ANALYSIS OF FAUNAL REMAINS FROM TUDOR HALL, SITE 18ST677

Site 18ST677 (Tudor Hall) is a late seventeenth to early eighteenth century colonial site in St. Mary's County, Maryland. Phase II investigations at the site included the recovery of a small collection of faunal materials analyzed at the New Orleans lab of R. C. Goodwin and Associates, Inc.

Zooarcheology Methods

Vertebrate remains from the Tudor Hall site (18ST677) were examined using standard zooarcheological methods. Identifications were made by Charlene Keck and Nathanael Heller using the comparative reference skeletal collections of R. C. Goodwin & Associates, Inc. housed at the New Orleans laboratory. Guidelines and manuals used to aid identification procedures included Gilbert (1980), Hillson (1986), Olsen (1968, 1979), and Sisson and Grossman (1938), but these were not used in lieu of reference skeletons.

A number of primary data classes were recorded for purposes of analysis. Specimens were identified in terms of elements represented, the portion recovered, symmetry, and degree of fusion. The Number of Identified Specimens (NISP) was determined. Where specimens cross-mended, these counted as single specimens. Unidentified vertebrate specimens (UID Vertebrate) were not counted due to their fragmented condition and often minute size. The Minimum Number of Individuals (MNI) was estimated based on paired elements and age. Modifications were noted in general terms such as burned, cut, or worked. All specimens were weighed to provide additional information about the relative abundance of taxa identified. Unidentified vertebrate specimens were weighed as a whole.

While MNI is a standard zooarcheological quantification method, the measure has several well-known biases. MNI emphasizes small species over larger ones. For example, a collection with twenty squirrels and one deer shows a greater use of squirrels. This is misleading because the one deer provides more meat and is therefore of more economic importance than twenty squirrels. In addition, some elements are more readily identifiable than others. The taxa represented by these elements may be overrepresented. Conversely, some taxa represented by large numbers of specimens may present few paired elements and hence be underrepresented. Gars and turtles are good examples of this bias in which perhaps over one thousand scales or carapace fragments are counted as representative of a single gar or turtle respectively.

The measure, MNI, is also subject to bias introduced by the way samples are aggregated during analysis. The aggregation of separate samples into one analytical whole (Grayson 1973) allows for a conservative estimate of MNI, while the "maximum distinction" method applied when analysis isolates discrete sample units, such as test units, levels, or features, results in a much larger MNI. In estimating MNI for the Tudor Hall assemblage, all faunal materials were quantified as a single analytical unit.

Biomass was estimated for each taxon based on the total weight recorded for that taxon. Biomass estimates attempt to compensate for some of the problems encountered with MNI. Biomass refers to the quantity of meat which might have been supplied by the animal. Predictions of biomass are based on the allometric principle that the proportions of body mass, skeletal mass, and skeletal dimensions change with increasing body size. This scale effect results from a need to compensate for weakness in the basic structural material, in this case, bone. The relationship between body weight and skeletal weight is described by the allometric equation:

$$Y = aX^b$$

(Simpson et al. 1960:397). In this equation, X is the specimen weight, Y is the biomass, b is the constant of allometry (the slope of the line), and a is the Y-intercept for a log-log plot using the method of least squares regression and best fit line (Casteel 1978; Reitz and Cordier 1983; Reitz et al. 1987; Wing and Brown 1979). Many biological phenomena show allometry described by this formula (Gould 1966, 1971) so that a given quantity of bone or a specific skeletal dimension represents a predictable amount of tissue or body length due to the effects of allometric growth. Values for a and b were obtained from calculations based on data at the Florida Museum of Natural History, University of Florida, and the University of Georgia Museum of Natural History. The number of observations used in the regression is N, and the proportion of total variance by the regression model is r^2. The allometric formulae used in this study are presented in Table 1

The species identified from Tudor Hall are summarized by placement in faunal categories based on vertebrate class. This summary contrasts the percentage of various groups of taxa in the collection. These categories are Fish, Turtles, Deer; Other Wild Mammals, Domestic Mammals, Domestic Birds, and Commensal Taxa. The term "commensal" refers to taxa commonly found in and around human residences but which are not usually consumed. Such taxa generally include Old World rats (Muridae), New World mice and rats (Cricetidae), pets, such as dogs (*Canis familiaris*) and cats (*Felis domesticus*), and work animals. In order to make comparisons of MNI and biomass estimates possible, the summary tables include biomass estimates only for those taxa for which MNI was estimated.

A basic consideration with respect to MNI is the assumption that the entire individual animal was utilized at the site. From ethnographic evidence it is known that this is not always true (Perkins and Daly 1968). Cultural bias is inherent in zooarchaeological analysis yet provides the opportunity for human behavioral studies addressing issues other than relative abundance of taxa. For example, butchering practices and transportation costs may be inferred from an examination of the presence or absence of elements in an archeological assemblage. Butchering, the reduction and modification by humans of an animal carcass into consumable parts, is a series of acts and therefore is considered a process. When the sample size is large enough, the distributional and bone frequency data may show patterning or redundancy indicating purposiveness (Lyman 1982). The presence/absence of specimens associated with cultural values are often difficult to interpret from archeological deposits. It is usually assumed that specimens associated with parts of the body that supply relatively little meat represent cuts of meat less desirable than those associated with meaty portions of the carcass. For example, the femur is associated with more meat than are crania, lower legs, and feet. If a carcass was transported over long distances, specimens associated with less meaty portions might be left behind at the kill site to reduce transportation costs. This would result in an underrepresentation of these specimens at a residential site (Perkins and Daly 1968). Some specimens, such as metapodiae and phalanges, are not associated with meat

Table 1. Allometric Formulae Used in Biomass Estimations

Faunal Category	N	(Slope) b	(Y-Intercept) a	r^2
Bone Weight (kg) to Body Weight (kg)				
Fish	393	0.81	0.90	0.80
Turtle	26	0.67	0.51	0.55
Mammal	97	0.90	1.12	0.94
Bird	307	0.91	1.04	0.97

but might be valued as raw material for tools, while crania provide brains for tanning. This is particularly the case for larger individuals and animals used for special purposes. In these cases, it is often necessary to examine the element distribution patterns evident in the collection (Thomas 1971). The mammalian elements identified at Tudor Hall are summarized into categories by body parts. The Head category includes only skull fragments, including antlers and teeth. The atlas

and axis, and other vertebrae and ribs are placed in the Vertebra/Rib category. Forequarter includes the scapula, humerus, radius, and ulna. The Hindquarter category includes the innominate, sacrum, femur, patella, and tibia. Finally, metapodiae, podiae, phalanges, and sesamoids are assigned to the Foot category.

Relative ages of pig, deer, and cow were estimated based on observations of the degree of epiphyseal fusion for diagnostic elements. As animals grow and develop, the area of growth along the shaft of the element, the diaphysis, and the end of the element, the epiphysis, are not fused. Once the animal has completed growth, the shaft and the epiphysis fuse. Elements fuse in a regular temporal sequence (Gilbert 1973; Purdue 1983; Watson 1978). During analysis, specimens were recorded as either fused or unfused and placed into one of three categories based on the age in which fusion generally occurs. There is some ambiguity inherent in this type of analysis. For example, an element which fuses at eighteen months of age and is found archaeologically could be from an animal which died at eighteen months of age or many years later. Another method which is helpful in age estimation is tooth eruption sequences (Severinghaus 1949). This method has its limitations as well and is useful only when teeth are found embedded in the mandible or maxilla.

Modifications can indicate butchering methods as well as site formation processes. Modifications are classified as burned, cut, carnivore-gnawed, rodent-gnawed, and worked. Burned specimens may result from exposure to fire when a cut of meat is roasted. Burns may also occur if specimens are burned intentionally or unintentionally after discard. Cuts are small incisions across the surface of specimens. These marks are probably made by knives as meat was removed before or after the meat was cooked. Cuts may also be left on bone if attempts are made to disarticulate a carcass at joints. Gnawing by carnivores and rodents indicate that specimens were not immediately buried after disposal. Carnivores would include such animals as dogs and raccoons. Rodents would include such animals as mice, rats, and squirrels. Worked specimens such as grooved and snapped, flaked, or polished, include those which show evidence of human modification for reasons probably not associated with butchery.

Specimen count (NISP), MNI, biomass, and other derived measures are subject to sample size biases (Casteel 1978; Grayson 1979, 1981). In general, samples of at least 200 individuals or 1400 specimens are needed for reliable interpretations (Wing and Brown 1979). Smaller samples frequently generate a short species list with undue emphasis on one species in relation to others, whereas once the sample size reaches a representative population, additional data does not alter the relative abundance ratios among taxa. A further consideration, briefly outlined above, is the identifiability of certain species. Elements of some animals, for example, gar scales and turtle carapace or plastron fragments, are readily identifiable. In these cases the NISP may be high but the MNI may be very low. In addition, the weight of the total NISP may be very high with a correspondingly high biomass estimate. It is important, therefore, to examine relative abundance ratios derived from specimen counts (NISP), MNI, and biomass calculations with caution.

Poor preservation due to environmental conditions may affect the integrity of bone resulting in a small sample size or an assemblage with few identifiable specimens (Butzer 1982:120-2; Wing and Brown 1979:5-7). Fresh bone is 20-25 percent nonmineral. If bone is left exposed for a period of time the hydroxyapatite, or calcium phosphate, dehydrates and is oxidized. This process weakens the bone structure; the specimen becomes brittle and easily crumbles. Preservation of buried bone depends on soil-water circulation and composition. An acitic water and soil matrix will leach out the mineral components and oxidize the organic compounds in bone. A high sodium concentration in the soil-water composition leads to disintegration of bone as expansion and contraction within the bone structure occurs due to alternating episodes of water absorption and dehydration. Bone preservation is favored by an intermediate pH and the presence of mineralizing waters which increase bone density. Bone mineralization is most successful among large, dense elements such as tarsals, carpals, teeth, and the long bones of large animals (Butzer 1982:196-198; Lyman 1984).

Results

A total of 1304 specimens (NISP) weighing 2636.44g were identified from Tudor Hall (Table 2). An estimated nine individuals were identified, including one striped bass (*Morone saxatilis*), one snapping turtle (Chelydridae), one tree squirrel (*Sciurus* spp.), one domestic cat (*Felis familiaris*), one domestic pig (*Sus scrofa*), one white-tailed deer (*Odocoileus virginianus*), two cows (*Bos taurus*) and one chicken (*Gallus gallus*). Unidentified vertebrate remains weighed 235.1g.

Unidentified (UID) Fish specimens (N=110) included scales, dorsal and misc. spines, and vertebra. Most of these were recovered from FS# 5043, the same sample that also included two specimens positively identified as striped bass (*Morone saxatilis*), and may all be elements

Table 2. Tudor Hall: Species List

Taxon	NISP		MNI		Wt./g	Biomass	
	#	%	#	%		Kg	%
UID Fish	110	8.5			1.83	0.0481	0.2
Morone saxatilis	2	0.2	1	11	0.15	0.0057	<0.1
Striped bass							
UID Turtle	4	0.3			2.11	0.0052	<0.1
Snapping turtle family	10	0.7	1	11	15.76	0.2006	0.6
UID Mammal	837	64.2			1045.27	13.719	41.5
Tree squirrel family	1	0.1	1	11	0.46	0.0013	<0.1
Felis domesticus	1	0.1	1	11	1.78	0.0442	0.1
Domestic cat							
Even-toed ungulates	24	1.8			136.84	2.2009	6.7
Sus scrofa	161	12.4	1	11	233.11	3.5547	10.7
Domestic pig							
Odocoileus virginianus	11	0.8	1	11	151.17	2.4072	7.3
White-tailed deer							
Bos Taurus	13	1.0	2	22	810.16	10.907	33
Cow							
UID Bird	3	0.2			0.39	0.0009	<0.1
UID Bird (eggshells)	126	9.7			2.25		
Gallus gallus	1	0.1	1	11	0.06	0.0016	<0.1
Chicken							
UID Vertebrate					235.1		
Totals	1304		9		2636.44	33.096	

representative of this single individual. The elements identified as striped bass include a burned cleithrum and preopercular.

Mammals dominate the collection in terms of NISP and bone weight. A total of 837 specimens weighing 1045.27g were identified as Unidentified (UID) Mammal, including burned or unmodified tooth, petrous, mandible, and misc. cranial fragments, rib fragments, longbone shaft fragments, and other misc. fragments. One tree squirrel (*Sciurus* spp.) was identified by an illium

ment, and a domestic cat (*Felis domesticus*) was identified by mandible fragments. Twenty-specimens weighing 136.84g could be identified as Artiodactyl. Domestic pig (*Sus scrofa*) identified from 161 specimens weighing 233.11g. Pig elements were mainly mandible, tooth, other miscellaneous cranial fragments. Eleven specimens were identified as white-tailed (*Odocoileus virginianus*). These included astragalus, calcaneus, femur, tibia, scapula, merus, and ulna fragments, weighing 151.17g. Cow (*Bos taurus*) was represented by thirteen cimens weighing 810.16g, including two atlases, various cranial fragments and foot fragments, ilium, a sacrum, and two femur fragments.

One identified specimen compares favorably to chicken (*Gallus gallus*), and another ecimen was identified as Unidentified (UID) Bird. Additionally, 126 examples of bird eggshell are identified. Because of their fragmented condition, the eggshells could not be typed to ecies, although chicken is a reasonable possibility.

In terms of biomass, mammals dominate the Tudor Hall collection. Unidentified ammals contributed 41.5 percent of the total biomass. This was followed by cows (33 percent), gs (10.7 percent), deer (7.3 percent), and artiodactyls (6.7 percent). All other taxa combined tributed less than 1 percent of the total biomass.

Summarizing the collection according to vertebrate class (Table 3), the collection is minated by domestic mammals in terms of NISP, MNI, and biomass. Other domestic taxa clude chicken. Wild or non-domesticated taxa include fish, turtles, squirrel, and deer. Of these, eer constitutes the only significant contributor in terms of biomass. Commensal Taxa is mposed of one domestic cat.

A study of element distribution at Tudor Hall (Table 4) shows heavy overrepresentation of g by cranial elements. This overrepresentation may be the result of a biased sample, in which ly one or two skulls, badly crushed, could contribute hundreds of fragments to the sample. ow shows a relatively even element distribution, with the exception of forequarter elements. The eer is represented exclusively by forequarter, hindquarter, and foot elements. The lack of trunk d cranial elements at the site may be indicative of field dressing at the kill site. The meatier rtions of the carcass would have been retained, while the less useful portions would have been scarded in the field. The lack of vertebrae and ribs may also be attributable to preservation or mple size bias.

Table 3. Tudor Hall: Summary of Faunal Remains

Taxon	NISP		MNI		Biomass	
	#	%	#	%	Kg	%
Fish	2	1.0	1	11	0.0057	<0.1
Turtles	10	5.0	1	11	0.2006	1.2
Deer	11	5.5	1	11	2.4072	14.1
Other Wild Mammals	1	0.5	1	11	0.0013	<0.1
Domestic Mammals	174	87	3	33	14.462	84.4
Domestic Birds	1	0.5	1	11	0.0016	<0.1
Commensal Taxa	1	0.5	1	11	0.0442	0.3
Totals	200		9		17.123	

Table 4. Tudor Hall: Element Distribution

Taxon	Head	Vert./Rib	Forequarter	Hindquarter	Foot
Tree squirrel				1	
Domestic cat	1				
Artiodactyl	7	4	2	4	7
Domestic pig	156		2	2	1
White-tailed deer			6	3	2
Cow	3	2		4	4
Total	167	6	10	14	14

Age determination of larger mammals based on epiphyseal fusion yielded limited results (Table 5). The only data for pig was a completely fused acetabulum, indicating a minimal age of 12 months. A fused second phalanyx from a cow indicates a minimum age of 10 months. A little more data was available for deer. Two distal humerus fragments and a distal tibia fragment all exhibited epiphyseal fusion indicating a minimum age of 14 months.

The only modification identified in the Tudor Hall collection was burning. A total of 792, or 61 percent of the specimens were burned (Table 6). In terms of bone weight, including the Unidentified (UID) Vertebrate classification, a total of 1869.79g, or 70.9 percent, of the faunal material was burned.

Table 5. Tudor Hall: Epiphyseal Fusion

		Pig		Cow		Deer	
		Unfused	Fused	Unfused	Fused	Unfused	Fused
EARLY FUSING:							
	Humerus, distal						2
	Scapula, distal						
	Radius, proximal						
	Acetabulum		1				
	1st/2nd Phalanx, proximal				1		
	Metapodial bones, proximal						
MIDDLE FUSING:							
	Tibia, distal						1
	Calcaneus, proximal						
	Metapodial bones, distal						
LATE FUSING:							
	Humerus, proximal						
	Radius, distal						
	Ulna, proximal						
	Ulna, distal						
	Femur, proximal						
	Femur, distal						
	Tibia, proximal						
TOTAL			1		1		3

Table 6. Tudor Hall: Modifications

Taxon	Burned		Unburned	
	Ct.	Wt./g	Ct.	Wt./g
UID Fish	35	0.6	75	1.23
Striped bass	2	0.15		
UID Turtle			4	2.11
Snapping turtle family	3	5.78	7	9.98
UID Mammal	588	678.64	249	366.63
Tree squirrels			1	0.46
Domestic cat	1	1.78		
Even-toed ungulates	18	101.24	6	35.6
Domestic pig	113	106.72	48	126.39
White-tailed deer	8	127.7	3	23.47
Cow	6	639.85	7	170.31
UID Bird			3	0.39
UID Bird (eggshells)	18	0.28	108	1.97
Chicken			1	0.06
UID Vertebrate		207.05		28.05
Totals	792	1869.79	512	766.65

Discussion

The Tudor Hall II faunal assemblage is represented by a relatively small sample. A combination of factors may have adversely effected the preservation of the faunal material, including environmental conditions at the site and the negative impact of burning. Much of the sample was highly fragmented and could not be identified beyond more general categories. Nearly 65 percent of the NISP fall under the category of Unidentified (UID) Mammal. The NISP is further biased by the large number of pig cranial fragments, UID Fish elements, and UID Bird eggshells, which together account for 30 percent of the NISP.

Considering the limitations associated with small sample size, the Tudor Hall II collection indicates heavy reliance on domestic mammals. Domestic pig and cow dominate the collection in terms of NISP, MNI, and biomass. The presence of a chicken and many eggshell fragments further illustrate the importance of domesticated taxa. Nevertheless, some wild species were being exploited, including deer, squirrel, fish, and turtles. No vermin were identified in the collection, but the identification of a cat suggests the keeping of pets, perhaps to help control vermin. Further work at 18ST677 is necessary to determine whether these observations remain valid in a larger sample.

Table 7: Faunal Remains Recovered from Tudor Hall

FS	CT	WT/G	CLASS	FAMILY	GENUS	SPECIES	COMMON NAME	ELEMENT	MODIFICATION	ADDITIONAL DESCRIPTION
701	1	4.27	Mammalia	Artiodactyla			Even-toed ungulates	Carpal/tarsal		
701	1	0.93	Mammalia	Bovidae	*Bos*	*taurus*	Cow	Misc. Tooth fragment		
702	5	2.54	Mammalia				UID Mammal	Misc. fragment		shaft frags; possible artiodactyl
702	1	0.39	Mammalia	Artiodactyla			Even-toed ungulates	Misc. Cranial Fragment	Burned	very rugose; possible horn or antler frag
702	3	0.98	Vertebrata				UID Vertebrate	Misc. fragment	Burned	
703	1	2.3	Mammalia				UID Mammal	Misc. fragment	Burned	shaft fragment
703	3	0.28	Vertebrata				UID Vertebrate	Misc. fragment	Burned	
706	1		Mammalia				UID Mammal	Misc. fragment		shaft fragment
706	3		Mammalia				UID Mammal	Misc. fragment	Burned	one shaft fragment in 2 pieces
706	1		Vertebrata				UID Vertebrate	Misc. fragment	Burned	
707	1	3.3	Mammalia				UID Mammal	Misc. fragment		shaft fragment, possible artiodactyl
707	1		Mammalia				UID Mammal	Misc. fragment	Burned	
707	1	2.09	Mammalia	Artiodactyla			Even-toed ungulates	Carpal/tarsal	Burned	
709	1	1.31	Mammalia				UID Mammal	Misc. fragment		shaft fragment
709	1	0.54	Mammalia	Artiodactyla			Even-toed ungulates	Metapodial	Burned	proximal podial/metapodial fragment
709	1	0.21	Vertebrata				UID Vertebrate	Misc. fragment	Burned	
710	1	1.09	Mammalia				UID Mammal	Misc. fragment	Burned	
712	4	1.99	Mammalia				UID Mammal	Misc. fragment	Burned	
714	4	1.17	Mammalia				UID Mammal	Misc. fragment		possible fragments from femur
714	1	1.38	Mammalia				UID Mammal	Misc. fragment		possible femur fragment of artiodactyl
715	1	38.79	Mammalia	Bovidae	*Bos*	*taurus*	Cow	Sacrum		fragment
717	6	9.85	Mammalia				UID Mammal	Misc. fragment		1 shaft frag
717	4		Mammalia				UID Mammal	Misc. fragment	Burned	
717	1	12.56	Mammalia	Tayassuidae	*Sus*	*scrofa*	Domestic pig	Misc. Tooth fragment		
717	1		Mammalia	Tayassuidae	*Sus*	*scrofa*	Domestic pig	Astragalus		right, fused
717	7	0.91	Vertebrata				UID Vertebrate	Misc. fragment		
718	2	4.96	Mammalia				UID Mammal	Misc. Cranial Fragment	Burned	
718	7		Mammalia				UID Mammal	Misc. fragment	Burned	
718	4		Vertebrata				UID Vertebrate	Misc. fragment		
719	8		Mammalia				UID Mammal	Misc. Cranial Fragment		possible pig
719	1		Mammalia				UID Mammal	Misc. fragment		
719	10		Mammalia				UID Mammal	Misc. fragment		shaft fragments
719	3		Mammalia				UID Mammal	Misc. Cranial Fragment	Burned	possible pig
719	18	34.15	Mammalia				UID Mammal	Misc. fragment	Burned	shaft fragments
719	1	0.48	Mammalia	Artiodactyla			Even-toed ungulates	Caudal Vertebra	Burned	
719	20	4.62	Vertebrata				UID Vertebrate	Misc. fragment	Burned	20+ fragments and bone dust

FS	CT	WT/G	CLASS	FAMILY	GENUS	SPECIES	COMMON NAME	ELEMENT	MODIFICATION	ADDITIONAL DESCRIPTION
720	1		Mammalia				UID Mammal	Petrous		possible pig
720	39		Mammalia				UID Mammal	Misc. fragment		
720	10	30.99	Mammalia				UID Mammal	Misc. fragment	Burned	
720	4		Mammalia	Tayassuidae	*Sus*	*scrofa*	Domestic pig	Misc. Tooth fragment		
720	1	11.5	Mammalia	Tayassuidae	*Sus*	*scrofa*	Domestic pig	Sacrum		fragment
720	1	10.22	Mammalia	Cervidae	*Odocoileus*	*virginianus*	White-tailed deer	Astragalus		Left; fused
724	2		Mammalia				UID Mammal	Misc. fragment	Burned	shaft fragment
724	2		Mammalia	Tayassuidae	*Sus*	*scrofa*	Domestic pig	Misc. Tooth fragment		
724	1		Vertebrata				UID Vertebrate	Misc. fragment	Burned	
728	2	0.13	Vertebrata				UID Vertebrate	Misc. fragment	Burned	
730	7	2.06	Mammalia	Tayassuidae	*Sus*	*scrofa*	Domestic pig	Misc. Tooth fragment		
730	1	0.4	Vertebrata				UID Vertebrate	Misc. fragment	Burned	
732	1	0.32	Mammalia				UID Mammal	Misc. fragment	Burned	
734	5	8.05	Mammalia				UID Mammal	Misc. fragment		
734	2	2.99	Mammalia				UID Mammal	Misc. fragment	Burned	
734	1	2.03	Mammalia	Bovidae	*Bos*	*taurus*	Cow	Misc. Tooth fragment		
742	1		Vertebrata				UID Vertebrate	Misc. fragment	Burned	
743	1	0.07	Vertebrata				UID Vertebrate	Misc. fragment		
744	5		Mammalia				UID Mammal	Misc. fragment		
744	2	4.65	Mammalia				UID Mammal	Misc. fragment	Burned	
744	1	16.93	Mammalia	Artiodactyla			Even-toed ungulates	Rib		
744	2	0.59	Mammalia	Tayassuidae	*Sus*	*scrofa*	Domestic pig	Misc. Tooth fragment		
744	8	0.48	Vertebrata				UID Vertebrate	Misc. fragment		8+ fragements and bone dust
744	4		Vertebrata				UID Vertebrate	Misc. fragment	Burned	
745	10	2.8	Mammalia				UID Mammal	Misc. fragment	Burned	
745	15	0.32	Vertebrata				UID Vertebrate	Misc. fragment	Burned	15+ fragments and bone dust
747	2	3.76	Mammalia	Artiodactyla			Even-toed ungulates	Carpal/tarsal	Burned	
747	6	0.48	Vertebrata				UID Vertebrate	Misc. fragment		
749	1	31.88	Mammalia	Bovidae	*Bos*	*taurus*	Cow	Atlas		
749	1		Mammalia	Bovidae	*Bos*	*taurus*	Cow	Atlas		unfused
751	3	5.82	Mammalia				UID Mammal	Misc. Cranial Fragment		possible pig
751	23	6.7	Mammalia				UID Mammal	Misc. fragment		
752	10	18.04	Mammalia				UID Mammal	Misc. fragment		
752	1	92.4	Mammalia	Bovidae	*Bos*	*taurus*	Cow	Illium		right
753	10		Mammalia	Tayassuidae	*Sus*	*scrofa*	Domestic pig	Misc. Cranial Fragment		10 + fragments
753	1	35.81	Mammalia	Tayassuidae	*Sus*	*scrofa*	Domestic pig	Zygomatic		left
753	1		Mammalia	Tayassuidae	*Sus*	*scrofa*	Domestic pig	Occipital		fragment
753	1		Mammalia	Tayassuidae	*Sus*	*scrofa*	Domestic pig	Occipital		left side
753	1		Mammalia	Tayassuidae	*Sus*	*scrofa*	Domestic pig	Maxilla		with M2 and M3 embedded
754	1	2.28	Mammalia				UID Mammal	Misc. fragment		
754	1	4.28	Mammalia	Bovidae	*Bos*	*taurus*	Cow	Ulnar carpal		Right side
754	5	0.23	Vertebrata				UID Vertebrate	Misc. fragment		
755	1	0.7	Vertebrata				UID Vertebrate	Misc. fragment		

FS	CT	WT/G	CLASS	FAMILY	GENUS	SPECIES	COMMON NAME	ELEMENT	MODIFICATION	ADDITIONAL DESCRIPTION
759	1	1.74	Mammalia				UID Mammal	Misc. fragment	Burned	
767	1		Reptilia	Testudinidata			UID Turtle	Femur		
767	1		Reptilia	Chelydridae			Snapping turtle family	Misc. fragment		
767	1		Reptilia	Chelydridae			Snapping turtle family	Misc. phalanx	Burned	
767	1	5.78	Reptilia	Chelydridae			Snapping turtle family	Neural	Burned	
767	1		Reptilia	Chelydridae			Snapping turtle family	Misc. fragment	Burned	
767	7	21.28	Mammalia				UID Mammal	Misc. fragment		
767	19		Mammalia				UID Mammal	Misc. fragment		
767	6		Mammalia				UID Mammal	Misc. Cranial Fragment	Burned	
767	5		Mammalia				UID Mammal	Misc. fragment	Burned	
767	22		Mammalia				UID Mammal	Misc. fragment	Burned	
767	1	0.89	Mammalia	Artiodactyla			Even-toed ungulates	Metapodial		condyle; fusion?
767	1	12.18	Mammalia	Tayassuidae	*Sus*	*scrofa*	Domestic pig	Ulna	Burned	right; fusion indeterminant
768	1		Reptilia	Chelydridae			Snapping turtle family	Scapula		
768	1		Reptilia	Chelydridae			Snapping turtle family	Coracoid		
768	4	9.98	Reptilia	Chelydridae			Snapping turtle family	Misc. fragment		
768	1		Mammalia				UID Mammal	Misc. fragment		
768	1	11.51	Mammalia				UID Mammal	Misc. fragment		
768	9		Mammalia				UID Mammal	Misc. fragment	Burned	
768	1	12.1	Mammalia	Artiodactyla			Even-toed ungulates	Tibia		distal end; fused; pig?
768	5	20.59	Mammalia	Tayassuidae	*Sus*	*scrofa*	Domestic pig	Misc. Cranial Fragment		
768	1		Mammalia	Tayassuidae	*Sus*	*scrofa*	Domestic pig	Maxilla		right
768	4		Mammalia	Tayassuidae	*Sus*	*scrofa*	Domestic pig	Misc. Cranial Fragment	Burned	
768	8		Vertebrata				UID Vertebrate	Misc. fragment		
768	10	8.6	Vertebrata				UID Vertebrate	Misc. fragment	Burned	
769	20	16.48	Mammalia				UID Mammal	Misc. Cranial Fragment		possible pig; not confirmed
769	5		Mammalia				UID Mammal	Misc. fragment		
769	4		Mammalia				UID Mammal	Misc. fragment		shaft fragments
769	4		Mammalia				UID Mammal	Misc. Cranial Fragment	Burned	possible pig
769	30		Mammalia				UID Mammal	Misc. fragment	Burned	
769	1		Mammalia				UID Mammal	Misc. fragment	Burned	
769	1		Mammalia	Artiodactyla			Even-toed ungulates	Humerus	Burned	distal; fused; fragmented
769	20		Vertebrata				UID Vertebrate	Misc. fragment	Burned	20+ fragments and bone dust
771	1	0.43	Reptilia	Testudinidata			UID Turtle	Misc. fragment		carpal/tarsal
771	3	43.01	Mammalia				UID Mammal	Misc. fragment		
771	23		Mammalia				UID Mammal	Misc. fragment	Burned	shaft fragments
771	2	26.07	Mammalia	Tayassuidae	*Sus*	*scrofa*	Domestic pig	Misc. Cranial Fragment		
771	1		Mammalia	Tayassuidae	*Sus*	*scrofa*	Domestic pig	Lower M3		4 fragments mend
771	1		Mammalia	Tayassuidae	*Sus*	*scrofa*	Domestic pig	Mandible	Burned	with lower M1 or M2 embedded
771	8		Mammalia	Tayassuidae	*Sus*	*scrofa*	Domestic pig	Misc. Tooth fragment	Burned	
771	1		Mammalia	Cervidae	*Odocoileus*	*virginianus*	White-tailed deer	Humerus	Burned	shaft fragment from distal end
771	1	46.33	Mammalia	Cervidae	*Odocoileus*	*virginianus*	White-tailed deer	Humerus	Burned	left; fused distally

FS	CT	WT/G	CLASS	FAMILY	GENUS	SPECIES	COMMON NAME	ELEMENT	MODIFICATION	ADDITIONAL DESCRIPTION
771	1	16.54	Mammalia	Cervidae	*Odocoileus*	*virginianus*	White-tailed deer	Ulna	Burned	two fragments mend; right; fusion indeterminant
771	50	11.98	Vertebrata				UID Vertebrate	Misc. fragment	Burned	50+ fragments plus bone dust
772	6	5.35	Mammalia				UID Mammal	Misc. fragment		
772	3		Mammalia				UID Mammal	Misc. fragment	Burned	
772	1	20.64	Mammalia	Cervidae	*Odocoileus*	*virginianus*	White-tailed deer	Scapula	Burned	side? fusion?
772	1		Mammalia	Cervidae	*Odocoileus*	*virginianus*	White-tailed deer	Humerus	Burned	fragment does not mend or overlap with prev. entry
772	1		Mammalia	Cervidae	*Odocoileus*	*virginianus*	White-tailed deer	Humerus	Burned	right; 2 fragments mend; distal fused
773	1		Mammalia				UID Mammal	Mandible		
773	1	0.74	Mammalia				UID Mammal	Rib		possible dog, or any medium to large mammal
773	1	0.67	Mammalia				UID Mammal	Mandible	Burned	
773	1	0.46	Mammalia	Sciuridae	*Sciurus*	*spp.*	Tree squirrels	Illium		left
773	1	1.41	Mammalia	Artiodactyla			Even-toed ungulates	Femur		side indeterminant
773	3	0.85	Vertebrata				UID Vertebrate	Misc. fragment	Burned	
774	1	0.51	Mammalia				UID Mammal	Metapodial		proximal end
774	2	1.99	Mammalia	Tayassuidae	*Sus*	*scrofa*	Domestic pig	Misc. Cranial Fragment		
774	3		Vertebrata				UID Vertebrate	Misc. fragment		
774	6	4.25	Vertebrata				UID Vertebrate	Misc. fragment	Burned	
775	16	9.53	Mammalia				UID Mammal	Misc. fragment		possibly fragments from pig mandible
775	1	14.41	Mammalia	Tayassuidae	*Sus*	*scrofa*	Domestic pig	Mandible		2 fragments mend; M3 embedded
775	3		Mammalia	Tayassuidae	*Sus*	*scrofa*	Domestic pig	Mandible		misc. mandible fragments
775	1	568.8	Mammalia	Bovidae	*Bos*	*taurus*	Cow	Metacarpal	Burned	right proximal
775	10		Vertebrata				UID Vertebrate	Misc. fragment		10+ fragments
775	2	0.91	Vertebrata				UID Vertebrate	Misc. fragment	Burned	
776	20	21.38	Mammalia				UID Mammal	Misc. fragment	Burned	
777	8	1.7	Mammalia				UID Mammal	Misc. fragment	Burned	
777	1	16.86	Mammalia	Bovidae	*Bos*	*taurus*	Cow	Second phalanx	Burned	*Fused proximally and distally*
778	4	186.66	Mammalia				UID Mammal	Misc. Cranial Fragment		
778	2		Mammalia				UID Mammal	Misc. Cranial Fragment	Burned	
778	12	108.64	Mammalia				UID Mammal	Misc. fragment	Burned	
778	55		Mammalia				UID Mammal	Misc. fragment	Burned	
778	1		Mammalia	Cervidae	*Odocoileus*	*virginianus*	White-tailed deer	Femur		side indeterminat; shaft fragment
778	1	44.19	Mammalia	Cervidae	*Odocoileus*	*virginianus*	White-tailed deer	Calcaneus	Burned	right; fusion indeterminant; carnivore-gnawed
778	1		Mammalia	Cervidae	*Odocoileus*	*virginianus*	White-tailed deer	Tibia	Burned	right; fused distally
778	2	34.5	Mammalia	Bovidae	*Bos*	*taurus*	Cow	Femur	Burned	side?; do not X-mend
778	40	20.29	Vertebrata				UID Vertebrate	Misc. Cranial Fragment		

FS	CT	WT/G	CLASS	FAMILY	GENUS	SPECIES	COMMON NAME	ELEMENT	MODIFICATION	ADDITIONAL DESCRIPTION
779	23	85.01	Mammalia				UID Mammal	Misc. Cranial Fragment	Burned	all possibly pig
779	2		Mammalia				UID Mammal	Scapula	Burned	glenoid fossa; fused; possible pig
779	66		Mammalia				UID Mammal	Misc. fragment	Burned	
779	1	1.78	Mammalia	Felidae	*Felis*	*domesticus*	Domestic cat	Mandible	Burned	2 fragments mend
779	1	50.31	Mammalia	Artiodactyla			Even-toed ungulates	Tibia	Burned	right; possible pig
779	1		Mammalia	Artiodactyla			Even-toed ungulates	Tibia	Burned	fragment; fused proximally; possible pig
779	13		Mammalia	Tayassuidae	*Sus*	*scrofa*	Domestic pig	Mandible	Burned	13 fragments; side indeterminant
779	1		Mammalia	Tayassuidae	*Sus*	*scrofa*	Domestic pig	Mandible	Burned	5 fragments; left
779	50		Mammalia	Tayassuidae	*Sus*	*scrofa*	Domestic pig	Misc. Tooth fragment	Burned	
779	1	60.96	Mammalia	Tayassuidae	*Sus*	*scrofa*	Domestic pig	Ulna	Burned	left; fusion?
779	1		Mammalia	Tayassuidae	*Sus*	*scrofa*	Domestic pig	Acetabulum	Burned	right; fused
779	1	10.02	Mammalia	Bovidae	*Bos*	*taurus*	Cow	Third phalanx	Burned	
779	150	43.04	Vertebrata				UID Vertebrate	Misc. fragment	Burned	150+ fragments plus bone dust
780	68	183.32	Mammalia				UID Mammal	Misc. fragment	Burned	
780	16		Mammalia				UID Mammal	Misc. fragment	Burned	
780	1		Mammalia	Artiodactyla			Even-toed ungulates	Rib		
780	1	30.9	Mammalia	Artiodactyla			Even-toed ungulates	Misc. Vertebra	Burned	unfused
780	1		Mammalia	Artiodactyla			Even-toed ungulates	Humerus	Burned	distal; fused
780	6		Mammalia	Tayassuidae	*Sus*	*scrofa*	Domestic pig	Misc. Cranial Fragment	Burned	
780	5	32.28	Mammalia	Tayassuidae	*Sus*	*scrofa*	Domestic pig	Misc. Cranial Fragment	Burned	
780	5		Mammalia	Tayassuidae	*Sus*	*scrofa*	Domestic pig	Mandible	Burned	5 fragments do not mend but probably from same
780	14		Mammalia	Tayassuidae	*Sus*	*scrofa*	Domestic pig	Misc. Tooth fragment	Burned	
780	1	9.67	Mammalia	Bovidae	*Bos*	*taurus*	Cow	Occipital	Burned	occipital condyle
780	100	56.31	Vertebrata				UID Vertebrate	Misc. fragment	Burned	100+ fragments plus bone dust
781	10	15.49	Mammalia				UID Mammal	Misc. Cranial Fragment	Burned	possible pig
781	11	6.73	Mammalia				UID Mammal	Misc. fragment	Burned	shaft fragments
781	50	8	Vertebrata				UID Vertebrate	Misc. fragment	Burned	50+ fragments and bone dust
783	1	13.25	Mammalia	Cervidae	*Odocoileus*	*virginianus*	White-tailed deer	Femur		two shaaft fragments mend; fusion unknown
785	1	0.34	Mammalia				UID Mammal	Misc. fragment		
786	1	1.68	Reptilia	Testudinidata			UID Turtle	Misc. Vertebra		
786	1		Reptilia	Testudinidata			UID Turtle	Misc. fragment		
786	1	0.38	Aves				UID Bird	Femur		
786	1		Aves				UID Bird	Coracoid		
786	1		Mammalia				UID Mammal	Misc. Cranial Fragment		
786	3		Mammalia				UID Mammal	Misc. fragment		
786	17		Mammalia				UID Mammal	Misc. fragment		shaft fragments
786	3	101.95	Mammalia				UID Mammal	Misc. Cranial Fragment	Burned	
786	27		Mammalia				UID Mammal	Misc. fragment	Burned	

FS	CT	WT/G	CLASS	FAMILY	GENUS	SPECIES	COMMON NAME	ELEMENT	MODIFICATION	ADDITIONAL DESCRIPTION
786	2		Mammalia				UID Mammal	Misc. fragment	Burned	
786	1	5.49	Mammalia	Artiodactyla			Even-toed ungulates	Calcaneus	Burned	
786	1	0.81	Mammalia	Tayassuidae	*Sus*	*scrofa*	Domestic pig	Misc. Tooth fragment		
786	22		Vertebrata				UID Vertebrate	Misc. fragment		22 + fragments plus bone dust
786	5	10.16	Vertebrata				UID Vertebrate	Misc. fragment	Burned	
5006	0	0.23	Vertebrata				UID Vertebrate	Misc. fragment		
5006	0	0.08	Vertebrata				UID Vertebrate	Misc. fragment	Burned	
5027	1	0.22	Osteichthyes				UID Fish	Misc. fragment		
5027	2	0.01	Aves				UID Bird	Eggshell		
5027	1	0.06	Aves	Phasianidae	*Gallus*	*gallus*	Chicken	Radius		cf
5027	0	0.41	Vertebrata				UID Vertebrate	Misc. fragment		
5027	0	0.87	Vertebrata				UID Vertebrate	Misc. fragment	Burned	
5028	2	1.17	Mammalia				UID Mammal	Misc. fragment		
5028	0	0.79	Vertebrata				UID Vertebrate	Misc. fragment		
5028	0	0.52	Vertebrata				UID Vertebrate	Misc. fragment	Burned	
5029	3	0.05	Aves				UID Bird	Eggshell		
5029	1	0.19	Mammalia				UID Mammal	Misc. Tooth fragment		
5029	1	0.48	Mammalia				UID Mammal	Misc. tooth bearing element		
5029	1	1.42	Mammalia				UID Mammal	Misc. Cranial Fragment	Burned	
5029	1	1.4	Mammalia				UID Mammal	Petrous	Burned	
5029	2	0.83	Mammalia				UID Mammal	Rib	Burned	
5029	1	2.15	Mammalia				UID Mammal	Shaft fragment	Burned	
5029	2	3.05	Mammalia				UID Mammal	Misc. fragment	Burned	
5029	3	1.3	Mammalia	Tayassuidae	*Sus*	*scrofa*	Domestic pig	Misc. Tooth fragment	Burned	
5029	0	0.45	Vertebrata				UID Vertebrate	Misc. fragment		
5029	0	3.59	Vertebrata				UID Vertebrate	Misc. fragment	Burned	
5030	1	0.01	Aves				UID Bird	Eggshell		
5030	2	4.05	Mammalia				UID Mammal	Misc. Cranial Fragment	Burned	
5030	4	2.91	Mammalia				UID Mammal	Misc. fragment	Burned	
5030	0	0.11	Vertebrata				UID Vertebrate	Misc. fragment		
5030	0	2.02	Vertebrata				UID Vertebrate	Misc. fragment		
5031	1	0	Aves				UID Bird	Eggshell		
5031	1	0.57	Mammalia				UID Mammal	Misc. fragment		
5031	0	0.55	Vertebrata				UID Vertebrate	Misc. fragment	Burned	
5033	1	0.01	Aves				UID Bird	Misc. fragment		
5033	4	0.04	Aves				UID Bird	Eggshell		
5033	2	0.03	Aves				UID Bird	Eggshell	Burned	
5033	1	0.17	Mammalia				UID Mammal	Misc. fragment		
5033	1	2.03	Mammalia				UID Mammal	Shaft fragment	Burned	
5033	0	0.2	Vertebrata				UID Vertebrate	Misc. fragment		
5033	0	0.44	Vertebrata				UID Vertebrate	Misc. fragment	Burned	
5034	8	0.07	Aves				UID Bird	Eggshell		
5034	8	0.15	Aves				UID Bird	Eggshell	Burned	

FS	CT	WT/G	CLASS	FAMILY	GENUS	SPECIES	COMMON NAME	ELEMENT	MODIFICATION	ADDITIONAL DESCRIPTION
5034	1	0.29	Mammalia				UID Mammal	Misc. fragment	Burned	
5034	0	0.66	Vertebrata				UID Vertebrate	Misc. fragment	Burned	
5035	1	5.76	Mammalia				UID Mammal	Shaft fragment	Burned	
5035	0	0.61	Vertebrata				UID Vertebrate	Misc. fragment	Burned	
5036	1	0	Aves				UID Bird	Eggshell		
5036	1	4.44	Mammalia				UID Mammal	Misc. fragment		
5036	0	0.26	Vertebrata				UID Vertebrate	Misc. fragment		
5036	0	0.9	Vertebrata				UID Vertebrate	Misc. fragment	Burned	
5037	6	0.06	Aves				UID Bird	Eggshell	Burned	
5037	2	1.17	Mammalia				UID Mammal	Misc. fragment	Burned	
5037	0	0.42	Vertebrata				UID Vertebrate	Misc. fragment		
5037	0	1.15	Vertebrata				UID Vertebrate	Misc. fragment	Burned	
5038	0	1.11	Vertebrata				UID Vertebrate	Misc. fragment	Burned	
5039	2	0.63	Mammalia				UID Mammal	Misc. fragment	Burned	
5039	0	1.62	Vertebrata				UID Vertebrate	Misc. fragment	Burned	
5040	1	1.02	Mammalia				UID Mammal	Misc. tooth bearing element		
5040	2	2.33	Mammalia				UID Mammal	Mandible	Burned	
5040	2	0.41	Mammalia				UID Mammal	Misc. Tooth fragment	Burned	
5040	1	1.38	Mammalia				UID Mammal	Shaft fragment	Burned	
5040	19	16.19	Mammalia				UID Mammal	Misc. fragment	Burned	
5040	0	13.37	Vertebrata				UID Vertebrate	Misc. fragment	Burned	
5041	3	2.18	Mammalia				UID Mammal	Misc. fragment		
5041	4	3.17	Mammalia				UID Mammal	Misc. Cranial Fragment	Burned	
5041	8	1.65	Mammalia				UID Mammal	Misc. Tooth fragment	Burned	
5041	16	7.43	Mammalia				UID Mammal	Misc. fragment	Burned	
5041	0	15.08	Vertebrata				UID Vertebrate	Misc. fragment	Burned	
5042	21	0.43	Aves				UID Bird	Eggshell		
5042	2	0.04	Aves				UID Bird	Eggshell	Burned	
5042	3	0.5	Mammalia				UID Mammal	Misc. Tooth fragment	Burned	
5042	1	1.21	Mammalia				UID Mammal	Shaft fragment	Burned	
5042	1	1.44	Mammalia				UID Mammal	Misc. fragment	Burned	
5042	2	3.94	Mammalia	Artiodactyla			Even-toed ungulates	Misc. Cranial Fragment	Burned	
5042	1	1.16	Mammalia	Artiodactyla			Even-toed ungulates	Maxilla	Burned	
5042	2	1.27	Mammalia	Artiodactyla			Even-toed ungulates	Misc. Tooth fragment	Burned	cf Caprine/ deer
5042	1	0.91	Mammalia	Artiodactyla			Even-toed ungulates	Misc. tooth bearing element	Burned	
5042	0	10.54	Vertebrata				UID Vertebrate	Misc. fragment	Burned	
5043	3	0.11	Osteichthyes				UID Fish	Dorsal spine		
5043	40	0.46	Osteichthyes				UID Fish	Branchiostegals		
5043	16	0.05	Osteichthyes				UID Fish	Scale		
5043	1	0.13	Osteichthyes				UID Fish	Misc. spine		
5043	1	0.04	Osteichthyes				UID Fish	Misc. fragment		
5043	13	0.22	Osteichthyes				UID Fish	Misc. fragment		
5043	4	0.13	Osteichthyes				UID Fish	Misc. Vertebra	Burned	

FS	CT	WT/G	CLASS	FAMILY	GENUS	SPECIES	COMMON NAME	ELEMENT	MODIFICATION	ADDITIONAL DESCRIPTION
5043	1	0.07	Osteichthyes				UID Fish	Dorsal spine	Burned	
5043	19	0.28	Osteichthyes				UID Fish	Branchiostegals	Burned	
5043	11	0.12	Osteichthyes				UID Fish	Misc. fragment	Burned	
5043	1	0.09	Osteichthyes	Percichthyidae	*Morone*	*saxatilis*	Striped bass	Preopercular	Burned	Right side
5043	1	0.06	Osteichthyes	Percichthyidae	*Morone*	*saxatilis*	Striped bass	Cleithrum	Burned	Right side
5043	67	1.36	Aves				UID Bird	Eggshell		
5043	2	0.56	Mammalia				UID Mammal	Misc. fragment		
5043	1	0.2	Mammalia				UID Mammal	Misc. Tooth fragment	Burned	
5043	8	4.03	Mammalia				UID Mammal	Misc. fragment	Burned	
5043	0	4.4	Vertebrata				UID Vertebrate	Misc. fragment	Burned	
5044	1	0.14	Mammalia				UID Mammal	Misc. Tooth fragment	Burned	
5044	0	0.52	Vertebrata				UID Vertebrate	Misc. fragment	Burned	

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