



ARCHAEOLOGICAL INVESTIGATIONS AT BAKER CAVES I AND III:

A LATE ARCHAIC COMPONENT ON THE EASTERN SNAKE RIVER PLAIN

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THE FAUNA OF BAKER CAVES

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Method

Analysis of the vertebrate remains from Baker Caves was conducted by identifying each catalogued bone according to taxon, bone element or partial element represented, and anatomical position (right, left, proximal, distal, etc.). Identification was made by comparison with osteological material at the Paleontology Laboratory, Idaho Museum of Natural History, Pocatello, and utilizing some literature sources (Brown and Gustafson, 1979; Hogben, 1960).

Notes were made on: degree of osteological maturity based on tooth eruption and wear or degree of epiphyseal union in the post-cranial skeleton; breakage patterns and features; charring; weathering phenomena such as exfoliation, drying cracks and calcium carbonate deposition. This information was used to interpret the taxonomic composition of the assemblage, estimate minimum numbers of individuals/species represented, age and sex distribution, seasonality, taphonomy, butchering and bone breakage activities.

A small sample from Baker Cave I (10-BN-154) was analyzed, with the bulk of the fauna forming the basis for the following discussion coming from Baker Cave III (10-BN-153). Osteological material from Baker Cave III was recovered in a two-step process. Bones lying on the surface were mapped in situ, lettered, and retrieved by grid block position. The shallow

sediments (0-15 cm) of the cave were excavated and processed through 1/8" mesh screen, and the bones collected in the level bags from multi-block units.

Faunal Inventory

The fragmentary bones from Baker Cave I include portions of two right maxillary and mandibular tooth rows, two right distal tibia, right carpals, distal metapodial, and one fetal scapula, all of Bison from surface provenience.

Table 2 lists the animals represented in the Baker Cave III fauna. Most species and genera identified, with the exception of rabbits and bison, are based on a few elements or partial elements. All species are presently or historically extant on the Snake River Plain and their remains commonly accumulate, through a variety of mechanisms, in basalt caves and rock-shelters in this region.

Taphonomy

In general, bone preservation is good at Baker Cave III, characteristic of the dry climate and protection given by the cave environment. All bones are broken to some degree, teeth loose or missing, but identifiable features and fracture patterns are retained. A few bones are extensively weathered to friable, non-identifiable condition, in contrast to a few with tissue remnants still adhering. Some bones have distinctive rodent gnaw-marks. Less than 10% of the collection

TABLE 2

Baker Cave III (10-BN-153) Faunal List

Class Reptilia	Unidentified Snake	
Class Aves	Unidentified Bird	
	<u>Corvus corax</u>	Raven
Class Mammalia		
Order Lagomorpha	<u>Lepus</u> sp.	Jackrabbit
	<u>Sylvilagus</u> sp.	Cottontail
	<u>Brachylagus</u> <u>idahoensis</u>	Pygmy Rabbit
Order Rodentia	Unidentified Sciurid	
	<u>Marmota</u> sp.	Marmot
	<u>Neotoma</u> sp.	Packrat
Order Carnivora	Unidentified medium- large	Canid
Order Artiodactyla	<u>Bison bison</u>	Bison

is charred or burned.

A number of the elements from surface provenience show extensive weathering by desiccation and/or freeze-thaw action, which results in rectilinear fracturing and exfoliation. Many of the bison bones have a heavy coating of calcium carbonate, confined largely to one surface or side of the bone, a common phenomena on bone accumulating in basalt terrain caves. This indicates that the elements lay in an undisturbed position, with the carbonate accreting on the under-surfaces, for a significant but unquantifiable period of time. Bones which were buried are generally in excellent condition.

Natural mortality--entrapment in the cave, import by raptors and predators, pack rat hoarding--would account for the assemblage species composition and condition of part of the bone from Baker Caves. The element survival patterns, condition, and relative abundance of the bison and rabbit material implicate cultural selection and activity to account for their presence, abundance and distribution in the deposits.

The analysis, to date, has not been able to distinguish vertical separation in the bone deposit, indicative of more than one bison- or rabbit-processing event separated in time, or discrete cultural activity areas or associations within the area excavated. More information is needed to relate cultural features such as fire hearths and artificial stone arrangements and natural features such as pack rat middens,

cave entrances and fissures to the taphonomic history of the assemblage.

The rabbit remains, although expected in a cave deposit, dominate the small-medium size animal category in numbers of individuals. A combination of factors suggest that cultural activity was responsible for their abundance. These factors, equivocal if interpreted singly, include patterns of breakage and element survival, some charring and burning, overall numerical abundance, and the contrasting paucity of other anticipated animals in this size category--small carnivores, pack rats, larger ground squirrels, etc.--in the assemblage.

The rabbit bones deserve more critical analysis to test this hypothesis and contrast those factors which might point to human vs. other taphonomic agencies, the limitations of the sampling area and method, and the role of the cave conformation in creating the bone assemblage. The bias against smaller birds and mammals can be accounted for by the 1/8" mesh size used in screening.

The Bison Remains

Bison constitute the single large mammal species at the site. Features of modification and element representation reflect cultural selection in forming the assemblage. Discussion of the bison remains and their modification will form the focus of the following section. For the most part, skeletal evidence from both surface and subsurface assemblages

will be treated as a unit for descriptive purposes.

The bison remains are well-preserved and include such fragile elements as skull, maxillary and horn sheath fragments, lightly ossified costal rib portions, and parts of the sternum. The bison bone is highly fragmented, but broken surfaces are generally sharp and unabraded chemically or physically.

Tables 3 and 4 present an inventory, by element, of the bison remains. From this information, separation of individuals by mature-immature-fetal osteological age, and the use of measurements, something about the age and sex of the remains can be assessed.

The MNI (Minimum Number of Individuals), a figure relatively suggestive of the original number of animals deposited at the cave and a standard convention used in faunal analysis, is obtained by counting the maximum number of the most common, single, discrete element represented, e.g., the right astragalus, left maxilla, atlas, etc. Such estimates are highly conservative, and, due to various taphonomic factors, underestimate the original number of individuals deposited. The MNI, including all age classes at Baker Cave III, is 17, combining surface and subsurface provenience. The MNI is based on the distal right tibia. Other frequently encountered elements in the collection closely approximate this figure--distal humerus (10 left), distal radius (14 right) and astragalus (14 left). The anatomical origin of these abundant elements is also of interest. Their relative survival rates,

TABLE 3: Inventory of Bison; all elements/partial elements.
Baker Cave III (10-BN-153).

Provenience: Surface; all test pits combined.

Key: Frag = Fragment(s) R = Right L = Left I = Indeterminate

<u>Element</u>	<u>Indeterminate/ Fragmentary</u>	<u>Mature</u>	<u>Immature</u>	<u>Fetal</u>
Skull	2	-	-	-
Horn Core/Frag	-	-	-	-
Horn Sheath/Frag	-	2	-	-
Maxilla/Frag	-	3R 1I	-	-
Mandible/Frag	-	2L 3R	1L	-
Hyoid	-	-	-	-
Vertebrae:				
Atlas	-	1	-	-
Axis	-	1	1	-
Cervical	-	-	-	-
Thoracic	-	-	-	-
Lumbar	-	-	-	-
Sacrum	-	-	-	-
Caudal	-	-	-	-
Epiphysis/ Centrum	-	-	1	-
Rib/Frag	52+	-	-	1
Sternum	-	-	-	-
Scapula:				
Dorsal Border	-	1L	-	-
Proximal	-	1L 5R	-	-
Blade+Spine	-	1L 4R 1I	-	-
Blade Frag	-	-	-	-
Ventral Border	-	4L 1I	-	-
Complete	-	2L 2R	1R	-
Humerus:				
Proximal	-	1R	-	-
Distal	1	9L 5R	1R	-
Ulna: Proximal	-	1R	-	-
Radius: Proximal	-	2L 4R	1I	-
Distal	-	4L 8R	2L 2R	-
Scaphoid	-	1L	-	-
Lunar	-	2L 2R	-	-
Cuneiform	-	-	-	-
Unciform	-	-	-	-
Pisiform	-	-	-	-
Metacarpal:				
Proximal	-	2R	-	-
Femur: Proximal	-	1L	1L	-
Distal	-	-	-	-
Tibia: Proximal	-	4L 1R 1I	1L	-
Distal	-	4L 10R	2L 4R	1R

TABLE 3 (cont'd)

<u>Element</u>	<u>Indeterminate/ Fragmentary</u>	<u>Mature</u>	<u>Immature</u>	<u>Fetal</u>
Fibula: Distal	-	-	-	-
Long-bone Diaphyseal	61+	-	-	-
Fragments				
Astragalus	-	6L 4R	-	-
Calcaneus	-	4L 6R	-	-
Cuboid	-	1L 3R	-	-
Entocuneiform	-	1L 3R	-	-
Metatarsal:				
Proximal	-	3R	-	-
Distal Metapodials	-	4	2	-
Pelvis: Acetabulum	3L 2R	-	-	-
First Phalanx	-	-	-	-
Second Phalanx	-	-	-	-
Third Phalanx	-	-	-	-
Sesamoid	-	-	-	-

TABLE 4: Inventory of Bison; all elements/partial elements.
Baker Cave III (10-BN-153).

Provenience: 0-10 cm; all test pits combined.

Key: Frag = Fragment(s) R = Right L = Left I = Indeterminate

<u>Element</u>	<u>Indeterminate/ Fragmentary</u>	<u>Mature</u>	<u>Immature</u>	<u>Fetal</u>
Skull	6	-	-	-
Horn Core/Frag	-	-	-	-
Horn Sheath/Frag	-	-	-	-
Maxilla/Frag	-	3L	-	-
Mandible/Frag	2	2L 8R	-	1R 2I
Isolated Teeth/Frags	-	19	4	-
Hyoid	-	4	-	-
Vertebrae:				
Atlas	-	-	-	-
Axis	-	-	-	-
Cervical	-	3	1	-
Thoracic	-	2	-	-
Lumbar	-	2	-	-
Sacrum	-	-	-	-
Caudal	-	-	-	-
Epiphysis/Centrum/Frag	5	1	5	11
Rib/Frag	58+	-	-	13
Sternum	2	-	-	-
Scapula:				
Dorsal Border	-	-	-	-
Proximal	-	2L 1I	-	-
Blade+Spine	-	-	-	-
Blade Frag	-	1R 5I	3I	-
Ventral Border	-	1L	-	-
Complete	-	-	-	4
Humerous:				
Proximal	-	-	-	-
Distal	-	2R 3I	-	-
Ulna: Proximal	-	1L 1R	-	1
Radius: Proximal	-	1L 2R	-	-
Distal	-	2L 1R 1I	1L 2R 1I	-
Scaphoid	1	4L 1R	-	-
Lunar	1	4L 3R	1	1
Cuneiform	-	3I 1R	-	-
Unciform	1	1L	-	-
Pisiform	-	1	-	-
Metacarpal:				
Proximal	-	-	-	-
Femur:				
Proximal	-	-	-	-
Distal	-	1L	-	-
Fibula: Distal	-	2	-	-

TABLE 4 (cont'd)

<u>Element</u>	<u>Indeterminate/ Fragmentary</u>	<u>Mature</u>	<u>Immature</u>	<u>Fetal</u>
Long-Bone Diaphyseal	47 ⁺	-	-	1
Fragments	-	8L 1R	-	-
Astragalus	-	2L 1R 1I	1L	-
Calcaneus	-	1R	-	-
Cuboid	-	1L 2R	-	-
Entocuneiform	-	-	-	-
Metatarsal:	1	2L 1R	-	-
Proximal	-	6	-	4
Metapodials:	-	1R 1I	1L	3
Distal	-	-	-	-
Pelvis: Acetabulum	1L	-	-	-
Ilium Frag	1I 1I	-	-	-
Frag	-	1	1	1
First Phalanx	-	2	-	-
Second Phalanx	-	1	-	-
Third Phalanx	-	-	-	-
Sesamoid	2	-	-	-

partly due to durability, presence in the collection, and patterns of modification are important to reconstructing skeletal disarticulation sequence, modification methods, and history of deposition. The relative abundance of bison elements at Baker Cave III is presented graphically in Figure 1 and will be treated in more detail.

A series of diagnostic measurements, suggested by von den Dreisch (1976) and Speth (1983) and compared to metrical data (Speth, 1983; Appendix), were taken on post-cranial elements from Baker Cave III to deal with the Bos vs. Bison identification challenge and help separate the individuals by sex. For economy, these data are not included here, but confirmed the large Bovids as Bison. Of the seventeen MNI only two are clearly mature males, four are immature (less than three years old) individuals of indeterminate sex, one is fetal, and the remaining ten are adult females. This information fits the relative age and sex composition of the most commonly found social grouping among bison and, assuming a single killing and processing event at Baker Cave, suggests that some cooperative method was used prehistorically to "sample" a herd.

There are two immediately striking aspects to the Baker Cave III bison material. One is the highly consistent incidence of certain element portions, and absence of others, with repetitive patterns of modification and treatment. The other is the presence of fetal bison.

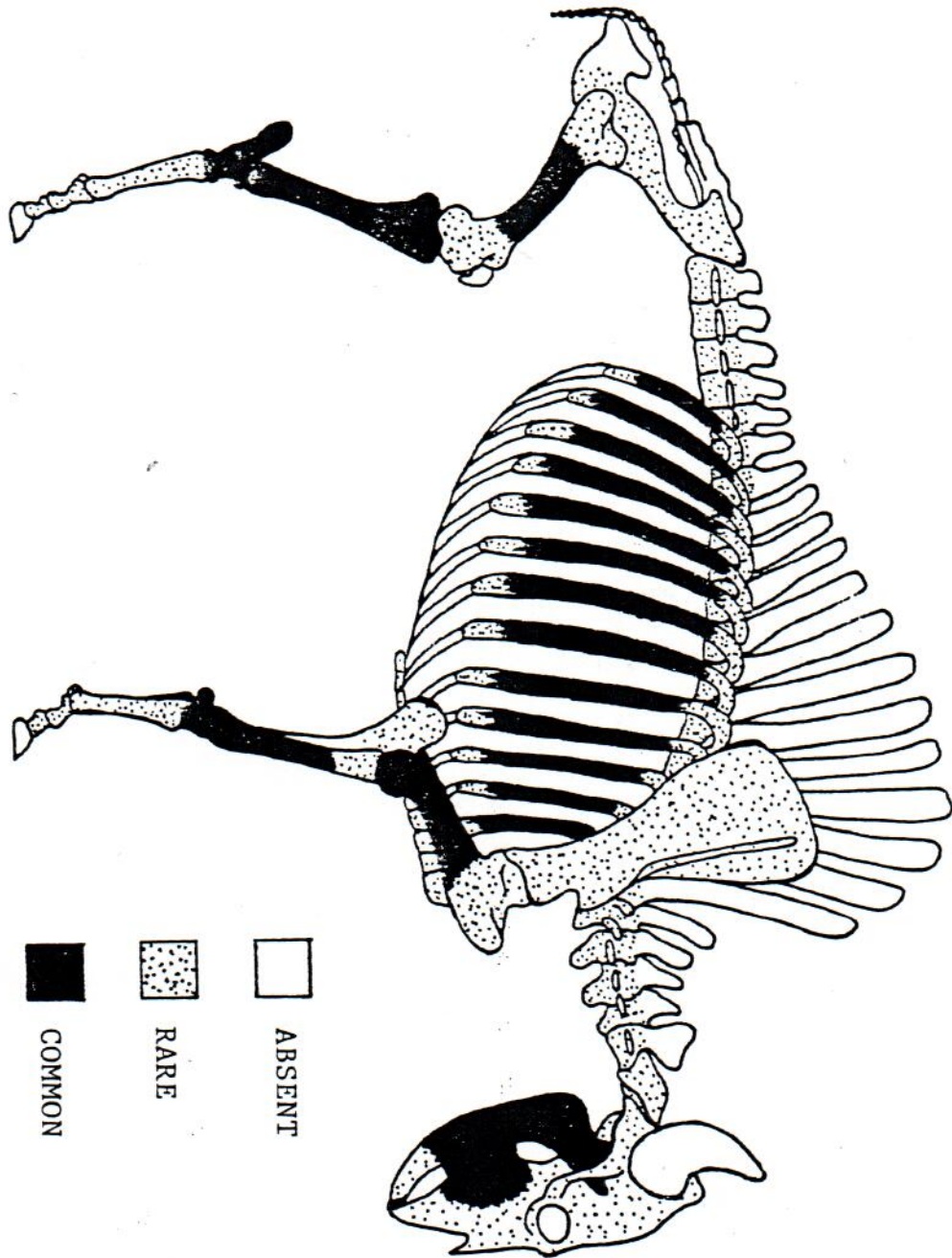


Figure 6. Generalized Skeleton Illustrating Relative Frequency of Elements/Element Portions of Bison at Baker Cave III (Adapted from Brown and Gustafson, 1979:10).

The general impression given by the incidence of bison elements and their alteration features (Figure 6) is that the cave is a secondary butchering and processing locale for meat and marrow. Although the hunting method employed cannot be known from the site data, the kill and primary butchering locale was outside of and at some distance from the cave, the animals reduced to portable units and taken inside for tertiary processing. The surface vicinity and entrances to Baker Cave preclude their use as corrals, deadfalls or traps. The condition of the osteological material itself suggests the following carcass treatment.

The animals were skinned (caudal vertebrae are absent from the cave assemblage) and most of the skull left at the kill site. Occasionally, portions of the maxillary region and mandibles, including the hyoids, atlas and axis vertebrae were brought to the cave. The very low occurrence and highly fragmented nature of the vertebrae, proximal ribs, and a contrastingly good representation of rib shaft portions, the absence of the sacrum and all vertebral dorsal spines, indicates that major back and neck muscle units were stripped at the butchering site, most of the axial skeleton abandoned, and rib-slab portions were brought to the cave along with the meat. Separation of the ribs was accomplished by smashing near the articular ends and all fragments demonstrate abundant impact fractures.

The reconstructed treatment of the shoulder and pelvic

girdles shows a strong emphasis on the meat and marrow yield of these elements. There is no demonstrable conservation of any bone from the limbs for tool-making purposes, but a few long-bone diaphyses fragments show slight polish on sharp edges and points. Diaphyseal fragments of the metapodials, archaeologically known to be favored bone tool raw material, are rare in the collection and may have been exported.

It is noteworthy that there is no evidence of sharp-edged stone tool use on any of the bones at Baker Cave III. This type of damage, common at megafaunal butchering sites, appears as cut-marks localized near major muscle, tendon and ligament origin and insertion points on the bones, or as chop-marks near joints. Skeletal dismemberment and bone reduction was accomplished on the Baker Cave III bison by a smashing technique which obliterated some bones and joints, and muscle removal may have been accomplished by prizing and stripping with useful fragments of sharp broken bone. All long-bones were reduced by mid-daphysis blows, and carry "classic" impact reduction features. These include: crushed impact zones with re-entrant flake scars, partly detached cortical bone flakes, radiating curvilinear fractures, percussor drag marks terminating at impact zones, battering marks and failed fractures. Marrow was probably scooped, possibly following light heating, from the medullary cavities of opened bones. There are none of the highly comminuted bone fragments construed as by-products of bone-grease recovery at Baker Cave III.

The shoulder girdle was brought to the site intact, minus the hooves and usually missing the phalanges, carpals and, frequently the metacarpals. The scapula was often imported with the forelimb and there is good representation of this element, always broken in a consistent way. It is difficult to suggest the reason or significance for reduction of the scapula in this way during the dismemberment or disarticulation process, but the element is commonly broken across the neck and around the base of the spine to produce ventral and dorsal border and broken spine fragments. In contrast to the often complete articular surface of the scapulae, the adjoining proximal humerus is rare in the collection, and, when present, is badly damaged. Part of this can be explained by the fragility of the proximal humerus due to its spongy bone composition and thin layer of compact bone. The upper and lower portions of the forelimb were separated by destruction of the proximal radius and ulna, leaving distal humeri and radii common in the collection.

There are no sacral vertebrae in the assemblage and a few, badly damaged portions of the pelvis and proximal femur. This separation occurred during primary butchering and most of these element portions discarded at that locale. Separation of the upper and lower hind limb resulted in destruction of the distal femur and a high representation in the collection of proximal and distal tibiae, tarsal elements and fragments of the femur diaphysis. Like the forelimb, metapodia and phalanges

were often discarded at the primary butchering site.

The tibia fragments in the collection best demonstrate diaphysial smash techniques, resulting in easily identified impact zones concentrated about one-quarter to one-third of the distance above the distal end and almost always on the posterior face. This action resulted in very similar morphologies among the distal and proximal tibia fragments and a high incidence of a very characteristic fragment of the posterior-proximal tibia shaft from below the epiphysis.

Astragali and calcanei are almost always complete and all skeletal elements are represented in the incidence of charring and/or burning.

The Baker Cave III bison includes a good sample of elements from fetal animals, complementing the factors of good preservation and the high number of adult breeding-age females in the assemblage. There is a paucity of literature to aid in the aging of these specimens and no comparative material was available. Wilson (1974) has published a discussion of this problem and offered some descriptive and metrical data which was consulted. The very small size and osteological immaturity of the Baker Cave III specimens, compared to data on fetal development of the skeleton, suggests that these individuals were near or at mid-term growth. Assuming a mating season of August-September for this region, a gestation period of nine months to birth in April-May, this indicates that Baker Cave kill probably took place in December-January, or mid-winter. Although

there are no definitive butchering marks on the bones, fetuses were brought deliberately to the cave with other carcass parts, implicating their inclusion in the prehistoric diet.

Summary

Analysis of the fauna from Baker Caves was aided by excellent preservation of the bone material and the opportunity to study a fairly large sample. There is a bias in the faunal list against some species which might be expected from such a cave setting where natural and cultural bone accumulation occurred. The absence of small vertebrate species could be accounted for by the screen mesh size, but also by the fact that recovery took place in an area selected because of cultural features, not as part of a cave-wide representative sample. Small animals and large species such as pronghorn and carnivores are frequently encountered in cave and rock-shelter fossil assemblages. The lack of these species in the Baker Cave III material may be due to the sampling biases noted above, or, in the case of the carnivores, to the fact that there is easy passage in and out of the cave and no "trapping" phenomena occurred.

The faunal analysis was conducted without knowledge of the archaeology or detailed topography and local ecology of Baker Cave. There are some advantages and disadvantages to conducting such a "blind" study and post-analytical comparison and reconciliation of the faunal analysis with the rest of the

archaeological record. It is the faunal analyst's prerogative, however, to repeat the plea for zooarchaeological and paleontological input into the excavation planning process.

The bison material, especially the fetal bones and fine sample of modified skeletal elements, is a welcome addition to document the presence of this animal on the Snake River Plain and its prehistoric use. The Baker Caves faunal assemblage is valuable for further detailed study of bison- and rabbit-bone modification, the discrimination of human vs. non-human taphonomic indicators in cave bone-accumulations, and a glimpse at some very discrete and specific evidence for prehistoric human activity.