COLLECTION AND ANALYSIS OF THE LITTLE BULL DRAW BISON REMAINS AT 5RB8828 RIO BLANCO COUNTY, COLORADO

for the

BUREAU OF LAND MANAGEMENT
WHITE RIVER FIELD OFFICE
MEEKER, COLORADO

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ABSTRACT

In August 2017, research associates of Dominquez Archaeological Research Group collected 31 bison bones and bone fragments from an erosional exposure of alluvium deposits in Little Bull Draw, a tributary of Douglas Creek, Northwest Colorado. The remains were determined to be an adolescent bison of unknown sex. Several of the specimens exhibited possible but not definitive evidence of cultural modification. Radiocarbon analysis of a bone collagen sample produced a conventional age of 1020±30 BP with a calibrated age of AD 910 -1050 (90.6 %).

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1.0 Introduction

In September of 2016, eight exposed bison bones and multiple bone fragments were discovered below a shear cutbank at the edge of a two-track dirt road in Little Bull Draw, a tributary drainage of Douglas Creek in Rio Blanco County, Colorado. A single rib bone was observed eroding out of a concavity in the upper aspect of the cutbank. These remains were initially shown to Holly Shelton of Dominquez Archaeological Research Group (DARG) by Dan Fiscus, a volunteer with the Rangely Outdoor Museum. As this find was determined to occur on Bureau of Land Management (BLM) administered lands, it was reported to Lukas Trout, Archaeologist of the White River Field Office. He defined it as an isolated occurrence and assigned its reference number as 5RB8828. Upon receipt of BLM approval, Carl Conner (DARG President) and Holly Shelton (Geoarchaeologist with DARG) collected 31 bison bones and bone fragments from the soil surface, and the exposed rib and five other bones from the cutbank concavity. The collected skeletal remains were transported to the DARG offices where cleaning, analysis, photography, and radiometric sample collection was performed by Holly Shelton.

2.0 Location

A mixed assemblage of 31 bison faunal elements, was found in Little Bull Draw, an east trending secondary drainage of Douglas Creek, in Rio Blanco County. This isolate was situated in an area approximately six meters northeast to southwest and three meters northwest to southeast. It consisted of a concentration of 31 *Bison bison* bones and bone fragments on a surface below a cutbank and eroding out of an approximately 30cm deep concavity in a sheer vertical cutbank immediately southeast and approximately 1.5 meters above a graded dirt road.

3.0 Environment and Depositional Context

At an elevation of 6009 feet, the associated vegetation consists of sparse native grasses, greasewood, and invasive weeds in highly disturbed soils next to the dirt road. Ground visibility is 98 to100 percent. Little Bull Draw is a sediment choked secondary drainage with a stacked stratigraphic sequence. The original location of the bones is characterized by significant erosional disturbance. Erosion is most pronounced along the face and at the base of the cutbank resulting in its ongoing deterioration. The bones are eroding out of the uppermost fringe contact of late Kaycee Formation soils within and occasionally above a very thin lens of fine, silty clay situated directly atop a lens of charcoal. The charcoal likely originated from a prehistoric forest fire and was deposited during an episode of drainage run off. The bones were buried beneath approximately one meter of alluvial deposition consisting of fine, silty clayey soils and poorly sorted fine-to-medium sandstone clasts. The poorly consolidated calcite soils within the concavity, once exposed by erosion of the cutbank, deteriorated and collapsed due to increased moisture content thereby exposing the bison bones.

4.0 Objectives and Methods

The objective of the assessment was to identify the remains, inspect them for evidence of cultural modification, and if indicated, obtain and submit a bone collagen sample for radiometric testing in order to establish a date of death.

Carl Conner and Holly Shelton conducted a controlled collection of the bison remains with Carl Conner handling the majority of the specimens. Thirty-one of the bison bones were found on the surface and in the colluvial soils below the cutbank. The remaining six were found eroding out of a concavity in the cutbank face. During the interim between discovery and collection, soils had accumulated over some of the bones obscuring them from view. These soils were delicately brushed away and the seven original surface bones and 24 additional bones and small scattered fragments were collected from the soils. A trowel was used to gently loosen the cutbank soils that adhered to the bones in the concavity in order to expedite removal while minimizing the risk of breakage. No screening or formal excavation was indicated or performed. As the exposed bison rib from the cutbank concavity was being extricated, five other bones were exposed and subsequently collected. Upon final inspection of the area, there was no sign of additional bones on the surface soils or within the concavity. A brief pedestrian survey of the roadside and nearby drainage revealed no additional bones or fragments. Although possible, it is suspected that few, if any, faunal elements remain in the cutbank.

The collected specimens were transported to the DARG facilities in Grand Junction, Colorado where they were identified, processed and analyzed. The bones were cleaned using bamboo picks and soft bristle brushes of various width and stiffness. Brush strokes followed the "texture" or "grain" of the bone so as not to degrade or inadvertently mark the bone surfaces. The bones were washed with tap water. Tap water in Grand Junction, being slightly alkaline, does not contribute to further bone degradation as would distilled water which absorbs CO_2 from the atmosphere resulting in a slightly acid solution in the pH range most destructive to bone. A spray bottle was then used to dampen the deeper recesses of the bone and the remaining sediment was removed using brushes. A final rinse was done using the spray bottle. The elements were then blotted dry and allowed to completely air dry in a 72° Fahrenheit low humidity environment. Faunal element identification was accomplished using techniques set forth by Olsen (1974), Brown and Gustafson (1979), and the University of Wyoming Virtual Bison 3-dimensional Interactive Skeleton website (http://www.uwyo.edu/reallearning/bisonindex.html).

After cleaning each element was visually examined for the presence of cultural modification. Microscopic analysis was performed using an American Optical FORTY binocular microscope. Professional digital photographic documentation of each specimen was completed by Masha Connor. A bone collagen sample, extracted with some degree of difficulty due to the density of the bone, was taken from the right tibia/fibula and submitted for radiometric analysis.

5.0 Findings

A total of 31 bones and fragments were collected. The remains are identified as *Bison bison* primarily due to the presence of a right metatarsal (Olsen 1974) and (Brown and Gustafson 1979). In addition, the bones are robust and originated from a deeply buried concavity set in middle to late third Medithermal loess situated atop very Late Middle Holocene mineralizing soils. This precludes the possibility of the bones being those of domestic cattle. As indicated by the unfused epiphysis of the tibia/fibula, the animal was a juvenile, likely less than four years old. The bones are not indicative of any single articulated unit and are separated from the entirety of the carcass due to decay and erosional relocation due to single or multiple episodes of channel wash. They were deposited as a mixed assemblage some distance from the original site of the animal's death.

The collected elements included: a right tibia/fibula; a right radius, sans ulna; a right naviculo-cuboid; a right metatarsal; an unknown thoracic vertebra; a right #6, #7, or #8 rib fragment; 18 additional but unidentified rib fragments; and seven unidentified vertebral fragments. The remaining six bones were extracted from the cutbank cavity where they were eroding out. These included: a right #2 or #3 rib fragment, with rodent gnaw and possible but unlikely cultural nick marks, eroding out from the center cutbank cavity; a left #12 or #13 rib fragment from the cavity center; a left #5 or #6 rib from the cavity center; a left 1st phalanx; an unidentified rib fragment from the northeast side of the cavity; and an unidentified rib fragment from the southeast side of the cavity.

The following four elements each exhibit some form of surficial modification; which, though most are highly likely a result of natural damage, some present a remote possibility of being tool assisted butchering marks. Although it is not possible to absolutely confirm any of the damage as evidence of butchering activity, the described right rib fragment may possibly present with several stone tool cut marks. The marks on the following bison bones are noted simply as a consideration in the event that additional bones erode out of the cutbank and present with clear evidence of harvesting activity.

The right tibia/fibula (Plate 1) exhibits damage to the tibial crest and the proximal fibula/tibia fusion projection. This damage was most likely sustained during episodes of high water flow in the prehistoric drainage channel, which would have subjected the specimen to turbulence resulting in traumatic and abrasive action to the epiphysis. Even though the near epiphysis and diaphysis would have been subjected to the same processes, they show minimal to no damage. Additionally, the damage may have been secondary due to modern mechanical insult from heavy equipment, passenger vehicles, or off highway vehicles particularly since the bones were located beside a frequently traveled dirt road. This type of damage could easily have been restricted to epiphysis. The possibility of the damage being the result of human butchering by chopping with a stone or bone tool, although remote, should not be completely disregarded. Overall, stage 2 weathering (Behrensmeyer 1978) is

present as would be expected with the bone having been exposed for a period of at least six months.

The right radius, missing the ulna, (Plate 2) exhibits an approximately eight millimeter long and four millimeter wide impact nick of undetermined origin on the posterior aspect of the shaft below the glenoid cavity. This mark may have occurred secondary to natural processes, and, though unlikely, is also similar to stone or bone tool impact marks (Binford 1981).

An unknown thoracic vertebra (Plate 3) exhibits a gouge mark to the left aspect of the lamina of the spinous process. This mark appears similar to a carnivore tooth mark (Haynes 1983) or claw mark (Rothschild et al. 2013). Although initially suspected to be a stone or bone tool mark, this determination now seems unlikely.

A right side #6, #7, or possibly #8 rib fragment (Plate 4) presents with marks that might be interpreted as butchering cut marks. Next to an obvious rodent gnaw mark are four, fine, abbreviated linear, parallel-incised cuts (Plate 5) near the fractured end of the specimen. Greenfield (2006) states that all stone tool cut marks are not V shaped but that they are usually straight, thin, and shallow with consistent internal morphology. As examination via scanning electronic microscope (SEM) is beyond the capability of this evaluation, the internal structure of the cut marks has not been analyzed. However, considering Greenfield's diagnostic criteria, it is possible that the marks are a result of stone tool butchering activity.

The remaining 34 bison bones are all unremarkable and evidence weathering of stage 1 to stage 3 (Behrensmeyer 1978) with much of this exacerbated during recent exposure to the elements. The six bones recovered from the concavity exhibit weathering of stage 1 to 2 (Behrensmeyer 1978). When first observed in the cutbank concavity the right #2 or #3 rib fragment was initially thought to possibly have cultural nick marks; however, this was quickly determined to be rodent gnaw. A left #12 or #13 rib fragment and a left #5 or #6 rib were both found eroding out from the center of the cutbank cavity. A left 1st phalanx (Plate 6) and an unidentified rib fragment eroding out of the northeast side of the cavity were collected, and an unidentified rib fragment was recovered from the southeast side of the cavity.

6.0 Discussion

6.1 The Occurrence and Fluctuation of Bison in the Desert West

(by James C. Miller and Holly Shelton; selected from Berry et al. 2012)

Records of bison on the Colorado Plateau and adjacent areas include historical records, wildlife studies, archaeological investigations, and in some cases, zoological and paleontological investigations. Now extinct forms of bison were present in Colorado in the Pleistocene and early Holocene and were prey for early hunters. The modern forms of *Bison*

Plate 1. Right tibia/fibula exhibits damage to the tibial crest and the proximal fibula/tibia fusion projection.

Plate 2. Right radius exhibits an approximately eight millimeter long and four millimeter wide impact nick of undetermined origin on the posterior aspect of the shaft below the glenoid cavity.

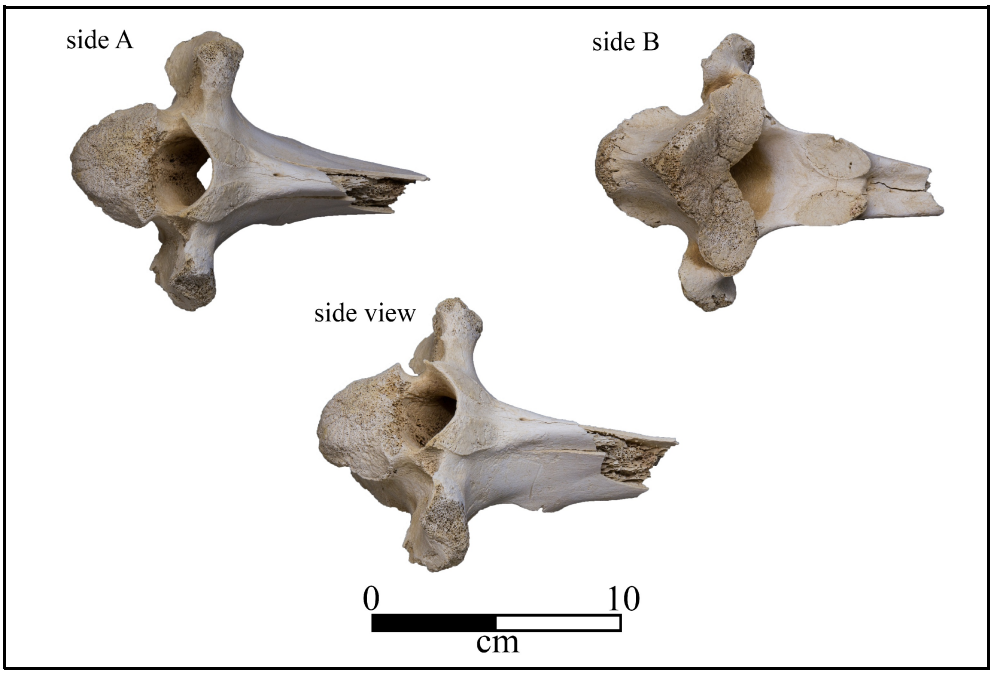

Plate 3. Unknown thoracic vertebra exhibits a gouge mark to the left aspect of the lamina of the spinous process.

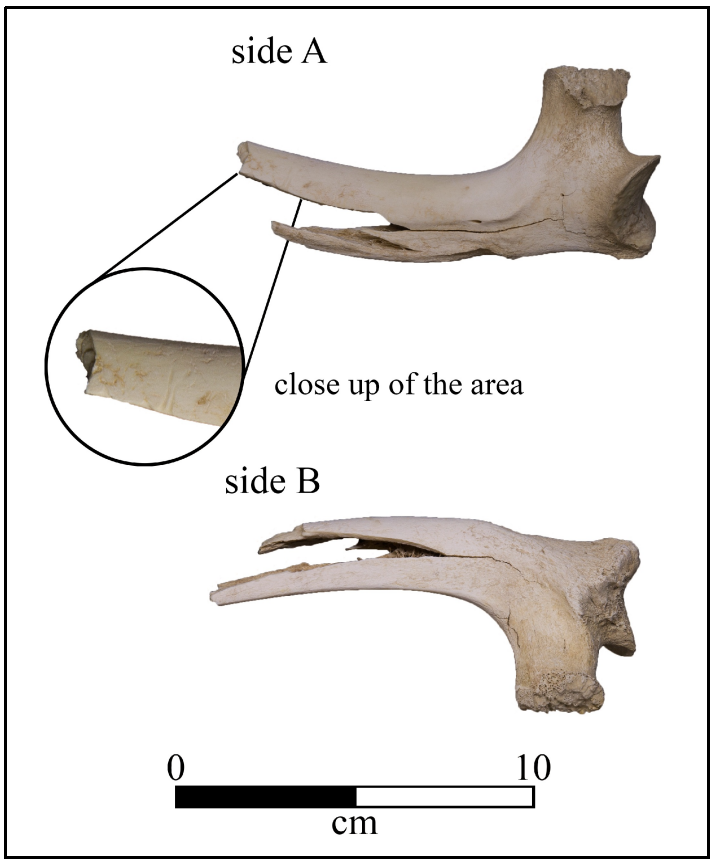

Plate 4. A right side #6, #7, or possibly #8 rib fragment presents marks that might be interpreted as butchering cut marks.

Plate 5. Next to an obvious rodent gnaw mark are four, fine, abbreviated linear, parallel-incised cuts near the fractured end of the specimen.

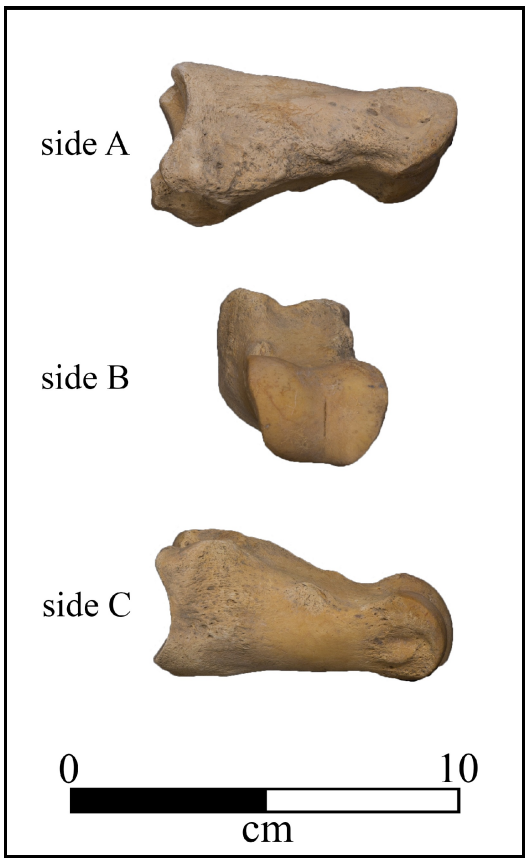

Plate 6. Left 1st phalanx recovered from the southeast side of the cutbank cavity.

bison – the plains bison (*B. bison bison*), the woodland bison (*B. bison athabascae*), and the mountain bison (an unnamed *B. bison* subspecies) – were certainly established by about 5000 years ago (Wilson 1978), although the youngest archaeological specimens of an extinct species, *B. bison occidentalis* are from the Hawken site south of Sundance, Wyoming, and aged from 6400 to 6000 radio carbon years before present (RCYBP), (Frison et al. 1976; Frison 1978). The extinction debate considers both human (e.g., Martin 1990) and environmental (e.g., Guthrie 1990) causes, but a combination of both seems best to explain the demise of the Pleistocene megafauna.

Meaney and Vuren (1993) examined the occurrence of bison in western Colorado and completed a records search statewide, including records from local museums and private collections that were previously overlooked. Bison on the plains in eastern Colorado were omitted from their study because of the substantial number of bison in that region. The results for western Colorado included the identification of 102 specimens from 86 localities in 20 counties in western Colorado; and, a literature search identified an additional 47 localities in 18 counties. Meaney and Vuren conclude bison were abundant on the plains and in the Parks in north central Colorado, but were relatively rare in the southwest part of the state, especially in the San Juan Mountains and Uncompahgre Plateau.

There are additional bison remains in western Colorado that were unknown to Meaney and Vuren or discovered later and include archaeological records as well as reports from outdoor enthusiasts. Four sites in the Uncompahgre uplift contain bison remains: sites 5ME5997 and 5ME6144 in Glade Park (Conner 1998), 5ME17922 on Blue Creek south of Gateway, and 5ME901 in the northern part of the uplift. Chronological placement is not so certain, but most probably age to after 3000 RCYBP. Bison was possibly identified at the Myron Taylor site (5LP696) on Red Mesa near the Colorado-New Mexico state line (Firor 2001). Grand River Institute recorded bison bone in the upper reaches of Willow Creek, north of Debeque in Garfield County (Miller and Smith 2008; Conner et al. 2008), and DARG investigated the first bison recovered from the slopes of Bocco Mountain in 2008 (Miller et al. 2009). Bison skulls have also been recorded in Garfield County at site 5GF90 and as isolated find 5GF2416.

Bison skulls are recovered from western Colorado with some regularity. Miller et al. (2009) report on a number of isolated bison skulls from western Colorado. Two bison skulls were discovered eroding from the cutbank of the Little Dolores River in Glade Park. Two more were found near Rangely, Colorado; one in the west end of Rangely Basin and the other in the cut bank of Duck Creek in the Piceance Basin. Three other skulls come from different locations in the Southern Rocky Mountains adjacent to the Colorado Plateau. The documentation of the remains, except in archaeological contexts, says nothing about the age of the remains or distribution through time; however, the range of bison in the Little Ice Age probably mimics the range of bison during the Late Pleistocene-Early Holocene (i.e., during the Younger Dryas), during the middle Holocene amelioration (Miller 2005), and through most of the late Holocene until after the Little Ice Age, ca. 150 years ago.

Butler (1978) indicates there is broad agreement that bison were abundant from the Green River in southwestern Wyoming westward through the northeastern corner of Utah and the Snake River Plain in eastern Idaho at historic contact. He also argues that bison could be found from northeastern California to south central Oregon, and cites the journals of early travelers that record bison in northern Nevada and the eastern parts of Oregon and Washington. Butler is concerned with bison in the Proto-Historic and early Historic periods. The occurrence of bison in other areas in the West is less well understood.

The presence of bison in the west was once thought to be limited to the early Historic Period, but the idea was discarded after archaeological excavations became more numerous. It became obvious that bison populations fluctuated through time in some areas. Butler (1978) states that bison were present in the upper Snake River country from before the human presence in the New World until well into the Historic Period. In the Columbia River basin, however, he indicates bison populations dwindled rapidly after 6300 RCYBP, recovered between 3000-1500 RCYBP, and were scarce during the Historic period.

Lubinski (1995) reports evidence for a fluctuating bison population in southwest Wyoming. Lubinski discusses 93 faunal assemblages from sites in southwest Wyoming from

Paleoindian to the Protohistoric. Bison made up 50% of the faunal assemblages included in the study, meaning bison were fairly common in the study area. Lubinski concludes that bison are present in the archaeological record from 9000 to 10,000 RCYBP, essentially disappear between 8000 and 5000 RCYBP, recover between 5000 RCYBP and 150 years ago, then disappear again.

Thompson and Pastor (1995) produced a summary of faunal remains in archaeological sites in the Kemmerer, Wyoming, Resource Area of the BLM in southwest Wyoming. The summary is based on 19 specimens which constitute 11.7% of the faunal remains they consider. Of the 19 specimens, three bison are reported from the early Archaic (5600 to 4800 RCYBP), one from the Middle Archaic (3200 to 2800 RCYBP), three from the Late Archaic (2800 to 1600 RCYBP), and 12 from the Late Prehistoric (1600-800 RCYBP); the time divisions used for the summary are arbitrary 400 year units. In short, they conclude that bison were present from 5600 RCYBP and populations increased after 1600 RCYBP.

None of the bison in western Colorado have a certain chronological placement. Most of the isolated skulls are in fairly good condition and are relics of the Little Ice Age. The specimens retrieved from archaeological sites on the Uncompahgre uplift are probably all younger than 3000 RCYBP.

There are environmental as well as cultural reasons to consider in discussing the distribution of bison west of the Continental Divide since the end of the Pleistocene. Butler's information is dated (published over 30 years ago), but applies to some degree. The data provided by Lubinski (1995) and Thompson and Pastor (1995) are more current and consider the occurrence of bison in an area easily accessible from western Colorado (the western Wyoming Basin), one that shares the same paleoenvironmental history (compare Miller 1992 and Miller et al. 2011), and one that had a cultural connection with western Colorado (see Berry 2011). Lubinski's results include more sites and specimens, and likely takes in at least part of the information presented by Thompson and Pastor. To reiterate, Lubinski (1995) concludes that bison were present from 9000 to 10,000 RCYBP, disappear from the archaeological record from 8000 until 5000 RCYBP, then recover and persist until about 150 years ago (i.e., until the end of the Little Ice Age). The sub-set offered by Thompson and Pastor (1995) duplicates part of this; bison are documented from 5600 to 800 years ago.

The absence of bison in the archaeological record in the early interval (roughly 8000 to 5600 RCYBP) corresponds closely to the early Holocene drought from 9500 to 6500 RCYBP (Miller 1992), with the worst part between 8000 and 6500 RCYBP (Miller et al. 2011). The end of bison for Lubinski, around 150 years ago, corresponds to the drought following the Little Ice Age (Miller 1992; Miller et al. 2011), and the end of bison for Thompson and Pastor (1995), around 800 RCYBP, corresponds to the drought before the Little Ice Age (Miller 1992; Miller et al. 2011). One other major drought is apparent in the record of both areas, at maximum stretching from about 4000 to 2800 RCYBP. Bison did not disappear in the interval, but Butler (1978) indicated bison expanded after 3000 years ago,

i.e., after this drought. The lag between climatic amelioration and the reappearance of bison – usually a few hundred years – may reflect the time for bison to migrate back into an area or for the numbers of bison to increase sufficiently to be profitable as a prey species for human groups.

It should be noted that the periods with decreased bison frequency, especially in the early and late Holocene, were periods of widespread surface erosion (Miller 1992, Miller et al. 2011). Behrensmeyer (1978) conducted a study of bone weathering and concluded that most bone is completely destroyed when exposed on the surface in about 15 years. The absence of evidence of bison in the periods identified may only reflect poor preservation because of longer surface exposure during the interval.

The above discussion of bison through time is almost entirely derived from archaeological studies and actually best describes when bison were on the prehistoric menu rather than the presence of bison in certain areas. It seems unfathomable that bison would not be on the menu if they were available, but social organization, mobility, settlement and subsistence practices have varied through time. Sites in the drought periods are small and usually contain only one or two hearths, suggesting a high degree of mobility and small group size, i.e., a nuclear family or an extended family. Sites in the cooler, moister intervals exhibit reduced mobility and larger group size, meaning people are living in one place for longer periods during the year – more permanent domiciles are built for habitation and usually more than one is constructed at a single location. As Frison (1978) observes, a single hunter has to use all his skills to hunt bison successfully while a group of three or more hunters has critical advantages. The occurrence of fewer bison in archaeological sites in drought periods could equally portray fewer successful hunts by only one or two hunters.

6.2 Taphonomy (majority selected from Miller et al. 2012)

The bison remains discussed here were completely disarticulated although the elements recovered were in close proximity to one another and indicate the minimal number of individuals as being a single animal.

One aspect of taphonomy considers the scattering of skeletal elements, especially after the loss of the soft tissue. The causes of scattering begin with the actions of carnivores and scavengers, and later include trampling and surface processes such as sheet flow alluviation or erosion. Toots (1965) and Hill (1979) conducted studies on the disarticulation of mammal skeletons. Toots (1965) observed the disarticulation of coyote (*Canis latrans*) skeletons in Wyoming and Hill (1979) observed the disarticulation of the modern Topi (*Damaliscus karrigum* Ogilby) in Kenya (topi are small African antelope with a weight range of 90 to 135 kilograms). The environment in both areas is semi-desert and similar to western Colorado. Two earlier studies by Weigelt (1927) and Müller (1950) observed the disarticulation of *Bos* skeletons on the Gulf Coast of the United States (cited in Hill 1979) and concluded that the mandible came off first and the extremities next. Toots (1965)

produced a slightly more detailed sequence for the coyote remains he observed: the crania, some limbs, and possibly the atlas separate initially; then, the ribs on the upper side; followed by a more complete disarticulation of the limbs and part of the vertebral column; and finally, the remainder of the vertebral column.

Hill (1979) developed a model for scattering for topi skeletons based on observations in the field. The sequence is more complex and proceeds through stages of disarticulation of the entire skeleton into articulated units and finally into single bones. In general, the forelimb, mandible, cranium and atlas, and caudal vertebrae come off first. This is followed, in the second stage, by further disarticulation of the fore and hind limbs, and the separation of the atlas and cranium. In the final stages, the ribs fall away and the axial skeleton begins to disarticulate. The thoracic and lumbar vertebrae, sacrum and pelvis are the first to fall away and are followed, finally, by the cervical vertebrae (except the atlas) together. The axis is next. The longest lived articulated unit is composed of the middle cervical vertebrae. In keeping with Hill's analysis, the Little Bull Draw bison bones were likely in the final stages of disarticulation when they were deposited in their present location.

6.3 Cultural Modification

Evidence of harvesting of this bison by prehistoric hunters as exhibited by bone surface modification secondary to stone tool butchering techniques is limited and questionable. The most likely evidence of butchering are the small, thin, straight and shallow incisions on the previously described unconfirmed #6, #7, or #8 rib fragment. At this stage of analysis, and secondary to the limits imposed by the lack of availability and access to an SEM assessment, it is not possible to confirm that the animal was harvested by prehistoric humans. However, as there is some limited evidence to be considered, the possibility should not be completely ruled out. If additional specimens erode out of the location, a thorough assessment for the presence of cultural modification could be performed that might result in a more satisfactory answer to the question.

There is a great deal of controversy regarding distinguishing human tool-assisted butchering marks from naturally induced damage. Standardized criteria for identifying stone tool cut marks, especially micro-striations, is variable with many qualified researchers publishing conflicting information. Bunn (1991) confidently and reasonably states that because a variety of taphonomic processes might have similar effects on bone, it is not possible to strictly rely on microscopic analysis and that a more effective methodology would include additional diagnostic criteria such as anatomical location of the marks, the composition of the deposits the specimen was located in, and other macroscopic analysis techniques. Greenfield (2006), on the other hand, indicates that the tools used in butchering, whether metal, stone, unmodified or retouched, leave "identifying signatures" that are characteristic of the specific tool used. Dominquez-Rodrigo et al. (2017) take an understandably conservative approach in their critique of a finding of stone tool cut marks on the fossil bone recovered from the DK-55 site in Dikika, Ethiopia. In the case of the Little

Bull Draw bison bones a conservative approach in the evaluation of marks on the bones is certainly prudent.

6.4 Radiometric Data

A bone collagen sample, taken, with some difficulty due to the density of the bone, from the diaphysis of the right tibia/fibula, was submitted for AMS testing on 5 September 2017 to International Chemical Analysis, Inc. of Miami, Florida. Logistical complications due to the impact of Hurricane Irma, delayed testing and the results were not received until 9 October 2017.

Testing of the specimen resulted in a conventional age of 1020±30BP with a calibrated age of AD 910-1050 (90.6 %) indicating existence of the animal during the Late Prehistoric (Appendix A). The bones were found within a region known to have been inhabited by the Fremont peoples between approximately AD500 and AD1300 (Reed and Metcalf 1999). By AD1250 the Fremont were in decline in eastern Utah and Northwestern Colorado and bison hunting may have been less frequent due to decreased human population.

7.0 Conclusions

Analysis of the remains indicate the animal was a juvenile *B. bison* of unknown sex, that died in an unknown location possibly due to human predation though this is by no means confirmed. The bones were re-deposited an unknown distance downstream from the death site. Bone collagen testing reveals that the animal died between AD 910 and AD 1050, placing it well within the Late Prehistoric during a phase when bison populations were likely somewhat stable in the region.

Bison were present and being exploited over time in the Douglas Creek area as indicated by at least two nearby specimens. A bison bone fragment was recovered from the Kuck Rock Shelter (5RB3157), a mid-elevation site near East Douglas Creek between East Dry Lake Canyon and Bowman Canyon. Radiocarbon testing from the site produced a date of 1020±50 BP. In addition, a partial bison cranium consisting of a partial frontal and the upper one-half of both orbits and two intact horn cores was located and collected on the surface of the East Douglas Creek drainage after a series of severe thunderstorms in 1983 or 1984. It is curated at the Rangely Outdoor Museum in Rangely, Colorado. Several short V shaped stone tool incised and steeply faceted grooves or nick marks are present on the upper aspect and near the tips of each horn core. It is suspected these occurred during removal of the horn caps from stone tool cutting through the dense connective tissue and nicking the horn core. In addition, it should be noted that several bison pictographs and petroglyphs exist in nearby Canyon Pintado suggesting that prehistoric peoples were aware of valued these animals.

In 2017 the Western Colorado Bison Project (Shelton et al. 2017) completed the first phase of a study of culturally modified bison bone in west-central and northwestern Colorado. Bone collagen samples that underwent radiometric testing totaled 35 of 250 specimens analyzed with resultant dates ranging from 11,700±90 BP (a non-cultural specimen) to AD 1830±40 BP. No dates between AD 0 and AD 700 have been found. Eight specimens produced dates between AD 775 and AD 1400. The specimen discussed here falls within this date range. The increase in the number of dates between AD 1000 and AD 1400 along with a significant increase in the occurrence of culturally modified bone beginning in AD 1400 through late AD 1800, with a noticeable spike in radiometric dates between approximately AD 1450 and the early 1800s, appears to indicate four cultural episodes associated with bison.

These four distinctive episodes of activity begin in the Formative Era and move forward into the Historic period. Formative Era peoples, limited to hunting on foot, would likely have taken bison on an intermittent or occasional basis thereby accounting for the low incidence of culturally modified bone during this period. Intermittent drought episodes may also have contributed to extreme fluctuations in regional bison populations. Significant numbers of bison may have succumbed to starvation or migrated northward and northeast away from the western slope to higher elevations and more productive drainage systems such as the Yellowstone, Missouri, Platte and Kansas rivers. Excluding the date of 11,790 BC to 11,410 BC produced by sample DARG 66, the *Bison priscus*, and concentrating on the higher calibration percentages, the most frequent occurrence of bison within the present study area spanned a time period between the middle to late 1400s and into the early 1800s. A measurable concentration of dates beginning AD 1600 and forward is likely indicative of the presence of horse mounted Ute and may speak to hunting by occasional intrusive tribes that would likely have included the Shoshone.

In order to develop an accurate scientific perspective of the interrelationship of bison and the native occupants of western Colorado it is imperative that bison related findings be valued among the archaeological community of western Colorado. This newly acquired data will be submitted to the Western Colorado Bison Project Database (dargnet.org/net/bison/bison.html), an interactive program that allows researchers to enter and access information related to bison. Attributes, photos, location information and radiometric dating information will be included with the data submission. This will contribute to clarifying and defining bison population concentrations, their movement on the landscape, and procurement patterns and processing techniques specific to the native people of the region.

The Little Bull Draw bison bones are a significant paleontological (and possibly archaeological) find for they contribute valuable data to the prehistoric record. In addition, the presence of bison in the region contributes to the cultural and spiritual fabric of present day tribal members. Traditional Ute oral history refers frequently to bison, bison hunts, and the bison's relationship with man, other animals and supernatural beings (Smith 1974). Although there is a respectable amount of information related to Ute hunting practices in

western Colorado, very little is documented regarding actual episodes of Ute bison hunting in the northwest and west-central region. Clifford Duncan, Elder of the Northern Ute Tribe, shared many stories of bison. Prior to his passing, he asked this writer to "learn all possible about the buffalo" and then "come and teach it to the kids; tell them how it was so they'll know. Too much is forgotten and there aren't too many of us left" (personal communication, Clifford Duncan 2012). The opportunity to evaluate the Little Bull Draw bison bones was an honor and a privilege not to be taken lightly and, it is important to note that the remains were treated with the utmost care and respect by Carl Conner and the staff of Dominquez Archaeological Research Group. Additional information is provided in Appendix B: OAHP Isolated find form (BLM only).

8.0 References Cited

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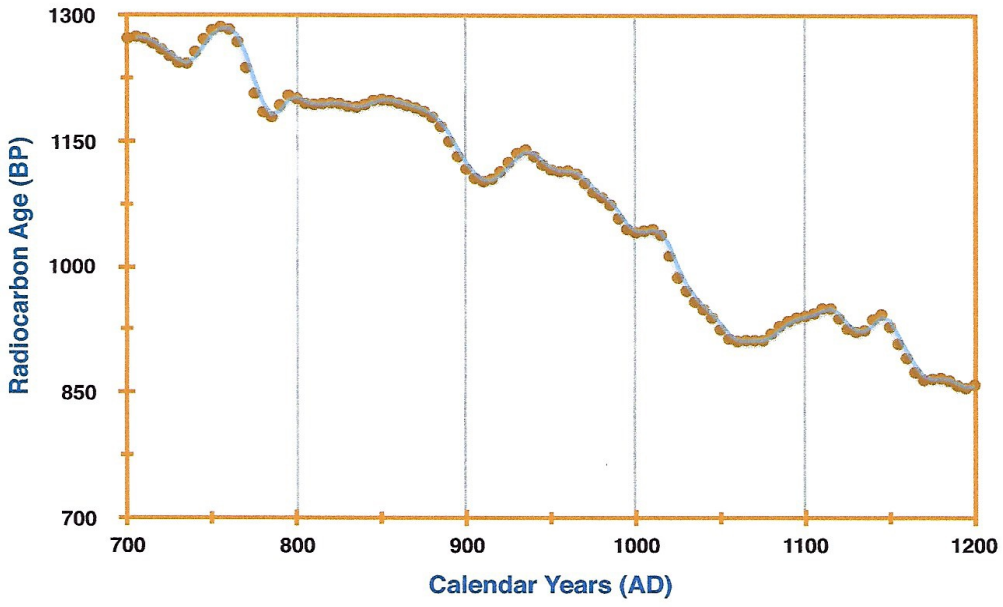
Appendix A: Radiometric Data

International Chemical Analysis Inc.
1951 NW 7th Ave
STE 300
Miami, FL U.S.A 33136

Sample Report

Submitter Name: Carl Conner
Company Name: Dominguez Archaeological Research Group, Inc
Address: P.O Box 3543, Grand Junction, CO 81502

Date Received	September 05, 2017	Material Type	Bone
Date Reported	October 09, 2017	Pre-treatment	Col-AAA
ICA ID	17B/0910	Conventional Age	**1020 +/- 30 BP**
Submitter ID	5RB8828	Calibrated Age	**Cal 910 - 1050 AD (90.6%)** **Cal 1090 - 1150 AD (4.8%)**



Appendix B: OAHP Isolated Find Form