other. The ways in which maize horticulture, deer or bison hunting, or intensive grass seed processing (just to name three examples) structured the settlement patterns and seasonal mobility of prehistoric groups will remain one of the most important research concerns for archaeologists working in eastern Colorado in the future.

Architecture

Although there is some regional evidence for Late Archaic architecture in the form of basin houses and "low, buried rock foundations," in general, stone architecture consisting of enclosures and masonry-walled structures is almost solely associated with the Late Prehistoric stage. Some Developmental period masonry architecture has been found in the Arkansas River Basin, but is more common in northeastern New Mexico. However, the paucity of architecture documented for the Late Archaic and Developmental periods may be a result of low visibility; i.e., such architecture may be largely buried and less visible than Diversification-period structures.

Developmental period architecture is typically simple, comprising low stone walls enclosing rockshelters or encircling shallow basins in open settings. Similar structures dating to the same period have been found to the north in the South Platte River Basin and to the south in northeastern New Mexico. These single-room dwellings likely had wood-post superstructures supported by rock foundations comprising coursed stone or upright slabs; they typically contain interior hearths, pits, and bell-shaped cists. Increased grass pollen in House 1 at the Forgotten site suggests that the roof may have been thatched. In a few cases on the southern Park Plateau, habitation structures are associated with partially walled plazas or extramural activity areas. House 1 at the Belwood site (5PE278) produced a radiocarbon date with a calibrated age range of A.D. 430–650. Calibrated radiocarbon dates from the Forgotten site (5LA3491) range between A.D. 540 and 1150. Basin houses or shallow pithouses lacking stone walls, which first appeared during the preceding Archaic stage, as noted above, were also used well into the Developmental period, particularly on the Park Plateau. Many exhibit postholes and contain interior features such as hearths and variously shaped pits. Radiocarbon dates for excavated examples on the southern Park Plateau range between A.D. 160 and 680. Architecture of any type is less well known in the Trinidad district of the Park Plateau, with only two excavated sites containing Developmental period structures known as of 1999. At least one of the structures at one site, 5LA1416, seems to date to the late or terminal Developmental period.

In comparison to the relatively simple structures of the Developmental period, architecture of the ensuing Diversification period is "generally more complex, variable, and massive" (Kalasz et al. 1999:196). It often consisted of multiroom structures built of contiguous rock walls, though some groups continued to build single-room domiciles. Apishapa-phase structures are frequently characterized by vertical slabs combined with horizontal masonry, exhibit circular or curvilinear walls and relatively informal internal features, and are present in both open and rockshelter settings. Apishapa-phase architecture commonly incorporated jacal construction, but not adobe. It is generally accepted that Apishapa structures display a relationship to the Plains Village pattern, an observation that is supported by ceramic assemblages. Sopris phase structures, on the other hand, tend to have rectilinear foundations, coursed horizontal masonry, use of adobe or jacal, mortuary chambers, and more formalized intramural features such as coped or mud-collared hearths. Sopris architecture is clearly influenced by the Southwestern pattern, a characterization that is reinforced by pottery types. Despite the similarities evident between Apishapa and Plains Village architecture on the one hand and Sopris and Puebloan structures on the other, the architecture of each phase is characterized by considerable variability, with morphological overlap between the two traditions.

A few cases of unusual structures that do not appear to be clearly affiliated with either Apishapa or Sopris are present in the upper Huerfano River and upper Purgatoire River areas. These consist of rough rectilinear foundations made of widely spaced cobbles or small boulders, and which, in at least one case, yielded evidence of adobe wall construction. Artifacts are sparse and internal features rare at these structures, though cord-marked pottery and small side-notched points were associated with one structure, which yielded dates spanning the Diversification period.

Gilmore (1999), following Brunswig (1996), groups habitation structures of the Early Ceramic period in the Platte River Basin into four types: stone circles, stone foundation walls for lean-tos in rockshelters, subrectangular stone surface structures, and shallow pit structures or basin houses. Gilmore describes nine excavated sites with habitation structures. The descriptions of the structures at the excavated sites suggest the existence of a fifth, albeit rather vague, structure type, consisting of prepared floors of variable plans entirely or partially surrounded by low stone walls. Rarely is more than one of the structure types found on a single site, at least at the well-investigated sites. The dominant structures during the Early Ceramic period are stone circles, followed by shallow pit structures or basin houses. Less frequent are subrectangular masonry structures, rockshelter lean-tos, and the poorly-defined fifth structure type that incorporates informal stone walls. Stone circles likely represent some sort of wickiup or tipi-like dwelling in which the stones anchored the presumably light frameworks and coverings of the walls. Shallow pit structures, also known as house pits or basin houses, were in use throughout the Archaic, at least based on evidence from adjacent regions, and thus likely have a long history in the area. At least one example in the Platte River Basin also exhibited a low stone wall or linear arrangement of stones demarcating the edge of the basin. In general, excavated Early Ceramic basin houses exhibit postholes on the floor interiors rather than encircling the floors, suggesting stout interior support posts against which light wall leaners may have been laid. The subrectangular masonry surface structure is the rarest dwelling type in the Platte River Basin, described as being present at only one investigated site, the George W. Lindsay Ranch (5JF11) site, on a hogback south of Boulder. Rockshelter lean-tos are likewise not well represented in the region. Most of the above-described structures contain low numbers of interior features such as hearths.

During the Middle Ceramic period in the Platte River Basin, Gilmore (1999) describes three excavated sites with evidence of architecture. The great majority of the structures are stone circles, though one shallow-basined dwelling with a low, circular stone wall was noted, as was a site with a possible "light shelter" (probably something akin to a wickiup).

The overall paucity of documented examples of Late Prehistoric habitation structures in the Platte River Basin compared to the adjacent Arkansas River Basin is quite striking. This likely indicates populations that were more mobile, and probably relied less on horticulture, than their neighbors to the south.

Apishapa Architecture

Apishapa-phase architecture, as understood during the preparation of the 1999 context documents, is characterized by its considerable variability, compared to other regional architectural styles present at Sopris-phase, Plains Village, and Ancestral Puebloan sites. Habitation structures during the Apishapa phase are found in open settings and in rockshelters. Structures in open settings include single-room and multiroom habitations that are typically situated on canyon rims and benches within canyons, though some are found in settings other than canyons or valleys. The structures exhibit stone foundations consisting of upright slabs, coursed masonry of rough unshaped stone, or both. Some walls or foundations can only be remotely described as coursed masonry, appearing as low, linear heaps of stone. Foundations apparently anchored superstructures built of wood, with variable closing materials that may have included brush, thatch, hides, or daub-plastered walls resembling jacal. The construction of some structures was likely ad-hoc, whereas others seem to exhibit planned designs. At the few excavated structural sites, postholes have been identified denoting the former presence of wooden post-supported walls or roofs. Overall, construction methods seem to have been opportunistic, taking advantage of local building materials and conditions. Interior features in Apishapa structures were generally more informal than those of Sopris-phase or Plains Village habitation structures.

Apishapa-phase rockshelter architecture exhibits the propensity for opportunistic construction to an even greater degree than open architecture. The most common pattern consists of a rock wall beneath, and aligned with, the dripline of the shelter. Presumably, wooden supports that utilized the stone walls as foundations completed the composite walls that enclosed the alcoves. In some cases, other rock walls are present within the rockshelters, bisecting them into multiple rooms. Evidence for storage features has been identified in some enclosed rockshelters.

Sopris Architecture

Residential architecture during the Sopris phase is typified by subrectangular to rectangular surface rooms or room blocks constructed of horizontally laid, mortared, stone blocks or slabs (Kalasz et al. 1999). Variability abounds, however, and other construction methods and house types were built during the Sopris phase. For example, surface rooms were sometimes constructed entirely of adobe or jacal, or combinations of masonry and adobe or jacal. Vertical stone slabs, more typical of Apishapa dwellings, were occasionally incorporated into structures. Sopris people also built shallow basin houses. Basin houses have a long history in the region and, indeed, across the West, and their use during the Sopris phase seems to represent continuity from the preceding Developmental period. Surface habitations exhibit anywhere from two to as many as 15 rooms, though most range from two to four rooms. Roofs comprised frameworks of logs and wood poles, likely covered with either mud or some type of thatch. According to Kalasz et al. (1999), some interior walls were apparently plastered and intramural features included collared hearths, ash pits, and bell-shaped cists.

Some sites have revealed evidence of extramural plazas or work areas, indicated by postholes denoting the past presence of simple walls or fences extending from the domiciles or enclosing exterior space. Often these areas also contain outdoor hearths and storage pits. The variability exhibited by Sopris-phase habitations, combined with differences in frequencies of imported ceramics, have been speculated to reflect possible differences in social status or at least "heterogeneous social roles" (Kalasz et al. 1999:239).

Architecture: Recent Research

Numerous research questions concerning architecture are presented in the 1999 prehistoric context documents, particularly the Arkansas River Basin context (Kalasz et al. 1999). The questions encompass architectural form, function, setting, interior features, geographic and cultural variation, diachronic variation, artifact assemblages, and the presence or absence of associated burials. Although a considerable number of architectural sites have been investigated compared to other site types, there remain many unresolved questions. That is largely because architecture is a complex phenomenon that articulates with many other research domains such as cultural affiliation, settlement patterns, subsistence, social organization, and population dynamics. Particularly important issues include the origin and temporal development of Late Prehistoric architecture (including the existence of possible Late Archaic antecedents), exploring geographic variation in architecture, more detailed comparisons of Apishapa- and Sopris-phase architecture (and ultimately explaining their differences), and exploring the relationships—if any—between Apishapa and Plains Village architecture on the one hand and Sopris and Rio Grande Puebloan architecture on the other.

Recent work in southeastern Colorado has produced limited new data related to architecture. Many new architectural sites have been recorded during large inventories, primarily in the PCMS or Fort Carson, though a few have been conducted elsewhere (Black 2000, 2003). A considerable number of architectural features have also been subjected to testing or data recovery excavations; again, most of these are within Fort Carson or the PCMS. Thus, the data are somewhat skewed toward work conducted at these two large military reserves. Nevertheless, these datasets likely provide opportunities for focused investigation of some of the research questions presented in the context documents.

Basin houses have been identified in Archaic and Late Prehistoric—especially Developmental period—contexts in eastern Colorado, though they are much better represented in other areas such as northeastern Colorado and southern Wyoming. A basin house associated with a Developmental-period component was recently investigated at site 5PE6772 near Pueblo (Anderson et al. 2013). This structure measured 2.8 m by 2.6 m and contained no internal features; the component was interpreted as a residential base.

A research issue discussed in the 1999 context questions whether "so-called Apishapa phase forts" are actually sacred or elite rather than defensive in function (Kalasz et al. 1999:242). This is likely a complex issue with no single correct answer, but Owens' (2007) PCMS study of architectural sites reinforces the notion that at least some sites incorporated a defensive function. In contrast, Evans' (2012) study of Apishapa occupations along the Saint Charles River concluded that architectural sites that appear to be defensive were actually related to hunting and monitoring of big game movements.

Other recent work has contributed modestly to understanding the functions of architectural sites—that is, their roles within settlement systems—and the functions of the structures themselves. For example, two of three structures at site 5LA7421 at the PCMS were tested and found to likely not represent habitation structures, but rather extramural work areas that had been demarcated by sediment-retaining rock enclosures (Schiavitti 2003). Owens' predictive model for the PCMS provides useful data and discussions relevant to both the functions of architectural sites and their roles within subsistence systems during both the Developmental and Diversification periods (Owens 2007).

Weimer (2009) studied a set of architectural features on two sites in South Park, concluding that at least some of them likely represent vision questing. A Protohistoric or historic age for the sites is considered likely, but the features remain undated and some might conceivably be associated with Late Prehistoric occupations. Few other recently documented architectural sites in eastern Colorado are ascribed a ceremonial function, although Black (2000, 2003) suggested that a structure found at site 5LA8731 during a survey near Trinchera Cave may be ceremonial.

In the Arkansas River Basin context, the authors note that "in marked contrast to Sopris-phase structures, human interments have not been found with Apishapa phase architecture" (Kalasz et al. 1999:196). This is no longer the case. At site 5LA3189 at Burke's Bend, rooms within Rockshelter 8 yielded two human burials. The authors comment that this comprises evidence "that Apishapa-phase mortuary practices may in some instances be comparable to those of the Sopris phase" (Kalasz et al. 2007:338). Gardner and Lammers (2015b) also recently reported a burial found within Apishapa-phase Structure 1 at site 5LA5838 in the Picket Wire Canyonlands. Based on these two instances, it would appear that some aspects of social organization posited for Sopris-phase groups as evidenced by burials closely associated with habitations may also apply to some Apishapa-phase groups.

Aside from the architecture-related issues stressed in the 1999 contexts, there are other avenues of research that might be pursued. For example, the possibility of the existence of communal structures or other integrative spaces at Apishapa or Sopris sites, an important consideration at architectural sites in the Puebloan Southwest, seems to have received less attention in southeastern Colorado (although see Zier et al. 1988). The existence of communal structures or work spaces, or integrative spaces such as plazas, has important implications for social organization. There also seems to have been relatively little discussion of occupation durations of Late Prehistoric architectural sites. Occupation lengths are important for thinking about how sites fit into their associated settlement systems, and can be estimated through artifact and midden densities.

THE PROTOHISTORIC STAGE

Introduction

This section discusses the Protohistoric stage within the RGFO study area and is organized by research domains. Each section presents a concise summary of the Protohistoric stage as presented in the 1999 context documents (Clark 1999; Kalasz et al. 1999) followed by a discussion of more recent advances in our understanding of the Protohistoric stage, as well as remaining data gaps.

The primary goal of this document is to provide an overview of current Protohistoric information. It is therefore important to acknowledge constraints associated with any discussion of this time period. One of the difficulties is the generally ephemeral nature of the occupations. As discussed below, the material culture is often sparse or can be interpreted as either Late Prehistoric or Protohistoric. This uncertainty is compounded by the continued use of tipis through the Protohistoric.

Chronology

The Protohistoric period's beginning and end dates vary depending on the context document. In the Arkansas River Basin, the Protohistoric period began around A.D. 1350/1450, corresponding with the Apishapa-phase abandonment and the arrival of Athapaskan groups (Kalasz et al. 1999). The period ended around A.D. 1725 with the withdrawal of the Apachean bands from southeastern Colorado and the increase in Spanish exploration and Comanche incursion into the area (Kalasz et al. 1999:250-251). In the Platte River Basin, the Protohistoric period dates to approximately A.D. 1540–1860 (Clark 1999). Clark justifies the end date for the Protohistoric period based on the first large scale migration of Euroamericans to Colorado beginning after gold was discovered in 1858 (Clark 1999:309).

Here, a composite of the two previously presented date ranges will be used: A.D. 1350/1450 to A.D. 1860 (Figure 8). These beginning and ending dates are not absolute, but are used as a general guideline when considering where to place archaeological sites within the overarching dating continuum. Instead of a clear break between the Protohistoric and Historic periods, archaeological data suggest a continuity of occupations, with the incorporation of Euroamerican material culture into the traditional Native American material culture (Clark 1999:309).

One of the important research goals for the Protohistoric is determining when Athapaskans arrived in the region. Athapaskan occupation of the Northwest Plains dates between A.D. 400 and 1250 with the peak occupation around A.D. 800–1000 (Kalasz et al. 1999:251). The next reliable dates are from the Southwest, where Athapaskan occupations date to the early sixteenth century. So, where were these groups between A.D. 1250 and A.D. 1500? Associations between early Athapaskan sites and tipi rings are present in tributaries of West Carrizo Creek Canyon in Las Animas County; both Apachean Ocate Micaceous pottery and Pueblo IV trade ware ceramics were found in the area. A conventional radiocarbon date of A.D. 1430 ± 60 from charcoal recovered from a rectangular structure at site 5HF1079 suggests the possibility for a Protohistoric-period component, even though the associated diagnostic materials indicate a Diversification-period occupation (Kalasz et al. 1999:251-252).

A suite of sites in the PCMS and in Las Animas County have diagnostic materials and radiocarbon dates that represent significant Apachean occupations possibly dating to the late sixteenth century and earlier. Apachean pottery (Micaceous Category 3 and 5) (site 5LA3189), Polished Category 1 sherds comparable to Dismal River pottery (sites 5LA5254 and 5LA5256), and a glass trade bead (site 5LA5254) have all been found. The conventional radiocarbon dates range from A.D. 1435 ± 65 at the Louden site (5LA6204) to A.D. 1580 ± 60 at the Sue site (5LA5255) (Kalasz et al. 1999:252).

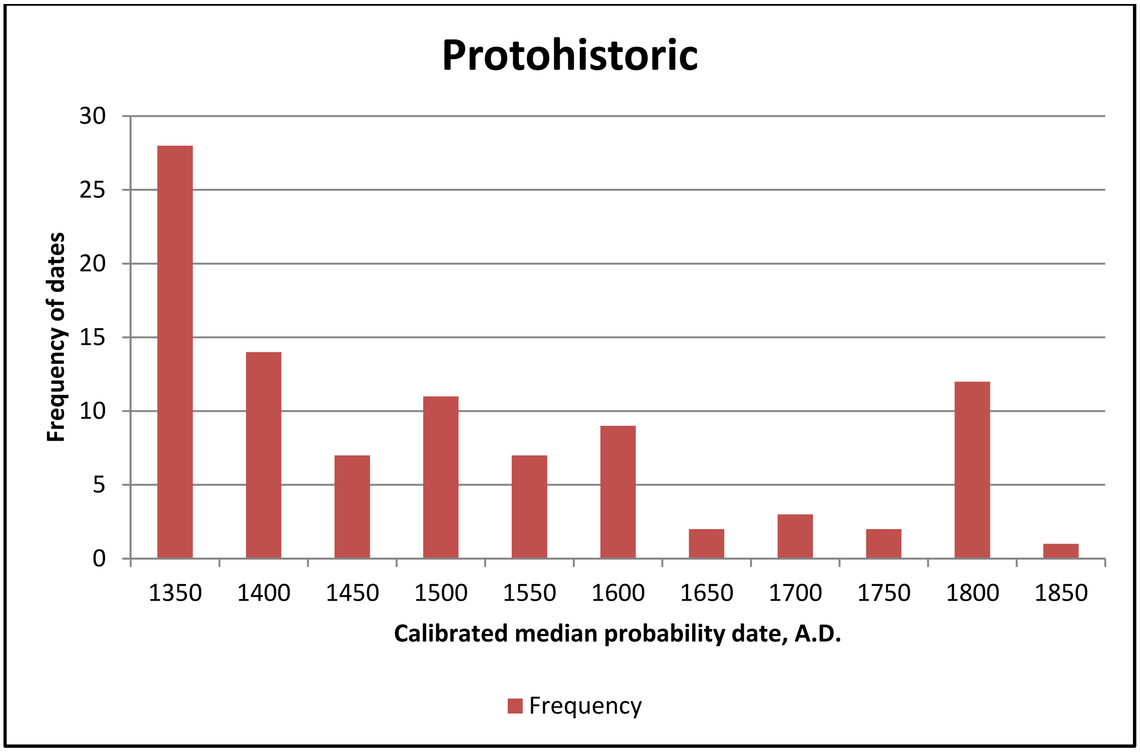

Figure 8. Frequency of Protohistoric-period radiocarbon dates available in RCGraph for the RGFO study area.

Clark 1999) and Kalasz et al. 1999) both emphasize the importance of identifying the time of arrival of Athapaskan groups to the area and of identifying methods for distinguishing between the Athapaskans and the previous occupants. Lithic artifact morphology between the Late Prehistoric and Protohistoric occupations is very similar; thus, the presence of Dismal River ceramic technology is often used to distinguish between the two periods. Recent research by Gilmore 2004b) suggests that Avonlea projectile points are associated with Athapaskan occupations. The presence of these points may therefore herald the arrival of Athapaskans to an area.

Some of the earliest evidence of Athapaskan arrival in Colorado has been found in the central Rocky Mountains and the Front Range foothills. Recent work in Rocky Mountain National Park and along the Front Range has identified relatively early Apachean sites with Dismal River ceramic assemblages. One of the most recently excavated of this collection of sites is the Lawn Lake site (5LR318), which has a stratified Apachean occupation (Brunswig 2012). From this site, a date of cal A.D. 1380 to 1450 was obtained using charcoal extracted from the outside of a Dismal River Lovitt Plain sherd. While this date does not necessarily push back the arrival of Athapaskan groups to the area, it does provide additional dated evidence for the presence of Athapaskan groups in the region during the early Protohistoric (Brunswig 2012).

Ceramics from the Pinnacle site (5PA1764), the Devil's Thumb site (5BL6904), and the Eureka Ridge site (5TL3296) were either directly dated or associated with dated occupations. Early Apachean ceramics, dating to cal A.D. 1450–1510, have been found at the Pinnacle site (5PA1764) (Gilmore 2004b:151). Dismal River ceramics are associated with an occupation dating to cal A.D. 1455–1650 at the Devil's Thumb site (5BL6904) (Brunswig 2012). The Eureka Ridge Protohistoric occupation dates to cal A.D. 1490-1650 and contains Lovitt Plain and Lovitt Simple Stamped ceramic sherds (Gilmore and Larmore 2012). Like the sherds from the Lawn Lake site, these dated occupations do not push back the Protohistoric period, rather, reconfirm the Athapaskan presence in the area.

Gilmore's (2004b) publication suggests that Avonlea projectile points could be representative of a prehistoric Athapaskan population, as well as a marker of proto-Apachean movement through the region. This supposition works if Avonlea points are the precursor of the Plains Side-notched projectile points. Avonlea projectile points were found at the Bayou Gulch site (5DA265) in association with radiocarbon dates of cal A.D. 1270–1520 and cal A.D. 1330–1420, which are later than the accepted Avonlea sequence, although the latter date range falls into the very beginning of the Protohistoric period. Gilmore (2004b) uses the earlier portions of the aforementioned date ranges in conjunction with a suite of other information to argue that the Athapaskan population passed through eastern Colorado during the late 1200s to early 1300s. However, it must also be noted that the Avonlea point could be a poly-ethnic point style and should not be automatically associated with a proto-Apachean population.

The most recent work relevant to the migration of Athapaskans into the region is the interpretation by Gilmore et al. (2013) of a Late Prehistoric occupation at Franktown Cave (5DA272). This occupation dates to cal A.D. 1160–1208 (two-sigma) which precedes the generally accepted Athapaskan entry into the region. However, the authors argue that the occupants of the Franktown Cave during this period were likely ancestral Apache and related to the occupants of Promontory Cave in Utah. This conclusion was reached using different lines of evidence, but the most compelling are the chithos and moccasin. A chithos is a split-cobble or discoidal hide-working tool that is culturally diagnostic of the Northern Apacheans. Thus, the association between the Late Prehistoric occupation at Franktown Cave and early Athapaskans at Promontory Cave is not unfounded.

The moccasins found at Promontory Cave and Franktown Cave display similar manufacturing styles. These similarities were compelling enough to lead Gilmore et al. (2013) to revise the timeline suggested only one year earlier in Gilmore and Larmore (2012), to now suggest an earlier migration timeline for the ancestral Athapaskan entry into the region. The 2013 migration model has Apacheans moving from the north into the Central Plains and the Southwest during the middle twelfth century. In the model, small groups who were part of a larger migrating population broke off and settled much of eastern Colorado. These groups likely took advantage of the peripheral spaces between territories of more established populations to establish a foothold within the region (Gilmore et al. 2013).

As a result, the following research questions posed in the Arkansas River Basin context (Kalasz et al. 1999:260) continue to be salient:

- *Can early Athapaskan sites be distinguished from later Apachean occupations?* Being able to easily differentiate between early and late Athapaskan occupations would aid in creating a more robust understanding of Protohistoric land use. However, the lack of differentiation among Protohistoric sites means that this question cannot currently be answered.

- *What, if any, are the temporal distinctions between sites with Sangre de Cristo or Jicarilla Apache affiliation and those with Dismal River Aspect affiliation?*

Cultural Affiliation and Population Dynamics

The Dismal River Aspect—which is currently understood as a manifestation of Apachean culture (Clark 1999:309-310)—and other Athapaskan cultural groups were the primary occupants of the region during the earlier part of the period, although questions remain regarding the application of the Dismal River Aspect label to occupations within the RGFO.

The Dismal River Aspect represents the most common Protohistoric Apachean occupation of the Central Plains and has been identified in areas surrounding the RGFO study area. If Plains Apache rancherias north of the Arkansas River are included in the Dismal River Aspect, it would allow for the inclusion of the Arkansas River Basin as part of El Cuartelejos. Additionally, there are sites fronting the Sangre de Cristo mountains and in southeastern Colorado and northeastern New Mexico that are thought to be Athapaskan variants of the Dismal River Aspect affiliated with Jicarilla or Sangre de Cristo Apache (Kalasz et al. 1999:251).

Unlike within the Arkansas River Basin, the Dismal River Aspect within the Platte River Basin appears at the beginning of the Protohistoric. Small side-notched and unnotched projectile points are found in association with Dismal River sites; however, they should not necessarily be used as diagnostic artifacts as they were also used during the Late Prehistoric period (Clark 1999:312).

Brunswig 1995) summarizes Athapaskan migration into the region and suggests that Late Prehistoric Avonlea ceramics from southern Wyoming and northeastern Colorado could represent evidence of the immediate predecessors of the Protohistoric Apache. This implies that by the late sixteenth century, the Apache were well-established in the Central and Southern Plains and the Southwest. Furthermore, the differing cultural divisions among the Plains Apache are likely the result of differences in band-level trait acquisition from neighboring cultural groups. This is most apparent in the various pottery types, with influences from the Caddoan groups in eastern Dismal River variants, Shoshonean influence in a western Dismal River variant, and Rio Grande Puebloan influence in the Sangre de Cristo or Jicarilla Apache variant (Kalasz et al. 1999:253).

Although numerous groups occupied the region, by the Late Protohistoric period the Jicarilla Apache are considered to be the primary residents of the Arkansas River Basin. However, there has not been a reliable way to differentiate between Athapaskan groups and the local, indigenous populations, so it is unclear which groups were the dominant population during most of the Protohistoric period (Kalasz et al. 1999:250-251).

Schlesier 1994), as cited by Kalasz et al. 1999:252), postulates a continuum of Athapaskan occupation within the context area through the latter half of the Late Prehistoric stage. However, this is primarily based on a small amount of skeletal evidence from the Sopris phase, where 13 burials have triple-rooted first molars, an Athapaskan population trait (Kalasz et al. 1999:252-253).

Aboriginal occupation of the Platte River Basin and the greater High Plains region escalated starting around A.D. 1500, perhaps because of the return of a wetter climatic regime. Data suggest an increased occupation of the mountains as well. The mountain region of the study area was used by multiple groups including the Shoshone, Comanche, and the Plains tribes, but the Utes are considered to have been the primary occupants of the mountains (Clark 1999:322-324).

Around A.D. 1730, the Comanches, aided by the Utes, pushed the resident Apache populations out of the study area and into New Mexico. While the majority of the Apaches went south to New Mexico, some sought refuge with the local Kiowa bands. These individuals were known as the Kiowa-Apaches and maintained their linguistic identity while living as Kiowas (Clark 1999:312-314). As reported by Major Long during the A.D. 1819–1820 expedition, the Comanche, Arapaho, Cheyenne, Kiowa, and Kiowa-Apaches occupied the area (Clark 1999:309-310).

The Apache abandonment is confirmed by ethnohistoric records and oral histories, indicating that from the mid-1700s on, the Platte River Basin was occupied first by Comanches, then Arapahos, and finally Cheyennes (Clark 1999:312-314). These consecutive occupations are collectively considered the "horse-gun-buffalo" culture that quickly spread through the region, but was extinguished by the last decades of the 1800s (Clark 1999:312-314).

The ability to distinguish between cultural groups during the Protohistoric is especially crucial as the Arkansas and Platte River basins were utilized by multiple groups with similar cultural materials and adaptations. Unfortunately, this tendency towards cultural similarity, combined with the lack of definitively dated Protohistoric sites, makes the ability to answer questions concerning cultural affiliation and population dynamics difficult.

While questions of affiliation remain difficult to resolve, one question that can be answered is the extent of Apachean trade networks, as indicated by the presence of exotic material and artifacts. Based on recent research, Protohistoric trade networks appear to have extended south into New Mexico and north into Wyoming or Montana. Pueblo IV ceramics (A.D. 1300–1600) were found at sites 5LR2 and 5LR12 in Rocky Mountain National Park (Brunswig 2005:125-126) and lithics sourced from El Rechuelos Rhyolite from the Jemez Mountains were found at site 5LR263 (Newton 2008). Eureka Ridge (5TL3296) has yielded Jemez Mountain obsidian and Alibates chert artifacts, suggesting trade relationships with New Mexico and Texas (Gilmore and Larmore 2005). Yellowstone obsidian was found in Rocky Mountain National Park at site 5PA1764 (Brunswig 2012), suggesting trade with Numic Groups. Sherds belonging to an Apachean Ocate Micaceous type, which is common to the south-central High Plains and northeastern New Mexico, were found at site 5LR2 (Brunswig 2012:26). While these instances are not definitive proof of complex trade networks, they do illustrate that there was an exchange of goods between different cultural areas.

As with most of the questions posed in the 1999 contexts (Clark 1999; Kalasz et al. 1999:260), there are more questions related to population dynamics that cannot be answered with presently available data than those that can. Other questions include:

- *What is the extent of Sangre de Cristo or Jicarilla Apache occupation in the Arkansas River Basin?*

- *What evidence exists for Cuartelejo Apache settlement in the RGFO study area?* While there is not enough information to answer this question, it is especially important to note that there is currently no archaeological evidence for Cuartelejo Apache settlements in the RGFO study area.

- *To what extent do cultural attributes of Central and Southern Plains Apaches overlap those of the Sangre de Cristo or Jicarilla cultural pattern variant in the Arkansas River Basin?*

- *Can we identify specific Plains Buffalo culture sites by cultural affiliation (i.e., Cheyenne versus Arapaho versus Comanche)?* Areas near Protohistoric sites should be investigated for rock art, as it has the potential to provide information regarding cultural affiliation.

- *What is the relationship of Protohistoric groups and sites to Middle Ceramic Shoshonean sites, such as Graeber Cave and Cherokee Mountain Rock Shelter? Is there enough continuity to argue that groups who produced those earlier ceramics can be associated with a historically known group?*

Technology

The sparse site and artifact density of the Protohistoric period within the RGFO study area has resulted in limited knowledge about specific Protohistoric artifacts. Bone and lithic artifact morphologies match the earlier Diversification period. The projectile points present at these sites include curated Archaic points or small triangular projectile points with or without side notches; these point types include Fresno, Reed, Washita, and Haskell. As the majority of the material culture cannot be used as a reliable indicator of Protohistoric occupation, there is a heavy reliance on pottery types in identifying occupations of this time period. The two primary pottery types associated with the Protohistoric period are Sangre de Cristo Micaceous and Dismal River Gray Ware. Ocate and Cimarron Micaceous are thought to be associated with Sangre de Cristo Apache occupations and may be a trade ware. Lovitt Plain and Lovitt Simple-stamped pottery are types of Dismal River Gray Ware. They are distinguished from one another by the presence or absence of decoration. When considering pottery types, it is important to remember that the Purgatoire River region was an area of interaction and trade between Central Plains and Southwest cultural groups; therefore, many different types may be found in the region. With regard to architecture, sedentary Dismal River villages can be identified by the presence of shallow four- to five-post pithouses and bell-shaped roasting pits (Clark 1999:312; Kalasz et al. 1999:255).

Uncompahgre Brown Ware pottery and Cottonwood Triangular and Desert Side-notched projectile points are indications of Protohistoric Ute occupations. However, the projectile points must be associated with Uncompahgre Brown Ware sherds to be diagnostic of the Protohistoric Ute because other cultural groups also used them. The same may be said concerning wickiups found in the region; they are often considered diagnostically Ute, but there is ethnographic evidence that they were also utilized by other groups that occupied the area. Another cultural marker associated with the Protohistoric period is peeled and scarred trees, typically ponderosa pines, which were utilized as a food source or as medicine (Clark 1999:322-333). Peeled ponderosas are usually attributed to the Ute, though other groups also engaged in this practice (Martorano 1988; Martorano et al. 1999)

Material culture during the later Protohistoric has many distinct features. Among these is a shift toward metal artifacts and other trade goods. Some sites dating after the mid-1700s have metal kettles and tin cups, which replaced pottery because metal is more durable, a feature that is especially practical for nomadic groups. Metal arrow points and knives were also used, though metal did not fully supplant lithic technologies; instead, the two materials were used in conjunction. Note that while the period itself shows distinct material use patterns, there are no discernable material distinctions between different tribes. The mobile nature of Protohistoric groups contributes to the difficulty in assessing group identity, as there is no suitable method of determining resident affiliation in an area that was occupied only briefly. Ethnohistorical documentation therefore offers the most reliable method of tribal identification. Additionally, bison were an important resource during the later Protohistoric, being used for both subsistence and material goods, including clothing, footwear, bags, water containers, and tipis. Evidence of some bison-sourced items is sometimes found at Protohistoric sites (Clark 1999:312-314).

Understanding Protohistoric technologies allows for a greater understanding of resource utilization, environmental adaptations, and cultural interactions. However, the majority of the questions about technology presented by Clark (1999) and Kalasz et al. (1999) cannot currently be answered because of the paucity of substantial Protohistoric artifact assemblages. Thus, the technological discussion presented below primarily focuses on raw material sources.

Lithic resources found at Protohistoric sites are typically from local or regional sources, such as Dawson petrified wood, Trout Creek chert, Table Mountain jasper, Dakota quartzite, and Kremmling chert, all of which were identified in the Eureka Ridge assemblage (Gilmore and Larmore 2005). The wide variety of lithic goods identified at Eureka Ridge and sourced from across the region is suggestive of a seasonal round, or at least movement across the landscape. This use of local resources is common at other Protohistoric sites and is indicative of groups who have "mapped on" to the landscape (Gilmore and Larmore 2005).

Exotic lithic materials from New Mexico (Cerro del Medio and Obsidian Ridge obsidian and El Rechuelos Rhyolite), the Texas Panhandle (Alibates chert), and Wyoming (Obsidian Cliffs) have been found in the Protohistoric assemblages at Eureka Ridge (5TL3296) (Gilmore and Larmore 2005), 5LR263 (Newton 2008), and the Pinnacle site (5PA1764) (Brunswig 2012; Tucker et al. 2005). As mentioned above, the presence of these materials is probably the result of trade networks or down-the-line trade with groups that frequented these areas.

Small unnotched and side-notched projectile points similar in style to those of the Late Prehistoric period are typically associated with Protohistoric period occupations (Albin et al. 2011; Brunswig 2012; Gilmore and Larmore 2005). This continuity of style between the two periods contributes to the difficulty in determining an occupation's age when no other temporal markers are present. The bipointed biface found at Eureka Ridge is an example of another specific artifact type that might be considered indicative of a Protohistoric occupation. The biface was retouched on alternating edges, giving it a beveled cross-section with the heaviest use found near the tip, suggesting use as a drill (Gilmore and Larmore 2005:29).

The Borman-Pikes Peak vessel (5EP3496) is an almost-complete vessel associated with the pre-Dismal River, early Athapaskan-Plains Apache occupation of eastern Colorado. A large olla with a tapered neck and semiconical base, the plain ware vessel was manufactured by paddle and anvil. The vessel is undecorated and the paste is dark gray in color, with granite temper, suggesting a reduction firing atmosphere. It may represent a new ceramic type, though it is currently the only known example (Ellwood 2010).

As discussed throughout this section, there are more questions about Protohistoric technology that cannot be answered than those that can be answered. One of the main challenges in assessing unique Protohistoric patterns is that, aside from trade goods, the material culture associated with the Protohistoric is very similar to that of the Late Prehistoric stage. Protohistoric-period sites can therefore be difficult to identify in the absence of trade goods. The questions from the original contexts (Clark 1999:334; Kalasz et al. 1999:260-261) that cannot be fully answered with the currently available data follow:

- *Are two-hand manos and trough metates associated with Protohistoric period occupation in the Arkansas River Basin?*

- *What attributes distinguish Apachean bone and shell tool/ornament assemblages from those of other cultures?*

- *Can Apachean micaceous pottery consistently be distinguished from that manufactured by Rio Grande Puebloans?* At this time, the pottery types cannot always be macroscopically distinguished from one another as both are generally plain wares.

- *What are the baseline technological trends in Apachean lithic tool production; e.g., are minimally modified flake tools emphasized over formal bifaces?* There does not appear to be any distinctive overarching trends in Apachean lithic tool production. However, this is partially due to the limited information available about Protohistoric Apache occupations. At Eureka Ridge, 24 modified flakes, 16 bifaces, and nine projectile points in various stages of completion were collected (Gilmore and Larmore 2005:24-29). This admittedly small sample suggests that there was not a strong preference for flake tools over formal tools. While the artifact assemblage at Eureka Ridge is not a perfect proxy for all of the Protohistoric sites within the research area, it is one of the larger fully analyzed assemblages.

- *Are there actually Dismal River projectile points?*

- *Did lithic production and procurement strategies change after the introduction of metal implements and the horse? There are many sites with metal projectile points.*

- *Do Protohistoric period lithic artifacts look different from those at earlier sites? Research at Protohistoric Pawnee sites suggest that the introduction of the horse allowed the transportation of larger amounts of stone, leading to the production of more expedient tools.* Newton 2008:47) postulates that the lack of formal tools and bifacial reductive strategies represented in the Protohistoric lithic assemblage at site 5LR263 indicates a more informal use of indigenous technology; however, only three tools were conclusively identified as being associated with the Protohistoric assemblage (Newton 2008:67). Additional information from other Protohistoric assemblages that also have European goods is necessary to more fully answer this question.

Settlement and Subsistence Strategies

Potential Apachean settlement-subsistence strategies range from tipi ring encampments associated with dog- or horse-pulled travois to the “rancherias” of El Cuartelejo and northeastern New Mexico. In the context area, there is ethnographic evidence of horticultural villages only along the Purgatoire and Arkansas rivers. However, such villages were also present in surrounding regions. Typically, Protohistoric sites in the Arkansas River Basin are identified by pottery, rock art, and often stone circles/tipi rings, although stone circle sites sometimes date to other periods. The typically sparse artifact and feature assemblages suggest a specialized, seasonal-round type of resource-procurement strategy centered near major drainages. These economic data are primarily gleaned from ethnohistoric accounts; for example, the Onate expedition of 1601 reported encountering nomadic hunter-gatherer Apache bands following the bison herd. By the time the 1706 Ulibarri expedition passed through the Purgatory region, they reported seeing small, horticultural Apachean villages (Kalasz et al. 1999:256-257). The Dismal River Aspect groups also utilized subsistence strategies ranging from hunter-gatherer adaptations to horticulture.

There are very few archaeological sites found within the study area that are confirmed to be Protohistoric Apachean, and none of them are major settlements. The known occupations are located in the West Carrizo Creek region and in the PCMS in the vicinity of Van Bremer/Burke Arroyo. These sites are often tipi rings or rockshelters that have very few artifacts or features, suggesting short-term occupations (Kalasz et al. 1999:255). The tipi rings found at the PCMS vary in size, which is an indication that not all stone circles were used for habitation. As noted above, it should not be assumed that all stone circles are Protohistoric (Kalasz et al. 1999:258).

The Hogback/Foothills region was utilized by both Plains and mountain tribes, providing sheltered campsites, rockshelters, and lithic material. Quarries in the Hogback were important sources of lithic material. There is a petroglyph panel at site 5LR293 that depicts a rider on a horse, thus dating occupation of the area to the Protohistoric. The low number of sites found within this region that date to the Protohistoric is likely because of its proximity to major urban areas, where urban development has eradicated the subtle traces of these mobile groups (Clark 1999:318-322).

Sites in the mountains tend to cluster in the period A.D. 1650–1700; however, as of 1999, there were only eight dated sites. While few in number, there are multiple site types within the region, including habitations, game drives, and peeled trees. Many of these sites are located on the first terrace of the South Platte River. The Utes were the primary group within the mountains, although there is ethnohistoric evidence that the Comanche, Shoshone, and Arapaho also used the mountains. The Arapaho used the area more intensively than the other groups, specifically near Estes Park and the eastern side of the Continental Divide (Clark 1999:322-333). An example of this is seen at site 5PA1300 where Weimer (2009) concluded that the site has evidence of an Arapaho origin or influcence. Brunswig suggests that the Dismal River Apachean territory extended into the foothills and the mountains near the Continental Divide (Brunswig 2005:207-213).

The small number of identified and excavated Protohistoric sites is especially noticeable when discussing overarching settlement and subsistence strategies. Using information from the excavated sites allows for some conclusions to be drawn; however, larger patterns of Protohistoric behaviors still cannot be inferred from the available information.

The mountain occupations with Dismal River pottery (sites 5BL6904, 5EP3496, 5LR318, and 5PA1764, 5TL3296) can be considered examples of either Dismal River occupations or trade between groups. There is currently no consensus as to which conclusion holds more weight, primarily because both arguments come down to differences in typing and interpretation. For example, Gilmore and Larmore (2005) noted that Plains Side-notched, Upper Republican/Plains Village, and Desert Side-notched points were found within the assemblage at Eureka Ridge. However, (Tucker et al. 2005:10) typed the same projectile points as Harrell and Washita arrow points, which are common in the Central and Southern Plains. If the points are Harrell and Washita, it would closely link Eureka Ridge with the Dismal River Aspect of the Central Plains. These differences in classification, along with uncertainty as to how Dismal River Aspect sites manifest in Colorado, preclude the ability to definitively state whether there was a Dismal River occupation in Colorado or whether such sites should be considered another type of Apachean occupation.

In regard to subsistence practices during the Protohistoric, specifically bison procurement and horticulture, there is evidence for the former and suggestions of the latter. The intensive processing of complete bison carcasses at site 5LR263 (Newton 2008) confirms that bison were utilized during the Protohistoric in Colorado. A horse distal scapula and distal metapodial were also found, suggesting that the occupants of 5LR263 employed horses in some capacity, such as transporting the juvenile bison carcasses (Newton 2008:45-47). However, both horse specimens from the site display green bone breakage and an impact cone is present on the scapula, possibly indicating consumption and not transportation use.

The evidence for horticulture within the research area is slim; however, maize has been identified at two Protohistoric sites. The earliest instance of maize in the Protohistoric is the charred maize residue found within the Borman-Pikes Peak vessel (5EP3496), dating to cal A.D. 1410-1470 (2-sigma) (Ellwood 2010). It was identified using phytoliths. Maize was also found at Franktown Cave in Components 9 (corn cobs) and 10 (a corn kernel). The Component 9 date overlaps with the Borman-Pikes Peak vessel with a date of cal A.D. 1450-1650. The corn kernel returned a radiocarbon date of cal A.D. 1660–1950. The large date range makes the interpretation of the corn kernel problematic, as it could be associated with historical rather than Protohistoric use of the site (Gilmore 2005). Because maize was found at these two sites, it can be assumed that horticulture was practiced to some degree during the Protohistoric period.

The lack of excavated data from Protohistoric sites renders answering questions about settlement and subsistence strategies difficult. The following are questions paraphrased from the 1999 contexts that currently cannot be fully answered with the information available (Clark 1999:334; Kalasz et al. 1999:261-262). For the sake of clarity, the term “stone circle” is used throughout the following discussion in place of tipi ring, as all tipi rings are stone circles but it cannot be assumed that all stone circles are tipi rings:

- *What is the evidence for the presence of more sedentary, long-term, residential bases in the Arkansas River Basin during the Protohistoric period, and are such sites restricted to a particular region?* The majority of the Protohistoric sites identified since 1999 have been campsites and not residential bases.

- *What is the functional relationship, if any, between rockshelter and stone circle sites in the RGFO study area?* There might be sufficient data to examine this question in greater detail now, but that level of analysis is beyond the scope of this study.

- *What regional variability is apparent in Protohistoric period settlement patterns within the study area?* There are not enough known Protohistoric sites to adequately discuss settlement patterns beyond recognizing that Protohistoric sites are found throughout the region.

However, a few Apachean sites have been found in the eastern Rocky Mountains and foothills, suggesting that these areas were used by multiple groups, including Athapaskans.

- *When did stone circles first appear in the Arkansas River Basin?* Stone circles likely appeared in the Arkansas River Basin during the Late Prehistoric, if not earlier, but their precise chronology is not well understood (Albin et al. 2011:638).

- *What is the evidence to indicate that spaced rock walls were associated with functions other than holding down the lodge covers of tipis?* Currently there is no evidence that spaced rock walls, or stone circles, associated with tipis have a function other than securing lodge covers. In a discussion of site structure on stone circle sites, Long (2011:110-114) states that stone circles in the highlands of the Pawnee National Grasslands have higher numbers of stones along the sides with the prevailing winds. While Long was discussing rocks within probable tipi rings and not spaced rock walls, it is possible that the latter did serve as foundations for some sort of wind break.

- *How closely does archaeological evidence correspond to early historical accounts of Apachean subsistence practices?*

- *What is the range of wild plant resources utilized by Protohistoric period populations?* Without more subsistence information, this question cannot currently be answered. However, Cheno-ams were found at the Pinnacle site (Tucker et al. 2005:21), suggesting that subsistence strategies incorporated at least some of the same resources consumed during earlier periods.

- *What, if any, are the regional differences in the Protohistoric period economy within the RGFO study area?*

- *Are forms of Apachean architecture other than stone circles present in the Arkansas River Basin?*

- *Are earlier stone circles smaller than those of later, Apachean occupations; i.e., is there a size difference in stone circles of the dog- versus horse-travois eras?*

- *Are there discernible differences between sites before and after the introduction of the horse?*

- *Are there architectural sites of Dismal River affiliation in the Platte River Basin?* It is still unclear if Cedar Point Village is or is not a Dismal River site. However, Gulley (2002) as cited in Baker et al. (2007) argues that the site was attributed to the Dismal River aspect because of the perceived lack of other options.

- *Is there a way to identify Protohistoric stone circles?* Many of the region's stone circle sites dated to the Protohistoric period have poor descriptions of the morphology of the rings. As these circles lack radiocarbon dates and sufficient descriptions of cultural material, it is uncertain whether they are attributable to the Protohistoric.

Geomorphology and Paleoclimates

Geomorphology and paleoclimate studies are important contributors to a comprehensive understanding of a region and the archaeological sites within it. While Protohistoric period climate is briefly addressed below, questions pertaining to geomorphology are not addressed here, and the reader is referred to the Arkansas River Basin context for a discussion of that topic (Kalasz et al. 1999:262-263).

The Little Ice Age, which dated approximately from A.D. 1400–1850, is a period of cooling that followed a period of relatively warmer conditions that occurred from A.D. 800–1400 (Mann and Jones 2003). The Protohistoric period falls entirely within the Little Ice Age; however, it is unclear how the Little Ice Age manifested within the RGFO study area because detailed regional studies have not been undertaken. Sites dating to this period are found from the Rocky Mountains to the Plains, indicating that the colder period did not preclude the utilization of all geographic regions.

Data Gaps and Directions for Future Research

The research questions posited by Clark (1999) and Kalasz et al. (1999) are still relevant because the Protohistoric period remains poorly understood. As the majority of these questions require a sample size larger than is currently available to adequately answer, future research must focus on improved methods of identifying Protohistoric sites within the study area. Site identification is complicated, as the cultural materials that distinguish Protohistoric sites from the Late Prehistoric sites are often small, as with trade beads, or prone to being looted, such as trade goods and metal projectile points. The presence of stone circles and linear features also cannot currently be used to date archaeological sites unless additional materials, such as diagnostic artifacts or a feature that may be excavated and dated, are present. Thus, a primary objective of future research into the Protohistoric stage should be to identify ways in which Protohistoric sites can be identified without reliance upon chronometric dates.

One method of Protohistoric site identification might entail undertaking a comprehensive study of all of the known and dated stone features to determine if there are characteristics, such as size, shape, or stone placement that are unique to specific time periods. Another possible method is to look for associated rock art with distinguishing characteristics, such as horses. For example, the rock art panel at site 5LR293, which is near site 5LR263, exhibits a horse and rider and other time-diagnostic information that might reflect the cultural affiliation of site 5LR263 (Newton 2008). While associating rock art panels with nearby archaeological sites is often tenuous and requires the presence of rock art in the vicinity of a site, it is a logical place to start looking for cultural associations. As additional Protohistoric sites are identified and more legacy data are used in research projects, archaeologists will be able to address more specific questions such as those discussed throughout this chapter.

Archaeologists need to further explore the route and timing of the Athapaskan migration into eastern Colorado. As discussed above, Gilmore et al. (2013) make an argument for pushing the migration back to the late A.D. 1100's. If this timing is correct, then it suggests not only an earlier migration into the region than was previously believed, but also that the presence of the Dismal River culture is not necessarily the result of the repopulation of Colorado from the east. Instead, the Dismal River Aspect might be better understood as having developed from continuous interactions between Athapaskan groups living in the high plains of Colorado and Nebraska. Additional research is necessary to confirm the early migration date. Assessing the relationship between Dismal River Aspect sites in both states might be more successful if looked at, as Brunswig (2012:21) suggests, in a more holistic, landscape-based manner. By acquiring more data about the Dismal River Aspect and, in turn, the Protohistoric populations in eastern Colorado, this poorly-documented period will become better understood.

THE HISTORIC NATIVE AMERICAN PERIOD

The following discussion focuses on developments in the understanding of historical Native American occupations of eastern Colorado after the writing of the 1999 prehistoric contexts (Clark 1999; Kalasz et al. 1999) and the 2007 historical context (Baker et al. 2007). Instead of fully summarizing the ethnohistorical background presented in Baker et al. (2007:92-101), only their discussion of the potential for these sites to be present within the RGFO study area is presented below, followed by more recent research.

Sites identified as historic Native American encampments are rare in eastern Colorado, although the National Park Service's work at the Sand Creek site is an exception. This dearth of sites likely results from a number of factors: these sites are often ephemeral and can be mistaken for prehistoric sites if more modern material culture is not present; visible sites may have been extensively looted and no longer contain identifying artifacts; or, though highly unlikely, these sites may have been covered by postdepositional processes and are not visible unless ground disturbing activities have occurred. Perhaps the most compelling argument Baker et al. (2007:100-101) make is that the larger and longer-occupied encampments occurred in areas that were also favored by Anglo settlements that have since destroyed them. However, given the potential number of larger historic Native American occupations, the authors suggest that some should still be visible on the landscape, and trying to identify these settlements by first using historical documents and then ground truthing the research findings should be a priority of future research. This still holds true, as the historic-period Native American occupation remains one of the archaeologically least understood periods in eastern Colorado (Baker et al. 2007:92-101).

Consultation with Native Americans is an important source of ethnographic information about the Historical Native American period within eastern Colorado. In view of the factors discussed above concerning the visibility of the sites within the archaeological landscape, consultation has the potential to provide more data regarding historical Native American use of the landscape. One of the most comprehensive undertakings of Native American consultation was done at the Fort Carson Military Reserve and the PCMS in 2008, when representatives from the Comanche Nation, Jicarilla Apache Nation, Kiowa Nation, Northern Cheyenne, Northern Arapaho, Oglala Sioux, Shoshone Tribe, Southern Arapaho, Southern Cheyenne, and Southern Ute were invited to consult on sacred cultural properties (Blythe 2008).

The consultation process involved visiting ancestral sites and reconfirming these tribes' past presence in the region. In addition, representatives were able to provide valuable insights, including cultural details that otherwise would have remained unknown. For example, the Red Tipi Sacred site (5LA5563) has pictographs that reflect activities of the nineteenth century Kiowa and Comanche occupations in the Purgatoire River valley. The site is a rockshelter with a freshwater pool in the middle of an intermittent drainage; the pictographs are on the rockshelter ceiling. The panel depicts a tipi outlined with a red band, associated with human figures and painted "X's" surrounding the tipi. The red tipi in the main panel was identified by Billy Evans Horse, an elder and Chairman of the Kiowa Nation, as belonging to his great-grandfather Red Tipi (Blythe 2008:72-74). Bill Voelker, a Comanche Nation representative, interpreted the red tipi as a symbolic indication that doctoring occurred within the tipi, possibly during an epidemic. Although the Comanche typically did not paint tipis, Mr. Voelker indicated that the shape of the tipi suggested a four-pole foundation typical of Comanche tipis (Blythe 2008:79-81).

Rock art panels within the PCMS including the Boulder sites (5LA3211, 5LA3212, 5LA5598, 5LA5599, and 5LA5602) and site 5LA5555 are associated with a Sun Dance lodge; symbols related to the dance were recognized by Northern Arapaho, Southern Arapaho, Southern Cheyenne, and Southern Ute. All of the tribal representatives that visited the Boulder sites suggested that the petroglyph was indicative of a typical Sun Dance lodge and not a medicine wheel as previously thought. At site 5LA5555, Joe Big Medicine recognized a counter-clockwise spiral with four layers as a symbol for Earth but also as indicative of a proto-Cheyenne band, the Suhtai. According to Mr. Big Medicine, this band was never recognized by the government but intermarried in 1835 at Bent's Old Fort with the Northern Cheyennes. The Suhtai were a distinct group that introduced the Sun Dance and other important ceremonies to the Cheyenne (Blythe 2008:64-71).

The Sitting Bear Sacred Site, which encompasses sites 5LA5568 and 5LA5569 and the surrounding environment, has extensive rock art panels. One panel that might be indicative of historical Native American occupations includes a sitting bear. Billy Evans Horse suggested that it might represent the Kiowa war chief Satank, or Sitting Bear. Sitting Bear was half Arikara and half Kiowa and, until his death in 1871 at Fort Sill, Oklahoma, was the leader of the *Kaitsenko*, the "Real Dogs," a select group of the bravest warriors. While Mr. Evans Horse could not be certain of the connection between Sitting Bear and the pictograph, it is consistent with Kiowa representations of Sitting Bear (Blythe 2008:92-95).

Another example of Native American consultation potentially informing archaeology took place at the Leef Ranch site (5LA9853). The Native American monitors present during excavations suggested that the circular rock cairns at the site represent open-air burials; the deceased would have been placed upon the rock concentration and a ceremony performed. The body would then "be left to decompose or be consumed by animals to complete the 'circle of life' with the earth" (Slessman et al. 2003:80-81). There were no human or cultural remains found associated with the excavated cairn, but the Native American consultant's description of the ceremony provides a possible explanation for the features. The report authors believe that the cairns are prehistoric in nature, though they have not been dated (Slessman et al. 2003:80-83). This example is a good illustration of how consultation can suggest meanings for particular types of archaeological remains that may be at odds with the evidence or with traditional archaeological interpretations, but nonetheless provide an added interpretive dimension to an otherwise enigmatic class of features.

Documented archaeological evidence of historical Native American occupations in eastern Colorado is presently slim. As discussed at the beginning of this section, this is due to a myriad of reasons, with the erasure of sites by later European occupations likely being the primary one. As demonstrated by the examples discussed above, Native American consultation can provide insights and aid in the identification of historical sites that might otherwise be interpreted as prehistoric or Protohistoric. Thus, collaborating with Native American consultants when appropriate might facilitate the identification of historic Native American archaeological sites. Being aware of the potential for historical Native American occupations at historical sites during surface recording or excavations is important, as the material culture may vary slightly from typical European or Hispanic occupations. Additionally, a good starting point for such research is the comprehensive examination of historical records to identify historic Native American settlements. Successful identification of historical Native American sites will likely take both historical research and careful artifact analysis. The identification of such sites, and improving the methods employed to detect them, should be considered important research goals.

SYNTHESIS AND CONTEXT FOR HISTORICAL ARCHAEOLOGY IN THE ROYAL GORGE FIELD OFFICE

Jack E. Pfertsh, Michael J. Prouty, and Jonathon C. Horn

Transportation (by Michael J. Prouty and Jonathon C. Horn)

The foundations of the complex transportation network in the eastern and central mountains of Colorado date back to prehistoric periods. Many of the state roads, highways, and interstate freeways that now cross the eastern plains and Front Range of the state follow earlier trails that were initially developed by Native American groups. These Native American trails provided the initial routes for European and American explorers, trappers, traders, and settlers in the nineteenth century. Routes that originally functioned as pedestrian and animal pack trails led to the development of overland wagon and stage routes, railroad grades, and finally, the unpaved and paved automobile routes that are present today.

Trails

Foot and pack trails were the first formal routes that comprised the early transportation system in eastern and central Colorado. Although individual trails might be present, the trails typically comprise larger travel corridors that might have consisted of numerous trails. Native American groups had already developed these trails to access areas throughout the state prior to European arrival. Early French and Spanish explorers, as well as European and American traders and trappers, then utilized these trails during expeditions into Colorado. Although many trails and routes undoubtedly existed across and near to RGFO-managed land, only a few such trails were formalized and heavily developed by the mid-nineteenth century. These trails included the Santa Fe Trail, the Cherokee Trail, the Overland Trail, and the Taos (or Trappers) Trail. Another significant trail that crossed the Plains was the Smoky Hill Trail that connected Atchison, Kansas, to Denver, Colorado, and was a popular trail during the Colorado Gold Rush; however, the Smoky Hill Trail crosses through private and state lands and is not near any land managed by the BLM-RGFO. As such, a detailed history of the trail is not provided.

Santa Fe Trail

The Santa Fe Trail provided a reliable overland route between Franklin, Missouri, and Santa Fe, New Mexico, crossing through lands that would eventually become the states of Missouri, Kansas, Oklahoma, Colorado, and New Mexico. Long before the trail assumed this name, the route was known to Native American groups who traversed this landscape (Duffus 1930; Hyslop 2002). Early Spanish explorers also utilized these Native American trails to explore their vast new territory (Hyslop 2002:9). Eventually, two Santa Fe Trail routes formed: the Mountain Route and the Cimarron Route, both of which crossed through southeastern Colorado. The Mountain Route in Colorado followed the Arkansas River to its confluence with Timpas Creek, west of modern-day La Junta, Colorado. Here, the trail turned south to modern-day Trinidad, Colorado. The trail crossed into New Mexico at Raton Pass. Only a small portion of the Cimarron Route crosses through the extreme southeastern corner of Colorado, along the Cimarron River. Travelers along the trail encountered many obstacles, both environmental and human-related. The route across the plains was dry and dangerous. Although the Mountain Route provided more opportunities for watering sources, it required crossing the southern Rocky Mountains, which was a difficult endeavor and typically added weeks to the journey (Hyslop 2002). Conversely, while the Cimarron Route was more expedient, water was scarce and the route crossed traditional hunting grounds of many Native American groups. It is for this reason that travelers often clashed with Comanche, Apache, Kiowa, and Pawnee as they traversed these areas (Duffus 1930; Hyslop 2002). To provide support for travelers and for the lucrative trade empire that had been established, many private companies and the U.S. government established trading posts along these routes. Bent's Fort was one such stopover, constructed along the Mountain Route of the trail in Colorado. The Mexican-American

War in 1846 severely impacted the trade enterprise and the trail became as a primary transportation corridor for military operations. Colonel Stephen W. Kearny and his Army of the West began their march to Santa Fe from Bent's Fort, utilizing and improving the Mountain Route as they progressed (Duffus 1930; Friedman et al. 1988:9-16). With the discovery of gold in California in 1849 and in Colorado in 1858, the Santa Fe Trail—among many other emigrant trails in the United States, including the California Trail, the Oregon Trail, the Cherokee Trail, the Overland Trail, and the Mormon Trail—provided access to the newly opened western territories and resources for settlers.

A number of segments of the Santa Fe Trail have been recorded within the RGFO study area. These segments are visible as large swaths through the prairie and as earthen swales that represent the remnants of wagon ruts. Through southeastern Colorado, multiple segments have been recorded in Baca (sites 5BA38, 5BA55, and 5BA418), Bent (site 5BN391), Las Animas (sites 5LA5795, 5LA5847, and 5LA11786), Otero (site 5OT234, 5OT452, and 5OT453), and Prowers (sites 5PW87 and 5PW187) counties. The documentation of alternate branches and routes accounts for the multiple site numbers within most counties.

Cherokee Trail

The Cherokee Trail was an overland wagon and pack trail that was established in 1849 as a route from Oklahoma to California by way of Kansas, Colorado, and Wyoming. It was established to access the gold fields in California and utilized portions of other trails, such as the Santa Fe Trail in the south and the California, Oregon, and Mormon Trails to the north in Wyoming (Gardner 2002). The Cherokee Trail takes its name from a group of Cherokees who traveled the route of the trail with other 1849 gold seekers. Although the trail is recognized as having been established in 1849, the foundation of it was formed during the 1830s, used then to access a number of fur-trading posts along the South Platte River, including forts St. Vrain, Vasquez, Jackson, and Lupton (Hafen 1948). With the discovery of gold in California in 1849, the trail was formalized to allow for a reliable route to the goldfields from the southeastern United States (Gardner 2002). Originating in the present-day city of Tahlequah, Oklahoma, near the Oklahoma-Arkansas border, the trail continued northwestward, where it merged with the Santa Fe Trail in Kansas. Travelers followed the Mountain Route of the Santa Fe Trail along the Arkansas River into Colorado. Departing from the Santa Fe Trail, the Cherokee Trail continued to follow the Arkansas River westward, turning northward along Fountain Creek near present-day Pueblo, Colorado. It then continued north along Fountain, Jimmy Camp, and Cherry creeks to the South Platte River near present-day Denver, Colorado. Here, the trail followed the course of the South Platte River and the Cache la Poudre River, skirting the Front Range. The trail then crossed overland northwestward before turning northward east of present-day Virginia Dale, Colorado, and into Wyoming. In Wyoming, the trail continued westward until it joined the California, Oregon, and Mormon trails near Fort Bridger in southwestern Wyoming (Gardner 2002). Additional and secondary routes of the Cherokee Trail were developed, including one that accessed Fort Bridger from the south by way of North Park, the Yampa River, and into Browns Park in northwestern Colorado and northeastern Utah. As western settlement continued, coupled with the discovery of gold in Colorado in 1858, the Cherokee Trail continued to expand, and portions of it formed the Overland Trail in the 1860s. These trails would eventually serve as the primary routes into and through the mountains, and would further provide access for settlement and freighting prior to the construction of the Transcontinental Railroad in southern Wyoming. Five segments of the Cherokee Trail have been previously documented. One segment has been recorded in Arapahoe County as site 5AH277 and one segment has been documented in Denver County as site 5DV835. The other three recorded segments (sites 5LR706.2, 5LR706.5, and 5LR706.6) are in Larimer County, and represent both the route of the Cherokee Trail and the Overland Trail.

Overland Trail

The Overland Trail, a wagon trail, was a major immigrant route in the western United States. The route was established to continue American westward expansion and to provide access to the mines of Colorado. As with other major travel routes in the West, the trail's route subsumed previous foot and pack trails in the area; it was not known as the Overland Trail until 1861. It began in Atchison, Kansas, and continued north and westward through Kansas and Nebraska, following the routes of the California, Oregon, and Mormon trails. The route then turned southwestward into Colorado, before turning northwestward into Wyoming and rejoining the California, Oregon, and Mormon trails near Fort Bridger in Wyoming. In Colorado, the eastern half of the Overland Trail followed a route used during the 1820s by Major Stephen H. Long during his exploration of the Platte River Basin in 1820 and by William Ashley, a prominent fur trapper in the region and the founder of the Rocky Mountain Fur Company (Mehls 1984b:21, 23). The route followed the South Platte River from the forks of the Platte River in Nebraska southwestward to the Cache la Poudre River nearly Greeley, Colorado (Hafen 1948). This particular route became a well-traveled course for fur trappers and traders into northern Colorado and farther west. The western half of the route, from the Cache la Poudre River into Wyoming, utilized the previously established Cherokee Trail. From its inception, the Overland Trail was considered the preferred route for an overland mail and freight road between California and Missouri (*Rocky Mountain News*, April 19, 1861). By July 1861, a stage and mail route was in use along this route known as the Central Overland California and Pike's Peak Express. Aside from the three segments of the Cherokee Trail/Overland Trail in Larimer County (site 5LR706), two segments have been recorded in Logan County as site 5LO348.

Taos Trail

The Taos Trail, or Trappers Trail, was an overland foot and pack trail through the southern Rocky Mountains that provided a reliable route for trappers between northern New Mexico and the Great Plains. The route roughly followed the route of the Old Spanish Trail north from Taos into the San Luis Valley. Skirting the eastern side of the valley, the trail turned northeastward at Sangre de Cristo Creek, crossed the mountains at Sangre de Cristo Pass, and continued northeastward to the Huerfano River. After crossing the Huerfano River, the trail turned northward along the eastern flanks of the Wet Mountains, before turning eastward at Greenhorn Creek near the present-day town of Rye, Colorado. The trail followed the approximate route of Greenhorn Creek northeastward until it joined the St. Charles River, where it crossed the river and turned north. It continued overland to the confluence of Fountain Creek and the Arkansas River. From there, it followed known routes to access other trading forts throughout the plains, including Bent's Fort, Fort Laramie, and the fur-trading posts along the South Platte River. Portions of the Taos Trail, for example, the segment connecting the San Luis Valley and the Great Plains via Sangre de Cristo Pass, were well-known to Native American groups and, by the 1810s, trappers and traders looking to reach Taos. In response to the increasing trespassing traffic on Spanish-owned lands, the Spanish constructed a temporary fort near Sangre de Cristo Pass to dissuade travelers from using the trail in the early 1820s (Lecompte 1978:32). Mexico achieved independence in 1821, resulting in increased access to Taos and Santa Fe markets for American traders. Traders using the Taos Trail were typically able to avoid inspections by Mexican officials, while those traveling the Santa Fe Trail generally found themselves subject to inspection. As a result of this discrepancy, use of the Taos Trail continued to increase, until it reached its height in the early 1840s, which coincided with the establishment of El Pueblo (Fort Pueblo) on the banks of the Arkansas River (Weber 1971:93). Soon afterward, travel along the Taos Trail dwindled as the fur trading enterprise began to decline and the Mexican-American War transpired in the late 1840s. The trail was surveyed by Lt. Beckwith in 1853 as a possible route for the 38th parallel railroad. Although the railroad was never built, portions of the Taos Trail later became local access roads and state and U.S. highways. Within the RGFO study area, the route of the trail has been documented within five counties. In Arapahoe, Adams, and Denver counties it has been recorded as the Trapper's Trail (sites 5AH215, 5AM143, and

5DV975, respectively). In Costilla and Huerfano counties it is documented as the Taos Trail (sites 5CT393 and 5HF935, respectively).

Wagon and Stage Roads

The development of wagon roads and stage routes coincided with western expansion and the development of towns and cities throughout the state. Wagon roads and stage routes sometimes followed the courses of earlier pack trails, as with the Cherokee and Taos Trails, and sometimes were developed on preexisting wagon roads, as with the Santa Fe and Overland Trails. Eventually, numerous named wagon and stage roads crossed through the west-central and southwestern High Plains and portions of the Rocky Mountains, providing access for freighting, mail, and gold seekers, and settlers to the growing towns and cities.

Within the RGFO study area, many of the roads that crossed the region served to connect major hubs to profitable outlying areas, such as mining centers or towns. As a result, numerous stage and mail companies that provided links to these regions were incorporated. A vast majority of these companies were short-lived or were quickly folded into larger, profitable operations. The major stage and mail companies are described below, along with a brief description of the route of the associated wagon road. For further information on smaller stage and mail lines, the reader is referred to the historic trail map summaries produced by the United States Geological Survey (USGS) for the Denver, Greeley, La Junta, Leadville, and Trinidad quadrangles (Scott 1999, 2004a, b; Scott and Shwayder 1993; Scott et al. 2008).

Leavenworth and Pike's Peak Express Company

The first stage company to provide service to Colorado was the Leavenworth and Pike's Peak Express Company (L&PPEC). The L&PPEC was organized by the established freighting company of Russel, Majors, and Waddell of Nebraska City, Nebraska, in 1858. Service to Denver, Colorado, began in the spring of 1859 (Mehls 1984b:96). From Leavenworth, Kansas, the L&PPEC followed the route of the Smoky Hill Trail to Denver, Colorado. The L&PPEC was short-lived, as it was financially unstable; in 1860, the company was reorganized as the Central Overland California and Pike's Peak Express (COC&PPE) (Mehls 1984b:97; Walker 1966:69). Two segments of the L&PPEC route have been recorded. In Denver County it is recorded as site 5DV836 and in Kit Carson County it is recorded as site 5KC82.

Overland Trail Stage Routes

As described above, the Overland Trail was a significant transcontinental trail that furthered western expansion. As an established trail through northern Colorado, it also served as a stage route in the 1860s. The first company to utilize the Overland Trail through Colorado was the COC&PPE in 1860. Formed from the reorganized L&PPEC, the COC&PPE was owned by Russel, Majors, and Waddell (Walker 1966:68). With the reorganization, the eastern terminus was changed from Leavenworth, Kansas, to Nebraska City, Nebraska, and the route utilized the Overland Trail rather than the Smoky Hill Trail to reach Denver (Mehls 1984b: 97). The COC&PPE ran tri-weekly stage coaches, carrying both passengers and mail from Missouri to Denver (Jackson 1982:7). With the establishment of the Western Stage Company and its delivery of the mail and passengers to Denver, the COC&PPE began to struggle financially. In an effort to boost revenue, Russel, Majors, and Waddell launched the Pony Express along the Overland Trail (Jackson 1982:10). However, this endeavor was also short–lived, and put further financial strain on the company. During this period, conflicts between Native American groups and travelers along the Oregon Trail resulted in increased use of the Overland Trail (Weimer 2016). Eventually, Russel, Majors, and Waddell were forced to sell the company at a public auction in 1862. The highest bidder was Ben Holladay, a renowned stagecoach operator in the western United States. Holladay purchased both the COC&PPE and the Western Stage Company routes and consolidated them into the Holladay Overland Mail and Express Company, or the Overland Stage Line (Jackson 1982). The Overland Stage Line operated the same route as the COC&PPE and the Western Stage Company successfully until 1864. Initially, hostilities between Native Americans and Anglo-American travelers on the Overland Trail were not as widespread due to the presence of the U.S. Army. With the outbreak of the Civil War, troops were removed from guarding the trail. Consequently, conflicts steadily increased. These conflicts resulted in the near closure of the trail, which in turn slowed mail delivery and decreased access to resources for the residents in Colorado. Eventually, persistent conflicts between Native Americans and settlers forced traffic, and mail delivery, onto the "Cut-off Route" that bypassed Denver via Fort Morgan and Fort Collins. The result of the movement of the stage line financially hindered Holladay's company, as it was required to rebuild infrastructure along the new route (Weimer 2016). At that point, another stage company, Butterfield's Overland Despatch [sic] (BOD), was formed to operate as a competing alternative to deliver mail and passengers to Denver. Since the stage line followed the route of the original immigrant trail, documented segments have already been discussed (see Overland Trail above).

Butterfield's Overland Despatch

Butterfield's Overland Despatch (BOD) was established by David A. Butterfield in 1864, with the backing of large eastern companies, including Wells, Fargo, & Company (Wells Fargo) (Jackson 1982:11). The route of BOD connected Atchison, Kansas, to Denver. Survey of the route began in 1865, and the first freight left for Denver that same year (Kansas Historical Society 2011). The final route of BOD followed the route of the Smoky Hill Trail: west along the Smoky Hill River through Kansas and eastern Colorado, then west to Big Sandy Creek. The stage line then followed Big Sandy Creek to west of modern-day Limon, Colorado. Here, the route of BOD departed the Smoky Hill Trail and progressed overland, crossing East and West Bijou Creeks, Comanche and Kiowa Creeks, and eventually joining the route of the Cherokee Trail along Cherry Creek near present-day Franktown, Colorado. With Wells Fargo exploring the feasibility of establishing a stage line, Ben Holladay purchased BOD in March 1866. Holladay's ownership, however, was short-lived, and by November of 1866, it, along with Holladay's other holdings, was consolidated under the Wells Fargo name (Jackson 1982:13). Segments of the Butterfield's Overland Despatch route have been documented in three counties within the RGFO study area. Segments include sites 5AH208, 5AM132, and 5DV833.

Wells, Fargo, & Company

Wells Fargo had owned a small stake in the Overland Stage Line, as well as a controlling interest in John Butterfield's Overland Mail Company. The John Butterfield mail and stage line ran south of the Rockies, connecting the southern states to California. With the success of the Overland Mail Company and a desire to expand their service, Wells Fargo began exploring the feasibility of establishing a stage line into Denver in 1866 (Jackson 1982). By the end of 1866, many of the preexisting mail and stage companies in the western United States were financially overextended. Wells Fargo never constructed a line as planned; however, in November of 1866, a "great consolidation" of mail and stage lines, including all of Holladay's holdings west of the Missouri River, was accomplished under the Wells Fargo name (Jackson 1982:13). Within Colorado, Wells Fargo operated four major routes: the Platte, Overland, Smoky Hill, and Mountain. Both the Platte and Overland Routes followed the same route as that of Holladay's Overland Stage Line (and the prior COC&PPE). The Smoky Hill Route utilized the former BOD corridor. In 1867, Wells Fargo purchased the mail contracts from Denver to Black Hawk and Central City and eventually expanded the line to Georgetown in 1868. From Golden, the Mountain Route went west of Guy Hill, then back south to Clear Creek. The route followed Clear Creek until it split at the confluence of North Clear Creek and Clear Creek. The northern route followed North Clear Creek through Black Hawk and Central City and terminated at Nevadaville (also known as Nevada or Nevada City). The southern route continued along Clear Creek through Idaho Springs, before terminating at Georgetown (Jackson 1982:29).

The completion of the Union Pacific Railroad in 1867, through the far northeastern corner of Colorado and into Wyoming, brought further changes to stage lines. Initially, all four routes were used and even expanded in 1867. Wells Fargo also constructed a new stage line from Denver to Cheyenne to access the increased traffic along the railroad. However, overland mail and passenger traffic began to decline in 1868. By 1869, Wells Fargo had decided to sell off stage lines, although the company remained a financial stakeholder in the organizations that formed to operate the old Wells Fargo lines (Jackson 1982:61). In 1870, the Kansas Pacific completed two railroads into Denver, furthering the decline of stage lines throughout Colorado. Because many of the Wells Fargo stage lines were consolidated from preexisting stage lines (such as the Overland Trail stage companies), no segments of constructed Wells Fargo routes have been documented within the study area. However, stage stations associated with Wells Fargo have been documented.

Along each of these routes, both swing and home stage stations were constructed, offering reprieve for drivers, passengers, and draft animals (Table 8). Home stations were substantial operations that served as an ending point for the driver, provided accommodations for the passengers, and meals for employees and passengers. Swing stations were smaller, often consisting of a single building for the attendants, and served as a place where draft animals were changed and passengers were allowed a short rest (Burke 2007:37). Stations were originally simple tent structures that were eventually replaced by sod, log, adobe, or stone structures. Swing stations were generally constructed between 10 and 20 mi. apart, depending on topography. On the Plains of Colorado, home stations were constructed between 50 and 95 mi. apart (Burke 2007:37). The stage station system utilized by Wells Fargo was common to many other stage companies in Colorado.

Barlow, Sanderson and Company

One of the most notable stage companies in Colorado was Barlow, Sanderson and Company (Barlow-Sanderson). This overland stage and mail company was formed by Bradley Barlow and Jared L. Sanderson in the early 1860s (Taylor 1971:117). Prior to becoming Barlow-Sanderson, the company went through multiple incarnations with additional primary owners; however, Barlow and Sanderson remained these companies' constant proprietors. Barlow-Sanderson operated many stage and mail routes throughout the West, but was renowned for their services throughout Kansas, Colorado, and New Mexico.

Table 8. Home Stage Stations along Wells Fargo Routes within the RGFO Boundary.

Route	Home Stations†	Closest Modern Community	State Site No.
Platte	Julesburg	Julesburg	
	River Side	Crook	5LO64
	Godfrey	Hillrose	
	Junction	Hoyt	
	Living Springs	Living Springs	5AM152
	Denver	Denver	
Overland	Denver	Denver	
	Burlington	Niwot	
	La Porte	Laporte	5LR750
	Virginia Dale	Virginia Dale	5LR698
Smoky Hill	Cheyenne Wells	Cheyenne Wells	
	Lake Station	Limon	
	Bijou Springs	Kiowa	
	Denver	Denver	
Mountain	Denver	Denver	
	Golden City	Golden	
	Central City	Central City	
	Idaho Springs	Idaho Springs	
	Empire	Empire	
	Georgetown	Georgetown	

† Stage stations taken from Jackson (1982).

Wells Fargo had a near-monopoly on the routes in the northeastern quarter of Colorado and Barlow-Sanderson dominated stage and mail delivery in the southern part of the state. By 1867, Barlow-Sanderson began providing overland mail and stage service over the Santa Fe Trail, and named the route the Southern Overland Mail and Express Company (Taylor 1973). Although Barlow-Sanderson formed towards the end of the transcontinental stagecoach era, the company was important for their role in providing stagecoach services from expanding railheads into the mountains. With the expansion of the Kansas Pacific into eastern Colorado in 1869, Barlow-Sanderson used the KP line as the beginning of their stage line (Taylor 1973). As a result, the area of stage service continually grew smaller as the Kansas Pacific moved westward. Initially, the eastern terminus of the Barlow-Sanderson line was at Kit Carson. The route then headed southwestward to Ft. Lyons along the Arkansas River. From here, the stage line utilized the route of the Arkansas River as its main travel corridor to access numerous areas of southern Colorado.

By 1876, the construction of the Kansas Pacific, the Denver and Rio Grande (D&RG), and the Atchison, Topeka, and Santa Fe (AT&SF) railroads had pushed the eastern terminus of Barlow-Sanderson into the foothills of the Rocky Mountains. Still operating along the Arkansas River, the stage line operated a number of lines that reached the interior mountains. Beginning at the railheads for the D&RG in Cañon City, the Barlow-Sanderson stage line initially ran northwestward to avoid the Royal Gorge, then turned southwestward to the Arkansas River. From here, the route paralleled the river westward, through the Arkansas River Canyon, before turning northwestward and arriving at a stage stop known as Bale's Tavern (near present-day Salida). From here, the company ran a line northward along the upper Arkansas River into Oro City (Leadville). Eventually, stage lines were established that continued west from Bale's Tavern and crossed over Marshall Pass and south into the upper reaches of the San Luis Valley. A fourth major route went south from Pueblo, through Greenhorn, Badito, over Sangre de Cristo Pass, and into the San Luis Valley (Burke 2007). In 1877, the D&RG constructed a line over La Veta Pass (just south of Sangre de Cristo Pass), eliminating the need for the Barlow-Sanderson line into the San Luis Valley. In 1878, Barlow retired, and the company was renamed J. L. Sanderson and Company; however, for the sake of consistency, the operating name of Barlow-Sanderson was still used (Taylor 1973:152). At the onset of the Silver Boom in Colorado, travel along the Barlow-Sanderson lines saw a significant increase in traffic. The Cañon City–Leadville line was so heavily trafficked in early 1879 that a tri-daily service became necessary (Taylor 1973:154). However, by 1880, the D&RG had expanded into many of the same areas as the Barlow-Sanderson lines, resulting in the need for fewer stage operations to the areas west of the Sangre de Cristo Mountains [except for the Cañon City–Leadville line (Taylor 1973)]. This line was short-lived, because by 1880, D&RG had expanded their tracks into Leadville, removing the last major stage line along the Arkansas River. Barlow-Sanderson continued to operate in western Colorado, especially in the San Juan Mountains, until 1884, when J. L. Sanderson and Company sold all their remaining Colorado stage lines to the Colorado and Wyoming Stage, Mail, and Express Company (Taylor 1973:162). Segments of Barlow-Sanderson lines have been recorded in Otero County as sites 5OT452 and 5OT1523. Site 5OT452 comprises segments of both the Barlow-Sanderson line and the Santa Fe Trail. As with Wells Fargo stage lines, Barlow-Sanderson stage lines overlay previously built roads, and might be recorded as separate sites.

Other Significant Routes

Although Wells Fargo and Barlow-Sanderson dominated the stage and mail routes throughout eastern Colorado, several smaller stage companies operated throughout the state. As a result, numerous wagon roads were present in eastern Colorado, connecting major hubs to smaller communities. Two significant routes that were not part of the Well Fargo or Barlow-Sanderson systems include those along the Arkansas River (prior to 1870) and across Ute Pass. Other significant roads include the Cañon City to Salida Road, Leadville Wagon and Stage Road, the Birdseye and Leadville Toll Road, and the Cañon City and Cripple Creek Toll Road, also known as the Shelf Toll Road.

The first road along the Arkansas River was built in 1859. The route traveled along the river, then turned northward through Eightmile and Twelvemile parks, after which it paralleled Current Creek into South Park. The route then turned west over Trout Creek Pass and north along the Arkansas River into Oro City (Leadville) (Everett and Hutchinson 1963). Eventually, the route was changed to follow the course of the Arkansas River, through the Arkansas River Canyon to its headwaters near Leadville. Many sections of this road would be incorporated into other roads, including the Cañon City to Salida Road and the Leadville Wagon and Stage Road. Small roads were constructed off the main route to access surrounding regions. This included the Copper Gulch Stage Line, which accessed Westcliffe, Silver Cliff, and other areas of the Wet Mountain Valley (Fossett 1880). The Ute Pass route was a well-traveled route that left Colorado City (Old Colorado City), followed Fountain Creek, then crossed Ute Pass near present-day Divide, Colorado, into South Park. It then followed Trout Creek to access the Leadville region. This route had been traveled by Native Americans, trappers, and prospectors long before a wagon road was established (Burke 2007:135). It was also the precursor to both the route of the Colorado Midland Railway in the 1880s, and later, the route of US Highway 24.

Cañon City to Salida Road

The Cañon City to Salida Road was a significant wagon road that dates to the early 1860s. The wagon road followed the course of the Arkansas River between the historical communities of Gorgemore (modern-day Parkdale) and Cleora (southeast of modern-day Salida). In 1860, following Native American trails through the region, Joseph Lamb created a pack trail route in order to supply placer mines in the region (Weimer 2004). In the early 1870s, the growing population, coupled with a desire to provide a reliable route to western Colorado counties and the San Louis Valley, prompted the Fremont County Commissioners to appropriate funds to build a road along the Arkansas River (Campbell 1972:178). The road began at the Parkdale siding of the Denver & Rio Grande Railroad and continued southwestward along Copper Gulch to Texas Creek. From here, it continued southward along Texas Creek before turning northwestward to access the Arkansas River via Oak Creek. It then followed the river northwestward through Pleasant Valley until it terminated at Cleora, southeast of Salida. The road was opened in 1874 and cut the distance between Cañon City and Salida from 82 mi. to 64 mi.; it took stage coaches eight hours to complete the trip (Campbell 1972:178). The construction of the Denver & Rio Grande Railroad along the Arkansas River did not significantly impact the use of the road, as it remained an important thoroughfare for the communities and stage companies that continued to use it (Weimer 2004). In the early 1910s, the wagon road was incorporated into the Rainbow Route, an early automobile trail (see the US Route 50 section—the National Old Trails Road/Rainbow Route—below). The newly designated route was constructed between 1913 and 1915 and required realignments, which included a cutoff around Copper Gulch that shortened the overall route by 11 mi. The Rainbow Route would eventually be designated US Route 50, a precursor to the modern Highway 50. Segments of the historical wagon road have been recorded in Fremont County as site 5FN1950.

Leadville Wagon and Stage Road

The Leadville Wagon and Stage Road was a major transportation route along the Upper Arkansas River that provided a reliable route to Leadville beginning in the mid-1870s. The route was not operated by a single stage company or endeavor, but rather was a maintained road between Buena Vista and Leadville. South of Buena Vista, stage and freight wagons took a number of routes, including a route to the east over Trout Creek Pass and another route farther south through Salida and Cañon City to reach the Front Range. However, each of these routes converged at Buena Vista, and a single route along the eastern side of the Arkansas River was used to access Leadville (Scott 2004b). With the construction of the Denver & Rio Grande Railroad, the Denver, South Park, and Pacific Railroad, and the Colorado Midland Railroad in the 1880s, the wagon road was realigned a number of times and traffic decreased. A number of segments of the historical wagon road have been documented in both Lake and Chaffee counties under site numbers 5LK60 and 5CF156, respectively.

Birdseye and Leadville Toll Road

In 1880, Henry "Colonel" Howland began construction of a toll road that connected the Ten Mile Road (modern-day Colorado State Highway 91) and the Mosquito Pass Toll Road, by way of Birdseye Gulch. Howland was an influential entrepreneur in the Leadville region who owned and operated the Birdseye Lumber Company. A small community, called Howland, grew up around the operation northeast of Leadville along the East Fork Arkansas River. Colonel Howland constructed the toll road southward along Birdseye Gulch, past numerous mining operations, before joining the Mosquito Pass Toll Road, which was a well-traveled route into Leadville via California Gulch. In 1880, the Denver & Rio Grande Railroad constructed a spur to the Kokomo mining camp and also built a station near Howland. By 1882, the community of Howland began to dwindle, and by 1884, the community of Birdseye was established along the toll road (approximately one-half mile southeast of Howland). Birdseye was a center for mining, timbering, and charcoal making. The toll road served as a vital link between two major roads in the region, along which valuable goods, timber, and ore were transported. It is not known when the toll road was abandoned, although its abandonment is likely associated with the abandonment of Howland and the growth and popularity of the railroad between 1882 and 1884. The toll road has been recorded as site 5LK1912 in Lake County (Weimer 2008).

The Cañon City and Cripple Creek Toll Road (Shelf Toll Road)

To capitalize on the gold fields in the Cripple Creek region, a group of investors from Cañon City and Florence incorporated the Cañon City and Cripple Creek Toll Road Company in 1891 (Campbell 1972:146). The company was organized to construct and maintain a toll road from the northern end of Garden Park to Cripple Creek, by way of Fourmile and Cripple creeks. The route was rugged, especially in the southern end where blasting was required to create a shelf on which to construct the road. It was for this reason that the road became known as the Shelf Toll Road. The road took approximately four months to build and was completed in 1892. Using the Shelf Toll Road, it took approximately six hours to travel north from Cañon City and four hours to travel south from Cripple Creek (Scher 1979). The road was narrow, traversing the steep hillsides 50–250 ft. above the creek. It was a well-traveled and popular route because it was the one of a few roads that provided the means to move ore from the Cripple Creek and Victor mines. The southern toll house was at Eldred on the Freek Ranch, a half-way house at Marigold, and the northern toll house was at the small settlement of Lawrence, south of Cripple Creek. Competition from the Eightmile Creek Road in Phantom Canyon to the east, and the subsequent construction of the Florence and Cripple Creek Railroad in 1893, strained the profitability of the toll road. Furthermore, the construction of the Midland Terminal Railway in Cripple Creek in 1896 and the Colorado Springs & Cripple Creek District Railway in 1901 made the toll road obsolete. By 1901, the Cañon City and Cripple Creek Toll Road Company was dissolved and the road was sold to Fremont and Teller counties, which continued to maintain the route as a free county road (Scher 1979). It is continually maintained today as Fremont County Road 9 and Teller County Road 88. A segment has been recorded in Fremont County as site 5FN486.

Railroads

The first railroad to cross into what would become the state of Colorado was the Union Pacific through the far northeastern corner of the state. Additional railroads, such as the Denver Pacific, Kansas Pacific, Colorado Central, and others, were eventually built to facilitate travel and shipping within the state. The history of these railroads is complex, with numerous financial failures, reorganizations, and mergers. The following section highlights the major railroads that were built across the RGFO study area.

Union Pacific (Transcontinental Railroad)

The first entry of a railroad into Colorado was associated with the construction of the Transcontinental Railroad in the far northeastern corner of the state by the Union Pacific in 1867. Beginning as early as 1858, boosters in the Denver and Golden regions lobbied for the proposed transcontinental route to cross through the newly established territory. However, numerous surveys conducted through the mountains did not identify a route that could easily be constructed. As a result, the Union Pacific selected a northern route through Wyoming, where the topography allowed for easier construction (Fraser and Strand 1997). Tracks were initially laid in 1861, working west from Omaha, Nebraska. Construction slowed as a result of the Civil War, with only 40 mi. of track constructed between 1863 and 1865. The Union Pacific attempted to survey a route through the mountains but ultimately failed and abandoned the effort. Although most of the Union Pacific line is north of Colorado, a small section does cross through the state. The route followed the South Platte River through present-day Julesburg and then turned northwestward and exited the state on its way to Cheyenne, Wyoming. This route paralleled the Overland Trail through Colorado. The completion of the Union Pacific spurred the construction of a number of railroads to Julesburg that would connect Denver, Golden, and the mining fields to the rest of the country. The completion of the Union Pacific line also made the use of the Overland Trail obsolete, effectively closing the trail to transcontinental travel. A segment of the Union Pacific line has been recorded in Sedgwick County as site 5SW45.

Denver Pacific

The Denver Pacific Railroad was built to provide a link from Denver to the Union Pacific line in Cheyenne, Wyoming. The Denver Pacific Railway and Telegraph Company was founded in 1867, led by Bela M. Hughes, John Evans, and David H. Moffat (Fraser and Strand 1997). After several years of negotiations, the Denver Pacific obtained a congressional land grant contingent on the construction of the line that made financing of the construction attractive to the Union Pacific. Once the route had been graded, the Union Pacific reneged on their agreement to finance further construction, so the Denver Pacific collaborated with the Kansas Pacific to complete the line. The partnership resulted in the absorption of the Denver Pacific into the Kansas Pacific Railroad and provided the financial means for the Kansas Pacific to complete their line to Denver from the east. Segments of the Denver Pacific Railroad have been documented in Adams, Broomfield, Denver, and Weld counties as sites 5AM459, 5BF130, 5DV841, and 5WL969, respectively.

Kansas Pacific

The Kansas Pacific was a transcontinental railroad that ran west from Kansas City. The plan for the original route was to join the Union Pacific in Nebraska. However, backers in Colorado, including John Evans and Jerome Chaffee, successfully pushed for the railroad to be rerouted through Denver (Mehls 1984b:101). Construction into Colorado began in 1869; the railroad entered Colorado and followed the route of the Smoky Hill Trail, along the Smoky Hill River and Big Sandy Creek into Denver. It then turned north and connected to the Union Pacific near Cheyenne, Wyoming, using the grade constructed by the Denver Pacific. The Kansas Pacific absorbed the Denver Pacific and regular freight and passenger service began in June 1870. The Kansas Pacific merged with the Union Pacific in 1880 (Fraser and Strand 1997). A number of segments of the railroad have been previously documented in Adams, Arapahoe, Broomfield, Lincoln, and Weld counties as sites 5AM472, 5AH808, 5AH1572, 5BF130, 5LN201, and 5WL1969, respectively.

Colorado Central Railroad

The Colorado Central was incorporated in 1865 as the Colorado & Clear Creek Railroad. Its name was changed to the Colorado Central & Pacific Railroad in 1866 and then, to the Colorado Central Railroad in 1868. The company operated under lease to the Union Pacific in 1879 and 1880. Early lines of the company ran from Golden to Central City and Black Hawk and from Denver to

Cheyenne. The plan was to connect the Julesburg to LaSalle Branch to the other lines of the Colorado Central by way of Denver. In the early 1870s, the Colorado Central was expanded west of Denver along Clear Creek as a narrow-gauge railroad to provide a link to the rich mines of Georgetown and Idaho Springs (Mehls 1984b). The company was closely associated with the Union Pacific, and constructed a branch line from the Union Pacific at Julesburg to the Denver Pacific line at LaSalle in 1881 and 1882. The line was expanded by the Union Pacific in 1882 to Silver Plume, and was reorganized as the Georgetown, Breckenridge, and Leadville Railroad at that time (McWilliams et al. 2014). In 1890, the Colorado Central was among the 11 Colorado and Wyoming railroads consolidated as the Union Pacific, Denver & Gulf Railway (UPD&G). The UPD&G was reorganized as the Colorado & Southern in 1899 (Fraser and Strand 1997; Ormes 1980). The Colorado Central Railroad has been documented in multiple counties within the RGFO study area under the site numbers 5AM2754, 5BL400, 5CC3.221, 5CC427, 5GL645, 5JF269, 5JF519, 5LO640, 5LR1731, 5SW45, 5SW107, and 5WL2946.

Denver and Rio Grande Railroad

The Denver and Rio Grande Railroad (D&RG) was a narrow-gauge railroad that reached into the mountains of Colorado, providing a railroad link to Denver for many areas. The D&RG was incorporated in 1870 by the former Kansas Pacific surveyor William J. Palmer (Fraser and Strand 1997). Palmer had decided to build the D&RG on a narrow-gauge track, rather than a standard gauge, believing that the narrow track would provide both logistical and financial advantages (Mehls 1984:101). A narrow track allowed for the D&RG to build in mountainous areas that were once thought to be out of reach for a railroad. The railroad would eventually provide rail access throughout the West, including Utah and New Mexico. Construction on the D&RG began south of Denver in 1870, and by the following year, it had reached the newly-formed city of Colorado Springs, and by 1872, the line had reached Pueblo (Mehls 1984:102). Palmer and the D&RG saw Pueblo as the first step toward expanding the line over Raton Pass and into New Mexico and on to Texas and Mexico (Fraser and Strand 1997). However, as the D&RG was considering expansion to the south, the Atchison, Topeka and Santa Fe (AT&SF) was looking at Raton Pass as their link for a transcontinental railroad. Beginning in 1876, the two railroads would clash over key expansion areas, including Raton Pass and the Arkansas Canyon.

The feud between the two rail companies culminated in both legal and physical battles for the Arkansas Canyon and the rights to build a line through the canyon to access the rich mine claims of the Rocky Mountains (Fraser and Strand 1997:25). With the onset of the silver boom in Leadville in 1878, both the D&RG and the AT&SF raced to construct a line to reach Leadville. The route would have to be built through the canyon, which would accommodate only one line. Both railroads sent engineers ahead of construction to lay claim for right of construction (Fraser and Strand 1997). Although the AT&SF arrived first and began grading in the canyon, the lead engineer for the D&RG, James R. De Remer, along with a contingent of men, snuck past the AT&SF. De Remer and his men built rudimentary stone forts and sniper nests, known as De Remer Forts, to barricade the AT&SF from constructing the line. Elements of these forts are still evident today within the canyon (Athearn 1985; Gantt et al. 2010; Osterwald 2003). The rudimentary stone structures were primarily constructed in April 1878 and June 1879 (Weimer 1993). While the stone structures are generally associated with De Remer and D&RG, it is unknown if the AT&SF constructed similar structures. The D&RG was successful in keeping the AT&SF east of Pinnacle Rock (approximately 20 mi. west of Cañon City); any stone structure west of Pinnacle Rock is likely associated with the D&RG (Weimer 1993). In 1879, after court injunctions and a brief time during which the AT&SF owned a controlling stake in the D&RG, the two rail companies reached an accord. The truce was based on an agreement in which the AT&SF would not build to Leadville or Denver and the D&RG would not build south (Fraser and Strand 1997).

In 1880, to provide access to the mines in the Wet Mountains to the south of Cañon City and the Wet Mountain Valley, the D&RG began constructing a grade through Grape Creek. Grape Creek was notorious for flash flooding, and previous floods had removed wagon roads through the creek (Campbell 1972). By spring of 1881, the line was completed to Westcliffe, and the first train arrived in April of that year. At that time, the mines in the Grape Creek Mining District were nearly played out, and as a result, provided little revenue to the D&RG. However, the line continued to operate for the few mines that were still profitable. The grade crossed Grape Creek 35 times in a 26-mi.-long stretch, and coupled with the common cloudbursts within the region, this segment of the D&RG was expensive to maintain because sections of grade were frequently washed out. In 1885, an annual inspection from the state railroad commissioner noted that the railroad was "dangerously out of repair," prompting it to be repaired once again (Campbell 1972:127). In 1888, a severe flood washed out the track in the fall and it was abandoned at that time.

A railroad associated with the D&RG, the Rio Grande Western Railroad (RGWR), was incorporated in 1881 and connected the D&RG to Salt Lake City. Both the D&RG and RGWR were influential, not only in stimulating mining and steel production in the region, but also in opening the mountains to tourists wishing to visit the Rocky Mountains (Pierson 2008:257). In 1901, Palmer sold the RGWR to George Gould for 6 million dollars, and through an intermediary, the two railroads were consolidated to form the Denver & Rio Grande Western Railroad (D&RGWR).

Within the RGFO study area, numerous segments of the D&RG have been previously documented in Arapahoe, Adams, Boulder, Chaffee, Custer, Douglas, Denver, El Paso, Fremont, Huerfano, Jefferson, Lake, and Pueblo counties. The site numbers includes 5AH255, 5AM982, 5BL455, 5CF644, 5CR43, 5DA921, 5DV4784, 5EP2181, 5FN779, 5FN1569, 5HF393, 5JF2346, 5LK50, 5LK491, and 5PE1776.

Atchison, Topeka, and Santa Fe Railroad

The AT&SF Railroad was organized in 1858 to connect Topeka, Kansas, to Santa Fe, New Mexico, and the then-recently acquired territories of the southwestern United States. The AT&SF received a government land grant upon its organization to help promote the construction of the railroad and encourage settlement of the regions traversed by the railroad. The line reached the Kansas-Colorado border by 1873 (Fraser and Strand 1997: 18). In the years following, the line expanded from the Kansas-Colorado border along the Arkansas River to Pueblo, Colorado (Fraser and Strand 1997: 19). In attempts to achieve their transcontinental railroad, the AT&SF began exploring expansion of their line south, through Trinidad and over Raton Pass at the New Mexico-Colorado border. Competing with the AT&SF was the D&RG, who were also attempting to expand south by accessing Raton Pass. In 1878, both rail companies dispatched engineers and surveys to Raton Pass to begin assessing the most feasible route over the mountains. The AT&SF was able to claim the pass through the right of prior construction by starting their survey by lantern light before the engineers from D&RG were able to begin their own survey (Fraser and Strand 1997:23).

By the mid-1880s, the AT&SF line crossed Raton Pass following the route of the Santa Fe Trail southwestward from La Junta, Colorado. The AT&SF would continue to operate and remain financially viable throughout the state until the Depression of 1893. However, by the early 1900s, the AT&SF emerged from receivership and continued to operate many of its lines throughout Colorado. With the increased automobile travel and shipping, the use of the railroad sharply decreased. Despite these changes, the AT&SF not only continued to be one of the most reliable railroad companies in operation, but also purchased struggling or defunct railroads. In the 1980s, the AT&SF merged with the Southern Pacific Railroad to form the Southern Pacific Santa Fe Railroad, which was later renamed the Santa Fe Pacific. By the early 1990s, the Santa Fe Pacific merged with Burlington Northern, Inc. to form the Burlington-Northern and Santa Fe Railway, which currently holds ownership of the railroad. The AT&SF has been documented within

Arapahoe, Bent, Douglas, Las Animas, Otero, Pueblo, and Prowers counties under site numbers 5AH1961, 5BN445, 5DA922, 5LA8548, 5OT228, 5PE1665, 5PW94, and 5PW152.

Denver, South Park, and Pacific Railroad

The Denver, South Park, and Pacific Railway (DSP&P) company was established as a feeder line to the Kansas Pacific Railroad (Davidson 1940:128). In 1874, workers began laying track west of Denver to haul gold and silver ore and concentrates from various mining districts in the Gunnison and Leadville areas. In 1879, the line reached Como, where a rail division was established and a roundhouse was built. From Como, the main line was built over Trout Creek Pass, reaching Buena Vista in 1880. Beginning in 1878, the DSP&P began extending its line to Leadville from the south, but found itself without a right-of-way through the town of Buena Vista. Consequently, in order to access and serve the mines of the area, the DSP&P forged an agreement with the D&RG, permitting the former to use the latter's track from Buena Vista into Leadville. The agreement was fraught with difficulties, and, in 1883, the DSP&P began to build a line to Leadville from Dillon. By the time the line reached Leadville in 1884, the mining boom had peaked and traffic on the line did not meet expectations (Fraser and Strand 1997).

In 1883, both the D&RG and the DSP&P planned a second route to access Leadville, albeit by way of the mining communities and camps within Summit County. This route was desirable because it would provide additional revenue from freighting and it would be a quicker route to Denver. In 1883 and 1884, the DSP&P and the D&RG disagreed about the line's use and land jurisdictions between Dillon and Leadville. Eventually, the DSP&P constructed a line that left Dillon, followed Tenmile Creek, crossed over Fremont Pass, and extended along the East Fork of the Arkansas River into Leadville. The line was constructed on the hillside above the creeks, in order to avoid the D&RG line. Once completed, the new line was 120 mi. shorter than the D&RG line and became a popular route, as passengers on the train rode in Pullman cars.

The DSP&P also extended their line from Leadville to Gunnison by way of the Alpine Tunnel in 1882. The high cost of construction through the tunnel resulted in the Union Pacific assuming control of the DSP&P in 1883. Further financial difficulties caused the railroad to go into receivership in May 1888. The Denver, Leadville, & Gunnison Railway (DL&G) was formed in August 1888 to take over the DSP&P lines. In 1898, DL&G, the Union Pacific, and the Denver and Gulf were combined to form the Colorado & Southern Railway (Fraser and Strand 1997). Segments of the DSP&P have been documented in Chaffee, Denver, Lake, and Park counties as sites 5CF167, 5DV6243, 5LK56 (a collocated route with the Colorado and Southern), and 5PA418.

Colorado Midland

The Colorado Midland was incorporated in 1883, and became the first standard-gauge railroad through the mountains (Fraser and Strand 1997). Construction did not begin until two years after incorporation. John Hagerman, who had owned the Mollie Gibson silver mine in Aspen, was elected president of the Colorado Midland in 1885 (Abbott 1989:13). The Colorado Midland was built to access the mines in Aspen, because at that time, the mining camp was still relying on pack trains and wagons for freight and the removal of ore (Fraser and Strand 1997). The Colorado Midland constructed a railroad from Colorado Springs, over Ute Pass, to Trout Creek Pass, and north to Buena Vista. From Buena Vista, the Colorado Midland continued to Leadville, and, in 1887, the Colorado Midland constructed the Hagerman Tunnel at 11,500 ft. over the Continental Divide (Abbott 1989). The line continued down through Basalt and reached Aspen by early 1888, then continued on to Glenwood Springs and New Castle (Fraser and Strand 1997). To decrease operating costs and to straighten out the line, the Colorado Midland began constructing the Busk-Ivanhoe Tunnel below the Hagerman Tunnel in 1890 (Fraser and Strand 1997). This same year saw Hagerman sell the Colorado Midland to the AT&SF (Abbott 1989:101). By the end of 1893, the Busk-Ivanhoe Tunnel was completed and trains began utilizing the cutoff in December. The AT&SF

and, by default, the Colorado Midland, went into receivership in 1894. The Colorado Midland was reorganized as the Colorado Midland Railway Company, with George W. Ristine serving as President. To decrease costs, the Colorado Midland utilized the Hagerman Tunnel until 1899, at which point it was able to purchase the Busk-Ivanhoe Tunnel from the contracting company. In 1900, the control of the Colorado Midland was split between the Colorado & Southern Railroad and the D&RG, and in 1908, a controlling interest was purchased by the Chicago, Burlington & Quincy Railroad (CB&Q). By 1912, the Colorado Midland had gone into receivership, and by 1917 it was reincorporated as the Colorado Midland Railroad Company, with Albert E. Carlton serving as president. The last Colorado Midland train ran in 1918, and in 1921, the rails had been dismantled (Abbott 1989; Fraser and Strand 1997). A number of segments of the Colorado Midland have been recorded in Chaffee, El Paso, Lake, Park, and Teller counties under site numbers 5CF354, 5EP361, 5LK61, 5PA17, and 5TL367, respectively.

Colorado and Southern Railroad

The Colorado and Southern Railway (C&S) was incorporated in 1898 with the express goals of developing a continuous railroad connection between Cheyenne and the Gulf of Mexico and to connect the east and west coasts with a transcontinental route through Denver (Fraser and Strand 1997). After the Union Pacific went into receivership in 1893, the C&S was formed from many of the Union Pacific's routes in Colorado. Besides the tracks north of Fort Collins, which the reorganized Union Pacific continued to maintain, the C&S took control of the remaining Union Pacific properties, as well as the DL&G and the Denver and Gulf (Fraser and Strand 1997). To complete their north–south connections, the C&S began buying railroads and constructing links where necessary; one of these purchases was a half-interest in the Colorado Midland in 1900. In 1911, the C&S had constructed track between Fort Collins and Cheyenne, giving the company full control of a continuous north–south line through Colorado (Fraser and Strand 1997). By the time the line was completed, the C&S was under the financial control of the CB&Q, but operated as a separate entity. When the CB&Q joined the Great Northern and Northern Pacific railroads to form the Burlington Northern Railroad in 1963, the C&S name was no longer used (Fraser and Strand 1997; Ormes 1980). Numerous segments of the C&S have been documented Adams, Broomfield, Boulder, Douglas, Denver, El Paso, Huerfano, Jefferson, Las Animas, Lake, Larimer, Pueblo, and Weld counties under site numbers 5AM1888, 5AM2754, 5BF47, 5BF70, 5BL400, 5DA19, 5DV6243, 5EP713, 5EP868, 5HF1811, 5HF1843, 5HF2127, 5JF519, 5LA7636, 5LK56, 5LK498, 5LR1731, 5LR9960, 5PE4162, and 5WL1043.

Switzerland Trail

In the midst of the Boulder County mining boom, the Greeley, Salt Lake and Pacific Railroad built a narrow-gauge rail from Boulder to Sunset, a distance of over 10 mi. By the mid-1890s, the railroad was extended to the Dew Drop Mine and an associated mining camp immediately southwest of the town of Ward. In 1897, the Colorado & Northern Western Railway began construction on a standard-gauge rail from Boulder to Ward. The railway was later renamed the Switzerland Trail. Mining in the Ward Mining District waned in the early 1900s, which prompted the Switzerland Trail to decrease service. Following the reduced service, the railroad was sold in 1904, and was renamed the Colorado and Northwestern Railroad. By 1906, only one train a week traveled to Ward. To revive the railroad, the new owners increased the number of tourist excursion trains in the summer of 1906. The revitalization was short-lived; during the winter of 1907, trains were only running on the easternmost section of the rail and service to Ward was suspended. The end result was the sale of the Colorado and Northwestern Railroad in the spring of 1909; it was subsequently renamed the Denver, Boulder, and Western (Bargielski Weimer 2000). The tungsten boom in Boulder County during WWI, as well as the growing recreational and tourist enterprises, ensured continued service into the mid-1910s. Beginning in the early 1910s, tourists used the Denver, Boulder, and Western to travel to Estes Park to take advantage of the growing recreation industry in the region. From Ward, tourists would take a Stanley Steamer to the Stanley Hotel in Estes Park. The continued lack of freighting capital, coupled with the increased use of automobiles in the late 1910s, brought about the end of the Denver, Boulder, and Western in 1919 (Bargielski Weimer 2000). Segments of the Switzerland Trail have been recorded in Boulder County as sites 5BL358 and 5BL8747.

Florence and Cripple Creek Railroad

During the late 1880s and the early 1890s, the prosperous mines at Cripple Creek and Victory initially relied on freight wagons to haul ore to the mills in Florence using the wagon road constructed by the Florence and Cripple Creek Free Road Company in Phantom Canyon along Eightmile Creek. The steady and expanding production at the mines taxed the freight road's capacity. To alleviate the demand of the mines, local boosters in Florence attempted to convince the D&RG to construct a track between Cripple Creek and Florence. The D&RG, however, was not interested. As a result, local backers organized and incorporated the Florence and Cripple Creek Railroad Company in 1893. Construction on a narrow-gauge railroad began in 1894 and utilized the Free Road roadbed that was given to the railroad by the Florence and Cripple Creek Free Road Company. In May 1894, the railroad was completed and almost immediately felt impacts from the competing Midland Terminal Railway from Colorado Springs. The ore production and the successful mills in Florence continued to keep the hastily built railroad operating. In 1895, a severe flash flood destroyed 12 mi. of track, and forced a realignment of the grade higher up on the hillside. In 1903, the Florence and Cripple Creek Railroad Company folded and the line was sold to the Cripple Creek Central Railway Company. By 1910, traffic along the line was sparse and limited to coal hauling to Florence because ore was being shipped to more efficient mills in Victor and Colorado Springs. A severe flood along Eightmile Creek in 1912 caused over $100,000 worth of damage to the line. The railroad was not able to afford the repairs and petitioned to abandon the line. Cañon City protested and a legal battle ensued over the future of the grade. In 1914, the Auto Club of Victor proposed the railroad be converted into an automobile road, and by 1918, the state had finished construction of the Phantom Canyon Highway (Campbell 1972). The grade has been recorded as site 5FN485 in Fremont County and as site 5TL56 in Teller County.

Expected Site Types

The magnitude of railroad construction in Colorado indicates that site types will include a wide variety of objects to structures. Expected site types in the study area include work camps (for example, site 5CF2197), grades (active and abandoned), sidings, spurs, construction camps, depots and stations (e.g., site 5FN1951), tunnels, bridges, trestles, De Remer Forts (in the Arkansas Canyon), and housing and maintenance structures, including section houses (e.g., site 5LK1905) and associated townsites. Since it is known that the railroads employed Chinese workers, sites with ethnic associations might also be found.

Data Gaps

Railroads are important for a variety of reasons. In addition to being significant in their own right, railroads form linkages with other sites. An understanding of this linkage may be important in interpreting those sites. For instance, animal corrals and loading facilities along a railroad would not have much of a focus unless the associated travel route is considered. Conversely, the corrals and associated materials may provide functional and temporal information about the railroad.

It is not necessary to record an entire railroad when encountered, but an attempt should be made to record legitimate segments with identifiable beginning and ending points. Segment endpoints may be designated by changes in condition or by readily recognized physical or topographic features, such as road or drainage crossings. This may require that a railroad be followed beyond the boundaries of a project to such a recognizable point. Several pieces of basic data should be collected with regard to each segment of a rail line that is recorded: general length; width; and other descriptive information about the grade, such as orientation, construction material, and how it appears (i.e., presence or absence of gravel ballast, ties, rails, and coal cinders). Description should also include information about whether the grade is built on contour, is a cut, cut and fill, or raised. It is also important to note if the grade has been modified or upgraded, if it is in current use, and if it is overgrown, with descriptions of these conditions when necessary.

Construction facilities are features and structures that were necessary for the construction of a railroad. Included in this group are construction camps, equipment storage facilities, and quarries or borrow areas. In every instance, construction camps and equipment storage facilities should be recorded as sites separate from the road or rail systems, although their association should be made clear. Quarries and borrow areas will be found in close proximity to the railroad grades and will most frequently be recorded as features of the grade; in most instances, if they are identifiable at all, these will usually be small borrow areas of little consequence. For larger construction activities, such as major fills, quarries or borrow areas may be quite substantial and easily recognizable. In those instances, it may be more appropriate to record the quarries or borrow areas as separate sites.

Although railroads can be recorded in segments, it is important that they are recognized as systems comprised of a wide variety of elements that work or would have worked together. Consequently, it is important to recognize and record associated features and consider their function, integrity, and importance as contributing elements of the railroad system of which they are a part. Features that can be expected to be encountered as parts of railroad systems include physical improvements, construction facilities, operational facilities, and service facilities. Operational facilities are structures and features used in the everyday workings of the railroad. These can include telegraph/telephone lines, water tanks, side tracks, wyes, turntables, ash dumps, coal chutes, fueling stations, and sand houses. Service facilities are structures and features constructed for the operation and maintenance of a completed railroad: administrative offices, passenger service facilities (e.g., depots, lodging), freight service facilities (e.g., railyards, loading facilities, corrals/stockyards), and maintenance facilities (e.g., section houses, roundhouses, maintenance pits, car and locomotive shops). In every instance, these facilities should be recorded as sites separate from the railroad grade, with the associations made clear.

The primary theme associated with railroads is transportation, which refers to the process and technology of conveying passengers or materials. Ascribing significance under the transportation theme alone may be somewhat difficult; significance will generally be better determined when associations with secondary themes are considered. Such secondary themes include commerce, community planning and development, engineering, entertainment/recreation, ethnic heritage, industry, landscape architecture, and politics/government.

Critical to assigning and considering themes for significance evaluations is defining the period of significance for a resource. The period of significance is the span of time when the property was associated with important events, activities, individuals, or use or when it acquired its important physical characteristics. It is possible that a property may have more than one period of significance, depending upon its historic associations. Continued use of a resource does not necessarily justify a period of significance that corresponds to its full period of use. Rather, the period of significance should correspond to the period of time when the resource made important contributions under a particular theme (area of significance).

In general, the evaluation of significance of a railroad should be done on the basis of its historical context, particularly when only a portion of the resource has been documented. This is because it is possible that the first time a rail line is recorded, it may be a segment of the line that does not retain good historical integrity. In such an instance, it might be tempting to evaluate the entire resource as insignificant on the basis of the poor condition of the individual segment. Because the entire rail line has not been observed, it is entirely possible that segments with good integrity may exist elsewhere. Consequently, when a rail line is evaluated as significant as a whole based on its merits relative to the various themes with which it may be associated, the historical integrity of individual segments can then be evaluated as contributing or noncontributing to that significance. This distinction is quite imperative—a significant resource complex can possess variable integrity. By documenting in this manner, both the overall importance of a rail line and each segment's varying capacity to contribute to that importance can be expressed and recorded. Those segments that do not retain historical integrity would likely not require protective measures in their management, whereas those with integrity would.

Primary Roads

In the early twentieth century, the introduction of the automobile changed the way that Americans traveled. The automobile cut down travel times and opened previously inaccessible areas to many individuals. Numerous roads and routes were improved or built to facilitate increased vehicle traffic. Many of the early automobile roads throughout the state followed preexisting wagon roads. A select few of these roads were also combined to create transcontinental roads, such as the Pike's Peak Ocean to Ocean Highway (PPOO) (US Highway 24 and US Highway 50), the Midland Automobile Trail (US Highway 6), and the Victory Highway (US Highway 40). Eventually, these named routes were assigned numbers under the Joint Board of Interstate Highways. While this number assignment did not occur until 1925, Colorado state officials had already begun laying the route of the state's roads, starting in 1909 with the formation of the Colorado Highway Commission (Autobee et al. ca. 2002). Although numerous roads have been built since 1909 within the RGFO region, only primary named roads are described herein. These roads are now part of the transcontinental highway system and are presented in numeric order.

US Route 6 (The Midland Trail)

US Route 6 had its beginning in the early stages of transcontinental automobile travel as the Midland Trail. In an attempt to create the first official coast-to-coast automobile road in the United States in 1912, backers in Denver began campaigning for the "Midland Trail," a proposed automobile road from Washington D.C. to Los Angeles, California, to cross through Colorado (*Motor Age* 1912). The road through the state was completed by 1917 and passed through Denver and Grand Junction. The road entered Colorado near Holyoke, close to the Colorado-Nebraska border. It continued westward, until reaching the South Platte River. The Midland Trail then followed the course of the river before making a pronounced bend to the southwest at Fort Morgan and continuing into Denver. From Denver, the route continued west through Golden and followed Clear Creek through Idaho Springs, Georgetown, and over Loveland Pass. From Loveland Pass, the road continued west over Vail Pass and followed the Eagle River to Dotsero, thence along the Colorado River to Grand Junction and into Utah.

As automobile travel became more widespread, the federal government sought to consolidate and improve the expanding highway system. In 1925, the Midland Trail was designated by the Joint Board of Interstate Highways to be a federal coast-to-coast highway (Joint Board on Interstate Highways 1925:53). The road was designated US Route 6, incorporating improvements and slight realignments. Initially, this designation only applied to the East Coast portion of the road, but by 1937, the section in Colorado was designated US Route 6 (Weingroff 2013b). At that time, US Route 6 became the longest transcontinental road in the United States, at 3,652 mi., and, by 1953, was named "The Grand Army of the Republic Highway" (each state individually appointed this designation at different times, beginning in 1937) (Weingroff 2013b).

When the Federal Highway Administration elected to extend Interstate 70 (I-70) west through Colorado, the majority of the route followed US Route 6. With the exception of a bypass around Loveland Pass (now the Eisenhower and Johnson Memorial Tunnels), the two roads were collocated from east of Idaho Springs west through the state. US Highway 6 also shared a collocated route with Interstate 76, built in the early 1960s, from Brush, Colorado, to Denver (Autobee et al. ca. 2002; Weingroff 2013b). Segments of US Route 24/The Midland Trail have been recorded in Clear

Creek, Denver, Jefferson, Logan, Morgan, Phillips, and Washington counties under site numbers 5CC171, 5DV11289, 5JF2638 and 5JF4509, 5LO479, 5MR743, 5PL480, and 5WN171

US Route 24 (Pikes Peak Ocean to Ocean Highway)

While the Midland Trail was being established as one of the first transcontinental automobile roads, the development of the PPOO was also underway. The PPOO was an early marked automobile road that utilized previously established roads and constructed links between established roads between 1914 and 1924. The overall route stretched from New York City to San Francisco, California (Weingroff 2013c). The PPOO was constructed in Colorado in the mid-1910s and entered Colorado at Kanorado, Kansas, at the Colorado-Kansas border. The highway continued westward across the eastern plains before turning southwestward at Limon, Colorado. From Limon, the road continued southwestward through Colorado Springs (headquarters for the PPOO Association) then turned northwestward through Woodland Park and over Ute Pass at Divide. From Divide, the highway continued westward across South Park, entering the upper Arkansas River Valley, where it turned northward through Buena Vista and Leadville and over Tennessee Pass. Sections of the highway from Old Colorado City to Leadville followed earlier wagon and stage roads, including Barlow-Sanderson routes (Porrata 1979). Portions of the earlier highway alignment through this section were constructed by prisoners from Cañon City in the early 1910s (Autobee et al. ca. 2002). The PPOO appears as State Route 18 (SR 18) on a 1916 Colorado state highway map issued by the Colorado Highway Commission. According to historical highway maps housed at the Colorado Department of Transportation office in Denver, SR 18 was later designated as Route 40S/State Route 4 from 1926 to 1935. From Tennessee Pass, the PPOO followed the course of the Eagle River northward, joining a shared route with the Midland Trail. The Midland Trail and PPOO shared this route between Eagle and Rifle, Colorado, where the PPOO turned northward through Meeker, Rangely, and into Utah (Weingroff 2013c).

In 1925, sections of the PPOO were reorganized and designated by the Joint Board of Interstate Highways to be subsumed within other federal highways (Joint Board on Interstate Highways 1925). In Colorado, the PPOO from the Colorado-Kansas border to Eagle, Colorado, was designated as US Route 40S, the southern extension of US Route 40 (Autobee et al. ca. 2002). During the Great Depression, the highway between Colorado Springs and Leadville was upgraded and rerouted to its current alignment as part of the Works Progress Administration's work on mountain roads (Autobee et al. ca. 2002). In 1936, after the upgrades, US Route 40S was redesignated as US Route 24 (Porrata 1979). As with US Route 6, US Route 24 became a portion of the interstate system in 1958. The eastern section of I-70 incorporated US Route 24 from the Colorado-Kansas border to Limon, Colorado. Construction of this section of interstate began in the early 1960s and was completed by 1964 (Autobee et al. ca. 2002:43). US Route 24/PPOO has been documented in Chaffee, El Paso, Lake, Park, and Teller counties under the site numbers 5CF1936, 5EP2889, 5EP3939, and 5EP4118, 5LK866, 5PA2004, and 5TL3031.

US Route 40 (Victory Highway)

The Victory Highway was the concept of a group interested in the establishment of a highway to connect New York and San Francisco. The Victory Highway Association was formed in 1921 and named to honor veterans of World War I (Blow 1924). The road was one of the early transcontinental highways to run through Colorado. It was highly anticipated, as its route crossed through many isolated counties, especially in the western half of the state, and its completion was expected to increase tourism and act as a boon to local economies (*The Routt County Sentinel* 1921). The Victory Highway was constructed in late 1921 by the Colorado State Highway Department, although the eastern portions of the road had been in use since as early as 1916 (Autobee 1996; Wiley 1976).

The Victory Highway entered Colorado from the east at the Colorado-Kansas border east of Cheyenne Wells, Colorado. The highway then continued westward to Kit Carson, where it turned northwestward through Limon before turning westward to Denver. From Denver, the route continued southwest past Golden and entered the mountains through Mount Vernon Canyon. The highway turned northwestward and joined Clear Creek east of Idaho Springs. The road continued west along Clear Creek until turning northwestward at Empire along West Fork Clear Creek, then turning north to cross Berthoud Pass. From Berthoud Pass, the highway continued northwestward through Granby, Steamboat Springs, Craig, and Maybell, before exiting the state near present-day Dinosaur (Blow 1924; Hobbs 1926).

In 1925, the Joint Board on Interstate Highways designated the Victory Highway as US Route 40N (Joint Board on Interstate Highways 1925:52). In 1936, US Route 40S, which followed the route of the PPOO, was designated US Route 24, and US Route 40N was designated US Route 40 (Autobee 1996). During the 1960s, small portions of US Route 40 were realigned during highway upgrades to its current alignment (Hand 2004). When I-70 was constructed in the early 1960s, it incorporated US Route 40 from Limon to Empire (Autobee 1996). Segments of the old highway and auto trail have been recorded in Clear Creek and Jefferson counties as sites 5CC171 and 5JF2260, respectively.

US Route 50 (The National Old Trails Road/Rainbow Route)

The current alignment of US Route 50 follows two previously named early automobile trails through the state. The eastern portion of the highway follows the route of The National Old Trail Road (NOTR), whereas the mountain portion of US Route 50 follows the Rainbow Route (also known as the Rainbow Highway). Both early automobile roads incorporated the routes of historic wagon roads or trails.

The NOTR had been proposed as a national transcontinental road as early as 1911 during the meeting of the Good Roads Congress (Weingroff 2013d). By 1912, the Good Roads Congress had created the transcontinental road following the historic pioneer trails that crossed the country. These routes followed emigrant trails, such as the Oregon and California trails across Kansas, Nebraska, Wyoming, and Idaho. The proposed road also followed both the Mountain and Cimarron Routes of the Santa Fe Trail through Kansas, Colorado, and New Mexico. The overall route of the NOTR extended from New York to Portland, Oregon then turned south along the coast to San Francisco, California, ending in San Diego, California (Weingroff 2013d). In 1915, the state of California held two expositions: the Panama-Pacific International Exposition in San Francisco and the Panama-California Exposition in San Diego. Backers of the NOTR, the Lincoln Highway, and other transcontinental roads anticipated tourism for California would increase and, as a result, an increase in traffic along the roads. To facilitate the additional use, the NOTR spent nearly 2 million dollars to improve the road (Weingroff 2013a).

In Colorado, the road entered the state at the Colorado-Kansas border, east of Holly. It continued westward along the Arkansas River through Lamar, Las Animas, and into La Junta. Near La Junta, the NOTR turned south, following Timpas Creek to Trinidad, thence over Raton Pass into New Mexico. From La Junta through Pueblo and into Cañon City, US Route 50 followed the route of earlier wagon roads, including the Barlow-Sanderson routes.

From La Junta through Pueblo and into Cañon City, US Route 50 followed the route of earlier wagon roads, including the Barlow-Sanderson routes. In the mountains, the initial route of US Route 50 began in the 1880s as a wagon toll road constructed over Monarch Pass. To keep goods and supplies moving between Cañon City and Gunnison, a 1911 bill that would allocate 50,000 dollars in state funds to assist in the construction of a route between Pueblo and Montrose was proposed. Several years later, in April 1913, Montrose, Hinsdale, Chaffee, Gunnison, and Fremont counties were given 80,000 dollars by the State of Colorado to build what was originally called the

Rainbow Route (or the Rainbow Highway). The route would essentially follow the existing 1880 wagon road but would require major realignments in Chaffee County to shorten the route between Cañon City and Salida and between Salida and Gunnison over Monarch Pass. The Salida to Cañon City cut-off began in the summer of 1913 and took two years to complete. The realignment of the route over Monarch Pass did not begin until 1919 and was opened to automobile travel in the fall of 1921. The route through Chaffee County ended up costing substantially more than the original allotted amount. It was reported that the 22-mi.-long section of the road over the pass was constructed at a cost of 10,000 dollars per mile (Edlund 1999b).

In 1925, the Joint Board on Interstate Highways designated the section of the NOTR from the Colorado-Kansas border to La Junta as US Route 50 (Autobee et al. ca. 2002). At La Junta, US Route 50 diverted from the NOTR and continued west to Cañon City. In 1938, the Rainbow Route from Cañon City to Montrose was chosen by the Colorado State Engineer to be included as part of US Route 50. Work commenced on the Monarch Pass section to reduce steepness of the grades and eliminate curves over 16 degrees. The new road over the pass was completed in the summer of 1940 (Edlund 1999a). The stretch of the NOTR from La Junta to Trinidad was designated as US Route 350. From Trinidad south into New Mexico, the NOTR was designated as US Routes 85 and 87, and eventually served as the route of Interstate 25 in the 1950s (Autobee et al. ca. 2002). The route has been previously documented within the RGFO study area with segments recorded in Chaffee and Fremont counties under site numbers 5CF938 and 5FN2535, respectively.

Expected Site Types

Under the trail and wagon/stage road theme, expected sites in the RGFO study area include trail segments (in various conditions, such as pack/foot trails and wagon ruts), temporary camps, artifact scatters, historical Native American sites along trails, rock inscriptions, rock art, and possibly arborglyphs. Because of the continuity of travel along certain corridors, some trails eventually evolved into wagon routes, resulting in physical remains that include road remnants (variety of conditions, such as intact road beds and improved modern two tracks) and associated sites, such as stage stops, temporary camps, artifact scatters, arborglyphs, register rocks, and other rock inscriptions (both etched and applied with wagon wheel grease).

For more developed primary roads in the study area, site types include abandoned road segments (concrete, asphalt, and gravel surfaces), early dirt road segments, roadbed retaining features, road infrastructure, such as Civilian Conservation Corps (CCC) culverts, bridges, or tunnels, construction camps, fueling stations, tollhouses, and rock inscriptions or advertisements.

Data Gaps

Identification is one of the primary issues surrounding the documentation of trails and roads. Prefield research is not always completed by archaeologists to determine if historic trails or roads cross project areas, unless well-known and documented linear resources are present. To rectify this, General Land Office (GLO) plats should be consulted prior to project fieldwork as a generalized practice and further investigated through the examination of aerial photographs. Because it is known that GLO maps were made with the primary intent of subdividing townships into sections, it is expected that depictions of trail or road locations will be most accurate at the points where they cross section lines. Once identified, the application of a systematic recording method should be emphasized and might include the use of the *Mapping Emigrant Trails Manual* (MET) published by the Office of National Historic Trails Preservation (Buck et al. 1993).

Several pieces of basic data should be collected about each segment of a road/trail that is recorded. First, general length, width, and other descriptive information, such as orientation, construction material, and appearance (e.g., linear depression, path through the vegetation, two-track, crowned and ditched, paved, gravel, or dirt) should be recorded. Specifically for roads, this would also include information about whether it is the segment is built on contour, is a cut, cut and fill, or raised grade. Second, it will be important to note if the segment has been modified or upgraded, if it is in current use, and if it is overgrown, along with descriptions of these conditions when necessary. Next, a good description of the beginning and ending point of each segment is necessary, with the segments accurately depicted on USGS maps, so that it is clear what has been documented and where future documentation is still required.

In doing historical research about roads and trails, the entire length of the linear should be described, delineated, or at a minimum characterized, if possible, even if the full length has not been documented. In addition, enough historical background should be obtained to put the linear site into context and to be able to assess its significance relative to the various themes that might apply. In general, evaluation of the significance of a road should be made on the basis of its historical context, particularly when only a portion of the resource has been documented. This is because it is possible that the first time a historic road is encountered, it may be along a portion of the road that does not retain good historical integrity. In such an instance, it might be tempting to evaluate the entire resource as insignificant on the basis of the poor condition of the individual segment.

Although roads and trails can be recorded in segments, it is important that they be recognized as systems that may be comprised of a wide variety of elements that at some point worked together. Consequently, it is important to recognize and record associated features and consider their function, integrity, and importance as contributing elements of a road or trail system of which they are a part. Features that can be expected to be encountered as parts of road and trail systems include physical improvements, construction facilities, and service facilities. Artifacts are also likely to be encountered along recorded linear sites. Artifacts can enhance the temporal knowledge about a road and trail or, at the very least, help to define its period of use.

The primary theme associated with roads and trails is transportation, which refers to the process and technology of conveying passengers or materials. Ascribing significance under the transportation theme alone may be somewhat difficult; significance will generally be better determined when associations with secondary themes are considered. Such secondary themes include commerce, community planning and development, engineering, entertainment/recreation, ethnic heritage, industry, landscape architecture, and politics/government.

Government

Exploration

American exploration expeditions encroached on Spanish territory soon after the Louisiana Purchase in 1803. In 1806, an official government expedition led by Zebulon Pike crossed through the region encompassed by the RGFO study area. Following the Arkansas River through the plains, Pike and a small detachment in November 1806 attempted to climb “Grand Peak,” the peak that would eventually bear his name. After the ill-fated climb—which was unsuccessful due a lack of provisions, proper clothing, and the late season ascent—Pike returned to his camp near modern-day Pueblo. From there, the expedition continued along the Arkansas River before camping at the mouth of the Arkansas River Canyon. Because of the impassable nature of the canyon, the expedition turned northwestward into South Park by way of Fourmile Creek and the South Platte River. The party then continued west over Trout Creek Pass to the Arkansas River. Upon reaching the Arkansas, Pike assumed he had reached the Red River, which was the designated boundary of the Spanish territory. Following the Arkansas River, Pike realized his mistake upon coming upon their camp at the mouth of the Arkansas River Canyon (the Royal Gorge). Pike took a detachment of his troops into the Wet Mountain Valley by way of Grape Creek, then over the Sangre de Cristo Mountains into the San Luis Valley. It was in the San Luis Valley that the group was captured by Spanish troops in early 1807 (Campbell 1972:4).

The Stephen H. Long Expedition of 1820 was another official government expedition that entered Spanish territory. The expedition seems to have entered the Purgatoire River Valley near the mouth of Bent Canyon and followed Chacuaco Creek to the south, into northern New Mexico. They then followed the Canadian River back to the Arkansas River and returned to the United States (Friedman 1988). One of the most famous explorations of the West was by the U.S. Army Corps of Topographic Engineers, with John C. Frémont as one of the exploration members. Frémont led a wide-ranging government-sponsored expedition across the West from 1842–1848. During this period, Frémont explored what would become Colorado on four different occasions, crossing through different areas within the RGFO study area. The 1842 expedition explored the Platte River to Fort St. Vrain, then northward into Wyoming. In 1843, the Frémont expedition examined the Cache la Poudre River canyon, and then proceeded over Hoosier Pass into South Park. In 1844, the party followed the Arkansas River to explore the headwaters of the river. They then crossed the Continental Divide at Fremont Pass near Leadville and turned westward to explore western Colorado and Utah. In 1848, Frémont returned to the area, this time a private citizen on a survey expedition for a railroad. The expedition crossed through Hardscrabble Creek, over the Sangre de Cristo Mountains at Mosca Pass, and through the San Luis Valley during the winter. The party ultimately became trapped in the San Juan Mountains, losing 11 men (Athearn 1985).

Exploration sites will be rare and will consist of camps, resting stops, and documented geological and specimen locations left behind as groups made their way through parts of Colorado. Expedition journals have been found to be the most reliable source of information to potentially pin-point these locations. For instance, work completed on the Old Spanish Trail and the Northern Branch of the trail documented travel by the 1853 Gunnison Expedition (Beckwith 1854), the 1858 Loring Expedition (Hafen 1946), the 1853 Beale Expedition (Heap 1854), and other passages along the trail route. These journals and the descriptions contained therein have proven invaluable in ground-truthing the actual travel route and locating camps and associated artifacts (Horn et al. 2011).

Military Forts

The late 1850s saw an exponential increase in activity in the area, as more and more people began to enter the Colorado Territory bound for the California and Pike Peak Gold Rushes. By the early 1860s, populations in the territory increased, and settlements began to take root. As a result of continued trespassing on Native American-occupied lands, conflicts with tribes were occurring, which eventually forced the federal government to recognize the need for protection. In 1860, orders were sent out to construct a fort along the travel corridor of the Arkansas River. The fort was to be located near Bent's New Fort and the supplies were sent to Bent's New Fort for storage until the construction was completed in late 1860. The fort was originally named Fort Wise after Henry A. Wise, governor of Virginia; however, it was changed to Fort Lyon after Virginia joined the Confederacy. The name change was in honor of General Nathaniel Lyon, who died in combat (Beckner 1975). The fort also functioned as an agency for the Cheyenne and Arapaho after the 1861 treaty was signed, and served the Kiowa and Comanche until all tribes were removed from the region in 1865. Fort Lyon continued to provide protection to individuals living and traveling through the territory, but was relocated upriver near present-day Las Animas after a severe flood in 1867. The new Fort Lyon was abandoned by the military in 1889 and was converted into a Navy tuberculosis hospital in 1906 (Beckner 1975). Fort Wise/Fort Lyon has been recorded as site 5BN395 and the relocated Fort Lyon has been recorded as site 5BN117.

Mounting conflicts in the Arkansas River region required the addition of another protective military fort. Orders were given in 1866 to construct a fort near the confluence of the Huerfano and Arkansas rivers. A location was chosen about 2½ mi. upstream from the confluence. Once completed in 1867, the fort was named Fort Reynolds in honor of General Fulton Reynolds, a Mexican War veteran who was later killed at Gettysburg. The fort continued to oversee the protection of settlers and travelers through the region until 1872, when lands set aside as part of the military reservation were sold (Beckner 1975). A historical marker for the location of Fort Reynolds has been documented in Pueblo County as site 5PE7804.

Fort Collins began as a small military outpost located along the Overland Stage Line near Laporte on the Cache la Poudre River. A company from the First Colorado Volunteer Cavalry was assigned to protect stages from growing conflicts with Native Americans in the fall of 1863. Cabins and a corral were constructed and the post was named Camp Collins. In 1864, a flood washed out the camp and it was subsequently relocated approximately 6 mi. east of Laporte on the Cache la Poudre River and renamed Fort Collins. A military reservation was established around the fort in 1868, protecting travelers and early settlers in the region. The military reservation was relinquished in 1872 and the area was opened for homesteading (Spring 1933). The relocated Fort Collins has been recorded as site 5LR1362. Camp Wardwell, near present-day Fort Morgan, was also established along the Overland Stage Line in 1865 to protect travelers along the route. By 1867, the camp was renamed Fort Morgan and consisted of sod and log buildings with an encompassing stockade (Ross 1945). After the Union Pacific had finished laying tracks into Cheyenne, traffic along the Overland Stage Line diminished. As a result, Fort Morgan was abandoned in the spring of 1868, with the US Army relocating the soldiers to Fort Laramie.

Land Survey and Distribution

Native American confrontation with miners after the discovery of gold near Denver in 1858 eventually led to a treaty in 1861, which attempted to remove the southern branch of the Arapaho to a small area along the Arkansas River. The treaty was never ratified by representatives of the tribe. In the years following, conflicts with the Cheyenne and Arapaho turned violent, as peaceful bands of these tribes were brutally massacred in 1864 at Sand Creek in southeastern Colorado. The Sand Creek Massacre touched off widespread conflict throughout 1864–65, resulting in the signing of treaties in 1867 and 1869. The Arapaho and Cheyenne tribes were completely removed from the eastern plains of Colorado by 1870, resulting in an influx of Euroamerican populations looking for prime agricultural lands. In order for lands to be officially entered upon for acquisition from the public domain, surveys were quickly conducted by the GLO, dividing the land along township and range lines and then surveying the section subdivisions. Areas most conducive to settlement were surveyed first, with several GLO plats completed in the early 1870s. Surveying continued as additional lands became settled, with most areas within the RGFO study area being surveyed by the early 1880s.

Indian Agencies (by Jonathon C. Horn)

Indian agencies were established by the U.S. government as part of the formal relationship with Native American groups as new lands were acquired. Indian Agents were the individuals responsible for cultivating relationships with the Native Americans and extending government policies. As treaties and agreements were negotiated and reservations were established, these relationships became increasingly complex and controversial.

During the early Territorial Period, initial management of Native American affairs in the region that would become Colorado was a result of acquisition of Mexican territory during the Mexican-American War, when General Stephen Watts Kearney occupied New Mexico in 1846. At that time, government interaction with Native American groups was largely focused on ensuring their acceptance of and peacefulness toward the U.S. government and to enforce laws regulating trade. Charles Bent became the first official of Indian Affairs when he was appointed civilian governor and Superintendent of Indian Affairs by Kearney in 1846 for the newly acquired land. His experience with numerous Native American groups through his affiliation with Bent's Fort, Fort St. Vrain, and his store in Taos made him a natural choice. He was killed during the Taos Revolt in January 1847. Subsequent governors, under military supervision, continued to serve as Superintendents of Indian Affairs in New Mexico. When the Utah and New Mexico territories were formally organized in 1850, each of the territorial governors also served as Superintendents of Indian Affairs. Utah Territory extended eastward over the entire western one-third of Colorado to the Continental Divide, and New Mexico Territory included the southern portion of Colorado east of the mountains. Kansas and Nebraska territories were established in 1854, with Kansas Territory covering the central portion of Colorado east of the mountains, and Nebraska Territory covering northern Colorado east of the mountains (Bent 1853). Eventually, all of these territories would cede lands for the creation of the Colorado Territory.

Agents were appointed to assist the Territorial Governor/Superintendents of Indian Affairs on a somewhat regional basis, conforming to areas occupied by one or more Native American groups. They were posted to communities or forts that were in relatively close proximity to the Native American groups they were to serve. In these early years, agents often had some direct contact with the Native Americans in their jurisdiction, with most of their time spent attempting to ascertain what groups were present, their numbers, their modes of life and general habits, their ranges, and to control illicit trade by neighboring whites or Hispanics.

J. S. Calhoun was the first agent in New Mexico, where he was posted in Santa Fe. He was responsible for negotiating the Treaty of 1849 with the Utes at Abiquiu. His jurisdiction covered lands occupied or entered by Apache, Comanche, Navajo, Ute, Arapaho, Cheyenne, Kiowa, and various Puebloan groups. In Kansas, former trapper Thomas Fitzpatrick was assigned the area of the upper Arkansas and Platte Rivers by 1847; his post was mostly concerned with the safety of travelers along the Santa Fe Trail and along the South Platte River. In an effort to protect emigrants traveling through the region on their way to California and Oregon, the U.S. government signed a peace treaty in 1851 with Plains Indian groups. It was known as the Treaty of Fort Laramie due to the proximity of the fort to the signing (McNitt 1962). A component of the treaty was assigning territories for the various groups. Among these, the Arapaho and Cheyenne were jointly assigned to the area east of the Rockies between the North Platte and Arkansas rivers. Annuity goods were distributed to the two groups at Bent's Fort; Bent's Fort was also established as the seat for the Upper Arkansas Agency agent, beginning in 1858. Territorial Governor David Merriwether, with the assistance of Lorenzo Labadi who served as the agent for both bands at Abiquiu, was responsible for the negotiation of two treaties with the Ute in New Mexico Territory in 1855: a treaty with the Capote band, finalized on August 8, 1855; and a treaty with the Mouache band, finalized on September 11, 1855. Reservations were proposed for the Capote along the Animas River and for the Mouache along the Rio Grande, both extending into what later would become Colorado. Neither of the treaties was ratified by Congress, but they were the first in a series of treaties that followed national Native American policy of coercing native groups to cede large portions of their territories for small reservations in return for money, goods, and services (Kappler 1904).

Fort Wise/Fort Lyon Agency

On February 15, 1861, within two weeks of Colorado Territory being officially established, the Cheyenne and Arapaho signed the Treaty of 1861 at Fort Wise. The treaty was deemed necessary due to increased conflict between the tribes and the miners and settlers flocking to the area as the result of the discovery of gold in 1858. Discussions between the federal government and the two Native American groups had been initiated in 1860. The Cheyenne and Arapaho agreed to cede most of their traditional lands for a smaller reservation that took up a considerable amount of southeastern Colorado and was bound on the north and south by Sand Creek and the territorial division between New Mexico and Colorado. The western portion of the reservation was to be occupied by the Arapaho and the eastern portion by the Cheyenne (Kappler 1904). With the treaty and establishment of Colorado Territory, A. G. Boone was appointed as the agent at Fort Wise (soon renamed Fort Lyon), succeeded by Samuel G. Colley in 1862. The Kiowa and Comanche residing in southernmost Colorado were also attached to the agency at Fort Lyon, though a treaty had not been made with them. The Cheyenne and Arapaho never really occupied the reservation, mostly because the buffalo that they depended upon were no longer present and only minimal improvements had been made for the agency. The Sand Creek Massacre, which took place on the reservation in 1864, gave rise to widespread warfare. The Treaty of 1865 resulted in removal of the Cheyenne and Arapaho from Colorado to reservation lands in Kansas and Oklahoma, and the Upper Arkansas Agency was terminated (McNitt 1962).

Government-Controlled Camps

Japanese Internment

After the 1941 attack on Pearl Harbor, paranoia began to infect national sentiment concerning Japanese-Americans. Fear and resentment began to build to such an extent that in 1942, the federal government issued Public Proclamation Number One, calling for the evacuation of over 110,000 Japanese and Japanese-Americans to established military areas in California, Oregon, Washington, and Arizona. From these areas, the populations were to be separated and interned in camps that would be built across the county. Following a meeting with the War Relocation Authority (WRA), Governor Ralph Carr volunteered to accept incarcerated Japanese into Colorado and a location near Granada was eventually settled on. The WRA purchased between 8,000 and 11,000 acres of land southwest of Granada and construction on the relocation center began in the summer of 1942 (Athearn 1985; Holsinger 1964). It was to be known as "Amache" after the daughter of Cheyenne Chief One-Eye, but was more formally identified as the Granada Relocation Camp. Although the camp was not yet completed, the first trainload of Japanese arrived by late August. By November, construction of the camp was complete and housed a peak population of 7,567 (Holsinger 1964). The detainees were housed in 30 residential blocks with each block composed of 12 identical, 120-x-20 ft. barracks with a mess hall, recreation hall, post office, laundry, toilet, and shower room. In addition, the facility also contained other structures catering to the basic needs of the incarcerated population and support for internal industries. Employment at the camp included work related to the day-to-day function and infrastructure of the camp; the vast majority of the detainees worked on the WRA farm that fed the population of the center. In all, 9,783 acres were farmed with 6,000 of those acres being irrigated by the Lamar Canal diverting water from Wolf Creek (Colorado State Archives 2015). Internees were also given work in the sugar beet fields surrounding the area (Athearn 1985).

Eventually, resentments toward the Japanese-Americans began to fade, and in 1943, male internees were allowed to volunteer for the armed forces during the war. Several of those enlisted became highly decorated, which aided in further lowering the barriers of distrust. As a result, in 1944 the War Department opened the draft to include Japanese-Americans. This met with mixed feelings from detainees, as many questioned how the same army that was incarcerating them had the right to draft them. Regardless, by 1945 nearly 1,000 soldiers, Women's Army Corps, and Army nurses from the camp were actively serving in the armed forces. As the war neared its end, the War Department began to allow certain detainees to return to the West Coast. Plans were made to close the camp as soon as possible, and by July, 1945, the population had been nearly halved. A closing date in mid-October was set. However, many of the detainees had lost their previous homes and had come to see the camp as familiar; by August, over 3,000 detainees still remained. The camp ceased to be a military facility in September, with the last trainload of detainees leaving on the last scheduled day of operation (Holsinger 1964). The camp, which is in Prowers County, has been recorded as site 5PW48 and is a listed National Historic Landmark.

Prisoners of War

During World War II, German and Italian Prisoners of War (POWs) were incarcerated in the state of Colorado. Between 1943 and 1946 there were 48 POW camps in Colorado, including base camps at Colorado Springs, Trinidad, and Greeley (Paschal 1979). The remaining 45 camps were considered branch camps and were established in various areas, each affiliated with a base camp. Many of the camps utilized existing CCC facilities, were housed in school structures, or were simply tent camps. The vast majority of the branch camps served as work-related camps, with the interned population used as labor to ease the labor shortage resulting from the voluntary and draft services in the armed forces during the war. Internees worked in the agriculture, lumber, and construction industries with the majority assigned to work on farms (Connor et al. 1999). The base camp in Greeley utilized prison labor for the labor-intensive sugar beet industry, with several branch camps established at sugar company locations.

The base camp at Colorado Springs was part of Camp Carson (later Fort Carson), which was built shortly after the 1941 attack on Pearl Harbor. Italian prisoners were brought to the camp in 1943. They remained for almost three months before being shipped out and replaced by German prisoners. The consistent influx of prisoners resulted in a size increase to Camp Carson, eventually making it one of the largest POW camps in the United States (Connor et al. 1999). Prisoners from Fort Carson were assigned to 17 branch camps across the state, working in agriculture, rock quarrying, and the logging industry (*Glenwood Post Independent*, June 16, 2008). Like the prisoners in Greeley, the Fort Carson camp also worked extensively for the sugar beet industry. Camp Carson POW camp was closed in June 1946 (Connor et al. 1999). Three POW camps have been documented within the RGFO study area: one at Fort Carson (site 5EP1221), one in Larimer County (site 5LR658), and one in Weld County near Greeley (site 5WL768).

Civilian Public Service

The Civilian Public Service (CPS) is included here, as it represents an additional section of government war-time programs. In observance of the difficulties of individuals that opposed the war because of religious or pacifist views, coined termed conscientious objectors, the CPS was developed as a legal alternative to enlistment during World War II. The CPS was operated by the Selective Service and churches through the National Service Board for Religious Objectors (Krehbiel 2011). Between 1941 and 1947, 12,000 male draftees served their country without enlisting in the armed forces. Instead, objectors provided much needed labor during labor shortages caused by the war. Their efforts would be classified as "work of national importance" and would include labor for soil conservation, forestry, firefighting, agriculture, social service, and mental health. The objectors were not paid for their labor. They occupied 152 camps across the United States, with 30 of these camps falling under the jurisdiction of the U.S. Forest Service, and 19 overseen by the Soil Conservation Service (SCS). Some of these camps reoccupied abandoned CCC camps (Hansan 2014). Five CPS camps were located in Colorado, with four of these on the Front Range. All four of the Front Range camps were operated by the Mennonite Central Committee. Of these, two camps completed work on public lands: SCS−CPS Unit No. 033-1 (site 5WL3201) and CPS Unit No. 005-1. Camp Unit 033-1 was opened in June 1942 and closed in October 1946. It was located 9 mi. north and 2 mi. west of Fort Collins in the Poudre River Valley. A branch camp at Buckingham, nearly 75 mi. east, was also associated with the Fort Collins camp. The men at the camp worked on the Greeley Dam, constructed irrigation ditches, and performed a wealth of erosional control projects. Camp Unit No. 005-1 was opened in June 1941 and closed in May 1946. It was established 3 mi. northeast of Colorado Springs and reused an abandoned CCC camp. The men of the camp completed SCS irrigation projects, which included the construction of diversion ditches (The Civilian Public Service Story 2015).

Land Management

Overuse of the public domain for grazing, damage caused by unchecked fires, and wasteful timber cutting led to the establishment of Forest Reserves in heavily timbered areas of the RGFO study area. Mountainous areas along the Front Range became the Pike, San Isabel, Arapaho, and Roosevelt National Forests. The Pike and San Isabel National Forests were two of the original eleven forest preserves in the state. By presidential proclamations, the Pikes Peak, the Plum Creek Timberland Reserves, and the South Platte Forest Reserve were established in 1892. Later, in 1905, these three reserves were combined to create the Pike National Forest. In 1902, President Roosevelt would set aside San Isabel National Forest. The Arapaho National Forest was added in 1907.

Congress did not authorize another forest reserve until the addition of the Roosevelt National Forest in 1932 (Noel et al. 1994).

Lands in the public domain not included in the National Forests continued to be available for settlement through the GLO. In 1934, enactment of the Taylor Grazing Act further regulated grazing on the public domain under the jurisdiction of the Grazing Service. In 1946, the GLO was merged with the Grazing Service to form the BLM.

Public Works

Water Development

Between the 1850s and the early 1900s, agriculture increased steadily. At first, local irrigation systems supplied the needs of farmers. However, as the population grew, large-scale irrigation was increasingly needed. The extensive growth of irrigation within Colorado over time has led to the construction of numerous ditches, canals, and reservoirs, and no attempt is made here to describe all established water storage and conveyance systems. Numerous irrigation ditches were dug throughout the Arkansas and South Platte river basins beginning as early as the 1860s. In the northeastern plains, the Union Colony (established by Horace Greeley and Nathan C. Meeker in 1869) began constructing a large irrigation system—which has been recorded as site 5WL842—to supply water to the colony's farmers, eventually irrigating 60,000 acres (Mehls 1984b:67). In the 1870s, ditches along the Upper Arkansas River, including the Missouri Park Ditch (site 5CF1253), the Hill and Sprague Ditch, and the Willowdale Ditch, were used to provide irrigation water for the growing agricultural industry in Chaffee County (Athearn 1985:124). In the 1880s, irrigation work shifted to larger, corporation-built canals and ditches. Many of these irrigation companies were well financed, usually by investors from the eastern US or from overseas, especially England. Along the South Platte and its tributaries, the English-financed Colorado Mortgage and Investment Company (CMIC) backed three major canal companies in the Denver, Fort Collins, and Greeley regions. The Northern Colorado Irrigation Company (a subsidiary of the CMIC) constructed the High Line Canal between 1880 and 1883 to irrigate land surrounding Denver in hopes of spurring settlement. The High Line Canal has been documented under the site numbers 5AH388, 5AM261, 5AM497, 5AM1291, 5BL2730, 5DA600, 5DV840, and 5JF250. The Larimer and Weld Canal (segments recorded as sites 5LR863 and 5WL844) was initially begun by Benjamin Eaton in 1878 to irrigate land along the Cache la Poudre Valley. In 1879, financial constraints forced Eaton to sell the canal to CMIC, which then formed the Larimer and Weld Irrigation Company to complete the canal's construction. The canal was finished in 1881. The CMIC organized the Loveland and Greeley Irrigation and Land Company in 1880, purchased a number of smaller, previously constructed ditches, and began expanding them to construct the Loveland and Greeley Ditch (segments recorded as sites 5LR503 and 5WL898). Construction continued until 1900 when it was completed to Greeley. The organization of large ditch companies also occurred along the Arkansas River in southeastern Colorado. The previously constructed La Junta and Lamar canals along the river were merged and reorganized as the Fort Lyon Canal Company in 1887. The company subsequently enlarged and extended the canal, now called the Fort Lyon Canal, until the system ultimately reached over 113 mi. long and 45 ft. wide (Athearn 1985). The Fort Lyon Canal has been recorded under the site numbers 5BN376, 5OT100, 5OT114, and 5PW39.

In 1907, Colorado Springs-based entrepreneur Spencer Penrose saw the potential for growing fruit along Arkansas River and subsequently formed the Beaver Land and Irrigation Company (Weimer 2007). The Beaver Land and Irrigation Company constructed a large hydraulic ditch system (the Schaeffer Hydraulic Ditch, recorded as site 5FN2146) consisting of paved and cement-lined ditches, earthen ditches, wooden stave pipe, and cement pipe laterals between 1908 and 1909. In 1909, the company established the town of Penrose and sold 10- and 40-acre parcels to be used for agriculture. Between 1909 and 1910, the company constructed the Schaeffer Dam, which impounded water in Lake McNeil that was used in the irrigation system. The system was successful in promoting fruit growing and other agriculture until 1921 when a massive flood destroyed the Schaeffer Dam. The industry rebounded slightly in 1923 with the construction of the Brush Hallow Reservoir, but never fully recovered and was further hindered by the Dust Bowl and the Great Depression of the 1920s and 1930s (Weimer 2007).

In the 1890s, government-funded water preservation projects increasingly supplanted private corporations. This was a result of a recognized need to mitigate water right disputes, as well as demands to meet the needs of a growing population. Funding for public water projects came from federal, state, and county sources. In 1892, Custer County provided funds to construct the Custer County and Apishapa reservoirs (Athearn 1985). In the 1890s and early 1900s, a number of reservoirs were constructed to capture spring runoff and store it for future irrigation use, especially in the sugar beet industry. Within the South Platte River basin, reservoirs that were constructed during this period include the Cache la Poudre or Timnath Reservoir (site 5LR1830), constructed by 1893; the Loveland and Greeley Reservoir—also known as Lake Loveland—constructed in 1893 (site 5LR1431); the North Poudre Reservoirs, constructed between the 1890s and the early 1900s (North Poudre Reservoirs 12 and 13 have been recorded as site 5LR12053); and Boyd Lake Reservoir (site 5LR11179), constructed in 1902. Numerous other reservoirs were constructed by various water storage and canal companies, all with the intent to store water for future agricultural use. In the Arkansas River Valley, the Great Plains Water Storage Company augmented natural playa lakes to create four reservoirs for the storage and distribution of irrigation water. Construction of the Neesopah (site 5KW291), Neegronda (site 5KW292), Neenoshe (site 5KW293), and Neeskah (site 5KW294) reservoirs began in 1895 and was completed by 1895, with water conveyed through feeder canals and ditches from the Fort Lyon Canal. Within the mountains, irrigation water was taken from natural lakes as well as being impounded. In Chaffee County, North Fork Reservoir was constructed in 1890 and Clear Creek Reservoir was constructed in 1902 to impound spring runoff for the purpose of irrigation and domestic water storage. In the early 1900s, Fooses (site 5CF638.2) and Garfield (site 5CF638.3) reservoirs in western Chaffee County were constructed as holding reservoirs for use in the Salida Hydroelectric system. In Lake County, the Colorado Fuel and Iron Corporation constructed the Sugar Loaf Dam and Reservoir, later known as Turquoise Lake, in 1882 and expanded the reservoir in 1904. The reservoir was used for irrigation, fish propagation, and domestic use. Twin Lakes Reservoir, originally constructed in 1896, was used for irrigation but also for ranching, domestic, municipal, and manufacturing purposes.

The early ditches and reservoirs were initially sufficient for farmers; however, during the drought years, primary water supplies ran dry, leaving farmers without water. To rectify this, storage facilities were used, and often consisted of natural lakes. As demand increased, creeks and rivers were dammed to create reservoirs for additional water containment. The Reclamation Service (RS) was formed in 1902. The RS contributed to furthering water conservation in the state, by constructing containment reservoirs and helping to fund private irrigation projects. However, early in its history the RS did not complete any projects on the Plains in Colorado (Noel et al. 1994). By the 1920s, all accessible water that could be easily diverted had already been tapped and the most logical storage lakes and reservoirs had already been utilized or constructed. Regardless, the need for water was steadily increasing, and demand was outstripping supply, thus causing continual conflicts over water rights. In 1923, the RS was renamed the Bureau of Reclamation (BOR). Under new organization, the BOR would reshape the irrigation history of the eastern portion of the state through the completion of large-scale projects, such as the Colorado-Big Thompson (C-BT) and the Fryingpan-Arkansas.

The C-BT was a major transmountain water diversion project that was envisioned as early as 1889. Between the years of 1925 and 1933, water demand and potential shortages became a primary concern for agriculturalists and investors alike, eventually prompting the organization of the Northern Colorado Water Users Association (NCWUA) in 1934. The NCWUA would become a political force focused on diverting water from the Western Slope of the state and channeling it across the Continental Divide. The organization's continued lobbying ultimately resulted in the development of the C-BT project (Abbott et al. 1982). The project did not materialize until the signing of the Colorado River Compact, which allocated Colorado River water between seven participating states. Once the compact was developed, a plan was devised to divert Colorado River water into northeastern Colorado watersheds for the purpose of irrigating agricultural lands in areas with water shortages. In January of 1935, the BOR was allotted funds by the Public Works Administration for the completion of a water study that ultimately led to the launch of the C-BT project in 1937 (National Park Service et al. 2015). The scope of the project was immense and included the construction of 10 reservoirs, about 18 dams and dikes, the Alva B. Adams Tunnel (site 5LR802) under the Continental Divide, six power plants, and numerous pumping plants, pipelines, transmission lines, and other structures that spread over 250 mi. Of the 10 reservoirs constructed, only six were on the Front Range: the Mary's Lake and Estes Lake (site 5LR3987) reservoirs near the town of Estes Park; the Pinewood (site 5LR3985), Flatiron (site 5LR3984), and Carter Lake reservoirs near Loveland; and Horsetooth Reservoir (site 5LR759) near Fort Collins. The full scale of the C-BT project was completed in the fall of 1956. Now, nearly 60 years later, the project continues to provide municipal and industrial water and hydroelectricity to 11 cities and provides water to irrigate nearly 720,000 acres of agricultural lands in the northern part of the state (Autobee 1996). A historic district—sites 5BL7953 and 5LR9611—has been created within Boulder and Larimer counties for the C-BT project and water control features associated with diversion have been recorded in Larimer County as site 5LR11235.

Although smaller in scale, the Fryingpan-Arkansas Project was a multipurpose water development whose construction was initiated by the BOR in 1963 and completed in 1980. The purpose of the project was to divert unappropriated water from the Western Slope of Colorado for water usage on the Eastern Slope. This was accomplished through a diversion system that took water from the headwaters of Hunter Creek and the Fryingpan River in west-central Colorado, piped it under the Continental Divide through a succession of tunnels, and stored it in a series of natural lakes and reservoirs west of Leadville. The lakes and reservoirs varied in size and included Lake Ivanhoe, Homestake Reservoir, Ruedi Reservoir, Turquoise Lake, Mt. Elbert Forebay, and Twin Lakes. Water from these storage facilities was systematically released thorough existing creeks into the Arkansas River and traveled through the river to the Pueblo Reservoir downstream. Water retained in the Pueblo Reservoir was used for irrigation, with a portion of its volume piped to the north through a 45-mi.-long pipeline, which fed water to Colorado Springs. Pueblo Reservoir also functioned as a flood control facility. Prior to Pueblo Reservoir, John Martin Reservoir was created for a similar purpose in 1948. John Martin Reservoir was created by the Arkansas River Compact and is located 140 mi. downstream. The Compact also allows the waters of the Arkansas to be diverted for irrigation between Kansas and Colorado (Abbott 1985).

Public Service—CCC

In the midst of the country's worst economic depression and environmental devastation, President Franklin Roosevelt created a series of domestic programs through the New Deal. The programs were aimed at alleviating the worsening economic conditions of the Great Depression by creating jobs for the country's youth and conserving the nation's depleting natural resources, a phenomenon heightened by the effects of the Dust Bowl. On March 31, 1933, the president signed a bill that would create jobs for the country's young men through the formation of the CCC. Shortly after its formation, CCC camps were established throughout the United States, and young men were recruited to complete a wealth of conservation projects (Pfaff 2010). By 1935, the CCC enrollment was at its highest, with over a half-million men occupying 2,652 camps across the country (Pfaff 2001). In Colorado alone, 8,400 men were employed and 172 camps were built across the state. An estimated one half to three quarters of the camps were managed by three bureaus of the Department of Agriculture—U.S. Forest Service, SCS, and Division of Grazing (BLM). All of the Division of Grazing camps and works were located on the Western Slope of the state. Within the state, 2,600 men were working on SCS erosion control projects. In time, the number of SCS CCC camps would outnumber Forest Service camps, as the severity of soil erosion on the Eastern Plains required an increased work force. The work undertaken by the SCS CCC included working with area farmers to administer erosion-control measures that included built resources, such as check dams, contour ditches, drainage outlets, the filling of gullied areas, furrowing, terraces, and tree wind breaks (Wolfenbarger 2005). Because of the nature of the work, SCS CCC camps or built resources are more likely to be found on BLM lands, and, in fact, may be found only on BLM lands. While the SCS CCC camps were scattered across the state; based on Parham (1981) presented in Wolfenbarger (2005), twelve of the camps were located on the eastern part of the state (Table 9). Based on the CCC Legacy online database, the dates the camps were established, and each camp's distance from the closest post office is also given (CCC Legacy 2015).

Table 9. Soil Conservation Service CCC Camps in Eastern Colorado.

Camp No.	Camp Name	Post Office	Date	Location†
SCS-1	Trinidad	Trinidad	1/11/1936	1 mi. east
SCS-2	Burnt Mill	Pueblo	7/22/1935	18 mi. southwest
SCS-3	Hugo	Hugo	7/25/1935	0.25 mi. east
SCS-4	Cheyenne Wells	Cheyenne Wells	7/25/1935	1 mi. (direction unknown)
SCS-5	Springfield	Springfield	7/26/1935	50 mi. south
SCS-6	Templeton Gap or Fountain	Colorado Springs	10/3/1934	4 mi. northeast
SCS-7	Franktown	Castle Rock	7/20/1938	4 mi. northeast
SCS-8	Wellington or Buckeye	Wellington	10/15/1935	25 mi. northeast at Buckeye
SCS-9	Elbert	Elbert	10/23/1935	5.5 mi. north
SCS-15	Sterling	Sterling	10/21/1939	1.7 mi. north
SCS-16	Horse Creek	Kutch	10/15/1940	26 mi. south
SCS-18	Huerfano	Gardner	1/15/1941	31 mi. northwest

† Miles distant from the post office.

The erosion-control work completed by the SCS CCC would have been extensive, with the majority of it completed on private lands. Work completion statistics from all of the camps are not readily available; however, research of the amount of work completed by the Springfield and Hugo Camps indicates that:

> In a three year period, camp SCS-5-C in Springfield constructed 145 earth dams (check and impounding), 143.1 miles of terraces, 1,683.8 miles of contour furrows, 7,861 acres of range revegetation, 35.1 miles of fences, and planted 45,731 trees. A total of 22,393 acres were under forty-six cooperative agreements with local land owners. The camp in Hugo had just as impressive work statistics. During the same three year period, the enrollees completed work on 125,000 acres of land, more than any other SCS camp in Colorado. This included 155 miles of fence, 2,725 miles of contour furrows, 175 permanent dams, 36,500 yards of diversion ditch, 3,425 tons of rock quarried, 125,000 trees planted, and 36,000 pounds of grass seed planted. They also hauled nearly 5 million pounds of poison and traveled 53,700 miles in two seasons working on the grasshopper plague (Wolfenbarger 2005:37).

Women were not admitted to the program, and the camps were generally segregated, with the establishment of minority camps including African-American camps, and to a lesser extent, Hispanic camps. Program participants earned 30 dollars per month, from which 25 dollars was sent to family. Individuals without family were paid 22 dollars per month (Pfaff 2010).

A number of CCC camps have been recorded within the RGFO study area. These include camps within Boulder, Chaffee, Custer, Douglas, El Paso, Logan, and Larimer counties, recorded as sites 5BL4930, 5CF356, 5CF1624, 5CR483, 5DA1221, 5EP352, 5LO634, and 5LR11149, respectively.

Within Jefferson County, the Mount Morrison CCC District has documented 16 resources related to the CCC, including sites 5JF3196–5JF3211.

Expected Site Types

The following discussion of government sites types likely to be encountered in the RGFO project area is condensed from Church et al. (2007: 456-458). The reader is referred to this document for a more detailed discussion of site types.

The federal government played a pivotal role in shaping the settlement of the country as well as the pattern of that settlement by promoting various programs for the dispersal of public lands, the construction of large-scale water projects, and elements of infrastructure (i.e., roads and transmission lines). It is because of this wide gamut of government involvement that the types of sites expected in this category will vary widely. Of the limited number of early government involvements within eastern Colorado—including exploration and military forts—most have been researched and are well represented in the historical literature. As a result, most of the early military fort locations are known and have been documented into the archaeological record, leaving few unidentified. By the same token, many of the early military exploration routes through the plains have been substantiated by government reports, journals, and maps documenting these routes. Although the probability of finding sites associated with these expeditions is rather low, detailed examination of expedition journals may provide the necessary information to locate trail and road segments, repair or activity areas, and camps. Given the duration of these exploration ventures, it is assumed that many of the dietary needs were met from hunting game along the route. Site remains may be minimal, considering the transient nature of the expeditions as they made their way across the landscape. Potential camp sites will likely be manifested as small artifact scatters with evidence of blacksmithing and, depending on the period, may not be easily differentiated from other historical sites. A good example of an early exploration site can be found in one of Colonel Loring's 1858 Expedition camps along the North Branch of the Old Spanish Trail. Using Loring's Journal, his 13 Mile Spring camp was located near Green River, Utah. The artifacts were found to be rather mundane until they were put into historical context. At this site, a curry comb and a canteen spout were identified; both were determined to be military-issued items with a short period of significance dating between 1856 and 1859. Closer examination of the site determined that wagon repair and horseshoeing were had also occurred at the camp (Horn et al. 2011).

Land surveying sites are associated with the distribution of public lands into private ownership by the GLO. The majority of sites expected to be associated with this activity will be cadastral—section markers primarily made of rock cairns, stones engraved with a one quarter mark, and trees marked with bearings. It is also possible that discarded artifacts, and even camps, from survey parties will be encountered. Given the nature of survey, these sites may be difficult to put into context unless they are located near, and associated with, section markers. In some instances, surveyor's notes taken during the GLO survey and available on the BLM-GLO web page may aid in the interpretation.

Unlike the western slope of Colorado, the Plains were served by only two known Indian Agencies—Fort Wise (later Fort Lyons) and the Special Ute Agency at Denver. It is expected that the number of sites associated with Indian Agencies will be quite low. Anticipated sites will likely be camp sites attributed to Native Americans camping in the vicinity of the agency. The close proximity of the Fort Wise/Fort Lyons Agency to New Bent's Fort will make discerning the difference between agency-related and fort-related Native American encampments difficult.

Only one Japanese-American internment camp was established in Colorado, Camp Amache (aka the Grenada Relocation Center). Although the site is currently on privately held lands, between 8,000 and 11,000 acres were purchased by the government for the function of the camp, including areas for sustaining agriculture completed by detainees. It is anticipated that the majority of activities associated with the camp's existence are on private lands; however, it is conceivable that trash disposal areas may be widely dispersed across the landscape near the facility. Also, in the latter parts of the camp's life, nearly 3,000 detainees remained at the camp unguarded. It is feasible that these detainees exercised their new freedom and ventured out to the surrounding countryside, engaging in either day or extended trips to places like the Arkansas River northeast of the camp. The trips may have been leisurely or for the purpose of fishing. The possibility of detainee-associated sites is low, but nonetheless possible, and would likely consist of temporary camps or artifact scatters. Given the extent of government-issued items, these site types may be relatively easy to put into context.

Given the threat that would have been posed by German and Italian POWs, sites apart from the main POW camps are unlikely, with the exception of work locales. POWs accomplished a wide range of labor tasks, as work groups were dispersed to different parts of Colorado from three base camps and 45 branch camps. The geographical locations of the various work details would have required additional, smaller, guarded camps to house the prisoners. The full extent of these camps is not known. One previously unknown POW camp was recorded on National Forest lands in Larimer County (site 5LR658). Prior to use as a POW camp, the site was the location of a former CCC camp. The site was used as a logging camp by the POWs, and at a later date, a private lumber company (Reed et al. 2012). The site's function as a POW camp was only determined through the historical record and artifact distinction from one occupation to another was not possible. In situations where camps were used only as POW facilities, it is expected that interpretable surface material manifestations will be present, given the potential for government-issued items. Moreover, records of these locations may be found in the course of post-field historical research, which should include searching local libraries and examining historical newspapers for the immediate area.

Like the POW reuse of CCC camps, CPS reuse of these camps will also be an issue in determining the range of activities undertaken. Given that these camps were carefully overseen and operated by religious sects and administered by the Government, it is anticipated that historical documentation of these camps exists. Unlike the POW camps, objectors were not incarcerated and only the access roads to and from the camps were guarded, leaving individuals free to access areas outside the camp. This leaves open the possibility for activity areas or congregation areas away from the watchful eyes of the camp; such activity areas will likely consist of simple artifact scatters, rock inscriptions, and arborglyphs in aspen-covered areas.

The development projects, such as the C-BT and Fryingpan-Arkansas, are expected to have generated associated sites within portions of the RGFO study area. Sites near Turquoise Lake may be expected and will likely be construction-related work areas, staging areas, material storage, artifact scatters, and construction camps.

The CCC presence in the RGFO study area is considered to be moderate considering their various responsibilities. The use of the CCC for SCS projects following the Dust Bowl leaves good potential for CCC-related sites. Aside from the obvious base camps, it is possible that side camps are present in areas where work projects were undertaken. These are expected to be short-term encampments, likely occupied over a period of months as work was completed. In these instances, temporary structures were likely used, with their placement following a formal military camp layout. In the absence of temporary structure locations, artifacts will likely be present; however, these will have been deposited off site in an attempt to clean up the area. Again, artifacts associated with this type of site will be government-issued items. In addition to potential camps, the built works themselves may also remain. For instance, the CCC was involved in the construction of numerous SCS projects requiring ditches, furrows, water diversions, and a bevy of erosion-control features. Without historical context, such structures will not be discernable from other built features.

Data Gaps

There have been good quality data retrieved with regard to fur-trader fort locations frequented by the military and military-constructed forts, most notably Bent's New Fort/Fort Wise/Fort Lyon by Carrillo et al. (2011). Initially a military fort, the Fort Wise location was later used as an Indian agency for the Arapaho and Cheyenne in 1861; although, it did not serve that function for long because the tribes were removed from the territory following the 1864 Sand Creek Massacre. Further research should focus on identifying the agency element at the fort. A special Ute agency is also known to have been active in Denver; its location is still unknown.

A great deal of work has been completed within the Amache Camp by Dr. Bonnie J. Clark from the University of Denver and others. Additional work could be completed in areas surrounding the camp to determine if activity areas or off-site disposal areas exist.

POW camps are under-recorded in the archaeological record. Aside from the testing work completed at a camp location at Fort Carson and the site recording of a POW side camp on the Arapaho-Roosevelt National Forest in Larimer County, little work has been done. Additional data are needed on base and side camps to better understand the extent of these camps and activities undertaken by them. For this to occur, careful consideration will need to be given to camp or activity sites dating to the WWII-era, with clarification achieved through archival research, to determine their context. Any additional data about these sites could go a long way in better understanding the utilization of prisoner labor, types of projects undertaken, and potential government interactions with prisoners. Although POW labor was heavily used at sugar beet farms, sites attributed to this activity are virtually unknown. The locations of beet farm detail camps are lacking. Overall, contributing data are needed to comprehend the extent and role of prisoners on these farms.

As with the POW camps, CPS sites are rare in the archaeological record, with only one known camp, CPS Camp #33 (5WL3201) previously documented on the Pawnee National Grasslands in Weld County. Considering that two main camps were assigned to the completion of projects on public lands, it is expected that additional side camps and elements of works completed by camp personnel are present. CPS personnel would have labored to construct ditches, dams, and erosion-control projects. As with SCS projects, only historical research will define the context for these features.

Public works sites associated with water development have a moderate potential to be found in the study area. The extent of these site types is unknown considering the history of water development in the eastern part of the state, and should not be considered limited to the water development projects outlined above. Public works sites, such as camp locations can provide a great deal of data concerning participants in the state's water development.

The CCC was one of the most popular and successful of the Depression-era New Deal Relief Agencies between 1933 and 1942. The CCC completed over 150 types of work projects under the direction of various agencies. Base and side camps and projects overseen by the SCS and Division of Grazing (BLM) are those likely to be on BLM lands in the RGFO study area. Research indicates that all of the projects undertaken for the Division of Grazing were completed on Colorado's western slope. A search of the Compass database shows that several CCC-related headquarters, camps, and works features have been recorded in the state. The vast majority of these are on National Forest lands, with a smaller number on municipal and privately held lands. The incidence of CCC-related sites on BLM lands is low. Considering that the highest likelihood for CCC-related sites in the RGFO area will be those attributed to SCS work, a greater emphasis on archival and document research will be necessary to determine CCC-SCS affiliation. For example, the type of erosion-control projects (e.g., dams, ditches, other water conveyance features, and erosion control measures) undertaken by the CCC-SCS will be similar to other projects completed by the private sector. Unfortunately, there is not a one-stop shop for this type of information, and most will be obtained from online documents detailing camp histories, camp newsletters, area newspapers, and local histories.

Agriculture

Farming

Within the RGFO study area, the territorial acquisition of lands began with Spanish ownership and lasted until the Mexican Revolution of 1821. By the 1830s, Mexico was becoming increasingly concerned about trespasses by Americans in its northern territory. Records indicate that the first land grants in Colorado were along the Conejos River in the San Luis Valley. Following the Mexican War, land status changed in the state, making Mexican land grants invalid; however, Governor Charles Bent of New Mexico agreed to uphold existing claims. Agriculture was well-established by the late 1850s west of the Sangre de Cristo Mountains and was just starting to gain a foothold on the eastern side. Settlement of the Purgatoire River Valley may have begun in the late 1850s and early 1860s by both Hispanics from New Mexico and Anglo-Americans enticed to the region by the Colorado gold rush; however, evidence of these early settlers has yet to be found. According to Carrillo (1990), former Comancheros and Ciboleros from the Plains, living in a near-aboriginal manner, may have taken up residence along the Purgatoire River prior to 1860. Conflicts between Native American groups and settlers on the Plains in the 1860s, including the Purgatoire River Valley, resulted in the establishment of Fort Lyon at the mouth of the Purgatoire River in 1867. It appears that the Bent Canyon and Red Rock portions of the Purgatoire River began to be settled by Hispanics and Anglo-Americans that same year. The majority of settlers were Hispanic farmers and sheep ranchers from northern New Mexico, but some Anglo-Americans, most engaged in the cattle business, also entered the area. The difficulty of making a living farming and sheep ranching along the Purgatoire River probably forced most of the Hispanic settlers to reconsider what they were doing and sell their landholdings to one of the large ranches that were becoming established in the region.

Some of the earliest agriculture in the study area can be dated back to the early trading forts established nearly twenty years before Colorado was a territory. For example, the small settlement of San Buena Ventura de Los Tres Arrollos was established illegally on Mexican lands near Fort Le Duc in 1844. It was considered to be a farming settlement and was on Hardscrabble Creek just upstream of its junction with Newlin Creek and downstream of the confluence of Newlin and Mineral creeks, hence the translated name "three arroyos." It was founded by traders George Simpson, Alexander Barclay, and Joseph Doyle, and between 1844 and 1845, the settlement was home to 70 people with the houses arranged around a central area and enclosed with an adobe wall as with most Placitas. Far from a trading post, the settlement grew enough crops and livestock to support its inhabitants. In its tenure, the difficulty of the name prompted the settlement to be referred to as San Carlos De Napeste, Saint Charles, or San Carlos, as it was called by Fremont in 1848. Eventually, the inhabitants would refer to it simply as Hardscrabble, coined from the rocky soils encountered during planting (Lecompte 1978).

Early settlers in Colorado relied on a number of legal devices to secure land. When the first Euroamerican settlers arrived during the 1858 gold rush, land was legally acquired through the Preemption Act of 1842. This law allowed a claimant to purchase a title to 160 acres for $1.25 per acre. Fearing that this act was not promoting the settlement of the West, Congress passed the Homestead Act in 1862. This act allowed the claimant to patent 160 acres of public land for the cost of the patent and the survey fees and to show proof that they had occupied the parcel for at least five years. In the 1870s, Congress enacted two additional laws to spur settlement of the Plains. The Timber Culture Act of 1873 allowed homesteaders to patent an additional 160 acres with the caveat that a portion of the land be reserved for tree planting. The Desert Land Act was passed in 1877 to encourage the settlement of arid and semi-arid regions and allowed claimants to patent up to 640-acre parcels with the stipulation that new irrigation systems would be constructed. Unlike the

Homestead Act, the Desert Land Act did not require proof of residence, but only that the land was irrigated (Mehls 1984b:66).

In northeastern Colorado, settlement and agriculture prior to the 1870s was limited because of conflicts with Native American groups and the Civil War. In the 1870s, increased access to the region through railroads such as the Union Pacific, the Denver Pacific, and the Kansas Pacific, coupled with decreased conflicts with Native Americans, resulted in the region being quickly populated. Initially, much of the agricultural endeavors were group driven, as people moved to the region to populate newly formed colonies. One such colony, the Union Colony (site 5WL761), was established in 1869 by Horace Greeley and Nathan C. Meeker, with the first colonist arriving in 1870. The colony was established near the confluence of the Cache la Poudre and South Platte rivers. The colonists developed a significant irrigation system that would provide water to the entire community and surrounding farmlands. Other colonies soon followed, such as the Colorado-Chicago Colony within the St. Vrain Valley, which established the town of Longmont, and the St. Louis-Western Colony, which founded the town of Evans; both colonies were established in 1871. The establishment of these colonies spurred development of the region; however, it also forced changes in the distribution of water. Conflicts between upstream and downstream water users forced Colorado lawmakers to add a "first in time, first in right" priority ranking of water rights to the Colorado Constitution during the Constitutional Convention in 1876. The success of this system of water rights and distribution resulted in other western US states implementing similar systems. Aside from water shortages, farmers in northeastern Colorado had to navigate other significant environmental constraints to make farming lucrative. Severe blizzards and thunderstorms, dust storms, and plagues of grasshoppers all threatened a farmer's crop yield. Despite these and other challenges such as free-wandering cattle and buffalo, farming continued to expand. Farms produced myriad crops, including—but not limited to—wheat, potatoes, corn, alfalfa, and other vegetables and fruit with great success. The development of railroads through the region shifted agriculture from subsistence farming to commercial endeavors. These were successful until the early 1890s when the Depression of 1893 and a sequence of dry years ended the expansion of farming in the region (Mehls 1984b).

The dry years and the Depression of 1893 forced farmers on the Plains to find alternative crops. Out of this need, the sugar beet industry began to grow in Colorado. Sugar beets were not necessarily a new crop for Colorado farmers. In the 1870s, farmers along the South Platte began growing sugar beets and discovered the crop was successful as long as it was well irrigated. Sugar beet factories had been constructed in California, Nebraska, and Utah in 1880s; however, the return on Colorado crops was low, and as a result not many farmers on the Plains planted the crop prior to 1900. However, at the turn of the century, farmers, looking to diversify crops and recoup their losses from the 1890s, championed the building of a factory on the Front Range (Mehls 1984b). Charles Boettcher and John Campion, two Colorado businessmen who made their fortunes in mining, recognized the potential for the industry along the South Platte. In the Arkansas Valley, George Swink was instrumental in developing the industry. In 1899, the first sugar beet factory was opened in the state (albeit in Mesa County on the Western Slope). However, problems at the Mesa County factory spurred Boettcher to open a factory near Loveland in 1901. The construction of the Loveland factory (site 5LR836) resulted in an agricultural boom. The sugar beet industry subsequently expanded throughout the Plains. Industry demands resulted in the construction of new irrigation systems, including reservoirs and canals, and numerous factories to handle the processing. In 1905, the Great Western Sugar Company was founded by Boettcher and Henry O. Havemeyer. This company was influential in consolidating the industry in the northeast, and eventually constructed the Great Western Railway in order to connect farmers to the processing factories. A number of sites associated with the Great Western Sugar Company have been recorded in Boulder, Denver, Logan, Larimer, Morgan, and Weld counties under the following site numbers: 5BL513, 5DV3338, 5LO483, 5LR1616, 5MR788, and 5WL786. Additionally, segments of the Great Western Railway have been recorded in Boulder, Larimer, and Weld counties under site numbers 5BL514, 5LR850, and 5WL841, respectively. Between 1900 and 1905, in southeastern Colorado, the American Beet Sugar Company constructed a factory in Rock Ford, the National Sugar Beet Company constructed a factory in Sugar City, and the Holly Sugar Corporation was chartered in Holly (Athearn 1985). The boom outpaced available labor, and between 1900 and the 1920s, the corporations began advertising job opportunities working in the fields. Labor was recruited from all over the country as well as abroad. Volga-Germans from Russia, Japanese-Americans from the Pacific Coast, and Mexican nationals, among others, all relocated to Colorado to make a living. The sugar beet industry continued to be successful and accounted for a large portion of irrigated land on the Plains. Through the 1920s and 1930s, sugar beets remained a vital crop to farmers in Colorado. However, through the 1940s, the industry declined as other natural sweeteners, such as corn syrup, became popular. Although sugar beets remain an important crop on the Plains, the demand never reached the same levels as the boom in the beginning of the twentieth century (Mehls 1984b).

Within the mountains, agriculture was primarily focused on ranching, although some farming took place within select areas. In the Upper Arkansas River Valley near Buena Vista, Frank Mayol established a farm in 1863 and sold produce to the mining camps in California Gulch in Leadville. Eventually farming took root in the Upper Arkansas, and a number of farms were established by 1865 within the Cottonwood, Brown's, Trout, and Chalk creek drainages (Athearn 1985). In South Park, the high altitude and prolonged cold created a short growing season, which made ranching a more viable alternative. Beginning in the 1860s, some farming was carried out to supply the mines around Tarryall and Fairplay. However, the majority of farming in South Park focused on growing hay for the numerous cattle and sheep ranches in the area. South Park became so well known for its high-quality hay that the product was exported to feed the horses of the British royalty and the Russian Czar (South Park National Heritage Area 2015a). With the diversion of water to the Front Range, the hay industry in South Park has declined significantly. The area is now primarily used for ranching. As was the case on the Plains, farmers within the mountains were reliant on irrigation to provide water to their crops. A number of reservoirs were constructed in the late 1890s and early 1900s in order to impound spring snow melt and supply the growing agricultural endeavors.

The DeWeese Reservoir is an early example of a significant water development project in the study area. The reservoir was originally part of the DeWeese-Dye Ditch and Reservoir system devised and constructed by the DeWeese-Dye Ditch and Reservoir Company. The company was owned and operated by Dallas (Dall) DeWeese and C. R. Dye. The purpose of the dam was to store water from Grape Creek used for irrigation of 1,800 acres of agricultural land near Cañon City that was put mostly into fruit orchards. DeWeese and Dye were land promoters who purchased land along the southern side of the Arkansas River south of Cañon City. According to an advertisement in the *Cripple Creek Morning Times* (April 23, 1898), the pair purchased land in Lincoln Park, which they named Fruitland (DeWeese-Dye Ditch and Reservoir Company 2010). The land was offered for sale as early as 1898 and advertised fenced 40-acre tracts, but also offered 3-, 5-, and 10-acre tracts. Improvements made to the land tracts included graded streets with shade and ornamental trees. The advertisement also stated that trees had 3 to 5 years growth with an "ample water supply" available for irrigation. According to the Colorado Division of Water Resources website, the original water rights for Fruitland were adjudicated on November 23, 1894 with the water diverted from Grape Creek. It was soon apparent that the water supply diverted from the creek was not sufficient to maintain irrigation during the late summer and fall of the year. To insure that irrigation water would be available during the late season, DeWeese and Dye endeavored to build a storage reservoir in the Wet Mountain Valley (DeWeese-Dye Ditch and Reservoir Company 2010). The pair acquired additional rights to water from Grape Creek, securing them on October 8, 1901 (District Court of the Eleventh Judicial District 1905). The construction of the dam began in 1902 and was completed in 1903 (DeWeese-Dye Ditch and Reservoir Company 2010). Once completed, the dam was 386 ft. long and stood at a height of 46 ft. The reservoir, when filled, covered a surface area of 147 acres with a storage capacity of 1,771 acre ft. (District Court of the Eleventh Judicial District 1905). Water from the dam was conveyed by ditch for 36 mi. across private lands and lands administered by the BLM-RGFO (DeWeese-Dye Ditch and Reservoir Company 2010). A segment of the DeWeese-Dye Ditch has been recorded as site 5FN1558.1 in Fremont County and the DeWeese Dam and Reservoir have been recorded as site 5CR575 in Custer County.

Because of the importance of agriculture, President Roosevelt signed the Reclamation Act into law in 1902. With the signing of the act, the federal government would begin to take a larger and more active role in irrigation development in the western United States. As part of the act, the Reclamation Service would be created and through them money would be made available to construct large-scale water projects that would provide water to previously non-irrigable marginal lands. The money for these projects came from the sale of public lands and was expected to open up undeveloped areas of the West. One of largest Reclamation projects in Colorado was the CB-T Project beginning in the 1930s following the drought of the period. The project was not completed until 1956, but when completed, it brought the equivalent annual flow of another Cache La Poudre River into the northern portion of the Front Range. With the completion of the project, the severe water shortages suffered during the 1930s would not befall Colorado farmers again (Autobee 1996).

Dryland farming

Near the end of the nineteenth century, easily irrigated lands on the plains of eastern Colorado were already homesteaded. The overall lack of divertible water and natural moisture would necessitate a new era of farming practices that would allow more marginal lands to be put into cultivation. It was also during the drought years between 1890 and 1900 that farmers were eager to try different farming techniques. The end result was the development and adoption of dryland farming. The method would require the use of drought-tolerant crops and adherence to plowing methods that conserved the existing ground moisture (Abbott et al. 1982). Crops introduced included drought-resistant strains of wheat from the Ukraine, such as Turkey Red (Athearn 1985). Programs were established by the state to encourage dryland farming through the founding of an Agricultural Experiment Station at Cheyenne Wells in 1893. To further the promotion, the Burlington Northern constructed a model dryland farm to demonstrate new seeds and cultivation practices. The potential of dryland farming created a renewed interest in settlement on the Plains, culminating in a second, larger settlement boom in 1906, with the creation of 20,0000 new farms (Abbott et al. 1982).

The new incursion of farmers into the state was largely the result of promotion through railroad campaigns that mainly targeted newly arriving immigrants in search of the American Dream. The campaigns included newspaper advertisements and printed broadsides; many of the newspaper ads were produced by railroad "Immigration Agents" or "Immigration Bureaus." Specific to the promotion of early twentieth century dry farming, numerous handbooks, publications, newspaper articles, and bulletins were also being produced that frequently provided exaggerated facts about cultivatable lands, crop yields, and environmental conditions (Geib 1913; Hollingsworth Talbot 1915; Pleasant 1919). Aside from embellishing successes, most promotions disregarded the subsequent failures of these pursuits (Mehls 1984a). Moreover, handbooks were written under the guise of being academic agricultural studies with the appearance of being authoritative materials, but were ultimately funded and published through railroad companies as promotional material (Cottrell 1909; Summers and Schafer 1928). The use of promotional materials, coupled with the lack of familiarity about cultivation practices and environmental conditions in Colorado, easily swayed individuals to be overly optimistic about their prospects.

Also occurring in the early part of the 1900s was another land promotion scheme focused on encouraging Colorado's dry-farming potential. Land speculation was stimulated by prominent business men, land speculators, and colonizers, with significant contributions by the Colorado State Board of Immigration (Mehls 1984a). Although this level of promotion was in line with previous land-grant promotions disseminated through printed media, the question arises: how did they reach the illiterate and non-English speaking populations? Based on illiteracy statistics from the National Center of Educational Statistics, during the 1900 to 1930 period when Colorado was being promoted to potential settlers, between 4.3 and 10.7 percent of the country's population was unable to read or write. Of the total number of illiterates, 10.8 to 13.1 percent were foreign-born individuals (National Center for Education Statistics 1993). One possible answer may have included the use of visual media through promotional agricultural exhibitions at local, county, and state fairs. In some instances, agricultural exhibits were furnished by various counties in the state and were also put on display in the capital building (*Steamboat Pilot*, September 12, 1917; Fort Collins Courier, August 4, 1919). These exhibits displayed crops and produce grown in various parts of the state and were viewed by thousands of people throughout the year (*Hayden Republican*, July 17, 1918). The visual exhibits offered prospective settlers a view of the agricultural opportunities available to them within the state.

Aside from advertising within the United States, immigration boards were also actively advertising in Europe through newspapers, pamphlets, and World Fairs. Some of these immigration boards were also employing ethnic agents to greet newly arriving immigrants as they stepped onto American soil. Still others employed agents overseas to entice Europeans to immigrate to the United States. As these boards found, many Europeans were seeking new opportunities that were not afforded to them because of overpopulation and the lack of land in their homeland (McDanal 2011).

Agricultural pursuits continued on the Plains with wheat-cultivated lands increasing three-fold in the region between 1909 and 1919. A factor in this increase was the government enactment of the Enlarged Homestead Act in 1909, which increased homesteads by up to 320 acres to encourage the use of marginal lands for dryland farming. During WWI, wheat prices soared as demand was increased and unseasonably wet weather brought about high crop yields. By the 1920s, agriculture and the country were in a depression and many were forced to give up farming on the Plains. Others began to increase their cultivated acres to ensure an income (Abbott et al. 1982). This continued into the 1930s as the federal government, who were focused on populating the Plains, ignored the signs of gross overplanting and plowing and continued to encourage more lands to be put into production (Athearn 1985). Heavy drought years between 1933 and 1938, coupled with intensity of farming operations, resulted in the Dust Bowl, which would continue over a five-year period. The devastation led to the founding of the SCS in 1935. The SCS was established as part of Roosevelt's New Deal and would help promote farm rehabilitation. The rehabilitation plan included an aggressive campaign to encourage new planting and plowing techniques. The program also paid disinclined farmers money per acre to utilize these methods. At the same time, the president ordered the newly formed CCC to plant 200 million trees as windbreaks and to hold the soil in place. These measures severely reduced the amount of dust and began to restore the land until the moisture returned in the 1940s. A second drought hit in the early 1950s and detrimental planting lessons had to be relearned as grain income fell by two thirds before recovering in the latter part of the 1950s (Abbott et al. 1982).

Ranching

Cattle Ranching

Agriculture first became a functioning industry in Colorado during the fur-trading era, with the establishment of forts and trading posts. During the two decades before the Civil War, early Hispanic farmers and ranchers migrated north from New Mexico and established themselves in the San Luis Valley and along the Arkansas, Purgatory, and Apishapa rivers. Early on, herders and farmers were hired by the fort and trading-post operators to supply food for consumption and for resale to travelers passing through the area (Carter and Mehls 1984). Records indicate that the earliest ranching in Colorado was in the Arkansas River Valley near the fort at Pueblo during the 1840s (Carter and Mehls 1984). Large cattle herds were also brought in by mountain man John Brown after he settled Greenhorn in 1847 (Lecompte 1978). It was also in 1847 that Dick Wootton was grazing cattle at Huerfano near the junction of the Huerfano and Arkansas rivers to supply the Santa Fe Army. A ranch associated with Wootton has been recorded in Las Animas County as site 5LA13236. Even with grazing's early history, it was not until 1859, during the Gold Rush, that mining heightened the demand for meat, and livestock raising became economically viable. To meet the new demand, individuals like Samuel Hartsel homesteaded in South Park in 1860, setting up his ranch headquarters east of the town that would eventually bear his name. Hartsel's homestead has been recorded as site 5PA308. The ranch would take advantage of the vast grasslands of the park near the confluence of the Middle Fork and South Fork of the South Platte River. By the mid-1860s, Hartsel would build his livestock holdings by providing beef, not only to the surrounding mining areas, but also to Denver to supply the growing populations that were arriving daily (Athearn 1985). The success of early cattle ventures like Hartsel's gave rise to additional enterprises on the plains of eastern Colorado. With the removal of the Cheyenne and Arapaho tribes from the Plains within the Colorado Territory, large expanses of grazing lands were now open to large cattle companies and their residing cattle barons. Open-range ranching would continue to take root through the 1860s, as Texas cattlemen, hampered by the Civil War, could no longer sell to northern markets and began to tap into the mining markets of Colorado. During this period, large cattle herds were driven into Colorado, where they would be pastured until they were sold to various mining camps. As a result, several livestock trails were established through southeastern part of the state. One of the earliest of these trails through the area was pioneered by John Dawson in the late 1850s to transport cattle from Texas to Denver to supply the gold fields. Dawson transported his cattle along a portion of a trail he had blazed earlier during the California gold rush, which entered Colorado along the Arkansas River, continued west to Pueblo, and traversed north along Fountain Creek (Athearn 1985). Probably the most famous livestock trail was the Goodnight-Loving Trail established by Charles Goodnight and Oliver Loving in 1864 (Carter and Mehls 1984). The trail followed the Pecos River to its headwaters, entered Colorado by way of Trinchera Pass, and was blazed over the pass in order to avoid Dick Wootton's per-head cattle toll on Raton Pass (Carrillo et al. 2012). From Trinchera Pass, the trail continued north to Trinidad, to Pueblo, and into Denver (Carter and Mehls 1984). Segments of the trail have been documented in Arapahoe and Denver counties as sites 5AH210 and 5DV834, respectively. The trail was later extended even farther north as Goodnight began to supply cattle to another large cattle company owned by John Wesley Iliff in the northeastern part of the state. Iliff was known as the Cattle King of Colorado and owned 15,000 acres of range land along the South Platte River between Julesburg and Greeley (Patterson and Poole 2000; Ubbelohde et al. 1972). In 1866, Iliff began supplying beef to the Union Pacific as they constructed their rail through northern Colorado (Ubbelohde et al. 1972). However, it was not long before large herds of cattle were being raised on the Plains, because it was an ideal grazing environment with ample grassland forage capable of sustaining large numbers of livestock. The Iliff Ranch has been recorded as site 5LO63.

The need to supply mining camps and growing frontier towns unquestionably fostered the livestock industries, but the demand for red meat absolutely soared at the end of the Civil War. Postwar prosperity stimulated beef markets and the population of the new Colorado Territory boomed, as an incursion of immigrants sought to obtain the American Dream. Westward expansion would also bring thousands of individuals to the state hoping to find economic stability by acquiring cheap land in the wake of the 1862 Homestead Act. With the populace came the beginnings of railroad transportation systems and the means to ship beef. The demand for cattle was at a premium, and capitalists successful during the American and British Industrial Revolution saw the cattle industry as an investment with a high rate of return—all it took was feed and water, and Colorado had an abundance of both. By the 1870s, livestock from capitalist-backed companies flooded onto the plains and were grazed on free public lands. It was during the late 1870s and mid-1880s that some of the largest ranch operations in the state were amassed, with 176 cattle companies incorporated in the state between 1882 and 1886 (Patterson and Poole 2000). One of these ranches was started by James Jones of the Jones Brothers, who came to Colorado in 1879 and engaged in both the sheep and cattle industries. Jones ranged cattle as part of the JJ Ranch; a line camp associated with the JJ Ranch has been documented as site 5LA11831. The Prairie Cattle Company (PCC) purchased the JJ Ranch and other Jones Brothers holdings in 1881, making the PCC the largest cattle ranch in southeastern Colorado (Athearn 1985; Patterson and Poole 2000). It is estimated that, following the purchase of the JJ Ranch, the PCC was grazing 54,000 head of cattle and 300 horses on lands that encompassed 3,500 square mi. (Carrillo et al. 2012).

The PCC was the first group from the United Kingdom to invest in the cattle industry of the American West. The company was made up of investors from Scotland and was operated by John Wesley Prowers. The brokerage firm of Underwood, Clark & Company of Kansas City convinced the syndicate of the soundness of investing in the American cattle industry. Underwood, Clark, & Company recommended purchasing three large cattle ranches, one each in Colorado, New Mexico, and Texas. The proposition was that by purchasing tracts of land that encompassed important water courses, they would control the remainder of the surrounding land that could then be used for grazing at no cost. Eventually, the company's cattle and horses ranged widely from southeastern Colorado and northern New Mexico to Oklahoma and the Texas Panhandle, utilizing an estimated 5.5 million acres. The vast majority of these range lands was on the public domain (Patterson and Poole 2000). The Colorado ranch was considered to be the base of the PCC's cattle empire and cattle were shipped from Las Animas and Granada. Despite difficulties in the cattle business in the middle 1880s, the PCC was operated at a profit for about 25 years. In 1912, the company began selling off their holdings, finally ceasing operations in 1917 (Clay 1961; Hurd 1957).

The PCC demonstrated that a great deal of money was to be made investing in frontier cattle ranching. It was the lure of money that eventually prompted the Thatcher Brothers and their associates to invest in the cattle industry. John and Mahlon Thatcher originally made their money by establishing a successful mercantile business in Pueblo in the early 1870s. Through the use of a small safe housed at the mercantile, the brothers began to build a lucrative banking business. Their banking success eventually led them to apply for a charter for the First National Bank (FNB) of Pueblo in 1871. The Thatcher Brothers (Frank, John, and Mahlon), along with their brother-in-law Frank Bloom, formed a partnership and opened the FNB of Trinidad in 1875. The success of the bank was ensured through the financing of pioneer expansion in the region. Through their banking endeavors, the Thatcher brothers acquired lands for the bases of their Bloom Cattle Company—incorporated on May 26, 1885—in Bent and Las Animas counties. The newly acquired ranch was located along the Mountain Branch of the Santa Fe Trail and just north of the yet-to-be-established townsite of Thatcher, Colorado. The company later operated as the Bloom Land & Cattle Company (BL&CC) until it was sold in 1944. Although the total number of acres owned by the BL&CC is unknown, it is certain that the company claimed range rights to thousands of acres of unpatented and public domain lands near their land holdings. The unauthorized use of public domain was a common practice by livestock companies, as they considered possession to be nine-tenths of the law, a justification referred to as "range rights" (Patterson and Poole 2000).

The cattle industry arrived late to the mountains. The area was not an open grazing expanse like the Plains and, as a result, smaller ranching operations settled in the region. Like their larger counterparts, these ranching operations also viewed use of the public domain as part of their range rights. Cattle grazed great distances beyond county boundaries. It is not certain when the first cattle began arriving in the valley but it is known that by 1870, the valley ranges were heavily populated with cattle. As stated above, Hartsel was among the first to bring cattle into the South Park region, along with cattle pioneer William Stout, who also brought cattle to that area. The Eddy Brothers also brought cattle into the park, trailing them from New Mexico. Ira Mulock (IM) and sons established the IM Ranch on Badger Creek. The peak years for cattle in the area were the 1880s. Large cattle herds were trailed up the Arkansas River Valley and into South Park using the Currant Creek Pass northwest of Cañon City. Additional trails also linked Parkdale, Texas Creek, and Cotopaxi along the Arkansas River and to the north to South Park and Custer County to the south. Cotopaxi was a haven for cattle rustlers moving cattle along trails through the area (Simmons 1990).

The Arkansas River Valley was hit with hard winters during the early 1900s, significantly thinning herds in the region. This setback was followed by the loss of free grazing lands through the establishment of the San Isabel Forest Reserve in 1902 (77,980 acres), followed by the 1905 creation of the Leadville Forest Reserve (1,129,947 acres), the Wet Mountain Reserve (239,251 acres), and a portion of the Cochetopa Reserve (1,333,300 acres) (Athearn 1985). Once-free open graze lands, as forest reserves, use of the land required grazing fees. Moreover, other accessible grazing lands were being taken up as mining claims. By the 1910s, rangelands had dwindled even further as homesteaders began to acquire 160-acre homesteads. One saving grace for ranchers was that those who acquired lands were allowed to increase their holdings up to an additional 320 acres after the passing of the 1909 Enlarged Homestead Act, and later increase them by 640 acres with the passing of the 1916 Stock-Raising Homestead Act. With the acquisition of lands, miles of fencing were built in an effort to control cattle. Cattle markets began to peak again by the mid-1910s, once the United States had entered into World War I. To feed the military, the government was encouraging as much cattle production as possible. As a result, prices reached a premium and the industry briefly boomed again; however, after the signing of the Armistice, cattle markets would drop once more (Everett and Hutchinson 1963).

The establishment of forest reserves brought about rangeland deterioration on other public lands not under the forest jurisdiction. Overgrazing left lands susceptible to erosion that was even further exacerbated by the Dust Bowl between 1934 and 1940. Damage to the land, coupled with continued conflicts between cattle ranchers and sheepherders, jurisdictional disputes, and other issues, brought about the end of free access to the rangelands through the passing of the Taylor Grazing Act in 1934. The focus of the act was to halt the continued abuses to public lands, create a mechanism for structured use, and provide much-needed improvements and developments, which would help stabilize the livestock industry that was so reliant on the use of public lands for grazing.

Sheep Ranching

Sheep predate cattle in southern Colorado, first associated with early Hispanic settlers of the region. Sheep were introduced to America as early as 1492, when the country was held by Spain. Sheep thrived in New Mexico, and were later introduced to the Navajos and Pueblo people, for whom they became a mainstay after the Pueblo Revolt in 1680. Following the Mexican War of 1848, Hispanic herders were grazing sheep in the Purgatoire River region and into the San Luis Valley. Later, by the mid-1800s, sheep were herded to California by Anglo traders, such as Kit Carson and Dick Wootton. The importance of sheep increased substantially in 1859 with the Pike's Peak Gold Rush, as many miners were replenishing their supplies at Hispanic settlements. Seeing the profitability of supplying sheep, New Mexican herders brought tens of thousands of sheep to Denver to meet the demand for wool and mutton. The continued demand prompted several pioneer sheep ranchers of Euro-American descent to establish ranches in southern Colorado during the 1860s and 1870s. Sheep raising continued to increase in Colorado, with the Raton Basin counties of Las Animas and Huerfano becoming primary centers of the sheep industry, along with El Paso County. The sheep industry, unlike the cattle industry, continued to grow into the latter part of the 1880s. However, as with the cattle industry, the sheep industry began to wane significantly by the turn of the century because of homestead land acquisitions and the loss of free grazing range after the establishment of forest reserves (Carrillo et al. 2012).

With the continued loss of grazing lands, competition between cattle and sheep ranchers soon gave rise to violence in the West. Conflict between the two entities was more than just competition for water and grass; it also included elements of ethnic bigotry between the cowboy, a romanticized symbol of the rugged West, and the perceived Spanish-speaking threats to the cattlemen. The latter was largely unfounded, as the majority of sheep ranchers were Anglo. Anglo cattlemen used intimidation and violence in their attempts to remove sheep from the range, citing that sheep rendered unrepairable damage to grasslands and left behind a scent that cattle could not tolerate (Athearn 1985; Carrillo et al. 2012).

The only Hispanic rancher in the early 1880s who may have operated on an equal footing with large cattle companies like the PCC was Casimero Barela. Casimero Barela was a prominent man in Las Animas County, both as a stock raiser and a political figure. Barela was born in El Embuda, Rio Arriba County, New Mexico, and moved to the San Francisco Valley near Trinidad in 1867. Barela operated a large livestock ranch, and had a merchandise and forwarding business. He was involved in the establishment of the town of Trinidad and the San Luis Valley Railroad. The town of Barela was named for him, and he had his ranch headquarters and a general merchandise store there between about 1881 and 1887. Barela focused on growing sheep for wool, but also appears to have raised some cattle. Barela controlled vast acreages of grazing land, much of it on the public domain. In 1885, the Secretary of the Interior forced Barela and another rancher named Hall to remove illegal fences from 38,000 acres of land (Carter and Mehls 1984). Barela served in the House of Representatives of the Territorial Legislature from 1871 to 1874, and was a delegate from the 12th District to the 9th and 10th General Territorial Assembly in 1872 and 1874. He was a delegate to the Constitutional Convention in 1875 and 1876, served as a State Senator from 1876 to 1893, and was in the State Assembly in 1903. His portrait hangs in the Colorado State Capitol. In addition, Barela was the Assessor for Las Animas County in 1870, County Sheriff in 1874, County Treasurer in 1882, and County Judge in 1883. Barela died in 1920 (Hall 1895; Stone 1918) (*Denver Tribune Republican*, January 5, 1893; Colorado State Business Directories 1875-1888).

Intimidation of the settlers by the large cattle companies may have resulted in some of the early Hispanic settlers, particularly those engaged in subsistence farming or sheep ranching, to sell out. By the middle 1880s, only a small number of Hispanics owned land in the Purgatoire River region, though a number continued to reside in the area and work as laborers. Beginning in the early 1880s, Eugene Rourke began acquiring the lands of his departing neighbors, eventually amassing the largest cattle ranch in the region. Sites 5LA5826, 5LA6533, and 5LA8813 are associated with the Rourke Ranch. The ranch was an important location in the canyon, serving as a stage stop, post office, and store in the 1870s and 1880s.

Hispanic people in the area formed a small community that centered around the holdings of Damacio Lopez, where a store, post office, and Catholic Church were located. The community originated in the early 1870s and lasted until about 1902. With the collapse of the Hispanic community, the region became almost exclusively the domain of large cattle ranches, particularly those of Eugene Rourke and Thomas Conyers. Hard times and drought in the 1920s and 1930s resulted in even more land acquisition by the Rourke Ranch and the demise of neighboring ranches, including that of Conyers. The Rourke Ranch continued to operate until 1971, when it was sold. Later, the land was acquired as part of the Piñon Canyon Maneuver Site (PCMS) in 1983 and was turned over to the U.S. Department of Agriculture as part of the Comanche National Grasslands in 1992.

Expected Site Types

Prior to 1848, the Colorado Territory was settled by Mexican citizens, mostly in the southern one third of the territory. Sites attributed to this settlement phase will be ranchos (Church et al. 2007). Hispanic interactions with local tribes during the early period sometimes resulted in material culture that was similar to that of Native Americans, as a consequence of similar subsistence practices and technologies. This can make some early period sites of Hispanic and Native American groups extremely difficult to separate. Other site types associated with early agriculture may also include temporary range camps, the result of herders following grazing stock across the landscape. These will likely be ephemeral because of the transitory nature of herding.

In 1848, U.S. land legislation replaced that of Mexico and removed previous trespassing laws. Concentrated interest in settlement of the Plains of eastern Colorado did not occur until the Gold Rush of 1858, which brought with it an estimated 100,000 gold seekers. Those that did not find riches acquired lands and began to cultivate crops and raise livestock to feed a hungry new population. By 1862, the opening of public domain for homesteading through the GLO brought with it a stream of successful farms and ranches, but also resulted in as many failed attempts. Because of the ease of acquiring lands and a small capital investment, a plethora of individuals sought to survive and capitalize on farming and ranching. For these reasons rural agrarian and ranching sites will represent the vast majority of historical period sites identified in the RGFO area. It should be noted that in the process of these agricultural endeavors, individuals exploited resources well beyond the bounds of land to which they held formal title. This pattern also resulted in trespass usage of surrounding public lands. Ranching enterprises, with their wide use of public lands for grazing, were typical trespassers. There were also trespasses attributed to individuals or families squatting on land either for the short- or long-term. These trespass activities result in sites ranging from simple range camps and wood procurement sites, to structures and facilities representing households, sub-headquarters, or cow camps. Range camps will consist of small to moderate-sized artifact scatters made up primarily of food-related items, spring development, and, possibly, arborglyphs. In some instances, rudimentary corrals or holding pens are found in association with these camps. Wood procurement sites were typically focused on firewood or fencepost collection and likely have remains similar to range/line camps, with the notable addition of a high density of cut trees in the near vicinity indicative of wood harvesting. A good example of these site types can be found within the PCMS, where several small, localized artifact scatters were identified across the landscape. The scatters were found within the pinyon and juniper forests and in associated with heavily harvested trees. The majority of the trees were harvested by removing only the upper portion so that the tree was not killed. Historical research found that the sites were locations of short forays by the Bloom Cattle Company to harvest firewood for the winter and posts to build fences (Pfertsh in Mueller et al. 2012).

Headquarters/home bases of ranch-related sites will range from individual buildings or structures to complexes or farmsteads. Complexes are expected to be composed of several buildings or foundation remnants of a residential structure or structures; hired-hand bunkhouses, cabins, or dugouts; corrals; outbuildings made up of workshops, smokehouses, and ice houses; barns for hay, livestock housing, and milking; outhouses; cold-storage root cellars; grain- or corn-storage buildings or silos; and equipment or implements indicative of hay raising or cultivation of other livestock feeding crops. The equipment can be either motorized or horse-drawn and used for cutting, bailing, and stacking. Complexes attributed to sheep ranching will be similar, but will likely have function-specific elements, such as dipping tanks and shearing stands. The continual care of livestock required beneficial landscape alteration: irrigation systems originating from a creek or river, fields, pasture, and enclosure fences. Fencing can be rudimentarily constructed of brush, tree branches, or rock or more formally constructed of post and wire or log railing. Domestic water for complexes would have been provided by a well or a developed spring. Water was collected either by hand-drawn system or by a pump (Simmons and Simmons 1999).

There is expected to be some level of overlap between ranching and farming sites as the economic goals of each were intertwined to a certain extent; however, the two also exhibit some differences. Like ranching sites, farming sites will range from individual buildings or structures to a collection of buildings comprising a farmstead or farm complex where cultivation and harvesting activities were based. Such locations will have all the same building types as ranching sites, but will also have a higher number or larger volume of grain-storage facilities or silos and crop-harvesting equipment and implements. Some common types of equipment include plows, motorized or horse-drawn combines, threshers, disks, harrows, and seed drills. Barns are almost certain to be present on farm complexes; these would have supported limited livestock raising for dairy, market sale, or personal consumption.

Sugar beet crops were largely grown on existing, legally acquired farm lands. Sugar beet factories were also built on lands with legal title that remained in private ownership. Sites on public land associated with the sugar beet industry are expected to be found on lands surrounding private fields and likely to be attributed to camps, habitations, and activity areas. As Twitty (2003) points out, sugar beet factories provided the labor for farmers, but farmers were responsible for providing the living accommodations. Some of the accommodations were acceptable, while others were extremely deplorable. With this in mind, it is feasible that laborers took advantage of surrounding public lands to construct their own habitations. Expected site types may consist of temporary camps used by ethnic groups or may include simple dugout structures, tent locations, or rudimentary habitation structures. Other site types may be temporary use areas purposefully set away from company housing for individuals to indulge in vices, religious practice, observances, or to gain a sense of freedom away from the watchful eye of farm overseers. Additionally, disposal areas may also be present on surrounding lands as beet farmers removed household and other activity discards and beet remains to other areas in an attempt keep their lands clean. These could be extensive considering the number of laborers employed at one time.

Data Gaps

Early phases of Spanish and Mexican farms and ranches are underrepresented in the documented archaeological record. As mentioned previously, the lack of these sites may be attributed to technological and material similarities with Native American groups. Early agriculture and pastoral sites associated with the fur-trader forts are also underrepresented. The locations of some of these fort-related sites have been outlined above. Other data gaps also exist for pre-gold rush sites dating after 1848 in the Eastern Colorado Territory. Following the major benchmarks in agriculture history, data from sites attributed to feeding the gold rush are also lacking. The dearth of these types of sites can be partially attributed to the spotty land acquisition records prior to the 1862 Homestead Act. It is significantly easier to put farms and ranches acquired during the post-homestead periods into historical context, because the documentary record is far more complete and obtainable. This is not to say that earlier records cannot be accessed, but it does mean that more care needs to be given to determining a focused period of significance before archival research can be fruitful. The deficiencies in the number of early dating sites is further demonstrated in Church's work (2007:283).

A prevailing data gap is the need for clarification of site types and periods of significance. For instance, representational terminology, such as farm (farm complex), ranch (ranch complex), and homestead are typically used interchangeably for a variety of site types, often resulting in interpretive and database consequences. The remedy for this is a more concise evaluation of activities undertaken, with special attention given to identifying relevant data provided by structure, features, objects, and artifacts. In this manner, discernable differences can be acknowledged between site types (e.g. farms vs. ranches) and functions (e.g. dry farming vs. irrigation, raising cattle vs. raising sheep). In some instances, this may not be possible given functional overlap—some ranches employed a level of agriculture and some farms raised livestock. The term homestead should, however, be reserved for those ventures legally acquired as a 160-acre land acquisition obtained through the GLO. Determining site types can potentially be accomplished by making stronger use of archival sources by completing postfield historical research through the online BLM-GLO land patent data base, microfiche GLO records in BLM public rooms, county courthouse records searches, and even online genealogical research. In this manner, periods of significance, interpreted through on-site cultural materials, can be placed into the proper historical context. Caution should be exercised, as not all land acquisitions are presented on the GLO database for various reasons. A lack of GLO data should not deter researchers from using other archival sources such as courthouse records. Increasingly, counties are making these records available online.

With better-defined site functions and periods of significance, a wealth of potential research possibilities could arise. Focused research is expected to bring about an expanded understanding of how early ranches and farms faired under the growth of large cattle companies and their inundating grazing practices. Better data might also allow for a deeper understanding of the impacts that range restrictions had on small and large cattle and sheep operations following the establishment of forest preserves. Moreover, it could highlight how well these operations survived the transition to centralized and controlled-base operations with far more limited land available for grazing. For those sites that spanned long periods of use and occupation through multiple generations, information might be available to isolate impacts of national trends and historical events, such as the Depression, Dust Bowl, and wars.

Industry

Fur Trade

Shortly after the 1803 Louisiana Purchase, the United States increased to twice its size and became Spain's neighbor. Little was known about the newly acquired country that in 1804 the government sent an expedition headed by Meriwether Lewis and William Clark to explore it. The Lewis and Clark expedition was followed by a second expedition in 1806 into the central Rocky Mountains led by Lieutenant Zebulon M. Pike. Pike and his men were later arrested for trespassing on Spanish soil; this intrusion marked the beginning of American encroachments onto Spanish-controlled soil (Athearn 1985). By the mid-1810s, following the end of the War of 1812, trapping expeditions entered the central Rocky Mountains in search of beaver and other furs. The incoming trappers pioneered the Trappers (Taos) Trail through the San Luis Valley and over Sangre de Cristo Pass (see the Transportation section). Others traversed along the Old Cherokee Trail or a continuance of the Taos Trail north along the Front Range (Carrillo et al. 2011). From the east, the Taos Trail left the Huerfano River near the current town of Badito and continued along South Oak Creek. The trail brought about continued intrusions into Spanish territory, and eventually led to the construction of a small Spanish fort in 1819 to guard against trespassers using the Taos Trail through Sangre de Cristo Pass (Athearn 1985). The fort was located by Leroy Hafen sometime in the 1930s and has been assigned site number 5HF306. The fort was built of native stone on a small plateau where the trail left Oak Creek. When the fort was relocated, it was found to have partial walls remaining and was heavily overgrown by oak brush (Athearn 1985; Beckner 1975).

The encroachments onto Spanish lands would continue until Spain's rule ended after being overthrown by Mexican revolutionaries. In early 1822, New Spain was independent and became the Republic of Mexico. Following independence, lands were opened for trade. Between the 1820s and 1830s, the beaver-pelt trade boomed, feeding lucrative hat markets in the eastern United States and in Europe. The growing fur market resulted in several trapping expeditions entering into various parts of the Colorado Territory and moving onto the Front Range to exploit the Arkansas, Purgatoire, and Huerfano rivers. By 1830, trapping forays extended north into South Park and along the South Platte. Trappers continued to exploit South Park and the Arkansas River Valley well into the 1830s. By 1833, the price of beaver felt fell to nearly half of what it had been, as beaver hats went out of style and were replaced by silk hats. The toppling of the fur trade resulted in a shift from trapping to a trade economy, whereby increased trade with Native American groups fed a thriving buffalo robe market. The first to establish themselves in the trade markets along the Arkansas River were John Gantt and Jefferson Blackwell. Gantt and Blackwell were well-established trappers in the northern part of the Colorado Territory and later in the Arkansas River Valley. The partners built a small trading post in the winter of 1831–1832 near the confluence of the Arkansas and Purgatoire Rivers to trade with local tribes. They continued to use the location for trade until the spring of 1834 when they built a more substantial facility, calling it Fort Cass. The fort was built of adobe and located on the northern bank of the Arkansas River 6 mi. downstream of the river's junction with Fountaine Qui Bouille (Fountain Creek) (Weber 1971). Business at the fort was later abandoned because of increased competition with Bents Fort built downstream in late 1832 to early 1833.

The Bent brothers (Charles, George, and William) and Ceran St. Vrain dominated among the new wave of western traders. The Bents and St. Vrain entered into a partnership after William and Charles arrived in Santa Fe in 1829 (Lecompte 1978). Initially, the partnership centered on transporting and marketing goods for the Santa Fe trade. By 1832, Bent, St. Vrain & Company (Bent/St. Vrain) began trading with Native American tribes along the Arkansas River. To facilitate their new venture and to tap into the increasing traffic along the Santa Fe Trail, the company constructed a fort 12 mi. upstream of the Purgatoire River. Construction of Bent's Fort, as it would come to be known (recorded as site 5BN548), began in 1833. The construction further expanded the company's trade domain in the Arkansas Valley, and later led to the establishment of other posts on the South Platte River (Carrillo et al. 2011). In the summer of 1837, Bent/St. Vrain built Fort St. Vrain (site 5WL814) on the South Platte River, approximately 6 mi. south of the Cache la Poudre River. The Cache la Poudre was a significant trapping stream, as it was a commonly used route into the mountains, North Park, and southern Wyoming (Butler 2012). Fort St. Vrain was the northernmost fort on the South Platte River and was in competition with three other forts within 20 mi. to the south ("New" Fort Vasquez, Jackson, and Lupton/Lancaster) (Lecompte 1978). The competition proved to be inconsequential, because, by 1842, Fort Vasquez (site 5WL568) was abandoned, Fort Lupton/Lancaster (site 5WL849) was near its end shortly thereafter, and Fort Jackson (site 5WL816) was purchased by William Bent (Lecompte 1978; Noel et al. 1994).

By 1842, Bent's Fort was the most important fixture on the Santa Fe Trail, in part because it was near an easily fordable crossing of the Arkansas River. After Charles' death in 1847, William Bent attempted to sell the fort to the military, but his offer was rejected. It is rumored that in 1849, William destroyed the fort either by setting a fire or blowing it up using black powder (Beckner 1975; Carrillo et al. 2011). It was not long before William built Bents New Fort farther downstream from the original in 1852–1853. Bents New Fort (site 5BN394) was constructed of masonry, and was built at the popular rendezvous site of Big Timber on the Arkansas River. Following the signing of treaties with Native American Tribes, Bent received the government contract to freight and distribute annuity goods from the fort. Several of the treaties were broken by the government, leading to the relinquishment of annuities and a cessation of trade with the tribes. By 1857, Bent determined the fort to be a loss, and offered to lease it to the government. The lease would be beneficial, because the military post of Fort Wise/Lyons was nearby. The government did not pay Bent rent for two years, and it was not until 1864 that an agreement was reached to buy the fort. However, before the fort could be purchased, water flooded Fort Lyons, making the use of Bents New Fort unnecessary. As a result of the damage, Fort Lyon was relocated about 23 mi. upstream near present day Las Animas (Beckner 1975).

During the initial construction of the original Bents Fort, Maurice Le Duc and William LeBlanc, at the request of the Bent brothers, constructed a fort along Hardscrabble Creek, where the town of Wetmore is now located (Athearn 1985). The fort (documented as sites 5CR11 and 5FN860) was established in the early 1830s to take advantage of Hardscrabble Trail, which was expected to become a primary trade route through the Sangre de Cristo Mountains. The fort was of simple construction using vertical logs in an octagon shape (Beckner 1975). It was known by many names, including the "Crow's Nest", "Buzzard's Roost", or "El Cuervo," but because it was run by Maurice Le Duc, it would generally be referred to as Fort Le Duc or even Fort Ledoux (Athearn 1985; Lecompte 1978). Le Duc was a logical choice to oversee the fort, because he spoke several languages, including different Native American dialects. He also lived at the fort with his Ute wife, a benefit when it came to trading with the tribe. Early on, it was clear that the fort would not be successful, mostly because Le Duc would take long absences to trap and hunt. In addition, the Hardscrabble Trail failed to become a primary trade route, further reducing the fort's success. The fort was abandoned by the early 1840s, when it burned. According to Le Duc, the fort was burned during a Native

American raid; however, inhabitants of a small village adjacent to the fort stated that it was burned by Le Duc's wife, after she learned of his adulterous antics in Taos (Beckner 1975).

Contemporaneous with the original Bents Fort was a small competing fort and settlement, built in 1839 and located 5 mi. upstream. The fort was originally named Fort Independence, but was referred to as "Fort Leche" or "Milk Fort" because of the large number of goats that provided milk to its inhabitants. The inhabitants of the fort subsisted on limited trade, hunting, and growing small corn crops. Because the fort grew crops, raised livestock, boasted a small population, and did not solely rely on trading, it is considered by some historians to be the first settlement on the Arkansas. Fort Leche only survived until 1840 or 1841, and likely succumbed to the trade competition from Bents Fort.

Another attempt at settlement in the Arkansas Valley was made three years later with the construction of Fort El Pueblo in 1842 (Lecompte 1978). El Pueblo (recorded as sites 5PE303 and 5PE1127) was constructed about 60 mi. to the west of Bents Fort and upstream from the junction of Fountain Creek and the Arkansas River. The fort was heavily used for defense in 1846 and 1847 during the Mexican War (Beckner 1975). Although its population fell dramatically by 1848, it continued to be used for trade after Bents Fort was abandoned. The final blow to El Pueblo came in 1854, when all of the fort's remaining inhabitants were murdered by Native Americans on Christmas day 1854 (Lecompte 1978).

Expected Site Types

Sites associated with the fur trade are expected to be scarce because of the transitory nature of the industry and the low quantities of necessary equipment and material goods. It is expected that there is a greater possibility to discover fur trading sites at gathering areas, such as rendezvous sites, or at areas around known trading posts. Likely materials associated with fur trade-era sites will have similarities to Native American sites of the same period, especially considering that trading was occurring with regularity between the two groups. Expected items include beads and metal items, such as knives, arrow points, traps and trapping equipment, and tomahawks and axes. Firearm technology between traders and tribes will appear largely parallel, although tribal members often acquired the more outdated version of the technology first. Early firearm-related artifacts will consist of flintlocks and percussion caps. In addition, trapper's trails are known to have traversed through areas of the Front Range and are further discussed in the Transportation section of this document. By locating physical remains of these trails, fur trade-era sites might be found.

Data Gaps

Because of the overall lack of fur-trade-era sites, several data gaps are present. It is expected that the best data to address this early period can be sought through additional work on Colorado's trading posts. Additional data gaps include a lack of documented representative camps or other associated sites.

Mining and Mineral Processing

Mining

The feverish search for gold and silver in Colorado is the subject of a legendary tale, beginning with the 1858 Pikes Peak Gold Rush and lasting well after the formation of the Colorado Territory in 1861. During the gold rush period, the territory would be inundated with a welling population of over 100,000. The search for riches would continue onward, with up and downs, throughout the nineteenth century and into the twentieth century. The RGFO study area encompasses some of the richest mining districts in the state, and has also been the center of various types of mining. Though information presented in this section has been gleaned from several sources, the section draws heavily from works by Fell and Twitty (2006); Twitty (2004, 2007); and Athearn (1985).

Precious Metal Mining

Central City and Black Hawk

Like the other mining districts, the history of Central City and Black Hawk began in the wake of the 1858 gold rush. After the placer gold began to play out on Cherry Creek, John H. Gregory set out to explore the waterways of the mountains by gold panning from the Cache La Poudre southward toward Pikes Peak. Beginning along Clear Creek, known then as the Vasquez Fork of the South Platte River, Gregory progressed upstream, following whichever tributary of the creek showed the most promise for gold. Using his experience, he began traversing along North Clear Creek and eventually found a good showing of gold in a side ravine of the creek. Before Gregory could thoroughly examine the area, heavy winter snow forced him out, but he returned in the spring of 1859. Upon his return, he found a wealth of free gold eroding from rich ore lodes in the gulch. Finding the source of the free gold, Gregory filed two claims in the gulch, which would later be named Gregory Gulch. With his claims staked, Gregory spread the news of the strike, and a major gold rush to the area ensued, fostering the establishment of three camps: Mountain City, Central City, and Black Hawk. The early workings in the area consisted of placer mining focusing on the numerous drainages in the region. Like other mining districts, it was not long before the free gold was exhausted and hard rock mining was needed to exploit the remaining gold veins. Early on, hard rock mining could only extract loosely consolidated rock near the surface that could be processed with simple crushing and concentration. In a short time, this too was exhausted, leaving only deeper ores that were harder and could not be extracted or processed economically. The capital necessary to undertake hard rock mining was often beyond the reach of the average miner. Through time and necessity, hard rock mining eventually began to evolve and more effective measures for extracting and processing ore were soon developed (Young 1970). The use of simple ore-crushing arrastras soon gave way to stamp mills, which steadily increased the amount of ore that could be processed. Although the increased amounts of processing also increased profitability, it was quickly determined that the previous gold ore content lessened with depth. By 1863, stamp mill yields dropped dramatically and gold production in the district began to decline drastically. The stamp mill failure contributed to the backlash of stock speculation and collapse during the Civil and Indian wars. The industry's failure to innovate processing methods led to a plummet in the price of gold. Much of the mining in the district suffered significantly and many mills and mines closed as a result (Fell and Twitty 2008).

By the mid-1860s, the forced removal of Native Americans from the Plains, coupled with the end of the Civil War and increased accessibility to the area by travel and shipping routes, resulted in a slow rebuilding of the mining industry in the region. The cessation of hostilities would also allow for the construction of railroads into the mountains of Colorado, which ultimately provided economic stimulus to the mining industry as well. By the late 1860s, mining in Central City and Black Hawk was revived as new innovations in ore extraction and smelter processing were also leading to increased profitability. However, with the depth of the shafts, additional problems began to arise. Deep mines were constantly being flooded by groundwater and required bailing and pumping to remove the water. Flooding began to impact mine production in the district to such an extent that by the early 1890s a solution was sought through the construction of a drainage tunnel. The Argo, or Newhouse, Tunnel (recorded under site numbers 5CC76 and 5GL133) was dug from the south at Idaho Springs, extending northward and intersecting nearly all major mines on its way toward Central City. In addition to drainage, the tunnel would also be used as a causeway to inexpensively transport ore to mills in Idaho Springs. The 4.16-mi.-long tunnel was completed in 1907; however, the tunnel did not prove to be a final solution, nor was it the stimulus to mining that it set out to be. As a result, many of the flooded mines never reopened (Sims et al. 1963).

Even with new mining technologies and processing, mining in the Clear Creek/Black Hawk district decreased rapidly between 1900 and 1920 as a result of exhaustion of principal ore bodies. With the loss of profitable ore supplies, mine closures followed and several large mines closed. By the late 1900s, mining activity virtually came to a halt, with the lull in mining continuing through the 1910s, WWI, and into the 1920s as the Great Depression hit and created even more hardships for the industry. A much needed revival in the industry came in 1933 when the Gold Reserves Act was enacted. Among other things, the Act devalued the dollar to spark inflation while simultaneously increasing gold prices. The devaluation had the desired effect; revitalization in the mining industry occurred throughout the 1930s and into the early 1940s, but was later interrupted by the advent of WWII. During the war, the U.S. Government passed L-208, which decreed that precious mineral mining was nonessential to the war effort. This effectively led to a massive shut down of the industry. Following the war, mining in the district never again approached the levels of the previous mining eras (Twitty 2007).

Boulder

The history of the Boulder Mining District began in 1850 with the California Gold Rush, when a collective group of Georgians and Cherokees, en route to California discovered placer gold near present-day Golden. The discovery was not comparable to the draw of the gold in California, and the group continued on west. Finding limited success, the Cherokees returned to Georgia. Learning of the gold discoveries in Colorado, three parties of prospectors led separately by William Green Russell, John Beck, and John Easter made their way into the Colorado Territory in 1858. The two former parties traveled west along the Arkansas River, joining forces on the trek, and began to pan for gold at the confluence of Cherry Creek and the South Platte River. Here, they found only moderate success, prompting Easter to leave the Pikes Peak area and journey farther north to the confluence. At this same time, economic depressions east of Colorado Territory gave rise to the 1858 Pikes Peak Gold Rush. The Pikes Peak gold rush caused the first large-scale immigration into Colorado by non-native settlers, and by 1859 several settlements were established in the territory. One such settlement was established at present-day Denver (originally named Auraria) and served as a jumping-off point for the influx of gold seekers. From here, prospectors began to fan out to other areas of the Front Range in search of gold. The first mineral explorations near Boulder were undertaken during the initial rush beginning on Boulder Creek. Gold deposits in the canyon were found only in small amounts, prompting prospectors to branch out to other stream beds and drainages and to begin penetrating deeper into the mountains. Economically viable strikes were soon discovered, and word spread to the overpopulated placer diggings at Auraria. By the summer of 1859, prospectors flooded into the region to exploit every conceivable drainage in the area, extending westward to Gold Hill and well beyond. To manage the rapid growth of the mining in the region, the Boulder Mining District was formed in July 1859 (Twitty 2007).

Initially, mining in Boulder County was done by placer mining of gravel deposits along drainages in the hope of finding gold. Because the required investment was relatively low, placer mining was practiced by many. While the majority of the prospectors inundating the region were inexperienced and had only a passing familiarity with mining principals, there were several among the population who were knowledgeable with regard to placer deposits and how they originated from hard rock gold veins. Applying this knowledge, several gold veins were discovered in the newly formed mining district. Because the veins could be traced from the ground surface, gold was easily extracted in quantities that were highly profitable. Prospecting began to focus on geological structure and locating the source of mineralization. Prospect pits were frequently used by miners to reach bedrock in areas that appeared to have promise for mineralization of precious metals, and as a way of tracing a vein. Early on, ore from the veins was easily extracted, fragmented, and separated with a simple sluice. Larger sized ore deposits could be processed by using an animal-powered arrastra, whereby large muller stones rotated over stone floors to crush ores. Once the ore was ground down, the gold was collected using a process of amalgamation with mercury. With economical ways to extract and process ore, hard rock mining was born; it quickly spread throughout the county as prospecting and mining continued at a frantic pace. Between 1859 and 1864, prospectors organized nine principal mining districts in Boulder County (Table 10). During this period, the population of the county grew rapidly until mining encountered a decline in the early 1860s. The decline is attributed to several factors, including the relatively rapid exhaustion of placer deposits, limitations to hard rock mining, and concerns over the Civil War. The mining decline continued into the mid-1860s, and by 1868 the first gold rush in Boulder County was effectively over (Twitty 2007).

Table 10. Boulder County Principal Mining Districts.

Mining District Name	Date Organized
Boulder	July 1859
Bald Mountain	June 1864
Central	September 1861
Gold Hill	March 1859
Gold Lake	February 1861
Grand Island	March 1861
Snowy Range	June 1861
Sugarloaf	November 1860
Ward	September 1860

Boulder County's mining industry began to recover during the late 1860s to early 1870s, as the end of the Civil War created a greater flow of capital. Transportation had become more fluid in the Colorado Territory because wagon routes were more reliable following the removal of Native Americans from the Plains of eastern Colorado. The Transcontinental Railroad was completed by 1869 and would become the main shipping artery for several off-shoot railroads that accessed various mining camps and settlements in the Colorado Territory. New smelters were constructed in Denver and Golden, ushering in a decrease of fees and making it cost effective to ship ore for processing. The development of new mining technologies that allowed for more lucrative ore production brought about a renewed focus on hard rock mining. Technologies such as stamp mills and smelters were capable of recovering gold in ores that couldn't have been processed by other methods (Twitty 2007). Silver was also actively being mined and smelted economically and this created a boom, most notably at Caribou.

Then, in 1872, tellurium, a rich mix of both gold and silver, was discovered at Gold Hill (Abele 1989). By the mid-1870s a hard rock mining boom was active in the mining districts and continued with high productions into the early 1890s, although some of the mining districts in the county experienced low production during the mid-1880s. The boom would eventually collapse with the 1893 Silver Crash. Many in the Colorado mining industry who relied on silver for their livelihood were devastated when the price fell dramatically. The depression from the falling prices lasted into the late 1890s, followed by a revival by 1897. The rebound of the resource extraction industry was driven by a stable economy, renewed interest in gold as a stable investment, a willingness of investors to participate in the industry, an increase in technologies that cut production costs, and the districts' new-found optimism. By 1905, many of Boulder County's major ore producers had exhausted their principal ore bodies. With the profitable ore supplies gone, a wave of mine closures followed, and several large production mines closed. In the latter part of the 1900s, most mining activity came to a halt. Once-large production mines were forced to lay idle because of low yields.

The mining bust continued through WWI and into the 1920s as the Great Depression hit and created even more hardships for the industry. In 1933, President Roosevelt launched a plan to revive the mining industry through the signing of the Gold Reserves Act, a piece of legislature that allowed the government to control the cost of gold. The value of gold was increased in association with the act and the industry was revitalized for a time. Mining remained strong through the 1930s and into the early 1940s, but when the U.S. became involved in WWII, the industry was derailed once again. As part of the war-time effort, the War Production Board passed L-208, which called for the suspension of precious-metals mining, in order that mining endeavors focus their attention on mining metals necessary for the war effort. The passing of L-208 effectively ended mining in Boulder County, as gold and silver exploration and production never again approached the levels of the previous mining eras (Twitty 2007).

Tungsten was also a focus of mining activity in Boulder County. Tungsten was discovered in the Grand Island and Sugar Loaf Districts as early as the 1870s; however, at that time the metal held no economic value. Prospectors encountering the metal had various names for it—black iron, barren silver, and magnetite. The tungsten mining industry began to take shape in the county in the early 1900s, when the metal became economically viable via the production of alloys; mining activity was noticeable by 1903 and the associated industry experienced a small boom by 1905. The outbreak of WWI would further fuel the tungsten boom as the need for steel and steel-alloy goods skyrocketed. By 1918, the war had ended and cheaper supplies of tungsten were newly found in China, effectively ending the boom. The low period in tungsten mining continued into the 1920s. The Gold Reserve Act worked to revive the industry somewhat because of the small amounts of gold present in the tungsten. As the United States entered into WWII, tungsten mining would again become a prosperous pursuit as demand soared for the production of arms for the war. The boom ended when the War Production Board accumulated a surplus of tungsten and stopped purchasing it in 1944. The industry underwent a hiatus at this time that lasted for about 10 years; in the early 1950s, the U.S. government resumed the purchase of tungsten, this time in connection with the Cold War and the Korean Conflict. Prices held steady for some time and tungsten mining continued into the mid-1950s (Twitty 2007).

Leadville/Cache Creek

Following the discovery of gold in Colorado in 1858, the search for ore expanded westward into the mountainous regions including the Leadville area. Mining originally focused on placer deposits and resulted in the formation of the California Mining District and the establishment of Oro City, the precursor to Leadville. The search for gold also gave rise to the organization of Lake County in 1861. Given the long and complex history of mining in Leadville, only a brief overview is presented here. Shortly after the initial gold rush to Colorado, two mining expeditions in search of gold, one by A. G. Kelly and one by Slater and Company, reached the Upper Arkansas River in 1859 (Griswold and Griswold 1951). Some gold was found, but because of the late season, the expeditions returned to the Front Range. In the early 1860s, members of the expeditions returned to the region. Kelly's group returned to Kelly's Mining District (also known as Kelly's Bar), south of Granite Creek. Another small group of miners were working along Granite Creek (Cache Creek). Slater and Company went farther north along the Arkansas River with groups panning different gulches on either side of the river. In late April 1860, Abe Lee recovered the first sizeable gold in what would be named California Gulch. Subsequently, the California Mining District was established. Word of the discovery travelled and an inevitable rush to the area occurred. Members of the Cache Creek group, including Samuel B. Kellogg, Horace A. W. Tabor, his wife Augusta Tabor, and their son Maxey, were some of the first to arrive. By the end of 1860, the region was filled with upwards of 10,000 people looking to strike it rich (Griswold and Griswold 1951:4)). To accommodate the growing population, numerous cabins were constructed as well as businesses that included stores (one of which was built by Tabor), gambling houses, and dance halls. This collection of buildings was soon named Oro City (recorded as site 5LK1438). Oro City continued to grow in the early 1860s, with mills being constructed as well as additional cabins, boarding houses, stores, and saloons.

By 1865, the placer deposits had been mostly depleted in California Gulch and a gradual decline in mining activity ensued throughout the late 1860s, including the near abandonment of Oro City. Mining in the late 1860s was limited to prospectors looking for the source of the placer deposits. In 1868, the Printer Boy Lode (recorded as sites 5LK476 and 5LK1220) began to produce significant ores. Oro City was moved 2.5 mi. to the west to be closer to the Printer Boy Lode, near the future location of Leadville. The Printer Boy Lode continued to produce through 1869, but by 1870, the mine was played out and the camp was essentially abandoned (Griswold and Griswold 1951). Mining continued to be limited through the early 1870s until the discovery of lead and silver carbonate ore in 1874. These discoveries prompted more searching, and eventually led to additional findings in 1876 (Horn and Chandler 1997). A second rush to the region occurred in the late 1870s, resulting in the subsequent establishment of Leadville in 1877. Silver mining was at its peak in the late 1870s, as miners sought to make their fortunes. By 1878, the search for silver spread much farther south and into the Wet Mountain Valley area, with the Silver Cliff Mining District becoming a major silver producer (see Hardscrabble/Silver Cliff/Westcliffe History below) (Athearn 1985). The mining frenzy continued until a miners wage strike in May 1880 caused many miners to abandon large production mines, thus slowing production (*Daily Alta California*, May 27, 1880). Contemporaneous with the labor disputes, the D&RG railroad reached Leadville in August 1880, and the DSP&P (later the Denver, Leadville & Gunnison; the C&S; and the Leadville Mineral Belt Railway) arrived shortly thereafter. By the time the railroads arrived, the area's silver boom had begun to decline, because previously mined surface ores were rapidly depleted and shaft mining was necessary to reach deeper deposits.

Before the formation of Lake County, gold was discovered on the upper Arkansas River near the future location of Granite in 1860. From Granite, placer mining began to extend to the west along Cache Creek, resulting in a settlement of Cache Creek. The majority of the mining claims along the creek were being worked by the Gaff Mining Company by 1866. With the extensive placer mining along the creek, it was apparent that the creek's water was insufficient for the size of the operations. To rectify this, the company obtained water rights to and, diverted water from, Lake Creek and Twin Lakes north of Cache Creek. According to the Colorado Division of Water Resources, the first of these ditches was the Cache Creek Ditch that diverted water from Willis (Willet's [sic]) Gulch nearly 2 mi. southwest of Twin Lakes. The water for the ditch was appropriated in November 1861. Water for a second ditch, referred to as the Arlington Ditch (recorded as sites 5CF191 and 5LK349), was appropriated two months later in January 1862. Additional water was appropriated from the Arlington Ditch in 1873 and 1897. Both ditches are still labeled on the topographic map of the area. The increase in water improved the productivity of the placer mining operations and systems of sluices were put into use to process larger amounts of gold-bearing gravels. The profitability continued along the creek and several of the mining claims were consolidated and periodically changed hands through time. Gaff Mining Company sold their placer workings in 1872 to group of investors forming the Cache Creek Mining Company. The company expanded their workings in the area significantly in the 1870s; however, the amount of gold recovered was steadily declining by that time. It was clear that additional water would be required in order to broaden the mining operations, process more gravels, and make the venture more lucrative. In 1881, the mining company built an additional ditch to divert water from Clear Creek, which paralleled Cache Creek to the south. The undertaking would be called the Clear Creek Ditch and would require the engineering of a flume, tunnel, and ditch to transport water to placer workings on Cache Creek. According to ditch records examined on the Colorado Division of Water Resources online water rights database, the water for the ditch was appropriated in October 1882. The ditch was completed the same year. The following describes the location of the ditch:

> A dam diverted water from Clear Creek into a flume at the mining town of Vicksburg, and the flume paralleled the creek's south side. The flume crossed to the creek's north side, and as the canyon descended east, the flume gently contoured along the canyon's north wall. Almost due south from Cache Creek's head, the flume abruptly turned north and entered a 1,700 foot-long tunnel that miners bored through an intervening ridge. Water pouring out of the tunnel's north portal entered two ditches, one of which traversed above Cache Creek's south side while the other wrapped around the drainage's head to the north side. In the Clear Creek drainage,

the flume was 40 inches wide and 50 inches deep, and the system carried 4.34 cubic-feet of water per second (Twitty 2005:9).

Following the construction of the Clear Creek Ditch, the Cache Creek Mining Company sold to the Twin Lakes Consolidated Placer Mining Company. A second company, the Twin Lakes Hydraulic Gold Mining Syndicate, was formed after the purchase and leased the mining operation from the Twin Lakes Consolidated Placer Mining Company (Twitty 2005). Major improvements and additions were made to the hydraulic water system beginning in 1884 (Southworth 1997). The system utilized existing ditches and flumes and employed the use of boom ditches to release a surge of water to process large volumes of gold-bearing gravels. The company continued profitably into the late 1880s and also added hydraulic mining to their operation. The hydraulic method included the installation of high-pressure water nozzles fed by pipelines and penstocks. The new washing equipment required additional water, thus necessitating the enlargement of the Clear Creek Ditch. Even with the advancements, the company was nearly bankrupt by 1890, and its mining operations were idle through 1891. Still, seeing the profitability of the operations, the Twin Lakes Hydraulic Gold Mining Syndicate purchased the mining holdings from their parent company (Twin Lakes Consolidated Placer Company) and the name was changed to Twin Lakes Placer, Ltd. Twin Lakes Placer, Ltd. continued intensive placer mining in the area of Cache Creek and expanded its landholding to the west near Lost Canyon. The company built the Arlington Ditch, which was functional by 1897, and the company was washing sediments at full capacity by the turn of the century. Washing profits continued into the 1910s. By 1911, however, the company was being taken to task over heavy sediment discharges reaching the Arkansas River. For decades the discharges entered the river unchecked and towns downstream, such as Salida, Cañon City, and Pueblo, were dealing with the effects. It was at this time that the latter two cities sued for an injunction against the Twin Lakes company. The courts upheld the injunction and the Twin Lakes Placer, Ltd. was forced to stop work in 1912. The gold deposits were never fully exhausted at Cache Creek and interests in recreational mining of the area still exist today (Twitty 2005).

Mining continued profitably in the Leadville area until the late 1880s, when the price of silver fell, only to have the market fully crash in 1893. The crash of 1893 resulted in the closure of numerous mines. Following the silver crash, gold mining saw a resurgence in area mines and gold production increased. The rebound would not last for long, as miners went on strike again in June 1896. Mine owners not willing to concede brought in replacement workers, and the strike became violent, causing the Colorado State Militia to be brought in to keep order. The strike was settled in March 1897, but because maintenance work was suspended, many of the mines filled with water and some were never reopened. An effort to dewater the mines continued over the next several years, and gold mining continued profitably, reaching a peak in 1900.

By 1903, mining attention shifted to the production of zinc, which quickly became the largest product of the mines in the area at that time. Zinc prices fell between 1907 and 1908, but peaked again in the 1910s during WWI. Zinc mining was replaced by molybdenum mining northeast of Leadville. Molybdenum was first discovered in 1879, but at the time, there was no commercial use for the mineral and it remained untouched until the beginning of WWI. With the U.S. entrance into the war, molybdenum was sought as an alloy to strengthen steel for the war effort. Commercial mining of the mineral began at the Climax Mine (site 5LK909) near Leadville as prices spiked during the war. The mine was originally located on Bartlett Mountain by Charles Senter, and much of the mineral exploration occurred on Ceresco Ridge and followed a fault at Fremont Pass. By 1917, claims were staked all over the area. Mining of this mineral continued sporadically into the early 1930s. The low ore production from the mine led to the eventual abandonment of the C&S's Leadville Mineral Belt Railway in 1937, and parts of the D&RG starting in 1941. The latter was completely abandoned by 1944. Mining at the Climax Mine would continue into the 1980s, with thousands working at the mine (Simmons 1990). The mine's production ceased in 1987, but it has been reopened recently under limited production (*Summit Daily*, August 8, 2012). Reprocessing of precious metals mine dump ores occurred during WWII and mining east of Leadville continued on a minor scale into the 1960s (Horn and Chandler 1997).

Hardscrabble/Silver Cliff/Westcliffe/Querida

Because of the potential for profit, early mining in the state centered primarily on gold. Silver was discovered in the process of mining for gold, but was largely found to be an annoyance as it clogged sluices. At the time, the technology for extracting silver and lead was absent and the metal was ignored and discarded. In the late 1860s, silver-lead smelting was in use; however, much of the silver was lost unless the ores were exceptionally rich. It was not until the early 1870s that blast furnaces fueled by charcoal or coke were employed to recover larger amounts of the silver (Fell and Twitty 2008). The technological shift brought about an increase in silver mining. Silver was discovered near the Wet Mountain Valley during the later 1860s and early 1870s by cattle ranchers living in the area. The finds were eventually pursued by prospectors who substantiated the presence of rich ore veins and formed the Hardscrabble Mining District between 1871 and 1872. A year later, word of the discoveries spread and resulted in a major rush to the area around Rosita Springs on the eastern edge of the valley. A town quickly grew up at the spring, and in the next year the area was swarming with fortune seekers. It was not long before the sheer number of prospectors resulted in claim speculation in the areas surrounding Rosita Springs. By 1875, the silver boom in Rosita Springs was at an end, and prospectors began to look several miles north on Robinson Plateau, the base of Mount Tyndall, and other areas to the west of the mountain for their next discoveries. The new areas did not disappoint, and within a short span of time, prospectors began to discover several rich ore bodies. Among these was the Bassick Mine (site 5CR59), developed by Edmund Bassick in 1877 on the southern flank of Mount Tyndall. Unlike the other strikes in the area, Bassick had discovered a rich body of gold ore just three feet below the ground surface. At first, the strike was not taken seriously by the other miners in the area; it was not until Bassick began to remove an estimated 64,000 dollars per month from the mine that the local residents took notice. The discovery would create another massive boom in the area, resulting in the organization of the Querida Mining District and the establishment of the settlement of Bassickville/Bassick City (site 5CR9), which would later be named Querida (Twitty 2004).

As Bassick's Mine continued to produce staggering amounts of gold, prospectors combed the region looking for the next big strike. The next big strike would come quite by accident and would catch the attention of all of the mining industry in Colorado. The discovery was made by R.S. Edwards as he traveled between Bassickville and Ula on the western end of the Wet Mountain Valley. Here, Edwards stopped to examine a larger vertical, volcanic cliff-face on the southeastern portion of the valley. By taking assay samples, Edwards later learned that the cliff had a low silver content. Not seeing the immediate value in the cliff, Edwards moved on to other ventures for the next year until other options ran thin. Edwards returned to the cliff with his partner Robert Powell and began removing more ore samples. This time, the assayed samples revealed that the ore was rich in silver. Trying to keep the discovery under wraps, the partners began to work the area to find the ore body. They continued to submit samples for assay, which eventually gave the find away and a rush ensued in 1878. Fortunately for them, Edwards and Powell were able to stake their claim over the primary ore body before the rush began. By the summer of 1878, a massive rush was underway, and gave birth to the town of Silver Cliff (Twitty 2004). Owing to the silver boom, the population of the Wet Mountain Valley increased substantially nearly overnight. The increased population and production of silver ore prompted the D&RG to extend its line from Cañon City into the valley via Grape Creek. The line was to follow the rugged canyon along the creek, exiting where the DeWeese Dam is currently located. The railroad was completed by 1881, but its destination was not Silver Cliff. Instead, the station stop was placed 1 mi. west of the boom town. The newly established stop eventually became the town of Westcliffe.

The silver boom was short-lived, and began to wane dramatically by the early part of the 1880s following the closing of area mines and mills (Athearn 1985). The failure of the area mills to process the ore, and the destruction of the newly built railroad route via flash flooding, further reduced the profitability of the area's silver mines. Regardless of the challenges, the Querida District persisted until it was hit again with a series of mine closures in 1884, mostly among small-producing mines. If not for a limited number of principal mines, the district would have suffered a complete collapse. Mining continued into 1885, when the Bassick Mine, the primary economic contributor to the district, went bankrupt and closed. After a period of depression, it would begin to see a slow revitalization in mining by the late 1880s, as a number of mines were put back into production (Twitty 2004). The mounting loss of mining revenue and the constant track washouts in Grape Creek Canyon led to the abandonment of the D&RG line in 1889 (Ormes 1980). Even with the transportation woes, the district continued to show promise as it slowly began to recover in the early 1890s, only to be hard hit by the 1893 Silver Panic. The devaluing of silver spelled economic disaster for the district through most of the 1890s, but silver rebounded late in the 1890s and early 1900s. The rebound was fueled by a national economy that was stabilizing, mine owners who were willing to reinvest in their properties, technologies that allowed for lower cost production, and the improvement of transportation.

The district again underwent a collapse following the 1907 national economic recession. Only a smattering of work continued in the district into the 1910s until the onset of WWI brought about higher silver prices and breathed new life into the district. The end of the war resulted in a decrease in silver prices, sending the district into yet another low that would last into the 1920s as the post-war depression continued.

The Hardscrabble, Silver Cliff, and Westcliffe mining districts would remain idle through the Great Depression and into the 1930s, and would see a return of limited interest after the passing of the Gold Reserve and Silver Purchase acts in 1934. The acts were devised to revive the mining industry by removing the dollar from the gold standard and buying gold at inflated prices. Much of the mining activity in the district focused on restricted mining and the reprocessing of old ore piles. By the 1940s, the region would again be hard hit during WWII with the War Production Board's passing of L-208, which called for the suspension of gold mining and a focus on metals necessary for the war effort. Upon entering the war, the price for industrial metals and silver increased dramatically, forcing the government to place a price cap on them. The increase in silver prices brought individuals back to the mining districts to reopen and work previously closed mines. Following the war, price caps were removed, thereby fostering increased silver prices. The recovery was brief, because of exhausted ore bodies district-wide, expensive production, and a lessening of mining as a viable industry. By the late 1940s, only two mines remained in production, with the Bassick Mine continuing production into the early 1950s. By the mid-1950s, the work in the mine ceased, and only the ore dumps were being reprocessed. All mining activity concluded by 1957 (Twitty 2004).

Cripple Creek

A small wave of placer mining began on the western flanks of Pikes Peak in the late 1870s and early 1880s, but only saw limited production. Later, in the 1890s, significant amounts of gold were discovered below the peak, eventually reviving mining interest in the area of Cripple Creek. The area was rich in gold-bearing ores, with the highest concentrations found in small cavities of volcanic rock. Following the discovery of high-value gold, a rush to the area resulted in the creation of the Cripple Creek Mining District by 1891, the establishment of Fremont, and a year later the town of Cripple Creek. In 1893, the two towns merged into Cripple Creek. Declining silver prices eventually culminated in the 1893 silver crash, and gold mining again became the center of activity when the mining district became fabled, attracting a flood of miners. The new rush led to the founding of Victor and smaller settlements like Anaconda (recorded as site 5TL2080), Gillette, Goldfield (documented as site 5TL71), and Independence (recorded as site 5TL78), which served mines nearby. Gold production soared, making the Cripple Creek District one of the largest gold-producers in the world (Fell and Twitty 2008). The Florence & Cripple Creek Railroad extended lines into the mining district by 1894 and was later followed by the Midland Terminal Railway (site 5TL79) (Hunter 2002). By 1899, one million ounces of gold had been recovered from the district, and by the turn of the century, new mining technologies, such as chlorination and cyanide leaching, made gold extraction far more efficient and less expensive than traditional stamp milling (Fell and Twitty 2008). At its pinnacle, the district's mines were rumored to have created 30 millionaires and employed hundreds of workers.

By the turn of the century, mine production began to slow because the rich ores diminished as the depth of the mining increased. Also with depth came water, which began to flood most of the mine workings. The volume of water was too much to pump out using conventional methods and drainage tunnels had to be built. Even with the drain tunnels, production declined through WWI and into the 1920s. Mining began to pick up again in the early 1930s when the price of gold increased. But, by the 1940s, mining in the district had come to a virtual standstill as the country entered into WWII, resulting in a focus on mining metals for the war effort rather than nonessential metals. After the war, gold prices were low, making it uneconomical for most to continue mining, and the district shut down. Following the shutdown of the last remaining production mill, an effort was made to revive the district in the early 1950s by the construction of a state-of-the-art Carlton Mill (site 5TL338) between Cripple Creek and Victor. Mining increased slightly and the mill processed ore until it was closed in the early 1960s. The district remained inactive until the mid1970s (Hunter 2002).

Coal Mining

The decade between 1880 and 1890 was a time of growth and industrialization for Colorado. Industrialization in the state drove the demand for coal, which was used as fuel in factories, for smelting ores, and in railroad construction. The coal fields were centered in three principal areas of the state: the Northern Coalfield included Jefferson, Boulder, and Weld counties and provided supplies for Denver; the Middle Coalfield included Fremont, Park, and El Paso counties; and the Southern Coalfield, which included Las Animas and Huerfano counties. The last proved to be far superior to the other two regions, with mining in Las Animas and Huerfano counties beginning in 1880. The vast majority of the large coal mines were owned and operated by railroad companies or their subsidiaries. For example, the Union Pacific held mines in the Northern Field and the Santa Fe Railroad had mines in the Cañon City and Trinidad areas. By far one of the most substantial coal mine operators was the Colorado Coal and Iron Company (CC&I) founded by William J. Palmer (Athearn 1985), which was built to provide iron rails for Palmer's construction of the Rio Grande Railway. The Colorado Fuel and Iron (CF&I) steel mill would be fed by coal from the Huerfano River country and ore from the San Luis Valley. CC&I eventually began buying up mining lands around Trinidad and Walsenburg, primarily mining the coal seams in the foothills of the Sangre de Cristo Mountains (Athearn 1985; Ubbelohde et al. 1972). Some of these lands were illegally obtained, later leading to legal issues with the Department of the Interior. CC&I also built an iron mill at Bessemer south of Pueblo, quarried limestone near Pueblo, and opened coke ovens between Trinidad and Crested Butte to produce coal coke for smelters in Leadville, Denver, and numerous other places. CC&I was consolidated with the Colorado Fuel Company in 1892 to form the CF&I. At the time of the consolidation, the company was producing 75 percent of Colorado's coal. CF&I was acquired in 1903 by the Rockefeller family and Gould interests (Athearn 1985).

Initially, coal was sought for use as a fuel in domestic heating. Coal mining in the Northern Coalfield began for this purpose as early as 1864 in Jefferson and Boulder counties, with coal sources limited to exposed seams. The 1860s revitalization of the mining industry, coupled with the early 1870s completion of the Denver Pacific, Kansas Pacific, Colorado Central, and the Boulder Valley railroads, brought prosperity to coal miners in the state (Fell and Twitty 2006; Stone 1918). The Northern Coalfields continued to prosper from 1900 to 1920 as population increases created a solid market of homeowners and businesses seeking coal for heating purposes. However, by the 1880s, the Northern Coalfield was vastly overshadowed by the development of the Southern Coalfields. The need for coal, for both heating and industrial uses, would increase further with the country's entry into WWI. Although coal output from the Northern Field increased as a result, its low-grade composition made it unfit for industrial use (Fell and Twitty 2006; Mehls 1984b). Following the war, coal production declined, as railroads began converting to diesel-powered locomotives, and households to petroleum and natural gas for heating. Even CF&I converted their once coal-powered plant to natural gas. The resultant wane in coal mining extended through the 1920s, with an even sharper decline through the 1930s. The industry experienced a surge associated with WWII and the demand for war-time iron, though this apex was brief and ended at the close of the war (Fell and Twitty 2006).

The miners extracting coal, especially from the Southern Coalfield, lived near the mines in small townsites established by coal mining companies and furnished with company houses (Carrillo et al. 2012). These townsites were located in isolated canyons and drainages, such as Reilly Creek, Colorado Canyon, and Berwind Canyon (site 5LA2175), along with other smaller canyons northwest of Trinidad. Isolation forced individuals to purchase food and equipment at company stores and alcohol at company-owned saloons. In addition, medical care, schools, and law enforcement were all provided by the company. Miners were waged in company scrip, charged inflated prices for housing, and forced to work long days under dangerous mining conditions. The poor conditions, coupled with the lack of management resolve, eventually led to escalated tensions and resentment between the miners and mine management. Surprisingly, it was not the coal miners, but the gold miners of Cripple Creek who initiated the ensuing period of labor disputes, when they went on strike in 1903 in recognition of the deplorable labor conditions of the smelter workers in Pueblo, Denver, and Leadville. As a result, miners that were part of the Western Federation of Miners Union (WFMU) left the mines in Cripple Creek only to spark violence as the state militia was sent to squash the strike. By 1904, mine owners hired scab labor and the mines were reopened, thus breaking the WFM (Athearn 1985).

The first coal strike in Colorado occurred in 1910 in the Northern Coalfield in Boulder County. In a three-year period, labor issues were mounting in the Southern Coalfields as well. In the fall of 1913, coal miners in Huerfano, Las Animas, Pueblo, and Fremont counties went on strike. The miners were represented by the United Mine Workers of America (UMWA), who were determined to unionize the coal fields of Colorado. Among other things, the UMWA worked on behalf of the miners to increase wages, shorten work days, and increase safety. The mining companies, particularly CF&I, who employed about 14,000 miners, responded harshly to the demands by bringing in scab labor and evicting striking miners and their families from company housing (Athearn 1985; McGuire and Reckner 2003). The evictions forced miners to move into tent colonies near company towns. One of the largest colonies was near Ludlow (recorded as sites 5LA1829 and 5LA13295), close to the mouth of Berwind Canyon about 18 mi. north-northwest of Trinidad. The camp was composed of approximately 150 tents, housed 1,200 people, and also served as the headquarters for the UMWA. The strike was violent from the outset, and tensions continued to mount to such an extent that the governor sent the Colorado National Guard to restore order. Relations between Ludlow residents and the National Guard were tense, leading to the governor removing the Guard, only to have mining companies replace them with their own employees. Pushing to stop the strikes, the mining company's armed guards attacked Ludlow on the morning of April 20, 1914. The attack continued throughout the day; the following day, only the smoldering ruins of the camp remained, with two women and 11 children dead. The events at Ludlow prompted an uprising of striking miners throughout southern Colorado. Strikers waged war on the Southern Coalfields, taking control of the mining district, killing company employees, and destroying company-owned towns. Fearing the worst, President Wilson disbursed federal troops to the area to restore order as the strike continued into the winter of 1914. Immediately following the tragedy at Ludlow, miners and guards clashed in the Cañon City Mining District, as well. Armed battles between the factions occurred at Rockvale and Chandler, claiming one life. The public was appalled by the violence at Ludlow, with John D. Rockefeller Jr. left facing the aftermath of CF&I

involvement in the tragic events. Because of the public outcry, Rockefeller, with the enlistment of a public relations firm, introduced mining reform in Southern Coalfield mines. The extent of the reforms does not appear to have appeased miner's concerns, as strikes continued into the 1920s and unionization of Colorado's mining industry was not established until the 1930s (McGuire and Reckner 2003).

The strikes had a detrimental effect on the coal mining industry, and, as a result, thousands of miners found themselves without a job. When Europe entered into WWI, the demand for coal was augmented by the demand for steel war-time goods and the increased rail traffic related to the movement of war-related goods across the country. The impact of war was short-lived, however; even as the United States was entering the war in 1917, the demand for coal was beginning to dwindle. By 1919, the country was enduring a post-war depression, and the demand for fossil fuel was slumping as coal began to give way to petroleum products. Rail traffic lessened, and many smelters ceased operations after the war, collectively contributing to reduced coal use. Throughout the 1920s, coal production remained minimal as coal was replaced with cleaner burning fuels for home heating, such as natural gas, the use of which became common by the mid-1920s.

The construction of a natural gas pipeline in 1928 effectively concluded domestic coal use along the Front Range. Coal production continued to fall into the 1930s, and by 1932 coal production was cut by half, and miners faced massive layoffs. Production rose again in the late 1930s and early 1940s as industries resumed the export of war-time goods to England at the onset of World War II. Coal production reached its peak in 1941 as the United States entered the war. The war necessitated industrial production at full capacity, which, in turn, spurred the increased need for railroad shipments. The WWII war-time boom lasted to the mid-1940s, tapering off again with the end of the war. By the 1950s, coal mining on the Front Range was restricted to the mines serving the CF&I plants. This production trend continued into the 1970s (Athearn 1985).

Uranium

While, in general, the post-war mining industry was weak as a result of the government-mandated halt on precious-minerals mining, uranium mining experienced a boom in the late 1940s and early 1950s. Uranium was far from being a newly-discovered mineral, as the first deposits were found in 1871 near Central City. The boom was the result of the U.S. entering the nuclear age after the bombing of Hiroshima and Nagasaki. After the Soviet Union tested their own atomic bomb, the U.S. responded by stockpiling radioactive materials during the Cold War. This led to wide prospecting as the U.S. Government began buying as much domestic uranium as they could get. In 1949, a major uranium discovery was found in Jefferson County north of Golden by Fred Schwartzwalder, a weekend prospector (Young 1977). Schwartzwalder's mine made its first ore shipment in 1953. It became one of the largest sources of uranium on the Front Range, producing more than 99 percent of the ore from the Front Range uranium mines. He sold the mine in 1955 and it continued to operate until 1995 (Downs and Bird 1965).

Another uranium producer on the Front Range was the Copper King Mine in Larimer County. The mine was originally explored for copper and zinc in the 1920s, but only recovered small amounts of zinc that did not even pay for the cost of milling. Prospectors found uranium at the abandoned mine in 1949, and the mine was worked for uranium from 1951 until it was closed in 1953 (Sims et al. 1958). Additional important discoveries of uranium were made at Idledale and Jamestown, with several others scattered throughout the Front Range mineral belt, which crossed parts of Park, Clear Creek, Gilpin, and Boulder counties (Sims and Sheridan 1964). Intensive prospecting ended in 1958 when government supplies had reached a surplus, effectively ending unlimited exploration and wide-spread purchase. The government continued to purchase uranium until 1970, but set stricter regulations on its extraction and purchase. After 1970, the construction of nuclear power plants, both in the U.S. and abroad, brought about a temporary elevation in prices. Uranium prices followed a downward trend during the 1970s and 1980s and fell drastically in the late 1980s, effectively ending the rampant mining, with the exception of a handful of larger projects, such as the Hansen Project in Boulder County in late 1970s (Church et al. 2007).

Gypsum

Gypsum deposits have been discovered in areas of Fremont County near Wellsville on both sides of the Arkansas River. The deposits are primarily Pennsylvanian and Quaternary in age forced into irregular domes and anticlinal accumulations by Laramide and younger movements. The deposits have been used in the manufacturing of concrete and agricultural products. It has been estimated that, since 1952, approximately 50,000 tons of gypsum have been removed from these deposits and sold as a soil supplement by the U.S. Soil Conditioning Company of Salida. Gypsum mining also took place in Coaldale after the coal mining industry died out, coinciding with the opening of cement plants east of Florence. Coaldale holds the single largest gypsum deposit in the Arkansas River Valley (Simmons 1990).

Fluorite/Fluorspar

Fluorite—also referred to fluorspar in the mining industry—is an important industrial mineral composed of calcium and fluorine. It has a variety of applications and is used as a flux for smelting, making iron partials bind in the manufacture of steel, and in the production of certain glasses and enamels. In the mineral's purest form, it can be used for hydrofluoric acid manufacture. Additionally, some of the specimens that have exceptional shape, transparency, and color are cut into gems or used to make ornamental objects. Large quantities of fluorite have been mined in Chaffee County, with the principal mining districts at Poncha Pass and Browns Canyon. Development of the mineral began as early as 1920, with the largest quantities discovered in Browns Canyon. It is estimated, that between 1924 and 1944, 85,000 tons were extracted from the region, totaling about 5,000,000 dollars at the time. The Browns Canyon District covers about 9 sq. mi. and was one of the nation's largest fluorspar producers between 1927 and 1949. During that time, numerous mines were worked in the district, with the ore shipped by rail to processing mills in the immediate area and at Salida. One of the primary processing mills was constructed in 1938, with the majority of the resulting product sold to CF&I. The fluorite boom continued until 1960 when foreign competition caused a market bust (Simmons 2010).

Copper

Colorado has not been a major copper producer; however, the mineral has been mined in Lake, Chaffee, and Fremont counties. Some of the largest Colorado copper producers were the Sedalia, Independence, and Copper King mines within the Turret Mining District near Salida, recorded as sites 5CF649, 5CF1976, and 5FN2500, respectively. Prospects were found at Cleora, Cotopaxi, and the Red Gulch Copper District. The Cleora prospects were numerous, but no substantial deposits have been found there. The Cotopaxi mine north of the townsite of Cotopaxi was worked successfully, with a considerable amount of ore mined from it until it was closed in 1907. The Red Gulch district is 9 mi. north of Cotopaxi, and was the site of several mines. The district was served by two settlements: Copperfield and Springfield. Copperfield was issued a post office in June of 1907. A post office was never established at Springfield (Bauer 2006b). The "Red Beds" of the Red Gulch area were mined for copper by the Copper Prince, Red Gulch, and Copper Anchor mines (Hayes and Lindgren 1908).

Mineral Processing

As outlined in the mining section above, extensive mining has been conducted in the RGFO study area, resulting in a high potential for mineral-processing sites. Given the extraction and ore processing limitations faced by operators during the 1880s, 1890s, and 1900s, technologies were rapidly evolving and differed from one mining district to next and even between ore bodies.

Ore Processing

Arrastra

One of the earliest technologies employed by Colorado miners to process ore was the arrastra. The arrastra was initially used by the Spanish, and consisted of a circular-shaped feature with a tightly fitted stone floor. Typically, an arrastra ranged between 6 and 20 ft. in diameter, with low walls and a center capstan. The workings ground the ore by dragging heavy muller stones across the stone floor using draft animals. The technology was used early in Colorado's mining history because it was inexpensive, but it still required a great deal of labor to operate. Because the technology was an inefficient way of recovering metals, the arrastra became nearly obsolete by the 1870s; by then, ore was being processed by custom mills (Fell and Twitty 2006). Although arrastras were known to have been utilized in early processing, few are known to have been encountered in the RGFO study area. Two have been previously recorded, including one near Buena Vista recorded as site 5CF869 and one near Empire documented under the site number 5CC637.

Ore Bin and Ore-Sorting Houses

The availability of custom mills to process ore often resulted in the construction of ore storage bins at mining sites. Ore bins typically stored ores that had fairly consistent quality and rock type. Three types of ore bins were utilized for storage: slope-floor, flat-floor, and compromise bin. The first did not have a large storage capacity, but did allow for the ore to be gravity fed through side or bottom chutes for loading into wagons or rail cars. The flat-floor had a greater storage capacity, but required ore to be shoveled out. The compromise bin was what the name implied, a combination of the flat- and slope-floor bins. These bins were built of heavy timbers to hold up under the weight of the ore being stored. All were loaded from the top and in some instances, had sections of receiving bins (Fell and Twitty 2006). Often, the tops of the bins were covered to keep the ore from freezing (Pfertsh 2015).

Ore-sorting houses were a technological step up from storage bins and required more financial investment to build and use. These structures were designed with multiple levels. The top level contained a row of receiving bins with a sorting floor beneath the bins. Underlying the sorting floor was a row of holding bins. Both the sorting and holding bins had sloped floors so that the ore could be gravity fed. Ore was brought into the structure and placed into one of the various receiving bins based on its size and richness. Mixed ore was put into bins with a sorting grate at the bottom. The grate was known as a grizzly, and allowed the higher-grade ores that broke off into smaller pieces to be separated from the waste rock. The waste rock continued on to be further processed by hand (Fell and Twitty 2006).

Smelter

Smelting was another method of processing ore; it involved a roasting process to retrieve metals. The roasting process often had to be customized to treat the ore of a particular region. When the ore was delivered to the smelter, it was first broken manually or mechanically into like-size pieces and was loaded into a brick-lined, steel furnace. Furnaces, along with the smelting process, are well described by Fell and Twitty:

> Common furnaces were cylindrical steel vessels 4 to 12 feet in diameter and lined with firebricks. They stood on stout rock or brick masonry foundations and featured tap spouts and tuyeres, which were ports that admitted air blasts, at graduated intervals. At center was a columnar charge of fuel, and workers dumped crude ore around the fuel column until the ore chamber was full. They usually admitted lead bullion, or lead or iron ore first, because these soft metals served as a flux, which, when molten, helped the rest of the ore to liquefy. After workers arranged layers of ore, sealed the spouts, and added more fuel, they started a blower that fed air to the

> smoldering fuel, bringing it to a great heat. As the lead or iron ore melted and the temperature increased, the liquid metals came into contact with harder metals and minerals, causing them to soften, melt, and trickle down into the base of the furnace. Over time, the lot of ore became molten and the heaviest material, usually the metals, settled to the bottom while the lighter waste floated to the top. At this point, workers opened the upper slag spouts and tapped the liquid waste into slag carts, then did likewise for intermediate slag spouts. After they drew the waste off, the workers added more ore and fuel until the pool of liquid metal rose to the height of a lower slag spout. At this time, workers opened the lowest spout at the furnace base and tapped the molten metal into pots or molds until liquid slag made an appearance, indicating an end to the metal. Workers then repeated the process, keeping the furnace in continuous operation for days or weeks. Because metallurgists used gravity to draw ore through the processing stages when possible, they usually sited smelters on a slope (Fell and Twitty 2006:151-152).

Early on, charcoal was used as a fuel source for smelter furnaces. It was produced in a multitude of areas and shipped by wagon and later by train to smelter facilities. Production involved a rudimentary wood reduction process accomplished in simple pit or beehive kilns built of stone or brick. The heat intensity of charcoal fire was limited, resulting in the later use of coke, either naturally occurring or produced from coal.

Charcoal Production

A good example of the charcoal industry can be found in the upper Arkansas River Valley, where the industry was extensive and only overshadowed by mining. Charcoal production in the valley began during the late 1870s as the primary fuel for smelting during the mining boom at Leadville. The charcoal industry would continue to grow along with the mining industry until the turn of the century, when ore was shipped to Pueblo for smelting and charcoal was replaced by coal coke.

The charcoal industry has often been considered to be "shady," because the majority of the wood used to make charcoal was removed from the public domain, with several of the production kiln sites also located on public lands; one such charcoal processing area has been recorded in Lake County as site 5LK1238. In an effort to quell the illegal use of timber, Congress passed the 1878 Timber and Stone Act with the intention of authorizing the sale of timber on the public domain for the development of domestic and mining properties. Colorado Senator Henry Teller argued that miners, farmers, and ranchers should be exempt as long as the timber they used was for the development of their own property. This exemption provided a legal loophole for the continued production of charcoal in the Arkansas Valley, as it was an important industry in the area (Weimer 1997). Overall, the act was not completely successful, as the charcoal industry continued to thrive, and by 1880 the impacts of illegal cutting were investigated. The investigation determined that aside from 1,200 cords of wood being cut daily to produce charcoal, 22 sawmills were also cutting and producing a daily total of 100,000 board feet. The success of the charcoal industry was further influenced by the railroad, which was actively using their land grants to cut timber for ties and charcoal production.

Charcoal production was completed in both beehive kilns and in pit kilns. The former were considered to be the most efficient and produced good quality charcoal, whereas the latter were considered to be of inferior quality. However, the financial investment for the above-ground kilns was far more extensive than pit kilns. Past documentation of possible pit kilns by Weimer (2008) at site 5LK1904 found that some pit kilns were between 5 and 10 in diameter and built of unmortared native stone. The kilns are near the abandoned townsite of Howland. Weimer determined based on the historical research she conducted for the site that the features may represent the remains of a small, 1880s charcoal operation that produced 9,000 bushels per month. Weimer conjectured that the operation could be attributed to the townsite's founder, Colonel Henry Howland (Weimer 2008).

There are several known locations in the upper Arkansas Valley where the remains of charcoal kilns may still exist. These are primarily linked to 1880s production. Charcoal in the region was produced from various types of local wood; however, pine and juniper were preferred. Historic kilns are known to be present at Browns Canyon, Poncha Springs, Howard, Buena Vista, with at least seven used at Texas Creek along the Arkansas. The Browns Canyon kilns were run by H.D. McAllister; he was known to have operated seven kilns at this location but several were destroyed and rebuilt in 1882. J.W. Taylor had three large-capacity kilns at Browns Canyon and also ran kilns at Howard. Kilns were also built at Malta near Leadville by McGee and Miller. The Pike brothers shipped charcoal from Browns Canyon to Leadville smelters. According to the 1885 Colorado census, the Pike brothers were likely Charles and James Pike. Both were listed in the census as "Coal Burners", along with nine other men listed as "Wood Choppers." The Pikes are thought to have had kilns at Harp's Switch at the northern end of Browns Canyon near the current town of Centerville (Everett and Hutchinson 1963).

Coke Production

Coal, largely from the Trinidad coal fields, was baked into coke that was used for fueling the steel industries in southern Colorado. Derived from bituminous coal, coke can occur naturally, but is most commonly man-made and produced through a firing process. The result is a hard, gray, porous material used as fuel in blast furnaces for smelting precious metals, as well as iron ore. Coke was being produced by the CC&I as early as 1876 when they constructed coke ovens at El Moro north of Trinidad. The ovens were producing coke from coal mined at Engleville and Starkville several miles south of the city (Carrillo et al. 2012). By the early 1900s, the newly formed CF&I had expanded coal production statewide and was operating hundreds of coke ovens at Sopris, Tabasco, Berwind, Primero, Starkville, Segundo, Tercio, and Walsenburg (Emrich 1984:Item 8, page 2:). With steel production on the rise, the American Smelting and Refining Company built a townsite in support of coke production in 1906 called Cokedale (site 5LA5782); the company operated 350 coke ovens at the location (Carrillo et al. 2012; Emrich 1984). Coke production remained steady into the 1910s and experienced a surge during WWI as the demand for iron for war machines peaked. Although coal production began to wane after the close of the war, the coke industry remained stable because it was also used in the precious metal ore smelting industry. The post-war stability was temporary, as a decline in the industry occurred during the 1930s after silver-lead smelting virtually died out. Only those coking ovens in close proximity to the Pueblo steel plants continued to prosper during this time. As with the coal production trends, coke would see a major resurgence as steel production substantially increased during the early 1940s with the country's entrance into WWII. The response to the war demand was overwhelming, and eventually prompted the federal government, through the Defense Plant Corporation, to construct even more coke ovens. At the end of the war, coal mining closures were occurring at a rapid pace and coking industry centers like Cokedale closed their mines by 1947 (Emrich 1984). This trend was not reflective of the coking industry as a whole, which remained steady over the next 30 years, into the mid-1970s. A major change in the industry occurred at this time when federal air standards required the construction of improved ovens and the modification of existing ones. Several ovens not meeting standards were discontinued. In addition, the steel industry moved to electric furnaces during this time, thus shifting away from coking coal use (Fell and Twitty 2006).

Concentration Mills

The majority of mining operations were small. They shipped ore to smelter locations and paid to have it processed because they did not have the capital or the quantities necessary to warrant construction of a concentration mill. Larger operations tended to invest in the construction of a concentration mill because shipping and processing costs were prohibitive for large quantities of ore; concentration mills refined the ore to a more manageable level so that less mass was shipped to the smelter for final processing. This ultimately saved the mining company money because they only had to pay to ship and process higher quality ore. Concentration mills were often built in levels on a terraced slope to capitalize on gravity to feed the ore downslope and into the different levels for the staged processing. As described by Fell and Twitty:

> Mills came in a variety of scales, and large facilities usually required stone masonry and concrete terraces to support the building and heavy machinery, while earthen terraces and substantial beam work were sufficient for small facilities. Large mills were heavily equipped to process both high volumes of ore, and complex ore that resisted simple treatment. To do so, they often provided primary, secondary, and even tertiary stages of crushing and concentration, and may have featured several parallel sequences. Small mills, by contrast, usually provided several stages of crushing and concentration in a single, linear path. Engineers and metallurgists tended to follow a general pattern when designing concentration mills. An ore bin stood at the mill's head and fed raw ore into a primary crusher, usually located on the mill's top platform. The crusher reduced the material to gravel and cobbles ranging from 1 to 4 inches in size, which descended to a secondary crusher located on the platform below. The secondary crusher pulverized the ore to sand and slurry, which went through a screening system. Oversized material returned for secondary crushing and material that passed the screen went on for concentration at small mills, or tertiary crushing then concentration at large mills (Fell and Twitty 2006:152).

Sometimes, in addition to crushers, concentration mills had a series of stamps that would be employed after the ore finished secondary crushing. The stamps were made of "a timber gallows frame with guides for heavy iron rods featuring cylindrical iron shoes" (Fell and Twitty 2006: 154). These were raised by a cam in unison that also allowed them to forcefully drop, effectively crushing the ore.

An important and well-documented example of a concentration mill is the Wallstreet Gold Extraction Mill in the small mining town of Wallstreet in Four Mile Canyon in Boulder County. The mill, the extant part of which has been recorded as site 5BL800.1, is part of the Wallstreet Historic District. The town of Wallstreet was founded around 1895; it was initially called Delphi but was acquired and renamed by mining promoter Charles W. Caryl in 1897 (Dallas 1985). In 1898, it became a station and siding on the Colorado and Northwestern Railroad. Caryl began construction on the Wallstreet Gold Extraction Mill in 1901 and it was completed and began operating in 1902 (Bailey n.d.; Dallas 1985). The large concentration mill was built of milled lumber and local stone and included an office beneath it. For several years it processed ore from nearby mines including the Nancy, the Silver Eaglet, the Gold Eagle, and others (Dallas 1985). Finely crushed gold ore was roasted and cooled in the tall stone tower that remains intact today (Bailey n.d.). Air and chlorine gas were passed through the oxidized minerals, further breaking it down. The ore was then transported to leaching tanks, where soda ash, sodium chloride, and sodium cyanide were added; the resulting liquid containing the gold in solution was then subjected to an electrolytic process that precipitated the gold for refinement into bullion (Bailey n.d.). The mill was closed by 1905 and sold in bankruptcy proceedings in 1907 (Bailey n.d.; Pettem 2005). The machinery was subsequently dismantled and moved to the Livingston Mill in Sugarloaf (Dallas 1985; Pettem 2005).

Stamp Mills

Because stamp batteries are sometimes used at concentration mills, the term stamp mill can apply to concentration mills. It can also be used to describe a facility that uses only stamps, like those described above, and no other means to recover metal (i.e. concentration or smelting). Similar to a concentration mill, stamp mills were built in levels and used gravity to move the ore. Stamps are typically held in a vertical frame composing a stamp set (the battery) driven by a cam. Stamp mills are classified by the number of stamps they hold, such as a 10 stamp that holds 10 stamp sets. Some ore processing applications required a large amount of water to power a water wheel, which in turn drove the cam. Others required a water source to facilitate a horizontal steam engine and boiler that served as the power source. There are instances where a stamp mill is considered an amalgamation stamp mill because of the installation of a tertiary crusher and/or a concentration appliance. The equipment necessary for the function of a stamp mill was considerably less than a concentration mill and tended to be smaller and far less complex (Fell and Twitty 2006). Typically, abandoned stamp mill sites have visible, linear rows of foundations. The overall apparatus can exceed 20 feet in height, requiring large foundations. In general, stamp mills are rare within the study area and often represent early ore processing.

Expected Site Types

Of all of the site type categories, mining and mineral processing sites are considered to be the most varied. Mining sites will consist of early placer mining, hard rock (both gold and silver), coal, uranium, and even lesser known minerals. In addition to site differentiation, there will also be temporal variations based on level of technologies applied, reuse, and regional distinctions influenced by geology and landforms. For instance, placer mining is the earliest form of mining. It was focused on surface mining along water courses in the pursuit of free gold eroding from parent sources. Archaeologically, the method is considered highly ephemeral and would have included the use of panning, ground and box sluices, wooden long toms, and water diversion and conveyance features. Over time, the easily accessible gold-bearing gravels became exhausted (Church et al. 2007). For placer mining to remain profitable, it was necessary to process more material than could be done with simple hand tools. Hydraulic mining became the answer to this dilemma, but it required more capital, labor investment, and ample supplies of water to be productive. Because of the large-scale production, hydraulic mining was often employed by larger mining companies, rather than individual prospectors. More than anything, hydraulic mining resulted in visible landscape alterations, as the process unnaturally eroded landscapes, dislodged hundreds of thousands of tons of dirt and rock, and dumped massive amounts of discharge material into the nearby streams and rivers, choking them with debris and causing extensive flooding and erosion issues. As flooding became widespread, a war over the practice raged until hydraulicking became illegal in 1884 (Young 1970). The expected site types connected with hydraulic mining are small to large camps with associated artifacts, visibly modified landscapes, water conveyance features (i.e. ditches, boom dams, flumes, pipes, penstocks, and hoses), water containment features (i.e., earthen and wooden reservoirs), and water nozzles. Cache Creek serves as a good example of this site type (Twitty 2005). It boasted a wealth of water conveyance features used during the mining. In addition to the mining-related elements, the site documentation by Twitty (2005) identified several habitation foundations and artifact scatters representing the different temporal occupations of the townsite. The Cache Creek site is described in more detail in the settlement section below.

Although hard rock mining was occurring in tandem with placer and hydraulic mining, the method was not fully explored until free gold deposits were exhausted. Placer and hydraulic mining allowed for flexibility of location, whereas hard rock mining tended to be more permanent (Church et al. 2007). With permanence comes a greater potential for archaeological evidence of these episodes. Early mines would have employed relatively simple technologies, whereby ore extraction was restricted to rock near the surface that could be processed with simple crushing and concentration. The labor investment for early hard rock mining ranged from a single individual or small group to more organized mining companies with limited or moderate capital. Associated sites will likely tend to be on the short-term end of the spectrum, with occupations influenced heavily by economic trends, production, and return. Typical remains include adits, pits, waste rock, camps, isolated features, a limited number of structures, and artifact assemblages indicative of prepackaged food-related items. Depending on the distance of these mines from processing centers, ore was typically transported by pack animals or by wagon, thus creating a single trail or a network of trails and roads. As ore output increased, ore bins were constructed on site for storage prior to being transported. In situations where processing facilities were too distant or nonexistent, arrastras may have been used on site to process limited amounts of ore.

As discussed in the history of the mining districts, capital investments became ever more necessary to the continued production of mines with the increasing depth of ore extraction. With the increased flow of capital, several once-abandoned mines were brought back into production, and a multitude of technological innovations came into effect. The new technology brought about the industrialization of the industry and the modernization of mines. The larger the scale of production, the more visible these sites will be. In some cases, the current remains may be the result of mine redevelopment and may be masking earlier temporal components. The remains of hard rock mining sites will be variable with varying degrees of preservation. In the years following the abandonment of mines, a multitude of site impacts may have occurred, from building material salvaging, scrap metal salvaging during the Depression and World Wars, artifact looting, fires, and natural deterioration, removing much of their surface signature. As a result, shafts, adits, waste rock, and sundry artifacts may be all that remain. As stated in Church et al. (2007:316):

> Mining leaves characteristic structures and patterns of use on the landscape, including adits, shafts, waste rock and tailings piles, and haul roads, even when architectural elements have disappeared. Stepped, descending foundations of ore-processing plants that crushed, pulverized, and separated ore from its matrix and concentrated its minerals are particularly characteristic of precious metal lode mines Church et al. (2007:316).

Potential site types are extensive and are further outlined by Hardesty and Little (2000) and presented in the Colorado historical context (Church et al. 2007:306-322). In addition, an extensive list of historic mining property types can be found in Fell and Twitty (2006) and are arranged by specific mining type. To further aid in the understanding of potential sites that might be encountered and to provide historical background for site interpretation, archaeologists are encouraged to examine Master Title Plats, Historic Indices, and Mineral Survey plats available on the GLO-BLM online database. The research will provide mining claim information and the location of structures and/or workings that were completed at the time of the Mineral Survey. The information gathered from this source will only apply to patented mining claims, although, additional information may be obtained from the county courthouse. At the very least, in the absence of supporting documentation, artifact analysis and full disclosure of features and their potential function are expected to determine chronology, the extent of activities undertaken, and the level of technology applied.

Sites attributed to coal mining are not expected to be frequent on BLM-managed lands; however, if encountered, such sites will likely be in the southern part of the study area between Trinidad and Cañon City. Site types are expected to consist of the remains of unpatented or trespass coal mines with elements similar to the hard rock mining elements listed above. Coal mining remains will also include camps (both temporary and long term) and company settlements, rail loading features, aerial tramways, and single or a battery of coke ovens.

In the case of uranium, domestic purchase of the by the U.S. Government during WWII fueled widespread prospecting across the entire state. Rampant prospecting and hopeful exploration resulted in the remains of numerous prospecting sites, consisting of pits and scrapes excavated both by hand and by heavy equipment. Because of the nature of the prospecting, it was unusual for claims to become patented unless they were expected to produce large amounts of uranium (Church et al. 2007:306-322). Sites associated with uranium exploration are therefore expected to entail the usual prospecting pits and altered landscapes. It was common for both individuals and groups to have lived in camps near exploration areas. These sites will primarily be in sedimentary basins and sandstone-type deposits.

Data Gaps

There are a mass of mining sites recorded in the RGFO study area within the various districts outlined in the mining section. Given the abundance of these sites, there is potential for good quality data, not only in terms of functions, but also for temporal context. Unfortunately, the archaeological value of these sites is often unrecognized during the documentation process, resulting in an NRHP determination of nonsignificant (Church et al. 2007). Two of the primary data gaps are clarity and consistency of site use and completeness of recording. Often, this results in an overall lack of understanding of key events, trends, technology, and themes. It is for this reason that researchers are encouraged to standardize recording and to gather adequate historical information in relation to each site. At the very least, mining and mining-related sites should be researched through mining patent records available on the BLM-GLO website to determine the earliest historical use of the site. In some instances, these sites will not be patented and this information will not be accessible. Once baseline data, such as the Mineral Survey Number, have been obtained, additional research should also be completed at the courthouse level to examine the location certificate. If the claim changed ownership, an amended location certificate can also be found. Every year, annual assessment work needed to be done at mining claims in order to keep the claim valid. These annual assessment documents, called Affidavits of Labor, were also filed at the courthouse. Additional research may include the examination of mining records housed at the State Archives in Denver, newspapers, histories and special collections at local and university libraries, mining and engineering journals collections at the Colorado School of Mines, and claim records from the National Archives in Washington D.C.

Quarrying

Stone deposits typically quarried within Colorado are distributed widely and include sandstone, granite, marble, and limestone (Stone 1918). Several varieties of stone have been quarried in the RGFO study area, with some contributing to the construction of important civic buildings in the state. For example, granite from the Mount Princeton area of Chaffee County has been used in the construction of city and county buildings in Denver (*Salida Mail*, October 29, 1929). Moreover, the unique geologic processes that occurred along the Arkansas River Canyon east of Salida produced some of the highest quality marble in the state. Two notable sources of marble produced significant quarries: the Kerr Quarry near Howard and the Wellsville Quarry near Wellsville, both in Fremont County. Kerr marble was coveted as a building material and was used in the construction of commercial, civic, and religious buildings in the early part of the 1900s. The marble was used in the construction of the First Church of Christ Scientist (site 5DV914) in Denver, built in 1900, and the Pueblo Public Library (site 5PE4270), built in 1903 (Gantt et al. 2010). Another marble source near Beulah in the south of Pueblo was quarried beginning in 1893. The rich red marble was used to furnish portions of the state capital's interior, after which the marble was nearly exhausted and the quarry was closed by 1906.

Extensive sandstone quarrying has also occurred widely within the RGFO study area and was the primary industry for places like Stone City (5PE593 and 5PE793). Stone City lies northwest of Pueblo and northeast of Penrose. Beginning in the nineteenth century and continuing into the early twentieth century, sandstone was in great demand for constructing buildings in Pueblo and Colorado Springs. Clay for making firebricks was also in great demand with the success of the steel and iron industry, particularly after the opening of the CF&I steel mill in Pueblo. To meet the demand, stone quarrying was undertaken around Turkey Creek to exploit the popular stone of the same name. Much of the early quarrying was done by the Turkey Creek Stone Company, formed in 1908 by principal owner R. K. Potter. At first, the development of the quarries was limited by the cost and difficulty of transporting stone to Pueblo (Fort Carson Military Reservation 2010).

Following the opening of the quarries, the Colorado-Kansas (C-K) railroad began construction of its line from Pueblo to Turkey Creek on November 22, 1909 (*Wray Rattler*, December 3, 1909). The original route of the railroad proved to be difficult, and a new, easier route was constructed in 1912. The lowered cost and lessened difficulty of transporting stone and clay prompted the opening of additional large quarries in the area. The development of the quarries led to the establishment of Stone City, which served as the headquarters for the various quarries and a home for their labor force. The quarries and clay mines operated successfully until the onset of the Great Depression in the 1930s. As a result of the Depression, major construction projects were halted, and less expensive construction materials, like concrete, replaced stone. Following the closing of the stone quarries, the C-K Railroad was dissolved in 1934. The Colorado Railroad, Inc. was formed in 1938 and the railroad was reopened. The new owners added an electric engine and continued making occasional hauls of clay and freight to Stone City. Clay mining continued in the area, and clay was shipped over the C-K Railroad through the 1940s and into the 1950s until it was abandoned in 1957 following flash flooding that destroyed several bridges (Fort Carson Military Reservation 2010). The tracks were dismantled in 1958.

Sandstone was also mined from the Harding Quarries near Cañon City. Patent data from the BLM-GLO online patent database indicates that Lebbeus and Theodore Harding acquired lands northwest of the city beginning in 1888 and continuing into 1891. Based on the data, the brothers appeared to have had "building stone" and "limestone" quarries. The resources from both were likely used as building materials. According to the historical research completed by Simmons and Simmons (2005) for the Harding Building (site 5FN720.34) in Cañon City, Western Architect and Building News reported in 1890 that the Harding Quarry was one of the best sandstone quarries in the state of Colorado at that time. The stone was a valued building material in the region because it was dense and solid and came in numerous colors, including white, pink, brown, and a mottled mixture of colors. It is rumored that fifty railcars of the stone were used in the construction of the Mineral Palace in Pueblo. The quarries were also noted to have produced white limestone. The quarries were in a good location, and stone could easily be transported by a good wagon road to the D&RG railroad at Cañon City. It is also known that the quarries provided a great deal of stone for local construction, as well (Simmons and Simmons 2005).

A discussion of building stone quarries would not be complete without addressing Lyons sandstone. The town of Lyons was established because of the stone from the Lyons Formation. The town was originally to be named Quarry Town but was named instead for Edward S. Lyons, the town founder. Stone quarrying in the area had its boom in the 1880s when the demand for paved streets and sidewalks began around the country. Lyons sandstone was in great demand because it could be removed in thin, sturdy, uniform slabs ideal for use as paving stone. Organized quarrying in the areas north of the town began by 1884, with numerous Finns and Swedes working the quarries. The stone began to fall out of favor when it was replaced by asphalt and concrete in the early part of the 1910s. Although not at peak production, the quarries remained productive through the 1920s and 1930s. While they were nearly closed after World War II, the quarries saw a substantial revival soon after, as Lyons sandstone became highly sought after for use as building and patio material (Pace 2015).

Several limestone quarries were also active in the RGFO study area. Limestone was an important mineral resource in the upper Arkansas region and was exploited for various industries. Early on, much of the limestone was used by the CF&I, with Pueblo and Cañon City emerging as early producers of the material. CF&I began to quarry limestone in the early 1880s south of Pueblo and established a company town originally named San Carlos. The name of the town was changed to Lime, with a post office authorized under this name in 1898 (Bauer 2012). It was situated 8 mi. south of Pueblo on the D&RG Railroad, near the San Carlos Station, and along the St. Charles River (Athearn 1985). Initially, the quarries produced all of the lime used for furnace flux to remove impurities in the steel produced at the CF&I Minnequa Plant. By the early 1900s the quarries' production had slowed and limestone was only produced for the Eiler's Plant (Camp and Plant 1902). The post office service was discontinued in 1943 (Bauer 2012).

Another of the CF&I's quarries opened in 1902 at Calcite (site 5FN1815). The Calcite quarry produced limestone that was valued for its high quality calcium carbonate to be used as flux in the CF&I's steel mills in Pueblo. The D&RG built a line to the quarries and the town of Calcite was established. The quarries were the sole reason for the townsite, which also housed some of the quarry workers. The post office was established on June 29, 1904, and service was discontinued on April 30, 1930. The railroad and quarries stopped operating soon after. After CF&I abandoned the quarries, the quarries continued to operate under private ownership until 1936, when all mining at the site ceased.

After the Calcite closure, limestone quarrying shifted to the Monarch quarry west of Salida. Limestone was also quarried near Limestone Ridge at the Newett quarry 7.5 mi. east of Buena Vista and used in a variety of industries. Lime was also quarried near Wellsville. Locally procured limestone was shipped to Leadville's smelters to be used for flux and also shipped to Denver and Colorado Springs for the same reason. The construction of sugar factories in the early 1900s on the Western Slope, in eastern Colorado, and in towns north of Denver created a significant demand for limestone (Simmons 1990). Lime was used to remove impurities from sugar juice and was applied to soils to reduce acidity. By the early 1900s, the concentration of the sugar beet industry along the Front Range gave rise to a great deal of limestone quarrying (Twitty 2003). This was especially true for the areas around Fort Collins, where several limestone formations were exploited at Ingleside, Rex, and Stout.

Cement and Concrete

The town of Concrete was a company town built to house the workers of the U.S. Portland Cement Company plant. Cement is a mixture of calcium and silica-rich materials (such as limestone) that is an adhesive and binding agent, but is prone to cracking. In contrast, concrete is a blended mixture of cement, water, and aggregates (such as gravel and sand) and is a far more durable binding agent. The town was started in 1905 and the post office was established in May 1908. Initially, the plant operations were on the northern side of the Arkansas River, but they eventually shifted to the southern side of the river to a facility owned by the Colorado Portland Cement Company (CPCC). The CPCC was organized in Denver in 1901 by Charles Boettcher, a wealthy mining capitalist who brought the idea for the industry back from Germany. The first cement shipment was made in 1902, and a few years later a plant was opened in Fremont County where the necessary ingredients were readily available (Lesley 1924). Both facilities were later purchased and merged in the early 1920s under the Ideal Cement Company name. The operations on the northern side of the river were shut down by 1921, and the workers were moved to the townsite of Portland on the southern side of the river. The town was named after the process of manufacturing cement from limestone. Its post office was authorized in March 1900 and service was discontinued in August of 1952.

Expected Site Types

Although most quarry sites were patented and withdrawn from the public domain, the extent of quarrying activities is certain to have resulted in associated sites in the surrounding areas on public lands. It is also expected that small unpatented quarries used to produce stone for a small number of structures or that proved unfruitful, might also be found. For the most part, the methods employed for quarrying will leave notable alterations to the landscape and will vary depending on stone type and function of the quarry. Typical methods will manifest as areas of rock exposed either by hand or mechanically, vertical and stepped rock faces where blocks or sheets of stone have been removed, and waste rock piles. Remaining rock faces will often have traces of small-diameter, hand-drilled holes used to dislodge stone blocks or larger drill holes used for dynamite blasting.

Prospecting pits used to expose buried rock strata are also likely to be attributed to quarrying activity. The primary difference between quarry prospecting pits and mining pits is the geological environment in which they are found—sedimentary versus volcanic—and the morphology of the pits; e.g., shallow, exploratory surficial pits compared to more formalized, constructed, and supported pits. Aside from the altered landscape, haul roads should also be visible. The range of road types expected include the following: simple, linear depressions or swales, possibly deeply incised, attributed to the use of wagons weighted with stone; cut-and-fill roads, some with masonry retaining walls and mechanically built cut-and-fill roads. In the event that quarry operations were extensive, a railroad spur used for transporting the stone may also be present. This will be especially true for CF&I and large-scale sugar beet limestone quarries.

Given the extent of the quarry operations and their close proximity to populated areas, the labor force may have lived on site or commuted daily. It is expected that associated camps may be nearby, located in the areas surrounding the quarry. Camp sites are likely to include shade, level ground, access to water or wood, or road access. If the quarry laborers commuted, it is still expected that food-related artifacts will be present. The methods employed for quarrying were similar to mining, particularly in limestone quarrying. Extraction-related artifacts are likely to include a variety of hand tools, iron drills, chisels, and wedges for removing stone. By the early 1900s, air-powered rock drills were being employed, requiring the use of large compressors to supply air through hoses to the drills. Typically, equipment will have been removed or salvaged by the time archaeologists arrive and often all that will be left is a mounting foundation where the equipment was once located. Once rock was dislodged, the blocks or slabs were moved using rope, wire rope, or cable and lifted using hand- or horse-powered derricks. In time, derricks were powered by steam and gasoline engines. Blacksmithing was necessary at all quarry locations to keep tools sharp and in good repair. Remains attributed to blacksmithing might include small structures, the remains of heating forges, cut pieces of metal, slag, and other fire-altered material.

The extent of quarry remains will be dependent on the intensiveness of quarrying activities. In some instances, quarries may have been used for long durations to produce large-scale building materials or industrial material. Larger quarry sites, such as the Calcite, Kerr, and Harding quarries are often depicted on topographic maps or are well-documented through the local history. In other instances, quarrying activities may have been limited to producing building materials for a single structure or a small number of structures or were used short-term to produce a small amount of industrial material. Below is an example of a site on BLM lands in Fremont County (5FN1870) with archaeological remains typical of what would be expected for a small-scale quarry that was never patented:

> …consisting of two main quarrying areas. The southern area includes a large, deep pit, with three waste rock piles and a machine mount. Quarrying in the northern area was more dispersed, with three major waste rock deposits, and a road leading to the most westerly of them. Amethyst glass was found in the northern area; cables and other scrap metal were found in both the northern and southern areas. In 1980, a claim was made by Frank Atencio and Sons, and the site was last assessed in 1992. However, the presence of amethyst glass indicates that the quarry might date to as early as the 1920s (Bargielski Weimer 2002).

Data Gaps

Quarried stone, and later cement for building material, were costly and difficult to transport without rail or motorized access. These limitations often resulted in quarries being located near larger towns, with the resulting stone used as a ready building material. However, some were located based on the availability of stone and materials. With the various qualities of stone available and the number of potential quarries, adequate historical research will be necessary to understand the extent and use periods of quarry sites. Currently, research data are insufficient to completely understand the number and types of quarries that once existed. Quarries were often small and undocumented, with sporadic and infrequent use. Other data gaps center around the mining process used at various quarries and the level of technology employed. It is possible that little evidence of technology remains—perhaps only hand tools were employed or perhaps all machinery was removed when operations ceased.

Oil

The first oil discovery in Colorado occurred in 1860 and consisted of a natural oil seep at Oil Spring in Fremont County, north of Cañon City. The well that was drilled on this discovery was the first west of the Mississippi. The spring (5FN118) was filed on by Gabriel Bowen in September 1860. Bowen later developed the spring to produce illuminating and heating oil under the name Bowen & Company. After a series of sales, the seep was eventually purchased by Alexander Cassiday and became the site of the first oil well, drilled in 1862. Cassiday produced hundreds of barrels a day and formed the Colorado Oil Company. Cassiday sold the company and its well locations in 1865 (Kupfer 1995). Isaac Canfield and David Peabody were also known to have drilled in the 1870s to find the sources of the seeps, and determined that the oil sources were not pools but impregnated fissures. Canfield struck oil in 1876, 1,000 ft. down, and Peabody struck oil in 1882 (Simmons 1990). After selling his wells, Cassiday drilled others along Coal Creek and, with Isaac Canfield, hit oil in 1881; the discovery of oil led to the area being named the Florence Oil Field (Kupfer 1995). Soon, organizations began to explore and develop wells near Florence. Refineries were built in Florence, and the field produced much of the state's oil until 1923 (Church et al. 2007). After WWI, pressure in the oil seams had ceased and the industry faded drastically (Simmons 1990).

Oil began to slowly replace coal as the most-used fuel in America by 1910. Large deposits of oil were found to exist under some areas of the Plains in eastern Colorado. Several wells were drilled in eastern Boulder, Larimer, Weld, and Adams counties, with high producing fields, such as the Boulder Field and Wattenburg Field, established. Prior to 1920, northeastern Colorado was a major oil producer, but its reputation was overshadowed by new fields found in Oklahoma and Texas (Mehls 1984b).

Expected Sites

Given the (somewhat limited) history of the oil industry in the RGFO study area, it is expected that site types will vary. Information on the site 5FN118 National Register Nomination Form indicates that the Oil Spring site had pits, shallow shafts and short drill holes present. In addition, some of the twentieth century workings at the Oil Spring site had been removed by the time the site was recorded, including shafts, pumps, storage drums, and miscellaneous materials (Kupfer 1995:1). Given the remains found at a 1910s-era oil well location excavated near DeBeque, Colorado, as an example, oil-related sites might also include intact or fallen derrick remains or just derrick anchoring points. Often, a pipe casing or circular depression marking the drill hole can be found at the center of these points. Use of an on-site steam boiler would result in concentrations of coal or slag. Boiler use may also have necessitated the construction of water conveyance and storage features such as ditches and reservoirs. Anchoring points are also expected to have been used in association with some boilers and their smoke stacks; these will consist of heavy pipe or rods driven into the ground. Structural remains are also possible at oil well sites. Such remains will typically be connected to an engine house near the base of the derrick. Additional structures could include housing for well workers, but, if present, these will be simply built because of the temporary nature of oil wells. It is also anticipated that sparse-to-dense artifact will be present and will reflect food preparation and consumption and the use and repair of heavy machinery (Horn 2001).

Data Gaps

The primary data gap for early oil industry sites is simply their underrepresentation in the documented archaeological record. Special attention needs to be paid to documenting the early history of oil production sites to evaluate and learn about the technology that was used. For this to occur, accurate identification of this site type is necessary. Depending on the years of use, supporting documentation of oil wells can be found at the BLM.

Health and Wellness

Colorado Springs was founded in 1871 by General William Jackson Palmer as the terminus of his D&RG Railroad, which was built south from Denver. Originally named Fountain Colony, Palmer envisioned the settlement as an upscale, model community void of saloons and other establishments that attracted unsavory characters. To promote the colony, experienced promotor General Robert Cameron of the successful Union Colony was retained by Palmer and his associates (Mehls 1984b). The colony was laid out on 1,000 acres at the junction of Fountain and Monument Creeks. Cameron challenged Palmer's Quaker sensibilities, which eventually led to Cameron's dismissal. Palmer resumed the promotion and construction of the colony and by the fall of 1871, the first train pulled into the colony station. At this time, the colony was renamed Colorado Springs. The city became a destination for the wealthy, taking on an antiquarian atmosphere that earned it the nickname "Little London." By the mid-1880s, Colorado Springs was being heralded as a center for health and wellness, as well-off but sickly individuals began flocking to the area to take advantage of the therapeutic mountain air and alleged healing waters of the soda springs developed by Palmer and his associates in Manitou Springs. One of the foremost promoters of the healing properties of Manitou and Colorado Springs was Dr. Edwin Solly. Dr. Solly had successfully treated several cases of lung consumption and tuberculosis, primarily for wealthy patients seeking treatment (Pierson 2008).

The mountain air and soda springs, with purported healing properties, resulted in the construction of a series of sanatoriums beginning in 1890. The most prominent of these were Glockner (site 5EP309), built in 1890; Bellevue, built in 1900; Nordrach Ranch (Colorado's first open-air facility), built in 1901; and Craigmore (site 5EP2706), built in 1905 (Abbott et al. 1982). By the early 1900s, Colorado Springs had 17 hospitals and sanatoriums. Among these was a sanatorium built by the fraternal organization Woodmen of the World to provide free tuberculosis treatment to its members. The Woodmen of the World Sanatorium (recorded as site 5EP590) was constructed in 1907 and opened in 1909. The patients at the Sanatorium lived in individual circular huts instead of hospital rooms. The Sanatorium continued to treat its members until it was sold in 1947 and was later donated to the Sisters of St. Francis. The Sanatorium was renamed Mount St. Francis in 1947 (Sisters of St. Francis 2012).

Although the Woodmen of the World Sanatorium provided treatment to its members at no cost, nonmembers were faced with the high cost of sanitarium treatment. To avoid the cost of treatment, but still reap the health benefits of the region, many individuals relocated to the area either as part time or full time residents. It is estimated that between the 1880s and 1890s, one third of the population in Colorado Springs had relocated from other areas to improve their health (*Colorado Springs Telegraph Gazette*, April 19, 1992).

Colorado has long been a destination for the nation's ailing, not only for the health benefits of its climate, but also for the alleged healing waters of its numerous hot springs. In addition to the already-mentioned Manitou Springs, Wellsville became a popular destination during the 1880s and 1890s for its carbonate hot springs. The town was settled in 1880 and quickly developed into a resort, complete with a hotel, bathhouse, and bathing pool (Bauer 2006b). Mount Princeton, northwest of Salida, experienced a similar history. In the 1870s, a group of hot springs were developed at the mouth of Chalk Creek Canyon; these were referred to as Chalk Creek Hot Springs, Hortense Hot Springs (site 5CF169), Heywood Hot Springs (site 5CF311), and later Mount Princeton Hot Springs (documented within site 5CF311). By the 1880s, the hot springs became an attraction, especially to the local miners who used the therapeutic waters for respite from their heavy labor. In Cañon City, the Colorado Central Improvement Company constructed a bath house in 1874. The hot springs became a popular destination in the late 1870s and through the 1880s. By 1884, after passing through the hands of a number of other owners, the Royal Gorge Hot Springs (a stock company) constructed a 30-room hotel with access to the D&RG railroad across the river from the hotel. The hotel was expanded in 1893 by Dr. J.L. Prentiss, a local drug store owner who constructed additional rooms and a fresh water delivery system for the hotel, which has been recorded as site 5FN2100. After 1899, the hotel's business steadily declined, forcing Prentiss to close the hotel and hot springs in 1906. Attempts at reviving the hotel occurred by different owners in the late 1900s and in the 1920s, with little success. The complex was razed in 1950 (Weimer 2005). In 1879, a group of silver miners formed the Mt. Princeton Hot Springs and Improvement Company and used their wealth to build a large resort hotel in 1889. In addition to this hotel, the prestigious Antero Hotel was later constructed in 1917 and became a major tourist destination. The hot springs and resort continued to operate into the 1920s but began to decline through the 1920s and 1930s. By the 1940s, the hotel operation had ceased and it was sold in the mid-1940s. Following the sale, the hotel became a school. It was dismantled in the early 1950s (Bauer 2006a).

Farther up the Arkansas River from Mt. Princeton are Cottonwood Hot Springs. The springs were developed as early as the 1870s when a hotel and bathhouse were built. Another hotel was built near the spot in the 1890s. The early resort at the hot springs was converted to a sanatorium in the early 1900s; it burned in 1911 (Bauer 2006a). East of the Arkansas Valley, the hot springs within South Park were also developed for tourists and health-seekers. In mid-1870s, Samuel Hartsel constructed a bath house consisting of three bath rooms and a waiting room near his ranch for those seeking the therapeutic hot water. Popularity of the hot springs grew so much that by 1875 Hartsel had constructed a hotel (documented as site 5PA744) to accommodate the influx of travelers. After the construction of the Colorado Midland Railroad, the hotel continued to be a popular tourist destination. The hotel declined in popularity with the removal of the railroad in the early 1920s. The hotel burned in 1972 and the hot springs were officially closed (South Park National Heritage Area 2015b).

Expected Site Types

Individuals with respiratory ailments like tuberculosis (TB) and asthma began coming to Colorado because the climate eased their symptoms. In time, facilities were built in places like Denver and Colorado Springs to treat those suffering from these lung ailments. These facilities were built within the city limits and are not expected to be found on public lands. The predecessors to these facilities, however, were health camps that were established to serve the influx of sufferers. Camp locations are not well-documented and are likely to exist in areas surrounding later established medical facilities. Previous work around areas north of Colorado Springs has found that there is potential for elements of health infrastructure and off site recreation areas. It has also been determined that TB sufferers coming to Colorado Springs took up homesteads in the foothills surrounding the town. These homesteads were similar to other farming and ranching homesteads previously acquired in the area. One of the fundamental differences, however, is that lands acquired by TB patients consisted of marginal parcels not desirable for livestock or cultivation. These lands were also chosen for their proximity to medical facilities such as the Woodmen of the World Sanatorium (Pfertsh 2014).

Hot springs were also sought by the ailing population coming into the state. Often these springs were developed and offered accommodations for their visitors. There is a potential for small undeveloped hot springs to exist in areas of Colorado, with possible associated activity areas and artifact scatters.

Data Gaps

Aside from architectural documentation of historic hospitals and TB sanatoriums, sites associated with health and wellness are underrepresented in Colorado's documented archaeological record. As the historical record shows, many of the health and wellness facilities serving the sick were separated by ethnicity and religion. Data collected through the identification of camps, facilities, or other associated site types have the potential to provide considerable insight into how different ethnic or religious groups coped with medical conditions. The data might also highlight the living and medical conditions of the various groups and identify differential or standardized treatments used by each.

Recreation and Tourism

Tourism and recreation have been economically important to the communities in the vicinity of the study area since the early 1900s. Several small communities and towns within the study area developed as a response to mining and lumber ventures in the mid- to late-1800s. The towns of Nederland and Ward were both built up around successful mines, and other towns were developed along rail lines and in areas of timber production. By the early 1900s, mining had dwindled, and tourism began to take on a more important role in the economic survival of several small towns. Tourism was first promoted by railroads throughout Colorado as a strategy to increase ridership, resulting in a dramatic increase in tourists and vacationers to, and within, Colorado between 1890 and 1920. For example, the Switzerland Trail, a standard-gauge rail from Boulder to Ward that was originally constructed to support mining in the Ward District, later became a well-known tourist attraction. This rail line eventually declined, partially as a result of the popularity of the Stanley Steamer (Bargielski Weimer 2000). The Switzerland Trail is discussed in detail in the previous section titled Railroads. The strategy of reimagining former mining towns and railroads as tourist attractions capitalized on the increased leisure time available to the middle class beginning in the 1890s, particularly in growing metropolitan areas. The Royal Gorge, through which another spectacular railroad route runs, was established as a park in 1906 and was enhanced as a scenic destination in 1929 with the construction of the highest suspension bridge in the world at the time—entirely as a tourist attraction. The automobile increased middle class mobility in the 1910s and 1920s, resulting in the improvement of roads into recreational areas and the development of camping, lodging, and recreational facilities catering to a more mobile public by the 1930s (Guilfoyle et al. 2007). Tourism remains a focus for many of the towns in the study area to this day.

BLM lands, National Forests, and State Wildlife areas continue to provide developed and undeveloped recreational opportunities for hiking, bicycling, all terrain travel, jeeping, camping, fishing, wildlife watching, and hunting. Hunting has been and continues to be important to the economy region; the prospects for trophy deer and elk have long drawn hunters from throughout the nation.

Expected Site Types

Sites associated with recreation and tourism will be varied in regards to their level of complexity and defining features and are related to the amount of funding that was available during their establishment. The use of federal dollars through the CCC brought about the development of roads, bridges, camp grounds, and picnic areas. Additional areas have been developed on National Forest, BLM, and state lands, and cover a wide gamut of site types. Site types expected to be identified in this category are developed trails, roads, shelters, picnic areas, camp grounds, toilets, rest areas, scenic stops, and signage. Through time these site types have been upgraded and updated, but early vestiges will still be present.

Data Gaps

Because tourism and recreation have often been viewed as a succession of limited and transitory events, archaeologists tend to minimize the importance of sites attributed to this theme (Church et al. 2007). However, given the role that tourism and recreation have played in the development of Colorado's economy, sites within this theme are significant because they have the potential to address economically driven research questions. For example, data collected from such sites will further our conception of the impacts that tourism and recreation have had on development of recreation facilities and the advent and survival of tourist towns. Similarly, these data will aid in determining the development of landscapes and the evolution of access to isolated or "wilderness" areas. Site identification could also help in understanding the country's change in defining and interpreting social values and social attitudes toward work, especially after the widespread use of the automobile and significant national events like the Depression and wars. Lastly, site recognition could allow for the meaningful characterization of recreation and tourism participants and how such activities were viewed and valued by different socioeconomic classes.

Settlements

This section discusses a sample of different types of settlements that developed in the RGFO study area throughout history. Settlements have been vital in the West as they provided individuals seeking to increase their socioeconomic standing access to growing industries and capital. Early on, most of the non-native settlement on the Plains followed the 1858 gold rush. As a result, small settlements began to spring up around working claims, with many disappearing through the boom and bust cycle so prevalent in mining. The claims and discovery areas that remained consistent eventually gave birth to more permanent settlements. Although of minor impact during the early period, farming and ranching was conducted on the Plains; however, the exponential growth of mining in the eastern Rocky Mountains would be a major impetus behind the surge in farming that would eventually transform large areas of the Plains into farmland and pasture in the late nineteenth century.

Given the sheer magnitude of the RGFO area, a complete inventory and history of settlements is beyond the scope of this study. Therefore, the following constitutes brief histories of a cross-section of communities and settlements in the RGFO study area. The settlement types included in this section provide a historiography of mining, farming and ranching, railroad, agrarian/cooperative, religious, and ethnic settlements. A great deal of historical information can be gained about residential centers through the chronologies of post offices compiled by Bauer (2006a, b, 2012) for some of the counties within the RGFO project area.

Mining-Related Settlements

Placer/Hydraulic Mining: Cache Creek

In the wake of the 1858 gold rush, an abundance of prospectors began to infiltrate the mountain regions of Colorado. Early on, these miners were looking for placer gold, as it was easy to extract with little capital investment and few equipment requirements. Gold Hill in Boulder County was an early area of exploitation, moving on to Clear Creek near the town of Georgetown, and eventually into Park and Summit counties. Word of gold placer strikes prompted a flood of prospectors to Colorado and the progression of activity continued to push into the mountains. By 1860, gold was discovered on the upper Arkansas River near the future location of Granite. From this discovery, placer mining began to extend to the west along Cache Creek, resulting in the establishment of a settlement of the same name, which has been recorded as site 5CF72. Based on research conducted by Twitty (2005), the earliest known mineral exploration in the area is attributed to individuals known only by their last names—Campbell and Shoewalter. At the time, the settlement did not yet exist and the creek had no formal name. The credit for the name Cache Creek is given to these men after they cached supplies in the vicinity of the creek. The creek is approximately 3 mi. long, stretching eastward from its headwaters near Lost Canyon to its confluence with the Arkansas River west of Granite. The bed of the creek is an estimated 1/3-mi.-wide swath of glacial moraine. Through prospecting along the creek, the two men discovered a significant amount of gold and immediately staked claims. It was not long before others heard of the discovery and flocked to the area.

In 1860, a small camp (which has been documented as site 5CF2952) was established 2 mi. from the mouth of the creek and would become the first real settlement in the upper Arkansas River region. Horace Tabor also spent time at the settlement before striking it rich in the California Gulch area near Leadville. First populated by about 300 prospectors, by 1861 the population of Cache Creek grew to nearly 1,000 people (Simmons 1990). The settlement served both as a miner's community, as well as a supply center for several smaller mining camps to the west, including Gold Run, Ritchie's Patch, and Oregon Creek. The settlement eventually grew into a small town and was granted a post office in August 1862—the first post office in the newly formed Lake County (Bauer et al. 1990; Twitty 2005). The town continued to progress and was later incorporated in 1866. As the intensity of the placer workings grew, so did the amount of gold being recovered from the area. Capitalists began purchasing individual placer claims and consolidating them under newly organized companies. By the late 1860s, much of the placer mining requiring low labor investments was exhausted and those working individual and small-scale claims left the area to work in higher yield areas around Leadville. The larger capital ventures remained, but the population of the region began to dwindle. The discovery of gold near Low Pass in the vicinity of Granite drew prospectors away from Cache Creek and eventually the population of the town of Granite outgrew that of Cache Creek. The growth of Granite resulted in the settlement receiving a post office in November 1868 and the relatively rapid relinquishment of the Cache Creek post office in February 1871 (Bauer et al. 1990). It is speculated that the town persisted with only a few miners occupying it through the early 1910s.

Hardrock Mining: Dawson City

Most Colorado towns associated with mining remained strongly tied to the mining industry; as a result, like the industry that birthed them, they endured some level of boom and bust throughout their history. Many of these settlements did not survive the difficulties of the busts, while still others were so short-lived that only a modicum of evidence for their existence can be found. Dawson City was one of these little-known settlements that essentially grew up overnight and was gone before a change of season occurred. Dawson City lies approximately 5 mi. southwest of Cañon City and was established at the southern base of Dawson Mountain. The townsite grew up as a result of a discovery of a rich gold deposit at the Copper King mine on December 10, 1898. The mine was staked by Bonewitz Dawson, Irving Dawson, Benjamin Dawson, Daniel Bonewitz, and J.B. Hannum. The partners allegedly struck the rich ore and removed samples for assaying, which returned the potential for an astonishing amount of gold per ton. The potential wealth was heralded as one of the largest gold strikes, one that would be on par with vast amounts of gold discovered at Victor north of Cañon City. Word of the discovery at the Copper King spread quickly and within a week, prospectors and wealth seekers flooded to the area in search of gold. Mining claims were staked throughout the area and a tent town was born at the foot of the slopes below the Copper King mine. Varying newspaper reports placed the population at 300, 500, and even as many as 2,000. Lots in the newly thriving town were selling quickly as businesses began to set up temporary tent stores and restaurants. It was not long before the town boasted a bunk house, grocery, hardware store, and two saloons, all housed in temporary tent structures until permanent structures could be built. The new hamlet was christened Dawson City in honor of the Copper King partners. However, before one building could be constructed, suspicions and reservations began to surround the legitimacy of the mine strike. Misgivings with regard to the strike found their way not only into the local newspapers, but into the Denver newspapers, as well. As suspicions intensified, one of the writers for the *Denver Republican* traveled to Dawson City to end the speculation and witness the rich ore vein for himself. After much negotiation, the reporter was allowed into the mine and removed several samples to be assayed, which were found to be rich in gold. Even with the results, it was still uncertain if the ore deposit was just an isolated pocket or an extensive vein. To determine the answer to this, the Dawsons allowed a group of mining experts and potential buyers looking to purchase the Copper King to examine the mine's vein. Through a series of dynamite blasts, several samples from the ore vein were tested and found to be rich in copper but containing virtually no gold. The sampling further determined that the gold in the mine was limited to a small pocket. The news hit the community hard, and after just three weeks the population picked up and moved on, and Dawson City vanished from the newspaper headlines (Dawson 1994).

Railroad-Related Settlements

Given the number of railroads functioning by the mid-nineteenth century and into the twentieth century, it is highly likely that numerous townsites, railroad camps, and populated railroad facilities are present on BLM-RGFO lands. As outlined in the transportation section, the construction of railroads in the RGFO study area followed on the wake of the regional mining booms within the state. In the course of their construction, the track-laying termini became temporary small, short-lived townsites. Some of these locations would later function as support facilities for continued maintenance, while others morphed into railroad towns and grew into important stops and shipping points. Although these settlements were affected by the railroad strategy of populating areas along their rails as a way to maximize profits, the vast majority were not owned by the railroad (Hudson 1982).

Lake County: Howland/Birdseye

Both Howland and Birdseye developed relatively near each other in Birdseye Gulch. Howland developed in the valley at the confluence of Birdseye Gulch and the East Fork of the Arkansas River. Birdseye (also known as "Bird's Eye") is situated approximately one mile to the southwest, up the gulch, and grew up around the DSP&P railroad section house. Howland was named for its founder Colonel Henry Howland, who was born in Massachusetts and later became a Chicago lumber businessman. During the Civil War, Howland was a first lieutenant in the 51st Illinois Infantry before being promoted to captain and later to colonel in 1865. He remained in the position for a short time before returning to the lumber business. In the 1870s, Howland moved to Leadville to invest in mining (Johnson 1986). According to Howland's obituary, while in Leadville, he formed a partnership with three others in an extensive mining scheme that promised a lucrative return on his money. It turned out the investment was a fraud; Howland was knocked unconscious by one of his partners and all of the investment money was taken, leaving him penniless (*Chicago Tribune*, May 7, 1883). Howland turned to the lumbering business after the incident and is listed in the 1879 Leadville City Directory as a superintendent of a sawmill and as having a residence on the corner of Main Street and Pine Street. He is known to have managed the Birdseye Lumber Company, which included numerous timber claims and a sawmill. The town of Howland was issued a post office in August 1879 with Henry Howland serving as the postmaster. Howland also built the Birdseye–Leadville Toll Road (5LK1912.1) in 1880 that linked the townsite and the Birdseye Gulch area with the Ten Mile and Mosquito Pass stage roads (Weimer 2008). At that time, Howland is listed in the census as being 50 years old and the manager of the Mercury Company. In 1881, Howland gave up his Colorado dreams and returned to the east where he drowned in 1883 in a canal in Rochester, New York (*Chicago Tribune*, May 7, 1883). The Howland post office service was discontinued in September 1882, but it was still referenced as a polling place for elections in 1884 (*Leadville Daily Herald*, September 4, 1884). Prior to Howland's departure, the D&RG built a segment of a narrow-gauge line from Leadville to Kokomo in 1880 and built a station near the junction of Birdseye Gulch and the Howland townsite in 1881. The station was named Birdseye and appears on the 1884 GLO plat map in the southeastern quarter of Section 32 in Township 8 South and Range 79 West. The location is also confirmed by an 1882 DSP&P (later the C&S) survey map that indicates the Birdseye station was located southwest of Howland in the river valley.

The townsite of Birdseye was documented by Weimer (2008) under the site number 5LK1905 with the following information extracted from the recording. By 1883, disagreements between the DSP&P and the DR&G over jurisdictions in the segments between Dillon and Leadville led to the DSP&P constructing a new line to the south. Based on the current data, the Birdseye section house was probably built around 1884 after the completion of the DSP&P line, with the Birdseye townsite surrounding the section house also being settled shortly after. Archaeological evidence indicates the townsite included a bunkhouse, at least two small cabins, and a dense artifact scatters. It is speculated that a small population occupied the Birdseye townsite year round (Weimer 2008). The Birdseye section house remained extant until 1929, but was removed by 1943, indicating that the townsite had declined and was abandoned sometime during those years (Weimer 2008). The C&S eventually converted the line to a standard gauge in 1943 to haul freight to the Climax Mine. This line continued until the mine was closed in 1986. In 1988, the Leadville, Colorado, and Southern Railroad began running tourist trains along the route.

Boulder County: Frances

Another example of type and function associated with railroad townsites can also be observed at the Frances townsite (site 5BL7358). The townsite was originally documented in 1977 by a local Nederland resident, with a detailed recording of the site completed in 2000 and reported in Bargielski Weimer (2000). In the midst of the Boulder County mining boom, the Greeley, Salt Lake and Pacific railroad built a narrow-gauge rail from Boulder to Sunset, a distance of over 10 mi. west-northwest. By the mid-1890s, the railroad was extended to the Dew Drop Mine and an associated mining camp immediately southwest of the town of Ward. In 1897, the Colorado and Northern Western Railway began construction on a standard-gauge rail from Boulder to Ward. At the same time, the Big Five was formed as a result of a consolidation of large mining interests.

The town of Frances grew out of the Dew Drop mining camp established to house prospectors and mine workers in the area. The exact date the Dew Drop mining camp morphed into the Frances townsite is not certain; however, it is speculated to have occurred around the same time that the Colorado & Northwestern Railroad built a station at the camp in 1898. The railway was later renamed the Switzerland Trail and, by the summer of 1898, the railroad built a spur to the Big Five Mine southeast of Frances. Frances was granted a post office in October of the same year (Bauer et al. 1990). Mining at the Big Five began to wane significantly by the early 1900s, resulting in reduced train service to Frances by 1903. Following the reduced service, the Switzerland Trail was sold in 1904 and by 1906 only one train a week traveled to Frances. To revive the railroad, the new owners increased the number of tourist excursion trains in the summer of 1906. The revitalization was short-lived; during the winter of 1907, trains were only running on the easternmost section of the rail and service to Ward was suspended. The end result was the sale of the Switzerland Trail in the spring of 1909 and it was renamed to the Denver, Boulder, and Western (Bargielski Weimer 2000).

In the wake of the declining mine production, it appears that the population of Frances severely diminished, as its post office service was canceled in January 1905. Regardless, the town continued to exist as a rail stop along the Switzerland Trail (and later the Denver, Boulder, and Western) and was still in existence by the early 1910s. The tungsten boom in Boulder County during WWI would ensure the town's continued survival into the mid-1910s until tungsten prices fell in 1917. The lack of freighting capital, coupled with the increased use of automobiles, brought about the end of the Switzerland Trail in 1919 and the eventual abandonment of Frances (Bargielski Weimer 2000).

Fremont and Chaffee Counties: Townsites and Stations along the D&RGW

Following the construction of the D&RG Railroad through the upper Arkansas River Canyon between Cañon City and Salida, several stations were established to serve the railroad. Beginning at Cañon City and moving west-northwest, the first station was Parkdale (site 5FN779.13), placed at the mouth of the Royal Gorge. The station was originally named Big Spring Ford after James McCandless's ranch located at the ford in the river along the wagon road to the upper Arkansas River Valley and to Silver Cliff. The name was later changed to Twelve Mile Ford because it was 12 mi. from Cañon City. It was changed again to Twelve Mile Bridge when a bridge was constructed over the river ford. During the construction and right-of-way conflicts between the AT&SF and the D&RG, the AT&SF had a construction camp at the location and called it Webster. When the D&RG gained the right-of-way, they established the Currant Creek Station there as well. The station had a depot, water tank, bunk houses, a section house, and stock pens and became a major shipping point for railroad ties and copper ore. A post office was granted to the location in 1880 under the name of Parkdale. The Greenhorn Mountain Mining and Milling Company built an ore processing plant in 1901 at the location on the southern side of the river. The section of the railroad between Parkdale and Cañon City is owned and operated by the Cañon City and Royal Gorge Railroad in partnership with the Rock and Rail Company that transports stone from the Parkdale area (Bauer 2006b). The Parkdale siding was cursorily recorded in 1996 by the U.S. Surface Transportation Board; a siding, foreman's house, and two section houses have been documented at the site (5FN779.13–.15) (Stazak and Ozment 1996).

About 13 mi. up the canyon is Texas Creek. The Texas Creek townsite and D&RGW depot were documented as site 5FN2536 in 2010 (Gantt et al. 2010). Originally named Ford, the town was founded in the early 1880s at a wide terrace along the Arkansas River. The name was chosen for the location because it was a narrow portion of the river where the wagons could ford across the river to the road on the northern side. The small community was on the southern side of the river; after the completion of the D&RG, the Texas Creek station was built across the river from the location. Another important aspect of the townsite is that it was located at the terminus of a wagon road from the rail, traveling south, and brought supplies for the Silver Cliff and Westcliffe mining camps. A post office was granted for the town in January 1881. Interestingly, only a "ranch" is depicted on the 1882 GLO plat map at the location of the original site of Ford on the southern side of the river.

In September 1885, the name of the town was changed to Texas Creek and it was relocated to the northern side of the river. The name was adapted from another settlement established 10 mi. south in the early 1870s (Bauer 2006b). This Texas Creek was renamed "Hillside" in the early 1880s (Bauer et al. 1990), in order to bring the settlement in agreement with the railroad station. The town later became an important junction on the rail when a branch line to Westcliffe was constructed south along Texas Creek in 1900 to replace the Grape Creek route that had washed out and had been abandoned in 1889 (Jessen 2001; Ormes 1980). The construction of the Westcliffe branch also resulted in the construction of a bridge over the river, which was later used by wagons (Bauer 2006b). The new location of the town afforded a limited amount of land, which ultimately dictated the maximum size of the community. The 2010 documentation of the townsite identified the remains of several buildings encompassing a 17.6-acre area. Although not found during the site recordation, a deteriorated row of charcoal kilns were once present at the site and noted by Jessen (2001). At that time, the kilns were thought to have been part of a primary industry operating at the town.

The railroad branch to Westcliffe was discontinued in 1937 and the trestle was removed shortly after the branch's abandonment. Although the branch was abandoned, the D&RGW depot at Texas Creek remained active until the mid-1950s (Gantt et al. 2010).

As depicted on the 1881 D&RG Railway system map, rail travel from Texas Creek to the west made stops at Cotopaxi, Vallie, Howard's, Badger, and Cleora. The history of Cotopaxi is covered below in the Agrarian Colonies section. According to Bauer (2006b), Vallie was never issued a post office, suggesting it functioned as a limited-use siding. Howard was settled in 1876 by John Howard, and in 1880 the D&RG placed a station there. Initially, the majority of the development was along the railroad on the northern side of the river, but it later grew on the southern side as well. Because of the abundance of wood in the area, charcoal was also produced at Howard and shipped to Leadville smelters. These charcoal kilns were built near the railroad tracks and were later converted to coal to produce coke. Limestone quarries were also exploited southwest of Howard, resulting in the construction of railroad spur to Calcite (see the quarry history above).

Badger (see below) was the next stop along the rail before reaching Cleora. Cleora—which has been recorded as site 5CF2211—was originally established in the summer of 1878 by the AT&SF railroad ½ mi. from Bale's Station, which was built by William Bale along the Cañon City–Salida Road (5FN1950) that followed the Arkansas River. The town is said to have been named after Bale's daughter and was to be a supply center along the rail for the area's mining districts. However, because the town supported the AT&SF, when the D&RG was granted the rights to the rail, it bypassed Cleora by building the line to the west. The D&RG later founded Arkansas (the future Salida) 2 mi. up the river to service their steam locomotives. By 1882, the Cleora post office was closed and by 1885 Cleora was almost deserted; however, location near the town continued to function as siding on the railroad (Bauer 2006b; Golson 2013).

In addition to the railroad-related settlements, there were a bevy of rail-support facilities that also served as small population centers. The most common facilities included section stations, section tool-houses, flag or switch houses, sidings, water stations, and work camps (Berg 1893). Of these types, section stations and sidings were the most tangible and are often documented on historic GLO and topographic maps; however, only a limited number have been documented within the study area. A good example of a rail-support facility is Badger Station (site 5FN1951). As mentioned, the station is along the D&RGW (formerly the D&RG), in the upper Arkansas River Valley, west of Texas Creek. The station was documented by Weimer (2004) and was found to have extant structural remains of the section house, a bunk house location, a privy, and a scatter of associated artifacts. Subsequent research determined that the station was in existence as early as 1881 (Weimer 2004). However, considering the rail had already reached Leadville by the early fall of 1880, the station location may have been used slightly earlier. A later survey of the station by the D&RG in 1883 produced a plat map of the station components, which served as a reference for the archaeological remains. The survey map details the presence of a station on the western side of Badger Creek and depicts a section house, bunkhouse, water tank and pipeline, and a siding northwest of the station. Badger Station continued to be depicted as a stop along the rail into the mid-1890s. It likely still functioned as a railroad facility into the late 1910s, as the site components were later detailed on a 1919 survey map. The station was no longer listed on the D&RGW timetable by 1941 (Weimer 2004).

Several other, smaller railroad-support facilities were operating along the Arkansas River in addition to the stations. For instance, Spike Buck (site 5FN779.82) was located several miles east of Texas Creek and was originally the location of an Atchison, Topeka and Santa Fe Railroad construction camp (Osterwald 2003). Later, section hands working on the D&RGW railroad lived at Spike Buck, where the D&RGW operated a small siding. A small settlement grew up at the location and, at its peak in 1883, housed an estimated population of 25. The siding was likely used for loading and unloading supplies and for rail maintenance. It never grew large enough to gain its own post office. It continued to function until it was abandoned in 1906 (Jessen 2001).

To the west of Cleora, the D&RGW entered Salida and continued westward and away from the Arkansas River Canyon. Once at Salida, the D&RGW, Salida to Monarch Spur branched to the southwest and the main line continued a distance from the river on its northern side before rejoining the course of the river at the mouth of Browns Canyon. It is here that a stop on the rail grew into a small settlement. Early on, the settlement was called Kraft and boasted a boarding house, store, school, and saloons that served railroad crews building the D&RG; it later served as a stop on the rail. It was also home to individuals engaged in the production of charcoal used in Leadville smelters (see charcoal production history above). A post office was established at Kraft in February 1882. The name of the location was changed in 1888 to Browns Canyon with the name of the post office changed to the same in May 1888. The D&RG maintained a small station at the location. The name of the settlement was again changed to simply Brown Canyon in March 1904, dropping the "s" following the Post Office Department standards for naming. The settlement was populated primarily by individuals engaged in the livestock industry. The post office service at the settlement was canceled in June 1908. Reportedly, through its history, the settlement was located on both sides of the Arkansas River (Bauer 2006a).

Railroad Construction Occupation

Although railroad construction camps are not considered long-term habitation sites, they are nonetheless considered informal settlements founded on similar principles—location and opportunity (Church et al. 2007). Some of the camps will reflect a fleeting and passing occupancy, whereas others represent temporary communities occupied for longer spans of time during railroad construction. Typically, camps were incrementally placed along the railroad line and were occupied until the distance to construction areas necessitated moving them. As for the construction camps recorded along the D&RG Railroad in the Arkansas River Canyon in Fremont County, sites such as 5CF2197 were found to have semi-permanent architecture, including dugouts, perimeter foundations, and rock walls. In addition, five stone ovens were also recorded (Gantt et al. 2010). These architectural elements suggest that occupation durations were more than merely a short span of weeks; more length occupations were likely driven by time expenditures associated with the building the railroad in difficult terrain.

Agrarian Colonies/Settlements

At the end of the Civil War, transportation routes into the state improved and expanded, spurring settlement within Colorado. As routes into the state began to be forged, primarily after the end of the Civil War, populations began to settle areas of Colorado. While most came to find riches in the silver and gold industries others came to acquire "free" land through homesteading or to become part of a collaborative effort to establish a colony. Some colonies were founded as temperance colonies, religious settlements, or as settlements for groups that shared the same ethnic background. The majority of the colony efforts began as early as the 1860s and continued through the 1870s. These settlements, founded on utopian ideals, were not all long-term endeavors, and by the turn of the century most of the colonies had disbanded as a greater wave of individualized agricultural ventures took root (Mehls 1984b).

One of the first attempts at Euroamerican colonizing began in 1869 as Carl Wulsten established a colony thorough the German Colonization Company of Chicago. After visiting areas of Colorado, Wulsten settled on the area at the southern end of Wet Mountain Valley, west of the present-day town of Westcliffe. The colony trespassed on the Ute Reservation, as it existed at the time, and caused a significant uproar from the government and the tribe; however, it remained. The colony became known as Colfax, named after the vice president of the colonization company, Schuyler Colfax. Officials for the colony requested a 40,000-acre grant from the government. The government request was not completed by the time colonists reached the valley so they squatted on the lands. In an attempt to expedite the land grant, Wulsten went to Washington to meet with government officials. In his absence, internal strife in the colony climaxed, and by the time Colfax returned in 1870, the colony had dissolved. The lack of cohesion and the difficult environment prompted some of the colonists to leave the valley and others to disband and take up lands elsewhere (Athearn 1985).

Although one of the earliest, the Colfax Colony was not the only attempt to establish communal agrarian settlements in Colorado. By far one of the most famous colonies was established in 1869 near present-day Greeley. It was to be an agrarian utopian settlement promoting high moral standards through the prohibition of liquor. The colony was founded by Horace Greeley and Nathan Meeker, who originally named it the "Colony of Colorado but soon renamed it the "Union Colony" (aka the Greeley Colony and Union Temperance Colony). The colony's populace arrived in 1870 and immediately began to ready fields for planting, built an irrigation system, and construct shelter. The new system of irrigation became the first undertaking of its kind in northeastern Colorado and fostered a new generation of farming in the state (Mehls 1984b). The name of the colony was later changed to honor Horace Greeley and the town of Greeley was incorporated in 1886.

Contemporaneous with the Union Colony was the founding of the Chicago-Colorado Colony at Longmont in Boulder County. The settlement began in 1870, but the purchase of 55,000 acres for the colony did not occur until 1871. The lands purchased were in an advantageous location and could be irrigated by the St. Vrain, Left Hand, and Boulder creeks. The settlement eventually evolved into Longmont (Patten 2011).

Also occurring at the same time were several ventures that were unsuccessful. The St. Louis-Western Colony was founded in 1871 at Evans in Weld County, south of the Union Colony. It was short–lived, largely because of mismanagement, but its failure was also due to its proximity to Greeley, which was already successfully supplying local and regional markets (Mehls 1984b; Patten 2011). Another example is the Southwestern Colony (aka Tennessee Colony or Memphis Colony), near the early settlement of Green City, which was organized in 1871. Its population ebbed and flowed, with most leaving early on. Once the population stabilized, it was renamed Corona by the remaining settlers and changed to Wiggins in 1896 (Patten 2011). The Corona Colony turned out to be a land speculator scam by its creator Colonel David S. Green and was falsely advertised as being a bustling city on the river with ornate civic buildings. The new colonists arrived to find only expansive, unsettled prairie, prompting many to leave after they arrived (Mehls 1984b).

Western colonies provided opportunities for many immigrants to leave their struggles in their native lands with the possibility of becoming financially independent through land ownership. Such opportunities were also available for those already in the country, allowing them to leave the urban areas and head west. For example, in 1878, the Hebrew Immigrant Aid Society (HIAS) was attempting to help Jewish immigrants establish colonies in the West. One such colony was founded along the Arkansas River near the small railroad station of Cotopaxi (site 5FN112). The colony was promoted by Emanuel Saltiel through letter correspondence with the HIAS organization's founder Michael Heilprin. To entice Heilprin, Saltiel promised to build houses and barns, as well as equip the future colonists with farm equipment and supply them with livestock and seed (Oswald 2005). The situation seemed to be a perfect solution for the placement of Russian Jews that were experiencing hardships under Czar Alexander II (Athearn 1985). Heilprin sent his secretary to Colorado to examine the colony location; however, before the secretary could report back, Alexander II was assassinated and Alexander III enacted new, repressive, anti-Semitic laws. Immigration to America became imperative for this oppressed group, and thousands of Jews left Russia and filed requests with the HIAS looking for aide. In a desperate move, the HIAS sent the arriving Russian immigrants directly to Colorado to occupy the colony. When the 63 colonists arrived in Cotopaxi on May 8, 1882, they stepped off the train and into broken promises. The colony was located 2 mi. from the railroad station on a dry terrace with no irrigation water. There is some disagreement with regard to the location of the townsite—it may have been 2 mi. south of Cotopaxi along Oak Creek, or possibly 2 mi. north along Bernard Creek (Athearn 1985; Oswald 2005). When the settlers arrived, they also found that only a fraction of the houses promised were actually constructed and, of those that were, they were simple boxes with a door and no windows. There were also no farm implements or seed as was promised. Amidst the difficulties, the colonists made every effort to succeed by planting crops using borrowed seed and equipment. Because the new colonists were not familiar with the climate, the crops failed. To survive, many of the men went to work constructing sections of the D&RG Railroad in the region, which allowed them the money necessary to get through the winter and money to plant crops in the spring. These failed as well (Athearn 1985). By 1883, several of the colonists departed, leaving only a handful remaining at Cotopaxi. Those that remained hung on until it was no longer feasible, and by June of 1884, the colony was dissolved (Athearn 1985; Oswald 2005).

Religious settlements

Mormons from Mississippi en route to the Salt Lake Valley arrived in southeastern Colorado in 1846 and built cabins along the Arkansas River ½ mi. downstream from Pueblo. The Mississippi Latter Day Saints would be one of four groups that populated the settlement later referred to as Mormon Town. By early 1847, Mormon Town would have a population of over 300 people, including 47 women and an undisclosed number of children. The settlement was also populated by members of the Mormon Battalion enlisted as part of General Kearny's Army during the Mexican War. Because the Battalion soldiers were considered part of the United States Army, Mormon Town was also considered a military camp. Although only occupied temporarily, at its peak, the townsite boasted approximately 50 houses and a tabernacle (Lecompte 1978). In 1877, a group of 72 Mormon converts from Alabama came to Pueblo by train and wintered on the Arkansas River. They lived in crudely built barracks and moved into the San Luis Valley in the spring (Athearn 1985).

A smaller group of Mormons also established a small loose-knit colony in the Wet Mountain Valley. The group settled near Ula, once part of the German Colony approximately 2 mi. northwest of Westcliffe. The new colony was composed of eight Mormon families who left Utah and arrived in the valley in 1870. The families relocated to Colorado because they had become disillusioned with the Mormon Church and sought to acquire free lands under the Homesteading Act. Once established, the group did not attempt to enact a typical Mormon collectivist program, such as the United Order. Instead of an egalitarian community, the group sought to be independent (Everett 1966).

Another colony with ecclesiastical directives was established in 1898 by the Salvation Army on the Plains of eastern Colorado along the Arkansas River, between the current towns of Holly and Granada (Ubbelohde et al. 2006). It was considered a philanthropic colony and was named Fort Amity. The premise of the colony was to provide social development in an attempt to help impoverished city populations by teaching them to farm and, in turn, to become self-sufficient. The colony was set up as an 1,800-acre settlement along the bottom lands of the river; each family was sold a plot of land to be paid for through work over time (Athearn 1985). Families were allotted 10 acres, along with livestock and farming implements. The cultivated lands supported 350 individuals during the colony's peak. As time went on, the soils proved to be heavily alkaline; water seepage brought the salinity to the surface, eventually making the land unfit for farming. As a result, Fort Amity was abandoned in the early 1900s (Ubbelohde et al. 2006).

Ethnic Colonies

By the turn of the century, agrarian settlements for communal benefit had begun to wane significantly. The slowing of the nineteenth century colony craze can be attributed to the limited number of success stories these ventures achieved throughout their history. Regardless, some of the country's population still gravitated toward a collective existence. As history had shown, not all colonists were attempting to attain a utopian existence; some were merely looking to find financial stability and obtain the comfort and safety of living with others of similar ethnic backgrounds. One such colony was Dearfield (site 5WL744), an African-American settlement on the plains between Greeley and Fort Morgan. The colony was the vision of Oliver Toussaint Jackson in 1910. Encouraged by the words of Booker T. Washington in *Up from Slavery,* Jackson envisioned an all African-American settlement where individuals could own their own land and where farming could be employed to alter the future of its residents (Slaughter et al. 2005; Ubbelohde et al. 2006). In 1921, near its peak, the colony had a population of 700, and was engaged in dry-farming techniques and raising livestock and poultry. The colony witnessed only a modicum of success as continued membership was stagnated by a deficiency of African-American settlers within the state. The colony continued to survive through the 1920s and into the 1930s, until the effects of the Great Depression and the Dust Bowl ultimately led to its abandonment (Beaton 2012).

A second African-American colony was also established at Dry, Colorado, in the southeastern part of the state. Founded in 1917, it was contemporaneous with Dearfield. Unlike Dearfield, Dry was not an actual town, but rather was composed of a collection of homesteads with a single school. The Dearfield School has been recorded as site 5OT1323. Because of its dispersed population without a townsite, Dry is considered more of a settlement than a colony. The settlement was located roughly 8 mi. south of Manzanola, Colorado, by the Rucker sisters—Josephine and Lenora (also referred to as Kitty). During its peak, Dry was home to nearly 100 people (Slaughter et al. 2005), and remained occupied into the 1930s, when it would suffer a fate similar to Dearfield, with national and local hardships resulting in the near desertion of the settlement (Beaton 2012).

Expected Site Types

Most townsites and settlements were established based on proximity to resources and transportation networks (such as a trails, wagon roads, railroads, or roads), and the potential for economic benefits to the residents. The settlement section presented above outlines examples of settlements, townsites, and camps, each representing a different category of human habitation, though each type is similar in being composed of groups of individuals living together to form a community. By examining the varying types of habitation and the size of each, an understanding of their extent and function becomes more apparent. Evidence for identifying these site types can range from obvious to ephemeral depending on the extent of the remains. Standing architecture provides clear association of spatial layout and townsite organization. In instances where standing architecture remains, archaeologists should make efforts to distinguish between single-family holdings and community holdings. Single-family holdings would be manifested as a central residence with possible associated outbuildings on a definable individual parcel. Community holdings would appear as a collection of households (such as a cluster of small cabins, a boarding house, or apartment, with possible associated outbuildings) that form a residential center that allows for the pooling of resources. It should also be noted that agrarian colonies (whether collective, religious, or ethnic) will have a much more widely dispersed residential population that includes lands or plots cultivated by each household. In this scenario, GLO patent records and historical documentation will be necessary to understand the extent of these settlements. Site types can potentially be determined through more intensive use of archival sources by completing post-field historical research through the online BLM-GLO land patent database, county courthouse records searches, and even online genealogical research. In this manner, periods of significance, interpreted on the basis of on-site cultural materials, can be placed into their proper historical contexts. Caution should be exercised, as not all land acquisitions are presented on the GLO database. A lack of data should not deter researchers from using other archival sources, such as county courthouse records, which are increasingly being made available online.

As so often is the case with residential centers after years of abandonment, building material salvaging, fire, floods, natural deterioration, and looting will have destroyed or removed nearly all evidence of standing architecture. What tends to remain of structures include foundations, depressions, platforms, and building materials that are not subject to rapid natural decay, such as stones, concrete, iron fasteners, window glass, and the occasional fragment of lumber. It is expected that at least some level of structural material remains will be present at settlements; however, if structural signatures are ephemeral or lacking, identification may come from the presence of domestic-use artifacts. Archaeologists are encouraged to assess spatial patterning to determine if patterning exists that may pinpoint structure locations. In structure locations can be pinpointed in this way, historical documentation will again be necessary to determine if a settlement is extant.

Also covered in this section are camps, which commonly signify impermanent occupations, ranging from short–term, over a period of days, to long–term, over a period of months to years. As evidenced by the D&RG camps, occupancy may manifest as simple artifact scatters associated with food preparation and consumption, or it may be expanded to include landscape modification for temporary habitation structures such as tents. Some of the camps appear to have been more developed, with the construction of dugouts, bread ovens, and rock walls. As is the case with the boom town of Dawson City, some residential centers might have established with the intent of becoming more permanent but were abandoned before they could evolve beyond temporary use.

Data Gaps

One of the primary archaeological needs for understanding this theme is to clarify the extent of potential settlement remains and to authenticate whether a settlement is actually represented. This can be accomplished through a variety of archival research and cartographic resources. In addition to research, special attention should be paid to the architectural evidence on site to better classify the extent of the structures present and type of settlement represented, such as townsites built by companies, utopian communities, or a collection of individual residences occupied as an informal settlement. Moreover, artifacts associated with residences should be carefully scrutinized to better clarify the history of the settlement and/or the evolution of its occupation, including periods of growth, abandonment, or events effecting population fluctuation. As discussed in Church (2007:485), data are lacking on group-occupied structures, as well as on commercial and institutional buildings within settlements.

MANAGEMENT RECOMMENDATIONS FOR CULTURAL RESOURCES

By Rand A. Greubel and Matthew J. Landt

Management of prehistoric sites and historic Native American and Euroamerican sites within the RGFO should be guided by archaeological research goals and the needs of the public. Sites that have the potential to yield data that can be used to refine the models of past use of the study area or to address specific research questions should be regarded as significant resources, worthy of protection and scientific investigation. In general, sites that meet Criterion D for eligibility for listing on the National Register of Historic Places are those that have the potential for yielding important scientific information. The prehistoric and historic overviews of the cultural resources in the RGFO that have been presented above, in conjunction with the concise synopses of the prehistoric contexts for the Arkansas and Platte river basins (Gilmore et al. 1999; Zier and Kalasz 1999), provide contexts for evaluations of site significance. Moreover, the sensitivity modeling conducted as part of this study will help to guide decisions about project development and resource management and, it is hoped, illuminate particular areas with the highest potential to yield the data necessary for the advancement of regional research objectives.

Research Context for the RGFO: Data Needs and Potential Research Directions

Data gaps and needs by research domain for each prehistoric period have been presented in the preceding sections. The thematic discussions of history and expected historic site types have collectively presented contexts for historical archaeology within the RGFO study area and identified general data gaps and needs. These synthetic summaries, used in concert with the 1999 prehistoric context documents and the published historic context for Colorado (Church et al. 2007) can be used to generate research goals and questions for each time period. Major research directions for the RGFO area identified during this study are summarized briefly below. Specific research questions are not reiterated; the reader is referred to the preceding synthetic summaries, the 1999 prehistoric context documents (Gilmore et al. 1999; Zier and Kalasz 1999), and the 2007 historical context for Colorado (Church et al. 2007) for detailed presentations of research questions and issues.

Paleoindian

Nearly all of the Paleoindian research questions posed in the 1999 prehistoric contexts remain valid. A major data gap for the Paleoindian stage is simply the low number of Paleoindian sites in the RGFO study area, especially as compared to sites of later periods. Therefore, all Paleoindian sites that retain any integrity or data potential should be considered significant. All issues related to chronology should continue to be considered important. A calibrated calendrical chronology of Paleoindian occupations should be pursued as an alternative to existing uncalibrated chronologies. Recent research has suggested that Paleoindian groups of all periods may have been more diverse than expected with regard to the geographic regions that they occupied and the wide range of resources they exploited; this issue would benefit from additional research. Related to this general topic is the more specific issue of variability in the exploitation of lithic raw materials and reduction strategies, particularly in the Plains versus mountains. Other important research goals include the need for a better understanding of early Paleoindian occupation of the mountains and the construction of demographic models for all periods.

Archaic

The majority of the research questions pertaining to the Archaic stage that were presented in the 1999 prehistoric contexts have not been fully answered. Refinements of Archaic chronologies are needed, which will entail more reliable radiocarbon dating for all periods. Parallel with this is the need for a calibrated calendrical chronology of the Archaic stage in eastern Colorado; researchers have somewhat conservatively tended to adhere to taxonomic schemes utilizing uncalibrated radiocarbon dates, despite advances in date calibration. A greater understanding of population dynamics remains an important goal, particularly for the Early and Middle Archaic periods. Other significant research issues revolve around Archaic use of the mountains; therefore, any Archaic sites in the mountains that retain integrity should be considered important resources. All aspects of the Middle Archaic McKean Complex should be considered worthwhile foci for future research.

Late Prehistoric

Late Prehistoric data in the RGFO study area are considerably more profuse than data from any other prehistoric period. As a result, the research questions are more numerous and detailed. The great majority of the research questions presented in the Arkansas and Platte river basin contexts (Gilmore et al. 1999; Zier and Kalasz 1999) remain partially or wholly unanswered, and nearly every research domain can benefit from additional work. The reader is referred to these documents and to the discussions presented in the preceding synthesis for particular data gaps and important research directions.

Several areas of research are especially important. Among these is a better understanding of the timing and nature of the introduction of technologies and subsistence innovations that characterize the beginning of the Developmental and Early Ceramic periods in eastern Colorado. The inception and denouement of distinctive regional cultures such as the Apishapa and Sopris phases require additional research. The degree to which Apishapa and Sopris groups, and other contemporaneous cultural groups both within and outside of the region, interacted requires additional research, as does the nature of those interactions. Archaeologists need a greater understanding of the ideological and spiritual lives of Late Prehistoric peoples. Research into rock art, mortuary practices, and potentially ceremonial features and structures holds promise for yielding such insights. Investigations based on middle-range theory that utilize ethnographic and ethnohistorical data should prove useful in this regard, but other approaches are possible (cf. Loendorf 2008).

Much progress has been made over the past few decades in modeling Late Prehistoric settlement systems and patterns of mobility, but more work is needed, particularly in regard to intraregional differences and use of the mountains. Related to this, more research is needed into lithic reduction strategies and the uses of pottery and its role in the subsistence and settlement systems of Late Prehistoric groups. Although progress has recently been made in modeling the relationships between paleoenvironmental change and population dynamics during the Late Prehistoric (Gilmore 2008), research that builds on the recent work will continue to be important for understanding the underlying causes and contexts of the broad changes in demographics, settlement systems, subsistence practices, and technologies during this period.

Protohistoric

As with all of the preceding cultural stages and periods, the Protohistoric research questions posited in the 1999 prehistoric contexts (Gilmore et al. 1999; Zier and Kalasz 1999) should still be considered relevant. Two important goals should be finding better ways to differentiate Protohistoric sites from sites of earlier time periods when temporally diagnostic artifacts are lacking, and simply to increase the database of excavated and surface-documented Protohistoric sites. There are many aspects of Protohistoric chronologies and lifeways that need additional work, such as the timing of the introduction of certain artifact types and technologies, and better understanding of when historically known tribes such as the Apache, Comanche, Cheyenne, Arapahoe, Ute, and Kiowa entered and exited the region, and how each group exploited the resources within the study area. One example of a technology that may have evolved through time—and, therefore, the morphology of which may be diagnostic of particular time periods—are stone circles (i.e., tipi rings). Rock art styles likely exhibit similar diachronic changes, some of which are moderately well understood. With both of these topics, however, there is room for additional research.

A major research goal in the region, and one that has actually seen considerable advancement since the publication of the 1999 prehistoric contexts, is to achieve better understanding of the route and timing of Athapaskan migration into eastern Colorado. This is an exciting area of inquiry, especially in the way in which it articulates with archaeological and anthropological research conducted in adjacent regions (e.g., Gilmore et al. 2013; Gilmore and Larmore 2012).

Historic Native American

Most of the research issues that are important for the Protohistoric period are also important for Historic Native American occupations in the RGFO study area. Documented Native American sites of the historic period are relatively rare. It may be that more have been recorded than is currently known, but they are not recognizable as historic because temporally diagnostic artifacts or other chronological information are lacking. Another obvious reason that they are rare is that the historic period was brief compared to preceding periods, and, therefore, fewer sites were generated. It is possible that many of the major Native American camps of the historic period were in areas that were the subsequent focus of Euroamerican settlement, resulting in the destruction of sites or their concealment beneath urban, suburban, and rural developments. Finally, some historical sites that have been interpreted as affiliated with Euroamerican occupation may actually be Native American.

As with Protohistoric sites, more work needs to be done with respect to finding better ways of distinguishing Native American sites of the historic period from those of earlier periods, and of differentiating ephemeral Native American and Euroamerican sites. Expanding the database of Historic Native American sites should be considered an important goal. An approach that may prove fruitful for future research into the Historic Native American occupation of the RGFO study area is the use of historical documentary sources (e.g., ethnohistorical accounts, county histories, oral histories, photographs, military records, newspapers) to locate sites or to identify areas that may contain Native American sites. The use of metal detection has proven to be an effective method for finding historical artifacts and thereby providing the data necessary to confirm that a site belongs to the historic period. However, caution is advised. The overenthusiastic use of metal detection, especially when it is not conducted under the umbrella of a carefully conceived research design, can be injurious to sites. Because it results in the removal of particular classes of artifacts from the archaeological record, it should only be conducted when the goals are well defined, artifacts are mapped and their depths and other contextual data are carefully documented, and the artifact recovery records are easily accessible to researchers.

It is well known that ethnographic data can inform archaeology through ethnographic analogy and other middle-range theoretical approaches. This can take the form of existing data or data generated from new ethnographic research. Ethnography can be invaluable for supplying layers of cultural information and meaning that can bridge the interpretive gap between archaeological data and the reconstruction of past lifeways and even ideologies. Archaeologists need to do a better job of engaging Native Americans through consultation and collaboration, given the potential for interpretive advances in archaeology on the one hand, and for offering archaeology as a potentially useful tool for Native elders and communities on the other. Native American elders and other keepers of traditional knowledge can help archaeologists to discover the meanings of rock art, ceremonial structures and features, and other archaeological remains linked to past rituals, spirituality, and ideologies (e.g., Blythe 2008).

Historic Euroamerican

Important research needs and data gaps for historic-period Euroamerican sites and occupations in Colorado are discussed in Church et al. (2007). Data gaps and important research directions more specific to the RGFO have been presented thematically in the preceding synthesis of historical archaeology. The major points are reiterated below.

Roads and trails are arguably one of the most neglected of archaeological site types, likely because they are ubiquitous and problematic to record, often extending for great lengths. A major goal of future archaeological work on the RGFO should be to focus on accurate identification of historic roads and trails. Key to this is prefield research consisting of the examination of GLO plats, old topographic maps, and aerial images (e.g., Google Earth). Once identified in the field, historic roads and trails should be systematically documented with the goal of collecting basic data. Roads and trails may be associated with other types of sites or facilities, and the associations should be documented to the greatest degree feasible for any given project. Associated artifacts will yield information about the periods of use and possibly the function of the road or trail. It is important for archaeologists to understand that roads and trails did not exist in isolation, but rather were components of larger systems.

Given the obvious importance of railroads in the history of the western US, their archaeological documentation is important because it can reveal information about how they supported economies, industries, and population movements during the historic period. Most of the factors pertaining to field documentation of railroads or their archaeological remains are similar to those identified for roads and trails. Prefield research and basic data collection are important. Even more than roads and trails, railroads were components of larger, more complex systems that often extended for great distances and included a variety of ancillary features and associated site types. Archaeologists should become familiar with these and the correct vocabularies used to describe them. Assessments of significance for railroads should always take their contexts, associations, and specific functions (i.e., the purposes for which they were built) into consideration. Construction camps may often be associated with railroads, and it is important to recognize them as such, rather than as unassociated manifestations. Many historical documents relating to railroads are extant, and the researcher should make use of these materials to determine periods of significance and to compile historical narratives of railroad construction and use.

The synthesis of government-related sites in the RGFO focuses on military forts, Indian agencies, Japanese-American internment camps, POW camps, CCC camps and related sites, CPS camps and related sites, and sites related to the early history of government entities such as the Reclamation Service (later the BOR), the BLM, and the USDA Forest Service. The major goal for archaeological research into government associated site types is their identification and documentation. It is important to be able to understand the historical meanings and significance of these sites and the events that created them. The only way to accomplish this is to locate and carefully document the major sites, followed by the identification and description of as many ephemeral associated site types as possible. Like any other archaeological site type, government sites did not exist in isolation, but instead were part of larger site complexes. Delineating these complexes across the landscape will allow for more meaningful interpretations of individual sites.

As most archaeologists who have worked in Colorado or, indeed, across the west understand, sites related to historic farming, stock raising, and homesteading are omnipresent on the landscape. There are many research questions and data gaps for the agricultural theme, which are presented in detail in Church et al. (2007) and discussed in the preceding synthesis of historical resources on the RGFO. Some significant data needs are summarized here. Much more research is needed for the earliest agricultural sites, particularly early Spanish and Mexican farms and ranches in the southern part of the RGFO study area and farming and pastoral sites associated with fur-trader forts. It is likely that later historical and modern agriculture and other developments have obscured such remains, so the evidence for these agricultural activities during the early periods may be subtle and sparse. If such sites are identified, subsequent archival research should be pursued. Another significant data gap is the need for clarification of site types and periods of significance for all historical agricultural sites; the archaeological literature unfortunately contains too many examples of substandard site recordings and use of misleading or incorrect terminology, which inhibits any research that might attempt to rely on these data. Rectifying this can only be achieved through more careful evaluation of site functions and activities, and more thoughtful and concise use of correct terminologies to describe these archaeological manifestations. Fieldwork should be followed by historical research using the online BLM-GLO land patent database, county courthouse records searches, and other searches of primary and secondary documentary sources.

The discussion of archaeological sites associated with the industry theme in the foregoing synthesis for the RGFO divides these sites into several subthemes, including fur trade, mining, quarrying, oil, health and wellness, and tourism and recreation. Other important industries in Colorado, such as logging, are not extensively discussed because they were only minimally conducted on lands that are now under the management of the BLM-RGFO. Data needs for fur trade-era sites pertain to almost every aspect of sites of this period, given the rarity of such sites. The discovery and identification of fur-trade-era sites, therefore, is the most important data gap for this subtheme. With regard to mining sites, there are relatively abundant data but the quality of this information is often wanting. Many mining sites are evaluated as insignificant because the recorders do not recognize their research value; moreover, many mining sites are incompletely recorded and suffer from inadequate postfield historical research. These problems can be rectified through more thorough and informed field recording followed by archival research, as described in the preceding synthetic discussions. The major data gap related to stone quarrying is the lack of adequate historical research that might allow for greater understanding of the extent and use periods of quarry sites. Other significant data gaps relate to quarrying methods, procedures, and technologies as inferred from the material remains documented at quarry sites. This can be challenging because quarries may have relied extensively on hand tools or on machinery that was later removed. The primary data gap for early oil industry sites is their paucity in the documented archaeological record. Therefore, the ability to recognize and identify such sites is of critical importance. It is possible that documents relating to early oil exploration and extraction can be found at the BLM, depending on the time period. Sites associated with the health and wellness industry are also underrepresented in the documented archaeological record. This was an important industry in some areas within the RGFO, but it is likely that sites associated with health and wellness have not been recognized as such. They might include camps, buildings or other structures, and facilities, some of which were associated with particular religious or ethnic groups. As with other site types in the industry theme, the identification and thorough recording of such sites, followed by adequate historical research, will be key to understanding the extent and significance of this industry in the study area. Tourism and recreation have unarguably comprised an important industry throughout Colorado, and in some respects have played major roles in the use of marginal or "wilderness" areas, the economies of small towns, and even the development or preservation of landscapes. Yet, tourism and recreation sites are often given short shrift in terms of archaeological documentation and interpretation. Better identification, recording, archival research, and evaluations are imperative. The data obtained from tourism and recreation sites have the potential to reveal insights into social values and how different socioeconomic classes expended their resources in pursuits related to leisure, recreation, and self-expression.

One of the primary data needs for sites associated with the settlement theme is to identify the remains of such site complexes and to confirm that a settlement is actually represented, given the potential for confusing settlements with other types of site or building complexes such those associated with ranches or other industries. It is important to document the architectural evidence and the extent of structures and to follow up fieldwork with careful archival and cartographic research. Through these means, it should be possible to determine the type of settlement represented by the archaeological remains, such as a townsite built by a company, a utopian community, or an informal settlement composed of a collection of individual residences. Associated artifacts should allow the clarification of the chronology and evolution of the occupation.

Threats to Cultural Resources

Cultural resources are the fragile and nonrenewable physical remains of prehistoric and historic human activity, occupation, or endeavor that are of importance in human history. Cultural resources may comprise the physical remains themselves, the areas where important human events occurred (even if evidence of the event no longer remains), and the environment surrounding the actual resource. Impacts to cultural resources that are caused directly or indirectly by project activities are, therefore, considered adverse and permanent. Common threats to cultural resources on BLM lands in eastern Colorado are listed below.

Energy Development

The recent boom in energy development projects (e.g., oil and gas, wind farms, and transmission lines), though not as numerous in the RGFO as in other areas of the west, has impacted cultural resources in various ways. Well pads and staging areas linked with oil and gas field developments are associated with surface disturbance over large areas as individual drill-heads continue to be preferred over directional-drilling (Kreckel 2007). Linear construction projects such as access roads, pipelines, and transmission lines are more likely to impact a wider variety of sites because disturbances are distributed across multiple ecozones and cultural use areas. In all of its varied forms, energy development often causes indirect impacts to cultural resources by improving access to sites and increasing erosional processes that are specific to particular locations. Improved access to sites in remote areas tends to increase site visitation and impacts from surface artifact collection and looting (cf. Nickens et al. 1981).

Wildfires

Wildfires are natural phenomena that are likely to have impacted most prehistoric sites. Although many fires are naturally started, the direct and indirect effects of wildfires are, nonetheless, potentially detrimental to sites (Lentz et al. 1996; Ryan and Jones 2003). Fires may alter surface artifact distributions, complicate radiocarbon dating and obsidian hydration studies (Smith 1999), and cause spalling of rock faces that leads to the destruction of rock art (Noxon and Marcus 1983). Some site types such as Native American wooden structures and historic wooden structures, and some artifacts, may be entirely destroyed by fire. Fire suppression efforts, especially the mechanized construction of fire lines, can disturb swaths of sediments through sites. The indirect detrimental effect of increased erosion that follows in the vegetative void behind a fire should be of equal concern to cultural resource managers.

Vegetation Treatments

Land-managing agencies have utilized various types of vegetation treatments to reduce fuel loads on the landscape in an attempt to lessen the potential impact and severity of wildfires. Vegetation treatments include chaining, prescribed burns, roller-chopping, hydro-axing, and chopping/mulching as well as timber sales. Like all ground-disturbing activities that utilize mechanized assistance, vegetation treatments have direct and indirect impacts to sites (Andrews 2004; Harms and Reed 2006). The advantage of vegetation treatments over natural wildfires is the ability to plan the activity and thus apply a certain amount of foresight when assessing the degree of negative impacts to a site.

Grazing

The grazing of livestock (e.g., cattle or sheep) can adversely impact cultural resources (Osborn et al. 1987; Roberts and Gardner 1964). Grazing animals directly impact sites by trampling and churning shallowly buried cultural deposits and artifacts, and by toppling fragile standing structures by rubbing against them. These direct impacts are exacerbated by indirect erosional impacts that occur when animal densities outstrip the capacity of the landscape to recover. This type of destruction can occur over a broad area, but can also be highly localized, such as when animals congregate around water sources, salt licks, shades, and corrals.

Off-Highway Vehicles

The use of off-highway vehicles (OHV) on public lands has dramatically increased in popularity since the 1970s. The increasing ability of OHV users to access remote and challenging terrain is directly related to the impacts by OHV users on cultural resources. Both direct and indirect impacts (ground-disturbance and erosion) are of higher concern when unauthorized roads or trails are created. Erosion is of greater concern in arid areas with sparse vegetation and in particularly steep and rugged areas that are more susceptible to erosion and less able to recover from disturbances. As OHV users access otherwise remote areas, there are increasing concerns about increased site visitation and impacts from surface artifact collection and looting (cf. Nickens et al. 1981).

Land Exchanges

As noted by others (Reed et al. 2008a, b), the loss of meaningful protection because of land exchanges or sales of public lands may be a cause for concern with regard to impacts to cultural resources. The transfer of public lands to private hands, whether it is corporations or individuals, opens cultural properties to direct impacts (e.g., looting, mechanized ground disturbance, grazing) that may lead to indirect impacts as noted above.

Vandalism

Vandalism of archaeological sites on BLM lands across Colorado—and, indeed, across the western US—is a serious problem (e.g., Nickens et al. 1981). It can range from surface collection of "arrowheads" and other artifacts—a common pastime in the west that many people have traditionally engaged in since the first Euroamerican settlement of the area—to illicit and highly destructive digging in rockshelters, architectural ruins, and other highly visible sites. There is no way to know how many shallow or primarily surficial lithic scatters in the RGFO have essentially been stripped of diagnostic artifacts over the years by arrowhead hunters, thereby losing much of the data that such sites can provide, but the number is likely very high. There is little that the BLM can do about this activity, which is surely ongoing, other than public education. Of greater concern is the focused destruction through illicit excavation of sites with intact buried cultural deposits. The BLM should continue to be aggressive both in protecting highly visible and important sites such as rockshelters and architectural ruins and in prosecuting looters who are caught in the act of vandalizing such sites.

Cultural Resource Use Categories

The BLM has defined six cultural resource use categories for classifying sites, described in their Land Use Planning Handbook and summarized below (Table 11). The use categories are *Research/Scientific*, *Education/Interpretive*, *Traditional Cultural*, *Conservation*, *Aesthetic and Artistic*, and *Discharged from Management*. For this study, Alpine uses the additional category *Undetermined Use* for sites that do not fit into any of the BLM's defined use categories. The types of sites assigned to each use category are discussed below. Tables classifying the majority of the known cultural resource sites on BLM federal surface in the RGFO into use categories are included in Appendix B.

Research/Scientific

Sites in the Research/Scientific use category are suitable for scientific or historical study using current research methods and techniques. Cultural resources in this category generally consist of prehistoric or historic sites that contain archaeological deposits that can yield information applicable to important research questions. Such deposits are typically subsurface, but in some cases may represent surficial artifacts or features that can yield information through additional surface recording and collection. This category includes prehistoric and historic sites that are eligible to the NRHP under Criterion D, but may also include some that are evaluated as eligible under other criteria.

Table 11. Cultural Use Categories on BLM-RGFO Surface Management

Use Category	Resource Example[1]	Criteria for Assignment
Research/Scientific	Prehistoric sites, historical sites and structures	Eligible under Criterion D, possibly some ineligible sites suitable for experimental studies
Education/ Interpretive	Prehistoric structures and rockshelters, historical structures and camps, railroad grades and constructed features, wagon roads, historically significant roads and canals, prehistoric rock art, historical inscriptions	Visually striking, historical or anthropological interpretive value, ease of access
Traditional Cultural	Ceremonial sites, Native American rock art, churches, cemeteries, historically significant ranching structures and facilities	Traditional cultural properties, Native American sacred sites, ceremonial function, churches, cemeteries, Euroamerican and Hispanic traditional use sites
Conservation	Prehistoric and historical sites, historical forts, railroad stations and constructed features, wagon roads	Eligible under Criterion D, scarce or fragile, unable to study using current methods
Aesthetic and Artistic	Native American rock art, historical Euroamerican and Hispanic sites and structures with artistic or aesthetic value	Criterion C, other more subjective aesthetic or artistic value
Discharged from Management	Ineligible sites, isolated finds	Not eligible for inclusion in the NRHP, not useful for potential experimental research
Undetermined Use	Needs data sites, NRHP-eligible historical linear sites	Need data sites, unevaluated sites, functioning ditches or roads

[1] Not a complete list; just some suggested site type examples for each category.

It is understood that scientific study could result in the property's physical alteration or partial or full destruction. Some particularly important properties classified as having scientific use may also be classified into the Conservation category. In such cases, it should be understood that conservation may only be necessary until such time as data recovery becomes feasible; that is, sites placed into both categories need not necessarily be conserved in the face of research or data recovery. Exceptions might include sites such as masonry structures that should be conserved after excavation for other reasons, such as public interpretation. Some sites in the Research/Scientific category may also be listed in other use categories, such as the Traditional Cultural or Education/Interpretive categories.

In the preceding synthetic summaries and discussions, data gaps and a number of research questions or issues deemed important for advancing scientific and historical understanding of the past human occupations of the RGFO are identified and discussed. Obviously, some sites are better suited for yielding data to address specific research questions than others. For example, research questions relevant to the Protohistoric stage or Historic Native American period can be best addressed with data from NRHP-eligible sites that have yielded some evidence of occupation during these periods, with sites with architectural remains such as tipi rings, ceramics, or Euroamerican trade goods representing the site types with the highest research potential. Table 12 describes the types of sites that offer the best potential for addressing the research questions identified as

Table 12. Guide to Identifying Prehistoric or Historic Native American Sites on the RGFO with Data Recovery Potential.

Archaeological Unit	NRHP-eligible sites offering the best data potential	NRHP-eligible sites offering good data potential	NRHP-eligible sites and non-eligible sites/isolated finds offering limited (but still useful) data potential
Paleoindian stage	Open or sheltered artifact scatters with a Paleoindian component exhibiting substantial soil depth, good contextual integrity, and moderate to high numbers of artifacts. Sites with known thermal features should rank higher.	Open or sheltered artifact scatters with a Paleoindian component exhibiting shallow to substantial soil depth, at least moderate contextual integrity, and low to moderate numbers of artifacts. Sites with known thermal features should rank higher. Any lithic procurement site with a Paleoindian component is important.	Open or sheltered artifact scatters with a Paleoindian component exhibiting shallow soil depth, low to moderate contextual integrity, and low numbers of artifacts.
Archaic stage	Open or sheltered artifact scatters with an Archaic component exhibiting substantial soil depth, good contextual integrity, and moderate to high numbers of artifacts. Sites with known thermal features or obsidian should rank higher.	Open or sheltered artifact scatters with an Archaic component exhibiting substantial soil depth, at least moderate contextual integrity, and low to moderate numbers of artifacts. Sites with known thermal features or obsidian should rank higher. Any lithic procurement site with an Archaic component in important.	Open or sheltered artifact scatters with an Archaic component exhibiting shallow soil depth, at least moderate contextual integrity, and low numbers of artifacts.
Late Prehistoric stage	Sites with structures exhibiting substantial and intact deposits inside unexcavated (or partially excavated) rooms, substantial and intact deposits in extramural areas, and overall good contextual integrity. Also, open or sheltered artifact scatters with ceramics. Sites with known thermal features or middens should rank higher.	Open or sheltered artifact scatters with a Late Prehistoric component exhibiting substantial soil depth, good contextual integrity, and moderate to high numbers of artifacts. Sites with known thermal features or obsidian should rank higher. Sites with Late Prehistoric structures badly damaged by vandalism but where some intact deposits may yet exist. Any lithic procurement site with a Late Prehistoric component is important.	Open or sheltered artifact scatters with a non-structural Late Prehistoric component exhibiting shallow soil depth, at least moderate contextual integrity, and low to moderate numbers of artifacts. Sites with small, heavily vandalized structures where extramural areas still retain potential.
Protohistoric and Historic Native American periods	Sites with structural remains such as Native American wooden structures or tipi rings exhibiting some soil deposition (can be shallow), good contextual integrity, and moderate to high numbers of artifacts. Also, open or sheltered artifact scatters with ceramics or Euroamerican trade goods. Thermal features should rank a site higher. Single-component sites are best (i.e., no problems with mixing or palimpsests).	Open or sheltered artifact scatters with a Protohistoric or Historic Native American component exhibiting some soil deposition (can be shallow), good contextual integrity, and moderate to high numbers of artifacts. Sites with known thermal features or obsidian should rank higher. Any lithic procurement site with a Protohistoric or Historic Native American component is important.	Open or sheltered artifact scatters with a Protohistoric or Historic Native American component exhibiting some soil deposition (can be shallow), at least moderate contextual integrity, and low to moderate numbers of artifacts. Sites with cambium-stripped pine trees.

important for each archaeological unit. This table describes three types of prehistoric sites: those with the potential for limited but still potentially useful data, those with the potential to yield good data that are relevant to at least some of the research questions identified in this study, and those with the best potential to yield data relevant to the most important research issues identified in this study.

Sites in the Research/Scientific use category are also well suited for experimental studies, even when such studies result in substantial alteration to or loss of the site. Experimental studies do not typically include standard archaeological data recovery. The goals of an experimental program should be to increase understanding of natural or human-caused deterioration, to test the effectiveness of particular protection measures, or to develop new research or interpretation methods. It should not be applied to cultural properties with strong research potential, traditional cultural importance, or good public use potential, if it would significantly diminish those uses. The data resulting from experimental use should benefit the interpretation or management of cultural resources similar to those subjected to experimentation.

In the RGFO study area, no specific sites have been identified for the types of experimental use described above. The category, however, need not be restricted to sites that are intentionally subjected to some type of destructive action in order to achieve the experimental result. There are many sites on the RGFO that have already been subjected to destructive natural forces, such as lithic scatters that suffer impacts from ongoing erosion and sites with wooden components that fall prey to wildfire. If such sites can be identified and ground-truthed, it may be possible to harness these natural destructive events for innovative experimental studies. For example, one can imagine experimental approaches to sites that have burned. Has the burning hastened erosion and, if so, in what ways and how rapidly? Regular monitoring of recently burned sites may allow insights into such "n-transforms" (Schiffer 1987) as they occur over a period of months or years. Similar opportunistic experiments could be devised for sites undergoing the effects of natural erosion in a variety of settings.

Another way to employ experimental methods but spare cultural resources is to create faux sites and allow them to be subjected to natural and cultural impacts such as erosion, cattle trampling, and vandalism. Such sites could consist of archaeologist-created lithic scatters placed in strategic locations where they can be easily visited, monitored, and subjected to data collection. The result might help land managers to understand the effect of such impacts on real cultural resources. Of course, such experiments can also be carried out simply by monitoring real lithic scatter sites over a lengthy period of time, but the advantage of the faux site is that every aspect of it—particularly the number of artifacts involved and their precise placements—can be controlled and documented.

Conservation

Sites classified for conservation are those that are unique, represent a particularly scarce type of resource, or cannot be adequately studied with current research methods. Sites of special historical or architectural importance are included in this group. Fragile, vulnerable, and rare sites are included in this category. Sites in this group might be considered for preservation until excavation and analytical methods superior to those currently available are developed. As defined for this study, this category is *not* mutually exclusive with other categories. Many sites in the scientific category that are also included in this category might be appropriate for either excavation in the near future or conservation, but this is a decision for BLM land and cultural resource managers. Therefore, the sites listed in the table in Appendix B and in the database submitted to the RGFO as appropriate for conservation represent only a potential pool of sites for actual conservation.

Traditional Cultural

This category is applied to cultural resources known to be perceived by a specific social and/or cultural group as important in maintaining their cultural identity, heritage, or well-being. This group includes sites regarded or designated as properties of traditional religious and cultural importance, also known as traditional cultural properties (TCPs), although TCPs may also include geographic locales, landscapes, or landforms such as mountains that are not necessarily archaeological sites. Sites classified into the Traditional Cultural use category should be managed in ways that recognize the cultural importance ascribed to them and to accommodate their continuing traditional use.

Prehistoric and Historical Native American site types in the RGFO that are included in the Traditional Cultural use category include vision quest sites, shrines, rock art sites, stone circles, burials, and cambium-stripped pine trees. Historic Euroamerican sites associated with traditional cultural use or important in the history or memory of a particular group might include cemeteries, homesteads, early townsites, old churches, and sites where traditional activities were conducted on a regular basis (e.g., a corral complex where local ranchers conducted annual spring branding).

Education/Interpretive

Sites classified into the Education/Interpretive use category are those with qualities that make them useful for onsite interpretation, education, or recreational use by the general public. This category may include historic sites such as standing buildings or other types of structures (e.g., a bridge) suitable for continued or adaptive use.

As applied to sites in the RGFO study area, the public use category contains a wide variety of site types that are perceived as having potential for interpretation or educating the public about prehistory or history. Examples of prehistoric site types potentially suitable for interpretation include rock art sites, sites with visible architecture, and excavated sites where an interpretive sign would be useful. The development for public interpretation of some prehistoric site types, however, should be weighed against the possibility that the sites could suffer increased vandalism as a consequence of being singled out for interpretation. For this reason, only sites that can be protected in some fashion should be considered for public interpretation.

Examples of historic Euroamerican site types (or specific sites) suitable for interpretation include mining complexes, tramways, standing buildings with interesting architecture, historic rock art or inscriptions, and feats of engineering.

Other site types in the RGFO are suitable for recreational use by the public. This group would include historic roads and trails that are open to foot, bicycle, or motorized vehicle traffic; and, as noted above, structures such as standing buildings or bridges that can be adapted for some type of recreational use.

Aesthetic and Artistic

Cultural resources classified into the Aesthetic and Artistic use category will primarily consist of sites that are eligible for inclusion in the NRHP under Criterion C. This group of sites includes Native American rock art (petroglyphs and pictographs), unusually good examples of prehistoric or historical architecture, and any other site with high aesthetic value

Discharged from Management

Sites that have no identifiable use are classified into the Discharged from Management category. This includes sites that are not eligible to the NRHP and that have no obvious value for experimental use—although some ineligible sites are eminently appropriate for experimental use.

Most isolated finds are also classified into this category. Sites classified for Discharged from Management are removed from further management consideration and do not impede other land uses.

Undetermined Use Category

The use category Undetermined is not one formally used by the BLM, but there are sites within the RGFO that cannot be assigned to any other use category because they either lack sufficient data to allow an accurate assessment of eligibility or are NRHP-eligible sites that do not readily fall into the Research/Scientific, Education/Interpretive, Traditional Cultural, Conservation, or Aesthetic and Artistic use categories. Sites placed in this category include those evaluated as "need data," "unevaluated," or "not assessed." Also included in this category are sites that are used by the public but not in the ways indicated by the BLM's Traditional Cultural category definition, such as ditches and canals, corrals, fences, occupied structures, highways, and functioning railroads.

Table 13 summarizes the use allocations assigned to 1,587 documented sites within the RGFO. Note that some sites are allocated to as many as three different use categories.

Table 13. Summary of Sites Assigned to Cultural Use Categories on BLM-RGFO Surface.

Use Category	Eligible	Not Eligible	Needs Data	Total
Research/Scientific	27	0	0	27
Research/Scientific, Education/Interpretive	38	0	0	38
Research/Scientific, Education/Interpretive, Conservation	13	0	0	13
Research/Scientific, Traditional Cultural, Conservation	1	0	0	1
Education/Interpretive	88	0	0	88
Education/Interpretive, Conservation	6	0	0	6
Aesthetic/Artistic, Education/Interpretive, Research/Scientific	1	0	0	1
Discharged from Management	0	1,255	0	1,255
Undetermined Use	5	0	153	158
Totals	**179**	**1,255**	**153**	**1,587**

Management by Use Categories

Cultural resource sites on BLM land in the RGFO are classified by use category in the tables in Appendix B and in the database submitted to the BLM along with this Class I overview. Some sites have been classified into more than one category, as summarized in Table 13. In general, sites that are eligible for listing on the NRHP because of their potential for yielding important scientific or historic archaeological data are classified into the Research/Scientific use category. Some sites classified for Research/Scientific use, however, may also be classified into the Conservation, Traditional Cultural, Education/Interpretive, or Aesthetic and Artistic use categories. As discussed above, it is not suggested that all sites classified as appropriate for Conservation be actually conserved. The list should be regarded merely as a pool of sites that might potentially be conserved; careful evaluation of site records and on-the-ground assessment will be necessary to determine which sites are actually worthy of conservation.

Most sites evaluated or determined not eligible to the NRHP are classified for Discharged from Management, though some—such as isolated finds or sites consisting solely of cambium trees—are classified into the Research/Scientific use category because they can yield data such as tree ring dates.

As discussed above, cultural resource sites in the RGFO are subjected to a multiplicity of threats on a daily basis. Sites in the Research/Scientific use category have intact cultural deposits. Human activities involving ground disturbances comprise a major threat to sites in this category.

When sites are on public lands or are associated with a federal undertaking, the Section 106 process affords some protection for sites in the Research/Scientific use category, though Section 106 only requires *consideration* of the sites, which may or may not include preservation or archaeological excavation (King 2008). Other major threats to scientifically important cultural resources on federal land include energy development (e.g., oil and gas wells, pipelines, access roads, transmission lines and substations), livestock grazing, OHV use, prescribed burns, wildfires, vegetation treatments, land exchanges, or vandalism, all of which can have highly variable but usually serious impacts to sites in the Research/Scientific use category. The impact of these threats is highest when they accelerate soil erosion. Natural soil erosion is also a great threat to sites, but generally is too pervasive to treat except in specific and limited circumstances (e.g., a masonry structure is being undermined by erosion and requires stabilization).

Particularly fragile sites in the Conservation use category, such as Native American wooden or brush structures and prehistoric masonry structures, are susceptible to the same types of threats as all scientifically valuable sites, only more so. Wooden structures may be destroyed by burning in either prescribed fires or wildfires. Vegetation treatments may destroy wooden structures directly or destroy the trees into which they are incorporated. Cattle, vehicles, or vandals may simply knock over brush structures whereas some may fall apart by natural deterioration. Native American wooden or brush structures are unlikely to last very long in the archaeological record; therefore, they should be carefully protected and conserved as long as practical. Archaeologists increasingly appreciate the importance of perishable structures for understanding prehistoric sites where traces of such structures have disappeared, and scientific approaches focusing on the structures and their associated activity areas continue to evolve. Some degree of protection can be insured if areas of old growth forest are mapped and avoided by energy development projects, prescribed burns, vegetation treatments, and land exchanges, at least until such time as cultural resource inventories can identify brush structures and other fragile sites types in those areas.

TCPs or traditional cultural use areas may vary greatly, as they may include landforms or other landmarks, vegetation communities, or archaeological or historical sites. As a result, threats to those resources can also vary greatly. Potential Native American TCPs in the RGFO may include vision quest sites, shrines, rock art sites, Native American wooden structures, burials, and possibly cambium-stripped pine trees. Possible Euroamerican TCPs might include cemeteries, homesteads, early townsites, old churches, and sites where traditional activities were conducted on a regular basis—though no Euroamerican TCPs have yet been identified as such on the RGFO. Avoidance of such sites by ground-disturbing activities and destructive undertakings such as prescribed burns and vegetation treatments is key for the protection of the RGFO traditional-use sites. Steps should be taken to ensure protection of the integrity of site settings. Potential visual impacts from planned undertakings should also be evaluated. If TCPs or traditional cultural use areas are also classified under Research/Scientific, Conservation, or Education/Interpretive use, their protection should be especially high priority.

Sites in the Education/Interpretive use category are also variable, including standing historical architecture, historic roads and trails, mining complexes, historical engineering projects, rock art sites, and certain other types of prehistoric sites. Many of these sites tend to be highly visible and are often readily avoidable by planned ground-disturbing activities.

Vandalism is another pervasive threat that affects sites in many different use categories. Vandalism can be reduced through discouraging vehicular access to important or highly visible sites in remote settings, by placing educational and cautionary signage, or by having BLM law enforcement or site stewards engage in more intensive monitoring of site condition in more accessible areas. It may be possible to enlist the help of other agencies or organizations, such as the county sheriff or the Colorado Division of Wildlife, to at least report possible cases of site vandalism; special BLM training sessions might be offered to individuals of other agencies who spend considerable time working in, or patrolling, areas where significant sites are present. The BLM should continue or even step up its efforts to enlist the public in site protection; the site stewardship program is an excellent way to accomplish this goal. However, public education is probably the best way to combat looting and other types of vandalism.

Management Recommendations

In the preceding sections, potential future research directions for prehistoric and historic archaeology in the RGFO have been discussed. Management strategies for dealing with threats to sites in particular use categories have been addressed and recommended. This section presents management recommendations from a more general perspective. First, the site sensitivity models constructed as part of this Class I effort are described. This is followed by discussions of the five overarching management objectives. Ideas are suggested for improving the identification, protection, and study of significant cultural resources on the RGFO and for enhancing public interpretation and education.

Sensitivity Modeling

The prehistoric and historical site sensitivity models are based on spatial correlations between site locations and environmental variables. The site sensitivity models assume that the location of a site on a landscape is, at least in part, a product of what can be found on the landscape at that place. In order to create those initial spatial correlations it is necessary to summarize the environmental variables for different time periods. Those summaries are also useful in highlighting trends in the dataset. That is, if prehistoric sites are consistently found on flat, south-facing areas in ponderosa forests, then other flat, south-facing areas in ponderosa forests are also likely to have prehistoric sites. Equally, if the majority of historic sites are located in ponderosa forests, then historic sites on the Plains have a lower likelihood of being included in the model. The results of the site sensitivity models are strengthened by understanding the structure of the underlying dataset.

A summary of the previously recorded sites in the database indicates that the landscape of the RGFO strongly structures the site sensitivity models. Both the prehistoric and historic site sensitivity maps indicate that the majority of sites can be found in evergreen forests on relatively flat areas that are near water and between roughly 8,500 and 10,350 ft. in elevation (Table 14). The least useful environmental indicator was aspect, with 30 percent south-facing sites and 20 percent north-facing and the remaining sites evenly divided between east and west. Within the large evergreen forest category, prehistoric sites were more consistently found in pinyon-juniper woodlands and historic sites were equally represented in pinyon-juniper and ponderosa pine forests. That distinction may have more to do with underlying geology and historic development in ponderosa pine forests that obscures prehistoric sites than it does with any differential use of the area through time. The largest difference between the locations of prehistoric and historic sites is related to geology. Historic sites were more consistently recorded above Precambrian gneisses and granites, while prehistoric sites were more often found on Cenozoic deposits. This difference is driven by the relatively high number of historic mining sites recorded in the mountains of the RGFO. Writ large, the ownership and management structure of landholdings in the RGFO, where the BLM actively manages more land in the mountains and foothills than in the grasslands of the Piedmont, Park Plateau/Raton Basin, and High Plains, heavily structures the dataset and the results of the site sensitivity model.

Objective 1: Identify Historic Properties

A large number of archaeological sites have been recorded within the RGFO on lands managed by the BLM. Despite the large number of sites recorded, these cultural resources represent a relatively small fraction of all the cultural resource sites present on the RGFO, as only a relatively small percentage of all BLM lands within the RGFO have been intensively inventoried for cultural resources. Clearly, more inventory work is needed before a full understanding of the prehistoric and historic occupations of the area can be achieved. It is recognized that public funding may not be available for large-scale inventories not directly tied to developments, but narrowly focused, smaller-scale surveys—designed to identify sites of particularly high scientific or historic value, traditional cultural properties, or sites for development for public education—may be more affordable or could be conducted using in-house personnel and resources.

Table 14. Top Ranking Environmental Variables.

Environmental Variable	Prehistoric Site		Historic Site	
	Top Ranked Variable	*% of Data*	*Top Ranked Variable*	*% of Data*
Elevation	8,500–10,250 ft.	43	8,700–10,350 ft.	49
Slope	<0–12 percent	55	<0–15 percent	48
Aspect	180–270° (SW)	33	90–180° (SE)	31
Roundtrip to Water	< 0.5 hr	50	< 0.5 hr	60
Vegetation	Evergreen Forest*	55	Evergreen Forest**	53
Geology	Cenozoic†	49	Precambrian‡	54

* Of which 75 percent are in pinyon-juniper woodland.
** Thirty-six percent of which are in pinyon-juniper woodland and 34 percent are in ponderosa forests.
† Geology of the last 66 million years that includes igneous, sedimentary, and unconsolidated Quaternary deposits.
‡ Geology of 1800–1000 million years ago that includes metamorphic gneisses and igneous granites.

Consideration should also be given to alternative or more intensive inventory methods in higher elevation areas where ground visibility is poor because of dense vegetation and where past inventories have encountered low site densities. Conducting archaeological monitoring of construction disturbances in non-site areas to determine whether cultural deposits have been obscured is one possible method that may reveal the presence of sites where few had been found before (see Hoefer et al. 2002:106). Areas that have recently burned also present opportunities for more effective inventory, provided duff and vegetation have burned off and the ground surface is fully exposed. In such cases, rapid mobilization of a survey crew will be necessary before vegetation grows back.

Site identification efforts should also include the testing and evaluation of the site sensitivity models developed by this project. Future cultural resource inventories can be compared to the site sensitivity maps created for this study. Site densities in the inventoried areas can be calculated by sensitivity zone and the validity of the model tested. If discordances are found, refinement of the sensitivity model should be considered.

Identification of historic properties should also include TCPs. The BLM should continue to work with Native American and other cultural groups with historic ties to the region to identify TCPs, so that they can be considered early in the planning phases of projects. Native American groups are sometimes reluctant to identify TCPs, so the BLM should continue its practice of direct consultation with tribes on development projects so that tribes can respond from an informed basis. It is also sometimes forgotten that Euroamericans, such as the descendants of early settlers of the region, may have links to sites or locales that can be characterized as TCPs for those groups or individuals (King 2008).

Accurate assessments of site significance are critical for identifying the types of sites needed to advance archaeological research in the region. Obviously, whether or not a site is evaluated as significant determines its fate. As Reed and Metcalf (1999) have argued, economic and political concerns make it impractical to classify all sites as significant resources. Cultural resource managers must, therefore, provide guidance to archaeological contractors regarding which sites are worthy of protection and worthy of the economic costs associated with that protection.

Sites dating to the historic period should be more rigorously recorded and evaluated than has typically been the case. Competent historic artifact analysis is necessary as a prime source of information about the period of occupation and function of a site. This information will help guide additional historical research whose goal should be to place the site in historic context temporally, functionally, and thematically. All historic-period sites, including structural sites, should be carefully examined and tested, if necessary, to evaluate archaeological potential. It should be remembered that archaeological deposits need not be deeply buried to contain data of importance, and even surficial scatters of artifacts may have data recovery potential. Historic sites found on federal lands will not necessarily be the same as those found on adjacent or nearby private lands, and this should be taken into consideration when significance evaluations are being made. That is, the history of land use and occupation on federal lands should be kept in mind when evaluating historic sites. Of exceptional importance, sites representative of failed or relinquished land acquisition attempts are a class of sites that can be considered typical on federal lands in general and on BLM lands in particular. They are not typical on private lands because successful land acquisitions resulted in lands becoming private and leaving the public domain, whereas failed land acquisition attempts reverted to the public domain and are still in federal ownership. Successful acquisitions developed into full-scale farms and ranches, whereas the failures represent short-term, single-occupation residential components that, on the surface, may appear inconsequential, but in reality are frequently repositories of unambiguous data that are clearly focused by theme and function (Church et al. 2007:287-289). Resource procurement sites on federal lands, such as for mining or stone quarrying, may have similar clear functional and thematic focuses and specific chronological periods. Short-term, single occupation sites are often an excellent opportunity for exploring ethnicity through archaeology. Realizing this potential requires recognition through artifact analysis and historical research. Site recorders should also realize that large and complex historic resources might, in fact, be inferior to simpler sites for the purposes of archaeological research. Historic sites occupied for long periods are often characterized by mixing of artifacts of various ages and functions, which complicates interpretations.

Objective 2: Protect Historic Properties

In addition to its obligations under Section 106 of the National Historic Preservation Act, the BLM is encouraged to enlist the cooperation of interested groups and individuals to monitor and protect the region's most important cultural resource sites (i.e., site stewardship or similar programs). The BLM should also be proactive in reaching out to local law enforcement agencies and educating them about the importance of upholding historic preservation and human burial laws.

It is recommended that the BLM be particularly aggressive in protecting cultural resources assigned to its Research/Scientific, Traditional Cultural, and Conservation use management categories. Special land-management strategies may be necessary to ensure that prescribed burns, grazing, off-road vehicular travel, recreation, vegetation treatment, or illicit collection or site looting do not adversely impact these important cultural resources. It is recognized that funding may be limited, but creative means of protection such as site stewardship, as noted above, should be used whenever possible. Signage and/or fencing might be considered for some site types. More frequent checking of highly visible and vulnerable sites during patrols conducted primarily for other purposes might help to protect sites as well.

Objective 3: Develop and Interpret Historic Properties

Efforts should be made to promote public understanding of the past in a manner that does not compromise a site's integrity of setting and overall level of protection. One method to further public appreciation of its nation's heritage is to develop a few sites for pubic interpretation. Some types of historic structures are particularly well-suited for interpretation, as they are usually near roads and often visually interesting. Prehistoric sites are more challenging to interpret for the public, as prehistoric architectural remains are often problematic for preservation and interpretation. Roadside signs may be an effective way to educate the public about cultural resources. Public education can also include the use of various types of media—websites, brochures, popular books, narrated DVD or online slideshows—to describe historic and prehistoric sites in the area.

Objective 4: Promote Scientific Research

Scientific analysis of historic properties by universities or non-profit research groups might also be promoted by the BLM. Scientific investigations provide a broader context for the evaluation and interpretation of other, similar sites in the study area. Scientific research is not the sole domain of academic institutions, however. Especially on large development projects where Section 106 is applicable, the BLM should demand high-quality research designs, state-of-the-art methodologies, and reporting of project results at archaeological conferences and in peer-reviewed publications. In some cases, it may be appropriate to enlist the assistance of avocational groups such as the Colorado Archaeological Society for small-scale local research projects.

Objective 5: Public Communication

Currently, the BLM communicates cultural resource information to the general public primarily through signs and brochures. The BLM also supports programs like Project Archaeology, designed to train elementary school teachers about archaeological issues. Brochures, signs, and well-informed educators all reach different segments of the general public and can be regarded as moderately successful in sensitizing the public to cultural resource concerns. There remains, however, a significant segment of the public that has not been reached through the established avenues of communication. Many do not realize the negative impacts of artifact collection or of driving off-road. Others do not realize the scientific value of many of the cultural resource sites in the RGFO. Increased use of mass media by the BLM might potentially reach a broad segment of the general public and would foster the preservation of cultural resources by increasing the public's awareness of the cultural resources on the public lands that they use. The RGFO might consider developing cultural resource-related messages for broadcast on commercial radio or television.

Of course, an economical way to communicate with the public is the internet. The RGFO should consider building or funding a website, or adding pages to their existing website, with abundant and interesting information about archaeology and history on the RGFO. Such a website should include both visually interesting graphics and substantive text. In addition to educating and entertaining the public, the website could describe the destructive effects of looting, illicit artifact collection, or irresponsible use of public lands. It could contain links to on-line literature and other interesting archaeology and history websites in the region and encourage visitors to join the Colorado Archaeological Society and possibly even become a site steward.

Conclusions

The goals of this study were to gather and organize baseline data on cultural resources within the Royal Gorge Field Office, create a site sensitivity model and maps covering the study area, prepare a synthetic overview of the prehistoric and historic occupations of the study area, and present management recommendations for cultural resource sites. These goals have been achieved. This Class I overview comprises a descriptive synthesis of currently known cultural resources in the RGFO, discusses important research issues in the study area and identifies the data needed to address those issues, presents site sensitivity maps for the prehistoric and historic time periods, discusses management options for cultural resources by defining use categories for particular classes of sites, and addresses potential threats to each category of those sites. Sensitivity maps resulting from this study have been provided separately to the RGFO.

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APPENDIX A

Summaries of Post-1999 Projects and Research

SELECTED RECENT PREHISTORIC RESEARCH

By Rand A. Greubel and Charles A. Reed

Introduction

Since the prehistoric contexts for the Arkansas and Platte river basins were published in 1999—roughly, the past 16 years at the time of this writing—numerous archaeological inventories, testing projects, and data recovery excavations have been conducted within the two adjoining drainage basins, which together encompass the full extent of the RGFO study area. As might be expected, recent (i.e., post-1999) inventories and testing projects greatly outnumber projects that involved extensive data recovery. In additional to new fieldwork, new research has been conducted using both previously existing and newly obtained datasets. This research includes synthetic studies, specialized analyses, and academic treatises focused on particular research problems.

The summaries below attempt to identify and describe those recent projects and studies that have yielded substantial and significant prehistoric data. The process of identifying these studies involved sifting through the numerous projects that have been carried out on BLM lands within the RGFO, as well as entreating dozens of prominent eastern Colorado researchers to identify significant projects or research conducted since 1999. RCGraph databases were also searched to locate projects that have produced radiocarbon dates in the region. The sum total of these efforts resulted in the acquisition of numerous reports, articles, papers, theses, and dissertations that collectively represent a body of work generated during the past 16 years that spans eastern Colorado. Although most of these projects were not conducted solely on BLM lands or use data obtained from BLM sites, they are all relevant to the prehistoric occupation of lands that are now within BLM jurisdiction in the RGFO. Although some recent projects have produced important data pertaining to the Paleoindian and Protohistoric stages (which have been discussed in the synthetic sections covering those time periods), the great majority of this work is especially relevant to the Archaic and Late Prehistoric stages, and so the summaries below deal principally with those time periods.

These summaries of recent research are intended to ferret out the more significant findings and identify new data, insights, or advances resulting from post-1999 research. As such, they are intended to serve as a guide for those who may be familiar with the information presented in the 1999 prehistoric context documents but who wish to know something about the archaeology that has been done in eastern Colorado since those documents were published.

Project Summaries

Recent projects that yielded significant data relevant to the Archaic and Late Prehistoric stages are summarized below. They are discussed by project type, including surveys, testing projects (i.e., small-scale excavations), data recovery projects (i.e., extensive excavations), synthetic or research projects, and specialized studies and analyses.

Surveys

Numerous archaeological inventories have been conducted within the administrative boundary of the RGFO since the publication of the 1999 prehistoric context documents. Not all of these inventories identified important sites or yielded particularly valuable data. In toto, however, they have produced a large volume of data that can—if combined with regional excavated data—be used to address issues related to settlement patterns, chronology, architecture, technology, subsistence, and social organization. Several large inventories in particular have yielded excellent data pertaining to the Late Prehistoric stage. These inventories are summarized in Table 1. The surveys summarized here represent large inventories for which reports could be obtained. The list is not exhaustive and should be regarded as a sample of work conducted in the study area since 1999.

Table 1. Regional Inventory Projects That Have Yielded Important Late Prehistoric Data.

Reference	Report Title (Shortened)	Major Contributions and Research Potential	Important Sites
Albin (2011)	The 2007–2009 Pinon Canyon Maneuver Site Transformation Survey Project	Very large inventory that yielded architectural and rock art sites, projectile points, ceramics, and cairns.	Architectural sites: 5LA5256, 5LA12500
Black (2000, 2003)	An Archaeological Survey of the Trinchera Cave Area, Southeastern Colorado	Survey of one square mile surrounding Trinchera Cave. A possible ceremonial structure. Ceramics are Puebloan gray wares and Sopris Plain; no cord-marked wares. Considerable use of local lithic materials, but also obsidian and Alibates chert. Architectural sites consistent with Apishapa, but ceramics more consistent with Sopris. Settlement systems seem to have been local, with connections to the south but no evidence for use of mountain areas to the west.	Possible ceremonial structure: 5LA8731
Brunswig (2005)	Prehistoric, Protohistoric, and Early Historic Native American Archeology of Rocky Mountain National Park: Volume 1	Evidence for Late Prehistoric use of mountain interior and high elevations. Of the Early Ceramic components, 14 are in the alpine zone, 8 in alpine-subalpine ecotone, 4 in the subalpine, and 11 in the montane zone. Analysis of lithic materials suggests that Middle Ceramic groups were wider ranging than Early Ceramic groups.	Game drive sites 5LR6, 5LR15, 5GA1095, 5GA2002 have Early Ceramic components
Charles et al. (2000)	A Cultural Resource Inventory of High- and Medium-Site Sensitivity Areas, Fort Carson Military Reservation	Several Late Prehistoric sites were documented.	Open architectural sites: 5PE2940, 5PE2964
Gantt et al. (2010)	Class III Cultural Resource Inventory and Test Excavations for the Proposed Over the River Art Installation	Site 5CF2690/5FN2509 has buried cultural deposits, at least some of which are Late Prehistoric. Site 5FN2516 yielded ceramics.	5CF2690/5FN2509, 5FN2516
Karki et al. (2006)	Archaeological Evaluation of 15,000 Acres on the Pinon Canyon Maneuver Site: BRAC Pay-Ahead Study	Discussion of the spatial and topographic distributions of architectural sites. Nonlocal lithic materials (evidence for trade): Alibates dolomite, Black Forest silicified wood, Edwards Plateau chert, Flattop chalcedony, Hartville chert, Niobrara jasper, Jemez Mountain obsidian, Tiger chert (Bridger Formation), and Trout Creek jasper.	Architectural sites: 5LA2280, 5LA5429, 5LA9619, 5LA10197, 5LA11037, 5LA11045
Kinneer et al. (2009)	A Class III Cultural Resource Inventory and Test Excavation for the Proposed Raton 2010 Expansion Project	The Spanish Peaks Lateral portion of the project area in particular exhibited a number of Late Prehistoric sites. At least three sites in the Apishapa Canyon produced ceramics, which were generally absent for other locations along the project route.	Ceramic sites: 5LA12102, 5LA11561, 5LA11557
Loendorf and Loendorf (1999)	Archaeological Sites in Welsh Canyon	Examples of both open sites and rockshelters with architecture. Projectile points and ceramics. Spatial and topographic analyses of site distributions. Positive correlation between the ages of surface artifacts and associated rock art.	5LA6599, 5LA6860, 5LA6603, 5LA6799, 5LA6948
Mueller et al. (2012)	Cultural Resource Inventory of 5,200 Acres and Archaeology Site Evaluations for Fort Carson at Piñon Canyon Maneuver Site in Training Area 16	Bear Springs Hills. No architectural sites. Numerous sites with dense ground stone assemblages. Good project-wide projectile point assemblage. Two sites produced ceramics, including ceramics similar to Barnes Red Slipped at 5LA13014 and a Puebloan black-on-white ware at 5LA12995. Eight sites yielded obsidian.	Ceramic sites: 5LA12995, 5LA13014

Table 1. Regional Inventory Projects That Have Yielded Important Late Prehistoric Data.

Reference	Report Title (Shortened)	Major Contributions and Research Potential	Important Sites
Owens et al. (2000)	Archaeological Sites Inventory in the Black Hills of the Pinon Canyon Maneuver Site	Examples of both open architectural sites (n=9) and rockshelters with architecture (n=4). Substantial project-wide ceramic assemblage. More lithic scatters and fewer rockshelters than the Welsh Canyon area.	Architectural sites: 5LA4938, 5LA6107, 5LA6878, 5LA7307, 5LA7310, 5LA7311, 5LA7333, 5LA7365, 5LA7421, 5LA7463, 5LA7466, 5LA7518, 5LA7523, 5LA7548, 5LA7600
Owens and Loendorf (2002)	Archaeological Sites Inventory of the Training Area 7 Portion of the Piñon Canyon Maneuver Site	Three open architectural sites. Two ceramic sites. Numerous ground stone. Jemez Mountain obsidian sources. Good treatment of the numerous Late Prehistoric projectile points.	Architectural: 5LA8037, 5LA8090; Architectural and ceramic: 5LA8104; Ceramic: 5LA8222
Owens and Loendorf (2007)	Archaeological Sites Inventory of the High Priority Portions of Training Areas 1, 2, 3, 4, 5, 6, 11, 13, and H of the Pinon Canyon Maneuver Site	Lithic scatters, architecture, quarries, and rock art. Architecture was most often found along the canyon edges (n=3), in the hills (n=8), or the grassy steppes (n=2). Ceramics, Late Prehistoric arrow points. Different types of exotic lithic materials suggest trade, including a fragment of a steatite vessel. Good data on site distributions for settlement pattern studies.	5LA9944, 5LA9956, 5LA10000, 5LA10059, 5LA10060, 5LA10063, 5LA10100, 5LA10103,
Piper et al. (2006)	Unlocking the Past: Archaeological Inventory of Training Areas B and C, Pinon Canyon Maneuver Site	Thorough discussion of projectile points. The authors suggest that the presence of side-notched versus corner-notched arrow points on sites that may be contemporaneous represents use of the area by different Late Prehistoric groups.	Ceramic site with four hearths: 5LA10545; architectural site: 5LA10563

Test Excavations

A number of projects have been conducted in eastern Colorado since 1999 involving test excavations that have yielded significant data. Twelve such projects are briefly described below. Most were Section 106 projects conducted in response to energy development, ongoing documentation of cultural resources on the Piñon Canyon Maneuver Site (PCMS) and Fort Carson military reservations, and an art installation along the Arkansas River. Two projects were conducted in Picket Wire Canyonlands as field schools by Western Wyoming Community College.

Evaluative Testing of 13 Sites at Fort Carson

This testing project on the Fort Carson military reservation resulted in the identification of four sites that contain substantial Late Prehistoric components (Charles et al. 2001). The project area is south of Colorado Springs and northwest of Pueblo, in El Paso and Pueblo counties. Site 5EP1080 produced debitage, flaked stone tools, manos, one small corner-notched projectile point, 10 ceramic sherds, and Late Prehistoric radiocarbon dates, including one on maize. Ceramic construction methods include both "mass modeled" and, more numerous, coiled; most of the wares in this assemblage are apparently cord marked.

Site 5PE750 yielded no radiocarbon dates or ceramics, but dates to either the Developmental or Diversification period. Stacked stone architectural features are present, as well as rock art panels. Late Prehistoric arrow points were dominated by corner-notched examples, though one side-notched point was recovered. Flaked stone tools, cores, and a small amount of ground stone were found. Site soils are shallow but retain additional potential.

Site 5PE1610 is a rockshelter with petroglyphs comprising linear grooves on boulders near the rear of the shelter. Testing produced charcoal that yielded a date indicating a Diversification-period occupation. Burned bone and debitage were recovered from the excavation, and metates and a chopper were found on the surface; no ceramics or projectile points were recovered.

Site 5PE1807 is a radiocarbon-dated rockshelter occupied during the Developmental period. The site yielded choppers, cores, and debitage. The functions of the tested Late Prehistoric sites seem to range from residential base to seasonal, short-term camps or resource procurement loci.

Evaluative Testing of 24 Sites in the Training Area (TA) 25 Burn Area at Fort Carson

Site 5EP56 is an open architectural, Developmental-period and Apishapa-phase site at Fort Carson south of Colorado Springs. The site, which exhibits two curvilinear rock alignments, is in the west-central portion of the military reservation (Sherman and Zeidler 2011). Testing at the site resulted in the recovery of small, triangular, side and corner-notched arrow points; quartz/mica-tempered, cord-marked ceramic sherds; and bison bone. Two radiocarbon dates from a midden deposit (Feature 2) yielded calibrated calendrical age ranges of A.D. 640 to 720 and A.D. 1220 to 1290, indicating occupations during both the Developmental and Diversification periods. Feature 2 (a midden partially enclosed by the rock alignments) yielded charred goosefoot, chokecherry, and maize kernels and cupules, and bison bones.

Test Excavation of 20 Sites for the Western Frontier Project

Twenty sites were test excavated for this project, of which four yielded substantial evidence for Late Prehistoric occupations (Kalasz et al. 2003a). Site 5WL4088, on a terrace above Crow Creek in Weld County, produced an Early Ceramic period radiocarbon date from Feature 1 (two-sigma calibrated range A.D. 880–1010), with associated flaked stone, ground stone, cord-marked sherds, and a corner-notched, expanding-stem arrow point. The site was likely a seasonal base camp.

Site 5EL157 is a Late Prehistoric campsite in Elbert County, overlooking the confluence of Willow Gulch and Big Sandy Creek. Feature 1 yielded a date with a calibrated (two-sigma) calendrical range of A.D. 890–1020. Good subsistence evidence in the form of charred seeds of panic grass, Cheno-Am, hedgehog-type cactus, and ground cherry was recovered. A Reed/Washita arrow point was found on the site's surface.

Site 5EL166 is in Elbert County along the terraces above Middle Bijou Creek; the creek is part of the Bijou Creek system, which is a tributary of the South Platte River. The site yielded both Late Archaic and Late Prehistoric radiocarbon dates, lithics, ground stone, bone, and fire-cracked rock. A level date with a two-sigma calibrated calendrical range of A.D. 900–1030 was obtained, as was a small corner-notched arrow point. The site likely functioned as a short-term camp.

Site 5KW103 is associated with a dune field that extends from Big Sandy Creek northwest of the town of Limon, in Kiowa County. A Developmental-period radiocarbon date with a two-sigma calibrated age range of A.D. 670–970 was obtained on bison bone. Lithic tools and burned bone were also recovered.

Inventory and Test Excavations for the Raton 2010 Expansion Project

This report (Kinneer et al. 2009) was the first of three generated by the Raton 2010 Expansion project that culminated in data recovery at five sites. This report details the inventory and initial testing phase of the project. The inventory part of the report describes the Late Prehistoric sites clustered along the Spanish Peaks Lateral portion of the project (from the vicinity of Weston to Aguilar), which yielded much more substantial evidence of Late Prehistoric occupations compared to more northerly project segments. The inventory and testing conducted in the Apishapa River Valley and Sarcillo Canyon yielded relatively abundant evidence of Late Prehistoric occupations, including projectile points, ceramics (most abundant in the Apishapa Valley), flaked and ground stone artifacts, and sites with demonstrated potential for buried cultural deposits. The dominant lithic material on these sites was locally available fine-grained basalt, but chert, chalcedony, quartzite, and obsidian (traced to the Polvadera Peak/Cerro del Medio region of New Mexico) were also identified. Sites in Sarcillo Canyon were found to be more intact than those in the Apishapa River Valley and its tributaries. The report authors concluded that the Late Prehistoric sites represent loci of lithic procurement, stone tool manufacture, and hunting and other subsistence activities.

Monitoring and Test Excavation of 14 Prehistoric Sites for the Raton 2010 Expansion Project

Prior to data recovery excavations, test excavations were conducted at 14 sites along the Raton 2010 Expansion Pipeline and construction was monitored (C. M. Anderson 2012). This work identified Late Prehistoric components at several sites. These sites were more fully investigated during the data recovery phase of the project (Anderson et al. 2013), which is described below.

Test Excavations for the Over the River Art Installation

Test excavations at two sites along the Arkansas River in the foothills of the Sangre de Cristo Mountains yielded sparse evidence of Late Prehistoric occupations. Site 5CF2690/5FN2509 was found to contain intact buried cultural deposits, at least some of which are likely associated with the Developmental period based on a corner-notched arrow point preform (Gantt et al. 2010). The flaked lithics included a "dendritic chert" similar to Trout Creek chert, and Kremmling chert was also identified.

At site 5FN2516, three ceramic sherds were recovered. Two are heavily weathered, but the third is cord-marked, suggesting a likely Developmental-period occupation. Although the Late Prehistoric materials recovered from these sites are sparse, the presence of occupations from this period in the mountains is important, as there is presently little evidence for substantial Late Prehistoric settlement in the mountains (Weimer and Troyer 2013).

Fieldwork, Geology, and Early Component Research at the Barnes Site, 5LA9187, PCMS

The Late Prehistoric component at the Barnes site was tested, resulting in the recovery of debitage, flaked stone tools, burned bone, numerous ceramics, and an Amazonite pendant (Ahler 2002). The report discusses the provenance of the Amazonite, presenting the possibility it was procured from a source near Pikes Peak.

Evaluative Testing of 5LA3421, PCMS

Site 5LA3421 is in the southeastern part of the PCMS, along Big Water Arroyo, a tributary of Taylor Arroyo and the Purgatoire River. The site contained a single feature comprising an arc of sandstone rocks just under 3 m in diameter (Charles et al. 2005). Four shallow rockshelters with some subsurface potential are also present on the site. The architectural feature was tested, revealing that it was a partially buried feature that may represent a short-term habitation structure. Artifacts recovered from the test excavation consisted of two projectile points, flaked stone tools, debitage, one bone bead, and one ceramic sherd. Maize pollen was identified. Charcoal from the test unit produced a radiocarbon date with a two-sigma calendrical age range of A.D. 990 to 1160, suggesting a terminal Developmental-period occupation.

Archaeological Testing at Four Sites at the PCMS

Testing of four sites at the PCMS revealed that three contained the remains of Late Prehistoric occupations (Nelson et al. 2007). At site 5LA4417, Feature 12 yielded a radiocarbon date with a two-sigma calibrated age range of A.D. 990–1230. The site produced a small faunal assemblage, along with a few flaked stone tools and arrow points.

Site 5LA5612 exhibited one corner-notched arrow point, one flaked stone tool fragment, and one ground stone fragment on the surface, in addition to bedrock metates. A small faunal assemblage was retrieved from the testing. The two-sigma range of the calibrated Late Prehistoric radiocarbon date is A.D. 770 to 980.

At site 5LA6108, Hearth 1 produced a radiocarbon date with a calibrated calendrical range of A.D. 580–680. This Developmental-period component yielded a corner-notched arrow point, cores, flaked stone tools, debitage, a small amount of ground stone, and modest faunal assemblage.

Testing of Site 5LA10929 at the PCMS

Site 5LA10929, on a terrace on the southern side of Lockwood Arroyo at the PCMS, was tested in 2006 (Owens 2008). The site contains a rockshelter, thermal features, rock art, and an associated artifact scatter. Slab-lined Feature 4 yielded a radiocarbon date whose calibrated range falls within the early part of the Developmental period. Analysis of charred plant macrofossils from the feature indicated the use of juniper and saltbush as fuel and suggested that prickly pear cactus was processed and consumed.

Report for 2004 Test Excavations at 5LA6493

Architectural site 5LA6493 is in the Picket Wire Canyonlands, Comanche National Grassland; 8 m^2 were excavated during a field school for Western Wyoming Community College in one of the larger structures (Gardner and Lammers 2015b). The site is described by the excavators as a multiroom habitation complex on a mesa top overlooking the Purgatoire River Valley. Two radiocarbon dates from the structures yield two-sigma calibrated calendrical age ranges of A.D. 795–1000 and A.D. 990–1160. Small, low side-notched to corner-notched arrow points with rather wide stems were recovered. A basin metate capped a subfloor pit. Maize, Cheno-Am, and cattail pollen were identified on ground stone implements. Other floral evidence was obtained for the exploitation of mustard family, grass seeds, purslane, and bulrush. A small faunal assemblage was recovered, the most notable aspect of which was a fish vertebra. The excavation also yielded a large number of micro flakes, suggesting intensive tool finishing.

Site 5LA5838, below site 5LA6493 in a lower topographic setting, was also investigated. It produced four radiocarbon dates with two-sigma calibrated age ranges of A.D. 260–890, A.D. 870–1005, A.D. 1005–1185, and A.D. 1015–1205. These dates suggest that the site experienced multiple occupations during both the Developmental and Diversification periods. Structure 1 contained a burial, noted as being unusual for an Apishapa-phase site. Locally available materials dominate the lithic assemblages and include Morrison Formation quartzite and chert. Gardner and Lammers (2015b) state that Apishapa groups may have occupied the area as early as A.D. 900.

Report of Test Excavations at 5LA5840

Very limited excavations were conducted by Western Wyoming Community College at site 5LA5840 in Picket Wire Canyonlands (Gardner and Lammers 2015a). A midden in front of a rockshelter that was truncated by a road cut was tested with a 1-x-1-m unit. This rich anthropogenic deposit yielded a thermal feature, debitage, a core, a biface, ground stone, a shell fragment, four cord-marked ceramic sherds, and burned bone. The feature yielded a radiocarbon date with a two-sigma calibrated age range of A.D. 1000–1170. Analysis of the residue on the sherds suggests that the pot was used for cooking maize. Micro- and macrobotanical evidence for the use of *Chenopodium*—and possibly grass and purslane seeds and juniper berries—was obtained. However, no maize pollen, maize starch, or maize macrofossils were found.

More extensive excavations were conducted at the site called “Wooten 1,” comprising a circular structure on private property south of the Comanche National Grassland. Cord-marked pottery was recovered from a horizon radiocarbon dated to A.D. 1160–1260. Small corner-notched and side-notched arrow points were also recovered. Gardner and Lammers (2015a) note that, based on charred macrobotanical remains found in the excavated matrix, *Chenopodium*, maize, purslane, and grass seeds were likely consumed at the site.

Data Recovery Excavations

Several data recovery excavations more extensive than the test excavations described above have been carried out in eastern Colorado since the publication of the Arkansas and Platte river basin prehistoric contexts in 1999. The salient results of those investigations that have yielded data relevant to the Late Prehistoric stage are described briefly in the following section. Readers desiring more detailed information are referred to the original reports.

2004 Excavations at 5EP2762, Jimmy Camp Park

Excavations at site 5EP2762 were undertaken by the Anthropology Department Archeological Field School of the University of Colorado at Colorado Springs (Arbogast 2004). The site is within an area near Jimmy Camp Creek that exhibits extremely high site density, particularly with regard to Late Prehistoric occupations. The excavations totaled 15 m^2 and resulted in the recovery of numerous lithic and ceramic artifacts. The site included a Late Prehistoric component evidenced by a hearth that yielded a radiocarbon date with a calibrated (two-sigma) age range of A.D. 580–770. The date suggests a Developmental-period component, although ceramics recovered in association are more consistent with a Diversification-period occupation.

Mitigative Excavations at the Monument Creek Site (5EP211) in Colorado Springs

The Monument Creek site (5EP211) is on a remnant terrace on the western side of Monument Creek, north of downtown Colorado Springs; excavations at the site encompassed 142 m^2 (Kalasz et al. 2005). The excavators interpreted the site as a series of small open camps. They investigated six cultural features. Radiocarbon dates indicate that the occupations took place over a 500–600-year range spanning the Archaic–Late Prehistoric transition. Little material culture was observed that could distinguish the two components, outside of radiocarbon dating, because the Late Prehistoric remains exhibited Late Archaic characteristics (Kalasz et al. 2005:139). The site contained several features, including a rudimentary, low-investment Late Archaic architectural feature consisting of two burned wooden posts. The overall site assemblage indicated repeated use of the locale as a short-term encampment where the early stages of lithic reduction were carried out. The site occupants apparently ate cactus, the seeds of grasses and Cheno-Am, artiodactyls, and cottontail.

Contemporaneous Late Prehistoric dates were pooled and the resulting date yields a two-sigma calibrated calendrical date range of A.D. 135–310. Of eight recovered projectile points, seven clearly appear to represent atlatl and dart technology. The absence of arrow points led the excavators to suggest that the atlatl and dart remained in use throughout the early Developmental occupation of the site. Aside from the points, other materials associated with the ostensibly Late Prehistoric component resemble Archaic materials, and the investigators note that they would not be recognizable as Late Prehistoric if it were not for the radiocarbon data. No ceramics were recovered. The role of the site within the settlement systems of the terminal Late Archaic–early Developmental-period occupants is compared to those of the groups that occupied the Ridgegate site (Kalasz et al. 2003b). The authors assert that the site data add to evidence suggesting north–south prehistoric movement along the Front Range and east–west movement between montane/foothill and Plains environments.

Mitigative Excavation of Five Archaeological Sites for the Raton 2010 Expansion Project

Sites investigated during this project included three—5LA11555, 5LA12661, and 5PE7499—that yielded Archaic components and three—5PE6772, 5LA12661, and 5LA12662—that yielded Late Prehistoric components (Anderson et al. 2013). Site 5LA12661 contained a rock-lined hearth that provided radiocarbon dates suggesting two likely periods of occupation within the Early Archaic. The site also produced one feature (Feature 1) that yielded a radiocarbon date with a two-sigma calibrated age range of A.D. 60–220, suggesting an occupation that spanned the transition from the Late Archaic to early Developmental period. Feature 1 contained pine charcoal, charred goosefoot seeds, and one possible charred prickly pear cactus seed fragment, but had no associated artifacts.

Site 5LA12662 was dated to the Developmental period; a radiocarbon-dated piece of cut bone yielded a two-sigma calibrated age range of A.D. 380–530. The small lithic assemblage included a hammerstone/mano and the small faunal assemblage contained pronghorn, deer, and a frog bone. The site also contained a transitional Developmental to Diversification-period component, evidenced by two radiocarbon dates from two thermal features. Feature 2, a circular basin-shaped hearth, yielded a date with a two-sigma calibrated age range of A.D. 1030–1210, whereas Feature 3, a concentration of fire-altered rock and charcoal-stained sediment, produced a date that yielded a two-sigma range of cal A.D. 1020–1160. Floral subsistence evidence from the component comprised Indian ricegrass, knotweed seeds, cactus, and goosefoot. Faunal remains consisted of one squirrel and two artiodactyl bones. Geomorphological evidence suggests that the transitional Developmental to Diversification occupation took place during a xeric climatic period. Finally, a Diversification-period component produced debitage, a flake tool, a biface, and a core. It contained a small faunal assemblage consisting of a few small mammal bones, some rodent bones, one cottontail bone, and several artiodactyl bones.

At site 5PE6772 near Pueblo, the Developmental-period component is defined by the remains of an architectural feature (Feature 1), flaked stone artifacts, ground stone, bone jewelry, faunal remains, and macrobotanical remains. Feature 1, a basin house, yielded a date with a two-sigma calibrated age range of A.D. 780–960. Fully exposed in planview, it measured 2.8 m by 2.6 m, with an area of 5.9 m^2. It was shallow, circular to slightly oval, with no internal features. It yielded 27 artifacts, including flaked stone tools, a ground/battered stone, and bone beads. The site also produced a Scallorn-type arrow point, a hammerstone, and manos. Faunal remains from the feature include 20 bone specimens that represent a rabbit and a medium-sized carnivore; the carnivore specimen is a bone bead. Analysis of a macrobotanical sample from the feature indicates that goosefoot seeds were processed in or around the feature. Cholla may have been used as a food or fuel source or for shelter construction.

In the synthetic summary of the project, the authors note that the excavated Late Prehistoric occupations exhibit little difference from Archaic sites, as they lack ceramics, stone architecture, and evidence of cultigens (Anderson et al. 2013). The only exception was a small projectile point from site 5PE6772, reflecting use of bow-and-arrow technology. This similarity between Archaic and Late Prehistoric occupations was also noted at the Monument Creek site (Kalasz et al. 2005), as described above. The authors suggest that the Developmental-period basin house at 5PE6772 denotes a seasonal residential base. All of the Late Prehistoric components were interpreted as seasonal, short-term, logistical or specialized task locales rather than long-term habitations. Lithic materials were believed to be entirely locally derived. No examples of exotic or nonlocal stone, such as obsidian or Alibates chert/dolomite (i.e., materials commonly found at other regional Late Prehistoric sites) were found. The sites along the Apishapa River contained primarily basalt and hornfels. Based on geomorphological evidence, the authors assert that prehistoric groups in the project area preferred to occupy alluvial terraces during mesic climatic periods, with the single exception as noted above at site 5LA12662.

Site 5LA11555 contained Early Archaic components. The oldest component included the remnants of two basin houses and a relatively sparse assemblage of lithic artifacts and botanical remains and was indicative of two separate occupations during the mid-Early Archaic and the latter part of the Early Archaic. A second, undated, component was also observed, stratigraphically superior to the Early Archaic occupations.

Excavations at site 5PE7499 resulted in the recovery of a sparse artifact assemblage with no temporally diagnostic tools or features. The component had been previously dated (C. M. Anderson 2012), however, to the Middle Archaic (4150–3930 cal B.P.).

Mitigative Excavations at the East Plum Creek Site (5DA1008) in Castle Rock

The East Plum Creek site (5DA1008) is notable primarily for its Middle Archaic component; a short-term camp that included evidence of a heavy reliance on both faunal (antelope, deer, elk, and bison-sized remains) and floral resources (as indicated by the ground stone assemblage). The Middle Archaic component was dated to a calibrated range of 4510–3830 B.P., with an additional outlier date potentially extending the age of the component to 3630 B.P. The component included stemmed indented-base projectile points ascribed to the Little Lake series, which the excavators distinguished from similar McKean points by flaking pattern, and which they interpreted as indicating evidence of an eastward expansion of Great Basin point types.

The site also yielded evidence for an Early Ceramic period component as represented by two small corner-notched arrow points and a single plain ware sherd from disturbed contexts above the Archaic component (Kalasz et al. 2003c). No radiocarbon dates were obtained from the Late Prehistoric component, which also produced two ground stone artifacts. The ceramic sherd is a brown-colored plain ware with very coarse granitic temper and a surface treatment that resulted in sparse striations from wiping. The authors note that it is similar to pottery recovered from the

Bayou Gulch site, for which a terminal Plains Woodland affiliation (A.D. 900–1100) was suggested. The Early Ceramic component at the East Plum Creek site appears to have been a short-term, seasonal camp.

Excavations at the Gilligan's Island Shelters (5FN1592), Fort Carson Military Reservation

Data recovery excavations at Gilligan's Island Shelters (5FN1592) at Fort Carson resulted in the identification of a Late Prehistoric component (Anderson 2008). Feature 2 yielded a radiocarbon date with a two-sigma range of A.D. 780–1148, indicating an occupation within the transitional late Developmental–early Diversification period. A purely Developmental-period occupation was also identified; the date from Feature 6A has a calibrated range of A.D. 546–771. The Late Prehistoric occupations collectively yielded a modest faunal assemblage (n=1,336) dominated by small mammals, hundreds of debitage, flaked and ground stone tools, obsidian sourced to the Cerro del Medio source in the Jemez Mountains, and one possible maize kernel fragment.

Archaeological Investigations at Eleven Sites of Welsh Canyon in the PCMS

At least eight of 11 sites investigated in the vicinity of Welsh Canyon at the PCMS yielded evidence of Late Prehistoric components ranging from ephemeral to intensive occupations (Schiavitti et al. 2001). Site 5LA6568 is a rockshelter with two Late Prehistoric occupations radiocarbon dated to A.D. 750–970 and A.D. 1050–1250 (two-sigma calibrated calendrical ranges); the earlier occupation (in Shelter 3) may be associated with prickly pear cactus processing, whereas the later occupation (in Shelter 2) yielded evidence for the processing of medium to large mammals and possibly shell pendant production.

Site 5LA6569 is a rockshelter with an occupation estimated to have taken place between A.D. 785 and 1250. Investigations yielded two side-notched and one corner-notched arrow points and a wooded artifact with sinew, possibly a broken arrow shaft. A small faunal assemblage was recovered. Site 5LA6576 exhibited at least five structures with walls constructed of stone slabs, averaging 3.5 m in diameter, with associated lithics along the canyon edge. The site was not tested, but cultural deposits are clearly present. The authors speculate that the site probably represents a "dispersed village" of the Apishapa phase. Obsidian artifacts were traced to the Cerro Medio source in the Jemez Mountains.

Site 5LA6592 is a rockshelter containing many abraded grooves and bedrock metates. A very unique set of matched shaft abraders was found on a ledge inside the shelter. Two hearths were excavated; one yielded a radiocarbon date with a two-sigma calibrated range of A.D. 1030–1255, indicating a Diversification-period occupation. The site yielded a small faunal assemblage, including a small number of bison bones. An upright slab in a wall alignment was conjectured to have served as a hearth deflector.

Site 5LA6595 is a lithic scatter with debitage, flaked stone tools, a small amount of ground stone, a boulder metate, side-notched arrow points, and two cord-marked sherds. The site produced a small faunal collection, including a bison tibia fragment. Multiple periods of occupation are represented; the earliest took place during the Developmental period between A.D. 590 and 685. A Diversification-period component was represented by three dates, whose calibrated calendrical ranges span the period A.D. 1065 to 1300. The ceramic sherd was associated with a radiocarbon date whose one-sigma calendrical range is A.D. 1235 to 1295.

Site 5LA6599 comprises a rockshelter and lithic scatter. A boulder in front of the shelter exhibits a pictograph consisting of a quadruped and human figure. The site yielded debitage, flaked and ground stone tools, a shaft abrader, and a very small faunal assemblage. A radiocarbon assay has a calibrated age range of A.D. 1020–1180.

Site 5LA6603 consists of a large rockshelter complex made up of three smaller shelters, two of which were investigated. Shelter 2 has an enclosing wall; it yielded debitage, flaked and ground stone tools, side-notched and corner-notched arrow points, and 16 potsherds. The ceramic vessel was plain brown ware, with a smoothed exterior surface. The authors state that it may fit within Hummer's (1989) Polished Category 3. The site also produced a small faunal assemblage that included dove and lark bones. Shelter 3 has a rock wall over 6 m long and contained very sparse lithic artifacts and a very small faunal assemblage.

Site 5LA6618 is a rockshelter with a large associated lithic scatter. A low wall divides the interior into two areas. The site yielded debitage, flaked stone tools (including a side-notched arrow point), a mano, and a low number of faunal bones.

A synthetic summary of the project investigations noted the heavy reliance on small animals, although low numbers of artiodactyls and bovids were also represented. The graphed radiocarbon data from the project sites suggest an occupational hiatus around A.D. 300. The project data suggest that plant processing was more important during the Developmental period than the preceding Late Archaic.

Archaeological Investigations from 1998 at Six Sites at the PCMS

Five of the six sites excavated during this project produced evidence of Late Prehistoric occupations (Schiavitti 2003). The sites are located in and around the Black Hills at the PCMS. At site 5LA6107, a circular stone structure was excavated; a radiocarbon date from a hearth in the structure has a two-sigma calibrated range of A.D. 685 to 1035, indicating a Developmental-period occupation. The investigations yielded debitage, flaked and ground stone tools, including a side-notched projectile point, other point fragments, and a metate. Site 5LA7410 was a pot drop with a few associated lithic artifacts. The pot was a cord-marked, globular jar.

Site 5LA7421 consisted of three stone structures, two of which were tested, with an associated lithic scatter. A biface made of Tiger chert—a material type from the Bridger Formation, of which there are no local outcrops—was touted as evidence for exchange. The site yielded flaked and ground stone tools. Projectile points were small side- and corner-notched varieties. It was determined that the structures were not habitations, but rather served to retain sediment or to delineate work spaces. One of the work areas (Feature 3) contained a metate. The authors contend that this implement is unique because it exhibits a "nutting" area adjacent to the grinding surface. The site produced two radiocarbon dates, the two-sigma calibrated ranges of which are A.D. 640 to 890 and A.D. 895 to 1205. The recovered ceramics are described as exhibiting both polishing and cord impressions. A modest faunal assemblage yielded Leporid bones but also some worked bone.

Site 5LA7538 was an extensive artifact scatter consisting of debitage, flaked stone tools, and ceramics. Three large features comprising middens or thermal features were present; one was tested. The two radiocarbon dates yielded two-sigma calibrated ranges of A.D. 330–645 and A.D. 380–620, indicating an early Developmental-period occupation. However, the authors note that a projectile point suggests a later occupation, so either the dates reflect the use of old wood as hearth fuel or an additional later occupation is indicated.

At site 5LA7548, two structures were identified, comprising a semicircular rock alignment and another eroded structure, both near the edge of a cliff. Additionally, two extramural thermal features were present. One feature and one structure were tested. Stratum 2 in Feature 1 yielded a radiocarbon date with a two-sigma calibrated calendrical range of A.D. 880–1115; this feature yielded debitage, cores, flaked stone tools, both stemmed and side-notched arrow points, and small faunal assemblage. Feature 3 yielded a radiocarbon date with a two-sigma calibrated range of A.D. 340–650. One maize pollen grain was identified from Feature 3.

In the project synthesis, the authors observed that the investigated sites collectively represent at least four different occupations that took place during the periods A.D. 390–430, A.D. 670–750, and A.D. 950–990, with the final Late Prehistoric occupation centered on A.D. 1310. Although not relevant to the period under consideration here, the authors also note a lack of evidence for Protohistoric period (a period they refer to as the "Late Ceramic Stage") occupations in their study area. As noted above for site 5LA7421, some investigated structures were interpreted as work or activity areas rather than habitations. Based on recovered micro- and macrofloral evidence, prehistoric use of juniper, pinyon, sagebrush, goosefoot, sunflower, and hackberry is indicated. Furthermore, the evidence for maize suggests that cultigens were exploited as early as A.D. 340–650.

Archaeological Investigations from the 2004 Testing of 16 Sites at the PCMS

Several sites investigated during this project contained evidence of Late Prehistoric occupations, but the contributions made by most of the sites' data were minor. The single exception was site 5LA8658, a large rockshelter exhibiting a deflated architectural feature and ashy surface stains (Bamat et al. 2007). The site yielded debitage, flaked and ground stone tools, and a small side-notched arrow point. Obsidian in the assemblage was sourced to the Jemez Mountains in New Mexico. A moderately sized faunal assemblage was also recovered. One radiocarbon date was processed and yielded a date that falls within the early Developmental period; it has a calibrated calendrical range of A.D. 265–630.

Excavation Report: Feature 5 5LA9187, PCMS

New Mexico State University, Las Cruces, conducted data recovery at the Barnes site (5LA9187) at the PCMS in 2001 (Lindsey 2001). Several Late Prehistoric thermal features and a pit (Feature 5) were excavated and 739 surface artifacts were collected. Feature 5 yielded over 1,200 beads. The stone beads were from a single unidentified quarry and are a form of soapstone. Lithic materials from the surface are a combination of local lithic materials and materials that originated from the north and southeast. The authors speculate that the nonlocal materials were acquired through trade. Feature 5 is interpreted as a mortuary or ceremonial feature.

Archaeological Investigations at Sites 5LA3186, 5LA3188, and 5LA3189 along Burke Arroyo in the PCMS

This report details the investigation of three sites at Burke's Bend at the PCMS (Kalasz et al. 2007). The project produced data specific to discrete Developmental-period and Diversification-period Apishapa-phase occupations. In addition, it yielded insights into pan-Late Prehistoric patterns that were common to both periods and suggest cultural continuity in the area. The three project sites produced 14 radiocarbon dates. The oldest date was 1420±60 B.P. from Rockshelter 1 at 5LA3188, and the youngest was 780±60 B.P. from Rockshelter 8 at 5LA3189 (see Kalasz et al. 2007:Table 71).

The mid-Developmental-period occupation at 5LA3188 lacked ceramics and substantial architecture, but yielded corner-notched arrow points and a few small side-notched points. Obsidian from Rockshelter 1 at 5LA3188 was sourced to the Jemez Mountains in New Mexico. The manufacture of implements and ornaments from bone and shell is well represented. No ceramics were recovered from any of the Developmental-period components investigated during the project. The authors note that no ceramics were recovered from the nearby Forgotten site (5LA3491), a Developmental period, open architectural site a few miles downstream from Burke's Bend investigated a few years earlier.

The Burke's Bend project produced more substantial data relating to the Diversification period. Site 5LA3189 yielded three post-A.D. 1000 radiocarbon dates. Rockshelter 8, in particular, produced numerous ceramics, ground stone artifacts, and side-notched arrow points from the

Apishapa-phase component. The Diversification-period components also yielded good data related to cooking technologies and possible storage features. The bone and shell production identified in Developmental-period components continued into the Diversification period. Rockshelter 8 at site 5LA3189, for example, yielded many bone tools. Rockshelter 8 also yielded a substantial assemblage of charred floral subsistence remains, as did Feature 6 at site 5LA3188. The macrobotanical materials and the abundant ground stone are interpreted as evidence of the importance of floral resources during the Apishapa occupations. Goosefoot was particularly prevalent, but seeds of tansy mustard, sunflower, skunkbrush, and indeterminate grasses were also identified and likely were important food species. "Processed Edible Tissue," possibly from berries, was identified. No evidence for maize was found. Obsidian from Rockshelter 8 was sourced to the Jemez Mountains. Other evidence for extraregional relationships is seen in the collared rim exhibited by the cord-marked vessels from Rockshelter 8. This type of rim is commonly associated with Upper Republican pottery from western Nebraska and suggests that "some level of interaction occurred between Apishapa phase and Plains Village tradition populations," although all of the pottery from site 5LA3189 is believed to have been locally manufactured (Kalasz et al. 2007:333). The lump-modelled cord-marked and plain ceramics from Rockshelter 8 are said to be consistent with ceramic assemblages recovered in other areas along the Front Range, especially Fort Carson. It is speculated that the introduction of pottery to the area may indicate the beginning of a period of more intensive resource processing.

The Diversification-period component at site 5LA3189 also produced data relevant to social organization. Some rooms in Rockshelter 8 yielded human burials, including an adult burial in an apparent slab-lined pit and a juvenile burial eroding from a similar pit. As the authors note, the "burials provide some indication that Apishapa-phase mortuary practices may in some instances be comparable to those of the Sopris phase" (Kalasz et al. 2007:338).

The report's synthetic summary contributes an excellent discussion of Developmental-period and Apishapa-phase settlement systems and strategies, which appear to have been similar. The authors hypothesize that the intensively occupied residential bases in the area represent population aggregation during the cold season, whereas less substantial camps were positioned to take advantage of specific resource patches seasonally, similar to Binford's (1980) field camps. While acknowledging the well-known importance of canyon settings for year-round or winter habitation during the Late Prehistoric stage in southeastern Colorado, the authors stress that base camps in steppe settings were also important and assert that "Burke's Bend represents a series of highly organized base camp operations" (Kalasz et al. 2007:330). An understanding of subsistence is critical to understanding settlement systems, and the project also yielded good subsistence data. In particular, the faunal assemblages recovered from the project sites indicate that the prehistoric occupants procured a variety of big game in the vicinity. Estimates of biomass based on the faunal materials reflect the importance of artiodactyls in local Late Prehistoric economies.

Archaeological Investigations at the Lopez Ranch (5LA2204) and Leef Ranch (5LA9853) Sites

Excavations at the Lopez Ranch and Leef Ranch sites in Las Animas County identified substantial Late Prehistoric occupations (Slessman et al. 2003). The Lopez Ranch site (5LA2204) is a sherd and lithic scatter along the upper Purgatoire River opposite the mouth of Lorencito Canyon. The site probably represents a Sopris-phase, short-term camp tethered to nearby habitations. A burned cobble feature (Feature 1) yielded a ceramic sherd and a radiocarbon date with a two-sigma calibrated range of A.D. 770–970. The excavators acknowledge that the radiocarbon date may be somewhat too early because of the use for old wood for hearth fuel. The function of the feature is unknown, although there was a one-hand mano nearby. No evidence of maize was found. The lithic regime was focused on the production of expedient flake tools from small cores. A shell pendant fragment was recovered. The ceramics (n = 126) comprised two distinctive types of plain wares. One type is similar to Plains Village cord-marked pottery; this vessel was likely a globular jar that was constructed by coiling, followed by scraping or wiping. The temper consisted of angular to subangular quartz, basalt, crushed granitic stone, and a small amount of mica that was likely part of the granitic stone. The authors note that this ware likely reflects interaction between upper Purgatoire people and Plains groups during the transition between the Developmental and Diversification periods. The other ceramic type was also constructed by coiling, and also scraped or wiped. The temper consisted of angular to subangular quartz, basalt, crushed granitic stone, and a small amount of sand, but no mica. Slight polish was evident on some sherds. This ware was identified as Taos Gray, and the authors state that its presence reflects interaction or trade relationships with northern Rio Grande Puebloans. The broad date range for Taos Gray is A.D. 900–1200, but it more likely dates to the period A.D. 1050–1200. The Lopez Ranch site is an important site type because more data are needed for such seasonal, non-residential sites in the Sopris settlement system. The presence of two different types of pottery that suggest contact with groups to the east and the southwest is also important.

The Leef Ranch site (5LA9853) is a large lithic scatter with several rock cairns along the upper Purgatoire River. Native American consultants believed the cairns were open-air burial markers. Alternatively, they might be associated with Penitente activity, which is known to have occurred in the area (Slessman et al. 2003). The single Late Prehistoric date from Feature 5, a slab-lined thermal basin with burned cobbles, yielded a two-sigma calibrated date range of A.D. 250–540, indicating an occupation during the Developmental period. Undated Features 7 and 8 are also associated with the Developmental-period component. A substantial assemblage of lithic debitage, flaked and ground stone tools, and projectile points was recovered from the limited excavations. Projectile points include both corner-notched (expanding stem) and shallowly side-notched arrow points. Local materials were used for early stage reduction, but more exotic imported materials were bifacially reduced and used for formal tools. Obsidian in the assemblage was sourced to northern New Mexico: Cerro Del Medio and Polvadera Peak. The authors note that the Developmental-period occupants relied more on local materials than the preceding Archaic site occupants. A number of manos were recovered; most are of the one-hand variety, but two two-hand manos were found. No ceramic artifacts were recovered. The small faunal assemblage includes deer/pronghorn-sized bones and a few elk/bison-sized bones, but is mostly composed of small mammals. At best, the floral evidence indicates processing of small seeds. No evidence of maize was found. The Leef Ranch site is important for studies of Late Prehistoric settlement systems, because it represents a site type that is difficult to identify; i.e., a demonstrably Developmental-period, short-term, seasonal, camp.

Archaeological Investigations at Eight Sites Associated with the Wolf Springs Ranch/Stanley Creek Land Exchange

SWCA Environmental Consultants conducted data recovery excavations at eight sites in Huerfano Park, five of which provided evidence of substantial Late Prehistoric occupations (Burnett et al. 2007). One intact feature was excavated at site 5HF1201. Feature A yielded a radiocarbon assay with a two-sigma calibrated date range of A.D. 345–540, indicating an early-middle Developmental-period occupation. Associated cultural materials included burned rocks, a low amount of debitage, and one unburned bison carpal. The debitage at the site reflects expedient tool manufacture. Recovered projectile points consisted of small corner-notched arrow points and also apparent dart points of typical Archaic types. Four metates and two manos were recorded on the site surface, indicating that plant food preparation was an important site activity. The small faunal assemblage included mule deer, in addition to bison as noted above. Site 5HF1201 produced no ceramics, ornamental artifacts, or evidence of habitation structures. It was interpreted as a short-term camp within a logistically organized settlement system. The co-occurrence of arrow and dart points may indicate simultaneous use of both atlatl-and-dart and bow-and-arrow technologies. However, it is also possible that both Archaic and Late Prehistoric occupations are represented.

At site 5HF1291, no cultural features were excavated and no radiocarbon dates were obtained, but prior work at the site yielded ceramics, indicating a Late Prehistoric affiliation. Data recovery at the site produced no evidence of habitation structures, but a substantial lithic assemblage was retrieved. The lithic artifacts reflect the use of the site as a locus of early stage reduction of local quartzite. In addition, low numbers of possibly nonlocal argillite, chert, chalcedony, petrified wood, and "silicified sediment" artifacts were identified, although it is acknowledged that the sources of these materials are unknown and may have been relatively close to the site. No exotic materials such as obsidian were found. Two metates and one mano were found on the site's surface. Overall, the evidence suggests that site 5HF1291 likely functioned as a short-term seasonal camp focused on the exploitation of local toolstone and floral resources.

Data recovery at site 5HF1401 resulted in the excavation of two cultural features. Feature 2 produced a radiocarbon date with a two-sigma calibrated calendrical range of A.D. 445–765 and the date from Feature 1 has a two-sigma calibrated range of A.D. 895–1160. These data indicate occupations during the middle Developmental period and the transitional Developmental–Diversification period, respectively. Both features were rock-filled basin hearths and the authors speculate that they were used to roast green pinyon cones. The flaked stone artifact sample from Late Prehistoric-age Concentration C is typified by the use of local materials, a lack of finished formal tools, and a predominance of early–middle stage bifaces and expedient tools such as lightly modified flakes. Two complete manos and three metate fragments were found. A Late Prehistoric arrow point fragment of obsidian was recovered from the Concentration C subsurface. XRF analysis indicates a likely origin within the Cerro de Medio source area in the Jemez Mountains. Overall, the data suggest that the site served as a seasonally occupied field camp where local lithic, floral, and faunal resources were procured and processed. One hearth at site 5HF1404 was radiocarbon dated; the date from Feature 2 yields a two-sigma calibrated calendrical range of A.D. 265–595, reflecting an early-middle Developmental-period occupation. Flaked stone debitage and tools associated with this occupation reflect the procurement of locally available toolstones and their subsequent early-stage reduction. Finished formal tools were lacking and the most prevalent artifacts included tested cobbles, freehand cores, and minimally modified flakes. Two manos were also recovered, suggesting that on-site vegetal resource processing took place. There were a low number of faunal remains, but flaked stone tools reflecting faunal procurement or processing were lacking. The site likely represents an ephemeral seasonal camp related to low intensity toolstone procurement and floral food processing.

At site 5HF1407, four cultural features yielded Late Prehistoric dates. Feature 3 was a large rock-filled basin hearth that produced a date yielding a two-sigma calibrated calendrical range of A.D. 425–645. Feature 7 was a large basin hearth filled with burned rock; it produced a date with a two-sigma calibrated range of A.D. 545–655. Feature 7a was a small basin hearth yielding a radiocarbon assay with a two-sigma calibrated range of A.D. 555–660. Lastly, Feature 12d, hearth containing burned rock, produced a radiocarbon date with a two-sigma calibrated range of A.D. 425–595. The four dates are statistically contemporaneous and suggest a single mid-Developmental-period occupation. In terms of associated materials, Feature 3 contained a calcined, deer-sized, long bone flake; Feature 7 contained four deer-sized long bone fragments, three of which are green-broken flakes resulting from marrow extraction; and Feature 12d contained debitage and a burned log fragment. Like several of the other investigated sites, the lithic assemblage from site 5HF1407 has a paucity of formal finished tools and is dominated by expedient flake tools and tested cobbles, primarily of locally available quartzite, though other, possibly nonlocal, materials are also present. Two projectile points were recovered. One is a Late Archaic-type dart point and the other is a Late Prehistoric arrow point. Five metate fragments were also recovered. The site likely functioned as a short-term, seasonal camp where early stage lithic reduction, plant processing, and hunting were conducted.

In the synthetic summary of the project, the authors contend that use of Huerfano Park by transitory hunter-gatherers began during the Late Archaic but peaked during the Late Prehistoric stage. The lack of habitation structures in the project area is taken as evidence that these groups did not winter in Huerfano Park. Rather, it is speculated that the area was only used for seasonal foraging. Regarding these Developmental- and Diversification-period peoples, the authors opine that they likely maintained "semi-permanent dwellings" to the south, possibly in New Mexico (Burnett et al. 2007:241). The posited connection to New Mexico seems to be largely based on the presence of Jemez Mountain obsidian at several of the project sites. A travel corridor from northern New Mexico is hypothesized to have extended upward into the San Luis Valley, and thence over Mosca Pass into Huerfano Park. Such a route would only have been viable in the late spring or early summer, after the snow had melted.

Mitigative Excavations at the Hess (5DA1951), Oeškeso (5DA1957), and 5DA1936 Archaeological Sites at the Rueter-Hess Reservoir

Three sites were investigated at the Rueter-Hess Reservoir, in Newlin Gulch, a tributary of Cherry Creek, near the town of Parker (Gantt 2007). The Hess site (5DA1951) yielded evidence of both Early and Middle Archaic period occupations. The Oeškeso site (5DA1957) and 5DA1936 yielded substantial Late Prehistoric components. All are described below.

The Archaic-stage occupation of the Oeškeso site consisted of a roasting pit dated to the Early Archaic and several Middle Archaic components. The only diagnostic Early Archaic point was recovered in a Middle Archaic context, suggesting that the point was curated by the Middle Archaic occupants. Two or three distinct Middle Archaic occupations were identified within a 350-year span, with an additional Middle Archaic occupation near the transition to the Late Archaic period. The most notable aspect of the Middle Archaic component was the presence of a basin house, which was interpreted to have been used primarily as a lithic reduction workshop over the 350-year span of the intense Middle Archaic occupation. This suggests that the site was used more as a logistical locale than as a residential base, compared to the nearby Hess site.

The excavators believed that the Hess site (5DA1951) occupations were related to those of the nearby Oeškeso site. The Hess site appeared to have served as a residential base camp, with three or more occupations over a span of 450 years. The Early Archaic component consisted of two small basin features of unknown function and no diagnostic tools. The Middle Archaic component contained two basin houses, both with internal features. The basin houses are contemporaneous with the structure at the Oeškeso site. While faunal remains at the Hess site indicate a broad-spectrum diet that is typical of the Middle Archaic, the presence of a fetal/neonatal bison humerus near the basin house suggests a spring or early summer occupation.

Site 5DA1936, situated on the end of a finger ridge, produced two radiocarbon dates from Features 3 and 5 that respectively yielded two-sigma calibrated ranges of A.D. 650–805 and A.D. 1265–1410, reflecting Early and Middle Ceramic-period occupations. These data were complemented by the presence of a corner-notched arrow point belonging to the Early Ceramic occupation and a second arrow point fragment consistent with point types used during the Middle Ceramic period. The two excavated features are heavily deflated, but appear to have been roasting pits similar to those associated with the Early Ceramic component on the Oeškeso site. Additional concentrations of fire-cracked rock on the surface may represent completely deflated examples of the same feature type. No ceramics were found in Late Prehistoric contexts at site 5DA1936, but a variety of flaked and ground stone tools were recovered. The excavators believe the site to have been used as short-term camp during both of the Late Prehistoric occupations.

The Oeškeso site spans two ridges overlooking Newlin Gulch and the Cherry Creek valley. It yielded nine radiocarbon dates reflecting at least three separate Early Ceramic-period occupations. The combined two-sigma calibrated date ranges of the contemporaneous dates suggests occupations during the periods A.D. 90–305, A.D. 265–655, and A.D. 670–985. The recovery of over 400 cord-marked sherds and numerous corner-notched arrow points supports the radiocarbon data. In addition to the pottery and arrow points, the components yielded large corner-notched knives, at least two dart points, and various flaked and ground stone tools. Expedient flake tools dominate the flaked stone tool assemblage. The pottery was made from clay and temper types available along the Front Range; Instrumental Neutron Activation Analysis (INAA) suggests that the clays could have been obtained locally. Features associated with the Early Ceramic component included (in order of frequency) basin hearths, roasting pits, "hearth cleanouts," and possible post holes. No storage features were identified; it is speculated that ceramic pots served for storage. The Early Ceramic-period component at the Oeškeso site yielded good subsistence data. The site occupants focused on the hunting of medium to large artiodactyls. No evidence of maize was found; rather, wild plant resources such as cactus (prickly pear and hedgehog-type) and Cheno-Ams were exploited. The presence of charred cactus seeds suggests site occupations from late spring to late summer. The author suggests that the site served as a logistical base camp. Despite the possible post holes, no clear evidence for habitation structures was found. Flakeable lithic materials outcrop occur near the site, and it is likely they were one of the reasons the locale was selected for occupation. According to the author, the "sheer number and density of artifacts and features" in the Early Ceramic component at the Oeškeso site comprises evidence for a rebounding population during this period (Gantt 2007:810).

Data Recovery of Thermal Features at the Venado Enojado Site (5CF555)

The Venado Enojado site (5CF555) is a buried site located east of Johnson Village. A feature was exposed during trenching for a county road, with a second feature encountered during salvage excavation of the first feature. Excavation identified Feature 1 as a basin-shaped rock-filled hearth; the feature was radiocarbon dated to the period 3660–3460 B.P. Feature 2 was an FCR concentration, apparently cleanout from Feature 1. Ground-penetrating radar (GPR) was subsequently conducted to evaluate the potential for additional features. GPR revealed two possible basin houses (Features 3 and 4) at the site. Neither were excavated but both are assumed to be contemporaneous with Features 1 and 2 (Watkins et al. 2012).

Synthetic Studies and Academic Research

The following section briefly summarizes research conducted since 1999 that represent important contributions to archaeological understanding of the Late Prehistoric stage in eastern Colorado. These documents represent synthetic summaries conducted for CRM projects, M.A. theses, a Ph.D. dissertation, journal articles, a National Register nomination, a conference paper, a chapter in an edited volume, a predictive model for the PCMS, and two historical studies summarizing past research at important Late Prehistoric sites.

The Saint Charles River Project: An Exploration of Prehistoric Trade, Exchange and Apishapa Architectural Patterning in Southeastern Colorado

This M.A. thesis describes the "exploration" of two rockshelters and five architectural sites near the town of Beulah through survey, mapping, and limited excavation (Evans 2012). The data are used to construct a model of settlement, subsistence, landscape use, and extraregional relationships for what is interpreted as a local Apishapa-phase occupation. Evans asserts that the study has helped to define the western boundary of Apishapa occupation in southeastern Colorado. Some of the more significant and salient conclusions of this study are described below.

Focusing on site- and locality-specific interpretations of landscape use, Evans contends that the extramural locations of thermal features associated with architectural features along canyon rims indicates warm season rather than year-round occupations. This is said to represent evidence for a mobile population of hunter-gatherers who used the structures within a logistically organized settlement system. Evans further argues that proximity and access to water was important in the placement of the structures, but also that their placement exhibits an awareness of the "natural watering patterns" of big game animals (Evans 2012:201). With regard to the latter, he believes that the structures were placed to enable efficient hunting of the animals moving to and from the river, rather than having some sort of defensive function as some researchers had previously hypothesized.

Evans posits that the "Saint Charles Apishapa" were not culturally isolated, but rather were part of a wide-ranging network of trade that extended from the Southwest to far flung regions to the northwest, northeast, and southeast. This is evidenced by the presence of Puebloan ceramics, obsidian from Cerro del Medio (New Mexico) and Malad (Idaho), catlinite from Minnesota, and Alibates chert from Texas.

Reconstructing Trinchera Cave: an Examination of the Excavation History, Chronology, and Stratigraphy of Site 5LA1057

This report is primarily a history of the excavation and research conducted since the 1950s at Trinchera Cave (5LA1057), an important stratified rockshelter east of the town of Trinidad (Zier 2015). It is also valuable as a source of primary data from the site, including radiocarbon dates. The site was mapped, the stratigraphy and its relationship to past excavations were reconstructed, previously undocumented rock art was recorded, and the site components summarized. No new analyses of artifacts or other materials were conducted as part of this project. This well-known site was subjected to multiple excavations in the 1950s, but no reports of this work were ever completed or published. Excavations conducted from 1999 to 2001, however, were professionally reported. The site yielded abundant evidence of intensive Late Prehistoric occupations, among others. Zier (2015) notes that the Late Prehistoric deposits are essentially gone, but limited intact deposits relating to the Archaic era are extant.

Some of the more important chronological data pertaining to the Late Prehistoric stage include radiocarbon dates on sandals (the calibrated ranges are A.D. 617–766, A.D. 880–1020, and A.D. 1023–1169), beads (A.D. 665–775 and A.D. 380–535), a juniper beam from a probable structure (A.D. 995–1165), and a bundle of tied yucca leaves (A.D. 1030–1210). These two-sigma calibrated calendrical date ranges reflect multiple Developmental and Diversification (Apishapa phase) occupations. Developmental-period dates are more numerous and suggest heavier use of the rockshelter during this period.

Most of the rock art at the site is affiliated with the Late Prehistoric occupations, comprising the Purgatoire Pecked I style of the Developmental period and the Purgatoire Pecked II style of the Diversification period, following Loendorf (2008) and Cole (1984, 1985). Animals such as snakes and scorpions, anthropomorphic figures, footprints, a handprint, a shield, a few abstract motifs, and numerous quadrupeds are represented. Also present is a pictograph that is probably an example of the Purgatoire Painted style, which is likely associated with the Apishapa phase.

Zier recommends that future work should include the full analysis of the materials recovered from the site "within the framework of a comprehensive research design" (Zier 2015:97). These materials include flaked and ground stone artifacts, ceramics, worked bone, worked and unworked shell, faunal remains, perishable items including both artifacts and macrobotanical specimens, and wooden structural elements. He also recommends more rock art research at the site.

Haldon Chase, the Snake Blakeslee Site, and the Archaeology of Southeastern Colorado: 1949 to 1955

This article presents a historical narrative of the events that led to the excavation of the Snake Blakeslee site, 5LA1247, and discusses the excavation methods and goals of the project (Lintz 1999). It is a valuable contribution for shedding light on an otherwise poorly understood period of archaeological research in southeastern Colorado. It also describes the contributions that Hal Chase made to southeastern Colorado archaeology, including conducting one of the earliest professional excavations of a stone enclosure site in the region; salvaging an important assemblage from continuing looting and placing it, along with the primary records, in suitable repositories; and notating in journals the locations and descriptions of important local sites and private collections.

Goin' Down to South Park: the Place of the Columbine Ranch Site (5PA2457) within a Prehistoric Context of Park County

This article is mostly relevant to the Paleoindian and Archaic stages and presents no data that explicitly or exclusively pertain to the Late Prehistoric stage, though some of the data and conclusions it discusses are relevant to the Late Prehistoric (Larmore and Gilmore 2006). The authors discuss the prehistoric use of Trout Creek chert (Leadville/Manitou Formation) and other lithic materials, noting that Trout Creek chert is the most prevalent lithic material in South Park and particularly on the Columbine Ranch site (5PA2457). Kremmling chert is the second most ubiquitous toolstone present in prehistoric assemblages. There is some discussion of a settlement model, prehistoric mobility, and climatic shifts.

Pinon Canyon Maneuver Site Heritage, Resources, and Stewardship (The U.S. Army Contribution)

This document provides very brief synopses of cultural resource-related work conducted at the PCMS prior to 2009 (Stout 2009). It summarizes and provides citations for numerous inventory, excavation, and ethnohistory projects.

Assessing Plains Village Mobility Patterns on the Central High Plains

The results of the analyses of lithic and especially ceramic assemblages from the Barnes Site (5LA9187) at the PCMS are used to explore possible regional connections and patterns of movement and trade among Plains-dwelling groups of the latter part of the Late Prehistoric stage; namely, Upper Republican Plains Villagers and the more residentially mobile "indigenous" High Plains groups such as those represented at the Barnes site (Lindsey and Krause 2007). The article, which includes detailed descriptions of the unique pottery from the site and also describes contemporaneous ceramics from other regional sites, presents evidence for important differences between these two groups. Rather than reflecting logistical use of the High Plains for hunting and other resource procurement forays by Upper Republican peoples based outside the region, sites such as the Barnes site seem to represent the seasonal residences of groups described as "indigenous drifters" (Lindsey and Krause 2007:104). These groups made pottery using technology similar to that of Upper Republican/Central Plains groups—with whom they may have had a "shared ancestral relationship"—but their material culture reflects a more mobile lifeway that included wide-ranging contacts with surrounding cultural groups (Lindsey and Krause 2007:104).

A Model for Predicting Late Prehistoric Architectural Sites at the PCMS

Mark Owens presents a predictive model for Late Prehistoric structural sites at the PCMS in southeastern Colorado that "examines the relationships between technological, functional, chronological, and environmental/geographic variables and their influences on the placement of architectural sites" (Owens 2007:1). In addition to commonly used variables, such as proximity to water, aspect, slope, elevation, and topographic setting, the model recognizes three categories of variables labeled as sensory, visual, and functional characteristics. Sensory characteristics refer primarily to acoustic performance, which focuses on the possibility that some sites—mainly those with rock art—may have been selected because of acoustic qualities that enhanced ceremonial function. Visual characteristics largely pertain to viewshed, particularly line of sight for communication purposes or to maintain connections between defensible landforms. Functional characteristics (i.e., site function) relate to proximity to important resources.

Acoustic performance was only relevant to a subset of sites and seemed to be a minor factor in site selection. Regarding visual performance, Owens concluded that line of sight for communication or connection between defensible landforms seemed to be important for some sites, but blending in with the landscape—presumably to be less visible and, therefore, less vulnerable—played an important role at other sites. Proximity to needed resources was apparently important at most sites, except as noted below.

Site locations were found to exhibit diachronic variation, with Developmental-period sites found in areas near abundant resources and Diversification-period sites situated in areas containing less water and fewer food resources. More specifically, Developmental-period sites were found to almost always be near permanent water, whereas during the Diversification period, viewshed or seclusion factored into decisions about site placement. The majority of architectural sites were associated with canyon rims, ridges, and prominent points. Owens notes the importance of canyon settings vis-à-vis proximity to water, toolstone outcrops, and availability of stone for grinding implements and building materials. Most architectural sites have southern exposures, suggesting cold weather habitation, though a significant number have northerly exposures suggesting warm season habitation associated with the exploitation of seasonally available food resources. These patterns are interpreted as reflecting considerable residential mobility.

Addressing the idea that sites on canyon projections or "raised landforms" may be related to defense, Owens suggests several plausible scenarios including competition over critical territory, control over important seasonal resources, resource depression or decreases in arable land, "internal and external sociopolitical pressures," and the influx of outsiders (Owens 2007:44). These factors, in turn, may have been related to droughts triggering population movements, attempted territorial expansions, and raiding to obtain resources. Conflict and competition between ethnically separate groups is evidenced by archaeological, ethnohistoric, and rock art data. Owens' model is useful because it is at once predictive yet explanatory; many of the factors that were identified as potentially important for the placement of architectural sites might be applied to other areas of southeastern Colorado.

Rock Art and Landscape in the Piñon Canyon Maneuver Site

Wintcher's article (2005), which focuses on sites in Bent and Stage canyons (tributaries to the Purgatoire River), explores the link between rock art and landscape using archaeological and ethnographic evidence. The posited link between Apishapa peoples and later Caddoan-speaking groups (e.g., Caddo, Pawnee), who may be their descendants, is invoked to justify the use of Caddoan mythology, spiritualism, and worldview to interpret rock art at the PCMS. Analogies to Athapaskan myth and symbolism are also employed, on the presumption that some of the rock art in the region may be Apachean or may share in a "Plains-wide" worldview (Wintcher 2005:165). Some of the key tenets and observations in this study include the spiritual significance of boulders and landscape features, the concept of spirit homes, and the use of rock art to control access to important ritual use areas or restricted territories. Examples are provided that illustrate the placement of rock art at the entrance to canyons that may have contained restricted locales or important resources. Other functional attributes of rock art are also discussed, including possible relationships to hunting rituals or shamanism.

Thunder and Herds: Rock Art of the High Plains

Loendorf's book (2008) constitutes an important descriptive summary and synthetic discussion of the rock art of the PCMS and Picket Wire Canyonlands; certainly the best and most complete to date. The various rock art styles defined for this area are thoroughly described; the available temporal evidence for each is discussed; and the relationships between rock art, associated archaeological sites, and larger anthropological concerns such as subsistence, ideology, ceremonialism, social boundaries, and cultural affiliation are addressed. The final chapter presents an insightful discussion of the more important archaeological implications of these data.

National Register Nomination Form for Franktown Cave (5DA272)

Franktown Cave (5DA272) is on the northern edge of the Palmer Divide, 25 miles south of Denver. In the National Register nomination form for the site, Gilmore summarizes the data from multiple excavations and analytical studies (Gilmore 2005). The temporal positions and contents of the Late Prehistoric components are reviewed. The site contained components from throughout the entirety of the Archaic and Late Prehistoric stages. Archaic components include materials ascribed to the Early Archaic based on the presence of Mount Albion and MM3 type projectile points, and two Middle Archaic Components (Component 1, dated to 3350–2880 B.C. and Component 2 dated to 2870–2500 B.C.). The Middle Archaic component is noteworthy for both the amount of recovered perishable cultural materials and the absence of any McKean complex points. The first possible Late Prehistoric occupation took place during the Late Archaic to Early Ceramic transitional period (Component 3, dated to A.D. 130–430). Other Late Prehistoric occupations took place during the Early and Middle Ceramic periods. Components 5–7, in particular, are important because few sites in the region have such robust Middle Ceramic occupations. The date range of the Early Ceramic component (Component 4) is A.D. 660–880 and the occupational ranges for the Middle Ceramic components are A.D. 720–980, 890–1170, and 1035–1290. These occupation periods are based on the two-sigma calibrated ranges of multiple radiocarbon dates obtained from sherds, maize cobs, and various perishable artifacts such as a basket and a moccasin.

Component 3 is described as transitional between the Late Archaic and the Late Prehistoric, but no ceramics or arrow points were recovered from Component 3 contexts, suggesting that at least two of the key technological shifts associated with the Late Prehistoric stage had not yet taken place on the Palmer Divide (Gilmore 2005). In addition to basketry and cord-marked ceramics, Early Ceramic Component 4 produced a corner-notched arrow point. Gilmore (2005:5) notes that the methods used to manufacture the Early Ceramic-period basket were the same as those used to make the baskets recovered from the Archaic components, indicating the persistence of this technology for thousands of years, and suggesting that the later groups may have been the descendants of the earlier groups. Material culture associated with the Middle Ceramic occupations included pottery, side-notched arrow points, a moccasin, a fragment of a fringed legging, maize cobs, and a hoop made of twigs and sinew. Some sherds were from globular cord-marked jars with constricted necks and collared rims comparable to pottery manufactured by Central Plains cultures. Despite the obvious connections to the Upper Republican cultures of the Platte River basin, the Middle Ceramic components also exhibit affinities with Apishapa-phase cultures of the Arkansas River basin.

Aside from the robust and continuous archaeological record for the Late Prehistoric stage, a major contribution of the site is the large quantity of well-preserved perishable artifacts. In terms of additional research potential, collections from the site have the potential to yield data relevant to a number of important research issues:

- Late Prehistoric lithic technology: the flaked stone artifacts have never been fully analyzed.
- Subsistence: morphological and genetic analyses of the maize may reveal important information about the origins and practices of Late Prehistoric horticulture. The faunal assemblage has likewise never been fully analyzed.
- Data from Component 3 have the potential to yield insights into the nature of the transition from the atlatl to the bow.
- The Middle Ceramic-period cultural materials from the site can provide additional data relevant to understanding settlement systems, cultural affiliations, and subsistence during this time period.

Way Down Upon the South Platte River: Southern Avonlea Manifestations and a Population-Based Scenario for Athapaskan Migration

This paper (Gilmore 2004b) attempts to link Late Prehistoric—especially Diversification period—demographics to Athapaskan migration. It suggests that large Late Prehistoric populations precluded Athapaskans from moving into the region until those populations declined beginning in the twelfth century.

The Context of Culture Change: Environment, Population, and Prehistory in Eastern Colorado, 1000 B.C. – A.D. 1540

Kevin Gilmore's Ph.D. dissertation "examines the interplay between prehistoric population dynamics and paleoenvironment, and to what extent these factors influenced culture change over the last 3,000 years on the western High Plains of Colorado" (Gilmore 2008b:1). To that end, Gilmore marshals numerous lines of evidence and combines them with paleoenvironmental data newly obtained from eastern Colorado pocket fens to construct an explanatory model of shifting demographics from the Late Archaic through the Late Prehistoric stages. He proposes possible explanations for the adoption of new technologies (e.g., pottery and the bow and arrow) and the introduction of maize horticulture as integral parts of the model and presents a thorough discussion of the evidence for demographic change in eastern Colorado.

Gilmore's model seeks to explain how climatic shifts affected prehistoric population growth and decline; how these changes affected settlement systems and burial practices; and why the bow and arrow, ceramic technology, and maize horticulture were adopted to varying degrees during the Late Prehistoric stage. Therefore, population increases and decreases driven by climate change underpin the model. The key climate events include the Terminal Archaic Drought (TAD; 250 B.C.–A.D. 100), the Early Ceramic Drought (ECD; A.D. 300–550), the First Millennium Amelioration (FMA; A.D. 550–975, a period of increased effective moisture following the ECD), and the Medieval Climate Anomaly (MCA; A.D. 975–1450). Immediately following the ECD, the evidence suggests that population growth rates peaked. Population pressure resulted in decreased residential mobility and smaller group territories during the FMA. This, in turn, necessitated more efficient use of available resources within the smaller territories, the use of greater numbers of different resource types (including lower ranked resources such as grass seeds and small mammals), and the intensity with which resources were processed. Bow and arrow technology was fully embraced at this time because it allowed more efficient capture of a wider variety of prey. The use of pottery proliferated because it allowed more efficient processing of the types of resources that were becoming more important, such as small seeds. Maize horticulture was adopted by some groups probably because it provided a partial solution to the problems presented by a shrinking resource base. Changes in mortuary ritual at this time are seen as an outcome of an increasing need to employ ritual as a way to reinforce group identity and emphasize the importance of controlling a specific territory and the critical resources it contained. These developments continued into the MCA, which was characterized by decreased effective moisture and increased temperature. Around 150 years into the MCA, regional populations began to level off and then decline. Near the end of this climatic episode, there is evidence that Middle Ceramic-period groups in both the Platte and Arkansas river basins began to migrate out of eastern Colorado; Athapaskan immigrants coming into the region from the north took advantage of this situation by moving into the resulting sparsely populated landscapes.

Holocene Drought Records and the Implications for Middle Archaic Cultural Ecology

In this article, Gilmore (2012) expands the paleoclimatic reconstructions that he undertook for his dissertation (Gilmore 2008b), extending them back through the Archaic era, focusing on the Middle Archaic. He used data from pocket fens and the GISP2 ice core, along with the median radiocarbon frequency of 71 McKean complex points from dated contexts, to correlate periods of increased aridity or cold with inhibited colonization by McKean complex peoples. Conversely, he was able to correlate an expansion of the complex with a period of moderate temperature and increased moisture.

Ritual Landscapes, Population, and Changing Sense of Place during the Late Prehistoric Transition in Eastern Colorado

This article by Kevin Gilmore (2008a) covers much of the same ground that is discussed more thoroughly in his dissertation, described above. The article, however, focuses more explicitly on changes in mortuary practices during the Late Prehistoric stage and their importance in creating ritual landscapes. As noted above in the summary of Gilmore's dissertation, the purpose of defining such landscapes may have been related to the need to control territories that had decreased in size as a consequence of increasing populations:

> …greater control of a smaller territory was necessary to guarantee access to critical resources, and the importance of territory and group identity was reinforced through repetition of rituals (such as burial ritual) at special places on the landscape. These recurring rituals created and reinforced community cohesion. The choice of topographically prominent locations to perform these rituals communicated possession of this territory by all members of the community, both living and dead, to other communities (Gilmore 2008a:102).

The Hogback Valley and Its Relation to Denver Area Prehistory

This article describes a landscape-scale study of prehistoric settlement patterns in the area encompassing Denver and the Hogback Valley (Moore and Busch 2003). Although the study is not specific to the Late Prehistoric, it is relevant because many of the sites in the study area date to the Late Prehistoric stage. The authors define a *habitation area* as an area characterized by a high density of habitation sites that was likely used on a year-round basis—similar to a habitation site catchment but more extensive because it is the catchment for multiple habitation sites—and a *habitation sub-area* as the core of a habitation area that was intensively occupied on a year-round basis. The authors conclude that the region surrounding Denver qualifies as a habitation area, and the Hogback Valley within this area qualifies as a habitation sub-area. They posit "short-range mobility by hunter-gatherers" who had no need to venture outside the habitation area because of its high productivity (Moore and Busch 2003:20).

Analysis of the Artifact Collection from the Jarre Creek Site (5DA541), a Terminal Early Ceramic Period Occupation on the Palmer Divide

This article presents the results of the analysis of artifacts from the Jarre Creek site (5DA541) on the Palmer Divide south of Denver, conducted by the Archaeological Research Institute at the University of Denver (Gilmore 2004a). The Jarre Creek site was excavated in the 1950s. New radiocarbon dates from the site have recently been obtained; the dates yield two-sigma calibrated calendrical ranges of A.D. 780–1025 and A.D. 780–1050. The terminal Early Ceramic component yielded projectile points, a reconstructable pot, flaked and ground stone tools, and the remains of two habitation structures. Gilmore sees the Jarre Creek site and other sites on the Palmer Divide as having "greater contact with developing Plains Village cultures to the east;" i.e., Upper Republican (Gilmore 2004a:21). The author concedes that although there is still not enough data to confirm the tenability of the "Franktown focus," there are differences in settlement patterns, economy, and material culture represented by the sites of this area when compared to contemporaneous sites in other parts of northeastern Colorado. Sites in the Palmer Divide area exhibit greater residential stability and more substantial occupations, compared to other areas of northeastern Colorado except the High Plains where Upper Republican occupations are present. A connection is hypothesized: Upper Republican peoples may have displaced indigenous groups, who relocated to the Palmer Divide. Population pressure in the Palmer Divide subsequently resulted in higher, less mobile populations; ideas developed more fully in Gilmore's (2008b) dissertation. This area had greater carrying capacity than many surrounding areas because it contained more resources. The large amount of ground stone found at Jarre Creek might reflect more intensive use of lower ranked resources as an outcome of greater competition for local resources. It is also conjectured that maize horticulture was adopted on the Palmer Divide because the greater stress on local resources made corn growing worthwhile. The focus on local raw material and heavy use of expedient flake tools seen in the Jarre Creek site assemblage are proffered as additional evidence for the above interpretations. In other words, increased sedentism, a greater dependence on floral resources, and increased use of local toolstones were the responses to a smaller territory resulting from population pressure.

Archaeological Investigations of the River Bluffs Open Space, Windsor, Colorado

Jessica Anderson's M.A. thesis describes the investigation of the Weinmeister (5LR12174) and Harvester (5LR12641) sites near the town of Windsor, in Larimer County, Colorado, and the analysis of existing private collections from the sites (J. E. Anderson 2012). The sites are near confluence of Fossil Creek and the Cache la Poudre River. At the Harvester site, a radiocarbon date from the excavation of Hearth 2 placed the occupation within the Early Ceramic period; this was confirmed by diagnostic artifacts from the private collection. The toolstones from both sites revealed heavy use of mountain-derived lithic materials for tool manufacture.

The synthetic part of the thesis focuses on the mobility patterns of Early Ceramic period groups as revealed through lithic material source areas and also examines the role of tubular bone beads in the mortuary complex. Anderson concluded that Early and Middle Ceramic groups occupying the Plains exploited lithic sources in both the mountains and the Plains. She also found that Early Ceramic sites in the mountains have yielded artifacts made of lithic materials from the eastern hogbacks, and Early Ceramic sites in the eastern hogbacks and Plains have produced artifacts made from materials obtained from the mountains. This is presented as evidence of "Grand Circuit" transhumance, corresponding to Benedict's (1992) rotary settlement system model.

Anderson's study of the bone beads revealed that they are consistent with bead assemblages defined for the Colorado Plains Mortuary Complex. She noted that burial modes and associated grave goods found in the Colorado Plains Mortuary Complex are comparable to those within the Plains Woodland Mortuary Complex, although there are significant differences as well, such as the lack of large ossuaries in Colorado Plains contexts. She concludes that the Colorado Plains Mortuary Complex is "an attenuated version of the Plains Woodland Mortuary Complex on the western High Plains" (J. E. Anderson 2012:174). Nevertheless, the correspondences between the two mortuary complexes are taken as evidence of a cultural or even genetic connection between the two regions. This, and the location of burial sites along major rivers connecting the western High Plains, eastern Colorado, and the Hogbacks, seems to reflect the existence of corridors of migration and transmission of ideas from east to west. Based on these data, Anderson rejects the mainstream interpretation that the Colorado Hogback Complex had little or no relationship to the Colorado Plains Woodland Complex, and, through it, the Plains Woodland Complex. She concludes that the data from the Weinmeister and Harvester sites, combined with other regional data, support the idea that Late Prehistoric groups living in or near the Hogbacks exploited both the mountains and Plains and likely represent a melding of indigenous traditions and cultures derived from Plains Village traditions.

An Analysis of Stone Circle Site Structure on the Pawnee National Grassland

This M.A. thesis investigates site structure on stone circle sites on the Pawnee National Grassland, including many that date to the Early or Middle Ceramic periods (Long 2011). It uses cluster analysis to reveal patterns pertaining to multiple variables including site setting (landform), stone circle gap direction, prevailing wind directions, and the parts of the features exhibiting the highest stone counts.

Communal Hunting along the Continental Divide of Northern Colorado: Results from the Olson Game Drive (5BL147)

This article reviews the results of investigations of the Olson Game Drive site (5BL147), including periods of use, how the game drive functioned, and how it fit into the settlement systems of the groups that used it (LaBelle and Pelton 2013). It also includes a good overview of the evidence for high elevation hunting sites in Colorado from a diachronic perspective. The site has yielded evidence of Archaic, Late Prehistoric, and Protohistoric components. Of five radiocarbon dates, two date to the Late Archaic and three date to the Protohistoric or historic period. LaBelle and Pelton note, however, that the use of high elevation game drives peaked during the Early Ceramic period. They link this to Gilmore's (2008a) research into Late Prehistoric demographic expansion, and suggest that rapid population growth led to resource depression in the heavily occupied foothills of the Front Range, further leading to an expansion in diet breadth and concomitant increased exploitation of nearby Alpine environments.

McKean Complex Projectile Point Variability

For his M.A. thesis, Larmore (2002) analyzed 400 McKean projectile points from 15 sites in Colorado and Wyoming, determining that the points were consistent across the region during the Middle Archaic. He suggested that the data may indicate a "…shared group identity over an area characterized by a relatively low population density" (Larmore 2002:203).

Prehistoric Occupation of the Palmer Divide Region in Colorado

Heidi Guy Hays (2008) examined private collections of projectile points from the Palmer Divide area between Denver and Colorado Springs. Although the provenience of the study assemblage was limited to the Palmer Divide, Guy Hays was able to examine numerous Archaic-stage projectile points. Roughly one-third (32 of 95) of the examined artifacts consisted of Early Archaic projectile points, counter to frequency expectations based on the low perceived population of the region during the Early Archaic period. These points were overwhelmingly (81.25 percent) manufactured from local raw materials (Guy Hays 2008:181–183).

Excavations at the Kaplan-Hoover Bison Bonebed (5LR3953)

The excavators of a Late Archaic period bison kill, the Kaplan and Hoover Bone Bed site (5LR3953), recovered remains of at least 44 individual bison, although the assemblage was thought to include as many as 200 (Todd et al. 2001). They also recovered nine projectile points, some of which share characteristics with Yonkee points. Overall, the recovered bison remains indicate less intensive butchering and processing than is expected at most Archaic-stage kill sites, with processing focused on ribs, hump, tongue, and, possibly, femur.

Specialized Analyses or Studies

A number of research projects or narrowly focused analyses relevant to some aspect of the Late Prehistoric or Protohistoric stage have been conducted and reported since 1999. These are briefly described below.

The Enduring Quest for a Clear Vision of the Past: Interpreting Aboriginal Stone Features on Two Archaeological Sites in South Park

This article discusses several classes of stone features situated on prominent ridges on two sites (5PA1300 and 5PA1804) in South Park (Weimer 2009). Various possible functions are discussed, including the possibility that the features may represent Late Prehistoric hunting complexes. The author favors their interpretation as vision quest sites dating to the Protohistoric or historic era, possibly affiliated with the Arapahoe.

Analysis of and Investigations into the Borman-Pikes Peak Whole Vessel (5EP3496)

This article describes a plain ware vessel (5EP3496) found below Pikes Peak (Ellwood 2010). The pot is a large olla with a tapered neck and semi-conical base, dark gray in color, undecorated, exhibiting granite temper. It had been manufactured by paddle and anvil and was dated to the period A.D. 1410–1470, which is the two-sigma calibrated calendrical range of an AMS date on charcoal scraped from the exterior of the vessel. Pollen data indicate it was used for cooking maize. Ellwood believed the pot to be "pre-Dismal River," but affiliated with early Athapaskans or Plains

Apache. Alternatively, it is possible that it is not Athapaskan, but rather associated with Late Prehistoric peoples of the terminal Apishapa phase or Middle Ceramic period. The calibrated date range falls near the end of the Diversification period and is within the latter part of the Middle Ceramic period. The date range does, however, overlap with those of two AMS dates reported by Gilmore from the Eureka Ridge site (5TL3296), which is believed to represent Athapaskan occupations (Gilmore and Larmore 2005).

An Inventory and Analysis of Ceramics from Sites on Fort Carson and the PCMS

This study describes the analysis of ceramics recovered from Late Prehistoric sites at Fort Carson and at the PCMS (Krause 2002). It is primarily a technological rather than a typological or temporal study. The study is described further in the synthetic section under ceramic technology.

Magnetic Susceptibility Investigations at the Barnes Folsom Site (5LA9187), PCMS

Though mainly focused on the Paleoindian component at the Barnes site (5LA9187), this report has limited relevance to the Late Prehistoric occupation of the site (DeVore 2002). It describes a Late Prehistoric pit exposed in Trench 2 that yielded beads, ceramics, and lithics from just below the ground surface.

Ground Stone Gorgets from the PCMS

This article describes three stone gorgets from the PCMS, which are likely of Late Prehistoric age (Lintz 2000). The author speculates about their purpose and suggests that the artifacts reflect contact with Woodland groups to the east.

The Prehistoric Utilization of Mollusk Shell in the Arkansas and South Platte River Basins

The M.A. thesis presents an extensive discussion of prehistoric use of mollusk shells in eastern Colorado (Calhoun 2011). Although not specifically about the Late Prehistoric stage, it includes a thorough treatment of the use of both native and exotic species during this period of time. Among other findings, the study concludes that exotic marine shells entered eastern Colorado primarily through trade with Southwestern groups.

A Binary Approach to the Analysis of Prehistoric Bison Distribution and Paleoecology

This M.A. thesis investigates prehistoric bison distributions and paleoecology in northern Colorado and southern Wyoming both spatially and diachronically using two methods (McKetta 2014). The first method identified bison occurrences in archaeological and natural contexts using archival documents. The second explored bison paleoecology using carbon and nitrogen stable isotopes analysis of prehistoric bison bone collagen. The result is useful for characterizing the distributions and availability of bison to Late Prehistoric hunters. The study found that the Late Prehistoric stage was represented by the most sites containing bison, which extended across all elevation zones in the study area.

Easterday II Cache: A Flake Core Cache from Weld County

The Easterday II Cache comprises 102 artifacts including 99 flake cores, two bifaces, and one unifacial scraper (Basham and Holen 2006). All artifacts were manufactured of Flattop chalcedony. The cores exhibit a distinctive and uniform "bi-directional" flaking pattern, consisting of the flakes on one face having been removed at right angles compared to those on the opposite face. The authors hypothesize that many, if not most, of the flake cores were used to produce flakes that served as blanks for arrow points. They compared the size of the flake scars on the cores with examples of Late Prehistoric side-notched arrow points, and found a positive correlation. Based on these data, they conclude that the cache probably dates to the Middle Ceramic period between A.D. 1100 and

1400. No other temporal data were available, so this interesting hypothesis is in need of further work and support.

The cache is regarded as evidence for the long distance movement of Flattop chalcedony, similar to other known instances on the Plains, and suggesting a mechanism for the transport of this material. The authors consider two different possible types of caching behavior: load exchange and strategic placement. The first refers to exchanging a load that a group was in the process of transporting for another that was considered more important for their immediate needs (e.g., toolstone for meat). The second refers to placing a necessary resource in a predetermined location for future recovery and use. It presumes planning depth (sensu Binford 1986) and reflects the likelihood that local lithic materials are lower quality and would not suffice for the intended purpose.