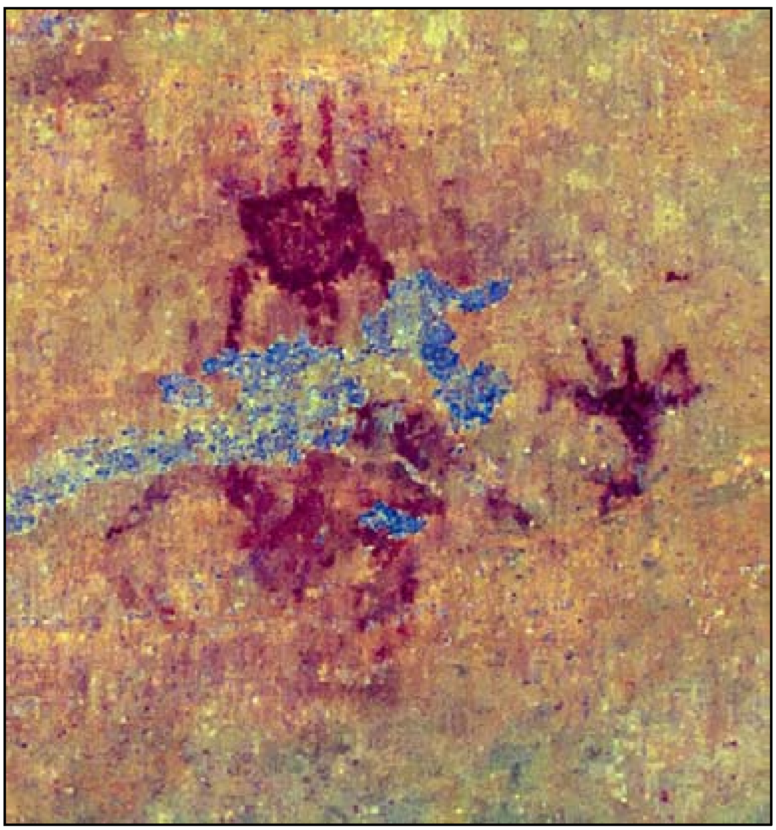
ETHNOGRAPHIC LANDSCAPE STUDY
NORTHWEST PICEANCE CREEK BASIN
FOR THE
WHITE RIVER FIELD OFFICE
BUREAU OF LAND MANAGEMENT
RIO BLANCO COUNTY, COLORADO
SECTION 1



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GRAND RIVER INSTITUTE

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BUREAU OF LAND MANAGEMENT
WHITE RIVER FIELD OFFICE
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Abstract

This report is written in partial satisfaction of Purchase Order L15PX01787 administered by the Colorado State Office of the Bureau of Land Management. It is Part I of an Ethnographic Landscape Study of the Northwest Piceance Creek Basin, an area that was an essential portion of the traditional Ute homeland during the historic period. This area has importance for other tribal groups as well; however, this study's focus is on the Utes and how they see themselves as connected to this landscape. Information gathered by this inquiry will benefit the Bureau of Land Management's White River Field Office in managing cultural resources in the Piceance Basin in light of intense oil and gas development along with other uses such as grazing, wild horse management, and fire management. Part I includes the results of an ethnohistoric literature review and documentation of the initial ethnographic contacts with the Utes. This report also summarizes the results of an intensive review of the archaeological data of the study area that has accumulated since 1972. This is provided in two autonomous sections that detail the archaeological and ethnographic research.

SECTION 1 – ARCHAEOLOGICAL INFORMATION AND RECORDS COMPILED FOR THE NORTHWEST PICEANCE ETHNOGRAPHIC LANDSCAPE: SUMMARY OF ARCHAEOLOGICAL LITERATURE REVIEW; CULTURAL AND PALEONTOLOGICAL RESOURCES SPREADSHEET AND DATABASE; MULTIVARIANT ANALYSES OF THE DIAGNOSTIC PROJECTILE POINTS; DIGITAL PHOTOGRAPHIC RECORD OF THE COLLECTED ARTIFACTS IN CSU AND MUSEUM OF WESTERN COLORADO CURATION FACILITIES; DISCUSSION OF ROCK ART AND ANALYSES OF SITE 5RB5848, A TRADITIONAL CULTURAL PROPERTY

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1.0 INTRODUCTION

This report is written in partial satisfaction of Purchase Order L15PX01787 administered by the Colorado State Office of the Bureau of Land Management. It is Part I of an Ethnographic Landscape Study of the Northwest Piceance Creek Basin, an area that was an essential portion of the traditional Ute homeland during the historic period. This area has importance for other tribal groups as well; however, this study's focus is on the Utes and how they see themselves as connected to this landscape. Information gathered by this inquiry will benefit the Bureau of Land Management's White River Field Office in managing cultural resources in the Piceance Basin in light of intense oil and gas development along with other uses such as grazing, wild horse management, and fire management. Part I includes the results of an ethnohistoric files search and documentation of the initial ethnographic contacts with the Utes. This report also summarizes the results of an intensive review of the archaeological data of the study area that has accumulated since 1972. Carl Conner served as the general project administrator and supervisor of the collection and analyses of the archaeological data. Nicky Pham prepared the spreadsheet for the archaeological database that Michael Berry constructed. Masha Ryabkova photographed artifacts previously collected from 255 sites that are curated at Colorado State University and the Museum of Western Colorado. Berry also completed a multivariant analyses of diagnostic projectile points from the curated specimen. Rich Ott served as the administrator of the ethnographic inquiry, and Jessica Yaquinto was the ethnographer who completed the ethnohistoric review, and along with Ott met with Ute tribal representatives.

This project was conducted in the spirit and intent of the federal and state legislation governing the identification and protection of cultural resources on publicly owned lands: the Historic Sites Act of 1935 (16 U.S.C. 461), National Historic Preservation Act (54 U.S.C § 300101 et seq.), National Environmental Policy Act of 1969 (42 U.S.C. 4321), Executive Order 11593 (36 F.R. 8921), the Historical and Archaeological Data-Preservation Act of 1974 (16 U.S.C. 469), the Federal Land Policy and Management Act of 1976 (43 U.S.C. 1701), the Archaeological Resources Protection Act of 1979 (16 U.S.C. 470aa et seq., as amended), and Article 80.1, Colorado Revised Statutes. These laws are concerned with the identification, evaluation, and protection of fragile, non-renewable evidence of human activity, occupation, and endeavor reflected in districts, sites, structures, artifacts, objects, ruins, works of art, architecture, and natural features that were of importance in human events.

2.0 LOCATION OF THE STUDY AREA

The project boundary is located in Rio Blanco County, Colorado, approximately 30 miles west and southwest of the town of Meeker. The project area occurs on 280,434 acres of BLM lands within all or portions of: T1N, R96W; T1N, R97W; T1N, R98W; T1N, R99W; T1N, R100W; T2N, R96W; T2N, R97W; T2N, R98W; T2N, R99W; T2N, R100W; T3N, R97W; T3N, R98W; T3N, R99W; T3N, R100W; T1S, R97W; T1S, R98W; T1S, R99W; T1S, R100W; T2S, R97W; T2S, R98W; T2S, R99W; T2S, R100W; T3S, R98W; T3S, R99W; T3S, R100W; 6th P.M.

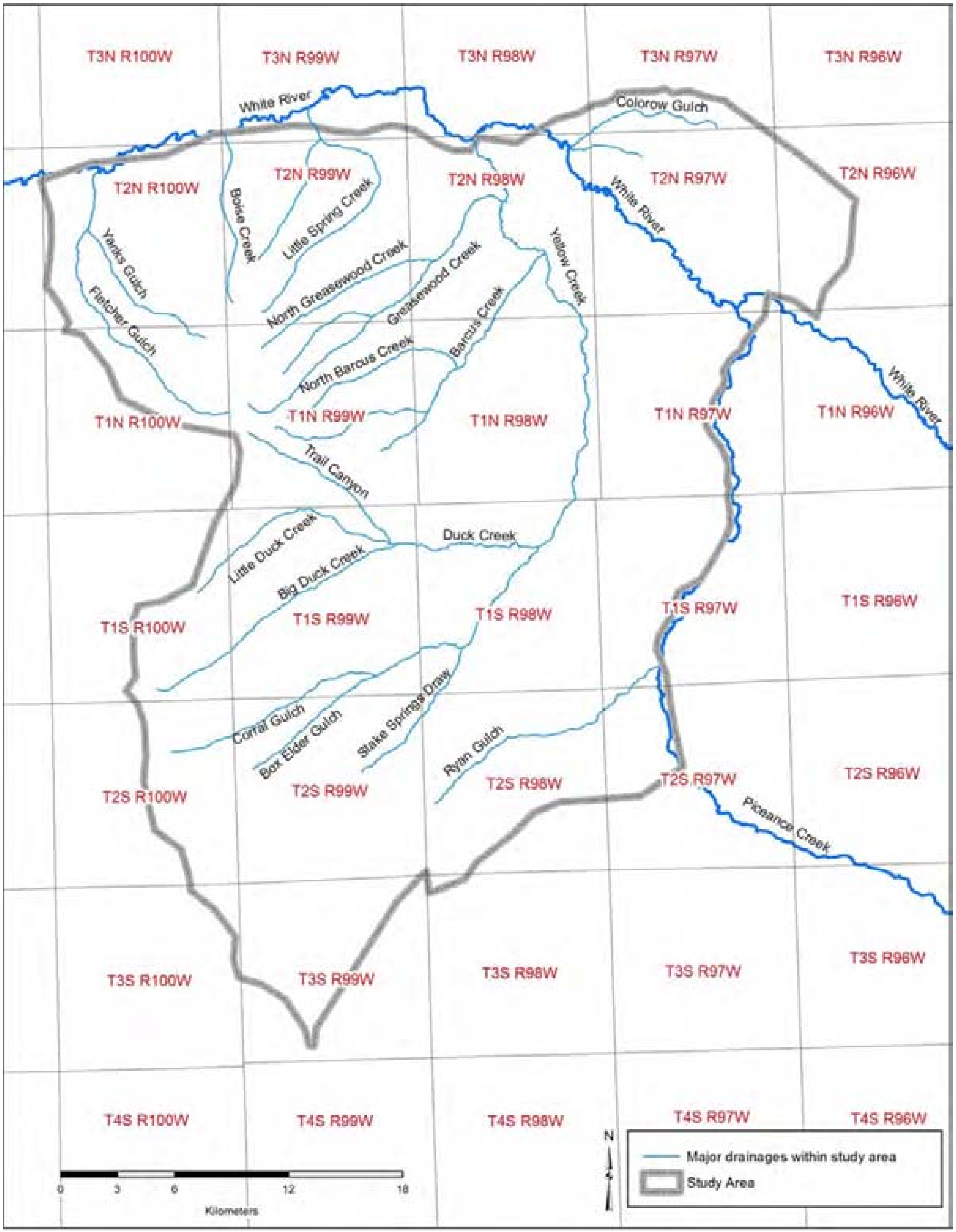


Figure 1.1. Project boundary of the Ethnographic Landscape Study of the Northwest Piceance Creek Basin.

3.0 ENVIRONMENT

This section is subdivided into summaries of the geology, physiography, soils, biota, and climate. It also provides a discussion of how the environment may have affected prehistoric and historic occupation of the area.

3.1 GEOLOGY AND PHYSIOGRAPHY

The project area is in the Piceance Basin, part of the Uinta Basin section which is in turn part of the Colorado Plateau physiographic province (Hunt 1974). The Uinta Basin forms an embayment between the Middle and Southern Rocky Mountains; the deepest part of the structural bowl has an aggregate of about four miles of Mesozoic and Tertiary sediment overlying Paleozoic rock. The Tertiary units deposited in the basin rise more gently to the south to form the escarpments of the Roan Cliffs, but rise much more steeply in the north and east, adjacent to the Uinta Mountains and the White River Plateau.

The project area is in the northwest portion of a large northwest-southeast trending structural downwarp known as the Piceance Basin. Subsidence of the Basin probably began some 70 million years ago, with the onset of the Laramide Orogeny during Late Cretaceous times, and continued until the Late Eocene (Young and Young 1977: 46). During this period of roughly 25 million years, the Basin received as much as 9000 feet of Tertiary stream and lake deposits, all of which gently dip toward the center of the downwarp. Subsequent erosion has exposed the Uinta Formation, formerly known as the Evacuation Creek member of the Green River Formation, which underlies the study area. Of middle-late Eocene age, the Uinta consists of grey to yellow-brown marlstone, siltstone, sandstone, and tuff (Cashion 1973).

The project is in an area of moderate relief with elevations that range from a little over 5340 feet to about 8700 feet. The area is characterized by numerous narrow ridges, and a dissected, dendritic drainage system. Erosion of the lacustrine deposits in the local topography has resulted in low convex ridges cut by dendritic washes. The small, intermittent drainages that lie south of the Yellow Creek Ridge flow generally south-southeastward into Ryan Gulch then east into Piceance Creek, which is a perennial tributary of the White River. In the north portion of the study area, the waters of Yellow Creek's tributaries flow east or northeast, then, after joining with the main drainage, flow north into the White River. Smaller drainages west of Yellow Creek and that of Colorow Gulch, on the north side of the White River, flow directly into the river.

Bedrock in the area is Uinta Formation (formerly the Evacuation Creek Member of the Green River Formation; Eocene; Tweto 1979). The formation consists of fluviatile sand- and siltstone and interbedded petroliferous lacustrine shale. The most prominent and resistant beds are dark yellow to brown, calcareous siltstone and sandstone originally deposited on flats bordering a shrinking Eocene lake and eventually filling the lake. More resistant to erosion, silt- and sandstone cap higher elevations within the area. Many of the sandstones represent channels crossing the flats to the lake, and vary from fine to coarse sand in thin to massive beds; laminar foreset beds are easily distinguishable in the channel sands. Other thin-bedded sandstones represent littoral facies in relatively quiet water. Thicker beds (most channel sandstone) have concretions varying in size from a few centimeters to half a meter or more, either round or elongated, formed by iron migration and accumulation. Incompetent bedding formed by de-watering of saturated sediment by overloading are common. Volcanic provenance of the original sediment is expressed by the secondary mineral assemblage which includes secondary mica, clay, and zeolites.

Lacustrine facies rock are largely fissile, petroliferous shale, dark gray in fresh breaks, but weathers white. Surface exposures on slopes give the appearance of a "racetrack," with "lanes" delineated by slightly more resistant shale beds that form minor breaks in the slope that collect colluvium and provide purchase for plants to take root. The more resistant beds appear to represent deeper water facies; intervening beds have more silt, although remaining fissile. Thin, discontinuous beds of limestone are present in the shale beds. The limestone was precipitated on the lake bottom, probably during low stands; a number of specimens displayed syneresis cracks formed by gas bubbles (e.g., methane) effusing from the lake bed.

A number of small, high-angle normal faults are present throughout the area, with off-sets ranging from a few feet to over a hundred feet (Plate 1.1). Most of these are probably the result of settling and regional tectonic stresses associated with the then continuing Laramide Orogeny and subsequent epirogenic uplift of the western continent during the Miocene. Cross-weaving sets of joint fractures are also evidence of tectonic stress.

Plate 1.1 Example of a small high angular fault, many of which are present throughout the area.

The most important physiographic features in the area are the deep alluvial sequences in Ryan Gulch, Corral Gulch, Stake Springs Draw, Yellow Creek, and their tributaries (Plate 1.2), and the evidence of various forms of mass wasting. Deep sequences of vertical accretion and fan alluvium are a result of soft, easily eroded bedrock combined with grossly underfit alluvial systems.

Related to sediment production is mass-wasting. “Terraced” slopes, evidence of slope creep, are ubiquitous (Plate 1.3). In the areas of the possible reservoirs, the scars and disturbances of numerous slides are present on north facing slopes, and emanating from the northern tributaries in the valleys are a number of debris flow lobes mixed with or overriding alluvial fan deposits. Small boulder-sized rocks litter the top of the debris flows, the result of kinematic sorting, and provide a rough measure of flow velocity and viscosity.

Plate 1.2. Example of the deep alluvial sequence in the study area gulches.

Plate 1.3. Example of terraced slopes which evidence slope creep in the study area.

3.2 SOILS AND VEGETATION

Soils are of the Rentsac, Rentsac-Redcreek, Rentsac-Piceance and Yamac types (U.S.D.A. SCS 1982). In general, they are cool, shallow to moderately deep, well-drained, and characteristically calcareous or alkaline. Because they are shallow and low in temperature, the agricultural potential of local soils is not good. The land is mainly useful for grazing and wildlife habitat. Along Yellow Creek, Ryan Gulch, Piceance Creek, and other major drainages of the region, the warm alluvial soils can support grass-hay and other crops if they are irrigated (Fox 1973: 111-19).

Elevations of the study area fall within the Upper Sonoran zone. Two main plant communities are present: sage shrubland, and pinyon-juniper woodland. It is assumed that the plant species present today were there in the past; however, the proportionate representations of the vegetation communities has undoubtedly been altered in modern times by grazing of domestic animals or displaced deer populations.

Sagebrush communities occur in the drainage bottoms areas and in open parks on the ridge tops and talus slopes. Big sagebrush (Artemisia tridentata) dominates this plant community. Other shrubs present include saltbush (Atriplex canescens), shadscale (Atriplex confertifolia), rabbitbrush (Chrysothamnus nausoesus), mountain mahogany (Cercocarpus montanus), bitterbrush (Purshia tridentata), winterfat (Eurotia lanata), and, where soils are more saline, greasewood (Sarcobatus vermiculatus). Prickly pear (Opuntia sp.) is common. Among the grasses found here are cheat (Bromus tectorum), western wheat (Agropyron smithii), bluebunch wheat (Agropryon spicatum), needle-and-thread (Stipa comata), Indian ricegrass (Oryzopsis hymenoides, and junegrass (Koeleria cristata) (U.S.D.A. SCS 1982). Greasewood is common in the lower drainage bottoms, as well.

Stands of pinyon and juniper occur on the ridges and talus slopes throughout the study area. Juniper (Juniperus utahensis) is the dominant species, occurring both in pure stands and with scattered pinyon (Pinus edulis). Within such woodlands there is very little understory, although any of the plants associated with the sage shrubland community (described above) can be found here as well.

3.3 FAUNA

Numerous wildlife species inhabit the study area. Studies by Baker and McKean (1971: 7-16) and Cringan (1973) suggest that there are at least 340 species in the Piceance Basin; among them 83 are mammals, seven of which the Colorado Division of Wildlife classifies as big game, four as small game, and nine as fur-bearers (Grady 1980: 53).

An important mammal in the basin today (and presumably in the past) is the mule deer (Odocoileus hemionus) whose winter population density in the Yellow Creek/Piceance Creek area is estimated at 52 per square mile (Baker and McKean 1971: 22). During the summer months, the deer herds migrate to the higher elevations of the basin, generally above 7500 feet (Grady 1980: 53).

Other mammals found locally include feral horses, mountain cottontail (Sylvilagus nuttalli), white-tailed jackrabbit (Lepus townsendi), bushytail woodrat (Neotoma cinerea), deer mouse (Peromyscus maniculatus), Colorado chipmunk (Eutamius quadrivittatus), golden-mantled squirrel (Citellus lateralis), rock squirrel (Citellus variegatus), bobcat (Lynx rufus), coyote (Canis latrans), red fox (Vulpes fulva), badger (Taxidea taxus), and skunk (Mephitis mephitis). Bird species observed in the Piceance Basin include the jay, horned lark, raven, red-shafted flicker, long-eared owl, golden eagle, and various other raptors. Goose, duck, grouse, pheasant, and dove are reported in the basin as well (Baker and McKean 1971; Cringan 1973; Jennings 1975).

3.4 CLIMATE AND LAND USE

Climatically, the region is characterized as having a cool, semiarid, steppe-type climate. Average annual rainfall ranges between 12 and 16 inches. Temperatures have varied between -20 degrees Fahrenheit in winter and 90 degrees Fahrenheit in summer with a frost free seasonal range of 70-to-100 days. Agriculture is limited by the low rainfall, short period of frost-free days, and low winter temperatures (USDA SCS 1982). The optimum growing season for native plants is May-June, during which time temperatures average around 55-60 degrees Fahrenheit. Frosts occur frequently between mid-September and early June, resulting in a growing season of roughly 45-100 days (ibid.; Hurlbett 1976:7).

For much of the year, the climate of the study area is cool and dry; only during the mid-winter months is the climate severe enough to have limited prehistoric occupation (Jennings 1975: 20). Summers can be hot and, by late June, many of the smaller drainages of the area have ceased to flow. However, all portions of the project area are within approximately 3 kilometers of either Yellow Creek, Ryan Gulch, Stake Springs Draw, or Corral Gulch.

Because of the short growing season and poor soil conditions, it is doubtful that prehistoric inhabitants practiced horticulture, probably subsisting by hunting and gathering instead. Faunal resources are excellent in the Piceance Basin–the mule deer herd is the largest migratory herd in the United States and numerous small mammals thrive in the sage shrubland and pinyon-juniper. Vegetal resources in and around the study area are also plentiful. Pinyon, goosefoot/amaranth, juniper, big sagebrush, saltbush, greasewood, prickly pear, and Indian ricegrass are all known to have been exploited by native American peoples (Elmore 1976).

In addition to yielding food, fuel, and raw materials, the pinyon/juniper forest was probably the main source of shelter. Other shelter may have been afforded by the small sandstone outcrops scattered throughout the study area.

Aside from antler, bone, and wood, there is locally little material available for tool-making. Much of the exposed rock of the study area is sandy and rather friable and, judging from the lithic artifacts identified during the present survey, it was not a preferred material for prehistoric tool manufacture. Also, as Jennings (1975: 14) points out, cryptocrystalline inclusions are rare in these sandy lower Uinta deposits, so it is likely that lithic tool-making materials were imported.

It is probable that, at least on a seasonal basis, prehistoric people were attracted to the study area by its bountiful vegetal and faunal resources. It is almost certain that hunting and foraging formed the basis of the aboriginal subsistence pattern in this area. Historic Euro-American land use of the area included ranching, which involved the collection of juniper poles for fencing and pinyon timbers for building; the cutting and limbing of these trees was highly evident throughout the study area. Presently, the area is being grazed by cattle and sheep, hunted for wild game, and explored for mineral resources including oil shale, nahcolite, and oil and natural gas.

4.0 GEOMORPHOLOGY

Alluvial processes are the most visible process affecting the landscape, expressed by the deep alluvial fill and well developed fan complexes. Colluvial or mass wasting processes are almost as important, with striking evidence in many places. The evidence for other processes is more subtle. Aeolian processes are represented by discontinuous sheet and shadow deposits on leeward and north-facing slopes or blanketing the flatter, highland terrain expressing gentle slopes with a northern or eastern aspect. Periglacial processes (i.e. frost heaving) are even more subtle, with virtually no surface evidence except for infrequent exposures in older aeolian deposits.

Alluvial deposits span the latest Pleistocene and Holocene and are displayed in a regular sequence of vertical accretion alluvium. Since the beginning of the Holocene climatic envelope, drainages in the area have accumulated sediment, in braided stream deposits early on, but as overbank, crevasse splay and backwater deposits later. The fact that so much sediment is available to the systems has resulted in deep alluvium in the major trunk drainages with at least three periods of deposition and one cut terrace apparent inside the arroyos.

Fan alluvium from lower order tributaries has made a significant contribution to the valley fill, but is typically more poorly sorted and coarser. The relatively steep fan surfaces are another result of rapid sediment production. Fans developed from tributaries dissecting the less well vegetated south facing slopes are more extensive because of greater sediment production from those slopes due to diminished vegetation. Fans developing from tributaries draining the north facing slopes are smaller thanks to better vegetal cover which enhances slope stability. One result of this unequal fan deposition is that the active channels of the major streams have been forced to the south flanks of the valleys along most of their courses (Plate 1.4), and a corollary result is that the slopes on the south side of the valleys have been more consistently undercut and greatly affected by colluvial processes that have produced slides, slumps and slope creep.

Plate 1.4. Unequal fan deposition causes the active channels of the major streams to shift to the south flanks of the valleys, so those slopes have been more affected by colluvial processes. (View looking east.)

Related to alluvial fan deposits are a number of debris flows, most developed along tributaries draining the north flanks of the main trunk dissections. Debris flow lobes are identified by evidence of kinematic sorting. Kinematic sorting rafts large rocks – frequently boulder-sized – to the surface of the lobes during flow. The flow lobes are characteristically narrow and long, with many almost reaching the present day incisions in the valley floor. Alluvial fill in tributary incisions contain a number of flow lobes.

Another striking feature in the arroyos is that lateral accretion (i.e. channel) deposits are limited to those in the active channel. Most commonly throughout the mountain west, incision since the end of the Late Glacial has exposed coarse gravel of Late Glacial age, but this is not the case for the major trunk drainages within the survey area. Some tributaries to the main trunk have five meters or more of latest Pleistocene and early to middle Holocene deposition, but no relic of Late Glacial gravel is apparent in the channels. This is another consequence of rapid sediment production and the alluvial system's inability to move much of the sediment load down stream and away. Even alluvium in first order tributaries of the main trunk drainages have great depth, sometimes exceeding many meters.

Measurements of valley width and valley flank slopes were used to estimate the depth of fill in some segments of some valleys. Valley width was measured directly; slope angles were measured with a clinometer. It was assumed that the pre-fill geometries of the valleys presented a "V" in cross-section. Depth of dissection in sections 33 and 34, T. 1 S., R. 99 W., on Corral Gulch is estimated to be about twenty meters deep. Only slightly more than half of the total estimated depth is viewable in any one exposure.

Another important alluvial deposit, although not so apparent on the landscape, is sheet flow alluviation. Sheet flow alluvium describes deposits affected by unchannelized flow on slopes with slope angles ranging from a few degrees up to the angle of repose. Typically, sheet flow is deposited in thin sheets, and like fan deposits diffuse and spread when distribution is affected by change in slope or by obstacles. Depth varies, sometimes radically, with features on the landscape, either biological or geological. Sheet flow alluviation on pinyon-juniper forest floors is a significant process.

Evidence of aeolian processes is less dramatic but consistently present. Deposition is essentially limited to leeward areas, essentially north and east facing slopes. A marked increase in sagebrush and grass cover frequently identifies deeper sequences of more recent (i.e., post 3000 years old) shadow and sheet deposits on gently sloping surfaces in upland areas, while xerophytes and salt and alkali tolerant plants mark earlier aeolian deposits. Older aeolian deposits, where preserved, are confined largely to the same locations, although less visible. Notably, frost heaving in these deposits usually armors the surface of the pre-3000 years old surface with pebble-sized rocks. Total depth of aeolian deposits is variable, with maximum depths approaching a meter or more. Recent loess sheets on north facing slopes are considerably deeper because collection is enhanced by vegetal cover which creates a more efficient sediment trap. However, older loess deposits are generally less well preserved on the north facing slopes because of slope erosion and mass movement (colluviation) during a period of drought prior to the more recent episode of loess deposition.

Colluvial processes are most prevalent on north-facing slopes, where added stored soil moisture enhances slope creep. Evidence of slope creep is represented by "terraced" slopes caused by a minimum of rotational movement of slope deposits (usually accumulations of sheet flow alluvium and/or loess). Other evidence consists of "pistol grip" trees and brush which identify plants affected by slope creep and left atilt that afterwards resumed vertical growth. On heavily vegetated slopes, with enhanced stored pore waters, larger rotational slides have developed. From a distance, the slides are most evident by linear patterns in brush copses arranged sub-parallel to slopes. A few larger, albeit much older slumps are evident along parts of all the major trunk drainages and are probably related to widely fluctuating climatic conditions around the Late Pleistocene-Holocene boundary.

Periglacial processes have little surface evidence, but are widespread, most notably in older aeolian deposits where edaphic, moisture and temperature conditions conducive for frost heaving are frequently met. The primary evidence for the process is platy- and prismatic-shaped, small pebble-sized particles oriented vertically with respect to the bedding planes; many times, mineral exclusion during ice formation results in thin mineral coatings on the undersides of the heaved particles. A notable unconformity separating pre-3000 years old loess from post-3000 years old loess is marked by a serir or desert pavement surface that was partially produced by frost heaving and further developed by deflation. The period of frost heaving appears to be in the middle Holocene, from 6500 to about 4500 years ago, since deposition after that period bears no evidence of frost heaving except in the northern plains.

4.1 STRATIGRAPHY DUE TO PALEOENVIRONMENTAL EFFECTS

The alluvial and aeolian depositional systems have a regular stratigraphy that is expressed, at least in part, over much of the project area. Colluvial deposits have no unique stratigraphic sequence, but interbed with or overlie other types of deposits. However, frequency of significant colluvial events – slides and slumps – are somewhat regulated by overall climatic conditions, especially during times of climatic transition from cooler, concomitantly moister conditions, when slopes are stabilized by vibrant vegetal growth, to warmer, dryer conditions, when slopes are destabilized and sediment stored on slopes is more heavily affected by the force of gravity. Periglacial deposits are integral to loess deposits, but are generally absent in alluvial deposits that existed at the time of frost heaving and survived to the present day. There are two main reasons this result came about: first, deposits of the age are well-sorted, braided stream deposits with little clay content; and second, well sorted deposits have good permeability and porosity, so deposits affected by vadose water (or stored pore water) alone were well drained, and those affected by phreatic groundwater, especially during the season of freezing, were saturated and transmitting water.

4.1.1 Alluvial Stratigraphy

The alluvial stratigraphy in the main trunk drainages of the Piceance Basin have a similar sequence which includes three distinct periods of fill and one cut terrace (Figure 4.1). The larger first order tributaries of these streams more often contain two fill sequences correlatable to the first and last periods of deposition in the trunk streams. It is noted that the alluvial sequences of the lesser tributaries of the trunk drainages are fundamentally different for ephemeral tributaries draining the north flank highlands as opposed to the south flank highlands feeding the trunk streams. Those on the north flanks have proportionately more sediment to contribute to the major trunks because of the factors of insolation and slope stability mentioned above.

The alluvial depositional sequence in Corral Gulch and Ryan Gulch is contained inside the Late Pleistocene dissection. (Dissection, as used here, defines excavation of bedrock during glacial or associated pluvial conditions while incision defines large-scale re-excavation and reworking of sediment deposited since the end of the glacial or pluvial period.) Dissection and incision are both considered to be the result of cooler, moister climates; avulsion is the term used to describe channel rework and rill formation in unconsolidated alluvium which form as a consequence of one or a series of closely spaced heavy precipitation events.

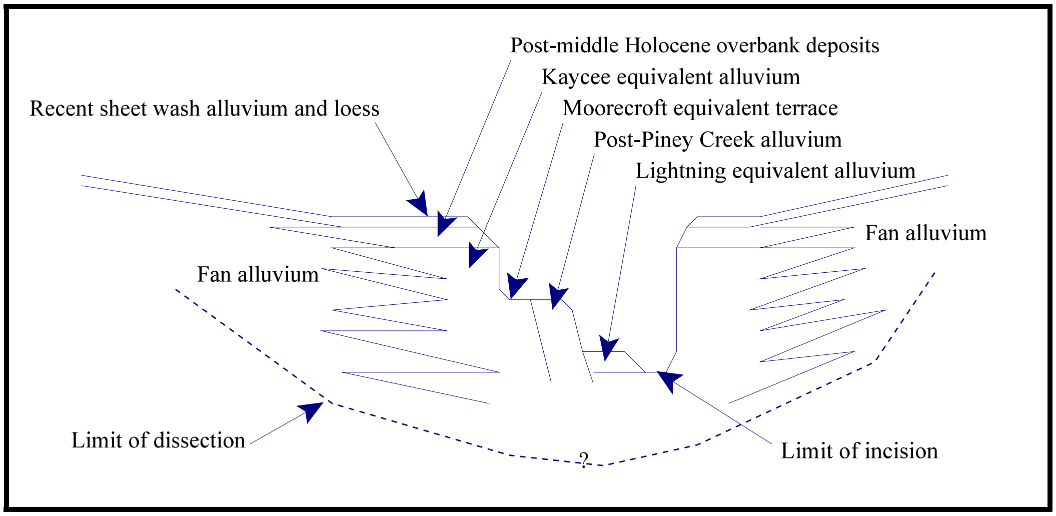


Figure 4.1. Diagrammatic cross-section of the alluvial stratigraphy in Ryan Gulch.

The first fill sequence is equivalent to Leopold and Miller's (1954) Kaycee alluvium and consists of braided stream deposits; more recent work (e.g., Miller 1992, in prep.) provides ages of this deposit from over 13,000 uncalibrated radiocarbon years before present (rcybp) to about 7500 rcybp. The second fill sequence is thought to be equivalent to Scott's (1963, 1965) Post-Piney Creek alluvium, which ages to a period from about 4500 to as late as 2800 rcybp (Miller in prep.). The last fill sequence is Lightning equivalent alluvium (also after Leopold and Miller 1954) which post-dates 1000 rcybp (Miller 1992, in prep). The Moorecroft equivalent cut terrace (after Leopold and Miller 1954) was formed between 6500 and 4500 (Miller in prep.) and incised into Kaycee equivalent alluvium.

The fill sequences are related to periods of long term drought. The greatest part of the fill in the valleys (i.e., Kaycee equivalent alluvium) is a result of severe drought accompanying the onset of the Holocene climatic envelope and is the sediment formerly stored on slopes in the Late Pleistocene soil. An alternate theory indicates that fill is a consequence of cooler, wetter conditions, but the ages of Kaycee equivalent deposition correspond almost exactly with the formation of all the major dune fields that formed in the Rocky Mountain basins and western Plains areas (Miller 1992, in prep.), so the association of alluvial deposition with cool, wet climates is erroneous.

Deposition in warm, arid intervals is a consequence of lost capacity and competence in the alluvial system (where capacity describes the quantity of sediment a drainage can move, and competence is the largest sized particle a drainage can move). Essentially, the drainages became choked with sediment during deposition of the Kaycee equivalent alluvium. This was an event that could not be repeated because the end of the Pleistocene was the only time such a large volume of sediment was available at one time for transport.

Climates ameliorated after 6500 rcybp. With the return of cooler, concomitantly moister conditions, incision began; the Moorecroft-equivalent cut terrace formed somewhere during this period. After formation of the Moorecroft equivalent cut-terrace, however, incision was initiated once more and the present day depth of incision is relict of the interval. Regional and even global evidence mark the middle Holocene as one of the coolest, moistest episodes since the end of the Pleistocene (Miller 1992, in prep.). In-filling (i.e. post-Piney Creek alluvium equivalent) began again by about 4500 rcybp when climates apparently warmed and dried and the streams again experienced diminished power (i.e. loss of capacity and competence).

Renewed deposition (post-Piney Creek equivalent) continued until at least 2800 rcybp, when another cycle of erosion ensued. This cycle of erosion likely deepened the incision and culminated in the final depth as seen in the present day. It is notable, however, that the equivalent of Late Glacial gravels, usually exposed by middle Holocene erosion, are not exposed in the area. This attests to the exceptionally large volume of sediment that became available for transport at the end of the Pleistocene glaciation and the inability of the trunk drainages to move it further downstream and out of the local alluvial system. Volume of fill, as mentioned above, is considerably more than exposed in the arroyo walls – again, probably less than half of the total depth of fill is viewable in the present day incisions.

After 1000 rcybp, climate became warmer and drier again, and Lightning equivalent alluvium was deposited in the channel bottoms. When climate ameliorated once again during the Little Ice Age, incision followed.

Bank-full flow and over-bank events have occurred on the main trunk drainages since Kaycee equivalent alluvium deposition. These deposits overlie the Kaycee equivalent alluvium, but have markedly different chemical modification, and instead of braided stream deposits, are represented by natural levee, crevasse splay and back water deposits which are fine grained deposits (usually silt) and lack evidence of numerous interbedded and stacked channels that compose the Kaycee braided stream deposits. The most recent deposition on the valley floors away from the arroyos consists of sheet flow alluvium from the valley flanks and renewed loess deposition.

One unique aspect of the overbank deposition is the total organic content. The organics derive from the petroliferous shale more than decaying vegetation. Much of the fine sediment contributed to the alluvial system is weathered shale and the organic content of the shale is sufficient to color the alluvial sediment dark gray to black. Of course, C^{14} ages obtained from these deposits, should that become desired in the future, will be problematic because of the admixture of old carbon with new.

Ephemeral drainages feeding the major trunk streams display sequences equivalent to the sequence originally described in Leopold and Miller (1954), essentially consisting of Kaycee and Lightning equivalent alluvium upstream. Most of the fill in the upstream reaches of these tributaries is again Kaycee equivalent, overlain by more recent sheet flow alluvium and loess. While something like the Moorecroft cut terrace is occasionally present, it is usually absent. Lightning equivalent alluvium again occupies the depth of the middle Holocene incisions. The underlying dissections on ephemeral drainages relic of the Late Glacial are also shallower, and it is not uncommon to have the equivalent of the Late Glacial gravel or bedrock exposed less than a hundred meters upstream from the point that the various tributaries enter the valleys of the main trunks.

Once the ephemeral tributaries enter the valley floor of the main trunks, distribution of flow during more arid intervals builds alluvial fans from the tributary mouths and into the valley proper. Fan alluvium is roughly correlatable to the alluvial sequences in the trunk streams and interbed with braided stream and other deposits being deposited by the main trunks, but sediment and rock delivered by the ephemeral tributaries sometimes overwhelms the capacity of the main trunks, so fan alluvium forces a realignment of the main trunks through avulsion. As noted, sediment production from the ephemeral tributaries draining the highlands north of the main trunk drainages is more significant and kept forcing the main trunks to the south sides of the valleys along many reaches.

The final component of the alluvial system is sheet flow alluviation. Sheet flow alluviation is unchannelized flow affecting slopes and contributes sediment to other deposits, and is perhaps the most important process on the pinyon-juniper forest floors. Sheet flow deposits on the forest floor are heavily affected by growth and death in the forest, and the biologic factors considerably confuse the stratigraphy, limit the lateral extent of contiguous deposits, and displace artifacts. The effect of tree growth churns the deposits, and when a tree dies and falls, it churns the deposits more. Dead fall dams establish rills, creating pockets of new deposition that force the realignment of the original rills, and create new areas of erosion and deposition. The myriad of surface alterations extrapolated through a hundred or a thousand or ten thousand years is mind boggling.

4.1.2 Aeolian Stratigraphy

The important aeolian deposits in the survey area are loess (wind-blown silt) sheets or blankets and shadows. The term “sheet” or “blanket” defines thin, albeit widespread deposits that drape the surface (they are also termed goze, e.g., Reineck and Singh 1975). Shadows are accumulations, generally leeward of effective obstructions, and are best developed on east facing slopes; however, obstructed shadows form on the windward side. Deposition of either sheets or shadows is a result of wind turbulence caused by expanding or compressing wind flow; turbulent flow allows suspended sediment to fall out to form the deposits. However, preservation and long-term stability of these deposits on the landscape is in large part the result of vegetal growth and vitality, so the deposits are phytogenic in nature, meaning they depend on vegetation for accumulation and stability. Vegetation benefits through the accumulation of sediment which enhances water storage and provides nutrients. Climate change to warmer, concomitantly drier conditions decreases vegetal vitality and this leads to degradation of the deposits.

Sheet deposits exhibit a regular four part sequence in the survey area. Two thirds or more of the total deposit is middle Holocene in age, possibly with some lower elements aging to the latest Pleistocene or early Holocene. The remaining depth represents late Holocene accumulations after about 3000 years ago. Typically, the late Holocene deposits are discontinuous in the part of the Piceance Basin surrounding the disparate survey areas, but are best preserved in coppice mounds in open areas. On relatively flat terrain or on protected (north- and east-sloping) slopes the upper deposits are more or less complete. Loess deposition is relatively insignificant in the windward edges of the forests, but deeper in and especially with a favorable aspect, such as on gentle north or east slopes, the loess deposits are well preserved and somewhat thicker, although bioturbated.

On steep slopes the sequence is incomplete. On the north facing slopes bordering the south flanks of the main trunk streams, mixed loess and sheet wash alluvial deposits are relatively young, probably a maximum of about 3000 years old, but probably younger, and perhaps as young as the last 500 years in some areas. Some of the deposits, however, may contain the remnants of older loess deposits which have been stripped away for the most part.

Maximum depth of loess deposits are on the order of a meter or a meter and a half in thickness. The best preserved deposits and the most complete aeolian sequences are on sage flats in the highlands, and these exhibit a four part sequence, with each individual sheet separated from older and/or younger components by unconformities. Unconformities are represented by serir deposits formed by deflation and in cross section appear as thin (1-2 cm thick) zones of coarsening grain sizes. Serir deposits mark lacunas, periods of erosion, and some are further enhanced by frost heaving.

The upper three loess deposits were emplaced in the last 3000 years, with the lowermost of the three probably aging between 2800-1000 years ago, and the upper two to between 500-350 years ago and into the 20th Century. The oldest sheet deposits probably date to between 6500-3500 years ago, but could include remnants of older loess deposits which were weathered during the same period in the middle Holocene. The separate deposits are frequently distinguishable by secondary mineral formation prospered by in-place or syndiagenetic weathering, with older deposits displaying correspondingly greater degrees of weathering and secondary mineral accumulations. The important secondary minerals are calcite, smectite, oxy-hydroxides, and sulfides.

4.2 Geological Implications of Regional Paleoclimate Conditions

Based on an analysis of the area's late Quaternary stratigraphy, the geologic history of the last 18,000 calendar years in the region follows something like the following scenario (cf. James C. Miller, Chapter 2, Conner et al. 2011a:2.35-2.36). [Dates (*) are calibrated.]

Late Pleistocene dissection scoured channels during the Late Glacial and deposited thick sequences of large, e.g., boulder-sized, gravel in most drainages. About 13,400 BC* the glaciers are retreating and capacity and competence decrease; the time between then and about 11,000 BC* is identified by Haynes (1991) as the Clovis drought. In areas dominated by aeolian processes, deflation occurs.

The Younger Dryas, from around 10,600 to 9000 BC*, the last gasp of the glacial period, took place around Folsom times. During the period, drainages are rejuvenated, surfaces stabilize, soil formation accelerates, and the late Pleistocene-early Holocene loess is slowly accumulated.

Between 9500 and 5500 BC*, the long drought hits (interrupted once around 7000 BC*, coincident with Pryor Stemmed occupations). Aeolian sand seas form in Colorado, Wyoming and Nebraska and drainages throughout the mountain west are choked with sediment and become braided; these are Kaycee equivalent deposits. Dunes form in places in western Colorado and are later preserved as clay dune cores, but Kaycee equivalent deposits varying from a few to several meters in thickness are ubiquitous in northwest Colorado. The Pleistocene extinctions were completed early in this interval and Paleoindian big game hunters were subsequently replaced by Archaic hunter-gatherers. While extinction of most of the Pleistocene megafauna took place in Clovis times, mammoth (e.g., Agenbroad 1978), and camel and horse persisted in some areas to around 9000 BC* (e.g., Miller and James 1986).

Cooling temperatures between 5500 and about 3100 BC* sustained the middle Holocene incision. Capacity and competence increased, but not to the levels achieved during the Late Glacial. As a consequence, when incision exposed Late Glacial gravel, stream power was insufficient to erode the gravel and most drainages initiated a cycle of channel widening. Away from drainages, the middle Holocene loess accumulated. Pithouses were in wide use in the Rocky Mountains, Wyoming Basin, and Colorado Plateau in the interval, suggesting more sedentary populations; Yarmony Site in Eagle County and site 5ME16789 near Battlement Mesa are local examples. McKean Complex is well represented in western Colorado during the latter part of the interval and the period of transition to warmer climates that followed. After about 3100 BC*, warming temperatures led to erosion of the loess by 2500 to 1850 BC* and the deposition of the middle Holocene alluvium.

Droughts in the late Holocene are best dated by periods of erosion, i.e., lacunas, identified by unconformities in loess deposits. Erosion in loess took place between 1850 and 950 BC*, 275 BC* and 165 AD*, and 1050 and 1350 AD*, and again in the last 150 years or so. The first interval coincides with the Middle to Late Archaic transition and the third interval coincides with the Medieval Warming Period in Europe. In the alluvial system, deposition of the middle alluvium ended after the first arid interval, by 650 BC*. The first of Lightning equivalent alluvium is deposited during the second arid interval, at some time after 650 BC*. As the suggested dates imply, the two deposits are nearly continuous and appear this way in sediment choked drainages, but on other ephemeral and small perennial streams, the deposits are more easily separated.

5.0 CULTURE HISTORY SUMMARY

Local and regional archaeological studies indicate nearly continuous human occupation of northwest Colorado for the past 12,000 years. Manifestations of the Paleoindian Era, big-game hunting peoples (ca. 11,500 - 6400 BC); the Archaic Era hunter/gatherer groups (ca. 6500 - 400 BC); the Formative Era horticulturalist/forager cultures (ca. 400 BC- AD 1300); the Protohistoric Era [Late Prehistoric] pre-horse hunter/gatherers (Early Numic [Ute, Shoshone, Comanche], ca. AD 1300 - AD 1650) and historic horse-riding nomads (Late Numic, ca. AD 1650 - AD 1881) have been documented. An overview of the prehistory of the region is provided in a document published by the Colorado Council of Professional Archaeologists entitled *Colorado Prehistory: A Context for the Northern Colorado River Basin* (Reed and Metcalf 1999).

A temporal illustration emphasizing the overlap of the subsistence strategies employed by the diverse cultural groups over the past 16,500 years is presented in Figure 5.1. It acknowledges the potential of the extension of the Late Archaic hunter-gather occupation coeval with Formative Era cultures. [Notably, dates of occupation are presented in **AD-BC** and **BP** (Before Present) contexts, which is important in the understanding of Tables 1 and 2 in the Archaic section.]

Historic records suggest occupation or use by EuroAmerican trappers, settlers, miners, and ranchers as well. Overviews of the historical record is found in the Colorado Historical Society entitled *Colorado Plateau Country Historic Context* (Husband 1984) and in the Bureau of Land Management's publication *Frontier in Transition* (O'Rourke 1980). Additional data can be found in the historical context published by the Colorado Council of Professional Archaeologists entitled *Colorado History: A Context for Historical Archaeology* (Church et al. 2007), which was used as the primary guide for this project in the evaluation of historic sites.

5.1 PREHISTORIC BACKGROUND

The following provides a brief discussion of each of the major prehistoric cultural/ temporal eras occurring during the past 12,000 years.

5.1.1 Paleoindian Era

North America's first human explorers arrived near the close of the Pleistocene as early as 18,000 years ago traveling by passage along Beringia the continental land bridge between what is now Siberia and Alaska. As craniometric evidence has indicated, the immigrants were diverse in origin, identified as belonging to various populations found in Asia and along the Pacific Rim. Specifically, northern and central Asians, people who later occupied the Polynesian islands, and the Ainu who later resided on the islands of northern Japan have been identified as the earliest ancestors of the Native Americans. The numbers of these colonists was apparently small because evidence of the first incursions is scant.

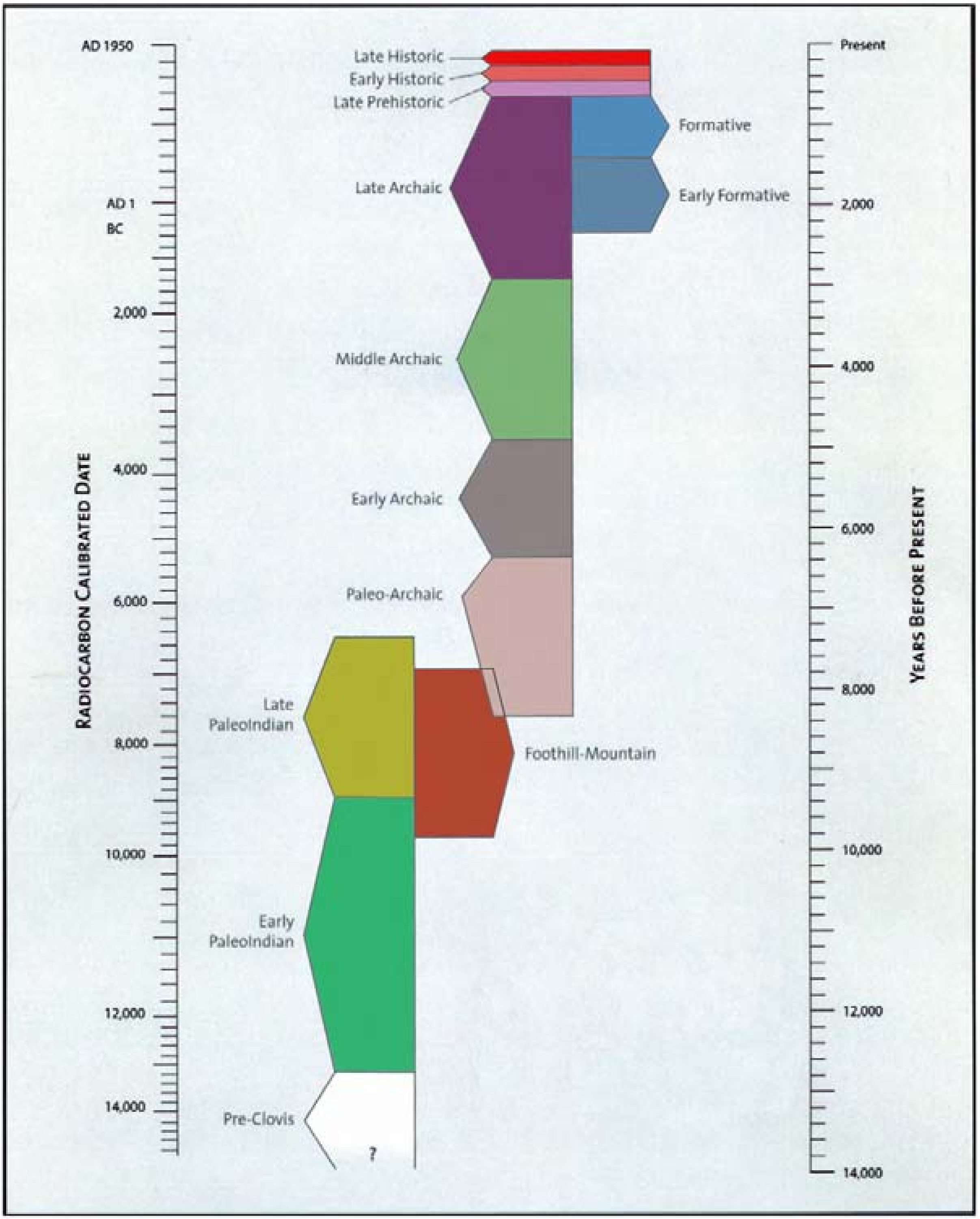


Figure 5.1 Temporal chart emphasizing the overlap of the subsistence strategies employed by the diverse cultural groups over the past 16,500 years.

However, the fact that they rapidly spread across the continents of North and South America is found in excavations at Meadowcroft Rockshelter Pennsylvania (Adovasio et al. 1990) and at Monte Verde in Chile (Dillehay 1984), sites which date to about 18,000 and 14,000 years ago respectively. Consensus has emerged that the dating of Monte Verde is valid; however, the dating of Meadowcroft continues to be the subject of debate (Haynes 1980, 1991). Such finds suggest a pre-Clovis colonization of the Americas.

The better documented later colonists to the Americas are termed Paleoindians. They were highly mobile groups of hunter-gatherers that traversed broad territorial ranges. Evidence of their mobility is found in their provisioning of high quality lithic materials from distant quarries, production of portable tool-kits emphasizing wood and lithic processing while having low numbers of grinding tools, construction of short-term residences (occupied for a few weeks to a few months) with little evidence of food storage, and an economic focus on the hunting of Pleistocene megafauna.

The Paleoindian period spanned 6,000 years from 13,500 - 6500 BC. They were hunters and gatherers who exploited seasonally available plant resources and hunted the last remnants of the herds of Pleistocene megafauna such as mammoth and Bison antiquus. Surface evidence in the form of diagnostic projectile points indicates five technological adaptations are present: Clovis Complex (ca. 11,200-10,900 BC), the Folsom Complex (ca. 10,900 -10,000 BC), and the Cody Complex or Plano Tradition (ca. 9000 - 6300 BC) followed changes in the climatic conditions. Overlapping the Folsom and Cody periods is the Foothill-Mountain Complex, dating ca. 9500-7000 BC (Frison 1991:67-71, 75, 80). Currently, data from the early Paleoindian period is limited in Northwest Colorado, and excavation data is nearly non-existent. Based upon surface finds representing the late Paleoindian period, three co-traditions appear to be operating in the region: the Plano Tradition of the Great Plains; the Foothill-Mountain Complex of Southern Rocky Mountains; and, a Paleoarchaic Tradition with links to the Great Basin Stemmed Point Complex. It is not until ca. 7000 BC that stronger indications appear for this period with a few radiocarbon dates.

Clovis Tradition

With the close of the Wisconsin Ice Age and the retreat of the mountain glaciers in the Southern Rocky Mountains, generally warm, moist conditions prevailed. As the generalized warming trend continued, the warm/moist conditions began to change. At the lower elevations, dry/wet climatic fluctuations appear to have brought on drought conditions between 11,200 and 9500 BC in the San Juan and Wyoming Basins, lowering the water table and concentrating surface water into shrinking water holes. In other areas, especially the higher terrain with its orographic uplifts, increased effective precipitation would have produced a rise in the ground water tables, local lake levels, and the number of springs, as well as an expansion of tall and short grass forage regions (Eckerle 1992). It follows that where there was increased moisture and grass forage, game animals would increase and prehistoric hunters would follow. This movement of animals probably brought the first Paleoindian groups into the region.

The occupation of the region by the Clovis Tradition hunters appears to have been rather ephemeral. The rugged, dissected, canyon environment of the area probably never supported large, extensive herds of megafauna such as could be found on the Great Plains. However, work by Agenbroad (1991), and Agenbroad and Mead (1987) indicate population distributions of Pleistocene megafauna did exist, particularly around the confluences of the Colorado and Green Rivers in southeast Utah. Whether such a population distribution may have existed here in the valleys of the White and Yampa Rivers and their tributaries is unknown. Species identified in southeastern Utah include mammoth, mylodont sloth, Shasta ground sloth, horse, camel, bison, and such present day fauna as big horn sheep, deer and bear (Agenbroad 1991). As a result, the Clovis Tradition occupation of the area was probably by small groups exploiting a rather limited population of large mammals in lush environments within the larger local canyons. However, to date there is no evidence of large kill sites of megafauna in northwest Colorado, though such sites may be deeply buried in the alluviums of the canyons and valleys.

Folsom Tradition

Evidence of the Folsom Tradition in the region is inconsequential. There are very few data, and except for an isolated Bison antiquus skull reportedly found near the confluence of the Colorado and Gunnison Rivers (Personal Communication, Harley Armstrong, 1992), there are no recorded megafauna kill sites. Folsom projectile points are rare; there are a few finds reported from private collections (with uncertain provenience), and regionally there are no well documented sites. The extent to which megafauna may have contributed to the overall subsistence pattern of local groups is still an open question. As with the Clovis Tradition, cultural materials from the Folsom Tradition are also probably deeply buried.

Three Midland points are also reported in the region. In Mesa County, they have been reported at two sites and as one isolated find (5ME281, 5ME1313, and 5ME5327). These projectile points very much resemble unfluted Folsom points and may possibly represent groups which lost, or never acquired, the fluting technology, or they may represent an intermediate step in the manufacturing sequence. They generally overlap, but make their initial appear appearance later than the Folsom points, and range in age from approximately 10,000 BC to 9000 BC. The three resource elevations range from 5,600 feet to 8,700 feet. It appears that the gradually drying climatic conditions may possibly have forced the megafauna and the people to concentrate around and near the more permanent water sources in the lowlands, followed by a dispersed migration to refugia at the higher elevations. As Pitblado (1993) observes, the Clovis and Folsom Tradition peoples occupying the region may have followed a more generalist approach to hunting and gathering rather than specifically focusing on the hunting of megafauna.

Notably, the fluted point tradition was coincident with the Western Stemmed Point Complex in the Great Basin and northwest Colorado Plateau, and paralleled its occurrence in the greater Southwest and High Plains regions. The Clovis and Folsom Traditions are followed by a variety of stemmed and/or shouldered Plano Tradition projectile points which may have been contemporaneous with Archaic Stage occupations in the Great Basin.

Plano Tradition

About 9200 BC, wetter environmental conditions again prevailed and timberline was lower in the La Plata Mountains located to the south of the RMPPA. Dunal areas began to stabilize and the sage brush began to replace the desert shrub. However, around 9000 BC another change occurred and the environment became drier. Between then and about 4300 BC the timberline in the San Juan Mountains gradually retreated to higher elevations than at present. Somewhere around 8250 BC the monsoon pattern appears to have shifted southward. As a result, the drying climatic conditions in the more northerly lowlands caused forage production to drop and affected the distribution of the faunal populations in the eastern Great Basin and Wyoming Basin. However, such conditions would have increased the occurrence of cool season tubers. By about 6900 BC, pinyon trees were well established in northwestern New Mexico (Eckerle 1992). These changing forage conditions may have helped spur a shift toward an increase in gathering in the lower elevations, along with a movement of animals and people to the relatively moister and higher elevations of the foothills and mountains.

The Plano Tradition, which includes the Foothill-Mountain Complex of the Middle and Southern Rocky Mountains and the Cody Complex of the Plains and Mountains, is generally coeval with the early Western Stemmed Pluvial Lakes Complexes of the Western Great Basin. Within the GJFO, projectile points representing the Plains complexes of Agate Basin, Hell Gap, Scottsbluff/Eden, James Allen, and Cody have been recovered from surface contexts of about 30 sites. The Plano sites' elevations in the GJFO again mirror the general upland approach identified with the fluted points.

Foothill-Mountain Tradition

In recent years, the majority of artifacts recovered from sites and as isolated finds dating to the Paleoindian Period in west central Colorado have been ones comparable to the Foothill-Mountain complex, dating ca. 9500-7000 BC (Frison 1991:67-71, 75, 80). Sites containing evidence of this complex in the RMPPA are 5ME13828, 5ME16351 and 5ME16669. The defining characteristics of the Foothill-Mountain complex derive largely from deep, stratified rockshelters- evincing long periods of human habitation- in Wyoming and Montana. The Foothill-Mountain construct is less well known in Colorado and many unanswered research questions remain. Nonetheless, sufficient data exist supporting the concept of a dichotomy in subsistence strategies between plains and foothill-mountain ecosystems.

Frison differentiates the Foothill Mountain from the Late Paleoindian mainly by evidence of differences in their subsistence strategies based on differences in their contact environment and resource base: "The Foothill-Mountain construct is an ecological model used to explain a complex of technology representative of a mode of subsistence specific to the highlands of the central Rocky Mountains" (Frison 1992:323). This strategy is one comparable to the later Archaic groups that would seasonally and annually shift their subsistence foci and locations both (ibid.:336-339). Open camps were established in moderately high parks and montane zones during warmer months; protective settings such as caves and rock shelters were sought in the foothills and transitional zone during colder months. Short term occupations at high altitudes represent specialized logistical endeavors.

Foothill-Mountain groups relied heavily on small to medium-sized animals. For example, Foothill-Mountain components in Mummy Cave (Wedel et al. 1968; McCracken 1971; Husted and Edgar 2002) contained faunal assemblages dominated by the remains of mountain sheep, thus attesting to the existence of cultural groups with different subsistence strategies than those living on the open plains and interior intermontane basins (Frison 1991:69). Bighorn sheep, pronghorn, deer, rabbits, rodents and reptiles constitute some of the most common faunal resources at Foothill-Mountain sites. Foothill-Mountain groups "...also relied heavily on plant resources, including seeds, berries, roots, leaves, and bulbs" (Reed et al. 2008). Ground stone provides additional evidence that floral resources were consumed.

Large communal endeavors such as communal kills are atypical of Foothill-Mountain groups and, therefore, large numbers of diagnostic projectile points are also absent. Known Foothill-Mountain projectile points display considerable regional variation (Frison1992:329; Gilmore et al. 1999:80; Reed and Metcalf 1999:66). Stylistic/functional attributes include lanceolate forms exhibiting parallel-oblique flaking, slightly concave and ground bases as well as thick cross-sections and rough craftsmanship (Reed et al. 2008:41). Pryor Stemmed and Lovell Constricted are well known points of Foothill-Mountain groups.

Also similar to what is found for the Archaic period, Foothill-Mountain sites are characterized by few lithic raw material types; the majority of which derive from local sources (Reed et al. 2008). The highly localized lithic raw material assemblages suggest an insular quality of Foothill/Mountain groups.

Paleoindian Architecture

Regionally, Paleoindian architecture is known from excavated sites in Wyoming. At three sites, structures were evidenced by holes indicating circular arrangements of poles or hard-packed living surfaces indicating circular lodge structures. Two of the oldest habitations were found in the Hell Gap valley. Dating 9750-9325 BC, they were apparent wickiup-like log structures with diameters of 2-4m (Irwin-Williams et al. 1973). At the same site, but dating slightly later in age (ca. 9550-9000 BC) were three more with similar arcs and circles of post holes in a component with Agate Basin complex affiliation. Evidence of a sixth structure was found at Hell Gap having a Frederick complex affiliation and dating to ca. 7650 BC. With characteristics of the Late Prehistoric period, it consisted of a stone circle roughly 2m in diameter considered to have functioned as weights for holding down the edges of a hide tipi. Similar to floors of these structures, a Folsom complex camp at the Hanson site in northern Wyoming, which dated 9750-9100 BC, yielded three hard-packed living surfaces "believed to represent some sort of circular lodge structures"

(Frison and Bradley 1980:9). Frison (1978:115-146) notes that indications from the associated artifacts and the nature of the "lodge" floors were that these were probably utilized for no more than a few days at a time. Similar evidence of structural remains was found at the Agate Basin site in southwest Wyoming. In the Folsom component there, two bison ribs were uncovered in a position suggesting they held down the edge of a lodge covering (Frison 1988:91-92). All these examples are evidence of temporary structures – not unexpected in a nomadic hunting-gathering culture. It is possible that more substantial habitations similar to late Pleistocene Paleoindian pit structures previously found in Russia were constructed in the intermountain region of the Untied States during the cold seasons.

5.1.2 Archaic Era

Empirical data for plant and animal use during the Late Pleistocene and early Holocene periods are exiguous. However, during this time span the last extinctions of the megafauna were occurring and vegetation communities were radically changing across the North American landscape in response to climatic changes. It marks the beginning of a technological and economical transition from a hunting/mobile subsistence pattern to a hunting-gathering/semi-sedentary one. The primary technological changes were the transition from twined basketry to coiled and the increased use of a variety of grinding tools that were utilized for the processing of roots, tubers and seeds collected from the expanding forests and grasslands. In general, this conversion resulted in a broader diet based on the increased emphasis on lower ranked plants and small animals. Also, evidence of the technological change is seen in the lithic tool kits used to hunt large game animals, as the large fluted and unfluted lanceolate projectile points gave way to smaller types, many of which were notched.

Important for understanding the Archaic Tradition in western Colorado is the fact that 1) three climatic zones were exploited: the cool desert, the temperate, and the boreal; and, 2) multiple biotic zones were utilized: the desert shrub (<4,600 ft.), the pinyon-juniper belt (4,600 - 6,500 ft.), the pine-oak belt (6,500 - 8,000 ft.), the fir-aspen belt (8,000 - 9,500 ft.), and the spruce-fir belt (9,500 - 10,500 ft.). Most sites occur in the pinyon-juniper zone but quantitative differentiation between it and the other zones is difficult to assess given the current state of the data. Clearly, at various times, ecological niches in these areas provided conditions stable enough for maintenance of a sedentary or semi-sedentary lifestyle. As continental environmental changes occurred throughout the Holocene, regional fluctuations were also felt, and the details of various cultural adaptations shifted as well.

A cultural-ecological model is posited and termed the Archaic lifeway, which incorporated broad spectrum hunting and gathering and the concept that co-traditions of diverse ethnic groups occupied and utilized different ecological facets of the same broad geographical area in differing ways. The socio-economic organization was conceptualized as consisting of band level societies focused on the household unit, with mobility as the adaptive strategy, and operating along an annual, seasonally based continuum from forager to collector, with subsistence and settlement strategies logistically organized on ecological economic zones that radiated out from the household residential base. Seasonal movements were primarily elevationally determined, based upon the availability and fruition of floral resources in concert with movements of large mammal herbivores (family Cervidae, Bos, Orvis and/or Antilocapridae) from winter to summer ranges and back again.

As expressed by Binford (1982, 2001) and Kelly (1992, 1995), mobility patterns among human foragers often take one or two basic forms: central place foraging characterized by a residential base from which foragers venture to collect foods and to which they return to consume them; and sequential foraging, characterized by movement from one location to another where food is both collected and consumed. There are of course many variants to the basic patterns: foraging groups may follow a central place strategy for part of the year and a sequential strategy for the remainder based on particular climatic conditions; or, a group may move its residential base two or three times a year, following a central place strategy from each new location. Alternatively, groups may split and reform, with part operating as central place foragers throughout the year and another part leaving to act as sequential foragers for part of the year before returning (Madsen and Schmitt 2005:124).

Central place foraging theory predicts that foragers established residential base camps in areas where a mixture of plants and animals were present, which would have maximized foraging returns within the vicinity of the camp (ecotones, wetlands, springs, sand dunes, etc.). It is assumed that long distance forays from these camps were conducted to hunt or collect special resources and usually resulted in establishment of a procurement camp. These camps were used to acquire and process raw materials before transport back to the residential camp in ways that maximized the net delivery rates to the centralized base camps. Because of climatic variations and seasonal availability of resources, the Archaic people of the Plateau were required to be collectors, the characteristics of which include: 1) storage of food for at least part of the year; and 2) organization of food procurement groups. Limitations to this orientation would be that long-term stays at residential camps would result in predation pressure on the higher ranked flora and fauna in adjacent areas, which would have increased the number of species being exploited, increased the travel distance for procurement, and lead to the expansion of a dietary regime to include lower-ranked plants and animals (Kennett et al. 2006a:135). Such a situation would have also opened Archaic populations to the acceptance of domesticated plants.

Archaic Chronology

Evidence of the Paleoarchaic transition period (ca. 7500-5500 BC) is found in the surface finds of diagnostic artifacts that indicate three traditions appear to be operating in the region: the Plano Tradition of the Late Paleoindian Period with links to the Great Plains, a Stemmed Point Complex with links to the Great Basin, and the Foothill-Mountain Complex--possible precursor to the Mountain Tradition extant in the southern Rocky Mountains. Three periods follow that are defined by cultural changes and punctuated by climatic episodes: Early Archaic (ca. 5500-3750 BC), Middle Archaic (ca. 3750-1250 BC), and Late Archaic (ca. 1250 BC -1300 AD).

The Paleoarchaic period (7500-5500 BC) witnessed a deterioration of regional climates accompanied by higher average temperatures and less effective moisture. Climatic warming caused a reorganization of the resource base. Biota retreated to the more conducive climates of high altitudes and low altitudes adapted to desert-like conditions. The volatility of the environment initiated cultural change which resulted in the transformation of a highly mobile, big-game hunting lifestyle into a semi-sedentary hunting and gathering lifestyle.

This subsistence pattern reflected a combination of considerations regarding resource availability, predictability, and productivity. The Archaic foragers focused their subsistence activities on species with higher caloric return rates when available and, when unavailable, shifted to resources with lower rates. Intra-regional differences in the distribution, density, and seasonal availability of significant dietary plants and animal species would have affected settlement strategies. Some high priority resources were more abundant in or restricted to certain areas, for example, pinyon pine in the Colorado Plateau uplands. In northwest Colorado, the lowland deserts and grasslands and the upland forests occur in relative close proximity and were likely exploited via base camps along their ecotones.

Based on the dry climatic conditions, this period was one when the early Uto-Aztecan speaking foraging bands of the west-central Great Basin migrated to its southwestern edge. Decreasing effective moisture in subsequent centuries probably motivated these hunter-gatherers to abandon the lowlands of this region in favor of better-watered middle Holocene refuges. Migration destinations likely included areas east of the Colorado River with movement onto the Colorado Plateau and also southward to the northern Sierra Madre Occidental. Climatological factors may also have encouraged some bands to continue migrating southward (Merrill et al. 2009).

The Early Archaic (5500-3750 BC) exhibits a good deal of cultural continuity with the preceding period. Semi-sedentary hunting and gathering remained the most effective adaptive strategy. Procurement efforts centered on a broad spectrum of biotic zones that were exploited through a central-place foraging strategy. The intensification in procurement efforts is manifested in the burgeoning visibility of processing features as well as pit (pithouse) and basin (house-pit) structures. This period marks the first half of the Middle Holocene and represents the harshest drought conditions experienced by the prehistoric population. Again, much of the data derives from surface finds of projectile points which cross-date from other regions to this period. Radiocarbon dates from this period from multi-component sites tentatively argue in favor of subsistence and settlement strategies logistically organized on ecological economic zones that radiated out from a household residential base. Evidence of decreased mobility and longer-term, seasonal residency in the form of pithouses has been found in the mountain areas, but subsistence data are sparse.

Evidence of occupation of northwest Colorado in the Middle Archaic Period, ca. 3750-1250 BC, from excavation data greatly expands in comparison to the previous periods. This cool moist period in the second half of the Middle Holocene is evidenced by a wide variety of projectile point styles covering large regions of the Intermountain West, with the greatest influences coming from the Great Basin and the Wyoming Basin, with some minor contacts from the Southwest. The number of radiocarbon dates increases dramatically over previous periods. The occurrence at several sites of radiocarbon dates from this period on multi-component sites suggests that subsistence and settlement strategies were indeed logistically organized on ecological economic zones that radiated out from a household residential base. In fact, this adaptation had become so well established that what may have once been simple, highly ephemeral, household residential bases had now become true 'base camps', which later metamorphosed into 'localities' that were repeatedly and systematically re-occupied.

The Middle Archaic roughly corresponds with the Neoglacial period, which exhibited an overall increase in effective moisture and cooler temperatures. On the Colorado Plateau, these conditions were conducive to the expansion of the pinyon pine forest northward from New Mexico into central Colorado and eastern Utah by around 2750 BC (Berry and Berry, 1986). With the advent of these more favorable environmental conditions, a shift by the aboriginal populations down to the middle and lower elevation levels would have been comfortably feasible. As the radiocarbon data reveal, there is an overall drop in the date frequencies for the Colorado mountains along with a corresponding rise in the date frequencies of the northern Colorado Plateau. By about 1700 BC, the pinyon forest again expands northward with pinyon and juniper trees present in the canyon bottoms and washes.

Climatic fluctuations occurred during this period and two distinct dry episodes are recorded by Petersen (1981) for the La Plata Mountains and by Chen and Associates for the Battlement Mesa area (Conner and Langdon 1987:3-17). Data supporting the first dry episode is derived from excavations conducted in the Alkali Creek Basin (located just north of the Gunnison Basin) and reported by Markgraf and Scott (1981). Their study indicates the presence of a montane pine forest at an elevation of 9,000 feet until ca. 3250 BC. The environmental model prepared for Battlement Mesa Community shows an accumulation of windblown silts ca. 3250 BC (at the end of an extended, increasingly dry episode of the Neoglacial period) and again ca. 600 BC.

Between 2850 BC and 2550 BC, the increased moisture allowed the pinyon pine to expand northward from New Mexico into central Colorado and eastern Utah, and it become a major component of the La Plata Mountains in southwestern Colorado. By about 1700 BC, pinyon/juniper forest is present in the canyon bottoms and washes of the Colorado Plateau. This period exhibits stabilization of dune fields and reversion to sagebrush steppe of much of the area covered in desert shrub communities. Consequently, increased game populations and a wider variety of edible plants were available to the human populations at lower elevations.

The Middle Archaic is distinguished on the basis of increased variability in material culture. Reed and Metcalf (1999:79) also suggest that this period is characterized by less sedentisim in settlement patterns and perhaps greater seasonality in the use of higher elevations. Archaeological evidence for this patterned seasonal transhumance is found in the remains of shallow basin structures and their associated artifacts identified from this period at the Indian Creek Site near Whitewater (Horn et al. 1987) and in the Gunnison Basin at Curecanti Reservoir (Euler and Stiger 1981; Jones 1986).

There also appears to have been sporadic contact with Middle Plains Archaic groups as defined by Frison (1978) and evidenced by diagnostic artifacts associated with the McKean Techno-complex. Again, such finds indicate that there was frontier contact in northwest Colorado between highly mobile bands of hunters and gatherers during the Middle Archaic Period due to improved climatic conditions, which provided opportunities for exploration. It may well be that there are no fixed or well-defined boundaries present and that all the groups are generally operating in an open, free interaction zone within the region.

The Late Archaic (1250 BC -1300 AD) is a time of apparent stress on settlement systems. Drought-like conditions coupled with population packing caused adaptive strategies to reach a pinnacle of intensification. Such intensification is reflected in heightened processing of seeds and other lower rate-of-return resources, cultigen manipulation, and evidence of a shift to the bow and arrow. The Archaic lifeway likely continued as a survival strategy for hunter-gatherer groups through the end of the Formative period.

The initial portion of the Late Archaic Period appears to consist primarily of climatic conditions somewhat similar to the present with periodic fluctuations between cooler and wetter, cooler and drier, or hotter and drier conditions, depending upon geographic location. The same seasonal patterns of floral and faunal exploitation probably continued much as they had during the Middle Archaic Period. However, uncertainty caused by the fluctuating environmental conditions, coupled with increasing population densities, may have led to changes in social organization and a greater necessity to define group territories and home ranges. This may have been due to pressures from outside groups trying to relocate as a result of adverse environmental conditions in other areas.

One final aspect of importance during this critical period concerns the introduction or development of the bow and arrow, a major technological innovation over the preceding atlatl and dart. Exactly when this change occurred is controversial, but the majority of the available data indicate ca. 300 AD.

Projectile Points

The primary technological marker of the Archaic era is the atlatl dart point. The atlatl dart point is significantly smaller than the lanceolate point of the Paleoindian era, and manufacture appears to have employed less specialized technologies (Frison 1991:395). Furthermore, a diversity of haft element forms becomes visible; they are generally categorized into four broad groups: lanceolate, stemmed, side-notched and corner-notched.

"Lanceolate styles that seem to be restricted to the Archaic era include a series of largely unnamed points that are relatively thin in cross section and generally less than 1.5 cm wide and 8 cm in length" (Reed and Metcalf 1999:85). A variety of forms is evident and includes morphological attributes such as concave, convex, or straight basal edges as well as straight or convex blade edges. Also, there may be a hint of constriction or of notches on the lateral margins near the base (Reed and Metcalf 1999:85). Ground bases and blade edges are generally rare and specimens demonstrate a less careful manufacture technology. Contexts for lanceolate styles typically range from about 7000 to 4500 BC. A common Archaic lanceolate style is the McKean Lanceolate, of the McKean Complex, dating from after 3800 BC to as late as 1200 BC (Frison 1991:89). Actually, four projectile point types are diagnostic of the McKean: McKean Lanceolate, Mallory, Duncan and Hanna. Although there is data to support the co-occurrence of these points and therefor that of a *techno-complex*, there is also ample evidence that the former two often appear in tandem and the latter two generally replace them near the end of the period. Frison makes this case using the Signal Butte site in western Nebraska, which had McKean Lanceolate points in association with Mallory-type side-notched points in dated levels from 4550-4170 BP [~3200- 3000 BC] (ibid.). Frison (1991:24) refers to sites that indicate the stemmed indented base points such as the Duncan and Hanna of the McKean Complex roughly date from 2550 to 1200 BC; however, Reed and Metcalf (1999:85) obtained dates of 3250 to 1500 BC for the Duncan and Hanna points in the Yampa Valley of Colorado.

Other stemmed points include a variety of styles ranging from contracting stem points generally subsumed under Gypsum, Elko Contracting Stem, and Gatecliff Contracting Stem categories; and a wide range of unnamed points with straight to convex to distinctly rounded bases" (Reed and Metcalf 1999:85). Contracting stem points from the Great Basin and northern Colorado Plateau evince temporal distributions from about 3800 BC to 500 AD (Holmer 1986:105). It is clear that stemmed points grade into corner-notched points, obscuring the boundaries between these two broad categories.

Side-notched points exhibit variable morphological attributes ranging from straight to convex to concave basal edges and/or straight to convex blade edges. Notches vary from shallow to deep and can either be situated near the base of the point (low notches) or higher on the blade (high notches). Pronounced basal indentations or basal notching of side-notched points in the area is rare; however, basally indented, slightly side-notched points are well recognized on the Northern Plains and constitute a cultural complex known as Oxbow. In general, side-notched points tend to predate 1800 BC. Examples of side-notched points indicative of the Archaic include: Elko Side-notched, Bitteroot, Northern Side-notched, Hawken, Mallory and Mt. Albion.

Corner-notched points evince an even broader range of size and basal diversity than do side-notched points. Generally, corner-notched points are subsumed under the Elko Corner-notched classification. Dates for Elko Corner-notched points are noted by Holmer (1986:102) to range from 7000 BC to 1000 AD, with three date clusters (7000-3750 BC, 3750-1250 BC, and 1-1000 AD). A series of distinctive corner-notched points have been stratigraphically date for the Uncompahgre Plateau by Buckles (1971:1220), which have provided a baseline that is of greater utility than those lumped by Holmer into the Elko Corner-notched type.

The proliferation in projectile point styles after the late Paleoindian era is not well understood. It is possible that this phenomenon is simply a byproduct of time. In other words, "the Archaic lasted a very long time and, thus; there was time for this variability to occur" (Reed and Metcalf 1999:83). Alternatively, the multitude of point styles may be a result of decreased mobility. Decreased mobility inhibits the exchange of ideas- relative isolation would allow point forms to diverge. The fact that these divergent styles co-occur within temporally defined archaeological components is more difficult to explain. Reed and Metcalf (ibid.) go on to suggest one possible explanation: "Divergence in styles occurred during the stable periods of relative isolation; sharing of styles occurred during periods of settlement adjustment." On a more finite scale, variation in styles may reflect functional differences or differences in raw materials. It is also necessary to consider the variation that results from individual manufacture. A less optimistic possibility is that projectile point styles simply do not carry the kinds of cultural or social identity that archaeologists ascribe to them; thus, attempts to explain variation are futile.

"At one time, investigators thought that the multitude of styles indicative of the Archaic would eventually sort themselves into chronological and geographic patterns that would make specific point forms diagnostic of temporal periods, and perhaps areas" (ibid.)- but evidence continually arises suggesting a lack of temporal and spatial patterning. For example, Metcalf (1998) attempted to generate a typology for the Uinta Basin Lateral project by sorting points according to overall size, outline, and haft element characteristics. The typology was refined according to details of point form and it was hoped that this would reveal some temporal patterning within these broad categories. The study proved futile in that no such patterning could be detected. According to Reed and Metcalf (1999:83), "It would appear that the diversity and lack of chronological and spatial patterning is real, and that it is time to move beyond wishful thinking about obtaining an orderly projectile point chronology for the area."

Archaic Era Adaptive Periods for Northwest Colorado

A recent publication documenting the “Synthesis of Archaeological Data Compiled for the Piceance Basin Expansion [WIC], Rockies Express Pipeline [REX], and Uinta Basin Lateral [UBL] Projects in Moffat and Rio Blanco Counties, Colorado, and Sweetwater County, Wyoming” (Metcalf and Reed, ed., 2011) provides the best summary of Archaic Era adaptive periods for Northwest Colorado. Figure 5.2 shows the distribution of Archaic Era charcoal dates derived from the WIC, REX, and UBL projects for the Paleoarchaic [Pioneer], Early [Settled], Middle [Transitional] and Late [Terminal] (Metcalf and Reed, ed., 2011:125). [Dates of occupation are presented in Before Present (BP) contexts, which can be transcribed into AD-BC contexts by use of Chart 1.]

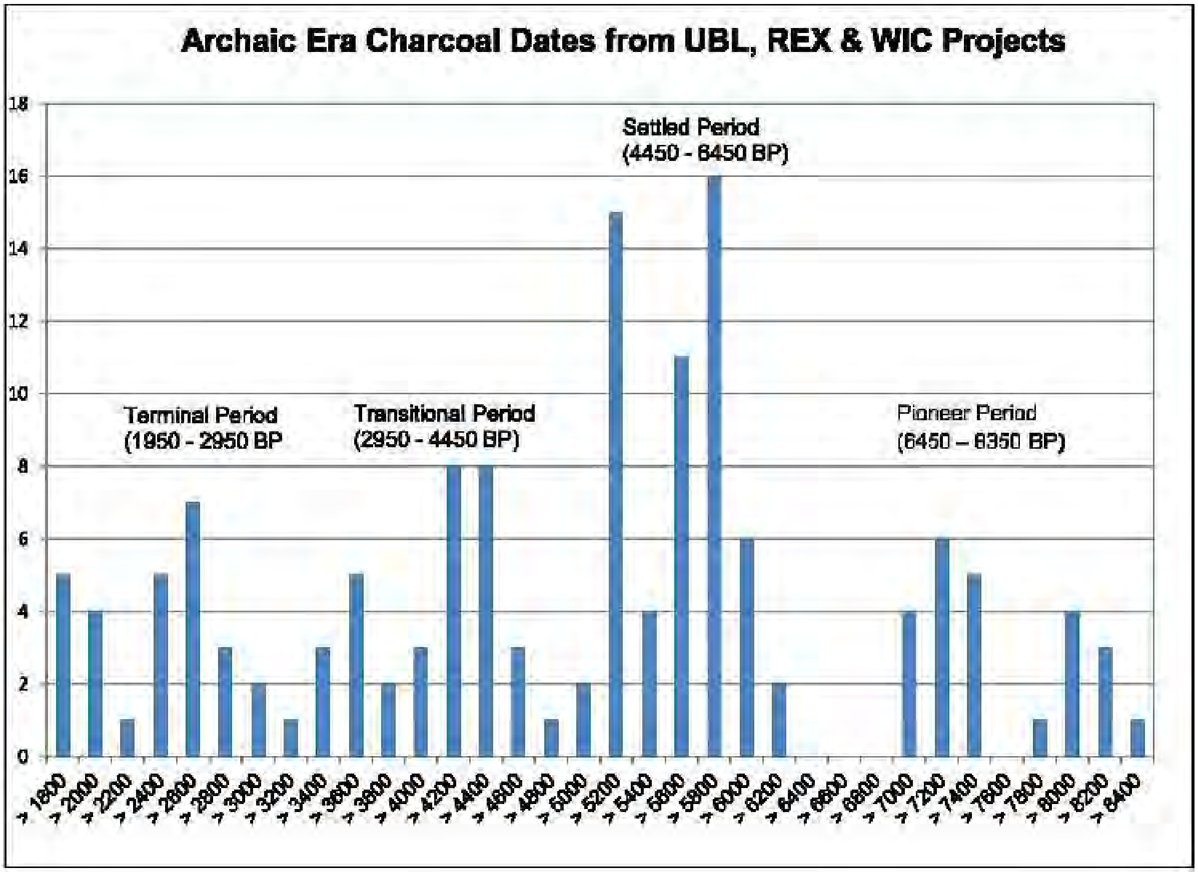


Figure 5.2. Archaic Era charcoal date frequency for the UBL/WIC/REX projects co-opted from Metcalf and Reed, ed., (2011:125, Fig. 50).

Based on the frequency dips of dates in Chart 2, Metcalf and Reed indicate that division of the Archaic Era into the four periods seems to be supported by the data, and are suggestive of some kind of shift in use patterns. The dips in occupation were potentially due to climate change, migrations of new people into the region, and/or new cultural developments. Their findings are qualified by these factors: "...the large number of radiocarbon ages between 5200 BP and 6200 BP reflects the presence of basin house sites with numerous dated features, and the relative paucity of charcoal dates between 4500–5000 BP reflects the difficulty in obtaining charcoal samples from cultural features within the dark cultural deposits common in the Spring Creek Paleosol. When the data are adjusted to account for multiple dates from individual components, the apparent frequency of occupation appears to have been relatively constant between 3500 BP and 6000 BP" (ibid.:126).

A revision of the Northern Colorado River Basin Archaic Era chronology and characteristics of each of the adaptive periods are presented in Tables 5.1 and 5.2 – information co-opted from the original text (ibid.:160 and 161).

Table 5.1. Proposed Revision of the Northern Colorado River Basin Archaic Era Chronology (Metcalf and Reed, ed., 2011:160, Table 41).

Northern CO Periods	Age BP	Age cal BP	Northwest CO Adaptive Periods	Age BP	Age cal BP
Paleoarchaic	8350 -6450	9350-7350	AP 1	8500-8100	9500-9000
Early Archaic	6450-5000	7350-5750	AP 2	7800-7000	8400-7900
Middle Archaic	5000-3000	5750-3200	AP 3 AP 4	6300-5100 4500-3500	7200-5800 5200-3900
Late Archaic	3000-1800	3200-1700	AP 5 AP 6	3300-2500 2200-1800	3600-2500 2200-1700

Table 5.2. Summary of Archaic Era Adaptive Periods for Northwestern Colorado (Metcalf and Reed, ed., 2011:161, Table 42).

Adaptive Period	Age cal BP	Characteristics
AP 1	9500-9000	Deception Creek points, medium artiodactyl hunting, simple hearth features, short-term occupations, predictable resources.
Anomaly	9000-8400	Warming/drying with some evidence of erosion.
AP 2	8400-7900	First use of house pits, introduction of large corner-notched projectile points and slab-lined fire pits, rabbit-focused, increase in long-term occupations, and less predictability in resources.
Anomaly	7900-7200	Resumption of drying; widespread erosional event.
AP 3	7200-5800	Widespread use of house pits, introduction of side-notched projectile point series; balanced use of pit feature types; medium artiodactyls emphasized in subsistence; first period of intensive use of the area, increase in long-term occupations; resources relatively predictable.

Adaptive Period	Age cal BP	Characteristics
Anomaly	5800-5200	Few occupations, but possible house use, a few deep roasting pits; rabbits in subsistence, fewest long-term occupations, within period of least resource predictability, sediments aggrading, inferred warm/dry.
AP 4	5200-3900	House use at beginning and end of interval, houses absent ca. 4800-4100 cal BP? Introduction of McKean complex projectile points; medium and some large artiodactyl use; rabbits gain importance after 4500 cal BP. Cool climate interval; "Spring Creek" paleosol develops.
Anomaly	3900-3600	Few occupations with last dated house pit; no archaeofuanas; warmer/dryer interval; major erosional episode.
AP 5	3600-2500	No houses; increased diversity of unclassified projectile points; smallest pit feature sizes; increased use of large artiodactyls, high incidence of long term occupations with some evidence of winter camps based on fetal material in archaeofaunas. Relatively predictable resources.
Anomaly	2500-2200	Few occupations, no obvious climate indicators; sediment record complex and variable depending on setting.
AP 6	2200-1700	Roasting pit use declines; low incidence of ground stone; rabbits increase in importance; fewer long term occupations; decreasing resource predictability.

Metcalf and Reed (2011:131-133) identified diagnostic points found in association with the Paleoarchaic, Early and Middle Archaic period sites, which are listed in Table 5.3. Importantly, they have identified a new type called "Narrow Series Points" that are characterized by broad, shallow side-notches, sometimes grading into a stemmed appearance, and are narrow, convex-to-triangular in overall shape. They also have a subset defined by shallow notches and a basal shape ranging from convex to very slightly concave. These have been dated ca. 7100–5900 cal BP (ibid.:132).

Table 5.3. Acceptable Early-dated Occurrences of Project Area Archaic Era Projectile Point Styles (Metcalf and Reed 2011:131, Table 38).

Point Type	Earliest Consistent Project Occurrences
Deception Creek	9490 cal BP
Elko Corner-notched	8000 cal BP
Elko Side-notched	7245 cal BP
Northern Side-notched	7100 cal BP
Narrow Series Points*	7100 cal BP
Duncan-Hanna	5000 cal BP
Mallory	4860 cal BP
McKean Lanceolate	4790 cal BP

*narrow series points are not a regionally named type.

Archaic Era Architecture of Northwest Colorado

The most basic typology organizes the multifarious record of Archaic architecture into two general types: formal and informal. The key distinguishing feature between formal and informal is the amount of labor invested in the construction. Formal structures exhibit heightened investment of labor and evince a proclivity toward prolonged or repeated occupation. Semi-subterranean structures are typical manifestations of formal structures. Informal structures are characterized by expedient construction and a short term occupation.

A more finite classification of Archaic architecture is represented in the work of Thompson and Pastor (1995). Three different structure types (i.e., pithouses, house pits and temporary shelters) were identified in the Wyoming Basin on the basis of "associated features (internal or external), density and diversity of material remains (e.g., tools, bone, fire-cracked rock, debitage), and the patterning and interrelationships of those remains" (Thompson and Pastor, 1995:90). Pithouses were identified as deep, round subterranean depressions containing interior features and internal architectural features (niches, walls), and that have madden refuse areas away from the structure. Examples include structures at the Medicine House site (McGuire et al. 1984) and possibly the Shoreline site (Walker and Ziemens 1976). House pits were identified according to smaller dimensions in diameter and depth. These structures were also noted to lack internal architecture, such as prepared floors and ventilator shafts. Examples include structures at Maxon Ranch (Harrell and McKern 1986), Sweetwater Creek (Newberry and Harrison 1986), and Split Rock Ranch (Eakin 1987). Temporary structures were described primarily as sun/wind breaks manufactured out of brush or wood. Remnants of four post molds encircling several small hearths at 48SW4492 (Creasman et al. 1983) appear to be temporary structures that were constructed to provide relief from the wind or the summer sun. Evidence for this structure type is extremely limited due to its ephemeral nature.

The ultimate goal of “typing” architecture is to unveil and discern the behavioral implications it carries for interpreting hunter-gatherer settlement and subsistence. For example, the presence of substantial structures carries implications concerning group mobility. Significant investment of labor suggests a strong tether to place and the importance of seasonal sedentism – both of which have been ethnographically documented (Gilman 1987). In the Rocky Mountains, evidence of substantial structures has stimulated speculation of a unique Archaic adaptation (i.e. the Mountain Tradition) to upland terrain-contesting the original idea that the mountains were exploited on a transitory seasonal basis (Metcalf and Black 1991). Despite criticism, the concept of a Mountain Tradition has directed "attention toward the existence of a rich prehistoric record that stands independent of broader culture areas like the Great Basin or Plains" (Reed and Metcalf 1999:79).

The occurrence of storage and habitation structures in this region have only in recent years been documented, primarily due to cultural resource management projects. The recent study by Metcalf and Reed (eds.) (2011:139) detailed data from a sample of 65 house pits with occupations spanning nearly the entire Archaic Era (Figure 5.3).

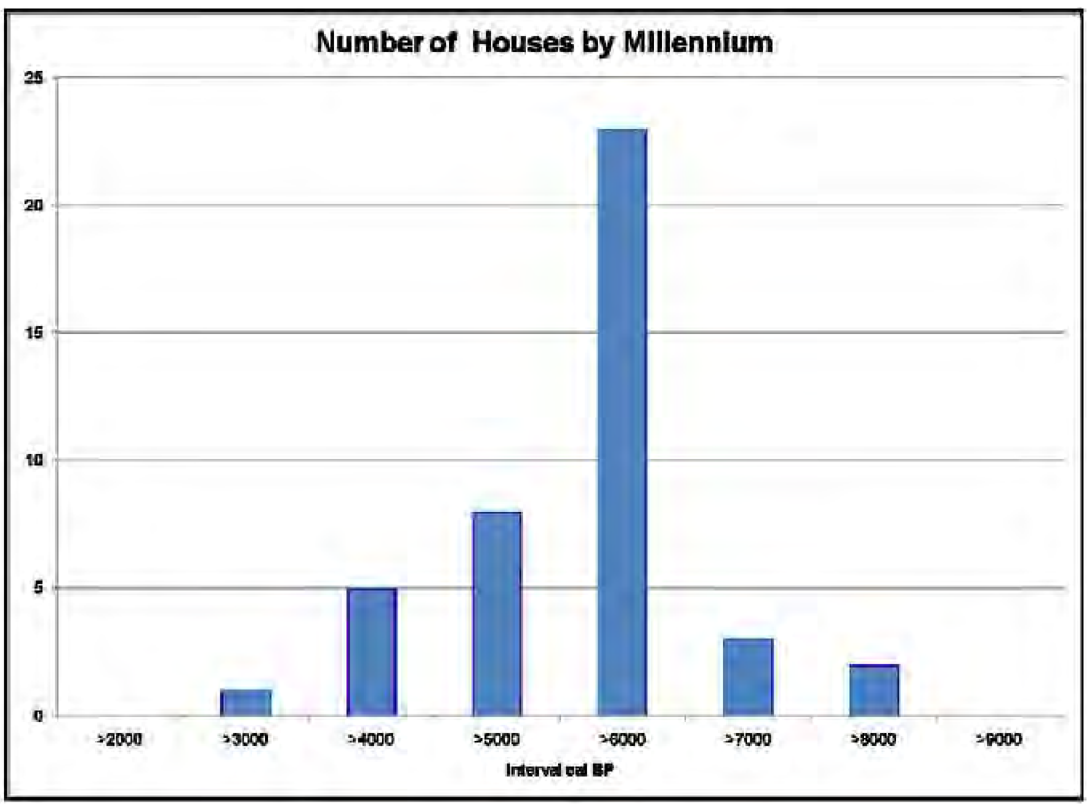


Figure 5.3. Number of dated UBL/ WIC/REX projects house pits by cal BP millennia (Metcalf and Reed 2011:131, Figure 59).

House pit ages ranged from the oldest at 8170 to 8022 cal BP (5MF6255) to the youngest at 3970 to 3560 cal BP (5MF2990). Their best documented/dated houses in the sample have ages between 4835 and 8170 cal BP, and the majority of houses date between 5600 and 7100 cal BP.

Prior to their study, two of the oldest pithouses in Colorado were found in the Yarmony site near Kremmling and dated between 5380 and 4800 BC (cf. calibrations in Metcalf and Black 1991:57-58). Also, at altitudes of 8,000 feet or more in Colorado, what were apparently wattle and daub structures have been found in the Curecanti National Recreation Area near Gunnison (Cassels 1997) and at the Hill Horn and Granby sites near the town of Granby (Wheeler and Martin 1982). The Curecanti structures date between 3400 and 1500 BC (Cassels 1997: 106-108). The Granby structures date to 2500 BC and the Hill Horn structures may date between to as early as 7000 and as late as 2500 BC (Wheeler and Martin 1982:24).

Comparable to the UBL/WIC/REX projects' data is that derived during the Collbran Pipeline Project conducted in west-central Colorado in the De Beque-Collbran area. During the 2009 field season, three pit structures were discovered during archaeological monitoring (Conner et al. 2014). At site 5ME16789, a house-pit floor was found near the present ground surface and was dated 5990 ± 40 BP ([Beta-263486] cal 4990 - 4790 BC). At the same site, a pithouse was identified at a stratigraphically higher level – although about a meter lower in the ground – that dated 4600 ± 40 BP ([Beta-263487] cal 3500 - 3190 BC). Another pithouse was identified during the monitoring project at 5ME16786. It dated 2760 ± 70 BP ([Beta-263486] cal 1080 - 800 BC), and is directly comparable to a pithouse excavated in the early 1980's at 5GF126, located in what in now the town of Battlement Mesa (Conner and Langdon 1987). Notably, the use of house pits was not observed for the period 3600-2500 BP in northwest Colorado during the UBL/WIC/REX projects, but such is known to occur in the Grand Valley area (near De Beque and Parachute) during the period ca. 3000-2700 BP (Conner et al. 2014).

Interestingly, recent excavations at the McClane Rockshelter, 5GF741, located in the Roan Plateau, provided evidence that Middle Archaic McKean Complex groups were creating structures within rockshelters by constructing brush and or pole walls around the perimeter of the overhang – essentially making sheltered houses. The interior exhibited a centrally located thermal feature, and lined and unlined storage pits. The evidence of these houses occurred in the two lowest stratigraphic units, which contained three occupation levels dating between ca. 4200-3000 BP. Winter occupation is surmised for these three habitations (Berry et al. 2013).

Thermal Features

A wide variety of features such as simple ash stains, basin hearths, rock-filled pits, rock-lined pits, slab-lined pits, and fire-cracked rock concentrations occur throughout the Archaic. Undoubtedly, most of these features were constructed for cooking food; however, some without thermal characteristics may have also been used for storage.

Relatively little research has been devoted toward understanding the function of such features. However, “archaeologists are beginning to do more with ethnographic descriptions and with experimentation.” (Reed and Metcalf 1999:81, 82). For instance, Stiger (1998:65) experimented with the heat-output of four feature types at the Tenderfoot site and Francis (2000:5) went so far as to calculate the potential volume of camas and biscuitroot that could be processed in a large cobble filled feature at 48SU1002 in the Upper Green River Basin of Wyoming. Thompson and Pastor (1995:91) also experimented with volume calculations for slab-lined features in southwest Wyoming and determined that the vast majority ranged from 40 to 60 liters. This 40 to 60 liter subset contained features dating from the Great Divide (7750-5600 BC) through the Uinta (1-1400 AD) phases. A second cluster of features had calculated volumes ranging from 80-150 liters; the majority of these featured dated to the Opal phase (5600-3400 BC). Two extremely large (268.6 and 285.6 liters) were noted and both date to the Pine Spring phase (3400-1450 BC).

Features are also one aspect of technological organization used to look at temporal changes. Reed and Metcalf (1999) organized 450 dated features, with origins in the Northern Colorado Basin, into 500-year increments. Originally, there were more than 50 descriptive labels for the 450 dated features. For the analysis, Reed and Metcalf decided on seven basic categories: simple ash stains, simple hearths, basin hearths, rock-filled pits, rock-lined pits, slab-lined pits, and fire-cracked rock features. Results from the analysis indicate:

> Simple stains and basin hearths appear earliest in time, and along with simple hearths, are important in all time periods. Rock- and slab-lined pits attain importance early in the Archaic, and also show increased frequency of use around 2000 to 2500 BC and again in the Formative era. Rock-filled features have generally the same temporal distribution as rock- and slab-lined features. Features that are primarily clusters of fire-cracked rock occur in the latter half of the prehistoric record (Reed and Metcalf 1999:82).

In the Gunnison Basin, a similar temporal distribution is evinced. Stiger (1998: Figure 7-2) indicates that unlined firepits occur in all periods. Specialized boiling pits occur from about 7500-4650 BC, and slab-lined pits occur from about 7000-1200 BC. Large fire-cracked rock features occur from 4650-1200 BC. Smaller fire-cracked rock features are more abundant later in time.

Several avenues of research are proposed to promote a better understanding of the associations between feature morphology, function and site activity. For instance, experiments with the heat out-put of different feature types may lend insight into the intensity of activities at a site and/or the length of occupancy. The temporal distribution of features or, more correctly stated, the frequencies of radiocarbon dates through time, has often served as a tool for estimating population. Finally, the temporal distribution of different feature types may carry implications concerning social organization (Stiger 1998).

5.1.3 Formative Era

The Formative Era from 400 BC – AD 1300 (as defined by Reed and Metcalf 1999:6) is represented the Fremont, Anasazi/Ancestral Puebloan, Gateway, and Aspen Traditions. The Fremont Tradition people are likely the most represented in the region and may have occupied it from ca. AD 200-1500; but there remain many unanswered questions concerning the Fremont. It is generally agreed, however, that various horticulturalist (Formative) groups--possibly of diverse origins and languages, but sharing similar material traits and subsistence strategies--occupied selected areas in Utah and western Colorado during that time.

The first real attempt to provide a regional synthesis of the Formative Period appeared in the West Central Colorado Prehistoric Context (Reed, 1984). At that time, the archaeologists working in the area were operating under the Formative Stage concept as defined by Willey and Phillips (1958:146) wherein the Formative Stage was defined as “the presence of agriculture, or any other subsistence economy of comparable effectiveness, and by the integration of such an economy into well established sedentary village life.” No temporal contemporaneity was implied. Very little work had been done, and much of the previous research had operated under the assumption that the sites were representative of the Fremont or Anasazi Traditions, with little consideration given the possibility that another, undefined tradition might be represented. However, one proposition put forward within this first Context was that these sites represented an in-situ development from an Archaic technocomplex wherein people practicing an Archaic tradition lifestyle adopted a Formative Stage lifestyle as the need to intensify food production arose. Cultigens may have been perceived as relatively unimportant to the hunting and collection of wild foods, which were still able to meet most of the economic needs.

The local Formative Era groups adopted many of the Anasazi traits, yet remained distinct in several characteristics including a one-rod-and-bundle basketry construction style, a moccasin style, trapezoidal shaped clay figurines and rock art figures, as well as a gray coiled pottery (Madsen 1989:9-11). The Fremont apparently retained many Archaic subsistence strategies, such as relying more on the gathering of wild plants and having less dependence than the Anasazi on domesticated ones--corn, beans, and squash. However, maize horticulture was practiced by the Fremont in selected areas throughout the region, as indicated by excavations in east central Utah and west-central Colorado (Barlow 2002; Hauck 1993; Madsen 1979; Wormington 1956).

The Formative Era is inextricably linked to the domestication of plants and the development of ceramics. The origins of the defined Anasazi and Fremont cultures that occupied the region are deeply rooted in the Archaic-possibly as early as 3000 BC. The principal events that link the Formative and the Archaic are the expansions of populations and transmittal of corn horticulture from Mexico. Expansion into the southwest from Uto-Aztecan speaking horticulturalists is noted as early as 1000 BC, but earlier evidence of the adoption of corn is found in the general region and suggests multiple incursions by horticulturalists into the Southwest from Mexico.

Production of the three principal domesticates-maize, beans and squash-in Mesoamerica was widespread by 2000 BC. Reliance on this triumvirate was preceded by varying subsistence strategies including mixed foraging, horticulture, and ultimately low level food production. These stages are characterized as prefarming, transition to farming, and dependence on farming. It is in this last stage that dispersal or expansion from homeland regions likely occurred. Regional adoption of corn horticulture results from a decision to minimize subsistence risk (Gremillion 1996:199). In contrast, for a horticultural society, examples of risk minimization shifts would be in diversification to fall-back wild plant resources or in the dispersal of growing plots (Kennett et al. 2006a:197). For a hunter-gatherer group to adopt horticulture meant a change in the fabric of their culture in order to organize planting, harvesting, storage, protection, and distribution of food. The rewards in adoption of agriculture are found in abundance of selected resources and by the resultant increase in population. The risk is found in the variability of climate causing shortfalls and the occurrence of boom and bust cycles. Bust cycles would result in a substantial decrease in population and force the remaining people to aggregate in environmentally favorable niches.

The best known of the early domesticates is maize. Some microfossil data suggest that the oldest surviving maize came from the highlands of Mexico and dates to ca. 8000 BC (Matsuoka et al. 2002). This early date is somewhat in question, however. Some researchers believe that Zea mays emerged as a separate species from its wild progenitor teosinte in the lowlands of Central America rather than the highlands of Mexico because dates from archaeological sites in the lowlands of Tobasco and Panama are as early as 5000 BC.

The pollen from the early maize is nearly indistinguishable from that of teosinte, but in samples just a couple of hundred years later the phytoliths and pollen assemblages from Panama and Tobasco are recognizably similar to those of modern maize. This sequence of transition in the pollen is not noted in the highlands of Mexico, but fully domesticated cobs have been found there that date to 5000 BC, which suggests that the origin of maize indeed occurred in the tropical lowlands. Distinct varieties of maize were developed to meet the needs of people living at various elevations and to meet various environmental threats, and adjustments are continuing today. Although much larger cobs are found in both lowland and highland sites in Mexico and Central America after 5200 BC, pollen evidence indicates that the smaller Zea persisted until about 3200 BC (Kennett et al. 2006b:122). Full-sized cobs may not have developed until about 1250 BC (Benz and Long 2000).

In any case, the representatives of this early group would not be recognizable as “corn on the cob,” but are best characterized as large grass heads. Importantly, the kernels were enclosed in a hard glume that was resistant to insect infestations and fungal diseases, which was likely the reason for their selection for storage and manipulation. In Archaic subsistence strategies, storability was a critical factor in the selection of some foods. Many seed types often yield lower immediate returns because they require more processing but are ideal for storage. In contrast, berries are an example of a food resource that yields higher immediate return because they are best consumed fresh.

The earliest evidence for corn in the Southwest was provided by Dick's (1965) excavations at Bat Cave in central New Mexico, which yielded dates of ca. 4500 BC. These dates were later disputed by Woodbury and Zubrow (1979) and Berry (1982). Dates from Bat Cave of ca. 2000 BC are now believed to be more accurate, although investigations at the site by Wills et al. (1982) have questioned the reliability of these as well. However, Haury's (1957) indication that maize was in use by ca. 2550 BC at Cienega Creek, a Cochise Culture site, and Irwin-Williams' (1973:9) assessment of maize use by the Oshara Tradition during the Armijo Phase (ca. 2250-900 BC) support the evidence for early maize in the Southwest. Similarly, the oldest squash seeds were identified at the Sheep Camp Shelter located in northwest New Mexico, and dated ca. 1100 BC (Simmons 1986:77).

In addition, Merrill et al. (2009) reference fifteen radiocarbon dates on maize macrofossils recovered from five sites located in New Mexico and Arizona. The dates cluster at ca. 2650 BC and raise the likelihood that maize arrived in the southwestern United States prior to that date. Importantly, the earliest dates for maize at three of these sites are consistent with dates derived from associated materials and features.

Recent finds in western Colorado, southern Wyoming and northern New Mexico have added to the case for the early dissemination of maize into the region. In Rangely, site 5RB4748 contained three Middle Archaic-age house-pits that each yielded corn pollen that dated ca. 3000-2450 BC (Rohman and Fetterman 2007:45). Rohan and Fetterman also report that corn microfossils have been collected in recent years from two northern New Mexico sites; the samples date 2900-2350 BC (Huber 2005) and 1700-1250 BC (Vierra and Ford 2005), indicating that corn has been present in the Southwest much longer than previously believed.

These dates for the earliest corn pollen indicate a potential migration of farmers into the Southwest from the Mexican highlands ca. 4800-3000 BC - a migration that was most likely motivated by climatological factors. As stated earlier in the Paleoenvironmental section, Miller (1992, in prep) reports that pollen from dated archaeological sites indicate the climate was coolest and wettest in the middle Holocene from about 5500 to about 3200 BC. It is during this time that the climate of highland central Mexico was characterized by decreased effective moisture, while after 5600 BC, the southwestern United States and northwestern Mexico experienced an increase in effective moisture (Merrill et al. 2009). As a result, farmers living in the transitional zone between these two regions may have been drawn northward by the relatively greater effective moisture available there.

The how, why, and when corn horticulture arrived from the Tehuacan Valley of Mexico and was adopted into the subsistence strategies of the Archaic populations in the American Southwest is a continually evolving research question. The routes by which corn traveled from the highlands of Central Mexico to the Southwest are unclear, and include possible movements through the lower elevations of the Pacific coasts of Mexico, through northwestern Mexico, and then into the Southwest, or it could have traveled along the eastern flanks of the Sierra Madre occidental through Chihuahua and then into the Southwest, though Adams (1994) suggests that both routes are possible depending upon the strains or races of maize involved. By whatever means, the principle questions revolve around adaptation to the environmental conditions present in both the Basin and Range and Colorado Plateau provinces of the Southwest.

As to why corn horticulture was adopted, Wills (1988, 1995) endorses an enhanced resource predictability model in which cultigens were transferred to the uplands from lowland economic systems utilizing seasonal sedentism, and that the initial use of maize in the Southwest was not a casual occurrence. Minnis (1992) basically agrees with an enhanced resource predictability model, but suggests that early agriculture in the southwest was small scale and dispersed, and was an opportunity which caused little conflict in the scheduling activities within the general context of mobile hunting and gathering. However, Matson (1991) argues that it is first necessary to create a developmental model of the environmental adaptations necessary for the transference of maize from the lowlands to the uplands, as viewed through the evolutionary history of maize and its technological history of cultivation. All three proposals are probably correct, depending to one degree or another upon one's position in space/time on the Colorado Plateau or in the Basin and Range provinces of the Southwest.

As to when, the earliest undisputed date in the Southwest is around ca.1900 BC, and the indications are that the transition to corn horticulture was probably well underway by ca. 800 BC (Cordell, 1997:140 - Table 5.1). For those peoples living near the northern end of the Colorado Plateau in west-central Colorado, the transition took a while longer, and it was not until late in the Basketmaker II period, ca. 400 BC, that the corn started popping.

A significant concentration of the Fremont Era sites has been identified in the Douglas Creek area of northwestern Colorado. Characteristics of this group include dry and wet-laid masonry structures on promontories, granaries in overhangs, and slab-lined pithouses. In recognition of the significance of the Douglas Creek's archaeological sites a National Historic District was established in 1973 that includes a 1.0 mile wide corridor that stretches roughly from where East and West Douglas Creeks divide north to the White River. The district was largely established in recognition of the highly visible rock art panels from whence it drew its name "Canyon Pintado" [Painted Canyon] from the journals of the Dominguez-Escalante Expedition. Several definitive inventories have been completed in the district including those by Gilbert Wenger (1956) of the University of Colorado, and by the Laboratory of Public Archaeology at Colorado State University in 1976, 1977, 1978, and 1979 (Creasman 1981a,b).

Hauck (1993:250) identifies several early Formative Era occupations of the Douglas Creek area that range in date from ca AD 300 to AD 950. The early period dates derived from sites 5RB3498 and 5RB454 (Hanging Hearth) include AD 320 ± 90 (Feature C 5RB3498) and AD 390 ± 70, respectively. Importantly, these features were found to have significant amounts of pollen and macro-flora that indicated the inhabitants were actively processing chenopod-amaranth (Cheno-Ams) seeds. Since Cheno-Ams thrive in disturbed soils, Hauck concludes that these plants were being manipulated, if not outright cultivated, in a growing patch. At 5RB3498, dates from six separate short-term occupations were acquired that ranged up to AD 970 ± 40, and all the thermal features contained evidence of Cheno-Am processing. Hearth features and strata in sites 5RB2828 and 5RB2829 had a much tighter range of dates which fall within the more traditional range of sites classified as "early Fremont" by Hauck. Those sites yielded 12 radiocarbon dates between AD 560 ± 80 and AD 810 ± 50; some of which had associated diagnostic artifacts including Rose Spring points and sand tempered gray ware. This ceramic type has been named Douglas Creek Gray ware by Hauck, and has associated dates of AD 570±40 and AD 790±60 (Hauck 1993:252). Comparable dates and ceramics were obtained from 5RB2958 (Baker 1990). Other Fremont ceramics known in the area include Uinta Gray Ware and Emery Gray Ware.

Hauck (1993:251) indicates that the resurgence of Anasazi artifact associations (both in lithics and pottery) in this general region evidently had "a Late Formative cultural phase similar to the Bull Creek phase of the San Rafael region to the southwest." This late Fremont period appears to extend from AD 950 and 1150, a range which is contemporaneous with the late Pueblo II and Pueblo III occupation on the southern Colorado Plateau. Two types of Anasazi ceramics often found in the Douglas Creek area are Tusayan and Mancos Corrugated gray wares. Similar intrusions of Anasazi ceramics have been identified in the Uinta Basin. Hauck also notes there is a distinct similarity between the dry-laid surface masonry structures, promontory sites above the canyon floor, and absence of free-standing storage units of the Uinta Basin and Douglas Creek areas with those found at the Turner-Look Site located in the Book Cliffs area (roughly north of Cisco, Utah). Accordingly, he states that the Book Cliffs phase as originally postulated by Schroedl and Hogan (1975:54-55) is probably the most appropriate designation for this late Formative development in the Uinta Basin and Douglas Creek localities.

Reed and Metcalf (1999:118) have proposed a sequence for the Fremont occupation of northwest Colorado that includes conclusions based on several of the previous inventory projects. They postulate four periods founded on the presence or absence of ceramics, corn horticulture, and structural features:

Early Fremont period: AD 1-550; characterized by the semi permanent structures, use of the bow and arrow, the presence of corn horticulture, but the absence of ceramics–a Basketmaker II-like adaption.

Uintah (or Scroggin) Fremont period: AD 550-1050; the "classic" period characterized by substantial residential architecture, gray ware ceramics, the presence of corn horticulture, and human aggregation into small hamlets.

Late (or Wenger) Fremont period: AD 1050-1300; characterized by the probable return to hunting and gathering; however, the lack of dated sites makes this period hypothetical.

Texas Overlook Site period: AD 1300-1600; due to the lack of data, this is a classification that is tentative at best and subject to further review.

5.1.4 Late Prehistoric Era

The dissipation of the Fremont Culture is roughly coincident with the drought of AD 1275-1300 and the influx of new people from the western and central Great Basin. The newcomers are referred to as the Numic speakers of the Uto-Aztecan language phylum (Smith 1974:10). Their appearance in Fremont territory ca. AD 1200 is indicated by finds of Shoshone pottery mixed with the upper strata of Fremont artifacts in numerous cave sites (Jennings 1978:235). Aikens and Witherspoon (1986) have proposed a model that includes an environmentally induced extinction of non-Numic inhabitants and an expansion of Numic foragers that occupied the Great Basin for at least 5000 years. They contend that the Numic were coexisting with non-Numic foragers and horticultralists during the Formative period when the regional climates were relatively warm and wet. During times of aridity, non-Numic farmers and wetlands foragers would have abandoned optimal areas, which, in turn, were re-occupied by Central Numic foragers. Similarly, Simms' (1986, 1990) suggests that Numic speaking foragers may have coexisted with Fremont farmer-foragers throughout the Formative Stage, and Jorgensen (1994:85) using linguistic and ethnographic data placed the Numic spread at about 2000 years ago.

The Numic Speakers brought to the Great Basin and Colorado Plateau a change in subsistence pattern. According to Bettinger and Baumhoff (1982:496-500), the Numic Speakers concentrated more heavily on small seed gathering and the hunting of large game over shorter distances, and thus exploited a smaller catchment. The technology for small seed gathering and processing was more advanced than was known to pre-Numic peoples and allowed support of larger populations. This strategy brought economic pressure to bear upon groups who did not practice it. Thus, the subsistence pattern that had been followed throughout the Archaic Period and altered slightly by the Fremont horticulturalists was supplanted entirely by the Numic scheme of procurement. Such a strategy was probably born of the needs created by changing climatic conditions and/or by increased population densities in the southwestern Great Basin (Bettinger and Baumhoff 1982:496-500).

The Numic expansion began in earnest beginning about 1000 years ago with the onset of the Little Ice Age (Petersen 1981). Cooler temperatures affected the growing of corn and the horticulturalists retreated to the south, which is reflected in the fact that there are significantly fewer radiocarbon dates from the study area. The broad spectrum hunting and gathering of the Numic maintained itself as a successful adaptation.

Based on diagnostic artifacts and radiocarbon dates, Reed and Metcalf (1999) propose dividing the Protohistoric era into two phases; the Canella and the Antero. Wickiups and other brush structures were often utilized during this period.

In the archaeological record for the Canella phase, post - AD 1300, Desert side-notched and Cottonwood Triangular projectile points predominate. On the Northern Colorado Plateau, these are often found in association with ceramics called Uncompahgre Brown Ware. Though once thought to date back into the Formative Period, post ca. AD 1350 marks the appearance of Fingernail-impressed, Plain and Micaceous varieties of this ceramic type. Reed et al. (2001:41-9) provide luminescence dates that generally support that as the earliest time for there ceramics, though AD 1300 cannot be ruled out.

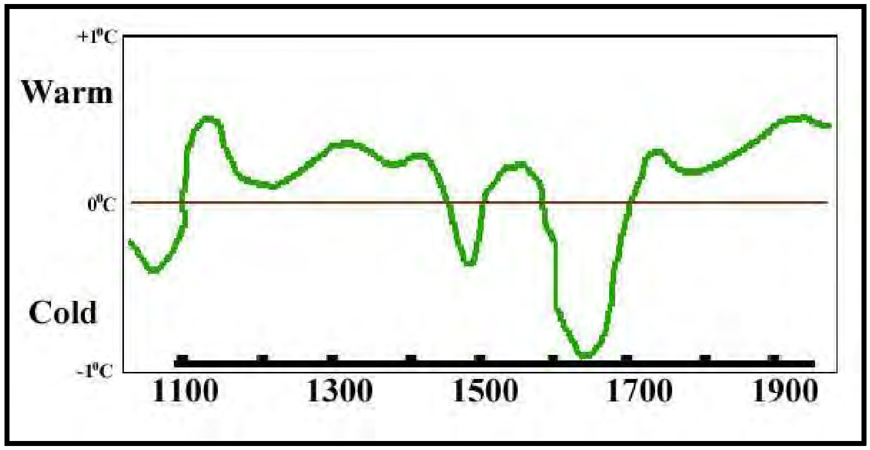
Sites with Uncompahgre Brown Ware in Mesa, Garfield and Rio Blanco Counties have been luminescent dated: 5ME4970, AD 1508 - 1644; 5ME16097, AD 1400 - 1520; 5GF620, AD 1450 - 1528; 5RB144, AD 1510 - 1590. Also in the Northwest Piceance Basin, site 5RB2929 was radiocarbon dated AD 1350±85 (580±80 BP, Beta-37819). Further south in Western Colorado, at the Pioneer Point site located in the Curecanti National Recreation Area, over seven hundred sherds of Uncompahgre Brownware ceramics (micaceous and non-micaceous tempered) were also recovered. These were associated with features dating ca. AD 1476 (474±70 BP) and AD 1466 (484±80 BP) (Dial 1989:19).

Toward the end of the Canella Phase, European trade goods may appear in limited quantities. The Antero phase dates from about AD 1650 to 1881 and represents the shift to a fully equestrian lifestyle and the addition of Euro-American trade goods such as metal knives and axes, metal projectile points, glass beads, cone tinklers, guns and cartridges, tin cans, and horse tack. Desert Side-notched and Cottonwood Triangular projectile points continued to be used, but were increasingly replaced by metal projectile points and firearms and were likely subsumed by ca. AD 1840. Wickiups (best characterized as small teepees with a 4-pole structural base) and brush structures were continued being used during this period.

A variety of floral and faunal items were used by the Numic speakers (the Numa). Textiles (basketry and other woven items) were made from squaw-bush, willow, and juniper bark (Smith 1974:91). Seeds and pinyon nuts were processed for food using grinding and milling stones. Other floral resources collected seasonally were serviceberry, chokecherry, currant, raspberry, elderberry, wild rose, sego lily, wild onion, and wild carrot. The hunting and trapping of rodents, deer, mountain sheep, elk, and bison are illustrated in the rock art (Conner and Ott 1978).

Important to the understanding of the Late Prehistoric/Historic Ute times is that the defining climate episode was the Little Ice Age, which occurred about AD 1300 and 1870. During this period, Europe and North America were subjected to bitterly cold and prolonged winters that reduced the growing season by several weeks. Within that time, two colder phases have been identified (Figure 5.4). The first began around AD 1300 and continued until the late 1400s. It was followed by a slightly warmer period in the 1500s. Then, a marked decline in temperatures occurred between AD 1600 and 1800, which was the height of the Little Ice Age. The cause is unknown, but the coldest part, ca. AD 1645 to 1715, was coincident with an episode of low sunspot activity, and solar cooling, called the Maunder Minimum 2 (Eddy 1976). During that time, the Northern Hemisphere was about 1° Celsius colder than present.

Figure 5.4. Fluctuations in temperatures during the Little Ice Age. (After Lamb 1969 and Schneider and Mass 1975.)



The environmental effects of prolonged periods of cold temperatures creates significant impacts on growing seasons of domesticated plants and would have lowered elevation levels of primary floral resources. It can also have devastating effects on trees; and, although cooler and moister temperatures are generally good for the spread and growth of pinyons, the cold extremes of the 17th century would likely have reduced pine nut production and affected the growing cycle of new trees. These temperature levels coupled with deep snows would have produced significant die-off of large mammal populations, as well. Because of these factors, the approximate 100 year dip in temperatures between ca. AD 1600 to 1700 – with a low mark about 1640-1650 – may have driven aboriginal Numic populations south and west to warmer climates in New Mexico, Arizona and Utah.

A migration to the south would have brought the Numic groups into close contact with Europeans, and perhaps fostered new alliances with Apaches, Navajos, and Pueblos. Horses were likely acquired during that time. New trading relationships were forged and new technologies acquired. With the acquisition of the horse came the reduction and ultimately the demise of the production of Uncompahgre Brown Ware. If this is truly a parallel occurrence, then a record of thermoluminescent dates for this ceramic should reflect the transition to a horse-riding culture.

5.1.5 Historic Aboriginal

The Utes were the dominant indigenous population in western Colorado from the beginning of the region's earliest recorded history; and they are the "only indigenous people to reside within the state from prehistory into their Late Contact phase" (Baker et al. 2007:31). Certain historical accounts and rock art evidence, however, suggest that other numic-speaking aboriginal groups — Eastern Shoshones from Wyoming and Comanches from the southeastern plains — periodically visited the northwestern region of the state for hunting, trading, and raiding (Chavez and Warner 1995; Baker et al. 2007:46-49; Hämäläinen 2008; Cole 1990; Keyser 1977, 1987; Keyser and Klassen 2001).

Nineteenth century American explorers into the Colorado Rockies also reported encounters with (non-numic-speaking) plains groups in the central mountain valleys, including Arapahos, Cheyennes, Lakotas and others who pushed from the northeast plains into the mountains as far south as the Arkansas River. Kiowas and Pawnees coming from the plains to the east were also reported in the central Colorado mountains from time to time (Simmons 2011; Farnham 1841; Fremont 1887). The Utes nevertheless persisted as the dominant indigenous inhabitants of the western slope until late in the nineteenth century when their ultimate removal to reservations in eastern Utah and southern Colorado cleared the way for American settlers.

The full geographic extent of Ute territory at its apex is generally accepted as having reached from western Utah to the eastern slope of the Rocky Mountains in Colorado, and from northern New Mexico to the northernmost reaches of western Colorado (Figure 5.5). Population estimates for the Utes during the early historic period vary widely, but it is broadly agreed that the entire population of all Colorado Ute bands probably never exceeded 10,000 (Simmons 2011:16).

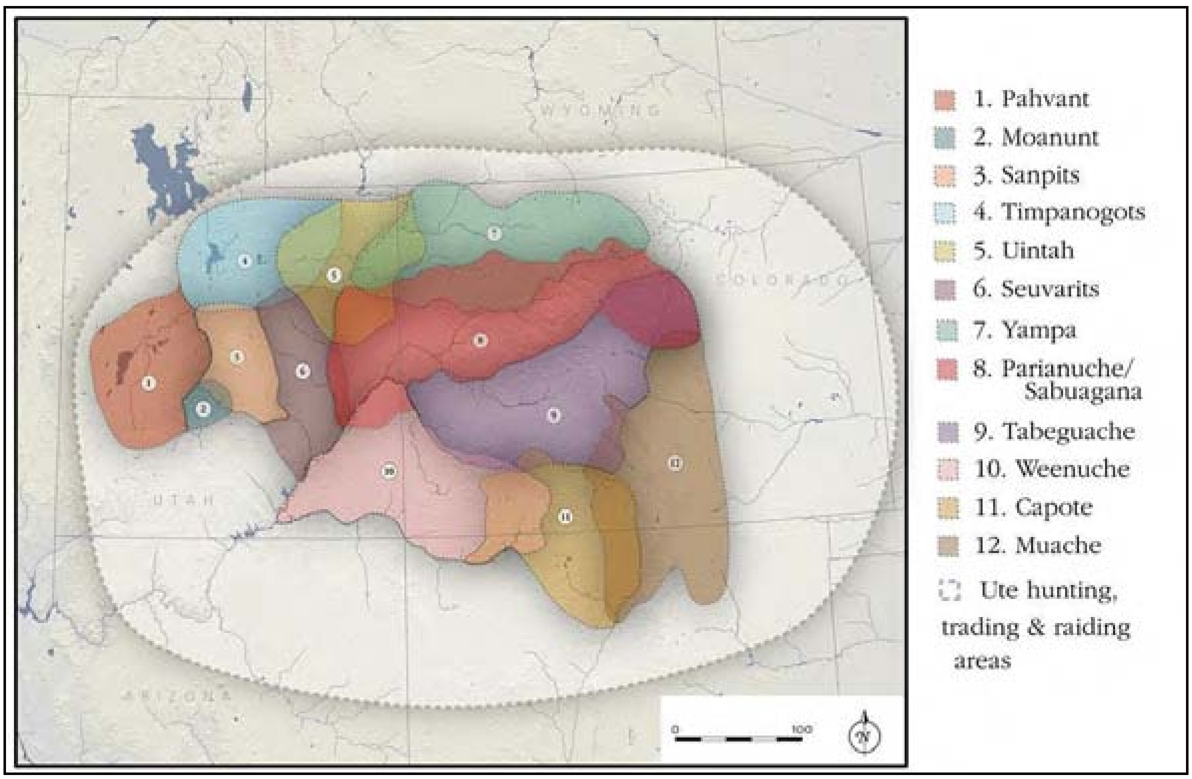


Figure 5.5. Approximate extent of aboriginal Ute territory and distribution of generally recognized historic Ute bands, ca. AD1600-1861 (after Simmons 2011:18).

Early contact between Utes and Europeans began late in the sixteenth century when Spanish colonists pushed northward into New Mexico along the Rio Grand River, eventually establishing Santa Fe as the capital of their New Mexico province in 1610. At that time Utes from Colorado were already engaged in regular trade with northern New

Mexico Puebloans (Tyler 1954:345; Schroeder 1965:54), and “Yutas”, as the Spanish came to call them, were repeatedly mentioned in Spanish administrative records from Santa Fe, Abiquiu and other northern New Mexico settlements beginning as early as 1626 (Blackhawk 2006:22). Horses and metal tools, traded and often stolen from Spanish colonists in New Mexico, began to spread northward to the Utes in Colorado as early as 1640 (Simmons 2000:29; Smith 1974; Blackhawk 2006; Sánchez 1997), but direct contact between the New Mexicans and the Utes was largely confined to the southern boundaries of Ute territory until late in the eighteenth century.

Prehistorically, Utes had traveled on foot and used domesticated canines to help with light transport of their material goods (Callaway et al. 1986; Simmons 2011). But their way of life changed dramatically during the eighteenth century as they acquired increasing numbers of horses, metal tools, and other trade goods from the Europeans (Simmons 2000:29; Smith 1974; Blackhawk 2006; Sanchez 1997). Equestrian mobility significantly expanded the Utes' regional presence (Lewis 1994; Blackhawk 2006), and they became “fine horsemen with vast herds” living “parts of the springs and summers in large encampments of 200 or more lodges” (Jorgensen 1972). Many of the Colorado Utes were successful in the intertribal horse trade which spread throughout the Colorado Rockies and the surrounding plains to the north, east and south during the eighteenth century; and they were prominent participants in the widespread raiding and warfare that swept through Colorado and surrounding regions — continually fueled by Spanish demand for captive human labor and Indian demand for horses (Blackhawk 2006).

Sporadic unsanctioned forays into western Colorado by Spanish venturers from New Mexico are thought to have occurred throughout the eighteenth century (Blackhawk 2006), but the region remained the “least explored and most poorly understood” on Spain's northern frontier (Francaviglia 2005:41). The first official Spanish expedition to reach west central Colorado was led in 1765 by Juan María Antonio Rivera, who traveled as far north as the Gunnison and Colorado Rivers (Sánchez, 1997:37). He was followed in 1776 by the Dominguez-Escalante expedition which retraced portions of Rivera's earlier route before eventually circumnavigating much of the Utes' Colorado and Utah territories. The expedition produced the first known map of the region (Figure 5.6) and recorded a number of encounters with Utes, including a group of eighty Sabuaganas mounted on horseback on eastern Grand Mesa (Chavez and Warner 1995; Bolton 1950). The Dominguez-Escalante expedition, however, was the last official Spanish foray into central and northwestern Colorado and the region remained largely unexplored until the early nineteenth century, when American trappers, traders and surveyors began to scout the intermountain West.

The fur trade rush during the early decades of the 1800s heralded even more “revolutionary transformation” of Ute life (Husband 1984:IV-12). Trading posts and Euro-American trade goods became an everyday part of the Ute landscape, and in 1848 the American victory in the War with Mexico marked the “beginning of the end for Ute sovereignty in the region” (Husband 1984:IV-12). With the signing of the Calhoun Treaty by seven Ute bands in 1849, the Utes irretrievably entered the sweep of American expansion into the West. Subsequent treaties, agreements and land cessions constrained the Utes into

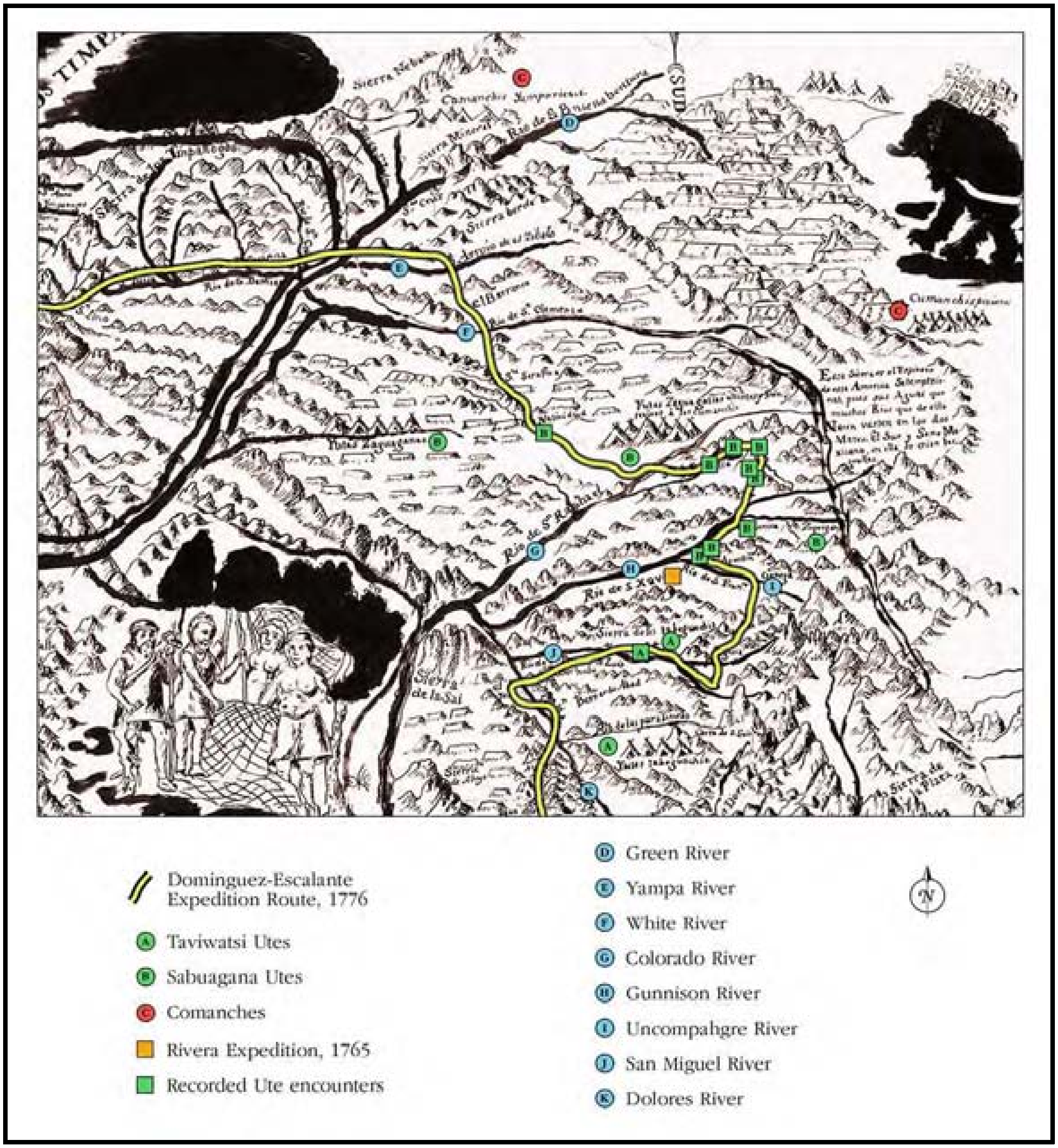


Figure 5.6. Annotated detail of one of the earliest known maps of western Colorado, drawn by Miera y Pacheco with the Dominguez and Escalante expedition in 1776 (Bolton 1950). Several Ute and Comanche encampments were recorded on Miera's map and the expedition's journal described a number of encounters with Utes, including a group of eighty Sabuaganas mounted on horseback on eastern Grand Mesa.

ever smaller territories during the next few decades, "as a strong surge of settlement, based on mining, ranching, timbering, and railroading directly intruded into the lands and the mobility upon which the culture and life ways of the Utes depended" (Burns 2004). By the late 1870s the Eastern Utes were "among the last free roaming Native Americans in the United States" (Baker et al. 2007:74).

As Ute territories shrank, they were subsumed first by Utah Territory in 1851, then Colorado Territory in 1861, and finally by the State of Colorado in 1876. Western Ute groups were constrained to the Uintah Reservation in Utah in 1861, and Utes in southern Colorado were pushed into the Southern Ute Reservation beginning in 1873. Ultimately, in 1881, the White River and Uncompahgre Utes were forcibly removed from Colorado to lands alongside the Uintahs in eastern Utah. The three groups subsequently organized as the Ute Indian Tribe of the Uintah and Ouray Reservation in 1937, each with equal representation in their Tribal Business Council (UIT 1937), and their joint lands are now known by that name (Figure 5.7).

Documentations of Ute lifeways began during John Wesley Powell's surveys of the Colorado Plateau and Great Basin between 1868 and 1880. His work comprised the "first systematic survey of Great Basin Indian demography and political organization" and continues to be a "baseline document for Great Basin aboriginal demography" (Fowler and Fowler 1971:97-119).

Powell's surveys focused predominantly on Numic-speaking groups in western and southern areas of the Great Basin, but he also met some of the Northern Utes, first on the White River in Colorado and later in Utah on the Uintah Reservation. He recorded vocabularies from Ute-speaking groups he identified as Tabuats, Yampaats, and Uintah (Fowler and Fowler 1971), and his records include perhaps some of the first photographs taken of Utes in their aboriginal territory (Plate 5). The earliest of all known photographs of Utes, including several from the White River area, are those showing members of a Ute delegation in Washington, D.C. for treaty negotiations in 1868 (Plate 6).

In the Early Contact period, Ute social and political organization continued to be shaped largely by the successful foraging patterns that had supported their migration into the northern regions of the Colorado Plateau in the Late Prehistoric; predominantly large game hunting and small seed gathering. Aboriginal Utes were highly mobile, migrating seasonally across diverse environments in small groups of 10 or 15 extended family members. Their material culture was for the most part lightweight, portable, and ephemeral, allowing for only what they could cache or carry (Duncan 2003; Smith 1974; Fowler and Fowler 1971; Fowler 2000; Burns 2004). It might be said that life was movement for the Utes; Powell's 1868-1880 survey manuscripts included the Northern Ute word pa-ant-ni, meaning to "walk about; to live" (Fowler and Fowler 1971:189).

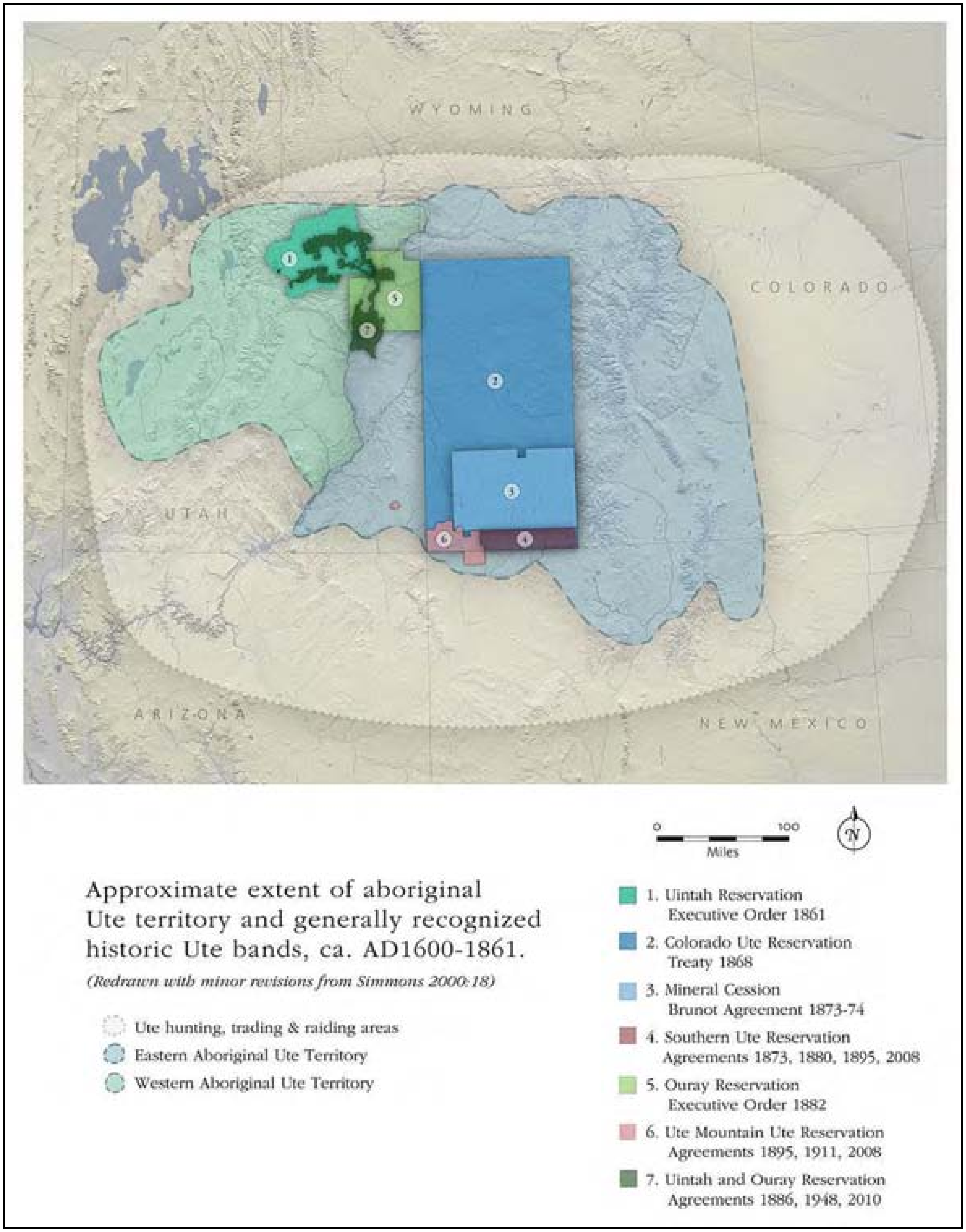


Figure 5.7. Chronology of historic Ute territory, reservations and land cessions, ca. AD1861 - 2010 (Wroth 2000:2; Simmons 2011:18; U.S. Census Bureau 2008, 2010).

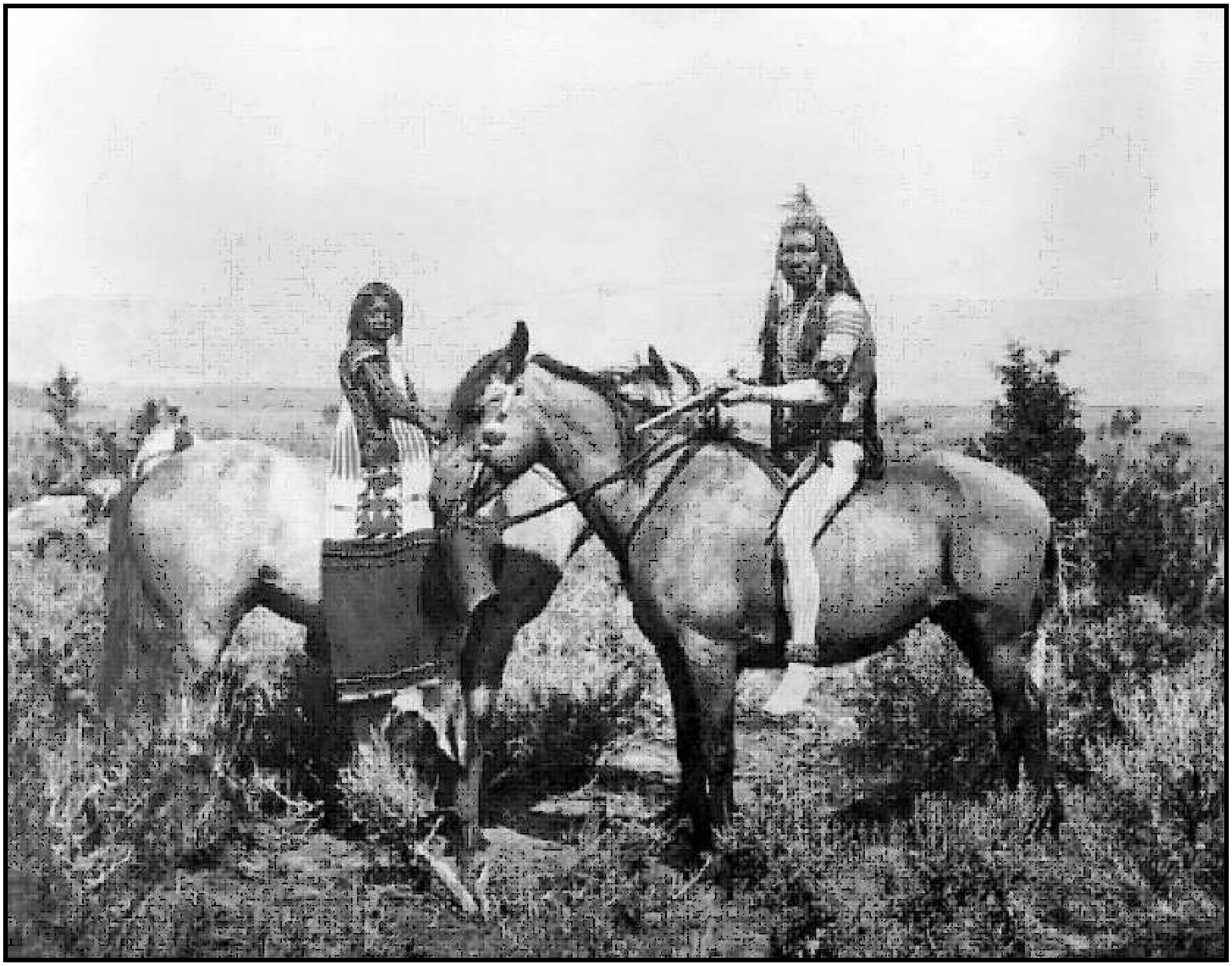


Plate 5.1. Utes in the Uintah Valley, photographed by J.K. Hillers during the Powell Expedition of 1873 or 1874. (Hillers 1873).

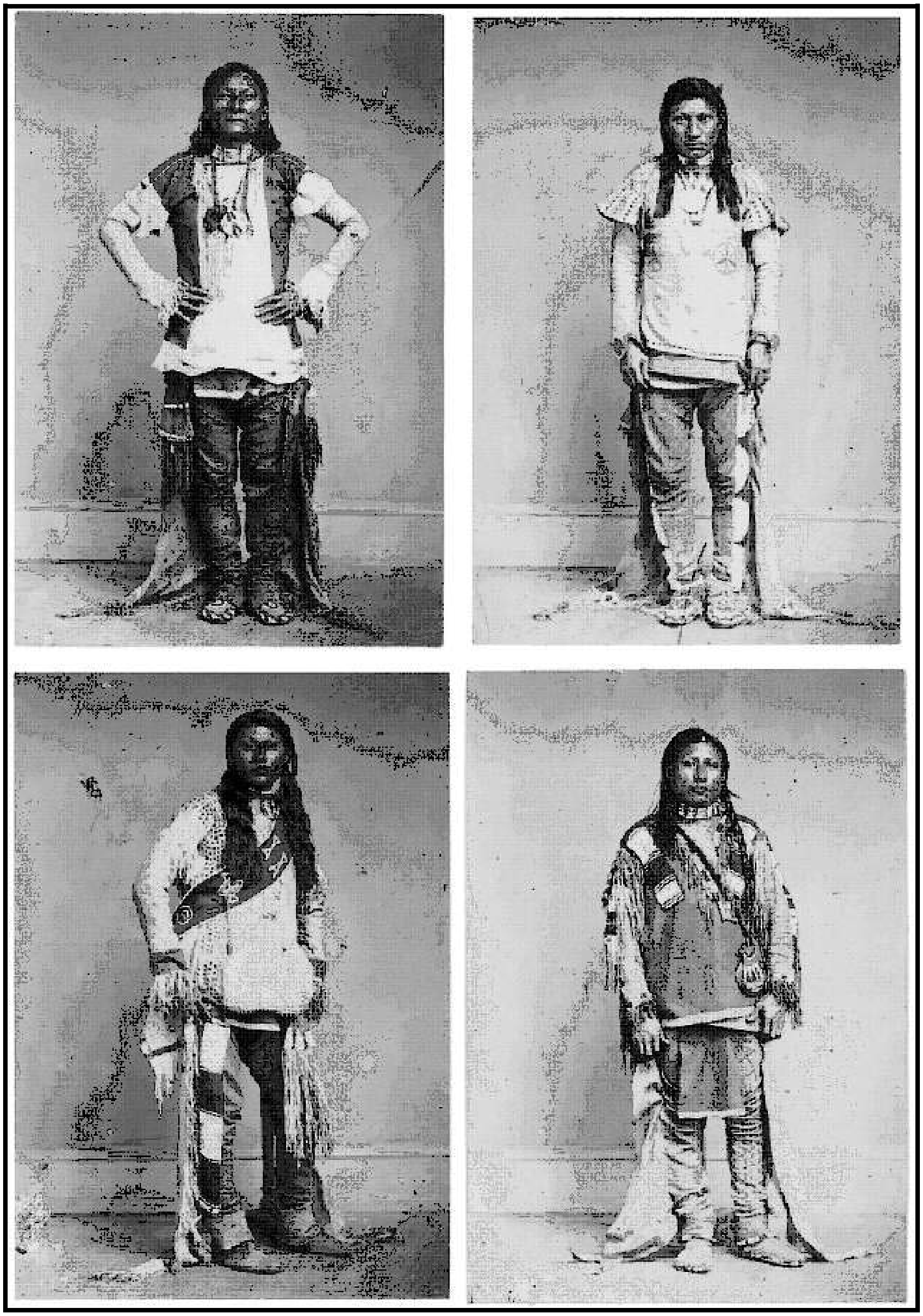


Plate 5.2. Members of the Ute delegation in Washington, D.C. March 2, 1868, for the infamous Kit Carson Treaty (Shindler 1868). Left to right, top to bottom: Chippin (Always Riding); Nicka-a-god (Green Leaf), White River (Yampa) Ute; Suriap, White River (Yampa) Ute; and Pe-ah (Black Tail Deer), Grand River Ute.

The Utes inhabited “a broad landscape ecology” (Burns 2004) that integrated their seasonal subsistence patterns into a spiritual and social framework, as summarized below by James Goss (2003) and Richard Lewis (1994):

“They had a diversified economy of meat, pinyon, and lots of roots and berries. So they had a very balanced diet just off of nature. They were able to maintain themselves as their ancestors did for thousands years by big game hunting and then exploiting these plant resources. So the unique thing about the Utes is that they had such a rich environment… this mountain environment with its diversity, and the abundance of game back in those days” (Goss 2003).

“Movement was a basic value (for the Utes). That is, you could say they had a sacred mandate, passed on to them by tradition from deity, that they were supposed to do this. They were supposed to have these ceremonies at different times of the year in different environments: That is, their Bear Dance in the pinyon, juniper and oak woodlands. Their summer ceremonies, which evolved into the Sun Dance, in the high mountain meadows, where they hunted. And that would have been at the summer solstice, at the first of summer. And then in the fall, they were supposed to be down out of the mountains by the beginning, the 21st or so of September. Subsequently, they had their fall pinyon harvest, and were not supposed to go up in the mountains again until spring. But after the pinyon harvest, they were supposed to be in their winter camp. And that was a pattern that wasn't just economic, but it was sacred. (They) had a sacred mandate to do it” (Goss 2003).

Ute society centered around the extended bilateral family, and periodic congregation of related or affinal kindreds to form local residence groups of from twenty to one hundred persons. These groups frequently traced relations through the matriline and resided matrilocally, but membership was fluid and flexible enough to adjust to personal and local environmental realities. Local leaders were older men who, through persuasion, influence, and proven ability, achieved a level of consensus for their plans. Most groups recognized specialized leaders who directed specific activities (hunting, moving camp, dances, or raiding) and had little or no authority over the group in other matters (Lewis 1994:30).

Larger “band” organization was limited to periodic congregations for defense, for spring Bear dances, or for summer hunting or fishing camps. Bands consisted of local residence groups linked by bilateral kinship networks and their common territorial range — specific features usually reflected in their band name. Local groups and even extended family groups remained relatively autonomous, because most bands lacked formal political organization. Local leaders in band councils (which could include women) decided necessary matters subject to community approval. Dominant groups often provided the most influential leaders – leaders who ultimately came to the attention of white officials looking to negotiate with a single “chief.” Ute bands recognized their larger group identity in custom, language, and territory, and remained united through kinship, trade, and defense against common enemies, but there was no larger Ute “nation” with long-lasting political allegiances or tribal councils (Lewis 1994:191).

One of the most prominent features of Historic Ute sites is the wickiup. There exists evidence from numerous archaeological investigations that have taken place in Colorado and elsewhere that habitations and shelters have been manufactured for thousands of years with wooden superstructures incorporated into their construction (Metcalf and Black 1991; Conner and Langdon 1987; Cassells 2003). It is likely that a significant percentage of prehistoric campsites included temporary shelters. This is based on the premise that, in all temperate and harsh-weather regions of the world shelters were necessary for human survival, or at minimum highly desirable. Binford (1990) surveyed housing among the world's foragers (hunters and gatherers) and found that some form of shelter is constructed whenever a foraging group stops, even for a short time.

> There are no known cases among modern hunter-gatherers where shelter is not fabricated in residential sites (or anywhere hunter-gatherers plan to sleep), regardless of the expected occupational duration, and only in rare instances are sites of any kind produced by hunter-gatherers where no shelter is provided for the occupants (Binford 1990).

Although many of the sites categorized as aboriginal "open architectural" in the OAHP database contain wickiups or brush shelters, all forms of extant wooden and brush features are of interest in terms of categorizing sites as being of Historic Ute affiliation. It is from the early historic and ethnographic records of the then-living native peoples, the photographs and illustrations that accompany them, and the archaeological documentation of the abandoned habitations and camp sites in the times since, that provide us with much of the data from which to formulate definitions and descriptions of wickiups and other forms of ephemeral architecture and perishable features, as found within the western United States.

5.2 Regional Historic Background

The following section provides background information on the early Euro-American exploration and settlement of the of the area. This includes details concerning the early explorers, fur trappers, and settlers of the region. The text of this discussion is derived in part from the Grand River Institute project report entitled "Oak Creek Expansion: Cultural Resources Inventory" (Roebuck et al. 1979:24-51).

Northwestern Colorado has, by virtue of its isolation and inaccessibility, remained on the fringe of Colorado's development as a whole, except for the modern energy development. In the past, the lack of major finds of precious metals, less than glowing reports of the region's prospects from early travelers, troubles with Indians, labor strife, and economic caprice have combined to retard the area's growth. Nevertheless, the history of the region is rich and colorful.

Recorded early European presence in the area is limited to the Escalante expedition and the probable influx of French fur trappers. Non-aboriginal activity has been characterized by periods of "boom and bust." Trapping, hunting in the grand tradition, exploration and tourism, prospecting, agricultural development, coal mining, railroad building, oil production, and modern recreation have all experienced times of modulated growth and decline.

5.2.1 Hunting and Trapping

In the 1820s trapper activity in the region began to pick up. It started as early as 1820 when Baptiste Brown (Jean-Baptiste Chalifoux) discovered Brown's Hole on the Green River. There were also trappers in Rio Blanco country before the full development of the fur trade. Among them were half-breed French trappers who worked for whomever paid the best price (Athearn 1976). Thereafter, the William Ashley party was sent out by the Rocky Mountain Fur Company from St. Louis in 1824 to trap the central Rockies -- Wyoming, the Yampa Valley, Steamboat Springs, and Brown's Hole (H.R.N.F. 1975:1-4). They reached Brown's Hole on the Green in 1825. This year also marked the incursion of Antoine Robidoux into west-central Colorado and up into Brown's Park, and the boom was on.

In 1830, Ashley sold out to Henry Fraeb, Jim Bridger, Thomas Fritzpatrick, Milton Sublette, and Jean-Baptiste Gervais. Fraeb and his party worked the Routt country in 1831, but The Rocky Mountain Fur Company was dissolved in 1834 (H.R.N.F. 1975:1-4).

Fort Davy Crockett, often referred to as "Fort Misery," was built in 1837 in Brown's Park. It was constructed by Phillip Thompson and William Craig because so many trappers wintered in the sheltered Brown's Park country where feed for the horses was plentiful and game was abundant (ibid.:10). When Thomas Jefferson Farnham visited the country in 1839, guided by a trapper named Kelly, he stopped at Fort Davy Crockett and noted:

> Its climate is very remarkable -- while the storm rages on the mountains in sight and the drifting snows mingle in the blasts of ice, the old hunters here heed it not. Their horses are cropping the green grass on the banks of the Skeetskadee, while they themselves are roasting the fat loins of the mountain sheep, and laughing at the merry tale and song (Farnham 1841:109).

Farnham had also made the first documented visit to Steamboat Springs, a place his guide Kelly had visited about 10 years earlier. There the Farnham party ran into a group of French Canadian trappers on their way to Middle Park who had been attacked by a band of Sioux on the trail from Fort Davy Crockett.

In 1840 Henry Fraeb went into partnership with Jim Bridger, and with a group of 23 others headed to the Little Snake to kill buffalo and trap beaver. On the way, he met the first emigrants bound for California (the Bartleson party). But during this trip, the group was attacked and Fraeb was killed by a large party of Cheyenne, Arapahoe, and Sioux Indians (the battle is discussed earlier). Shortly after that incident, Fort Davy Crockett folded and the fur trade diminished rapidly. By 1845, it had vanished as a major economic force.

Many of the trappers were not only colorful, but extremely hardy. For example, Thomas Smith was traveling in the area near North Park in 1827 when his party was attacked by a band of Indians. During the fight he suffered a wound which required amputation. This he performed himself, and Milton Sublette cauterized it for him. The party subsequently took Smith by stretcher to Brown's Hole where friendly Utes aided his recovery by "chewing roots and spitting juice on the wound." Smith fashioned himself a stump and was subsequently known as "Pegleg" Smith (H.R.N.F. 1975:2).

5.2.2 Exploration

Northwestern Colorado was visited by many famous (and some not so famous) explorers as they made their way through the West. They came for a variety of purposes: exploration, science, pleasure, adventure, and profit.

In 1776, the Escalante expedition passed through northwestern Colorado, trying to find an alternate route to California. They noted their disappointment in finding themselves in northwestern Colorado instead. However, their discovery of "Canyon Pintado" on Douglas Creek south of Rangely marks the first recorded archaeological site in northwestern Colorado (Athearn 1976:65).

Several explorers visited northwest Colorado in the early 1800s. Captain Benjamen L. E. Bonneville came into the region in 1826. Dr. Fredrick Wislizenius, traveling on a botanizing expedition for the American Fur Co., visited Fort Davy Crockett in 1839. E. Willard Smith visited the Fort in 1840 and found it still active; Smith had been given an expedition to the west as a graduation present from his father and made his way to Brown's Park via North Park and the Little Snake River. His party was alert to the dangers of Indians and encountered Shoshone, Sioux, and Ute during their travels (Smith 1955).

As mentioned earlier, Thomas J. Farnham and a party of four, guided by the trapper Kelly, came through the country in 1839, through the Gore Mountains via Red Dirt Creek, Gore Peak, to Service Creek, the Yampa River, and on to Fort Davy Crockett, with no trails to guide them. At least two accounts of this journey exist, the diary of Farnham himself (Farnham 1841) and that of Obadiah Oakley (Oakley 1955), a member of the party. Oakley's account is sketchy; Farnham's is more complete and replete with eloquent 19th century prose. Both accounts suffer from lack of detail, but it seems possible that their route might have taken them through Egeria Park to the Yampa River and thence downstream to Steamboat Springs. Farnham's guide, Kelly, had first come to the country in 1827 with the American Fur Co., and the party had stayed at a stockade Kelly had constructed to defend against Utes while he nursed a trapper back to health. On his return visit, Kelly complained,

> Now, the mountains are so poor that he would stand a right good chance of starving, if he were obliged to hang up here for seven days. The game is all driven out. No place for a white man now. More danger then, to be sure; but more beaver too; and plenty of grease about the buffalo ribs. Ah! Those were the good times, but a white man has no business here (Farnham 1841:100).

Farnham was particularly impressed with the country northwest of Craig. He wrote:

> We had been traveling the last five days in a westerly course; and as the river [Yampa] continued in that direction, we left it to see it no more, I would humbly hope, till the dews of heaven shall cause this region of deserts to blossom and ripen into something more nutritive than wild wormwood (sage) and gravel. This region is doomed to perpetual sterility and thus it is said to be with the whole country lying to the distance of hundreds of miles on each side of the whole course of the Colorado to the west. A vast plateau of desolation, yielding only the wild wormwood and prickly pear (Farnham 1841:106-107).

It might be noted that by the time Farnham's party reached Fort Davy Crockett, they had endured months of fear of hostile Indians and intermittent days of starvation, had lost most of their horses, and finally had to eat their loyal greyhound, at which time Farnham made the above remarks.

Colonel John C. Fremont returned from California in 1844, visited Fort Davy Crockett, and found it abandoned (Fremont 1970:708). He again returned to Colorado in 1845 on a military exploration of the Arkansas, Grand [Colorado], White, and Green Rivers, and subsequently wrote off western Colorado as being "worthless."

By 1860, different motives were bringing men to the mountains of Colorado. George Way discovered traces of gold at what was to become Hahn's Peak (DeKraay 1951), and in 1861 a party led by Joseph Hahn returned to the region to work the placer gold deposits. Being remote and inhospitable in winter, the area didn't have year-round settlers until the 1870s -the Hahn's Peak mining district was formed in 1874 (Athearn 1976:36-37). The area boomed between 1866 and 1887, during which time over one million dollars worth of gold was mined, but there was no big strike (DeKraay 1951:45).

Captain E. L. Berthoud traveled both the White and Yampa River valleys in 1861, looking for a more direct route from Denver to Salt Lake City (Powell 1961). The influence of this journey on the later location of a railroad into the region is suspected. John Wesley Powell visited northwestern Colorado in 1868-1869 during his exploration of the Colorado River. In 1868 he wintered at an area since called Powell's Park near the present town of Meeker. (It was to this site that Nathan Meeker moved the White River Ute Agency in 1879.) Powell noted that the area was of only marginal quality for agriculture without massive irrigation; stating:

> The region is one of great desolation: arid, almost treeless, with bluffs, hills, ledges of rock, and drifting sands. and the time must soon come when settlers will penetrate this country and make homes. It will be remembered that irrigation is necessary in this dry climate to successful farming (Powell 1961:182).

The Hayden Survey passed through northwestern Colorado in the mid-1870s. In a promotional article boosting Colorado for Hayden's "The Great West," W. B. Vickers noted:

> ...the area was virtually uninhabitable summer and winter, but that Routt County, in the extreme northwestern corner of the state, is covered with mountain ranges and spurs, and agricultural pursuits to some extent could be successfully carried on. The country at present is attracting but little attention, but when communication can be had with it easier than at present, it will be found capable of supporting a vast population (Hayden 1880:126).

The Hayden Survey publication also noted that:

> "Coal is found in a number of localities along the Yampah [sic], between it and the White, as well as north of it, and although it has not been thoroughly explored and tested, yet it promises to be very abundant and of good quality, equal to any in the territory" (Ladd 1876:438).

In addition to coal, Hayden recorded the presence of oil and oil shale in the Piceance Creek/Roan Plateau area, but lack of transportation inhibited development.

5.2.3 Early Settlement

Colorado's population was slow to increase in the post-Civil War era. In 1869, the English investor William Blackmore said that "Colorado now contains a population of 36,000 exclusive of Mexicans and Indians." (Blackmore 1869:28). Northwestern Colorado was an area of exceptionally low Anglo population. As John Wesley Powell said, "From time immemorial the region drained by the Grand, White, and Yampa Rivers has been the home of the Ute tribes of the Shoshonean family of Indians" (Powell 1961:62), and it was not until their removal that settlement and permanent white habitation of the region began in earnest.

The Utes did not claim the land north and east of the Yampa, hence early railroad surveys and travelers stayed on the north side of the river. The early settlement at Hahn's Peak, Steamboat Springs, and the ranches on the Little Snake preceded that of other areas, in part due to the freedom from Ute harassment. Hahn's Peak was the main population center of northwestern Colorado until about 1875. The Union Pacific Railroad in Wyoming helped bring settlers into the region, and by the mid-1870s there were scattered homesites along the Yampa River valley (Athearn 1976:41).

In 1871 the first cattle were driven into Colorado, into Brown's Park. This area quickly became notorious because of constant rustling and its popularity as a hideout for outlaws (Butch Cassidy and the Wild Bunch perhaps being the most famous).

Historic Euro-American interest in the potential agricultural lands of the reservation lands in western Colorado (namely the Uncompahgre, Gunnison, Colorado, Dolores, San Miguel, White, and La Plata River valleys) had been growing for some time prior to the Utes' banishment, and by the spring of 1881 frontier towns closest to the Ute lands were "crowded with people, anxious to enter the Reservation and take possession of the most desirable locations (Haskell 1886:2)." Only days after the last of the Utes had been expelled, settlers began rushing onto the reservation lands. Settlement activity spread quickly--during the autumn months of 1881 land claims were staked, townsites were chosen, and railroad routes were surveyed (Haskell 1886, Borland 1952, Rait 1932). The establishment of permanent communities occurred in the 1880s and 1890s. Town companies were formed and towns incorporated. The town of Meeker was established close on the heels of the Ute removal in 1882; Craig followed in 1889, Hayden in 1895. However, because the former reservation lands were not officially declared public lands until August 1882, the first year of settlement activity was marked by a degree of uncertainty regarding the legality of land claims.

When finally announced, the 1882 declaration did not allow homestead entries on the newly opened lands, but only preemptions, or cash entries, at the rate of $1.25 per acre for agricultural land, $5.00 per acre for mineral land (Borland 1952:75). By 1895, the major portion of the land in the area had been claimed, mostly under Cash Entry patents. The settlers raised their own food and availed themselves of the plentiful game in the area. Gardens, hay fields, and orchards were planted, and irrigation ditches were dug to divert the creek's water to cultivated fields. Large herds of cattle and sheep were accumulating, grazing the valley floors and the vast open ranges of the surrounding mountains, driven to the uplands via trails leading up the various gulches and canyons.

By the 1890s the ranching interests of northwest Colorado had become divided. At the time of the coming of the railroad, cattle production was the major industry there; and at one time, Steamboat Springs was the largest cattle shipping point in the United States (Athearn 1976:83). Hence, the large cattle outfits in the region of the Little Snake River and Brown's Park fought to preserve the Open Range policy in the face of incursions into their territory by homesteaders and, worse yet, sheepmen. Terrible, violent range wars erupted with the first attempts to bring sheep onto the open range. Sheepherders and their animals were killed or driven back to Wyoming. In 1911, the George Valley Sheep Massacre brought public sympathy to the sheepmen when hundreds of sheep were driven over a cliff to their deaths (ibid.). The combination of small ranchers banding together with sheepmen and the creation of the National Forests and the requirements of grazing permits broke the power of the big ranches. The high mountains bordering Egeria Park offer some of the best summer grazing in the county; in 1918, the first ten carloads of sheep were brought into Egeria Park.

The opening of the reservation lands in the areas of Piceance and Douglas Creeks allowed for settlement and establishment of dry-farming in the mid- to-late 1880's. The settlers raised their own food and availed themselves of the plentiful game in the area. Gardens, hay fields, and orchards were planted, and irrigation ditches were dug to divert creek's water to cultivated fields. Large herds of cattle were accumulating, grazing the valley floors and the vast open ranges of the surrounding mountains, driven to the uplands via trails leading up the various gulches and canyons.

In the early 1890's, approximately 60 families had established land patents on

Piceance Creek to pursue a ranching and farming lifestyle with the average homestead about 160 acres. However, Piceance Creek never developed the economic foundation for the birth of a bustling town. So the pioneers of the Piceance Creek had to travel to Meeker/Rifle for supplies or to see a doctor. It took about 10 to 12 hours to make the trip by horse. Eventually, by the early 1890's, the Rio Blanco General Store and Post Office was established along with a hotel and halfway house.

The life of a pioneer was one of toil. Often, families grasped every chance they could get to supplement their income; especially after the cattle industry started to experience a downturn in the late 1880's due to inclement weather. Many pioneers sold the hides they obtained from deceased cattle or deer. Other resources were tapped. For example, the Dudley Family established the first Post Office on Piceance Creek (Bury and Bury 1972: 45).

Development along Piceance Creek spurred the necessity for establishment of schools. The Rock School was the first built in 1897-1898, where curriculum for grades one through eight was taught to approximately 15 students (ibid.:49-50). Later, schools were established at the Burke's and Oldland's homesteads, and one at the mouth of Ryan Gulch (ibid.:46). Schools were the locus for community activities–both recreational and religious.

At the time of the coming of the railroad, cattle production was the major industry of Northwest Colorado, and Piceance Creek was a major cattle producing area. At the time, Steamboat Springs was the largest cattle shipping point in the United States (Athearn 1977:83), but most of the ranchers along Piceance Creek used the railhead in Rifle, which allowed them to ship cattle out of the area for a good profit. Likewise, cattle were shipped into the area. New breeds were introduced and cattle herds improved.

Inevitably, conflict arose over grazing rights which led to the end of open grazing (1860's to early 1900's) and legislation governing grazing rights. The large cattle outfits in the region of the Little Snake River and Brown's Park fought to preserve the open range policy in the face of incursions into their territory by homesteaders and, worse yet, sheepmen. A harbinger to the end of open grazing was the development of major forest reserves in 1891. This withdrew millions of acres of prime grazing land from the public domain and forced cattlemen to compete for grazing permits.

In 1889, a very dry summer was followed by a harsh winter with freezing rains and insurmountable snows. Thousands of cattle perished. Hard times followed in the 1890's when a drought literally dried up homesteads that employed dry-farming as their economic base. Those that practiced agriculture were limited to the canyons with flowing water where irrigation could be employed. A few sold their homesteads and ranches to move into Meeker or Rifle and pursue a less strenuous life. Others capitalized and expanded their holdings, and many of the ranches grew to astounding sizes. For instance, over the years, Reuben Oldland's place grew to 11,000 acres (Bury and Bury 1991:166). Another early settler, Joseph N. Neal, ran over 5,000 cattle, and in 1916, he received a remarkable profit of $75,000 for the sale of 1,110 head of cows and a few bulls (ibid.:159).

A new round of settlement occurred in the early 1900's. It was made possible by technological advances and better knowledge of scientific techniques in farming, as well as increased rainfall (although variable), which lasted into the early 1920's (Church et al. 2007:115). Population of Rio Blanco County steadily increased between 1890 and 1920 when it reached a height of 3,125. By 1930, however, the population had dropped to 2,180 (LaPoint 1979:43).

In the early 1900's, disputes over grazing rights and stress inflicted on cattle herds due to predators and rustling prompted the development of several cattle associations. One of their major concerns was that with increasing numbers of cattle in the region, the wolf populations grew out of control. By 1904, wolves were killing a quarter of the calf-crop (Bury and Bury 1991:160). In 1902, the Brown's Park Ranchmen's Association was formed to combat the grey wolves, and they offered a bounty of 20 dollars per hide (Athearn 1977: 81). The results proved unsatisfactory and the ranchers had to appeal to the U.S. Biological Survey for help (op.cit.:160). As a consequence, government trappers were sent into the field and kept continually on the job.

The Stock-Grazing Homestead Act of 1916 opened up new public domain to stockmen and farmers on a far greater scale than ever before and became the most popular homestead legislation ever passed. This act applied to all public lands in Colorado, and provided 640 acres of non-irrigable, non-timbered land "chiefly valuable for grazing and raising forage crops" (Schlebecker 1975:208). Much of the land was used for wheat instead of grazing, but could not be filed on until 1918. The act encouraged migration to the upland parcels of the Piceance Basin but its impact was not really felt until after 1920.

Some pioneers of the Piceance Creek became involved in the cattle-sheep war that engulfed western Colorado in the 1900's. Cattlemen feared the invasion of sheep because the animals "grazed to the roots." Groups were formed to stop or impede their introduction. Shepherds were killed and thousands of sheep were slaughtered during this uprising. The battle of the Yellowjacket Pass in 1920 marked the climax of the cattle-sheep war and brought public focus and sympathy for the sheepmen (Athearn 1976:82). The combination of small ranchers banding together with sheepmen and the creation of the National Forests with their requirements of grazing permits broke the power of the big ranches. The result of the conflict was the Rees-Oldland Bill of 1933, which was aimed at settling these disputes by dividing the Roan Plateau ranges between cattle and sheep. Finally, the Taylor Grazing Act was enacted in 1934, which regulated grazing on federal land and marked the end of open grazing (Bury and Bury 1991:167).

5.2.4 Early Transportation

Northwestern Colorado's exploitation was slowed by its inaccessibility due to the rather late entry of efficient transportation into the area. The first non-aboriginal visitors were confronted by a region without roads; Farnham noted the absence of well-developed trails on his visit in 1839 (Farnham 1841). The non-aboriginal explorers and pioneers made their way via game and Indian trails, the use of which hardly provided deluxe travel. A good storm can blow down enough timber to make pony travel unpleasantly invigorating exercise; indeed, one explanation given for the Utes' supposed burning of the forests in 1879 was to clear areas for pony travel. Whether the fires of the summer of 1879 were started by the Ute is disputed (H.R.N.F. 1975:44). The trails going west came from Gore Pass, went through Egeria Park to the Gray Ranch (Phippsburg), and headed across Twenty Mile Park to the Yampa River and beyond (Gray 1941). Dunkley Pass provided access to the Trappers Lake country and White River. These were apparently aboriginal routes through the area (Farnham 1841).

In 1873, John Q. Rollins constructed a wagon road that was passable most of the year over what had been Boulder Pass (Athearn 1976:66). Three years later, the Berthoud Pass road was rebuilt, making it the preferred route to that of Rollins Pass. By 1880, the Rollins Road was in ruins. The Hayden Survey parties made use of the Berthoud road in their travels through the Routt country. The route had changed from earlier construction, and when survey parties used it, the route went "over Gore Pass to Stampede Creek, across Egeria Park, down the Yampah [sic] seven miles, across Oak and Sage Creeks to Skull Creek to the Yampah River." (Ladd 1876:439). The development of these roads increased accessibility to northwest Colorado; previously, most non-aboriginal entry into the region had come from Wyoming.

5.2.5 Railroading

The early development of Colorado and the West was dependent on railroads for primary transportation. The early history of Colorado is replete with attempts to get a transcontinental railroad (the Central Pacific/Union Pacific combination) into the towns favored by various interests. Denver emerged as the capital of the state in part due to its privileged status as a rail center, the result of political maneuvering of men such as John Evans (second territorial governor, disgraced by his removal from office due to his part in the Sand Creek Massacre), David Moffat (banker and railroad promoter), and William Jackson Palmer (Civil War general and builder of the Rio Grande narrow gauge), tempering the hopes of Golden and Boulder interests. One of the "bolder" Boulder projects was the Denver, Utah, and Pacific which began grading through El Dorado Springs and South Boulder Canyon. A proposed divide tunnel was begun -- the dump remains at Yankee Doodle Lake on the east approach of Rollins Pass (Bollinger and Bauer 1962).

The eventual selection of the Wyoming route for the Union Pacific was not for lack of efforts of the Colorado parties interested in locating the road through their state. Men such as Evans, Moffat, Loveland, and Berthoud were instrumental in seeing that every conceivable pass from the Royal Gorge to Wyoming was surveyed. The survey of the Rollins and Berthoud Pass roads was in part a search for a rail route west. General Grenville Dodge, chief surveyor of the Union Pacific, was present when Rollins Pass was rejected in 1866; his party barely escaping with their lives in a roaring November blizzard near the site of the east portal of the Moffat Tunnel (Bollinger and Bauer 1962:181). The severity of Colorado's high country winter climate, in combination with prohibitive grade restrictions through certain parts of the mountains, made selection of Colorado unacceptable to the Union Pacific. Andrew Rogers recommended a tunnel to the Union Pacific two miles south of the current tunnel, beneath Rogers Pass (which lies halfway between Rollins Pass and James Peak) to the south. The Kansas Pacific surveyed the area in 1869. By 1881 efforts were made to build the railroad west out of Denver. Four surveys were run by the Colorado Railway (a Burlington narrow gauge project) over the former Denver Utah and Pacific right-of-way in 1884-1887, from Rollins Pass to Glenwood Springs. A three mile tunnel beneath Rogers Pass was proposed and grading was begun, but halted by a locomotive engineers strike in 1887 (Bollinger and Bauer 1962). This coincided with the need of northwestern Colorado for transportation to allow development; explorers Fremont and Hayden had noted the area's mineral resources and the need for transportation to market.

Various geological surveys were dispatched to appraise the area of its mineral resources in the wake of the Hayden Survey publications. In the 30 years prior to 1900, twelve to fourteen passes had been surveyed for railroad use and eighteen to twenty railroad projects undertaken, about half of which had incorporated tunnels. While some had never passed the promotion stage, many had involved actual grading. Nevertheless, rails did not cross the divide directly west of Denver, and only skeletal evidence of unsuccessful attempts remained (ibid.:183).

In 1903, David Moffat finally realized the plans made a quarter century before and began construction of the Denver Northwestern and Pacific Railway. Survey activity increased with the approach of the railroad. Many survey lines were run for the Moffat, five over the hogback south of the present tunnel, three over Rollins Pass (partly over the present tunnel), and one each over Devils Thumb and Caribou (Arapahoe) Passes, which are north of Rollins Pass (ibid.). The natural barriers standing in Moffat's way were nothing compared to the human ones. The route west led through Gore Canyon, which had been surveyed by the Denver, Utah and Pacific, the Rio Grande narrow gauge (while Moffat was president), and the Union Pacific (while Jay Gould was in control). It was vital to the Union Pacific and principal stockholder E. H. Harriman to stop the DNW&P's construction; Moffat's surveyors were denied access to Gore Canyon by the Interior Department. It was not until the intercession of Theodore Roosevelt that access was granted; investigation revealed that the sources of the blockade ran directly to Harriman.

Fenneman and Gale reported on the richness of the Yampa Coal Field and its need for a railroad in 1906. The next year a report commissioned by Moffat and compiled by William Weston was finished. In a series of evaluations of the natural resources of the region, they note the great economic potential (Fenneman and Gale 1906; Weston 1907). Weston added to the clamor for a railroad:

> Now, however, the fuel famine, which prevails in the states north, south, east, and west surrounding this untouched coal field, has caused people to demand that the coal be produced for the use of dwellers in the western states, and for whose benefit it was originally created. This will now be done, and as rapidly as the men and money available will accomplish it. As already stated, but little development has been done (Weston 1907:60).

The railroad emerged from Gore Canyon in 1907, headed for the coal of the Yampa Field -- its primary source of revenue. The first train arrived in Oak Creek on October 9, 1908; a carload of coal waiting for it was loaded by wheelbarrow and shovel and shipped to Denver (DeKraay 1951:77). The railroad finally reached its western terminus at Craig in 1913. Cattle interests boomed with the arrival of the railroad, peaking about 1910. By 1913, following the general pattern, Craig, as end of track, had become a major cattle shipping center (Athearn 1976). However, not everyone benefitted from the railroads arrival,. David Gray noted:

> The railroad came and coal mining began on a larger scale. Mail contractors and freighters were put out of business. Farmers immediately felt the effect of this when there was no sale for long grain and hay. The country was thrown in competition with the outside world. As a consequence, grain farming for profit was a thing of the past because of loss of home market and high freight rates for outside markets (Gray 1941).

The final blow to significant railroad expansion came in 1915 when the receivers of the Moffat, now the Denver & Salt Lake, convinced the London banker Pearson to dispose of his Mexican Central interests and complete the line to Salt Lake. He set sail for England to complete arrangements; unfortunately the ship was the Lusitania and a German torpedo sank the railroad's last hopes (Bollinger and Bauer 1962:139). After the heavy World War I demand for coal subsided, the railroad fell on increasingly hard times.

Many problems beset the D & S L: high operating expenses on Rollins Pass, accidents, complaints by livestock shippers of stock frozen to death in some cars on the pass, deteriorating maintenance, and lack of money (Athearn 1976:105). The railroad applied for abandonment but was refused. The year 1922 saw the passage of the Moffat tunnel bond issue. The coming of the tunnel promised another boom for the region, but it did not pan out. After intense promotion of the region, the lettuce industry collapsed, and the coal boom gave out -- causing a series of towns in northwest Colorado to lose population and the whole region fell into depression during the 1920s.

6.0 Study Objective

The objective of this portion of the project was to review and summarize an intensive review of the archaeological data of the study area that has accumulated since 1972. It was designed to assess those findings in the context of their contributing to a cultural landscape.

The region was an important seasonal destination for indigenous Numic-speaking Native American populations, and was part of the regional ethnohistorical setting during the catastrophic military conflict between the White River Utes and the U.S. military in 1879. Ute cultural authorities have stressed the importance of evaluating archaeological sites in relation to surrounding landscapes, citing their traditional religious and cultural perspective

(BLM 2012:3.10.5; Ott et al. 2010; Burns 2004). Nevertheless, historic cultural landscape settings in the basin have not been formally documented nor clearly defined relative to National Register of Historic Places (NRHP) and Colorado Office of Archaeology and Historic Preservation (OAHP) criteria. The mitigation of direct and indirect effects of large projects or multiple small projects would be aided by consideration of cultural resources within this area as part of a cultural landscape.

A cultural landscape is defined as "a geographic area, including both cultural and natural resources and the wildlife or domestic animals therein, associated with a historic event, activity, or person or exhibiting other cultural or aesthetic values" (Birnbaum 1994). There are four general types of cultural landscapes, not mutually exclusive: historic sites, historic designed landscapes, historic vernacular landscapes, and ethnographic landscapes. Accordingly, this project will be classified as an Ethnographic Landscape – "a landscape containing a variety of natural and cultural resources that associated people define as heritage resources. Examples are contemporary settlements, religious sacred sites and massive geological structures. Small plant communities, animals, subsistence and ceremonial grounds are often components" (ibid.).

Protecting cultural landscapes through planning, treatment and management has become a pivotal concern for federal agencies (Birnbaum 1994; Clement et al. 2014; Colwell and Ferguson 2014). Federal land management agencies are now encouraged to utilize landscapes "as a conceptual and methodological tool to manage and mitigate adverse effects on places associated with heritage" (Colwell and Ferguson 2014:237). "Taking a landscape-scale approach to mitigation can meet [the needs for both infrastructure development and conservation] while improving permitting efficiencies, reducing conflict, and better achieving development and conservation goals. In the mitigation context, the landscape approach dictates that it is not sufficient to look narrowly at impacts at the scale of the project; it is necessary to account for impacts to resource values throughout the relevant range of the resource that is being impacted" (Clement et al. 2014:i).

7.0 METHODS

An initial review of the archaeological information resulted in the decision to create a spreadsheet and database that can be used by the BLM and potential researchers concerning the important cultural resources of the NW Piceance Creek area. Associated with this effort was the photography of the collected artifacts stored at Colorado State University and the Museum of Western Colorado. The high quality digital photographs of the projectile points were utilized in a multivariant analysis. Digital photographs were also taken of the prehistoric and early historic rock art at the Colorow Cave and Corral Gulch sites for their preservation and interpretation.

Cultural resource information for the Northwest Piceance Creek Basin's database was derived mainly from the Colorado Historical Society's Compass website. From there, information was downloaded concerning approximately 2700 sites, isolated features and isolated finds. That information was compared with and added to the database of an additional 1096 such resources created by Michael Selle for the BLM-WRFO, which was discontinued in yr 2004. Most of the resources in that database were already accounted for in the SHPO data, but there were a lot of inconsistencies and missing information that was filled in by the BLM database. The comparison of the two provided corrections that would not otherwise have been possible.

After the two files were combined, sites were eliminated that were not considered pertinent to the project's goal. These included historic ditches, road segments, bridges, and the like. Much of the information in Compass is not uniform and cannot be easily searched or filtered. Corrections or "cleaning" was undertaken to make the database usable. So a resource by resource review ensued, and information was combined from the two databases -- filling in the missing information that was needed for analysis and simply correcting others. However, some of the inconsistencies were uncorrectable, and some of the categories between the two databases were simply incompatible. For example, in the assessment column for Compass, there are many sites that have an extra "106" inserted for those evaluated as eligible or need data, which makes sorting difficult.

Organizations, cultural association, and site type were categories that were edited to uniformity. For example, many sites had CSU as part of the organizations while others had Laboratory of Public Archaeology as its organization even though both are the same entity. In the artifact section of Compass, there is no quantity count for each item so the artifact counts were reviewed on the site forms when possible and corrected accordingly. The elevation information was also found to be mostly nonexistent for the resources, so elevations in the database were determined by using the given UTM coordinates.

Notably, the categories of open camp and open lithic were redefined because they were characterized differently between the two databases. For this project, the defining characteristics for an open camp include the presence of one or more ground stone tools, in addition to other artifact tools and /or features. Those containing only chipped stone artifacts were considered open lithic sites. Other site types such as open architectural, isolated find/feature, rock art, remained unchanged.

8.0 RESULTS

As a result of the inventory of the known resources, a total of 2726 sites and isolated finds/features were accounted for within the NW Piceance Creek Basin's project boundary. They were sorted by three resource types: archaeological, historical archaeology, and paleontological. For functionality purposes of executing the online database, an additional five columns were added to each site, isolated feature and isolated find on the spreadsheet to indicate the presence of culturally diagnostic artifacts and features: wooden structure, projectile point, ceramic, historic ware, and rock art. Many of the sites have multiple components of prehistoric, historic, and/or paleontology, along with multiple diagnostic categories, which are also indicated in the database.

The following presents a summary of the findings of the database reconstruction. It presents a breakdown of 2726 resources based on resource types. Representative site numbers for smaller categories are included. Asterisk **(*)** denotes a site for which diagnostics were found in the CSU and Museum of Western Colorado curations. A table of the 271 sites listing the photographed artifacts, resource type, and site type is incorporated in Appendix A. For full details of all 2726 sites, refer to the external spreadsheet or database in Appendix B.

1) Archaeological. As the major resource type from this project, prehistoric archaeology consists of 2004 sites: 1210 of which are isolated finds and 13 are isolated features; 414 sites are open camp; 251 sites are open lithic; 97 are open architectural; 2 are rock art; 11 are sheltered camps; 1 is sheltered lithic; 1 site has both open camp and rock art components; 1 site has both open camp and burial components; 3 sites are considered as unknown site type due to lack of information. With the vast number of 2004 sites, aside from the spreadsheet with all the details, a flowchart was made showing the general breakdown of each category and is included as a reference with the on-line database. For example, from the 2 sites that are rock art, **5RB6968** has a cultural association of Archaic, Fremont and Shoshone with 4 rock art panels. The other rock art site, **5RB5848**, has a cultural association of both Fremont and Shoshone with two panels.

2) Historical Archaeology. It is the second largest resource type with a total of 300 sites. 101 sites have the cultural association of Euro-American. Within those, 42 sites have wooden structures, 10 sites have historic wares, 1 site has a wooden structure and historic ware, and 3 sites have rock art. One site (**5RB5149**) has both Euro-American and Ute components; 1 site (**5RB7083**) has Euro-American, Ute and Hispanic components; 1 site (**5RB3048***) has Late Prehistoric, Fremont, and unknown historic components. There are 186 sites classified as unknown historic. Among those 186 sites, some of them are worth noting: 33 have wooden structures; 17 have historic wares; 4 have both wooden structures and historic wares; and 1 has both historic ware and rock art. Lastly, there are 10 sites from the historical archaeology resource type that do not have any information aside from their site number.

3) Paleontological. There are a total of 329 sites that are exclusively paleontological, with no prehistoric or historic archaeological components. A majority of the sites consist of plant fossils and "other" types of fossils.

4) Archaeological and Historical Archaeology. Out of 2726 resources, there are 87 sites with both prehistoric and historic archaeology components: 10 sites have wooden structures that consist of wickiups, a swing set, brush fences, drift fences, corrals, and a cabin; 12 sites have projectile points among other miscellaneous historic items; 5 sites have historic wares that are unknown in cultural association; 2 sites (**5RB2441** and **5RB4254**) have rock art designations that are unknown and Fremont/unknown in cultural association respectively. Seven sites have both wooden

structures and projectile points. Two sites (**5RB0451*** and **5RB5847***) have wooden structures and ceramics that are both associated with the Ute culture. Site 5RB0451 is characterized as Late Ute, while 5RB5847 is Protohistoric Ute/Ute. Four sites have projectile points and historic wares. One site (**5RB0528**) has projectile points, ceramics, and historic wares that are associated with Fremont and Euro-American cultures. One site (**5RB7017**) has projectile points, ceramics, and a historic rock art panel that is Late Prehistoric/unknown historic. Four sites have wooden structures, projectile points, and ceramics. One site (**5RB0238***) has wooden structures, projectile points, and historic wares that have a cultural association of Archaic/Ute/Euro-American. One site (**5RB4146***) has wooden structures, a projectile point, and rock art panels. This particular site has a lot of different cultural association of Archaic/Protohistoric Ute/Late Prehistoric/Fremont/Ute/Euro-American. Three sites (**5RB0831***, **5RB3691**, and **5RB7171**) have wooden structures, projectile points, ceramics, and historic wares. One site (**5RB7166**) has wooden structures, a projectile point, a historic ware, and a historic rock art panel. This 5RB7166 site has a cultural association of Late Prehistoric/Protohistoric Ute/unknown historic.

5) <u>Archaeological and Paleontological.</u> This combination of resource types consist a total of 4 sites. Site **5RB0824** and **5RB2692** are unknown in prehistoric and neither have any diagnostic artifacts. Site **5RB3593*** has a projectile point that we were able to relocate at the Museum of Western Colorado. The cultural association based on compass search for this site is of Late Archaic. Site **5RB4552*** also has a projectile point that we were able to relocate from Museum of Western Colorado, however, the cultural association based on compass search is unknown.

6) <u>Archaeological, Historical Archaeology, and Paleontological.</u> Site **5RB4293*** is the only one with all three components. There are a couple of projectile points and many other artifacts from this site, however, we were only able to relocate 1 obsidian base from the Museum of Colorado. This site has a cultural association of Late Archaic/Fremont/Protohistoric Ute/Ute/unknown historic.

7) <u>Unknown Site Type.</u> Site **5RB5621** has a lot of missing information. There is nothing in regard to the site in the compass search. It lacks an artifact section and coordinate to determine which category the site belongs to for our analysis.

8.1 Data Analysis

Putting the database to use as an analytical and management tool was the objective. Two analyses were run through ArcGIS to demonstrate its usefulness: hotspot (Getis-Ord Gi* statistic) and nearest neighbor (K-nearest neighbor). The following figure presents an illustration of the hotspot calculations.

[redacted]

Figure 8.1. Hot Spot Analysis of 2726 sites within the Northwest Piceance Creek Basin's project boundary.

The following figure demonstrates the usefulness of the spreadsheet and the database in searching specific attributes and plotting the results through ArcGIS. The map shows the distribution of all the wooden features (wickiups, leaners and platforms).

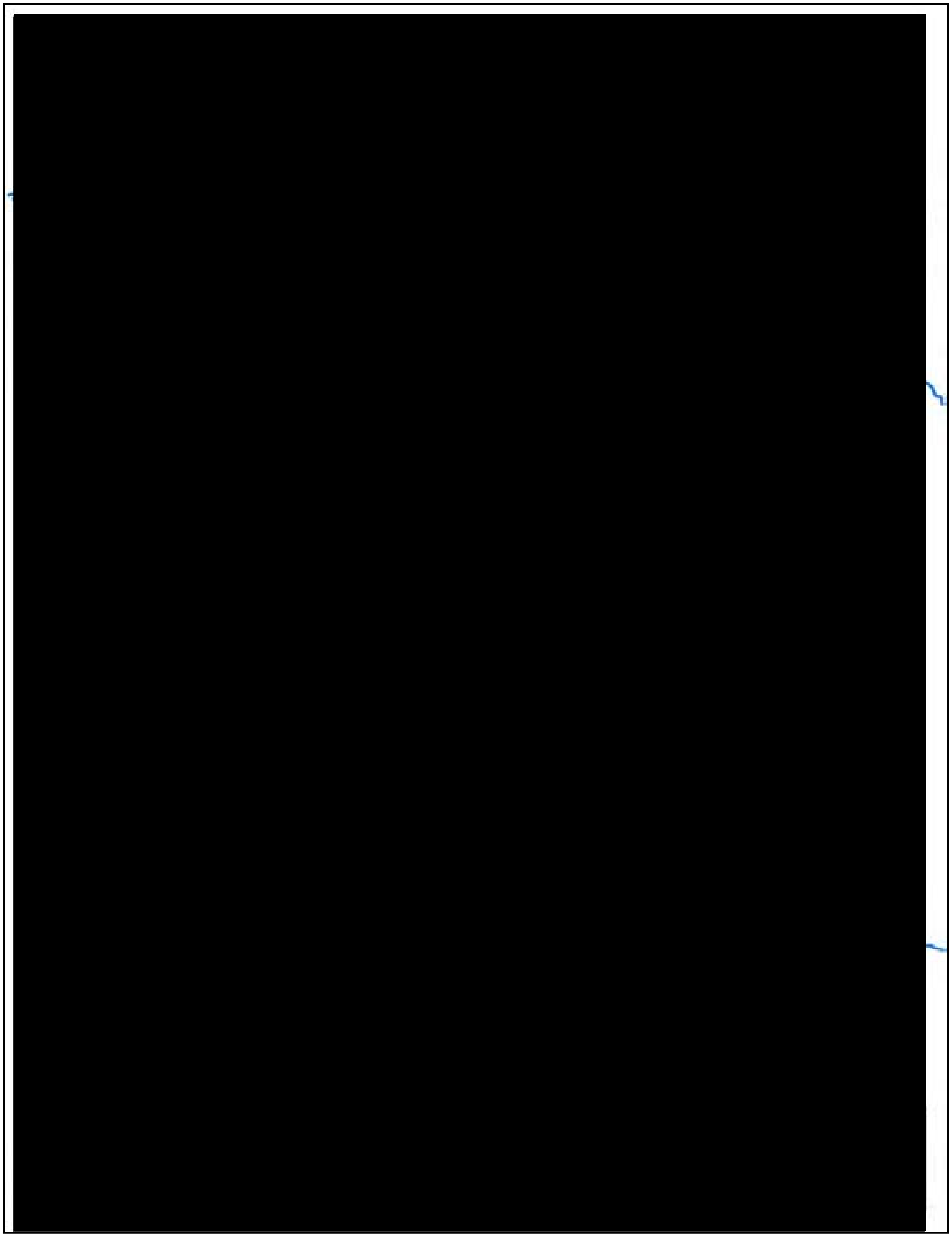


Figure 8.2. Map showing distribution of sites with wooden features (wickiups, leaners and platforms) within the study boundary.

In all, artifacts from 271 sites were reviewed and 294 photographs were taken of diagnostic projectile points, ceramics, and various other tools. A column of the cultural association for those artifacts was added to the spreadsheet. High quality digital photographs are included in the online database as a popup window. Utilizing the photographs of the projectile points Michael Berry conducted a multivariant analyses, which follows.

8.2 Multivariate Projectile Point Typology

No formal projectile point typology for the Piceance study area has ever been developed. Intuitive types have long been used based on perceived similarities to points defined in adjacent areas (e.g., the Great Basin, Plains, Western Colorado Plateau, etc.). However, such intuitive assignments lack statistical rigor and may well not reflect the true range of variability that exists in the Ute Trails region. We therefore sought to develop a multivariate typology based on the currently available projectile point collection .

Photographs were available for 302 points recovered during previous surveys; 76 from Colorado State University and 226 from the Museum of Western Colorado. Of those, 170 were sufficiently complete for analyses. Following initial analyses, statistical outliers and points lacking diagnostic information were removed from subsequent consideration resulting in a final count of 154.

The metric variables were measured using tpsDig Version 2.17 as shown in Figure 8.3. The variables are: a) length, b) mid-blade width, c) neck width, d) tang width and e) base width. The resultant measurements are shown in Table 8.1. For reasons discussed below, the metric variables proved inadequate to fully capture variations in projectile point form. Two additional variables were thus employed: 1) a binary variable for basal notch (1=true, 0=false) and 2) a nominal variable (1=Stemmed, 2=Corner-Notched, 3=Side-Notched).

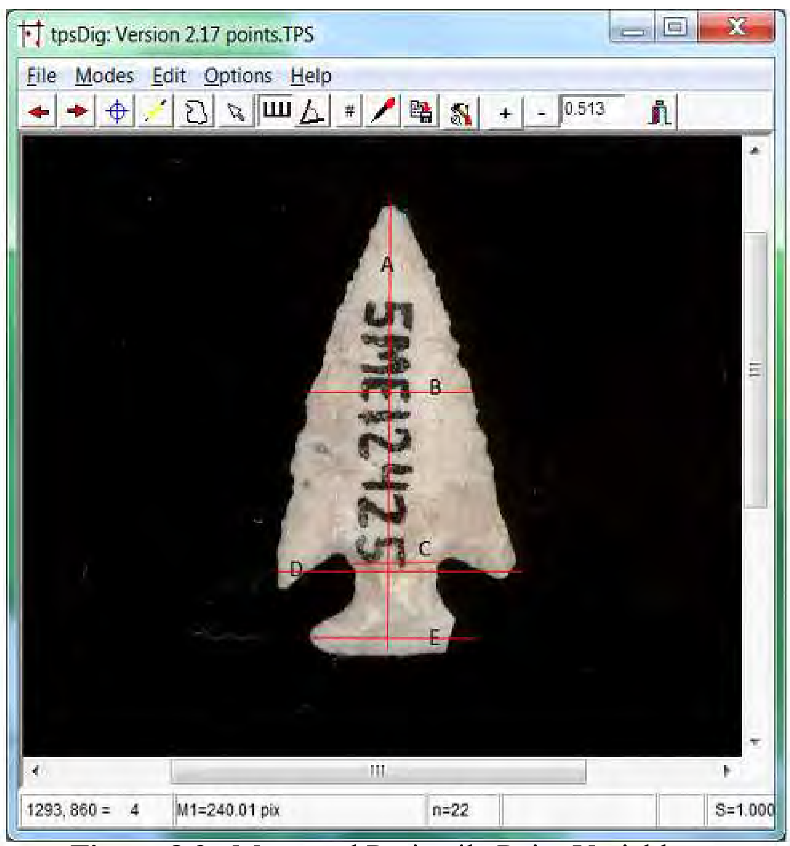


Figure 8.3. Measured Projectile Point Variables

Table 8.1. Projectile Point Variables (measurements in cm.)

Point Label	Length	Mid-Blade Width	Tang Width	Neck Width	Base Width	Basal Notch	Notch Type
5RB11s2	1.67	0.84	1.22	0.8	1.27	0	3
5RB11s3	2.51	1.16	1.56	1.07	1.46	0	2
5RB11s6	2.1	0.85	1.29	0.92	1.01	0	1
5RB137s5	3.2	1.35	1.92	1.02	1.28	0	2
5RB13s16	2.19	1.16	1.34	0.77	1.29	0	3
5RB13s18	1.69	0.78	1.11	0.93	1.37	1	3
5RB13s26	1.72	0.9	1.27	0.71	1.25	0	3
5RB1883s1	2.62	1.08	1.34	0.77	1.3	0	3
5RB18s9	2.32	1.02	1.22	0.61	1.12	0	3
5RB202s1	1.85	0.68	0.81	0.56	1.13	1	3
5RB2125s6	3.22	1.26	1.36	1.3	1.51	0	1
5RB2170s1	2.91	1.05	1.37	0.91	1.46	0	3
5RB2170s2	2.13	0.99	1.34	0.68	1.34	0	3
5RB2275s11	1.79	0.81	1.04	0.81	1.47	1	3
5RB2275s3	3.24	1.29	2.17	0.89	1.24	0	2
5RB2339	2.99	1.48	1.92	0.98	1.41	0	2
5RB2359	2.72	1.09	1.46	0.55	0.64	0	1
5RB2362	5.3	2.54	3.1	1.48	1.53	0	1
5RB2389	3.23	1.06	1.63	0.62	0.91	0	2
5RB238s2	2.8	0.81	1.05	0.47	0.43	0	1
5RB2391	1.86	0.76	1.14	0.79	1.29	0	3
5RB2396	2.36	1.08	1.42	1.23	1.8	0	3
5RB2502	2.02	0.86	1.05	0.83	1.46	0	3
5RB28s1	2.47	0.88	1.35	0.62	0.72	0	1
5RB28s2	2.72	1.49	1.85	1.47	1.73	0	3
5RB2930s1	1.63	0.76	0.97	0.62	1.08	0	3
5RB2931s1	2	1.1	1.36	0.93	1.35	0	3
5RB3	2.51	1.15	1.5	0.94	1.53	0	3
5RB316s3	3.32	1.26	1.66	1	1.35	0	2
5RB316s4	2.6	1.21	1.91	0.84	0.96	0	1
5RB320s3	1.95	0.85	1.33	0.8	1.06	1	3
5RB322s1	2.42	0.79	1.05	0.41	0.62	0	1
5RB322s2	3.02	1.17	2.06	1.35	1.98	0	3
5RB3593	5.55	1.94	3.02	1.5	1.56	0	1
5RB376s2	2.32	0.75	1.01	0.58	1.06	1	3
5RB376s3	2.31	1.19	1.41	0.91	1.15	0	2
5RB382s5	2.28	0.79	1.11	0.37	0.3	0	1
5RB383s4	3.08	1.27	1.82	0.82	1.25	0	2
5RB386s1	2.1	0.79	1.04	0.44	0.7	0	2

Point Label	Length	Mid-Blade Width	Tang Width	Neck Width	Base Width	Basal Notch	Notch Type
5RB398A1-2-2	2.51	0.99	1.32	0.56	0.77	0	2
5RB3s1	1.65	0.89	1.34	0.79	1.47	1	3
5RB3s3	2.34	1.08	1.45	0.66	0.9	0	2
5RB3s5	2.54	1.18	1.53	0.95	1.6	1	3
5RB400s1	1.32	0.71	0.97	0.68	0.99	0	3
5RB4027s2	3.7	1.6	1.63	1.14	1.45	0	3
5RB4128	2.22	0.85	1.07	0.61	1.27	0	3
5RB4135	2.27	1.22	1.62	1.09	1.54	0	2
5RB418s10	2.42	0.81	1.02	0.7	1.39	1	3
5RB4224s1	3.03	1.26	1.83	1.14	1.44	1	1
5RB4227	1.98	1.02	1.41	0.99	1.4	1	3
5RB4231fs1	1.94	0.79	1.27	0.56	0.63	0	1
5RB4231fs2	2.98	1.45	2.1	1.19	1.42	0	2
5RB4231fs3	2.76	1.17	1.54	0.63	0.78	0	2
5RB425s2	1.96	0.71	1.03	0.71	1.29	0	3
5RB4295s1	2.39	1	1.43	0.56	1.51	0	3
5RB429s27	1.56	0.66	0.95	0.86	1.17	0	3
5RB431s1	2.17	0.9	1.18	0.94	1.44	0	3
5RB432s1	1.78	0.77	1.18	0.55	1.21	0	3
5RB432s12	2.06	0.76	1.45	0.78	1.5	0	3
5RB432s30	1.43	0.65	0.94	0.52	0.91	0	3
5RB432s7	2.07	0.86	1.28	0.5	1.25	0	3
5RB4333	3.12	1.45	1.73	0.79	1.07	0	2
5RB4333s1	2.61	1.08	1.41	0.72	0.91	0	2
5RB4337	3.68	1.04	1.99	0.78	0.88	0	1
5RB433s2	4.7	1.63	2.06	1.27	1.54	0	2
5RB4343s1	1.9	0.84	1.14	0.6	1.11	0	3
5RB43s11	3.43	1.3	2.14	1.2	1.98	0	2
5RB43s13	1.64	0.69	0.99	0.75	1.02	1	3
5RB43s15	1.89	0.68	1.06	0.65	1.22	0	3
5RB43s23	1.76	0.88	1.25	0.58	1.33	0	3
5RB440s1	2.23	1.06	1.85	1.32	2.07	1	3
5RB440s2	3.79	1.41	2.28	1.3	1.62	0	2
5RB441s1	2.37	0.74	1.15	0.85	1.29	1	3
5RB447s2	3.56	1.59	2	1.05	1.19	0	1
5RB4495s11	2.61	0.91	2.01	1.12	1.61	0	3
5RB4495s12	2.34	0.87	1.35	0.51	0.77	0	2
5RB44s1	1.87	0.67	0.98	0.58	1.04	1	3
5RB44s2	2.01	0.66	0.95	0.63	1.04	0	3
5RB44s3	2.56	0.99	1.24	0.8	1.32	0	3
5RB4509	2.7	1.28	1.66	0.99	1.69	0	3

Point Label	Length	Mid-Blade Width	Tang Width	Neck Width	Base Width	Basal Notch	Notch Type
5RB4520	5.2	1.74	2.36	1.32	1.34	0	1
5RB4528s2	2.19	1.1	1.31	0.75	1.34	0	2
5RB4528s3	2.4	1.13	1.36	0.89	1.37	0	3
5RB4784s1	5.18	1.72	2.57	1.34	2.01	0	1
5RB4802s1	4.16	2.13	2.56	1.58	1.39	0	1
5RB4812s1	2.39	0.84	1.35	0.78	1.53	0	3
5RB4812s2	1.96	0.94	1.26	0.75	1.24	0	3
5RB4833s1	1.96	0.97	1.65	1.32	1.84	0	3
5RB4944	2.46	1.13	1.42	1.08	1.52	0	3
5RB4947	3	1.15	1.51	0.96	1.62	1	3
5RB509fs27	2.06	0.79	1.1	0.54	1.26	0	3
5RB5105s1	2.41	1.13	1.58	0.61	0.64	0	1
5RB5110s1	2.25	1.12	1.37	0.94	1.27	0	3
5RB5307	5	2.01	2.68	1.16	1.29	0	1
5RB532s1	2.7	1.51	2.38	1.37	2.3	0	2
5RB5330s1	2.82	1.5	2	1.11	1.73	0	2
5RB558s1	1.94	0.81	1.25	0.88	1.45	0	3
5RB5633	2.44	1.12	1.44	0.72	0.81	0	2
5RB5810s1	3.4	1.27	1.49	1.02	1.48	0	3
5RB5817s1	2.8	1.37	1.62	1.07	1.67	0	3
5RB5819s1	5.1	2.32	2.7	1.63	1.8	0	1
5RB5821s1	2.89	0.83	1.32	0.66	0.66	0	1
5RB5821s2	2.08	0.74	1.1	0.5	0.76	0	2
5RB5825s1	2.61	1.34	2.21	1.19	1.43	0	2
5RB5828s1	2.42	1.01	1.84	1.3	1.54	0	3
5RB5837	5	1.91	1.84	1.2	1.28	0	1
5RB5849s1	2.4	0.99	1.37	0.78	1.5	0	3
5RB5856s1	3.99	1.59	2.5	1.38	1.64	0	2
5RB5865	2.44	0.99	1.78	1.18	1.62	0	3
5RB5873s1	2.08	0.95	1.32	0.76	1.47	1	3
5RB5878s1	3.25	1.69	2.19	1.2	1.54	0	2
5RB5897s1	1.96	1.16	1.49	0.79	1.06	0	2
5RB5901s1	5.18	2.02	2.32	1.21	1.28	0	1
5RB5906s1	2.01	1.12	1.49	1.03	1.66	1	3
5RB5911s1	2	0.9	1.3	0.53	0.78	0	1
5RB5917s1	1.79	0.65	1.16	0.62	1.4	1	3
5RB5918s1	2.48	0.91	1.25	0.53	0.6	0	1
5RB5923s1	2.32	0.92	1.37	0.87	1.1	0	2
5RB5929s1	2.76	1.31	1.93	1.11	1.34	0	1
5RB5943s1	4.71	2.11	2.99	1.23	1.2	0	1
5RB5966s1	2.68	1.2	1.25	0.8	1.21	0	3

Point Label	Length	Mid-Blade Width	Tang Width	Neck Width	Base Width	Basal Notch	Notch Type
5RB5966s2	2.87	1.6	2.36	1.74	2.36	0	2
5RB5s1	1.65	0.68	1.07	0.7	1.32	1	3
5RB5s5	1.61	0.64	0.94	0.66	1.05	1	3
5RB6000s1	3.09	1.27	1.52	1.04	1.59	0	3
5RB6005s1	2.64	1.21	1.38	0.79	1.29	1	3
5RB6009s1	2.62	1.06	1.62	0.93	1.46	0	3
5RB6016s1	3.21	1.43	1.73	0.79	1.63	0	3
5RB6032s1	5.6	1.57	1.99	1.04	1.43	0	1
5RB6125s1	2.67	1.03	1.5	0.54	0.67	0	1
5RB6126s1	4.41	1.63	2.23	1.1	1.65	0	2
5RB6142s1	3.2	1.37	1.67	1.02	1.31	0	2
5RB6143s1	1.95	1.05	1.51	1.03	1.55	1	3
5RB6144s1	1.94	0.97	1.33	0.56	1.16	0	3
5RB6145s1	4.97	1.76	2.8	1.67	1.91	0	1
5RB6185s1	3.1	1.51	1.9	1.02	1	0	1
5RB6226s1AB	3.04	1.55	1.69	1.04	1.13	0	1
5RB6261s1	3	1.34	2.3	1.32	1.87	0	2
5RB6273s1	3.69	1.79	2.31	1.43	1.93	0	2
5RB6410s1	3.8	1.5	2.2	0.88	1.35	0	1
5RB645s1	1.97	1.1	1.32	1.03	1.24	0	3
5RB645s3	2.34	1.39	1.72	0.79	1.11	0	2
5RB6644	2.51	1.2	1.33	0.94	1.31	0	2
5RB6686s1	1.98	1.01	1.43	1.2	1.52	1	3
5RB6686s2	1.95	0.81	1.29	0.97	1.33	1	3
5RB7806s1	2.39	1.16	1.55	1.08	1.61	1	3
5RB7807s1	2.86	1.17	1.66	1.29	1.6	0	1
5RB7863	3.4	1.38	1.66	1.26	1.82	0	3
5RB7882	2.5	1.13	1.86	1.28	1.44	0	1
5RB796s2	1.68	0.66	0.94	0.57	1.11	0	3
5RB796s7	2	0.85	1.33	0.75	1.41	0	3
5RB821s1	2.7	1.61	2.64	1.24	1.36	0	1
5RB831s1	1.9	0.71	1.33	0.76	1.58	0	3
5RB9s1	3.67	1.51	1.76	1.4	1.77	0	2

8.2.1 Cluster Analyses

We initially sought to use the same typological methods we had applied to a smaller sample in a previous study (Conner et al. 2016). Cluster analysis was performed by generating a squared Euclidean distance matrix (based on the metric variable shown in Figure 8.4) followed by Ward's minimum variance clustering algorithm (Anderberg 1973). The resulting dendrogram is shown in Figure 8.5. While there were well formed clusters, visual inspection of the grouped projectile points suggested that the metric variables, alone, were not sufficient to discriminate among well known types. For example, small side-notched points were grouped together with the side and basal notched "Desert Side-Notched" points because the metric variables were very similar and did not address the relevant differences. As a consequence, the binary variable, "Basal Notch" was added to the variable set. Similarly, the failure of the metric variables to distinguish among type of hafting elements led to the addition of a nominal variable, "Notch Type" (coded as earlier noted).

The addition of non-metric variables required a significant shift in analytic strategy. The squared Euclidean distance matrix used for metric variables was no longer appropriate and had to be replaced by a distance matrix based on Gower's coefficient for mixed variable types (Gower 1971, Doran and Hodson 1975). In addition, Ward's minimum variance clustering algorithm could not be used because it is designed for and requires a squared Euclidean matrix on which to operate. Hence we employed a group average clustering method (Anderberg 1973).

Gower's Coefficient (following definitions are available at www.clustan.com)

Gower's General Similarity Coefficient s_{ij} compares two cases i and j, and is defined as follows:

$$s_{ij} = \sum_k \underline{w_{ijk} s_{ijk}} \div \sum_k w_{ijk}$$

where: s_{ijk} denotes the contribution provided by the *k*th variable, and
w_{ijk} is usually 1 or 0 depending upon whether or not the comparison is valid for the *k*th variable; if differential variable weights are specified it is the weight of the *k*th variable or 0 if the comparison is not valid.

It should be noted that the effect of the denominator $\sum_k w_{ijk}$ is to divide the sum of the similarity scores by the number of variables; or if variable weights have been specified, by the sum of their weights.

Ordinal and Continuous Variables

Gower defines the value of s_{ijk} for ordinal and continuous variables as follows:

$$s_{ijk} = 1 - | x_{ik} - x_{jk} | / r_k$$

where: r_k is the range of values for the *k*th variable.

For continuous variables s_{ijk} ranges between 1, for identical values $x_{ik} = x_{jk}$, and 0, for the two extreme values $x_{max} - x_{min}$.

Binary Variables

For a binary variable (or dichotomous character), Gower defines the component of similarity and the weight according to the table (right), where + denotes that attribute k is "present" and **-** denotes that attribute k is "absent".

	Value of attribute k			
Case i	+	+	-	-
Case j	+	-	+	-
s_{ijk}	**1**	**0**	**0**	**0**
w_{ijk}	**1**	**1**	**1**	**0**

Thus $s_{ijk} = 1$ if cases i and j both have attribute k "present" or 0 otherwise, and the weight w_{ijk} causes negative matches to be ignored. If negative matches are not to be ignored, the variable should be specified as a nominal variable (see below). If all your variables are binary, then Gower's General Similarity Coefficient is equivalent to Jaccard's Similarity Coefficient A/(A+B+C) since the negative matches scored in cell D are ignored.

Nominal Variables

The value of s_{ijk} for nominal variables is 1 if $x_{ik} = x_{jk}$, or 0 if $x_{ik} \neq x_{jk}$. Thus $s_{ijk} = 1$ if cases i and j have the same "state" for attribute k, or 0 if they have different "states", and $w_{ijk} = 1$ if both cases have observed states for attribute k.

The Gower's similarity matrix was generated and converted to a distance matrix, then subjected to group average clustering. The resultant dendrogram is shown in Figure 8.3. The cut point defines six distinct groups. These are displayed in Plates 8.1 through 8.6 and the type statistics are given in Table 8.2. The reader is referred to the following web site to match these types with named projectile points: http://www.projectilepoints.net/Search/Colorado_Search.html

Types 1 and 2 are stemmed points (Plates 8.1 and 8.2). Type 1 likely functioned as arrow or atlatl points with an average neck width of 0.8087cm. Type 2 likely functioned solely as atlatl points with an average neck width of 1.3633cm and an average length of 5.0792cm.

Types 3 and 4 are small, side-notched arrow points (Plates 8.3 and 8.4). They are metrically identical and were lumped together with the earlier attempts of clustering using only the metric variables. They have been differentiated in the current analysis with the addition on the basal notch binary variable. Type 4 thus conforms to the nominal definition of "Desert side-notched" points.

Types 5 and 6 are corner notched points (Plates 8.5 and 8.6). Type 5 is in the range of large arrow points with an average length of 2.6238cm and an average neck width of 0.7954. Type 6 likely represents atlatl points with an average neck width of 1.3000cm and average length of 3.4221cm.

Figure 8.4. Squared Euclidean and Ward's Minimum Variance Clustering of 5 Metric Variables

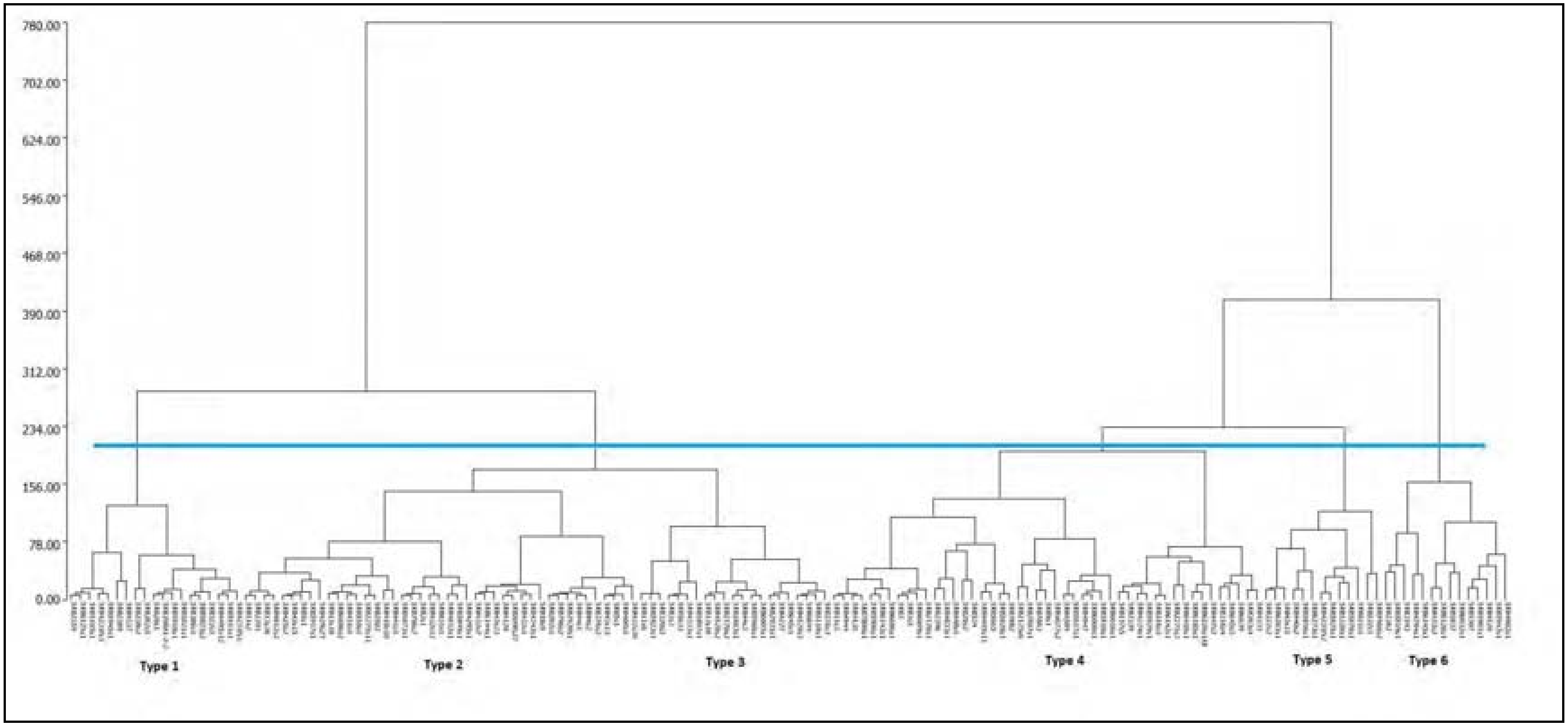


Figure 8.5. Gower's Coefficient and Group Average Clustering

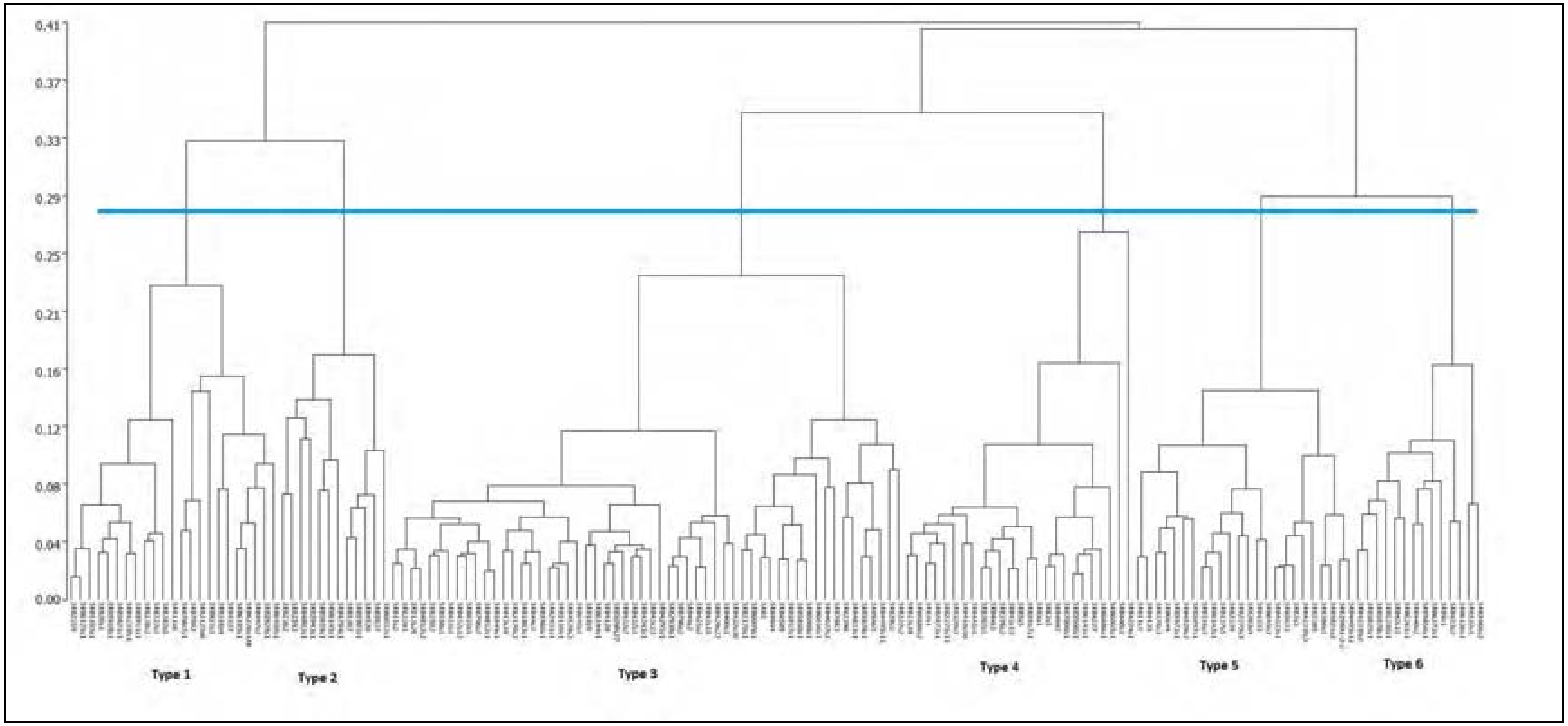


Plate 8.1. Type 1 projectile points.

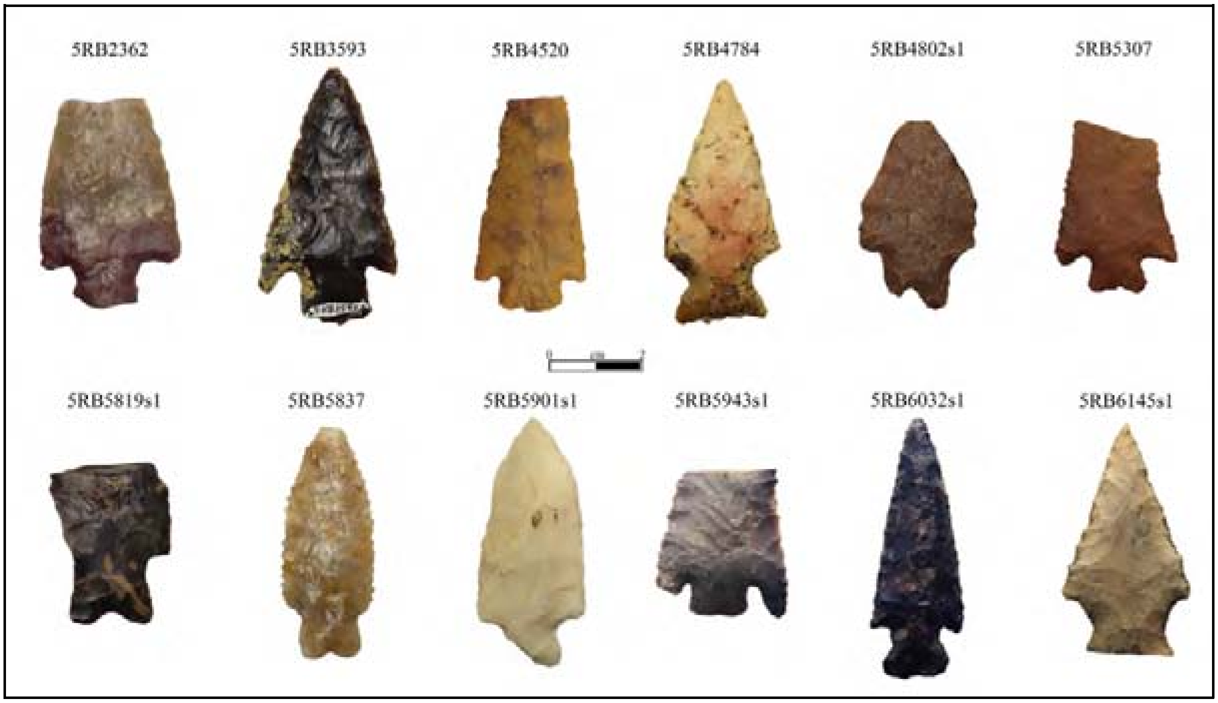


Plate 8.2. Type 2 projectile points.

Plate 8.3. Type 3 projectile points.

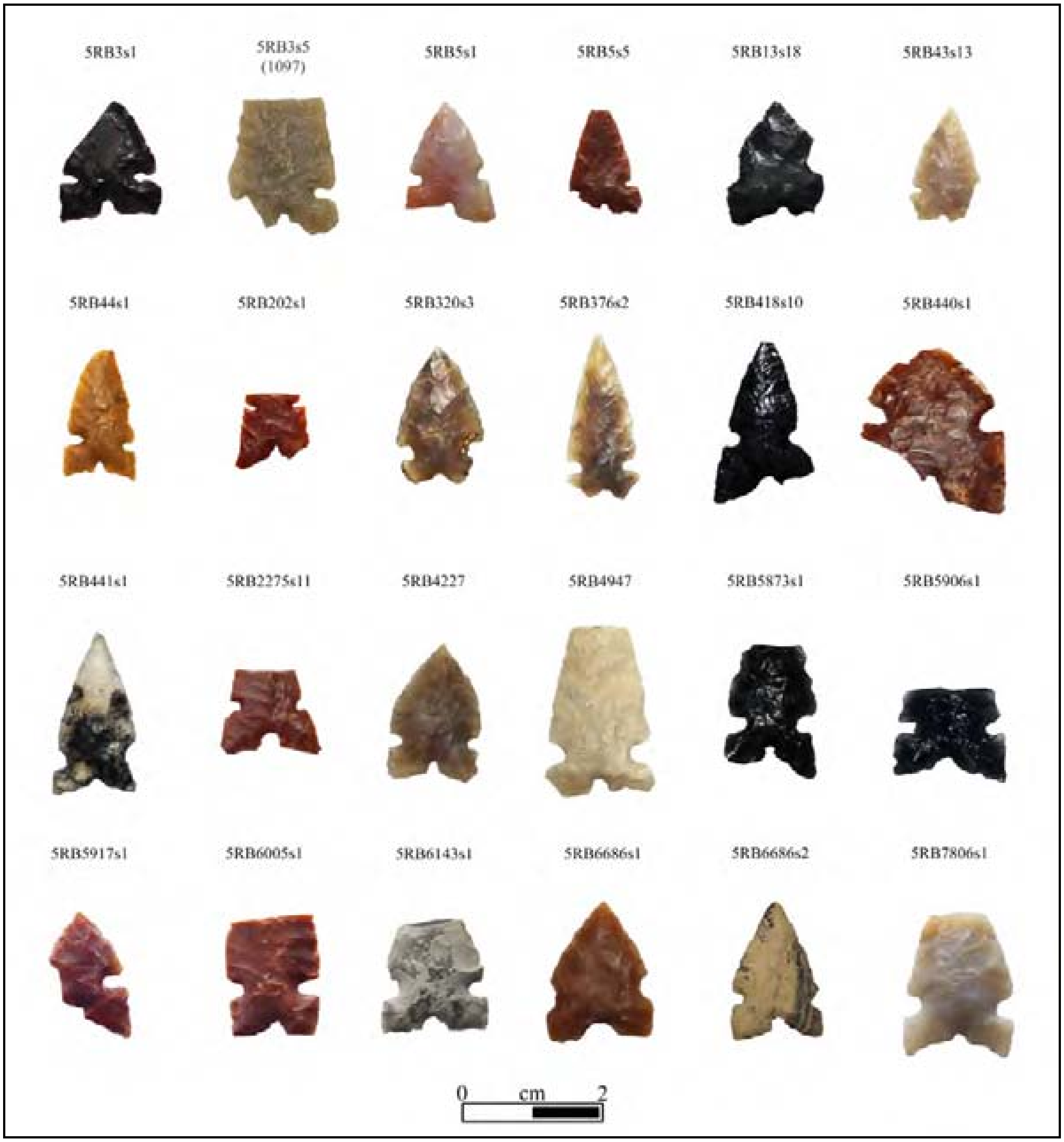


Plate 8.4. Type 4 projectile points.

Plate 8.5. Type 5 projectile points.

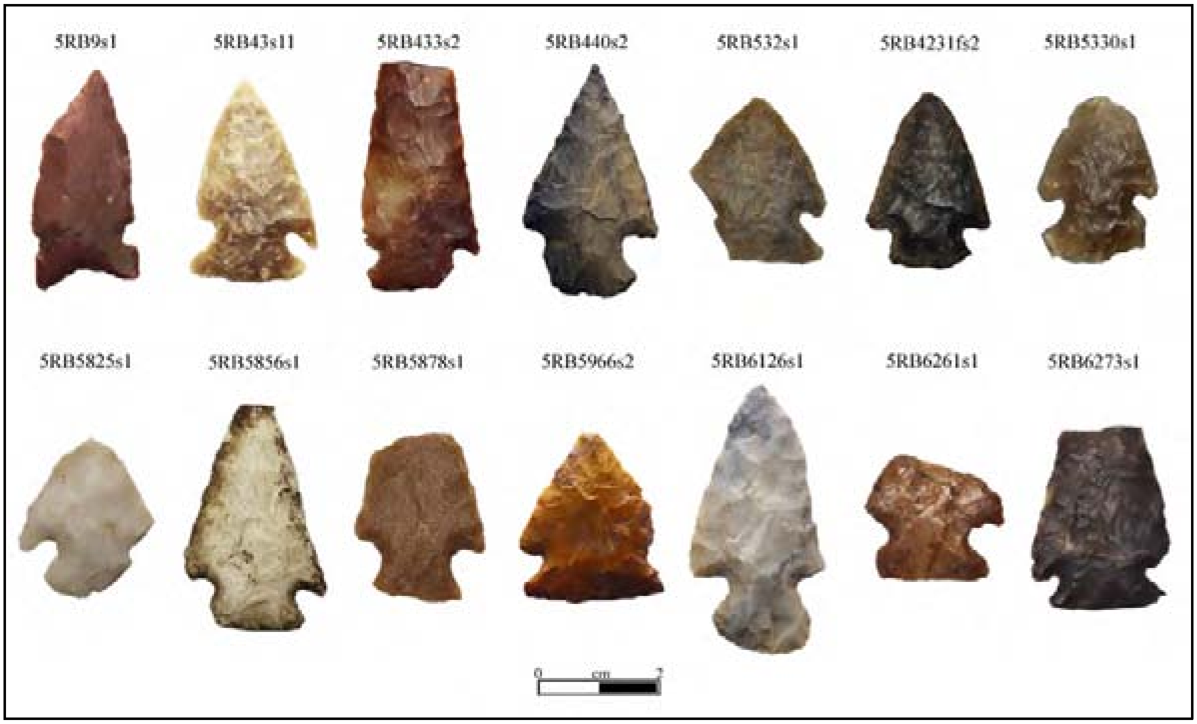


Plate 8.6. Type 6 projectile points.

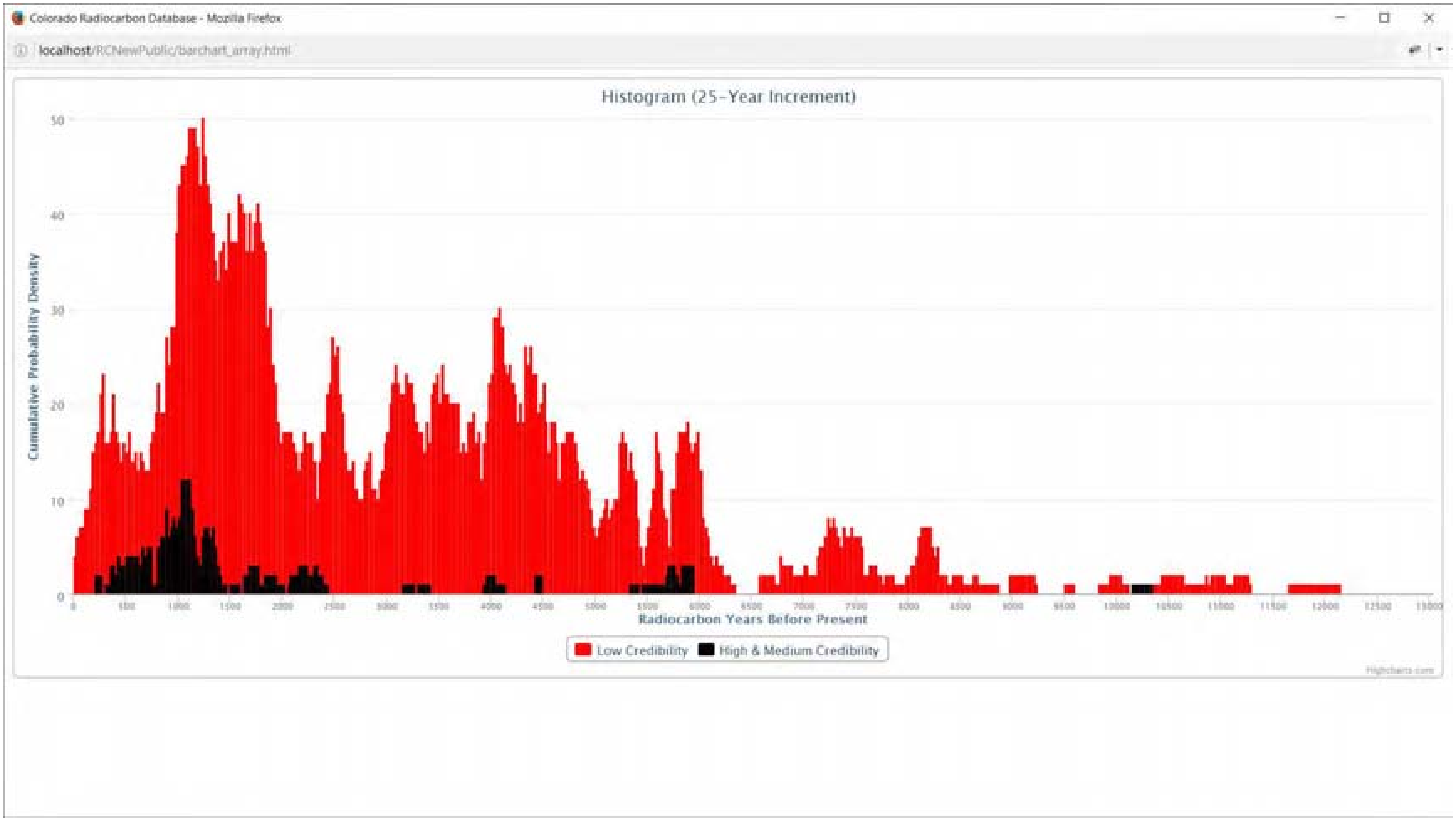
Table 8.2. Type Descriptive Statistics

Type	Mean	Std. Dev.
1		
Basal Notch	0.0000	0.0000
Base Width	0.9330	0.3701
Length	2.7391	0.4961
Mid-Blade Width	1.1165	0.2824
Neck Width	0.8087	0.3065
Notch Type	1.0000	0.0000
Tang Width	1.5943	0.4056
2		
Basal Notch	0.0000	0.0000
Base Width	1.5017	0.2690
Length	5.0792	0.3793
Mid-Blade Width	1.9808	0.2729
Neck Width	1.3633	0.2046
Notch Type	1.0000	0.0000
Tang Width	2.5775	0.3951
3		
Basal Notch	0.0000	0.0000
Base Width	1.3939	0.2257
Length	2.2704	0.5096
Mid-Blade Width	0.9841	0.2264
Neck Width	0.8509	0.2382
Notch Type	3.0000	0.0000
Tang Width	1.3529	0.2687
4		
Basal Notch	1.0000	0.0000
Base Width	1.3858	0.2497
Length	2.1121	0.4038
Mid-Blade Width	0.9100	0.2039
Neck Width	0.8592	0.2077
Notch Type	3.0000	0.0000
Tang Width	1.2892	0.2760

Type	Mean	Std. Dev.
5		
Basal Notch	0.0000	0.0000
Base Width	1.0954	0.2553
Length	2.6238	0.4340
Mid-Blade Width	1.1546	0.1952
Neck Width	0.7954	0.1898
Notch Type	2.0000	0.0000
Tang Width	1.5408	0.2627
6		
Basal Notch	0.0000	0.0000
Base Width	1.7700	0.2919
Length	3.4221	0.6476
Mid-Blade Width	1.5207	0.1436
Neck Width	1.3000	0.1649
Notch Type	2.0000	0.0000
Tang Width	2.2014	0.1849

Temporally, the bulk of the collection spans Middle Archaic through Late Prehistoric with a small probability of Paleoindian and Early Archaic. This assessment conforms well with the radiocarbon data for northwestern Colorado (Figure 8.6, www.dargnet.org/net/RCPublic/).

Figure 8.6. Radiocarbon Histogram of Northwestern Colorado



8.3 ARCHAEOLOGICAL LITHIC MATERIALS

A relatively low artifact count for prehistoric artifacts occurs on sites in the Piceance Basin region, compared to many other regions of western Colorado. This is consistent with the University of Denver inventory (Olson et. al. 1975), and for an inventory of an adjacent federal sodium lease area (Conner and Langdon 1980). Another factor in the low density of artifacts and possibly to the short-term occupation of the Piceance Basin may have been the low occurrence of a primary resource: toolstone. The rarity of cryptocrystalline materials in the Uinta deposits underlying the study area is well documented and likely accounts for the low number of artifacts observed (Jennings 1975:14). An analysis of those artifacts indicates that it was necessary for prehistoric peoples to import raw materials or to transport already-fashioned tools to the study area. Tools of locally available materials, such as petrified wood and quartzite, constitute only a small percentage of the total artifact assemblage, while about 95 percent of the total is of chert and chalcedony.

Tool stone types are an important consideration in the movement and possible trade relationships of prehistoric people, and they can also illuminate some facets of prehistoric preference. The low occurrence of cryptocrystalline materials in the Green River and Uinta formation deposits underlying the study area is well documented and likely accounts for the low number of artifacts observed on sites in the NW Piceance. Obsidian is the one type that hints at long-distance transport, probably through trade. Sources identified during the 2013 Shell project area north of Ryan Gulch found obsidian was recovered or traded from: Malad, southeast portion of Idaho, Oneida County; Black Rock Desert area, southwest Utah, Millard County; and, Wild Horse Canyon, southwest Utah, Beaver County (Conner et al 2013:240). The other materials can all be considered regional acquisitions and include varieties of opalitic chert and orthoquartzite. Importantly, many resistant rock types, cherts and orthoquartzites included, are often available from river and pediment gravel much closer than the closest outcrop of chert-bearing rock.

The terminology used here has its basis in the geologic literature and is fully elucidated in Miller (1991); however, other descriptive names are applied to these rocks. For instance, translucent opalitic chert is commonly called chalcedony. Chalcedony is a crypto-crystalline rock, indicating a concealed or hidden crystal habit (albeit viewable in cross-polarizing light), and forms in hydrothermal or geothermal settings while opalitic chert forms in surface environments, usually in water during fluctuating pH conditions. Opal, by definition, contains a small amount of water and has a Moh's hardness in the range of 6.5 as opposed to 7.0 for true chalcedony. It should be noted, however, that after opalitic chert is deeply buried and affected by geothermal heating, vugs or fractures in the rock are usually filled with chalcedony.

Opalitic chert is variegated and translucent to some degree, even in thick samples. Miocene opalitic chert ranges in color from almost clear to milky gray to white (often referred to as chalcedony), and brown to red; formed in shallow, ephemeral lakes; and almost always contains ostracodes (clam shrimp) and stromatolitic (i.e. algal) banding. "Local" sources include Troublesome and Browns Park formations (Miocene), east and north, respectively, from the Steamboat Mesa area, but a useful secondary source exists in nearby river gravel, in the present bed or in terraces. Other sources are at some distance, but not insurmountable. One of those sources especially for opalitic chert is the northern Uncompahgre Plateau. The Burro Canyon Formation (Jurassic-Cretaceous) produces cherts of white to cream, yellow, and pink to red in color, and they co-occur or inter-bed with orthoquartzite and porcellanite. In fact, there are numerous sources of this material in the Uncompahgre Uplift.

Other names are commonly applied to opalitic chert types. “Pumpkin” chert, an orange-to-red chert with manganese dendrites is usually derived from Mississippian, Pennsylvanian and Permian rocks. The local type is imported from quarries in the Madison Formation (Mississippian) located in the Sand Wash Basin. It should be noted however, that this material is variable in color and ranges from translucent white, gray, brown, black and orange to opaque brown, black, orange and red. This pumpkin chert and obsidian are often found together on Numic sites. Similar in aspects to the pumpkin chert, “pigeon blood” chert is white or clear opalitic chert with blebs of hematite and probably ferrihydrite and is formed in karst in Paleozoic limestones, but also in Miocene playa lakes. The karst limestones of the Leadville Formation (Mississippian) are host to a brown to gray chert found south of Eagle, Colorado.

The name “root beer” chert is often applied to any dark brown chert formed in terrestrial environments in perennial and ephemeral lakes or, less commonly, during subaerial erosion of limestone over hundreds of millions of years. A type regionally observed has been identified in quarries found in Sand Wash Basin. Belden Formation (Pennsylvanian) chert is one such root beer colored material that likely formed during subaerial erosion of limestone on a karst surface. “Jasper” is applied to any red, orange or yellow chert, but is more specifically spherulitic felsite which originates in rhyolite source rocks such as those found on the Flat Tops and Grand Mesa.

Banded opalitic chert from the Bridger Formation (Eocene) is referred to as “tiger” chert and was formed on lake beds of the Green River Basin. The material is usually dark brown or black with tan banding, and inclusive invertebrates, especially ostracodes, are commonly replaced by light blue opalitic chert or chalcedony. The banding represents lake varves -- alternating opalitic chert and porcellanite -- representing clastic deposition during monsoons (porcellanite) and silica precipitation in the dry season during deposition. The Phosphoria Formation (Permian) located in Northern Utah and Wyoming, is host to an opaque, purple colored chert that patinates to a discernable lavender color.

Orthoquartzite and porcellanite are silica cemented clastic rocks, the former sandstone and the latter mudstone (i.e., siltstone or claystone). Porcellanite is commonly, however not exclusively, associated with burning coal seams. Mesozoic clastic rocks are identifiable by mineral composition which is almost exclusively quartz and black chert grains (salt and pepper characteristics). Many of these orthoquartzites exhibit authigenic chalcedony filling interstices and voids, and quartz grains and silica cement have been altered to high refractive quartz by a combination of heat and pressure in diagenesis.

Sucrosic is another term applied to these rocks, describing reflected light from facets on fractured quartz and other mineral grains. Burro Canyon Formation (Jurassic-Cretaceous) orthoquartzite is variegated, ranging from tan to cream to red and green. Also, the Burro Canyon Formation's green porcellanite was used as tool stone in many areas. Dakota Formation (Cretaceous) orthoquartzite tends to be highly refractive and exhibits the aforementioned salt and pepper characteristics of Mesozoic clastic rocks. Cloverly Formation (Cretaceous) is chiefly identified by quartz overgrowths on clastic grains and even colors, ranging from gray to tan to red to purple while orthoquartzite from the Green River Formation is commonly gray, medium to fine grained and exhibits lower refraction qualities. This lithic material is also known to occur in the Sand Wash Basin. Morrison Formation (Jurassic) porcellanite contains fossil roots and rhizomes, and fucoids (worm burrows) associated to a fossil soil, and mottling related to exsolution of iron oxy-hydroxides.

Metcalf and Reed (eds, 2011:134) report three main lithic raw material types occurred in sites in their project areas and are considered local to the Colorado portion of the project area. These included: "Bridger" or "Banta Ridge" chert found in the Bridger Formation, with major outcrops in the Sand Wash Basin as well as in sources in northeastern Utah and southern Wyoming; "Pumpkin" chert derived from the Morgan and Madison Formations, with major outcrops on Cross and Juniper Mountains; and, a quartzite from the Uinta Mountain Group, a formation also with outcrops on Cross and Juniper Mountains. Notably, the Bridger chert exhibited its highest occurrence in the Early Archaic and Late Prehistoric occupations.

8.4 DIAGNOSTIC CERAMICS

Diagnostic ceramics were found in the curated materials for the Formative and Late Prehistoric (Early Numic) periods. General color and design associations were made but without careful temper evaluations, the following type identifications are tentative. The Formative types, as expected, appear to be mostly representative of the Fremont Culture. They include a black on gray sherd found at 5RB451 whose banding design is comparable to the Snake Valley type. An applique type called Great Salt Lake Gray was recovered from 5RB2624, where a black on red type that may be Deadmans was also recovered. A neck banded sherd found at 5RB535 may be a Manco Corrugated ware (Anasazi), but that is very tentative (Plate 8.7). The Fremont painted wares generally date between AD 900 and 1200.

Surprisingly, three sites (5RB410, 5RB425 and 5RB429; Plate 8.8) contained ceramic sherds exhibiting cord roughing and are herein associated with the Avonlea Culture, which has only recently been found in west-central Colorado (Conner et al. 2015). The ceramics are identified as Ethridge ware or Ethridge Cord Roughened ware that Meyer and Walde place in the Upper Kill phase of the Avonlea (2009:69). Also, this type is very similar to pottery dated AD 660-880 (1253±36 BP) recovered during excavations at Franktown Cave (Gilmore 2005:28). As early as 1961, researchers have proposed an

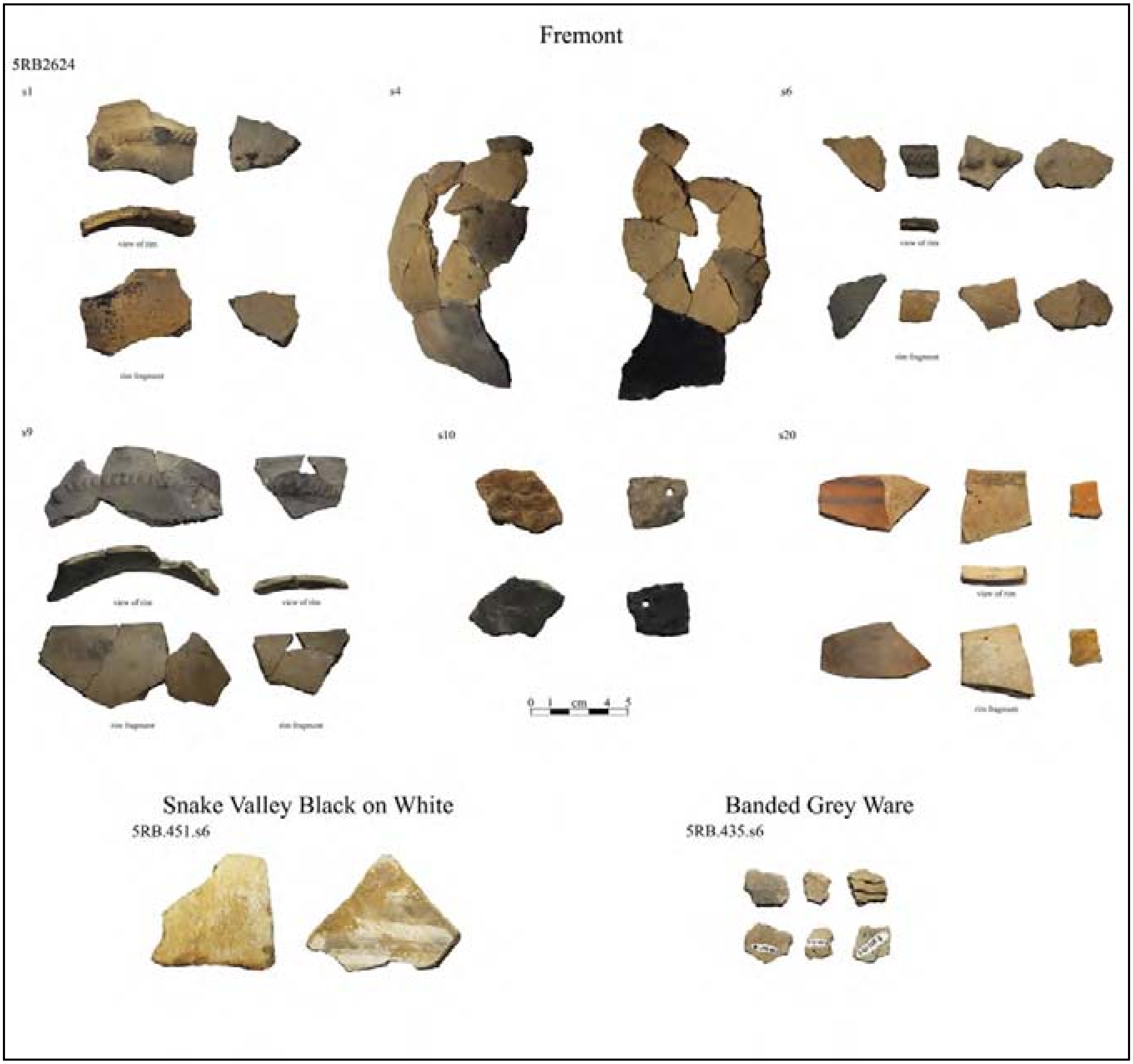


Plate 8.7. Formative Era ceramic types recovered from sites in the NW Piceance.

association between diagnostic projectile points and Athabaskan migrations from the north. However, ceramic types suggest Eastern Woodland influence from Siouan speakers in central Minnesota as early as 3000 radiocarbon years ago, and continuities in ceramic forms of Ethridge Ware suggest Avonlea may have been ancestral to present-day Blackfoot peoples. Avonlea horizon components form a number of regional phases that demonstrate relationships with different external groups, and local adaptations suggest long-term residency rather than migration (Walde 2006:185). There are a number of hypotheses about what happened to the Avonlea people. One hypothesis sees them having migrated south where they would later emerge as the Navajo and Apache people. Another sees them as staying on the Northern Plains where they contributed to the Old Woman's phase, which is associated with the North Piegan, Blood, and Gros Ventre. Some feel that Avonlea may have contributed to the Tobacco Plains phase of the Kootenay Valley of the Rocky Mountains. There is also speculation that they were involved in the formation of the village cultures of the Middle Missouri tradition.

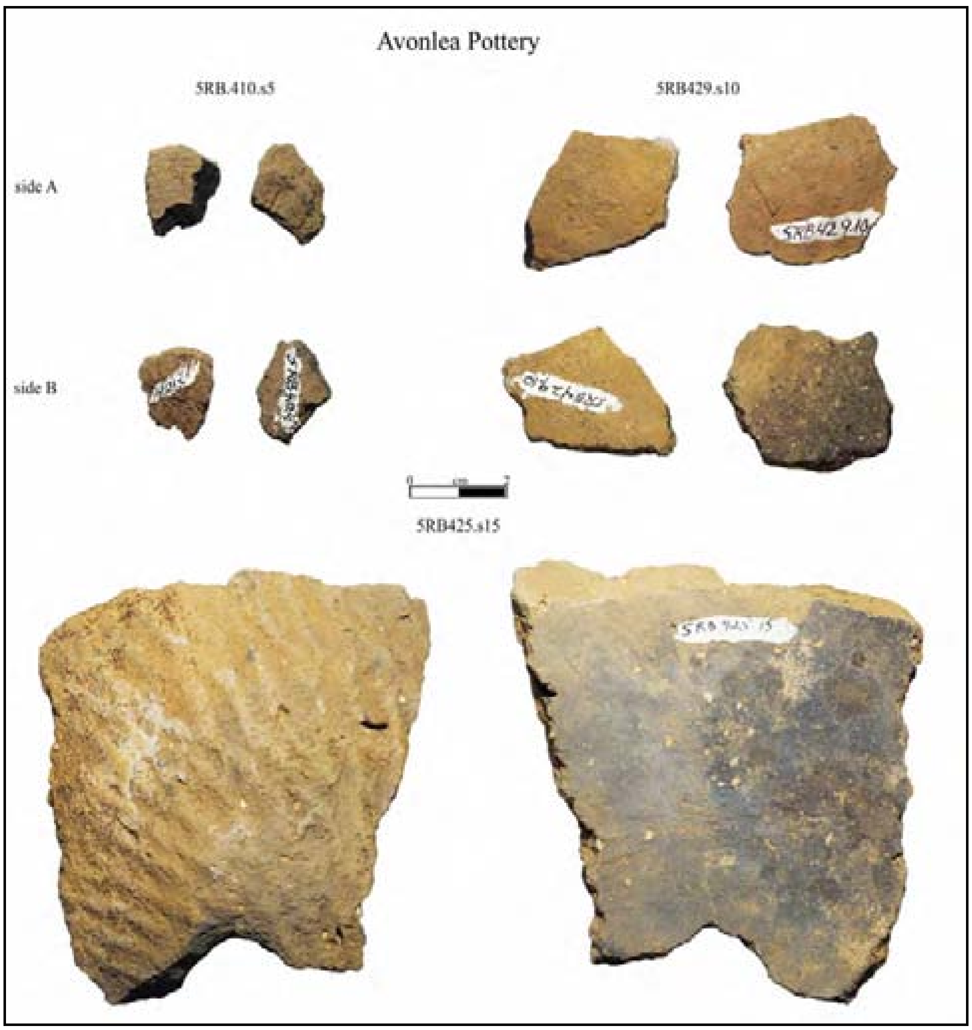


Plate 8.8. Avonlea ceramics recovered from three sites in the NW Piceance Basin.

Not surprisingly, Uncompahgre Brown Ware, the primary ceramic type of the region's Late Prehistoric (Early Numic), has been recovered from three sites (5RB319, 5RB411, and 5RB418) in the NW Piceance area (Plate 8.9). Jars are the main type of vessel and color variation is the result of poorly controlled and variable firing atmospheres, resulting in considerable variation in surface color and friable fracture characteristics. These jars characteristically have slightly flaring rims, constricted necks, wide and low shoulders, and somewhat conical, pointed bases. Exterior surfaces are light brown to reddish brown or grey in color – cores are slightly darker. Fingernail impressions are often present on the exterior surfaces. Material used for temper is variable and appears to reflect availability as well as the suitability of the tempering agents. Post ca. AD 1350 marks the appearance of Uncompahgre Brown Ware ceramics in the region. Though once thought to date back into the Formative Period, luminescence dates on sherds from sites within the BLM-GJFO and adjacent regions indicate the appearance of Uncompahgre Brown Ware generally postdates that time [5GF620, AD 1450 - 1528; 5RB2929, AD 1470 - 1530; 5ME4970, AD 1508 - 1644; and 5RB144, AD 1510 - 1590] (Conner et al. 2011b:5-53, 54). Reed et al. (2001:41-9) provide additional luminescence dates that generally support this observation, though an early date of AD 1300 cannot be ruled out.

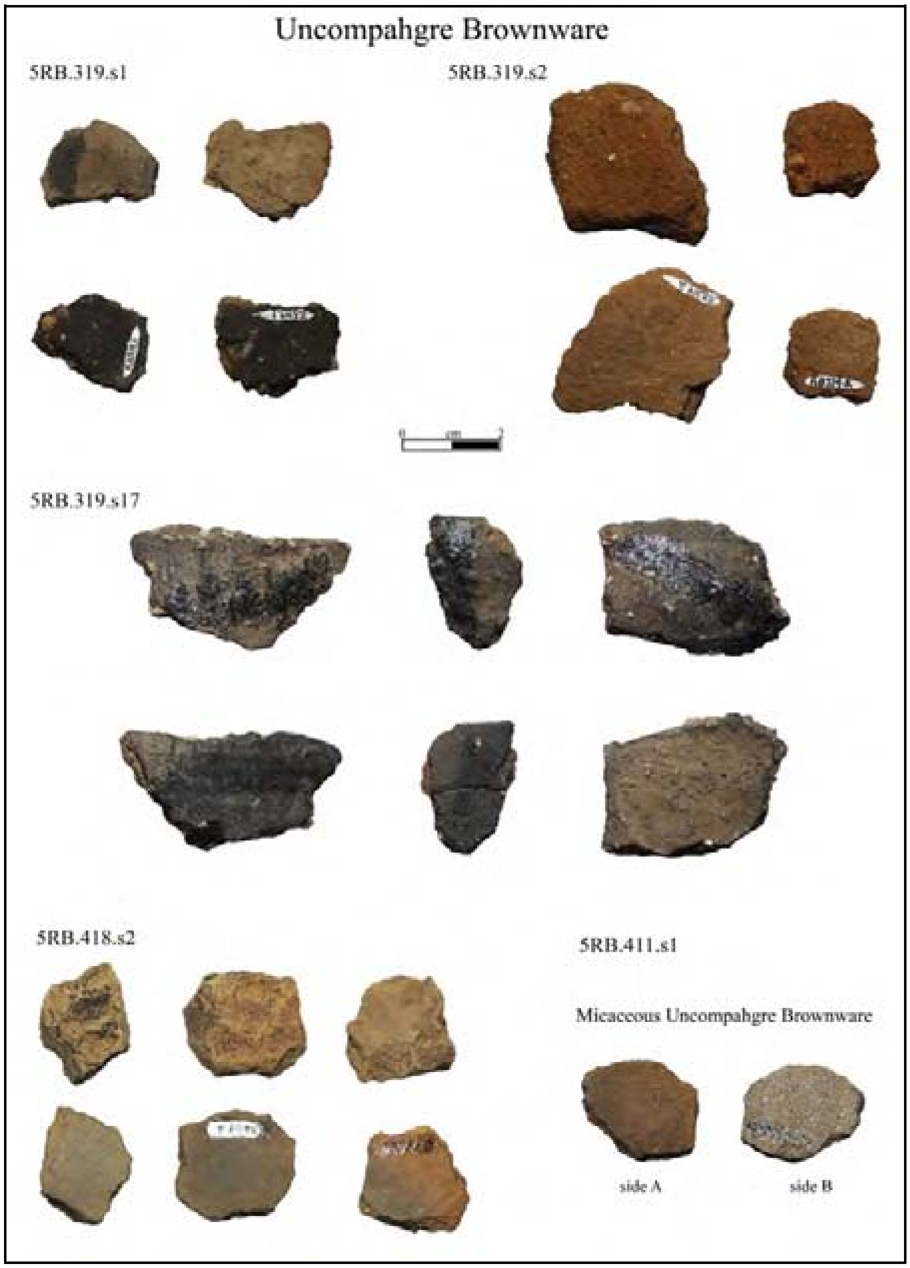


Plate 8.9. Uncompahgre Brown Ware pottery recovered from sites in the NW Piceance.

8.5 Archaeological Visibility

Archaeological visibility is a major concern in documenting and evaluating cultural resources. Most of the diagnostic artifacts recovered from the surface are from aeolian deposits or in the pinyon-juniper forest are Late Archaic or younger, generally less than about 3000 years old. A major factor in exposure is deflation which can easily strip away the relatively unweathered post-3000 year old deposits and leave artifacts on the deflated surface. Deflation in the middle to late 20th Century (exacerbated by development and grazing) has exposed the deposits, and probably older cultural deposits, too, but non-diagnostic, utilitarian artifacts could represent almost any period in the past. Another possible reason for higher frequency of sites after 3000 years ago is a hypothesized increase in aboriginal population during the period, but visibility of older cultural components is a problem and could also explain the disparity.

The fact remains that deposits older than about 3000 years old simply do not have good surface exposure because of deposition since. Aeolian deposits older than 3000 years ago are exposed in rill cuts, at the edge of sharp topographic breaks, or in disturbances caused by construction. Over broad areas in the surrounding areas, the sage-steppe is underlain by over a meter of aeolian sheet deposits, and the entire sequence of aeolian deposits is generally present. Surface exposure of older deposits over the surface is otherwise restricted to small deflated areas, and then only the upper contact of the early to middle Holocene deposits are usually exposed.

The problem is much the same in alluvial deposits, and perhaps worse. Besides being more heavily vegetated, which significantly reduces ground visibility, relatively recent sheet wash and loess deposition cover most older deposits on the flood plains of the major trunk streams. The only view of the older deposits is provided by the arroyo incisions, and in the major trunk drainages, the view afforded by the incisions does not expose the entire alluvial sequence. The truncated view probably spans the last part of the early Archaic to the present.

Archaeological visibility extends to different levels that are not often considered. As in any area of scientific endeavor, discovery is limited by the known, the knowable and the unknowable, representing, respectively, the knowledge already accumulated (however imperfect), what can still be discovered, and what can never be known. Considering exploitation of the various food resources available in the area, many sites – locales where prehistoric activity took place – were almost invisible to begin with, or the evidence of their being was transitory at best. The distribution of durable artifacts on a landscape gives but a partial picture of prehistoric land use, one where activities requiring the use of stone tools were conducted. Other activities leave little evidence, or none that is preserved.

9.0 Rock Art

The friable rocks of the Piceance Basin do not lend themselves well to the execution of prehistoric rock art. However, two sites (5RB5848 and 5RB4146) occur within the bounds of the present study that indicate cultural affiliation and are of regional significance. Sally Cole, noted rock art specialist, has contributed the following introductory remarks concerning its importance in the archaeological record.

9.1 INTRODUCTION (Sally Cole)

Prehistoric rock art is interpreted as part of ancient communication systems wherein information was presented and exchanged on a variety of levels, group identities were reinforced, and places and events were integrated into the rituals and histories of peoples. This draws on the strength of rock art-it is fixed in place and imagery and the patterns of use can be studied in relation to sites, local communities, and the larger cultural landscape in which images were displayed and observed. To the extent that rock art was public – openly visible to passers-by (unless restricted by social conventions invisible to archaeology) – it may have communicated beyond momentary events, across cultural boundaries, and influenced the worldviews of future generations. The communication qualities have proven useful for archaeological research on a number of levels including: utilizing rock art as cultural and social markers; determining the presence and significance of socio-religious systems (Francis and Loendorf 2002; Geib and Fairley 1992; Hurst 1940–1942, 1948; Keyser 1984; Kidder and Guernsey 1919; Spangler 2004); evaluating socioeconomic patterns and organization (Matheny et al. 2004; Robins 1997); and addressing questions of cultural affiliation for site interpretation and under the Native American Graves Protection and Repatriation Act (Bernardini 2005; Powell et al. 1998).

For the purposes of archaeological study, petroglyphs and rock paintings (and a variety of material culture types) are organized by style. For rock art, stylistic categories are comprised of repetitive types of imagery (forms, techniques, colors, organization, and themes) found in regional and chronological contexts. Directly dated rock art is rare. The need for destructive sampling has limited use of the widely accepted oxygen plasma extraction technique for AMS-radiocarbon dating of organic materials in paint (Chaffee et al. 1994, Russ et al. 1990); techniques for direct dating of petroglyphs are uncertain (Beck et al. 1998; Dorn 1998).

Established style chronologies generally rely on relative dating techniques including continuous observations as to the patterns of weathering, element superimposition, and associations with dated material culture and settlement and subsistence practices at a range of sites. Comparisons with culturally distinctive material culture such as pottery, figurines, and tools offer supportive data. More than a century of research on the Colorado Plateau and in the southern Rocky Mountains has provided a chronological framework for prehistoric rock art styles and related expressions tied to broad and more narrow cultural patterns in west central Colorado and the study area.

The earliest styles of rock art in west central Colorado and the study area are attributed to hunter-gatherers of the middle-to-late Archaic period, beginning 4000-3000 B.C. Early Archaic (even Paleoindian) petroglyphs cannot be ruled out with regard to examples on basalt, which resists surface weathering more than sandstone upon which the majority of rock art in the study area occurs. (This issue can be addressed by comprehensive survey and testing of sites associated with petroglyphs on basalt.) Late Archaic expressions [Barrier Canyon style] appear to have overlapped Formative times, beginning 1000-400 B.C. among Ancestral Pueblo (Anasazi)-Basketmaker II and approximately 1-200 A.D. among early Fremont populations on the Colorado Plateau (Charles and Cole 2006; Geib 1996; Spangler 2000). Interaction and social integration on various levels are likely over time, and group identities and their symbolic markers changed. The situation is well described by Berry and Berry (1986:319): Hunter-gatherers in symbiosis with farmers are not analyzable in the same terms as hunter-gatherers in isolation; hence for all intents and purposes, the Archaic came to a close in the Southwest with the introduction of sedentary village farming. It is expected that subtle and more obvious changes took place in rock art as a result of contact, and slight changes are probably not visible from a stylistic perspective, which is synthetic by nature.

9.2 SITE RECORDS – Two sites were revisited by this project.

Corral Gulch Rock Art Site (5RB5848) (As previously described by Grand River Institute):

> The site consists of a single rock art panel with six pecked figures, two scratched figures, radiating lines, parallel lines, and crossing lines. The figures all appear to be typical of the Fremont design motifs with broad shoulders gradually tapering into a narrow "body" with a relatively smaller head, both with and without horns. Figures 2 and 3 have been impacted by fracturing of the rock and pieces of the figures are no longer present. While the edges of the pecked figures show weathering, the panel is clearly visible and in relatively good condition. Figure 1 is a pecked anthropomorph with a round head and very broad shoulders tapering to a small torso. The figure measures 18 by 13cm. An insect nest was observed in the center of the head and is impacting the figure. Figure 2 is a pecked anthropomorph with what appears to be a horned head, and large broad shoulders tapering to a narrow torso. The figure measures 35 by 16cm. Rock fractures are present at the top and bottom of Figure 2. Figure 3 is a pecked anthropomorph with a small triangular-shaped head and a long neck attached to a circular body. The figure measures 10 by 5cm. The dim appearance and the presence of a crack in the rock face near the bottom of the figure suggest that the image has been impacted by weathering. Figure 4 is a pecked anthropomorph with a horned head and a very narrow neck connecting to a triangular shaped body. The figure measures 19 by 15cm. Figure 5 is a pecked anthropomorph with a horned head and long neck attached to a heart shaped body with a protruding "tail." The figure measures 22 by 33cm. The image has been impacted by modern vandalism of graffiti drawings with tar. Figure 6 is a pecked anthropomorph with a horned head that extends into sloping shoulders with a trapezoidal shaped torso. The figure measures 15 by 5cm. The image has been impacted by modern vandalism of a tar hand print. Figure 7 appears to be an avian figure scratched in detail with a head and neck attached to a triangular shaped body from which two legs and a tail protrudes. It resembles a Thunderbird-like figure and apparently represents a fairly

recent historic addition to the panel. The figure measures 8 by 5cm and has associated radiating lines.

The site actually contains two panels: Panel 1, a pecked panel of six figures with a second component of Biographic Style scratch art; and Panel 2, a scratch art panel located about 29m to the east.

The pecked rock art of Panel 1 is unusual and exceptional. Although the six pecked figures have been previously described as "carrot-men style," they also appear to represent bats – and possibly the Bat Clan of the Hopi (Figure 9.1). Notably, the Bat House, an ancient pueblo of the Hopi, is situated on the northwest side of Jeditoh Valley in northwest Arizona. It is called the Bat House because it was built, and formerly occupied by the Bat Clan (one of the Batlctn clans). The second panel is equally interesting. It has scratch art that depicts teepee-shaped elements; and importantly, an anthropomorph that reflects a belief in the supernatural powers of the Grizzly Bear and represents a warrior society (Figures 9.2 and 9.3).

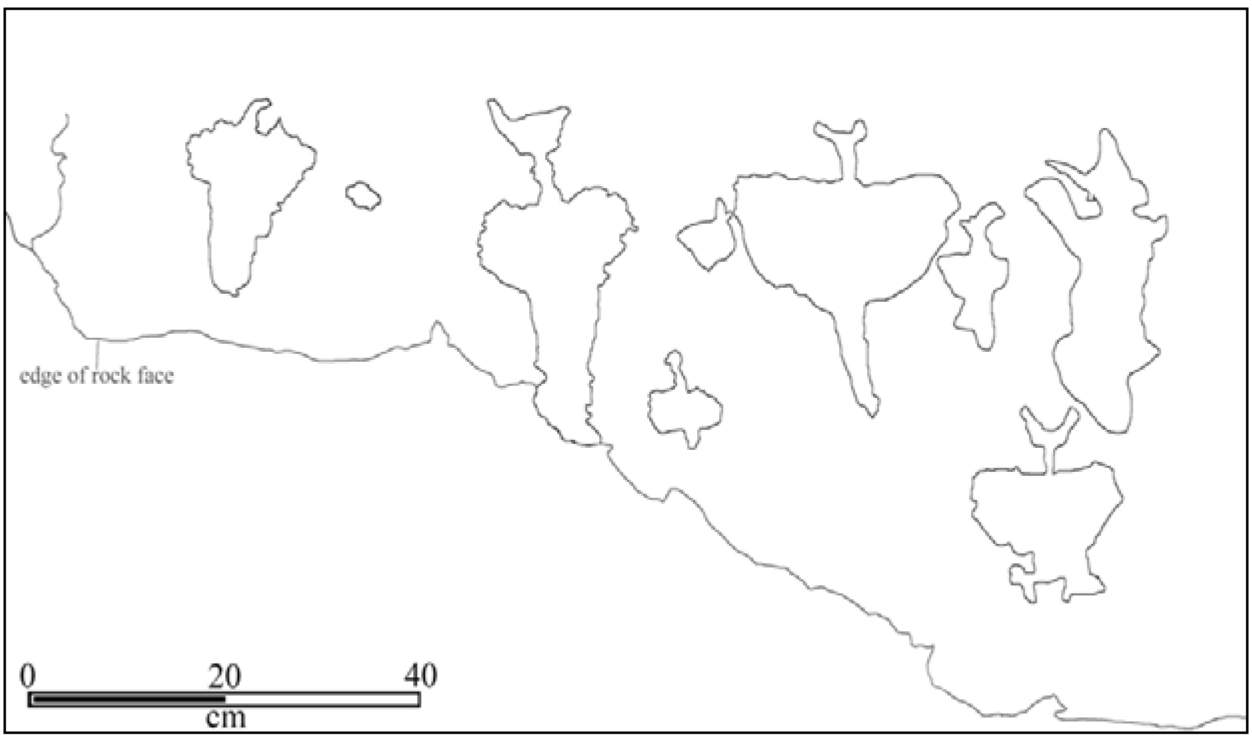


Figure 9.1. Outline drawing of the pecked images of Panel 1, 5RB5848, some of which appear to be bat-like.

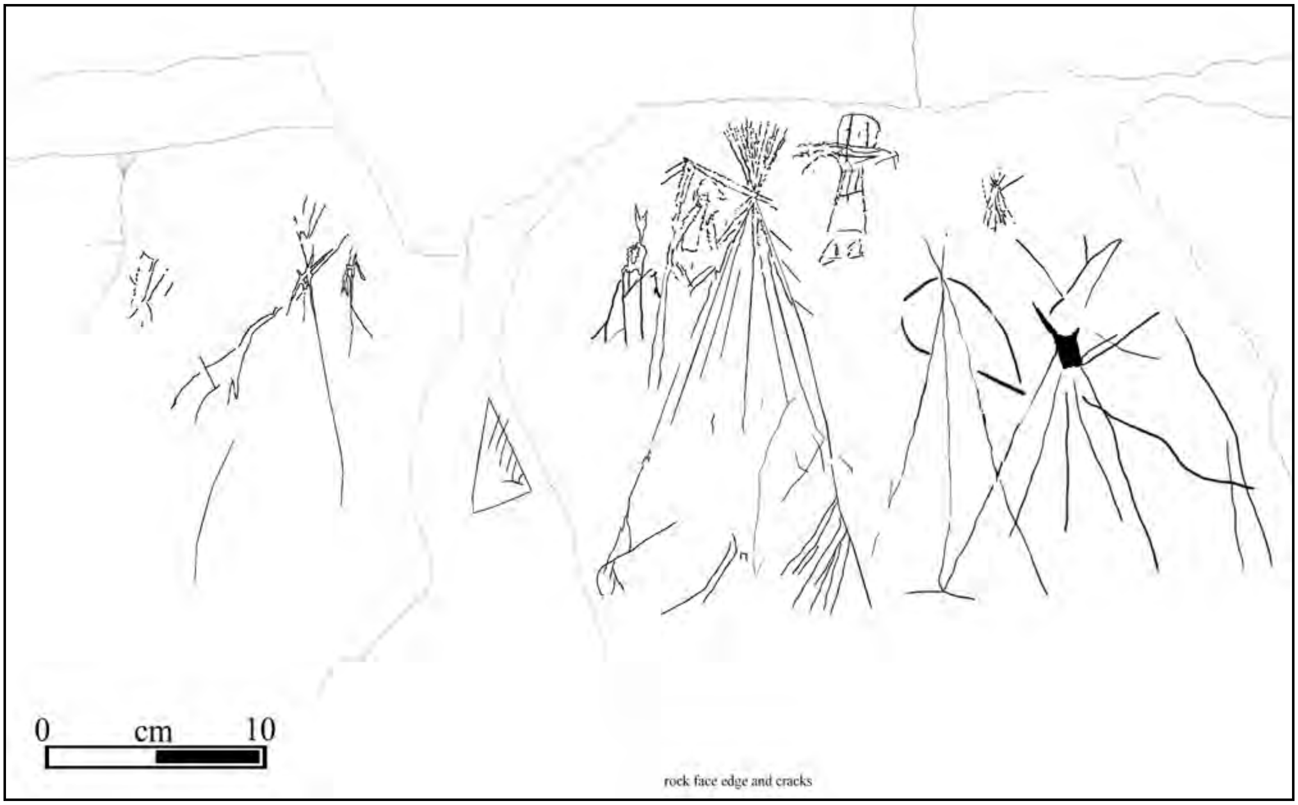


Figure 9.2. Panel 2, 5RB5848, which contains scratch art of teepees and a Grizzly Bear Warrior Society anthropomorphic figure (right of large teepee).

James D. Keyser and Michael A Klassen in their book *Plains Indian Rock Art* (2001:124-125) describe the warrior society called Bear Dreamer, "a fraternity for those warriors brave enough to have obtained bear power in their visions." The Blackfeet are mentioned by Keyser and Klassen (ibid.) as conducting a two week ritual marked by strenuous ordeals prior to a transfer of a bear knife bundle.
The authors go on to describe the society:

"Other men were bear shamans, known for their abilities to cure disease with bear medicine. ...Through visions, Bear Dreamers became the bear's human persona. Among many groups, they were the mightiest warriors and much feared by all enemies; they took a vow to charge straight toward the enemy and never retreat. Grizzly bear warriors painted tear streaks extending down from their eyes to mimic the glandular secretions that often mark a grizzly's face. Dressed and painted as bears, these warriors rushed directly into battle brandishing only their shield and a bear knife – the handle made from a grizzly bear's jawbone – and snorting or growling like their supernatural helper. ...Among many groups, these shamans were thought to transform themselves

Figure 9.3. Grizzly Bear warrior figure from Panel 2.

into bears to cure illness or conduct raids on enemies, and when a bear attacked or killed a person, the obvious conclusion was that the bear was, in fact, a transformed shaman from an enemy group."

The anthropomorph exhibits the tear streaks of the Grizzly Bear warriors. Also, the anthropomorph's head in Panel 2 is similarly depicted as one painted around the entrance of Bear Mask Cave (Figure 9.4). Keyser and Klassan speculate that the cave was used "in shaman rituals to conjure up the power of the bear" (ibid.:175).

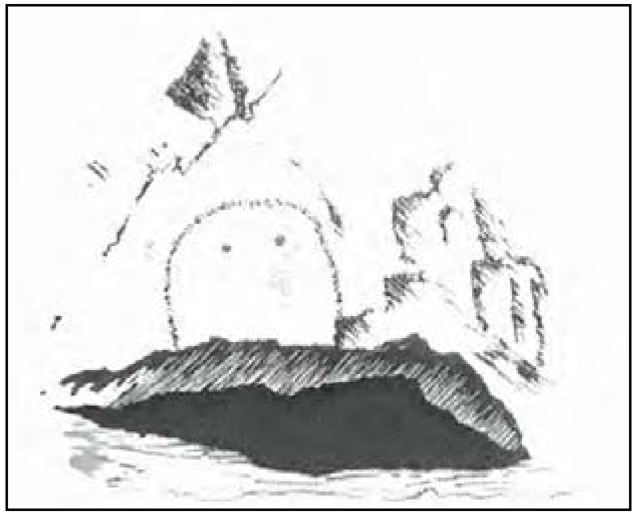


Figure 9.4. Painted bear head at the mouth of Bear Mask Cave (Figure 11.17 in Keyser and Klassan 2001:175).

Those authors go on to say that bear symbolism is most common in the Foothills Abstract tradition which is directly comparable to Sally Cole's Uncompahgre Style where bear tracks and images are common motifs. Rock art evidence of Bear shaman in the Ute culture is evident in the early Historic Ute panel of site 5ME232, and bear motifs are seen in the Shavano Valley panel (5MN5) that date to the late Historic Ute period (Cole 1987:230-231).

In the case of this panel, the Bear Shaman and teepee motifs in the scratch rock art in the Corral Gulch site are typical of Northwest Plains style. Keyser has associated similar rock art in Northwest Colorado with the Eastern Shoshone occupation of the region and assigns relative dates of AD 1300-1700 (Keyser 1975, 1977, 1987).

Colorow Cave (5RB4146) Rock Art Panels (As described in the site form completed by SWCA Environmental Associates):

"The Colorow Caves site (5RB4146) contains rock art that is well preserved, in good condition, and characterizes quality examples of regional rock art styles. The rock art at Colorow Caves covers a long, continuous stretch of time. Occupants in, and travelers through, this region utilized naturally exposed sandstone cliffs to create their designs and pictographs. Of special note are the Barrier Canyon Style pictographs and Fremont petroglyphs, which are rare in the project area, since most of these types of rock art styles are found in the Douglas Creek and Canyon Pintado Historical District, located approximately 35 miles to the west."

"The Barrier Canyon Style figures at the site are highly visible and not obstructed by vegetation or other topography. The panel is in a prominent location on the rock face, which is similar to other regional examples, an indication that it was meant to be viewed publically, as persons travelling the drainage would be able to see the rock art. Later peoples, most likely the Ute based on the Ute motifs on the same panel, would copy the Barrier Canyon images, possibly as an act of renewal or ritual (Cole 2004)."

"The Fremont rock art at the site is dominated by quadrupeds, most of which appear to be mountain sheep, except for two possible anthropomorphs noted on Panels 3 and 4, which cannot be stylistically typed as a specific Formative type. Because of the similarity of mountain sheep rock art in both the Uinta and Classic Vernal Styles which are common for northwestern Colorado, these panels are classified as general Fremont rock art."

The several panels depicting Barrier Canyon and Fremont styles are not uncommon in the region. Two images that represent those temporal/cultural periods are in shown in Plates 9.1 and 9.2.

Plate 9.1. Barrier Canyon style rock art figure found on Panel 2. Photo is enhanced using D-stretch.

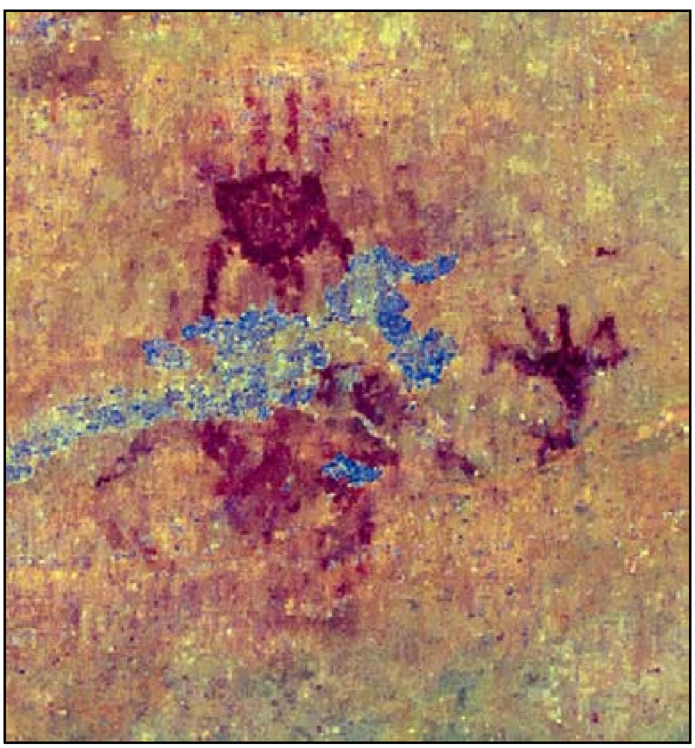


Plate 9.2. Fremont style rock art "waving hand" figure found on Panel 1. Element is similar to the waving hand glyph in Douglas Creek. Photo is enhanced using D-stretch.

Significantly, Abstract Groove Art is present representing the Basketmaker or early Anasazi period (Plate 9.3). Cole reports that "abstract groove art occurs in shallow rock shelters along cliffs and beneath boulders" in west-central Colorado (Cole 1990:53). She notes that some of those found in the Upper Dolores River Valley may have been made by Basketmaker people as part of a pattern established during the Archaic period. Additionally, similarly incised rock art was found in a clay-lined cist at North Shelter, a Basketmaker site in the La Plata Mountains near Durango (ibid.). The ground surfaces and grooves are comparable to those found on rock fall at site 5ME17922, a rockshelter located east of the Dolores River about 15 miles south of Gateway, Colorado (Conner et al. 2011b). There, maize cobs collected near the surface provided a conventional radiocarbon age of ca. AD 570 to 650 (Beta No. 290568), which confirms a Basketmaker III era occupation of that site.

Plate 9.3. Grooved line attributed to the Basketmaker, Anasazi Culture.

A Bighorn Sheep that is depicted on Panel 4 is of a "boat" form style (Plate 9.4) indicative of occupation by Eastern Shoshone, which Keyser dates ca. AD 1300-1700 (Keyser 1975, 1977, 1987). He calls this rock art "Shield Bearing Warrior Style, which comprises a constellation of associated motifs, including shield bearing warriors, V-necked humans, boat form animals, and vulvaforms...The result is an individualistic, highly stylized, static, well-executed art form that apparently functions in magico-religious context" (Keyser 1984:28). A second glyph on the same panel has a ghost-like figure that appears to have the same rounded head as other motifs representing the Grizzly Bear warrior society (Plate 9.5).

Plate 9.4. “Boat” form style bighorn sheep. Style is associated with the Eastern Shoshone, ca. AD 1300-1700.

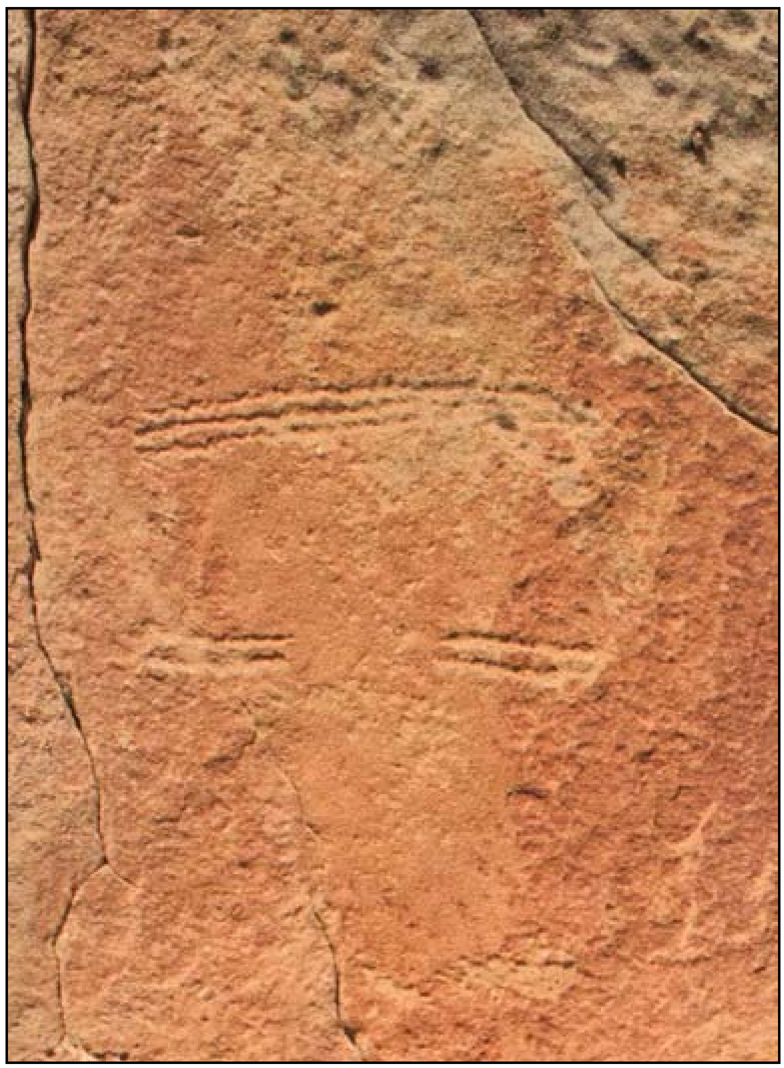


Plate 9.5. An anthropomorph glyph situated on Panel 4 that has characteristics of images of the Grizzly Bear warrior society. It is a bit deteriorated, but it has a rounded head, with holes for the eyes and mouth. Bands below the head indicate the bottom of the mask, and the two sets of lines near the center represent the clawed hands of the costume. This style is associated with the Eastern Shoshone, ca. AD 1300-1700.

10.0 Trails

Aboriginal Utes were highly mobile hunting and gathering people who migrated seasonally across diverse environments in small groups of 10 or 15 extended family members, keeping pace with plant and animal food resources. Their territory ranged from canyon-cut semi-desert shrublands, to mesa-top pinyon-juniper woodlands and dense aspen and pine forests, upward in elevation to the highest alpine peaks of the Rockies. Their material culture was for the most part lightweight, portable, and ephemeral, allowing for only what they could cache or carry (Duncan 2003; Smith 1974; Fowler and Fowler 1971; Fowler 2000; Burns 2004).

For the Utes, "movement was a basic value. That is, you could say they had a sacred mandate, passed on to them by tradition from deity, that they were supposed to do this.. And that was a pattern that wasn't just economic, but it was sacred. It had a sacred mandate to do it" (Goss 2003).

It might be said that life was movement for the Utes. One of the earliest written vocabularies for Ute language, recorded by John Wesley Powell in his 1868-1880 manuscripts, included the Northern Ute word pa-ant-ni, meaning to "walk about; to live" (Fowler and Fowler 1971:189; Knight 2007).

Throughout prehistory Utes traveled on foot. Later, some two to three hundred years ago, as they acquired horses from the Europeans, their mobility became significantly more expansive, their material culture more substantive, and their regional presence more pronounced (Lewis 1994; Blackhawk 2006). Nevertheless, in either mode, by foot or on horseback, Ute mobility relied on their knowledge and use of trails and trail networks across varied and often ruggedly complex terrains.

John Wesley Powell, one of the first anthropologists to record observations of aboriginal Ute lifeways, went so far as to remark that:

> It is curious to notice with what tenacity an Indian clings to a trail; a path which has been followed by his forefathers is sacred to him, and though in the constant and rapid erosion of the gulches and sides of the hills and mountains these trails have become very difficult yet he never abandons them when they can by any possibility be followed, even though a shorter and better road is very perceptible (Fowler and Fowler 1971:39).

Historic and prehistoric trails, therefore, to the extent they can be reliably identified, represent perhaps the clearest and most direct evidence of aboriginal mobility patterns we can find today.

The previously documented habitation sites and paths within and adjacent to Ryan Gulch demonstrate the importance of recording the linear resources in determining natural resource focus and potential intra-community relationships. Based on the location of a present day wetland and artesian well in the bottom of Ryan Gulch, a pond or even a small lake was present during the Little Ice Age near the fork in the road where the paved portion bears north to Corral Gulch and Yellow Creek. The recorded paths lead from Numic habitation sites on the ridges down to the projected pond local (Conner et al. 2013).

11.0 SUMMARY AND MANAGEMENT RECOMMENDATIONS

Based on the generally good condition of the landscape and the moderate impact affects of historic and modern EuroAmerican occupations and developments, many of the archaeological sites exhibit surface exposures and features in relatively good condition. Many of the sites with Ute wickiups and other wooden features remain intact, except for natural deterioration. The importance and value of the ethnographic landscape of the Northwest Piceance Creek Basin is found in the preservation of the archaeological sites and the relative good condition of the environment. This is due in part to the BLM's management policies -- and significantly, in the fact that the area has not become a recreation destination for anything other than hunting. Most of the impact agents are related to oil and gas development; the surface impact activities of which are intensely scrutinized by the BLM. However, impacts will likely parallel the inevitable increase in energy development, and recreation may also be a factor in future impacts.

The mitigation of direct and indirect effects of a large project or multiple small projects would be aided by consideration of cultural resources within this area as part of a landscape. Protecting these cultural landscapes through planning, treatment and management has become a pivotal concern for federal agencies (Birnbaum 1994).

Phase I is complete and this part of the study has contributed a crucial step: accurate and complete baseline data sets. In Phase 2, these findings will be shared and reviewed with BLM and Tribal representatives for the purposes of the selection of specific sites, site clusters, or culturally significant areas to be considered for protection, preservation, and/or actions that would mitigate existing or potential adverse effects. Accordingly, this landscape study, if employed to examine the overall nature and distribution of sites, trails, and utilized natural resources, will aid BLM managers working with Native Americans to identify: 1) Cultural resources of critical concern for preservation purposes under National Register (NRHP) and/or Area of Critical Environmental Concern (ACEC) designations; 2) Sites that lend themselves to scientific research; and, 3) Areas of little or no cultural concern.

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APPENDIX A: List of artifacts located in the Colorado State University and Museum of Western Colorado curation facilities with disc of photographs.

Site Number	Artifacts from NW Piceance Study Area in CSU and MWC curation facilities
5RB0003	*Combined with site 5RB1097* CSU: Projectile Point - 2 Desert side notched. Projectile Point - 1 unfinished obsidian side notched. Projectile Point - 1 corner notched. MWC: Projectile Point - s.1 Desert side notched, Green River formation. Projectile Point - s.2 Desert side notched, KD quartzite
5RB0005	CSU: Projectile Point - 2 Desert side notched
5RB0009	CSU: Projectile Point - Desert side notched
5RB0011	MWC: Projectile Point - s.2 Desert side notched. Projectile Point - s.3 Desert side notched. Projectile point - s.4 Pumpkin chert, base of Cottonwood Triangular. Projectile Point - s.6 Duncan, KB chert
5RB0012	CSU Knife - Ute leaf shaped
5RB0013	CSU Knife - Ute leaf shaped. Projectile Point - 3 Desert side notched. Projectile Point - 1 Sinbad side notched
5RB0018	MWC: Knife - fs.1 Bridger formation. Drill - s.1 (2008) hafted, Green River chert. CSU: 1 Projectile Point - Nawthis side notched. 1 Shell Bead
5RB0023	MWC: Projectile Point - fs.9 KD quartzite. Ceramic - fs.2 grayware, 2 pieces. Knife - fs.2 (2006) Bridger formation. Scraper - fs.9 (2006) chert.
5RB0027	CSU: Projectile Point - Cottonwood Triangular
5RB0028	CSU: Projectile Point - Anasazi stemmed. Projectile Point - crude side notched
5RB0033	CSU: Knife - 1 Cresent knife, pumpkin chert
5RB0035	CSU: Projectile Point - Nawthis side notched. Projectile Point - Uinta side notched
5RB0036	CSU: Projectile Point - Middle Plains Archaic, bifurcated stem. Biface
5RB0037	MWC: Projectile Point - side notched, KB chert
5RB0043	CSU: Projectile Point - s.9 corner notched. Projectile Point - s.11 corner notched. Projectile Point - s.12 Cottonwood triangular. Projectile Point - s.13 Desert side notched. Projectile Point - s.15 Desert side notched. Projectile Point - s.23 Desert side notch
5RB0044	CSU: Projectile Point - s.1 Desert side notched. Projectile Point - s.2 Desert side notched. Projectile Point - s.3 Desert side notched. MWC: Projectile Point - fs.1 side notched, Bridger formation. Projectile Point - fs.2 base, possible Cottonwood Triangular, Belden formation. Projectile Point - fs.1 (2008) base, Green River chert
5RB0053	CSU: Metal - s.17 historic
5RB0063	CSU: Projectile Point - s.1 Middle Archaic stemmed. Knife - s.2 Obsidian knife tip
5RB0116	MWC: Flint - fs.1 flint lock rifle, Madison farm chert. Projectile Point - fs.2 Leadville formation chert
5RB0130	CSU: Scraper - s.2 diagnostic. Drill - s.5 drill tip. Projectile Point - s.6 Desert side notched. Bead - s.4 beads. Metal - s.8 metal flat, used to make tinklers

Site Number	Artifacts from NW Piceance Study Area in CSU and MWC curation facilities
5RB0137	CSU: Projectile Point - s.5 Middle Plains Archaic, bifurcated stem, large
5RB0138	MWC: Projectile Point - Duncan, JMB chert
5RB0144	MWC: Ceramic - fs.1 3 pieces, 1 rim and 2 bodies. Ceramic - fs.1 (2008) 3 pieces, corregated brownware. Ceramic - fs.2 (2008) micaceous brownware, 1 rim and 1 body. Ceramic - fs.3 (2008) micaceous brownware, 2 rims. Ceramic - fs.4 (2008) brownware, 4 sherds. Ceramic - fs.5 (2008) brownware, 1 rim, 4 sherds.
5RB0159	CSU: Projectile Point - s.2 undetermined
5RB0202	CSU: Projectile Point - s.1 Desert side notched. Scraper - s.3 diagnostic scraper
5RB0238	MWC: Projectile Point - fs.1 Madison formation chert. Scraper - fs.4 Pumpkin chert. Scraper - fs.5 KB chert. Scraper - fs.7907-1 JMB chert. Projectile Point - 9078.A-1,s2 KB chert. Projectile Point - 9078.A-1,s3 Green River chert
5RB0316	CSU: Projectile Point - s.3 Early Plains Archaic, side notched, large. Projectile Point - s.4 side notched, large
5RB0319	CSU: Ceramic - s.17 inter mountain ware? Projectile Point - s.5 Rosegate. MWC: Ceramic - fs.1 2 brownware sherds, very coarse, tempered. Ceramic - fs.2 angular feldspar, quartz tempered. Projectile Point - fs.3 quartzite
5RB0320	CSU: Flake - s.2 Obsidian flakes. Projectile Point - s.3 Desert side notched
5RB0322	MWC: Projectile Point - fs.1 KB chert. Projectile Point - fs.2 side notched, possible KB chert. Projectile Point - fs.3 corner notched, pumpkin chert
5RB0325	CSU: Projectile Point - s.2 eclectic. Scraper - s.21 scraper
5RB0377	CSU: Projectile Point - s.3 corner notched. Drill - s.4 drill
5RB0378	MWC: Projectile Point - fs.1 Bifurcated base, Middle Plains Archaic, Leadville formation chert.
5RB0382	CSU: Projectile Point - s.5 stemmed
5RB0384	MWC: Projectile Point - fs.1 Anasazi, Madison formation chert
5RB0386	CSU: Projectile Point - s.1 Rosegate. MWC: Projectile Point - s.1 Sinbad side notched, JMB chert
5RB0398	CSU: Ceramic - s.1 Uncompahgre brownware. Knife - s.2 Ute leaf shaped knife. MWC: Projectile Point - fs.1 quartzite. Projectile Point - 8435-A1 KB chert
5RB0400	MWC: Projectile Point - fs.1 Late Prehistoric side notched, Morrison formation chert. Projectile Point - fs.2 Late Prehistoric side notched, glued, Opalitic chert, Madison formation
5RB0401	CSU: Ceramic - s.3 micaceous, Uncompahgre brownware
5RB0408	CSU: Projectile Point - s.1 Rosegate
5RB0410	CSU: Ceramic - s.5 Avonlea pottery?

Site Number	Artifacts from NW Piceance Study Area in CSU and MWC curation facilities
5RB0411	MWC: Ceramic - s.1 Uncompaghre brownware, micaceous. Projectile Point - s.2 chalcedony
5RB0412	CSU: Scraper - s.3 scraper. Projectile Point - s.6 Cottonwood triangular
5RB0413	MWC: Projectile Point - fs.6 quartzite
5RB0417	CSU: Projectile Point - s.1 Early Plains Archaic, side notched. Projectile Point - s.5 Early Plains Archaic, side notched
5RB0418	CSU: Ceramic - s.4 Dismal river. Ceramic - s.5 Dismal river. Ceramic - s.6 Dismal river. Projectile Point - s.7 Desert side notched. Projectile Point - s.8 Cottonwood triangular. Projectile Point - s.10 Desert side notched. Projectile Point - s.11 Cottonwood triangular. Ceramic - s.15 Dismal river. Metal - s.28 used to make tinklers. Metal - s.31 used to make tinklers. MWC: Projectile Point - fs.1 base, obsidian. Ceramic - fs.2 22 corregated, brownware sherds. Flake - fs.3 and fs.4 are obsidian
5RB0420	CSU: Projectile Point - s.1 Early Plains Archaic, side notched
5RB0421	CSU: Scraper - s.1 hafted scraper
5RB0422	CSU: Knife - s.2 large knife
5RB0424	MWC: Projectile Point - desert side notched, KB chert
5RB0425	CSU: Projectile Point - s.2 side notched. Projectile Point - s.6 Cottonwood triangular. Ceramic - s.15 Avonlea pottery. MWC: Biface - fs.1 KD quartzite
5RB0428	CSU: Spokeshave - s.1 spokeshave. Projectile Point - s.2 midsection of lanceolate
5RB0429	CSU: Ceramic - s.10 Avonlea, woodland cord marked? Gun Flint - s.19 gun flint. Projectile Point - s.27 Desert side notched. MWC: Ceramic - fs.1 brownware, rim fragment. Ceramic - fs.2 brownware, rim fragment
5RB0430	CSU: Projectile Point - s.3 side notched, small
5RB0431	MWC: Projectile Point - Desert side notched, Kremmling chert
5RB0432	CSU: Projectile Point - s.1 side notched, small. Projectile Point - s.7 side notched, small. Ceramic - s.10 intermountain ware. Projectile Point - s.12 side notched, small. Scraper - s.20 scraper. Projectile Point - s.30 side notched, small. Flake - s.31 utilized flake
5RB0433	CSU: Projectile Point - s.1 reworked, prior stemmed? Late Paleoindian. Projectile Point - s.2 Early Plains Archaic, side notched
5RB0434	CSU: Projectile Point - s.1 bifurcated stem
5RB0435	CSU: Flake - s.3 obsidian. Ceramic - s.6 banded grayware
5RB0440	CSU: Projectile Point - s.1 Rosegate. MWC: Projectile Point - fs.1 JMB chert. Projectile Point - fs.1 (2008) Green River chert
5RB0441	CSU: Projectile Point - s.1 Desert side notched. Projectile Point - s.2 Cottonwood triangular. Knife - s.4 Shoshonean knife
5RB0445	CSU: Knife - s.1 Ute leaf shaped knife. Knife - s.2 knife. Biface - s.3 butchering tool
5RB0447	CSU: Projectile Point - s.2 Rosegate

Site Number	Artifacts from NW Piceance Study Area in CSU and MWC curation facilities
5RB0450	CSU: Projectile Point - s.1 Desert side notched
5RB0451	CSU: Ceramic - s.6 Anasazi black on white. Biface - s.7 biface. Drill - s.8 drill. Knife - s.13 blade. MWC: Flint - fs.1 flint lock rifle, Bridger formation chert. Bead - fs.2, fs.4, fs.5 are glass beads. Bone - fs.10 polished flake. Metal - s.10 thin metal piece. Button - fs.12 metal. Flint - fs.13 flint lock rifle, chert. Metal Shot - fs.15 spent. Tinkler - fs.17 metal. Tinkler - fs.18 metal. Metal Shot - fs.19 spent, roundball 177 grains c.a. .44 or .45
5RB0494	MWC: Scraper - end scraper, Green River formation chert
5RB0509	MWC: Projectile Point - fs.22 metal. Projectile Point - fs.27 KB chert
5RB0525	MWC: Projectile Point - Madison formation, Elko side notched
5RB0532	MWC: Projectile Point - corner notched, KB chert
5RB0534	MWC: Projectile Point - Cottonwood triangular, chert
5RB0558	MWC: Projectile Point - fs.1 Desert side notched, Opalictic chert, Madison formation
5RB0563	MWC: Looked
5RB0605	MWC: Projectile Point - fs.1 obsidian
5RB0633	CSU: Projectile Point - s.2 Uinta side notched. Scraper - s.3 scraper
5RB0634	CSU: Projectile Point - s.2 corner notched, small. Flint - s.3 flint lock
5RB0645	CSU: Projectile Point - s.1 Desert side notched. Projectile Point - s.3 corner notched, small
5RB0653	MWC: Looked
5RB0821	MWC: Projectile Point - KB/JMB chert, reworked
5RB0831	MWC: Projectile Point - fs.1 side notched, Green River chert. Ceramic - fs.2 3 grayware sherds. Projectile Point - fs.3 base and partial midsection, JMB chert. Projectile Point - fs.4 basal inside notch, chalcedony. Projectile Point - fs.5 corner notched, quartzite. Bead - fs.6 9 seed beads. Ceramic - fs.7 2 corregated grayware sherds, 1 rim. Flake - fs.8 obsidian. Projectile Point - fs.9 unifacially worked on base, bifacially worked edges, obsidian.
5RB1097	MWC: Combined with 5RB0003
5RB1106	MWC: Knife - broken into 3 fragments, Pumpkin chert
5RB1879	MWC: Biface - fs.1 Late stage, Debeque formation chert
5RB1883	MWC: Projectile Point - fs.1 Green River chert. Ceramics - fs.2 through fs.8, all grayware, coiled, fs.5 is a rim sherd
5RB2056	MWC: Ceramic - fs.1 4 sherds, Snake valley corregated
5RB2095	MWC: Projectile Point - Debeque formation chert. Early Archaic side-notch.
5RB2097	MWC: Looked
5RB2098	MWC: HIST Ceramic

Site Number	Artifacts from NW Piceance Study Area in CSU and MWC curation facilities
5RB2170	MWC: Projectile Point - Unfinished Desert Side notch, Burrow Canyon. Ceramic - fs.4 intermountain brownware, 8 fragments. Biface - fs.2 fragment, Kremmling chert. Scraper - fs.3 Bridger formation chert. Projectile Point - fs.2 (2008) Desert side notch, Bridger formation chert. Projectile Point - fs.1 (2008) base, obsidian.
5RB2171	MWC: 2 Cottonwood triangular fragments - 1 pumpkin chert, 1 ostracodal chert - Numic. Projectile Point - fs.3 2 fragments, pumpkin chert, Late Prehistoric. Ceramic - fs.1 (2008) brownware micaceous, 5 pieces. Ceramic - fs.2 (2008) brownware micaceous.
5RB2224	MWC: Projectile point fs.1 - phosphoria formation - Paleo Foothill Mountain
5RB2275	MWC: Projectile Point - fs.16 obsidian. Projectile Point - fs.11 Pumpkin chert. Projectile Point - fs.3, 4, 12 are all KB chert. Ceramic - fs.7 3 pieces grayware sherds.
5RB2329	MWC: Biface - Pumpkin chert
5RB2330	MWC: Projectile Point - Quartzite
5RB2339	MWC: Projectile Point - chalcedony
5RB2359	MWC: Projectile Point - corner notched, KB chert
5RB2362	MWC: Projectile Point - stemmed, chert
5RB2385	MWC: Knife - Bridger Formation
5RB2389	MWC: Projectile point - pumpkin chert
5RB2391	MWC: Projectile Point - KB/JMB chert
5RB2396	MWC: Projectile Point - Chalcedony, serrated
5RB2410	MWC: Looked - Unaweep chert fragment
5RB2502	MWC: Projectile Point - Uinta side notched, Madison chert
5RB2508	MWC: Pottery - Formative, has a slip - P-III
5RB2534	MWC: Projectile Point reworked into a Drill - potlitted Debeque chert
5RB2574	MWC: Projectile Point - KB chert
5RB2614	MWC: Projectile Point - JMB chert
5RB2618	MWC: Projectile Point - Cottonwood triangular, chert, thin base
5RB2619	MWC: Looked

Site Number	Artifacts from NW Piceance Study Area in CSU and MWC curation facilities
5RB2624	MWC: Ceramic - fs.1 Douglas Creek Grayware, 1 rim and 2 bodies, see note. Ceramic - fs.2 Black Micaceous Brownware, 2 rims and bodies. Ceramic - fs.3 Grayware to Brownware partially reconstructed vessel, 21 attached and 1 extra. Ceramic - fs.4 Grayware to Brownware, partially reconstructed, 10 pieces. Ceramic - fs.6 Grayware to Brownware, 83 pieces. Ceramic - fs.9 Grayware to Brownware, partially reconstructed, 8 pieces. Ceramic - fs.10 2 corregated brownware sherds, 1 is perforated. Ceramic - fs.11 2 thumbnail, decorated Brownware, 1 rim with partial perforated. Ceramic - fs.13 2 black micaceous brownware, flared rim. Earthenware - fs.17 fine earthenwares, 2 fragments from trade pipes. Ceramic - fs.20 black on red, various white or red slipped, coiled, corregated, 58 pieces total.
5RB2644	MWC: Looked
5RB2714	MWC: Projectile Point - Burrow Canyon - Middle Plane Archaic
5RB2908	MWC: Knife - Fremont, formative, green river chert
5RB2929	MWC: Ceramic - fs.2 Uncompaghre brownware, 26 pieces, 1/26 rim, some are corregated.
5RB2930	MWC: Projectile Point - desert side notched, chalcedony
5RB2931	MWC: Projectile Point - fs.1 Desert side notched, Madison formation chert
5RB2934	MWC: Scraper - possible shaft smoother, pumpkin chert
5RB2968	MWC: Looked - Beads
5RB3023	MWC: Scraper - siltstone
5RB3047	MWC: Knife - base, KB chert
5RB3048	MWC: Projectile Point - fs.1 JMB chert
5RB3579	MWC: Biface - chert
5RB3593	MWC: Projectile Point - Burrow Canyon
5RB3955	MWC: Projectile Point - fs.1 Mississipian chert.
5RB4027	MWC: Projectile point - fs.4 not metal, rock. Projectile point - fs. 2, serrated, chert.
5RB4114	MWC: Projectile Point - fs.1 Anasazi stemmed, porcellanite, Wasatch formation
5RB4128	MWC: Projectile Point - desert side notched, KB chert
5RB4131	MWC: Projection Point - base, Bridger formation
5RB4134	MWC: Projectile Point - fs.1 JMB chert
5RB4135	MWC: Projectile Point - Uinta side notched
5RB4139	MWC: Scraper - KB chert
5RB4146	MWC: Biface - Biface fragment, Green River chert
5RB4164	MWC: Projectile point, not biface. Looked
5RB4188	MWC: Projectile Point - fs.1 desert side notched base, KB chert
5RB4224	MWC: Projectile Point - Bridger formation chert
5RB4225	MWC: Projectile Point - s.1 Cottonwood triangular base, KD quartzite.

Site Number	Artifacts from NW Piceance Study Area in CSU and MWC curation facilities
5RB4227	MWC: Projectile Point - Desert side notched, chert
5RB4231	MWC: Projectile Point - fs.1 Elko corner notched, pumpkin chert. Projectile Point - fs.2 Mississipian chert. Projectile Point - fs.1 (2008) KD quartzite.
5RB4293	MWC: Projectile Point - Base, Obsidian
5RB4295	MWC: Projectile Point - fs.1 2 fragments, Phosphoria chert
5RB4333	MWC: Projectile Point - base, Burrow Canyon chert. Projectile Point - fs.1 JMB chert
5RB4337	MWC: Projectile point - Mississipian chert. Formative
5RB4342	MWC: Projectile point - fs.1 Burrow Canyon, crude Duncan
5RB4343	MWC: Projectile point - fs.2 Triangular, pumpkin chert. Projectile point - fs.1 desert sidenotched, pumpkin chert. Drill - fs.3 pumpkin chert
5RB4495	MWC: Projectile point - fs.2 pumpkin chert. Projectile point - fs.3 quartzite. Projectile point - fs.4 crude. Grayware Cerammics - fs.6 Douglas Creek. Projectile point - fs.10 chert. Projectile point - fs.11 Archaic point possibly resharpen into a drill, claystone. Projectile point - fs.12 Mississipi chert
5RB4509	MWC: Projectile point - sidenotched, Burrow Canyon
5RB4520	MWC: Projectile point - pumpkin chert
5RB4528	MWC: Knife - fs.4 Dakota quartzite. 2 Projectile point - fs.3 fs.4 sidenotched Burrow Canyon chert. Projectile point - fs.1 side notched, pumpkin chert
5RB4531	MWC: Projectile Point - fs.1 Triangular. Ceramics - fs.7 5/5 corregated grayware, 6 pieces. Ceramics - fs.3 body, a lot of pieces. Ceramics - fs.4 Tusayan corregated, 2 pieces. Knife - fs.4 (2013) chert.
5RB4536	MWC: Projectile point - fs.2 Cottonwood Triangular, Bridger Formation, tiger chert. Projectile point - fs.3 sidenotched, basalt. Drill - fs.4 Bridger Formation.
5RB4537	MWC: Projectile point - fs.1 triangular, chalcedony. Projectile point - fs.2 cornernotched, chalcedony
5RB4541	MWC: Projectile point - fs.1 cornernotched, chalcedony
5RB4543	MWC: Projectile point - fs.1 triangular, Burrow Canyon. Projectile point - fs.2 sidenotched, chalcedony. Projectile point - fs.3 triangular, chalcedony. Projectile point - fs.4 cornernotched, Burrow Canyon
5RB4552	MWC: Projectile Point - Pelican Lake, partially serrated
5RB4784	MWC: Projectile Point - fs.1 chert
5RB4801	MWC: Knife - Black and white chert, Shoshone knife. Projectile Point - fs.1 (2008) pumpkin chert
5RB4802	MWC: Projectile Point - Pinto-shouldered, quartzite

Site Number	Artifacts from NW Piceance Study Area in CSU and MWC curation facilities
5RB4812	MWC: Projectile Point - fs.1 jasper. Projectile Point - fs.2 KB chert. Projectile Point - fs.1 (2008) possible corner notched, broken base, KD chert. Projectile Point - fs.2 (2008) Desert side notched, nearly complete, KD chert
5RB4833	MWC: Projectile Point - fs.1 Green River chert
5RB4944	MWC: Projectile Point - JMB red porcelainite
5RB4947	MWC: Projectile Point - Kremmling chert
5RB5012	MWC: Projectile Point - fs. side notched, Madison formation chert
5RB5105	MWC: Projectile Point - fs.1 Rosespring corner notched, pumpkin chert
5RB5110	MWC: Projectile Point - side notched, KB chert
5RB5224	MWC: Projectile Point - fs.3 Chalcedony. Projectile Point - fs.4 Kremmling chert
5RB5225	MWC: Knife - fs.1 Bridger formation.
5RB5228	MWC: Projectile Point - fs.1 base chert. Hafted Biface - fs. 2 Burrow Canyon. Biface - fs.3 2 pieces of triangular shaped bifaces, mudstone.
5RB5229	MWC: Projectile Point - chert
5RB5307	MWC: Projectile Point - quartzite
5RB5312	MWC: Projectile Point - Mississipian chert
5RB5330	MWC: Projectile Point - fs.1 chert
5RB5331	MWC: Drill - fs.1 chalcedony
5RB5389	MWC: Projectile Point - JM chert
5RB5390	MWC: Knife - Kremmling chert
5RB5395	MWC: Projectile point - pumpkin chert
5RB5397	MWC: Knife - Bridger Formation
5RB5633	MWC: Projectile point - pumpkin chert
5RB5643	MWC: Projectile Point - Base, possible Paleo-Indian, KB chert. Projectile Point - fs.1 (2013) Green River chert
5RB5767	MWC: Ceramics - fs.2 grayware.
5RB5810	MWC: Projectile Point - fs.1 side notched, KB chert
5RB5812	MWC: Looked - Obsidian flake
5RB5817	MWC: Projectile Point - fs.1 side notched, Madison formation chert
5RB5819	MWC: Projectile Point - fs.1 split stemmed, Green River chert
5RB5821	MWC: Projectile Point - fs.1 Rosespring corner notched, siltstone. Projectile Point - s.2 Rosespring corner notched, KB chert
5RB5822	MWC: Ceramic - fs.1 plainware. Flake - fs.2 obsidian
5RB5823	MWC: Looked - 2 Obsidian flakes
5RB5825	MWC: Projectile Point - fs.1 Elko corner notched, Madison formation chert
5RB5828	MWC: Projectile Point - fs.1 corner notched, Madison formation chert
5RB5832	MWC: Looked - Seed bead
5RB5837	MWC: Projectile Point - fs.1 Pinto, Mississipian chert

Site Number	Artifacts from NW Piceance Study Area in CSU and MWC curation facilities
5RB5847	MWC: Bead - fs.1 seed bead. Ceramic - fs.2 2 brownware sherds. Angular Shatter - fs.3 obsidian. Metal - fs.4 steel awl bit
5RB5849	MWC: Projectile Point - fs.1 Desert side notched, Bridger formation chert. Projectile Point - fs.2 possible drill, Madison formation chert. Projectile Point - fs.3 base, Madison formation chert. Bead - fs.4 seed bead. Ceramic - fs.5 micaceous, plainware, 2 pieces
5RB5851	MWC: Knife - fs.1 leaf shaped, Bridger formation.
5RB5855	MWC: Projectile Point - corner notched fragment, pumpkin chert
5RB5856	MWC: Projectile Point - corner notched, porcelainite
5RB5858	MWC: Projectile Point - corner notched (?), Kremmling chert
5RB5865	MWC: Projectile Point - Madison formation chert
5RB5866	MWC: Projectile Point - corner notched, JMB chert
5RB5873	MWC: Projectile Point - Desert side notched, obsidian
5RB5878	MWC: Projectile Point - corner notched, JMB quartzite
5RB5897	MWC: Projectile Point - corner notched, Kremmling chert
5RB5901	MWC: Projectile Point - corner notched, quartzite
5RB5906	MWC: Projectile Point - fs.1 side notched, base, obsidian
5RB5911	MWC: Projectile Point - fs.1 corner notched, Kremmling chert. Projectile Point - fs.2 side notched, Kremmling chert.
5RB5917	MWC: Projectile Point - fs.1 side notched, JMB chert. Ceramic - fs.2, fs.3, fs.4 are all brownware sherds, all micaceous
5RB5918	MWC: Projectile Point - fs.1 (2008) corner notched, JMB chert
5RB5923	MWC: Projectile Point - Basally notched, KB chert
5RB5929	MWC: Projectile Point - eared, broken into two pieces, KD quartzite
5RB5943	MWC: Projectile Point - fs.1 corner notched, Bridger formation
5RB5945	MWC: Projectile Point - fs.1 corner notched, Madision formation chert. Projectile Point - fs.2 corner notched, fragment, Madison formation chert
5RB5952	MWC: Projectile Point - fs.1 chalcedony. Projectile Point - fs.2 oolitic chert. Flake - fs.3 obsidian
5RB5964	MWC: Knife - fs.1 Kremmling chert
5RB5966	MWC: Projectile Point - fs.1 side notched, KD quartzite. Projectile Point - fs.2 corner notched, pumpkin. Flake - fs.3 obsidian
5RB5970	MWC: Looked. Projectile Point - fs.1 Paleo midsection, jasper. Projectile Point - fs.2 Paleo point, KD quartzite. Projectile Point - fs.3 base, obsidian. Flake - fs.4, fs.5, fs.6, fs.7 are all obsidian
5RB5980	MWC: Projectile Point - fs.1 Madison formation chert
5RB5983	MWC: Projectile Point - fs.1 KB chert
5RB6000	MWC: Projectile Point - fs.1 obsidian
5RB6003	MWC: Projectile Point - fs.1 Green River chert
5RB6005	MWC: Projectile Point - fs.1 Desert side notched, pumpkin chert
5RB6009	MWC: Projectile Point - fs.1 JMB quartzite
5RB6016	MWC: Projectile Point - fs.1 Mississipian chert

Site Number	Artifacts from NW Piceance Study Area in CSU and MWC curation facilities
5RB6018	MWC: Projectile Point - fs.1 Lancelate, serrated, JMB chert
5RB6026	MWC: Knife - fs. 1 KB chert
5RB6032	MWC: Projectile Point - fs.1 corner notched, KB chert
5RB6095	MWC: Ball - Fremont, quartzite
5RB6115	MWC: Projectile Point - fs.1 chert
5RB6117	MWC: Projectile Point - fs.1 jasper
5RB6125	MWC: Projectile Point - fs.1 corner notched, Bridger formation
5RB6126	MWC: Projectile Point - fs.1 chert
5RB6136	MWC: Knife - Madison chert
5RB6139	MWC: Projectile Point - fs.1 obsidian
5RB6142	MWC: Projectile Point - fs.1 corner notched, Kremmling chert
5RB6143	MWC: Projectile Point - fs.1 side notched, Phosphoria
5RB6144	MWC: Projectile Point - fs.1 Madison formation chert
5RB6145	MWC: Projectile Point - fs.1 Green River chert
5RB6178	MWC: Projectile Point - fs.1 KB chert
5RB6185	MWC: Projectile Point - fs.1 JMB chert
5RB6187	MWC: Projectile Point - Elko eared, KB chert
5RB6191	MWC: Projectile Point - fs.1 base, chert
5RB6223	MWC: Projectile Point - fs.1 chert
5RB6226	MWC: Projectile Point - fs.1 pumpkin chert
5RB6246	MWC: Projectile Point - fs.1 corner notched, chalcedony. Projectile Point - fs.2 corner notched, Madison formation chert
5RB6258	MWC: Projectile Point - corner notched, JMB quartzite
5RB6261	MWC: Projectile Point - corner notched, JMB chert
5RB6273	MWC: Projectile Point - corner notched, Phosphoria formation chert
5RB6410	MWC: Projectile Point - corner notched, Green River chert
5RB6612	MWC: Projectile Point - chert
5RB6614	MWC: Looked
5RB6615	MWC: Knife - Shishoni fs.1, Pumpkin chert. Scraper - fs.2, pumpkin chert
5RB6633	MWC: Knife - Dakota quartzite
5RB6638	MWC: Knife - Shoshone, broken, Mississipian chert
5RB6639	MWC: Projectile Point - Madison chert, Late Archaic Corner-notched
5RB6644	MWC: Projectile Point - Burrow Canyon chert, Avonlea?
5RB6667	MWC: Projectile Point - chert
5RB6685	MWC: Projectile Point fs.1 - Triangular, chert. Knife - broken into 3 fragments - fs.2abc, quartzite. Scraper - Dakota quartzite
5RB6686	MWC: 2 Projectile Point fs.1 and fs.2 - both chert, Desert Side notched.
5RB7746	MWC: Projectile Point - fs.1 Paleo Indian midsection, Green River quartzite
5RB7757	MWC: Knife - fs.1 Green River chert
5RB7771	MWC: Projectile Point - fs.1 chert

Site Number	Artifacts from NW Piceance Study Area in CSU and MWC curation facilities
5RB7783	MWC: Projectile Point - fs.1 Cottonwood Triangular, mudstone
5RB7806	MWC: Projectile Point - fs.1 Desert side notched, Madison formation chert
5RB7807	MWC: Projectile Point - fs.1 Late Archaic corner notched, Madison formation chert
5RB7812	MWC: Projectile Point - fs.1 Rosespring corner notched, Leadville formation chert
5RB7839	MWC: Projectile Point - fs.1 Late Archaic ironstone type 26, Wasatch formation porcelainite
5RB7852	MWC: Knife - chert
5RB7863	MWC: Projectile Point - early Archaic side notched, KB chert
5RB7865	MWC: Projectile Point - Desert side notched, KB chert
5RB7877	MWC: Looked - knife fragment
5RB7882	MWC: Projectile Point - reworked Foothill mountain, possible prior stemmed, Dakota formation quartzite
5RB7899	MWC: Projectile Point - Reoubideau type 24, chalcedony
5RB8090	MWC: Projectile Point - possible Fremont biface base, quartzite
5RB8104	MWC: Projectile Point - Anasazi stemmed, pumpkin

APPENDIX B: ETHNOGRAPHIC LANDSCAPE STUDY NORTHWEST PICEANCE CREEK BASIN ARCHAEOLOGICAL DATA CD

Contents of NW Piceance GRI CD:

1. NW Piceance Ethno Study Spreadsheet
2. Links to Online Database
3. ArcGIS analysis and maps
4. Photographed artifacts from Colorado State University
5. Photographed artifacts from Museum of Western Colorado
6. Photos of 5RB4146 and 5RB5848 Rockart
7. Composite graphics: Artifacts by time period and types of pottery
8. NW Piceance Ethno Study Powerpoint