THE WYOMING Archaeologist

VOLUME 64; NUMBER 2; 2020

ISSN: 0043-9665
[THIS ISSUE PUBLISHED
DECEMBER, 2022]

WYOMING ARCHAEOLOGICAL SOCIETY

THE WYOMING Archaeologist

WYOMING ARCHAEOLOGICAL SOCIETY, INC.

THE WYOMING ARCHAEOLOGIST is published semi-annually by the Wyoming Archaeological Society, Inc. Address manuscripts and news items for publication to: Dr Danny Walker, Editor, The Wyoming Archaeologist, 1687 Coughlin St, Laramie WY 82072.

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On the Cover:

Busycon contrarium, lightening whelk, shell reportedly from Garret-Allen site, Carbon County, Wyoming. Eckles, this issue.

THE WYOMING ARCHAEOLOGIST
VOLUME 64(1), SPRING 2020

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WYOMING CULTURAL TRUST FUND
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“Publication of this issue of The Wyoming Archaeologist is supported in part by a grant from the Wyoming Cultural Trust Fund, a program of the Department of State Parks and Cultural Resources.”

THIS ISSUE PUBLISHED DECEMBER 2022

FAUNAL REMAINS FROM THE GARRETT ALLEN (ELK MOUNTAIN) SITE (48CR301)

by

David G. Eckles

Excavations at the Garrett Allen (Elk Mountain) archaeological site recovered a large and diverse faunal assemblage. The purpose of this article is to summarize data on the faunal remains with emphasis on the unusual aspects of the assemblage. A brief introduction to the site excavations and chronology is presented first. More detailed information about previous investigations at the site is discussed in Eckles (2013).

The site is located in southeastern Carbon County, Wyoming at the northern end of the Medicine Bow Mountains and southern edge of the Hanna-Carbon Basin. It is within a homoclinal valley near the perennial Quealy Spring which forms an ephemeral drainage flowing north-northwest. Archaeological deposits are present south, southwest and southeast of the spring, and are from 10-12 feet above the spring.

Excavations began in late 1968 and continued each year through 1980. Units were established from a north-south, east-west grid. Most units were 5x5 feet blocks with some as large as 10x5 and 10x10 feet. Most units were excavated to 12 inches below surface with some units reaching 60 inches below surface. Excavations were performed by members of the Wyoming Archaeological Society with assistance from the Office of the Wyoming State Archaeologist and University of Wyoming Anthropology Department. Garrett Allen, who found and reported the site, participated in nearly all of the excavations.

After excavation artifacts were washed, numbered and cataloged using three by five-inch file cards. A coding system was established which identified artifacts by type. For example, the code "PP" was used for projectile points, "S" for scraper, "CT" for cutting tool, "PS" for pottery sherds, "BT" for bone tool, "H" for hearth, etc. The file cards are the primary, and in most cases, the only record of where artifacts were found. A different catalog coding was used for materials recovered during the field school project conducted from 1979-1980. It was a sequential numbering system using 38,000 as the beginning number, ending in the 39,000s. Some faunal remains were catalogued using a "C" prefix followed by sequential numbers (Eckles 2013). Unit provenience data were recorded by block units and individual 1x1 foot units.

During the 1979-1980 field school, five carbon samples were taken and submitted for radiocarbon dating. Three additional samples were submitted in 2013. One sample is from the early excavations and was taken from a five-by-five-foot unit (N-S Trench East End) at a relatively tight depth measurement of 44-48 inches. Two samples were obtained from residue on two large ceramic fragments (Table 1).

In the analysis of soils from the site, Hayter (1981:30) correlated four of the dates with his Soil Profile 1 which was placed within the archaeologically excavated area in the southwest quadrant of the site grid. It is assumed Hayter obtained depth information from the archaeological investigations to allow this correlation. Hayter's Soil Profile 2 appears to have been located at or near the North-South Trench excavated in the 1970s. A fifth date appears to have been obtained at a relatively deep location within this trench. The fifth date of 3120+/-250 (RL1420) is not shown on Hayter's Soil Profile maps by depth, but he states this date is from a cultural level above a grey gleyed clay subsoil. Based on his discussion of the soils and one of the profile maps in the field records which shows a one-foot-wide section from which soil samples and a carbon sample were taken, the depth of the 3120 B.P. date is estimated at 56 inches.

METHODS OF ANALYSIS

Faunal remains from the site were identified by comparison with known skeletons in the University of Wyoming Comparative Osteology Collection, managed by the Office of the Wyoming State Archaeologist. Published osteological keys and anatomy references, including Getty (1975), Gilbert (1980, 1981), Lawrence (1951), Olsen (1960, 1968), and Sobolik and Steele (1996) were also consulted. The goal was to document both the type of animal and specific element represented by the faunal specimen. If a bone specimen did not have the necessary morphological traits for positive identification to taxon, it was ranked by observable traits in a descending order from a higher level (e.g., Aves-bird, Canid-wolf, dog, coyote, Rodentia-rodents), or size category including large artiodactyl (bison elk), medium artiodactyl (pronghorn, deer, sheep), medium mammal (canid, badger, porcupine), small mammal (rabbit, ground squirrel) to an unidentified level if no traits were definable.

Table 1: Radiocarbon Dates, 48CR301.

Sample Number	Date Submitted	Radiocarbon years B.P. (uncorrected)	Area of Site	Depth Correlation by Hayter (1981:30) and 2013 samples
RL1406	1979-1980	510+/-110	SW Quadrant, 1979-1980	4-5 inches
D-AMS 004548	2013	591+/-25	Ceramic rim sherd residue	Unknown depth
RL1227	1979-1980	630+/-100	SW Quadrant, 1979-1980, Hearth, Level II	8-11 inches
D-AMS 004547	2013	797+/-33	Ceramic rim sherd residue	8 inches *
RL1228	1979-1980	920+/-110	SW Quadrant, 1979-1980, Level III	17 inches
RL1414	1979-1980	1670+/-120	SW Quadrant, 1979-1980, Hearth	22 inches
D-AMS 004549	2013	2363+/-30	N-S Trench	44-48 inches
RL1420	1979-1980	3120+/-250	N-S Trench	56 inches

*Depth of ceramics from catalog cards.

In addition to identification by taxon and element, other attributes were recorded. They are element portion, segment, side (where relevant), fusion of articular ends (i.e., mature or immature), type of breakage (if present), and total number of specimens. Unfortunately, many of the faunal remains from the site exhibit varying degrees of weathering on the bone surfaces and few butchering marks were observed. Most bones from the site are fragmented, also reducing the chances for preservation of butchering marks.

The minimum number of individuals (MNI) was calculated for each taxon by enumeration of the most common complete or nearly complete element representing the taxon. In this sense, MNI refers to the minimum number of individual animals necessary to account for all of the identified specimens in each element category (Casteel and Grayson 1977). The level of fragmentation of the assemblage limits the value of any MNI calculation, and so it should be considered only an estimate of overall taxon composition.

THE ASSEMBLAGE

Taxa represented in the assemblage include *Bison bison* (bison), *Antilocapra americana* (pronghorn), *Cervus elaphus* (elk), *Odocoileus* sp. (deer), *Ovis canadensis* (mountain sheep), *Canis* sp. (wolf, dog, coyote), *Castor canadensis* (beaver), *Taxidea taxus* (badger), *Erethizon dorsatum* (porcupine), *Procyon lotor* (raccoon), *Vulpes vulpes* (red fox), Mustelidae (mink, weasel), *Didelphis virginiana* (opossum), *Lepus* sp. (jack rabbit), *Sylvilagus* sp. (cottontail rabbit), *Spermophilus* sp. (ground squirrel), *Cynomys* sp. (pocket gopher), Aves (medium-large bird), Emydidae (pond/marsh turtle), Unionidae, (riverine bivalve mollusk), *Busycon contrarium* (lightening whelk), and *Pleurocera* sp. (aquatic gastropod mollusk)

The number of individual specimens (NISP) of faunal elements identified by taxon is presented (Table 2). The assemblage is dominated by elements of bison and pronghorn with fewer remains of elk, canid, rabbits, ground squirrels, medium to large birds and riverine bivalve mollusks. The other taxa are represented by only one to five specimens.

Minimum number of individuals by taxon for each depth increment is also presented (Table 3). In general, the MNI analysis shows a similar result based on NISP: bison is represented by more elements and individuals compared to pronghorn in most depth increments. Still, bison and pronghorn bones clearly dominate the assemblage. The other taxa are represented by only one individual in most depth increments. The MNI count of five canid individuals from 43-48 inches is the result of a bone concentration discussed below.

BISON REMAINS

Bison bone elements are represented by nearly all portions of the skeleton, and are represented in nearly all of the depth increments (Table 4). Front and hind leg elements appear to dominate the assemblage. Interestingly, mandibles are relatively common but cranial fragments are relatively rare. Phalanges are also fairly common but vertebrae are less so.

With the exception of phalanges, most of these elements are broken, either by human activity (most likely), or natural causes. Butchering marks in the form of green bone spiral breaks, blow marks and (rarely) cut marks are evident on many of the fragments (see Figures 1-2).

PRONGHORN REMAINS

Pronghorn bone elements are second only to bison in the absolute numbers of identified specimens. They are represented by nearly all portions of the skeleton, and are represented in nearly all of the depth increments (Table

5). As with bison, front and hind leg elements appear to dominate the assemblage; mandibles are relatively common; cranial fragments are relatively rare; phalanges are also common; and vertebrae relatively uncommon. The pattern of butchering is similar to bison (Figures 3-4). Of note are several pronghorn incisors from 0-24 inches below surface. Many of these were found in possible concentrations and are discussed below.

BONE FRAGMENTS

Most of the bone fragments recovered from the site can only be identified to group-size categories. These include large artiodactyl, medium artiodactyl, medium mammal, small mammal, and medium-large sized bird. Most of these fragments were recovered from 0-24 inches below surface (Tables 6-7). Similar distributions of unidentified fragments are present in the deeper depth increments, but with far fewer absolute frequencies.

As with the identified elements, large and medium sized artiodactyls are represented in relatively large numbers. Bone fragments, or bone splinters, derived from long bones and ribs are likely the result of relatively intensive processing of bison and pronghorn skeletons for the purposes of manufacturing bone grease and the manufacture of bone tools. The processing of relatively low numbers of smaller animal bones could be from cultural preferences, biases in data recovery during the excavations, or non-cultural breakage.

ELK REMAINS

Compared to bison and pronghorn, relatively few elk bones were recovered from the excavations (Table 8). Half of these remains are fragments of antler. There are two unmodified, probably shed, antler fragments and one unmodified tine fragment. The other antler time fragments show use wear on their distal ends, likely the result of

Table 2: Identified Bone Elements (non-tools) by Depth (inches), NISP.

Depth	0-6	7-12	13-18	19-24	25-30	31-36	37-42	43-48	49-54	55-60
Taxon										
Bison	146	241	69	91	51	11	18	59	2	9
Pronghorn	57	108	45	47	21	8	2	27	2	5
Elk	1	1	3	2	3	2		7		1
Deer	1	2	2	6	1		2			1
Mt. Sheep	1							1		
Canid	7	16	4	2	1		2	10		1
Fox		2		1						
Raccoon								1		
Mustelid			1							
Beaver				1						
Badger					1			4		
Porcupine								1		
Opossum								1		
Jack Rabbit		2			2			2		
Cottontail	2	2	1	3	1					
Ground squirrel		5	3	1	7					
Pocket gopher		2	2							
Turtle	1									
Aves		6	2					2		
Riverine bivalve		8		2		1		3		
Aquatic gastro-pod.	1									
Totals	**217**	**395**	**132**	**156**	**88**	**22**	**24**	**118**	**4**	**17**

Table 3: Minimum Number Individuals, MNI (non-tools) by Depth (inches).

Depth	0-6	7-12	13-18	19-24	25-30	31-36	37-42	43-48	49-54	55-60
Taxon										
Bison	7	9	4	6	3	1	2	4	1	1
Pronghorn	4	6	4	5	1	1	1	2	1	2
Elk	1		1	1	1	1	1	1		
Deer		1	1	1			1			
Mt. Sheep	1							1		
Canid	1	1	1	1	1		1	5		1
Fox			1	1						
Raccoon								1		
Mustelid			1							
Beaver				1						
Badger					1			1		
Porcupine								1		
Opossum								1		
Jack Rabbit		1			1					
Cottontail	1	1	1	1	1					
Ground squirrel		1	1	1	1					
Pocket gopher		1	1							
Turtle	1									
Aves		1	1					1		
Riverine bivalve		1		1		1		1		
Aquatic gastropod	1									

percussion or pressure flaking of lithic tools (Figure 5). Other elements include maxilla and mandible fragments, one radius, metapodials, one phalanx, and three teeth. The radius, metapodials and phalanx exhibit green bone breaks, consistent with butchering breakage.

Elk (*Cervus elaphus*) remains in Wyoming archaeological sites occur with some frequency, but as with the Garrett Allen assemblage, they occur in relatively small numbers. Kornfeld et al. (2010:332-335) present the most current synthesis of elk remains in Wyoming sites and conclude elk remains are relatively rare in the archaeological record before the Protohistoric period. One exception is the Late Archaic age Joe Miller site in Albany County in which butchered remains of eleven elk were recovered (Burnett et al. 2008; Kornfeld et al. 2010:334-335). The Joe Miller site is located at the western edge of the Laramie Basin near the Medicine Bow Mountain range, about 30 miles east of the Garrett Allen site.

Elk remains in smaller numbers have been found in a few sites from Paleoindian to Late Prehistoric times, including several sites in Wyoming and Montana in which elk antlers were gathered and used for tools (see Burnett et al. 2008:378-381).

During fieldwork at the site in 2014 and 2015, which included limited testing outside the main excavation areas, mapping and surface survey of areas surrounding the site, a relatively large number of shed elk antlers were noticed. A group of over 20 elk was also observed both on site and nearby the site. At least in modern times, elk have gathered in and near the site area, which, similar to the Joe Miller site, is located at the edge of a large basin close to the Medicine Bow Mountains.

The historic range of elk in Wyoming includes nearly all of the state. This includes shortgrass prairie and sagebrush-steppe habitats, as well as concentrations around all forested mountain ranges. Seasonal shifts in range include use of higher elevation areas in summer where vegetative diversity is greater, but also use of more arid basins where water sources are present (Buskirk 2016:342).

Table 4: Identified Bison Bone Elements (Non-Tools) by Depth (inches), NISP.

Depth / Element	0-6	7-12	13-18	19-24	25-30	31-36	37-42	43-48	49-54	55-60
Horn core	1		1		2	1	1			
Cranial		4	2		2		1			
Maxilla					1		1			
Mandible	5	13	2	2	3	2		3		2
Incisors	2	10		3				1		2
Molar	2	9	3	11	1	2	5	3	1	5
Hyoid	1	1						1		
Atlas			1							
Axis			1							
Cervical vert.		1	2	1	2					
Thoracic vert.	1	3	2	3	1	1	1			
Lumbar vert.	1	3	1		1			2		
Caudal vert.								1		
Rib	9	11	6	3	1		2	3		
Scapula	10	16	2	1	1		1	3		
Humerus	14	16	5	7	5		1	3		
Radius	12	20	2	8	3	2		3		
Ulna	6	16	4	5	2			1		
Metacarpal	6	7	3	2	4	1		3		
Carpal	8	16	3	2				1		
Innominate	3	4	2	3	1	1		1		
Femur	13	21	6	6	3			3		
Patella	5	5	1	1	1			3		
Tibia	11	18	7	10	4		1	7		
Metatarsal	3	7	2	3	1			4		
Astragalus	5	4	1	4			1	1		
Calcaneus	1	2	1	1	2	1		3		
Tarsal	9	9	1	3	1					
Phalanx	17	25	8	12	9		3	9	1	
Totals	**146**	**241**	**69**	**91**	**51**	**11**	**18**	**59**	**2**	**9**

CANID REMAINS

Canid faunal remains were found in most of the depth increments (Table 1). They include at least one specimen of the cranium, mandible, vertebrae, and long bones such as the tibia and scapula. No obvious butchering marks were observed. One bone awl was made on a canid left ulna. A concentration of faunal remains including several canid bones is discussed below.

MOLLUSK SHELL

Fourteen examples of riverine bivalve mollusk shells were recovered from the site. Eight of these were found at 12 inches below surface, one at two specimens at 24 inches, one at 36 inches and three from 44-48 inches below surface. Four of the shells from 12 inches and one

Figure 1: Typical long bone breakage, bison radius, proximal portion.

Figure 2: Typical long bone breakage, bison metatarsal, distal portion.

from 36 inches have been cut and snapped (Figure 6). The others are unmodified fragments of shell. In addition, one small shell pendant fragment was found at 48 inches below surface. It is too small for taxonomic identification, but is presumably made from mollusk shell. No hinge portions are among this sample of shell, so no identifi-

Figure 3: Typical long bone breakage, pronghorn humerus, distal portion.

Figure 4: Typical long bone breakage, pronghorn metacarpal, distal portion.

cation to genus/species was possible. They all appear to be similar to bivalves of the family Unionidae, (riverine bivalve mollusk) which occur with some frequency in Wyoming prehistoric sites.

GASTROPOD SHELL

One large unmodified aquatic gastropod shell (Figure 7) was recovered from the surface, or perhaps from an unspecified depth as the specimen showed some encrusted sediment and staining likely from burial below surface. The shell has been identified by Dr. Robert Dillon of the College of Charleston, South Carolina to the genus *Pleurocera*. The range of this genus is typically from the Mississippi River throughout the eastern portion of North America. Some specimens have been reported along the Missouri River as far west as far eastern Nebraska (Robert Dillon, personal communication, 2015). Shells

Table 5: Pronghorn Bone Elements (Non-Tools) by Depth (inches), NISP.

Depth / **Element**	**0-6**	**7-12**	**13-18**	**19-24**	**25-30**	**31-36**	**37-42**	**43-48**	**49-54**	**55-60**
Horn core		2								
Cranial	1	1								
Maxilla										
Mandible	4	10	2	3	3			3		1
Incisors	6	20	1	5						
Molar		2	2	1						
Hyoid										
Atlas			1					1		
Axis				2						
Cervical vert.	2		1		1			1		
Thoracic vert.			1	2						
Lumbar vert.								1		
Caudal vert.										
Rib			2		2					
Scapula	3	3	8	3				1		
Humerus	5	9	2	2	4	1		3	1	1
Radius	4	10		4				2		1
Ulna	5	6	1		2					
Metacarpal	4	7	6	2	3	4		3		
Carpal	2	2							1	1
Innominate	1	6	3	1				2		
Femur	3	4	3	2				1		
Patella										
Tibia	4	6	1	6	1			1		
Metatarsal	5	4	3	3	2	3		3		1
Astragalus	3	2	1	1						
Calcaneus	1	2	1	2	1					
Tarsal	3	1	2	1				1		
Phalanx	2	11	4	7	2		2	4		
Totals	**57**	**108**	**45**	**47**	**21**	**8**	**2**	**27**	**2**	**5**

of the genus *Pleurocera* were of some significance as a food source in the eastern half of North America, but were infrequently used for decorative purposes. There is some evidence they were associated with mortuary practices in Tennessee Archaic sites (Claassen 2015:219). In general, freshwater snail shells were not used prehistorically as much as some marine taxa (Gibbon 1998:720).

Another example of an exotic gastropod comes from the Middle Archaic component at Mummy Cave in northwestern Wyoming (Husted and Edgar 2002:67). A bead was made on the shell of *Leptoxis praerosa*, whose range includes the Cumberland River, Tennessee River, and lower Ohio River drainages (Goodrich 1940). An undated site from southwestern Wyoming (48UT38) with Middle

Table 6: Bone fragments, 0-12 inches below surface, all units, NISP.

Group	Long bone*	Scapula	Innom.	Vert.	Ribs	Cranial	Teeth
Large artiodactyl	891	30	12	58	562	22	74
Medium artiodactyl	738	11	17	19	364	3	44
Medium mammal**	14	1	1	4	2	1	1
Small mammal***	9		1	1	1		
Medium-large bird	4						
Totals	1656	42	31	82	929	26	119

* includes fore and hind limbs
** canid to raccoon size
*** rabbit size and smaller

Table 7: Bone fragments, 13-24 inches below surface, all units, NISP.

Group	Long bone*	Scapula	Innom.	Vert.	Ribs	Cranial	Teeth
Large artiodactyl	274	3	1	3	126	9	45
Medium artiodactyl	311	2		1	97	1	64
Medium mammal**	2	1	1	1			
Small mammal***	1			1	2	1	1
Medium-large bird	1						
Totals	589	6	2	6	225	11	110

*includes fore and hind limbs
** canid to raccoon size
*** rabbit size and smaller

Archaic to Late Prehistoric diagnostics contained a cache of snail and bivalve shells, one of which was identified to the genus *Cancellaria,* whose range covers an area of the western Atlantic Ocean from North Carolina to Brazil and the Gulf of Mexico coast (Zier 1977).

MARINE SHELL

A modified fragment of marine shell was reportedly found on the surface near the site. Dr. Emmett Evanoff of the University of Colorado identified this shell fragment in 1983 and determined it to be of *Busycon contrarium*, the lightening whelk, which is a common marine shell along the Gulf Coast states. This artifact and a large chipped stone biface are reported from a sandstone outcrop just northwest of the site. Both are illustrated in Frison (1991:355-356) and Kornfeld et al. (2010:445-446). Frison (1991:355) has stated:

> ". . . A large notched biface was reported to have been found on the surface in southern Wyoming and its authenticity was questioned. However, part of a large *Busycon* sp. shell was found a year or so later by a different person in the same location and it is now believed the two items were from a human burial that had eroded out nearby. Both items are diagnostic of materials from the lower Mississippi Valley that somehow found their way onto the Plains."

In addition to the possible location of these two artifacts at the sandstone outcrop, one human occipital bone may also be from the location. It was cataloged in the Garrett Allen site collection, although it is missing from the collection. There is no provenience information on the catalog card. Conversations with individuals who participated in the site excavations indicated a general consensus that human remains had been found in the area of the sandstone outcrop. Unfortunately, we do not know what these remains are or where they might be located if they were collected.

The area of the sandstone outcrop was examined in September of 2013 and in August of 2014 by staff from the Office of the Wyoming State Archaeologist and Wyoming SHPO, as well as students from the University of Wyoming. No artifacts or bones were located in or near this outcrop at these times. If a burial was present in this area and the marine shell artifact and notched biface were associated with the burial, it would appear all evidence

Table 8: Elk (*Cervus elaphus*) Remains, 48CR301.

Unit	Depth (inches)	Element	Tool	Count	Comments
0-10N 10-15W	6	Antler proximal portion		1	Shed antler fragment
21N 77W	8	Antler tine	Yes	1	Flaking tool
78N 49W	18	Antler tine	Yes	1	Flaking tool
80N 33W	18	Maxilla fragment and teeth		1	
88N 8E	18	Antler tine	Yes	1	Flaking tool
78N 30W	24	Incisor and molar		2	
E-W Trench 30W	28	Antler tine	Yes	1	Flaking tool
E-W Trench 32W	30	Molar		1	
25-30S 25-30W	30	Metatarsal proximal portion plus central and fourth tarsal plus calcaneus fragment		1	Articulated unit, exhibits green bone break
North across draw	32	Second phalanx		1	Exhibits green bone break
85N 44W	33	Mandible distal portion		1	
N-S Trench N. end	44	Radius proximal portion		1	Exhibits green bone break
N-S Trench N. end	44	Metacarpal distal portion		1	Exhibits green bone break
N-S Trench 25” NW	44	Antler tine	Yes	1	Flaking tool
E-W Trench E. end	44	Antler tine		1	
78N 38W	44	Maxilla fragment		1	Missing from collection
E-W Trench 40W	46	Antler tine	Yes	1	Flaking tool
E-W Trench 40W	46	Antler proximal portion		1	Shed antler fragment
E-W Trench 40W	60	Antler proximal portion	Yes	1	Flaking tool

of the burial has vanished.

The presence of marine shell in a Wyoming prehistoric site is quite unusual. Association with a burial might explain its presence, but it would remain a rare find. Claassen (2015:167) has argued, while widespread, the amount of *Busycon* shell in eastern archaeological sites does not fit a fall-off model of distribution as might be expected if it was traded. Rather the quantity and spatial distribution of this marine shell can be accounted for if it was made as offerings or gifts at the time of intercommunity rituals.

TURTLE REMAINS

One fragment of a turtle carapace was recovered from 0-4 inches below surface. It is a portion of the costal and neural carapacial bone with a portion of the rib visible on its ventral side. It does not exhibit any butchering marks or other signs of modification. Based on comparison with specimens in the University of Wyoming faunal collection, it most closely resembles those of pond and marsh turtles of the family Emydidae. There are two species in the family Emydidae occurring in Wyoming, *Chrysemys picta* (painted turtle) and *Terrapene ornata* (ornate box turtle) (Ernst and Lovitch 2009). The range of the former includes roughly the eastern third of the state while the range of the latter includes only a small portion of eastern Goshen County in extreme east-central Wyoming. Other turtle species known from eastern Wyoming include a snapping turtle (*Chelydra serpentina*) and the spiny softshell turtle (*Apalone spinifera*, formerly *Trionyx* sp.) (Ernst and Lovitch 2009).

Turtle bone is quite rare in Wyoming archaeological sites. Only nine sites were found to contain turtle remains in their assemblages (Table 9). Dated components include Paleoindian to Historic periods. This list does not include paleontological (fossil) turtle remains. These data were compiled from searches of the SHPO WYCRIS and UWAR data bases, as well as a search through several excavated sites with relatively large faunal assemblages.

What is interesting here is all the turtle remains are

Figure 5: Elk antler knapping tools (a and b), large artiodactyl rib tool (c).

carapace fragments. It would appear turtles in Wyoming were gathered primarily for their shells, suggesting use for containers such as food bowls or rattles (see Driver and Massey 1957). A similar conclusion was reached regarding the Clary Ranch Paleoindian sites in southwestern Nebraska, whose turtle carapace remains showed evidence of cut marks and scraping on the ventral surfaces (Hill et al. 2008:127).

FETAL BONE

Eighteen whole and partial faunal elements appear to be from near term fetal or newborn animals. Elements

Figure 6: Cut and snapped mollusk shell

Figure 7: Gastropod shell, genus *Pleurocera.*

include longbones, vertebrae and one phalanx (Figure 8). Taxa include bison, pronghorn and deer (Table 10).

The presence of near term/newborn artiodactyl bone suggests a late spring to early summer occupation of the site. Bison typically give birth to calves from mid-April to the end of June (Roe 1970:94). The timing for mule deer birthing in Wyoming is from late May through June (Wyoming Game and Fish Department 2002:2). For pronghorn, fawning typically occurs in late May to early June, but a few births can occur earlier in April and later into July (O'Gara and Yoakum 2004:291).

Given these bones were recovered from nearly all depths and across the excavated areas within the site, it would appear groups visited the site and hunted these artiodactyls at roughly the same time of the year over a period from about 500 to nearly 3100 years before present. It is not known how many separate occupations occurred during this time frame, but the fact the occupations took place at the same time of the year suggests the site was used periodically in the prehistoric past for

Figure 8: Pronghorn near term/newborn humerus.

Table 9: Turtle Remains in Wyoming Archaeological Sites.

Site	Location	Taxon (if known)	Dating	Reference
48GO305 (Hell Gap)	EC Wyoming	Unidentified carapace fragments	Paleoindian (pre-Agate Basin stratum)	Moore et al. 2015
48PA29 (Horner)	NC Wyoming	*Chrysemys* cf. *picta*-painted turtle, incised and unmodified carapace fragments	Paleoindian (Cody)	Walker 1987
SW13156 (Battle Spring Draw)	SW Wyoming	Unidentified incised carapace fragment	Paleoindian (Cody and Pryor Stem.)	Craven 2005
48LN2331 (Many Chiefs)	SW Wyoming	Unidentified carapace fragments	Middle Archaic	Reed 2005
48CR301 (Garrett Allen)	SE Wyoming	Family Emydidae, pond/marsh turtles, unmodified carapace fragment	late Late Prehistoric	This article
GO123 (Rock Ranch)	EC Wyoming	*Trionyx spiniferus* (now *Apalone spinifera*), softshelled turtle, unmodified carapace fragments	Protohistoric to early Historic	Zeimens 1987
48NA288 (Seminoe's Trading Post)	Central Wyoming	Family Emydidae, cf. *Terrepene ornata*, ornate box turtle, unmodified carapace fragments	Historic, mid-19th century	Walker 2009

Table 10: Near Term/Newborn Faunal Remains.

Taxon	Element	Unit	Depth in inches
Bison	Ulna diaphysis	30-33S 35-40W	4
Bison	Radius diaphysis	30-33S 35-40W	8
Pronghorn	Radius diaphysis	30-33S 30-35W	8
Deer	Ulna	E-W Trench 30-35E	12
Pronghorn	Humerus	30-33S 40-45W	17
Pronghorn	Scapula	30-33S 40-45W	17
Medium artiodactyl	Long bone diaphysis	30-35S 20-25E	17
Pronghorn	Scapula (burned)	23-30S 45-50W	22
Bison	Thoracic vertebra	33N 80W	22
Pronghorn	Tibia distal portion	23-30S 45-50W	22
Pronghorn	Femur diaphysis	78N 20W	24
Pronghorn	Ulna proximal portion	30-35S 10-15E	30
Medium artiodactyl	Femur diaphysis	30-35S 15-20E	30
Pronghorn	First phalanx	E-W Trench 25-30E	40
Pronghorn	Femur diaphysis	N-S trench N. End	44
Bison	Lumbar vertebra	E-W Trench E. End	44
Bison	Metatarsal diaphysis	E-W Trench E. End	44
Bison	Tibia	E-W Trench	48

similar purposes.

BONE CONCENTRATION

In one unit, 78N 38W, crania, mandibles and other elements of canid, badger, raccoon, porcupine, opossum, bison, pronghorn and elk were recorded at 44 inches below surface. According to the catalog cards, twenty-six bone elements were recorded at this depth (Table 11). The unit was excavated on April 28, 1974 by Garrett Allen. It appears the unit in question was part of a larger block or trench excavated from the edge of the site deposit (just above the spring) oriented north to south. This conclusion is reached on the basis of the general practice to dig in 5x5 feet blocks (see Eckles 2013) and from photographs showing larger block areas in the process of excavation at the northern end of the site, just above the spring. Unfortunately, there are no recording forms or photographs of the bone concentration from the 1974 excavations.

Seventy-seven percent of the remains are crania, maxillae and mandibles or elements anatomically close to the cranial bones such as the hyoid and atlas vertebrae. Most of the remains are from medium to small mammals (canid, raccoon, badger, porcupine and opossum). No butchering marks were observed on any of the bones (Figure 9).

The bone concentration has not been directly dated. Assuming the correlation of radiocarbon dates is applicable across the site's deposits, the canid and small mammal bone concentration could date to the early part of the Late Archaic period as a charcoal sample from 44-48 inches below surface returned a date of 2363+/-30 radiocarbon years before present.

The presence in a confined area of such a diverse group of mostly canid and other small mammal cranial bones and mandibles is unusual in Wyoming archaeological sites. It is made even more unusual given the presence

Table 11: Faunal Remains from Unit 78N 38W, 44 inches Below Surface.

Taxon	Element	Side	Portion	Count	Cat No.
Canid	Mandible	L	Complete	1	C3792
Canid	Mandible	R	Nearly complete	1	C3793
Canid	Mandible	R	Nearly complete	1	C3794
Canid	Mandible	R	Proximal portion with partial tooth row; teeth are quite worn	1	C3795
Canid	Mandible	L	Nearly complete	1	C3796
Canid	Mandible	L	Nearly complete	1	C3797
Canid	Mandible	R	Nearly complete	1	C3799
Canid	Maxilla	R	Fragment with partial tooth row	1	C3807
Canid	Maxilla	R	Upper front tooth row	1	C3808
Canid	Thoracic vertebrae (immature)		Nearly complete	4	C3820
Badger	Cranium		Complete	1	C3798
Badger	Mandibles	L, R	Complete	2	C3806
Badger	Maxilla		Maxillary tooth row	1	C3814
Badger	Atlas vertebra		Complete	1	C3815
Raccoon	Cranium		Complete	1	C3810
Porcupine	Cranium		Complete	1	C3809
Opossum	Humerus	L	Complete	1	C3817
Bison	Hyoid		Complete	1	C3813
Bison	Molar		Complete	1	C3819
Pronghorn	Atlas vertebra		Complete	1	C3816
Pronghorn	Metatarsal	R	Proximal end	1	C3818
Elk*	Maxilla		Fragment	1	C3812

*missing from collection, information from catalog card

Figure 9: Sample of canid mandibles from concentration area.

of an opossum (*Didelphis* sp.) humerus. The historic range of opossum probably did not include Wyoming or other Rocky Mountain states, nor the plains areas of North and South Dakota and Montana. The westernmost extension of the opossum range includes eastern Nebraska, most of Kansas and Oklahoma, and roughly the eastern half of Texas. The northern limit includes southern Wisconsin, southern Michigan and the southern half of the upper New England states (Neumann 1984:290). Buskirk (2016:76) shows a less expansive historic range with opossum lacking in the Rocky Mountains states and most of Nebraska, Kansas, and Iowa. The Garrett Allen site opossum element appears to be the only recorded instance of *Didelphis* in the Wyoming archaeological record.

There is some question about the historic range of raccoon. It has been assumed raccoons (*Procyon lotor*) were limited in their distribution by the need to be close to water sources and did not occur in most arid regions of North America, including the western Great Plains and Southwest (Hall and Kelson 1959). Warren (1910:219) stated raccoons and its subspecies were distributed over most of the United States with the exception of the Rocky Mountain states north of Colorado. In Colorado it was rarely found and only east of the Continental Divide. Early American historic and ethnographic accounts suggest raccoons were extremely rare or non-existent in the northern Great Plains (Finley 1995:4) The expansion of the range of *Procyon* into the Rocky Mountain west seems to have occurred as a result of agricultural expansion into this area starting about the 1870s (Finley 1995:3). The establishment of urban areas, irrigation canals, stock ponds and other water impoundments may have been the impetus for raccoon expansion (Kamler et al. 2003). Surveys of Late Pleistocene and Early Holocene paleontological sites in Wyoming and Idaho indicate no *Procyon lotor* remains in assemblages containing most of the mammalian taxa currently extant in the state (Anderson 1974; Walker 1986). Buskirk (2016:322-323) states *Procyon lotor* was likely not present in Wyoming at the time of Euro-American settlement, except for a few anecdotal recordings of raccoon in the 1870s. Its range expanded into Wyoming after the late 1800s to include the eastern one-fifth of the state by 1965.

Raccoon bones in Wyoming sites are rare. A cranium and mandibles were recovered from an historic era (ca. early to mid-1900s) trash midden at site 48CK1417 in the Wyoming Black Hills (Reust et al. 1996). One possible raccoon mandible was recovered from 48BH206 (Bottleneck Cave) in north-central Wyoming in probable late Late Prehistoric deposits (Husted 1969). Another mandible tentatively identified as (fossilized?) raccoon (*Procyon* sp.) was found at 48SH301 (Bentzen-Kaufman Cave) in north-central Wyoming in Early Archaic deposits (Grey 1962a). This bone was reported to be mineralized (Grey 1962b) as were other bones in the assemblage, but the degree of mineralization was not discussed. It is unclear if it is part of the archaeological faunal remains or a fossil of considerable age. Unfortunately, it cannot be found in any collections and unavailable for further analysis.

It is tempting to suggest the Garrett Allen site bone concentration represents a ritual disposal. There are several other sites in Wyoming in which canid skulls were purposefully interred in what was considered a ritual burial (Table 12). There are a variety of contexts represented at these sites: canid skulls and other canid elements interred in bison bone beds, as single burials, burial with other, usually bison bones, one canid interment with a human burial, and coyote skulls interred with a protohistoric horse.

The Vore site includes one skull, mandible, axis and atlas vertebrae of coyote (*Canis latrans*), multiple skulls and mandibles of probable wolf-dog hybrids (*Canis* cf. *lupus* or *familiaris*), and post-cranial elements of *Canis* sp. which appear to be larger than coyote (Walker 1980: 156-163). Reher and Frison (1980:19) suggest a ceremonial role for canid bones in the bison bone middens at the

Vore site, as well as for the Glenrock and Wardell sites. While not positing a ritual interment, Frison et al. (1976) reported mandibles and post-cranial remains of wolf (*Canis lupus*) from the Hawken site, an Early Archaic bison trap in northeastern Wyoming.

Interestingly, the Bentzen-Kaufman Cave, 48SH301 (Grey 1962a), yielded crania or mandibles of skunk, rabbit, elk, pronghorn, deer, cf. raccoon, prairie dog, pocket gopher, as well as bear canines in addition to canid mandibles and teeth. The context of these remains was not discussed, but the association of such a diverse assemblage of cranial and mandibular elements in relative proximity somewhat mirrors the Garrett Allen bone concentration.

There is evidence in Wyoming archaeological sites dating from the Early Archaic to Protohistoric of ritual interment of canid remains. The Garrett Allen site also appears to have such an interment, and is particularly unusual given the presence of other small mammalian taxa, especially the opossum humerus and raccoon cranium.

CONCENTRATION OF INCISORS AND OTHER FAUNAL REMAINS

Concentrations of artiodactyl incisors and other faunal remains were recovered in an excavation unit from 8-12 inches below surface and one from 24 inches below surface (Tables 13 and 14). None of the specimens show signs of modification.

Artiodactyl incisors were sometimes modified for attachments of string to serve as clothing decorations.

> "Deer and elk milk teeth, bear canines, rodent incisors, horse incisors, and bison teeth have all been mentioned by early observers as decorative devises, although the most highly valued were the permanent canine teeth of the elk…" (Koch 1977:47).

Wood (1957) discusses the presence of perforated elk canines in late Late Prehistoric sites in North Dakota and elsewhere, as well as ethnohistorical documentation of elk teeth as clothing decoration. The modification of elk canines appears to have been a relatively late phenomenon in the northern Plains among the Mandan, Hidatsa, Crow, Blackfoot and Dakota with Cheyenne, Arapaho and Dakota having adopted the practice after about 1800. Archaeologically, five bison incisors from the Piney Creek site (48JO312) exhibit encircling grooves at the juncture of the root and enamel (Frison 1967:20). Presumably, these modifications were for attachments of the teeth to some other object such as clothing, bundles, pouches, etc.

The diversity and type of faunal remains from the Soil Unit 3A2 might be suggestive of the contents of a bundle or other artifact designed for ritual use. Bundles of various types and designed for various ritual purposes could include a wide variety of plants, animal feathers, skin, bones, shells, unmodified and chipped stones, minerals, fossils, and decorative items such as beads and modified teeth. For example, the Wind River Shoshone used bison teeth for necklaces and in medicine rattles (Shimkin 1947:265) and a necklace of bison incisors was found in an Arikara medicine bundle (Howard 1974:267-268).

BONE AWLS

Bone awls were recovered from all depth increments across the excavated portions of the site, including 47 complete and fragmentary specimens (Table 15; Figures 10-11). Bone elements used to manufacture these tools have been identified as pronghorn (16), canid (2), and possible bird (1). Most of the awls are made on fragments of long bone (fore and hind limbs) and ribs of medium sized artiodactyls with a few from large artiodactyls. The preferred element for use in awl manufacture appears to be medium sized artiodactyl (often pronghorn) metapodials (Figure 10). Bone splinters from long bone diaphyses were also made into awls (Figure 11).

Table 13: Faunal Remains from Soil Unit 3A2, 8-12 inches below surface. *

Taxon	Element	Count
Bison	Incisors	10
Pronghorn	Incisors	17
Porcupine	Incisors	2
Small carnivore (fox size)	Canine	1
Artiodactyl	Molar fragments	8
Medium artiodactyl	Bone tool on rib	1
Mollusk	Cut and snapped shell fragments	4
Fossil bone unidentified	Vertebrate long bone	1
Artiodactyl long bone fragments	Probable fore and hind limbs	8

*Other items recovered include two sandstone shaft abraders.

Table 14: Faunal Remains from unit 78N 30W, 24 inches Below Surface.

Taxon	Element	Count
Bison	Incisors	3
Pronghorn	Incisors	6
Elk	Incisor	1
Elk	Molar	1
Artiodactyl	Molar fragments	28

BONE BEADS AND TUBES

Thirteen bone beads/tubes were recovered from nearly all depth increments across the site. They include beads made on canid, bird, pronghorn, small mammals, and medium sized artiodactyl long bones (Table 16; Figure 12). One probable gaming piece with cross-hatched design was made on a small-medium sized mammal rib (Figure 13).

DISCUSSION

Previous articles on the Garrett Allen site assemblages have emphasized the evidence for special place gatherings over the course of its prehistory. Chipped stone raw materials, many from considerable distances and multiple directions made their way into the site (Eckles and Guinard 2015). Atypical stone artifacts and minerals, also from distant sources, are also represented in the collections (Eckles 2019). Several projectile points with affinities to the Great Basin and Central Plains were recovered (Eckles and Miller 2019), as well as one exotic notched biface, possibly derived from the lower Mississippi River valley (Eckles 2019). As Hoffman (1994:354) has argued, the presence of artifacts from multiple sources and directions is one type of evidence for an aggregation site.

The faunal remains provide additional support to the idea the Garrett Allen site represents a gathering site. There are number of faunal taxa extralimital to the site from considerable distances and from multiple directions. Four of the taxa represented, *Pleurocera*, *Busycon*, *Didelphis*, and probably *Procyon lotor*, are exotic, their

Figure 10: Examples of bone awls made on pronghorn metapodials.

Figure 11: Examples of bone awls made on long bone shaft splinters, medium sized artiodactyls.

Table 15: Bone Awls.

Taxon	Element	Depth (in.)	Awl Portion	Length
Pronghorn	Metacarpal distal	4	Fragment	34.2
Medium artiodactyl	Rib	4	Fragment	50.6
Pronghorn	Humerus diaphysis	4	Complete	74.8
Medium artiodactyl	Rib	6	Complete	117.6
Medium artiodactyl	Long bone diaphysis	6	Fragment	47.7
Medium artiodactyl	Long bone diaphysis	6	Fragment	41.1
Large artiodactyl	Rib	6	Complete	109.8
Pronghorn	Metacarpal distal	6	Complete	110.8
Pronghorn	Metapodial diaphysis	8	Fragment	45.5
Medium artiodactyl	Metatarsal diaphysis	8	Fragment	67.3
Medium artiodactyl	Long bone diaphysis	8	Fragment	91.2
Large artiodactyl	Long bone diaphysis	8	Fragment	73.7
Medium mammal (canid size?)	Ulna diaphysis	8	Fragment	51.9
Canid (wolf/large dog size)	Ulna complete	11	Complete	145.2
Pronghorn	Humerus distal	12	Complete	52.0
Medium artiodactyl	Long bone diaphysis	12	Fragment	55.0
Medium artiodactyl	Long bone diaphysis	12	Fragment	53.8
Pronghorn	Metapodial diaphysis	13	Complete	122.7
Pronghorn	Metapodial diaphysis	15	Complete	142.4
Pronghorn	Metapodial diaphysis	16	Fragment	84.1
Medium artiodactyl	Long bone diaphysis	17	Complete	93.9
Pronghorn	Metatarsal diaphysis	18	Complete	131.2
Medium artiodactyl	Rib	18	Fragment	93.8
Large artiodactyl	Rib	18	Complete	132.2
Medium artiodactyl	Metapodial diaphysis	21	Complete	96.9
Medium artiodactyl	Metacarpal distal	21	Complete	115.2
Medium artiodactyl	Long bone diaphysis	21	Fragment	41.8
Pronghorn	Metatarsal diaphysis	22	Complete	120.0
Large artiodactyl	Rib	22	Complete	160.3
Medium artiodactyl	Rib	26	Fragment	35.9
Medium artiodactyl	Rib	27	Complete	88.6
Medium artiodactyl	Rib	20	Fragment	73.8
Pronghorn	Metacarpal distal	32	Complete	147.5
Pronghorn	Metacarpal distal	36	Complete	85.3
Pronghorn	Metatarsal proximal	36	Complete	137.4
Pronghorn	Metatarsal, distal	36	Complete	145.5
Medium artiodactyl	Long bone diaphysis	36	Complete	68.5
Medium artiodactyl	Rib	42	Fragment	54.7
Medium artiodactyl	Long bone diaphysis	44	Fragment	115.8
Medium artiodactyl	Long bone diaphysis	44	Fragment	73.5
Medium artiodactyl	Long bone diaphysis	44	Fragment	20.5
Medium artiodactyl	Metapodial diaphysis	45	Complete	139.4

Medium artiodactyl	Long bone diaphysis	45	Complete	110.6
Pronghorn	Metatarsal diaphysis	46	Complete	147.9
Medium artiodactyl	Metatarsal diaphysis	46	Fragment	58.9
Pronghorn	Metatarsal proximal	60	Complete	141.2
Large bird (?)	Long bone diaphysis	61	Fragment	75.9

Table 16: Bone Beads/Tubes and Other Worked (Decorative) Bone.

Taxon	Element	Depth (in.)	Type	Count
Small-medium mammal	Rib	11	Incised piece	1
Canid	Metapodial	22	Bead	3
Medium bird	Long bone diaphysis	22	Bead	1
Pronghorn	Metatarsal proximal end	28	Bead? (other decorative?)	1
Small mammal	Long bone	33	Bead	1
Medium carnivore	Tibia diaphysis	38	Bead	1
Medium bird	Long bone diaphysis	38	Bead	2
Small mammal	Long bone diaphysis	46	Bead	1
Small mammal	Long bone diaphysis	60	Bead	1
Medium artiodactyl or large carnivore	Long bone diaphysis	N/A	Bead	1

Figure 12: Examples of bone beads/tubes.

Figure 13: Incised bone fragment, probable gaming piece.

historically known ranges being far from the site.

Another type of evidence for a special place gathering site is the probability of ritual activity. The canid and other small mammal bone concentration is a probable example of this. A concentration of incisors and other bone may be indicative of a ritual bundle. The single turtle carapace fragment may suggest another ritual use. The site is located adjacent to a spring, and springs held spiritual significance for many Native American groups (see e.g., Benedict 1992:4-5). The interment of ritual items may be in part offerings to the spirits of the spring. The presence of near term/new born bone elements (and no other fetal elements) throughout the depth sequence (suggesting late spring/early summer occupations) is further evidence gatherings were planned to occur at the same time over several thousand years.

The frequencies and diversity of bone tools and use of bone for decorative items suggest not only typical daily living activities were carried on, but they occurred in similar proportions throughout the prehistoric sequence and were carried out by more than the "normal" number of individuals at an occupation site. A considerable amount of manufacturing of bone tools and decorative items took place in all depth increments. This includes bone awls, tubes, beads, one possible gaming piece and other worked bone. A relatively large number of sandstone "shaft abraders" were recovered (Eckles 2015), which were likely used in the manufacture of bone awls, atlatl and arrow shafts. Considering the number and sizes of end scrapers (total of 254) from all depth increments, hide, wood and bone working were major activities. There is great variability in the size of the end scrapers, from long, wide and thick examples, to tiny "thumbnail" sized specimens. This suggests a variety of applications. Many of these tools have been extensively used and retouched to a point where the tools are useless for further applications (see Eckles 2016). Exotic raw materials were preferred in the manufacture of end scrapers (Eckles and Guinard 2015). Elk antler was likely gathered on-site for production and use of knapping tools.

The faunal assemblage contains large numbers of bison and pronghorn bone, taxa which appear to be the primary focus of hunting, food preparation, hide working and whose bones were used in the manufacture of bone tools. The site contains a diverse assemblage of other taxa, although in significantly lower absolute numbers. The composition of faunal remains and taxa appear to be consistent throughout the depth sequence, indicating similar procurement and use of animal resources occurred during the prehistoric occupations.

ACKNOWLEDGMENTS

Many thanks to Jody Clauter and Mark Lane of the University of Wyoming Archaeological Repository who were of great assistance with the 48CR301 collections and associated field and lab documents. Danny Walker (Assistant State Archaeologist, retired) was of invaluable assistance in the identification of many of the faunal remains. Dan Eakin (Office Wyoming State Archaeologist Survey, retired) identified many of the faunal remains from the 1979-1980 field school project. Robert Dillon (College of Charleston, South Carolina) and Lusha Tronstad (Berry Center, University of Wyoming) collaborated on the identification of the gastropod shell. Steve Sutter and Dave Rapson of SHPO Cultural Records assisted in finding data on sites with turtle remains.

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