

Patterns of ancient animal use at El Mirador: evidence for subsistence, ceremony and exchange

ERIN KENNEDY THORNTON & KITTY F. EMERY

Department of Anthropology, Washington State University, PO Box 644910, Pullman, WA 99164-4910

Florida Museum of Natural History, University of Florida, Gainesville, FL 32611-7800

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ABSTRACT: El Mirador is among the largest Preclassic settlements in the Maya lowlands. The site has attracted attention due to its size and antiquity, but also for its location within a region containing few perennial water sources such as lakes and rivers. This report presents a preliminary and largely descriptive analysis of faunal remains recovered during early excavation of the site between 1978 and 1983. The zooarchaeological assemblage provides baseline information regarding past patterns of animal use, acquisition and exchange at El Mirador that may be compared with other Preclassic faunal assemblages from across the Maya lowlands. Intra-site temporal comparisons are also drawn between animal use during the site's primary Late Preclassic occupation, and a less extensive period of settlement during the Classic Period.

KEYWORDS: EL MIRADOR, MAYA PRECLASSIC, GUATEMALA, ZOOARCHAEOLOGY

RESUMEN: El Mirador es uno de los mayores asentamientos Preclásicos de las tierras bajas maya. El yacimiento atrajo la atención debido a su tamaño y antigüedad así como por su localización en una región con escasas fuentes de agua perenne como lagos y ríos. Este informe refiere un análisis preliminar y, en gran medida descriptivo, de los restos faunísticos recuperados durante las primeras excavaciones llevadas a cabo entre 1978 y 1983. La muestra zooarqueológica proporciona información de base referida a antiguos patrones de aprovechamiento e intercambio de animales en El Mirador. Estos pueden así ser comparados con otros conjuntos faunísticos Preclásicos de las tierras bajas maya. Comparaciones diacrónicas dentro del yacimiento se infieren también de los usos animales en el bloque de la ocupación del Preclásico Tardío y un momento de menor entidad del yacimiento que se corresponde con el periodo Clásico.

PALABRAS CLAVE: EL MIRADOR, MAYA, PRECLÁSICO, GUATEMALA, ZOOARQUEOLOGÍA

INTRODUCTION

This report presents the results of an analysis of the vertebrate and invertebrate faunal remains recovered from the site of El Mirador, Petén, Guatemala during investigations directed by Drs. Bruce Dahlin and Ray Matheny from 1978–1983. The faunal remains provide the first baseline information regarding the patterns of animal use and acquisition at this large and important site in the central Maya lowlands (Figure 1). In this report we identify the relative abundance of various taxa in the assemblage with particular emphasis on variations between residential and ceremonial contexts and an exploration of change in animal use patterns between the Late Preclassic (~350 BC–AD 150) and Late Classic (~AD 600–850). Through the analyses we also discuss habitat use and evidence for long distance exchange of animal resources as

explanations for some of the variation observed. In addition, we report on the effects of taphonomy, recovery methods, and quantification as sources of bias, and present a brief discussion of artifactually modified remains.

SAMPLE DESCRIPTION AND ANALYSIS
METHODS

The El Mirador faunal assemblage contains 3313 identifiable specimens (NISP: number of identified specimens), representing 65 MNI (minimum number of individuals) and 32 taxa. These tallies do not include land snails (NISP = 123) and small rodents (NISP = 38, MNI = 3), which may be intrusive. Identifiable human remains (NISP = 301) found intermingled with the zooarchaeologi-



FIGURE 1

Map of the ancient Maya world showing the location of El Mirador and other sites mentioned in the text. Map by Thornton and Emery.

cal materials were also excluded from NISP and MNI tabulations, but are reported in brief at the end of this article.

Sample Recovery

The El Mirador faunal assemblage was recovered using trowel and ¼-inch gauge screen. Zooarchaeological research has shown that the use of finer-gauge screens (1/8-1/16-inch) will increase the recovery of juvenile individuals and smaller sized taxa such as fish (e.g., Gordon, 1993; James, 1997; Cannon, 1999; Quitmyer, 2004; Wake, 2004). Recovery method tests conducted within the Maya region by Emery and Thornton (Emery, 2012; Thornton, 2012) confirm these previous finding and show that fish, reptiles, amphibians and small marine shells may also be better represented in fine-screened samples (see also Masson, 2004: 104). Consideration of sample recovery methods is of particular importance when comparing the El Mirador faunal sample to other contemporary assemblages.

Identification and Quantification

The El Mirador faunal remains were identified by Thornton under Emery's supervision using the modern comparative specimens housed in the Florida Museum of Natural History Environmental Archaeology Program (FLMNH-EAP) collections.



FIGURE 2

Rodent gnawed mammal long bone shaft fragment (631.0002;21/11/7—Early Classic)

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More specialized identifications were made using the museum's Ornithology and Malacology collections with the assistance of Curator David Steadman and collection manager John Slapcinsky, respectively. Specimens were identified to a more generalized taxonomic level when the complete range of comparative specimens was not available in the collections. The lack of comparative material had the greatest effect on the identification of small Kinosternid turtle remains, which were often identified only to the family level.

The assemblage was quantified according to specimen or fragment counts (NISP) and MNI tallies. Contemporary proveniences in close proximity (e.g., within the same plaza group) were aggregated into single units for MNI quantification. Since the remains of a single carcass may have been distributed among households or disposal areas within a particular area (Emery, 2004b), this method was used to prevented MNI inflation. However, well-dated faunal materials from separate time periods were considered to be independent in terms of MNI calculations even when in close proximity. The results of both NISP and MNI calculations are presented whenever possible, as neither method of quantification is ideal for presenting measures of relative abundance (Grayson, 1984; Ringrose, 1993). MNI estimates are based on the presence of paired or unique elements, with regard to age, sex and size (Reitz & Wing, 1999: 194-197). MNI results are often preferable when quantifying the relative abundance of animals from different phyla that have widely different numbers of skeletal elements. However, many Maya faunal assemblages have high taxonomic diversity, and low element redundancy, which results in very low MNI counts for each species, which may not accurately reflect relative taxonomic abundance (Emery, 2004b: 28).

ANIMAL USE AT EL MIRADOR: RESULTS AND DISCUSSION

Appendix 1 presents a full list of the El Mirador zooarchaeological remains organized by provenience. This list includes the scientific name and skeletal elements identified for each taxa. Table 1 provides the scientific and common names for all of the species identified in the assemblage and quantifies them according to NISP and MNI tallies.

Scientific Name	Common Name	NISP	%NISP	MNI	%MNI
Mollusca	mollusc	56	1.7	-	-
Bivalvia	bivalve	2	0.1	-	-
Gastropoda	gastropod	40	1.2	-	-
Scaphopoda	tusk/tooth shell	1	<0.1	1	1.5
Cerithiidae	cerith	2	0.1	2	3.0
cf. Strombidae	cf. conch	1	<0.1	-	-
<i>Strombus</i> sp.	conch	1	<0.1	1	1.5
<i>Conus spurius</i>	alphabet cone	1	<0.1	1	1.5
<i>Crassostrea virginica</i>	eastern oyster	8	0.2	2	3.0
<i>Spondylus</i> cf. <i>calcifer</i>	Pacific spiny oyster	1	<0.1	1	1.5
<i>Spondylus</i> sp.	spiny oyster	3	0.1	2	3.0
cf. <i>Spondylus</i> sp.	cf. spiny oyster	1	<0.1	-	-
<i>Pomacea flagellata</i>	applesnail	11	0.3	6	9.0
cf. Unionidae	river clam	3	0.1	2	3.0
Vertebrata	vertebrate	1595	47.6	-	-
Osteichthyes	fish	1	<0.1	1	1.5
<i>Sparisoma</i> sp.	parrot fish	1	<0.1	1	1.5
<i>Rhinella</i> cf. <i>marina</i>	cane toad	1	<0.1	1	1.5
Testudines	turtle	70	2.1	-	-
Kinosternidae	mud/musk turtle	3	0.1	2	3.0
<i>Staurotypus triporcatus</i>	giant musk turtle	1	<0.1	1	1.5
Emydidae	slider/pond turtle	13	0.4	4	6.0
<i>Dermatemys mawii</i>	Central American river turtle	12	0.4	1	1.5
cf. <i>Dermatemys mawii</i>	cf. Central American river turtle	10	0.3	-	-
Colubridae	colubrid snake	1	<0.1	1	1.5
Lacertilia	lizard	1	<0.1	1	1.5
cf. Aves	cf. bird	1	<0.1	-	-
Aves	birds	5	0.2	-	-
Aves (medium)	bird (e.g., duck, gull)	2	0.1	-	-
Aves (medium/large)	bird (e.g., duck, turkey)	2	0.1	-	-
Aves (large)	bird (e.g., turkey, vulture)	24	0.7	2	3.0
<i>Meleagris gallopavo</i>	wild/domestic turkey	4	0.1	2	3.0
<i>Meleagris</i> sp.	turkey	2	0.1	-	-
<i>Crax rubra</i>	great curassow	1	<0.1	1	1.5
<i>Ortalis vetula</i>	plain chachalaca	3	0.1	1	1.5
Mammalia	mammals	360	10.8	-	-
Mammalia (small)	mammal (e.g., rat, squirrel)	29	0.9	-	-
Mammalia (small/medium)	mammal (e.g., squirrel, racoon)	20	0.6	-	-
Mammalia (medium)	mammal (e.g., raccoon, dog)	92	2.8	-	-
Mammalia (medium/large)	mammal (e.g., dog, deer)	144	4.3	-	-
Mammalia (large)	mammal (e.g., deer, puma)	527	15.7	-	-
<i>Didelphis</i> sp.	opossum	1	<0.1	1	1.5
<i>Dasypus novemcinctus</i>	nine-banded armadillo	3	0.1	1	1.5
<i>Sylvilagus</i> sp.	rabbit	2	0.1	2	3.00
Sciuridae	squirrel	1	<0.1	1	1.5

Table 1. Continuation

Muridae*	mouse/rat	23	0.7	1	1.5
<i>Ototylomys phyllotis</i> *	big-eared climbing rat	15	0.5	2	3.0
Dasyproctidae/Cuniculidae	agouti/paca	3	0.1	-	-
cf. Cuniculidae	cf. paca	3	0.1	-	-
<i>Cuniculus paca</i>	paca	7	0.2	1	1.5
<i>Dasyprocta punctata</i>	Central American agouti	3	0.1	1	1.5
cf. Carnivora	cf. carnivores	1	<0.1	-	-
Felidae (medium) (cf. <i>Leopardus pardalis</i>)	felid (cf. ocelot)	1	<0.1	-	-
Felidae (large)	puma/jaguar	3	0.1	2	3.0
cf. Canidae	cf. canid (dog/coyote/fox)	5	0.2	-	-
Canidae	dog/coyote/fox	3	0.1	-	-
<i>Canis lupus familiaris</i>	domestic dog	28	0.8	3	4.5
cf. <i>Canis lupus familiaris</i>	cf. domestic dog	10	0.3	-	-
Artiodactyla	artiodactyl	4	0.1	-	-
Tayassuidae	peccary	20	0.6	4	6.0
cf. Tayassuidae	cf. peccary	1	<0.1	-	-
<i>Pecari tajacu</i>	collared peccary	4	0.1	1	1.5
Cervidae	cervid	19	0.6	1	1.5
<i>Mazama</i> sp.	brocket deer	43	1.3	5	7.5
<i>Odocoileus virginianus</i>	white-tailed deer	89	2.7	5	7.5
cf. <i>Odocoileus virginianus</i>	cf. white-tailed deer	3	0.1	-	-
TOTAL =		3351	100	68	100.0

NOTE: Human remains and landsnails have been excluded

* = species likely intrusive

TABLE 1

Taxonomic composition of the El Mirador faunal assemblage

Taxonomic Level	NISP	%NISP
Above class	1595	50.1
Class or below*	1587	49.9
Family or below**	301	9.5

* includes remains identified to class, family, genus or species

** includes remains identified to family, genus or species

TABLE 2

Portion of the vertebrate El Mirador faunal assemblage identified to particular taxonomic levels

Sample Preservation

Although specimen preservation varied greatly in the assemblage, many of the remains were highly fragmented and eroded. Approximately 50% of the vertebrate faunal assemblage (based on Archaeofauna 26 (2016): 232-264

NISP) was not identifiable to the level of taxonomic class (Table 2). Over two-thirds of these unidentified vertebrate remains came from unknown proveniences where the level of weathering and fragmentation was significantly greater than observed for other contexts. Large mammal long bone shafts were also highly fragmented in all proveniences, precluding their identification below the level of taxonomic class, and resulting in a large number of unidentified mammal remains. These preservational conditions are common for lowland Maya assemblages (Emery, 2004a). However, the MNI comparisons for the El Mirador assemblage may be skewed due to the relatively small sample size (Grayson, 1981), and the better preservation of the invertebrate remains (MNI/NISP ratio = 0.13) in comparison to the vertebrate remains (MNI/NISP ratio = 0.01).

Analysis of both the vertebrate and invertebrate faunal components revealed little evidence for

BURNT/CHARRED:

NISP	Provenience	Taxonomy	Skeletal Element
1	Operation 17 B-5, Lot 10	Mammalia (medium)	long bone shaft fragment
1	Operation 17 B-1, Lot 6	<i>Mazama</i> sp.	ulna
2	Operation 31, Lot 5	Mammalia (large)	long bone shaft fragment
2	Operation 31 A, Lot 6	<i>Odocoileus virginianus</i>	ischium (subadult)
4	Operation 32 Trench A, Lot 6	Vertebrata	unidentified bone
1	Operation 32 D-1, Lot 3	Mammalia	unidentified bone
1	Operation 32 D-1, Lot 4	Mammalia	unidentified bone
4	Unknown	Mammalia (large)	unidentified bone

RODENT GNAWED:

NISP	Provenience	Taxonomy	Skeletal Element
1	Operation 17 A-4, Lot 4	<i>Mazama</i> sp.	metatarsal
1	Operation 17 C-4, Lot1	<i>Canis lupus familiaris</i>	radius
1	Operation 21 I-1, Lot 7	Mammalia	femur? shaft fragment
1	Operation 26 K, Lot 4	<i>Meleagris</i> sp.	femur
1	Operation 32, Lot 11	<i>Canis lupus familiaris</i>	mandible

TABLE 3
El Mirador faunal remains with evidence of burning or gnawing

TAXA	NISP	%*	MNI	%
Marine Molluscs	19	1.2	10	15.4
Freshwater Molluscs	14	0.9	8	12.3
Fish	2	0.1	2	3.1
Reptiles/Amphibians	111	6.9	11	16.9
Birds	45	2.8	6	9.2
Mammals	1429	88.2	28	43.1
TOTAL =	1620	100	65	100

* percent of NISP identified to taxonomic class or lower

TABLE 4
Taxonomic distribution of the identified El Mirador faunal remains

natural modification. Less than 1% of the remains showed signs of either burning (0.5%) or rodent gnawing (0.2%), and no evidence for carnivore gnawing was observed (Table 3, Figure 2). The lack of extreme weathering, burning and gnawing on the remains from known proveniences suggests that the El Mirador faunal remains were rapidly buried after deposition, perhaps by being incorporated into architectural fill.

Taxonomic Composition of the Assemblage

According to NISP tallies, mammals are the most commonly identified animals in the assemblage (88%), followed by reptiles (7%), and birds (3%) (Table 4). The remaining 2% of the assemblage is composed of marine (1%) and freshwater molluscs (1%). Taxonomic distribution according to MNI also shows the dominance of mammalian taxa (43%) in the assemblage, but marine (15%) and freshwater molluscs (12%) appear to be almost as abundant as reptiles (17%) and birds (9%). This is likely due to the better preservation of the mollusc remains as opposed to their true abundance in the assemblage. The dominance of terrestrial mammals in the sample, regardless of quantification method, is not surprising considering El Mirador’s inland location, and the lack of large rivers and lakes nearby. Overall, the most commonly identified animals at El Mirador according to NISP, are the white-tailed deer (*Odocoileus virginianus*), brocket deer (*Mazama* sp.), peccary (Tayassuidae), domestic dog (*Canis lupus familiaris*), and various species of turtles (Testudines). The specific species identified in the assemblage are listed in Table 1



FIGURE 3

A. Bivalve (cf. Unionidae) shell fragment with two perforations below hinge (631.0316; 17/B3/5/112 – Late Classic?); B. Teardrop-shaped shell pendant (cf. Unionidae) perforated twice along midline (631.0405; 32/D/2/96 – Late Preclassic/Protoclassic)

and Appendix 1, and are described in more detail in the following sections.

Molluscs

Terrestrial land snails account for a large portion of the mollusc remains in the El Mirador assemblage (see Appendix 1) and are considered separately from the molluscs more likely used by the El Mirador residents. Ten separate taxa of terrestrial snails, representing 123 individuals, were identified. Although these species have the potential to yield valuable environmental data, reliable information regarding their burrowing behavior and habitat requirements is lacking in the literature. The apple snail (*Pomacea flagellata*) is the most common freshwater mollusc identified in the sample. This species could have been harvested from the *bajo* (seasonal wetland) and *aguada* habitats (constructed water reservoirs) found near the site. In contrast, other freshwater mollusc species commonly present in Maya zooarchaeological assemblages, such as jute (*Pachychilus* sp.) and freshwater clams (Unionidae) are absent, or rare in the sample. This is likely due to the site's distance from major lacustrine and riverine habitats. When found, the Unionid clams are primarily modified as decorative artifacts, reinforcing their use and non-local acquisition primarily as adornments rather than subsistence resources (Figure 3).

Various species of marine molluscs were recovered at El Mirador including the eastern oyster (*Crassostrea virginica*), spiny oyster (*Spondylus* sp.), conch (*Strombus* sp.), tusk shell (Scaphopoda), olives (*Oliva* sp.) and alphabet cone (*Conus*

spurius) (Figure 4). All of these species indicate trade of animal resources between the coast (primarily the Atlantic) and the interior of the Maya lowlands. One large articulated and unmodified specimen of *Spondylus* cf. *calcifer* was also present in the assemblage (Figure 5). This species of spondylus is significant because it is only found in the Pacific. The diversity of marine resources at El Mirador therefore indicates that the site was connected to Maya communities via multiple long distance trade routes. Many of the marine shells show evidence of artifactual modification, and it is likely that most were imported for ritual or craft production purposes. Most of the marine shells were recovered from elite ritual/ceremonial structures within the one of the site's main plazas (Tigre Plaza: Operations 26, 35, and 36), but two nearly whole eastern oyster shells were also found associated with an elite residential compound southwest of the main acropolis (Operation 46B).

Fish

Fish account for a very small proportion of the site's faunal remains (NISP = 2), which is not unexpected based on the absence of perennial lakes and river within the El Mirador Basin. A scarcity of fish remains in the zooarchaeological record is also a typical of many inland lowland Maya sites. However, the near absence of fish in many Maya faunal assemblages may be partially due to recovery techniques and preservation bias (Chase *et al.*, 2004; Emery, 2004 a, b). The only species of fish

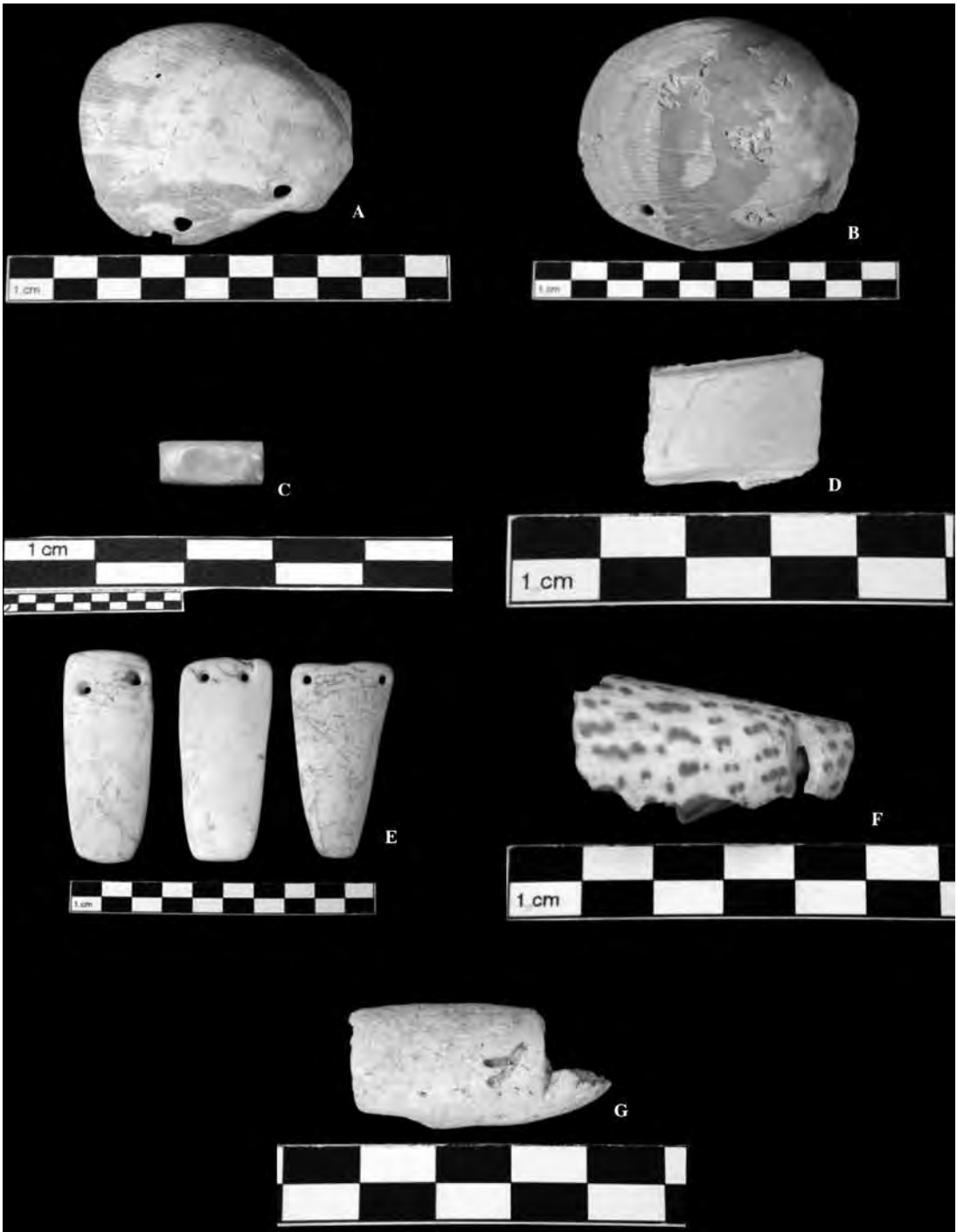


FIGURE 4

A. Perforated *Spondylus* sp. shell with spines abraded off (631.0019;26/K/4 – Late Preclassic); B. Perforated *Spondylus* sp. shell with spines abraded off(631.0276;32/D1/4/121 – Late Preclassic/Protoclassic); C. Cylindrical *Spondylus* sp. shell bead (631.0331; 26/A/9/216 – Late Preclassic); D. Thick cube of marine shell (cf. Strombidae) cut on four sides – likely debitage from shell artifact production(631.0186; 36/A/10/24 – Late Preclassic); E. Three perforated shell (cf. Strombidae) pectorals (631.0406;36/A/13/84 – unknown date); F. *Conus spurius* shell tinkler fragment (631.0329; 26/O/5/246 – Late Preclassic); G. *Oliva* sp. shell tinkler fragment (631.0039;47/D/6 – Late Preclassic).

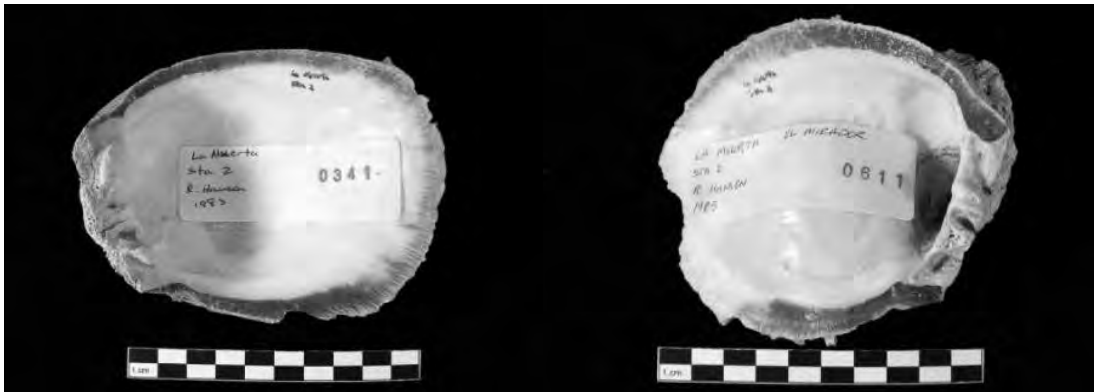


FIGURE 5

Unmodified *Spondylus* cf. *calcifer* shell (right (a) and left (b) valves) (631.0290; La Muerta, Sta. 2 (acc.# 611)).

identified in the El Mirador sample is the parrotfish (*Sparisoma* sp.), a colorful Atlantic coast species commonly found near coral reefs. The non-local nature of this species supports the hypothesis of El Mirador's participation in coastal-inland trade networks. Although it is not uncommon to identify small amounts of marine resources at Preclassic sites (Wing, 1977; Moholy-Nagy, 1985; Shaw, 1999; Fradkin & Carr, 2003; Teeter & Chase, 2004), the presence of marine fish remains at El Mirador is significant due to the site's distance from both the coast and major waterways used for transportation from the coast into the interior.

The well-preserved fish remains at El Mirador were found in a fill deposit sealed below a stucco floor in the Structure 34 Sub-complex (Operation 26J) located at the south end of the Tigre Plaza. Based on its location and architectural form, this building was likely used for elite ceremonial activities (Hansen, 1990). It is unclear whether the fish were imported for dietary consumption (including feasting) or for non-dietary ceremonial/ritual use. It is also impossible to determine whether the fish were imported in salted or unsalted form, although the site's distance from the coast suggests that salt would have been used to ensure preservation during transport. It is clear, however, that the fish were not brought into the site as processed fillets (i.e. with the heads removed) since all of the recovered fish bones are cranial fragments.

Including the fish remains, a total of 121 bone fragments were recovered from the sediments below the stucco floor. Other species present in association with the fish remains include deer, dog and turkey (*Meleagris* sp.). These species are common inclusions in Maya burial and cache

deposits, and also may have been used for ritual feasting (Pohl & Feldman, 1982; Pohl, 1983, 1985; LeCount, 2001; Emery, 2003). The marine fish at El Mirador may therefore have formed part of a suite of species used in public ritual, ceremonial or feasting activities carried out in association with Structure 34.

Reptiles

Reptiles, primarily freshwater turtles, are also present in the El Mirador assemblage. A large portion of the turtle carapace fragments are not identifiable since many do not have diagnostic markers, but the identified turtle remains include the giant musk turtle (*Staurotypus triporcatus*), Central

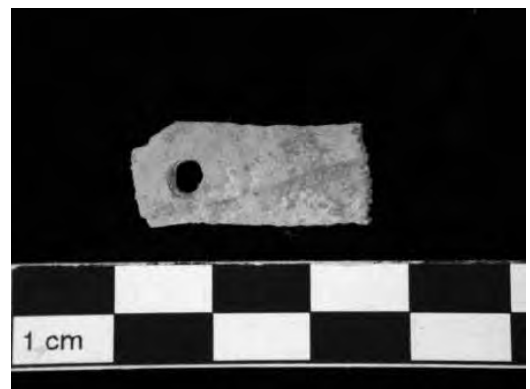


FIGURE 6

Perforated turtle carapace fragment (t) (631.0403; 32/B/21/52- Late Preclassic)

American river turtle (*Dermatemys mawii*), pond/box turtles (Emydidae), and small mud and musk turtles (Kinosternidae). Single elements from other non-turtle reptiles, including an unidentified lizard and colubrid snake, were also identified in the sample. While the small lizard and snake could be incidental inclusions, the turtles were probably consumed or otherwise used by the residents. Over 90% of the turtle remains were recovered from a probable elite residential compound located 50 meters east of the West Wall System (Operation 17). The concentration of turtle remains in the site's residential areas suggests that the turtle remains represent food waste. However, turtle carapaces could also have been used in these contexts as bowls, or musical instruments such as drums and rattles. One perforated fragment of turtle carapace found in Operation 32 supports the secondary use of at least some of the remains as modified artifacts (Figure 6).

Most of the turtle species in the El Mirador assemblage could have been acquired in the nearby forest and *bajo* environments, but the Central American river turtle may have been acquired some distance from the site. This species is highly aquatic, requiring large water-bodies such as major rivers and lakes, and cannot easily disperse long distances away from major watercourses (Campbell, 1998). The meat of *Dermatemys* is still highly valued today and a single specimen can yield a significant amount of meat, which may have made the extra procurement effort worthwhile. The large carapace of this species could also have been desired for use as an instrument, or container.

Birds

Birds are not common in the El Mirador assemblage, and all of the avian species identified are large, ground-dwelling galliforms including the turkey, great curassow (*Crax rubra*), and plain chachalaca (*Ortalis vetula*). These are commonly identified game species in lowland Maya faunal assemblages. Although galliforms were likely targeted because of their large body size and meat weight yields, the absence of smaller avian species could also be due to taphonomic factors. Survivorship of bird skeletal remains varies between species and elements due to differences in bone density (Ericson, 1987; Livingston, 1989; Nichol-

son, 1996; Dirrigl, 2001). All of the El Mirador avian remains represent species and elements with greater survivorship potential in archaeological contexts (see density data in Dirrigl, 2001). The prehistoric use of smaller avian species may therefore be under-estimated based on the recovered zooarchaeological assemblage.

Avian remains are distributed across the site in both residential (Op. 17, 31) and probable public ritual or ceremonial contexts (Op. 26, 27, 32, 35). Three individuals (one curassow, one chachalaca, and one probable turkey) are subadults. Although subadult and juvenile fauna are often preferentially used for ceremonial purposes (Pohl, 1983; Carr, 1996; Emery, 2003), subadult avian remains are present in both elite residential and public ceremonial contexts at El Mirador.

An unexpected finding was the presence of *Meleagris gallopavo* (wild/domestic turkey) in the site's avian assemblage. Prior archaeological and ornithological research has suggested that during pre-Colombian times, the natural range of this species did not extend south of central Mexico (Leopold, 1959: 269; Schorger, 1966: 49; Steadman, 1980; Thornton & Emery, 2015). To date, remains of *M. gallopavo* have not been identified in Maya archaeological contexts dating to before the Postclassic period (ca. A.D. 1000-1500) when it was likely introduced as a domesticated species (Hamblin, 1984). With the assistance of Dr. David Steadman (Curator of Ornithology, FLMNH), we identified five possible specimens of *M. gallopavo* from Late Preclassic deposits in Operations 26 and 35. To confirm the osteological identifications, we submitted four of the five specimens for ancient DNA analysis by Dr. Camilla Speller and Dr. Dongya Yang at the Simon Fraser Department of Archaeology Ancient DNA Lab. The fifth specimen was too small to be tested. Three of the four turkey bones were positively identified through aDNA analysis as *M. gallopavo*, while the fourth sample was inconclusive (Thornton *et al.*, 2012). The Late Preclassic date of the deposits containing *M. gallopavo* remains was reconfirmed with AMS radiocarbon dating of associated faunal remains in 2009. Therefore, this significant finding represents the earliest presence of this species (in either wild or domesticated form) within the Maya lowlands (Thornton & Emery 2015).

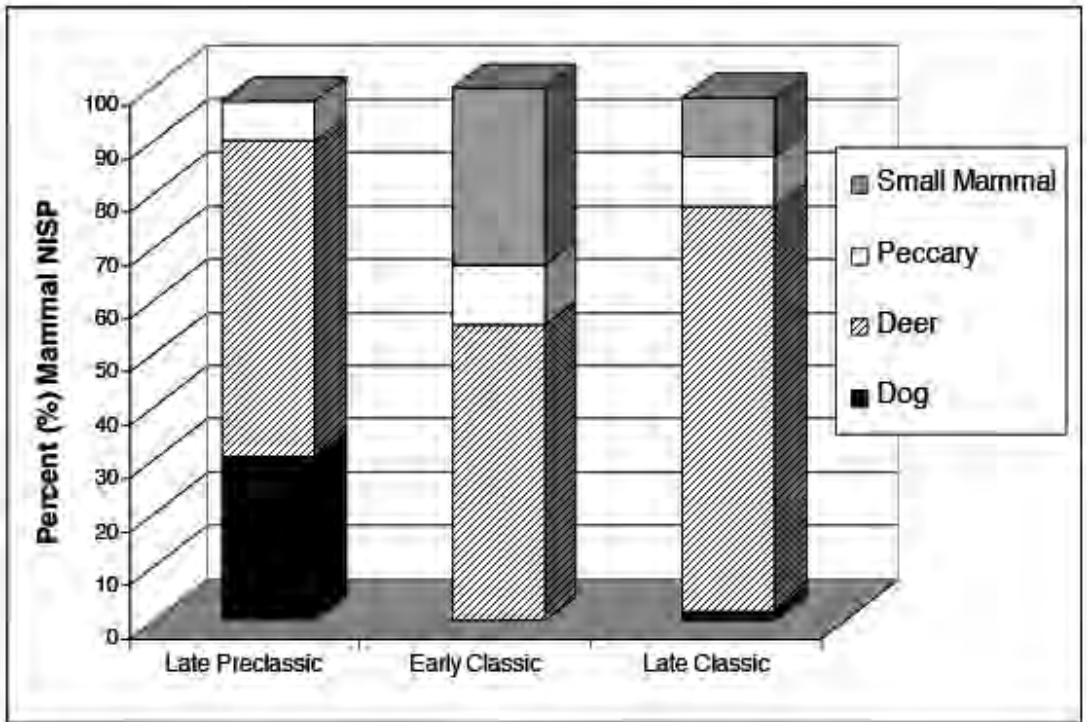


FIGURE 7

Distribution of mammalian faunal remains at El Mirador (based on percent of mammal NISP identified below the level of taxonomic class).

Mammals

Of the twelve mammalian taxa identified, the white-tailed deer was the most commonly encountered species. Brocket deer, peccaries and domestic dogs were also prevalent in the sample, while opossum (*Didelphis* sp.), armadillo (*Dasyus novemcinctus*), rabbit (*Sylvilagus* sp.), squirrel (*Sciuridae*), paca (*Cuniculus paca*), agouti (*Dasyprocta punctata*), and felid (e.g., *Leopardus pardalis*, *Panthera onca*, *Puma concolor*) remains were less frequently encountered (Figure 7). The very well-preserved remains of two big-eared climbing rats (*Oryzomys phyllotis*) were also present in the sample, but this species is probably intrusive.

Domestic dogs are primarily represented in the sample by teeth and jaw fragments, although several long bones were also recovered. The presence of a cut mark on the distal end of a tibia indicates butchery and probable consumption of domestic dog at El Mirador (Figure 8), as suggested for other Preclassic sites (Wing, 1978; Clutton-Brock & Hammond, 1994; Shaw, 1999; Emery *et al.*, 2013).

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The butchered element was recovered from a Late Preclassic floor fill deposit within the Tigre Plaza (Op. 32B, Lot 22). Nineteen other cranial and post-cranial *Canis lupus familiaris* elements were found in this operation.

Most of the remaining canid remains were recovered from Late Preclassic fill deposits in the



FIGURE 8

Dog (*Canis lupus familiaris*) tibia with cutmark at distal end (631.0362;32/B/22/55– Late Preclassic)

Anatomical Region +	Observed	Expected	O/E Ratio
Cranial	39.0	63	0.62*
Axial	18.0	73	0.25
Forelimb	21.0	8	2.63
Hindlimb	25.0	16	1.56
Distal	44.0	104	0.42*

+ Cranial = skull, mandible, teeth, antler; Axial = vertebrae, ribs; Forelimb = scapula, humerus, ulna, radius; Hindlimb = pelvis, sacrum, femur, patella, tibia; Distal = metapodials, carpals/tarsals, phalanges

* Difference is not statistically significant as determined by a binomial test for differences of proportion at a significance level of 0.05.

TABLE 5

Observed vs. expected artiodactyl skeletal element distribution

nearby Structure 34 Sub-complex (Op. 26J, 26O, 26P). All of these contexts represent public ceremonial areas located within the site's architectural core. In the Maya area the use of dogs as feast foods, ritual sacrifices, and as burial and cache offerings is well-documented (Pohl, 1983; Hamblin, 1984; Shaw, 1995; Masson, 1999; Emery, 2003; Kozelsky, 2005; White *et al.*, 2004; Emery *et al.*, 2013). In some cases, dogs may have even been intentionally fattened on maize for elite feasts and ritual use (White *et al.*, 2001, 2004). While none of the dog bones at El Mirador were associated with burials or caches, they were likely deposited in middens within and around the Tigre Plaza before being quickly incorporated into structural fill deposits during building construction (Hansen, 1990: 84). The Late Preclassic El Mirador dog remains may therefore represent general refuse associated with feasting, sacrifice, or other ceremonial activities taking place in the Tigre Plaza. The religious and dietary importance of this species appears to have been greatest during the Preclassic period. The only canid remain dating to a later time period is a radius found in a Late Classic elite residential group (Op. 17C-4, Lot1).

Unlike dogs, large bodied artiodactyls (deer and peccaries) are found in relatively equal numbers in both elite residential and public ceremonial areas at El Mirador. An analysis of the skeletal element distribution of these important species is presented to examine butchery and carcass distribution patterns across the site. This is accomplished by comparing

the observed skeletal distributions to expected distributions based on the number of identifiable elements in a complete artiodactyl skeleton (Reitz & Wing, 1999: 211). Values greater than 1 tend to indicate over-representation of a particular body portion and statistical significance is assessed using a binomial test for differences of proportion at a significance level of 0.05. At El Mirador, major limb sections, which bear the most edible meat, are present in greater than expected proportions, while cranial, axial and distal elements appear to be under-represented (Table 5). However, the under-representation of distal and cranial elements is not statistically significant. This pattern did not change when the calculations were done separately for residential and non-residential contexts. These results suggest dietary use of deer and peccary, with initial butchery occurring primarily outside of the elite residential and public ceremonial proveniences represented by this sample. The major meat-bearing fore and hind limb elements of these species may be present in greater numbers due to their preferential distribution to the El Mirador elite for dietary or artifact production purposes. Similar element distribution patterns have been observed at other Maya sites (Pohl, 1985, 1994).

Artiodactyl age class and element side distributions can provide additional information about animal use and the differential access to resources. Subadult animals are often more common in ritual and elite deposits, suggesting some degree of elite control over access to young individuals (Pohl, 1983; Wing & Scudder, 1991; Carr, 1996). Skeletal elements from the left side of the body also tend to be more prevalent in ritual assemblages, perhaps due to the preferential use of one body side in ceremonial contexts (Pohl, 1985; Emery, 2003). Based on these observations, we might expect to see a greater number of left elements and subadult animals associated with the site's main public ceremonial areas. Although we did not observe any differences in artiodactyl element side (right versus left) distribution across the site, subadult deer and peccaries were present in greater numbers in residential contexts (Ops. 17 and 31) than in public ceremonial areas (Ops. 26 and 32). Sample size is small, but young animals at El Mirador may have been preferentially used for elite dietary consumption although their use in elite domestic rituals cannot be completely ruled out.

TEMPORAL CHANGE IN ANIMAL USE

Approximately 45% of the El Mirador faunal remains were recovered from well-dated contexts. All chronological comparisons in faunal use are based on the subset of dated assemblages within the site's complete faunal sample. Chronological assessments for the faunal assemblage were provided by Ray Matheny and were based on ceramic and carbon-14 data.

Over 57% of the faunal materials assigned to a particular time period at El Mirador date to the Late Preclassic period, while 12% and 30% of the sample date to the Early Classic and Late Classic respectively (Table 6). Due to the small size of the Early Classic sample, discussion of chronological change in animal use patterns will focus on contrasting animal use during the Late Preclassic and Late Classic, although Early Classic trends will be shown for comparison.

Preclassic animal use patterns at El Mirador are similar to those identified at other Preclassic sites within the Maya lowlands. Prior to the Late Preclassic, Maya animal use emphasized the use of aquatic resources such as fish and turtles (Wing & Scudder, 1991; Fradkin & Carr, 2003), while during the

Time Period	NISP	%NISP
Late Preclassic	794	57.6
Early Classic	166	12.0
Late Classic	418	30.3
	1378	100.0

TABLE 6

Distribution of dated El Mirador faunal remains by chronological period

Late Preclassic animal use shifted towards greater reliance on larger terrestrial species including deer and dog. This Late Preclassic pattern has been observed at the sites of Cerros, Cuello, Dzibilchaltun, Colha, Seibal, Altar de Sacrificios and Kaminaljuyu (Wing & Steadman, 1980; Carr, 1985; Cliff & Crane, 1989; Pohl, 1990; Wing & Scudder, 1991; Shaw, 1999; Masson, 2004; Emery *et al.*, 2013). Although similar in its overall pattern of Late Preclassic animal use, El Mirador differs from many of these sites in its extremely limited use of aquatic resources including fish and pond turtles prior to the Late Classic. This difference could be explained by variation in the local habitats surrounding each site. Cerros is located on the coast, while Seibal, Altar de Sacrificios, Cuello, Colha, and Kaminal-

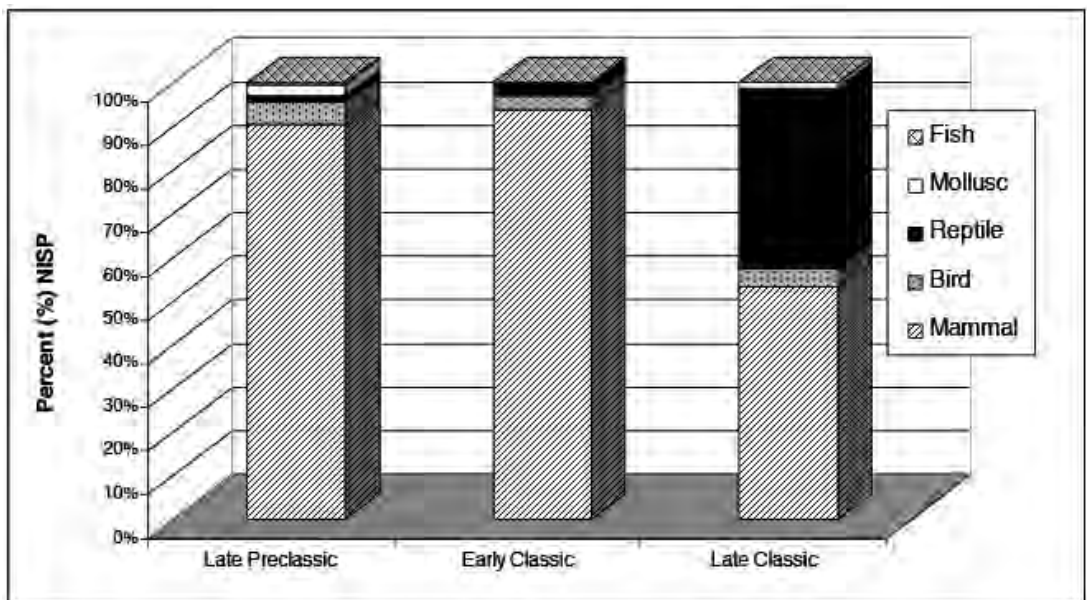


FIGURE 9

Temporal change in distribution of faunal remains according to taxonomic class (based on percent NISP). Tallies do not include unidentified vertebrate remains and marine molluscs

juju are all located near or adjacent to major lakes or rivers. The El Mirador region lacks perennial water sources, but interdisciplinary environmental reconstruction at the site indicates the presence of extensive wetland marshes (*civales*), which were used for agricultural purposes during the Preclassic Period (Hansen *et al.*, 2002). Fauna from these wetland habitats appear to be under-represented in the Preclassic zooarchaeological assemblage from El Mirador. This could be due to cultural selection of terrestrial species, recovery method bias, or over-representation of ceremonial faunal (e.g., deer

and dog) from non-residential contexts within the site’s core. More research is needed to determine the extent to which animal use at El Mirador differs from other contemporary sites based on cultural and/or environmental heterogeneity.

When the Late Preclassic and Late Classic faunal samples from El Mirador are compared, several major trends can be discerned. Animal use during the Late Preclassic is characterized by significant use of mammalian resources, especially deer and dogs. Between the Late Preclassic and Late Classic the importance of deer, turtles and small mam-

Provenience	Time Period	Quantity	Description
17/A(Tr2)/4	Late Preclassic (mixed)	1	Bone spatula or perforator - large mammal long bone shaft fragment scored and snapped longitudinally and polished
17/A(Tr2)/6/122	Late Preclassic (mixed)	1	Bone perforator - large mammal long bone shaft fragment scored and snapped longitudinally and polished
17/B1/4/34	Late Classic	1	Medium/large mammal long bone shaft fragment – snapped longitudinally and polished
17/B3/5/112	Late Classic?	1	Bivalve (cf. Unionidae) shell fragment with two perforations below hinge
17/C5/5/59	Late Classic?	1	Mammal long bone shaft fragment – split longitudinally; polished on exterior surface
19/A1/9	Late Preclassic	1	Shell fragment – possibly polished
26/A/9/216	Late Preclassic	1	Cylindrical <i>Spondylus</i> sp. shell bead
26/J/2/104	Late Preclassic	1	Large mammal long bone shaft fragment cut longitudinally and polished exterior surface
26/J/4/106	Late Preclassic	1	<i>Odocoileus virginianus</i> proximal phalanx - proximal epiphysis removed and polished, and interior hollowed out
26/J/19/4	Late Preclassic	1	Tubular bone bead – large mammal long bone (humerus?) shaft cut through horizontally at proximal and distal ends, and polished
26/J/19/4	Late Preclassic	1	Bone tube – large mammal long bone shaft cut through horizontally at proximal and distal ends
26/K/4	Late Preclassic	1	Perforated <i>Spondylus</i> sp. shell – two perforations along dorsal edge, and exterior spines removed
26/O/5/246	Late Preclassic	1	<i>Conus spurius</i> shell tinkler fragment – horizontal slit cut in anterior body whorl
26/O/25-27/281	Late Preclassic	1	Large mammal long bone shaft fragment – snapped longitudinally and polished
31/A/1/95	Late Classic	1	<i>Odocoileus virginianus</i> femur shaft fragment cut through horizontally at distal end
31/A/5/125	Late Classic	1	Bone tube – large mammal tibia shaft cut horizontally at proximal and distal ends and polished
31/A/8/158A	Late Classic	1	Bone tube/bead - large mammal long bone shaft cut horizontally at proximal and distal ends, polished and blackened on interior and exterior surfaces
32/B/11/29	Late Preclassic	1	Turtle carapace fragment – possibly polished along one edge
32/B/11/29	Late Preclassic	1	Deer (Cervidae) phalanx distal epiphysis fragment – possibly polished/ worked
32/B/12/32	Late Preclassic	1	Small cylindrical bone bead with two fine decorative grooves around circumference

Table 7. Continuation

32/B/14/38	Late Preclassic	1	Tubular bone bead – large avian long bone shaft cut through horizontally at proximal and distal ends; exterior polished
32/B/21/52	Late Preclassic	1	Perforated turtle carapace fragment
32/D/2/96	Late Preclassic/ Proto-classic	1	Teardrop-shaped shell pendant – highly nacreous shell (cf. Unionidae) perforated twice along midline
32/D1/2/102	Protoclassic	1	Perforated peccary (Tayassuidae) canine tooth – biconical perforation through root
32/D1/3/85	Late Preclassic/ Proto-classic	1	Large mammal long bone shaft fragment grooved longitudinally at one end
32/D1/4/121	Late Preclassic/ Proto-classic	1	Perforated <i>Spondylus</i> sp. shell – two perforations along dorsal edge and exterior spines removed
35/A/12/17	Late Preclassic	1	<i>Spondylus</i> sp. shell fragment – spines abraded, cut on all sides; possible mosaic inlay?
36/A/10/24	Late Preclassic	1	Thick non-nacreous cube of marine shell (cf. Strombidae) cut on four sides; likely debitage from marine shell artifact production
36/A/13/84	Unknown	3	Rectangular marine shell (cf. Strombidae) pectoral pendants with two perforations at one end
47/D/6	Late Preclassic	1	<i>Oliva</i> sp. shell tinkler fragment – horizontal slit cut in anterior body whorl; apex/spire removed just below shoulder
TOTAL =		32	NOTE: drawings of some of these artifacts appear in Hansen (1990: 198-200)

TABLE 7

El Mirador bone and shell artifacts listed by provenience

malian game such as opossums, rabbits, agoutis, pacas and armadillos increases while the use of dog decreases (Figure 9). Exotic and important ritual species such as marine shells and large felids also decrease over time and are present in greatest quantities in the Late Preclassic assemblage. This may be due to differences in sample size, or it may reflect the site's greater political power and trade connections during the Preclassic. It is also important to note that the Late Preclassic and Late Classic

faunal assemblages at El Mirador are not equal in terms the types of the contexts represented. Most of the Late Preclassic remains come from public ceremonial areas, while the Late Classic sample is dominated by remains excavated from elite residential compounds. The abundance of deer, dogs, and other large-bodied terrestrial mammals in the Late Preclassic sample may represent their preferred use for ritual or ceremonial purposes, rather than a reliance on these taxa for subsistence purposes.



FIGURE 10

Perforated peccary (Tayassuidae) canine tooth (631.0332;32/D1/2/102–Protoclassic)

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FIGURE 11

A. Highly polished and blackened bone bead/tube made from a large mammal long bone shaft (631.0001; 31/A/8/158A – Late Classic); B. Bone tube made from a large mammal tibia shaft cut through horizontally at proximal and distal ends and polished (631.0006; 31/A/5/125 – Late Classic); C. Cylindrical bone bead with two fine grooves around circumference (631.0198; 32/B/12/32 – Late Preclassic); D. Bone tube made from a large mammal long bone shaft (631.0401; 26/J/19/4 – Late Preclassic).

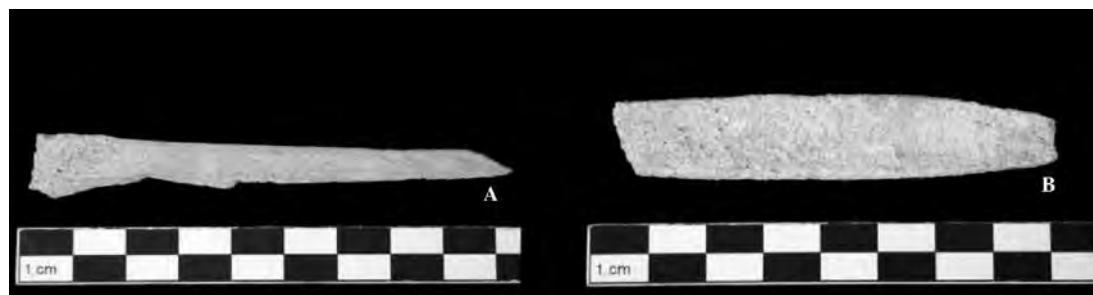


FIGURE 12

A. Polished bone perforator made from a mammal long bone shaft fragment (631.0025; 17/A(Tr 2)/6/122 – Late Preclassic (mixed)); B. Bone spatula or perforator made from a large mammal long bone shaft fragment (631.0056; 17/A (Tr2)/4 – Late Preclassic (mixed)).

Bone and Shell Artifacts

A total of thirty-two bone ($n=19$) and shell ($n=13$) artifacts were recovered from the El Mirador excavations. A full list of artifact proveniences and descriptions is provided in Table 7. At El Mirador, modified bone artifacts were recovered from the Tigre chultun (Op. 32D), fill deposits in Structure 34 (Op. 26) and the Tigre Plaza (Op. 32B), as well as in elite residential groups within the Danta Complex (Op. 31) and outside the West Group wall system (Op. 17). Worked shell arti-

facts were primarily found in association with fill deposits within the Tigre Complex (Structures 34, 4D2-1, 4D3-2) and in elite residential groups located in Op. 17 and southwest of the great acropolis (Op. 47). Most of the bone and shell artifacts were not associated with discrete burial or cache deposits. Exceptions to this include a peccary tooth pendant (Figure 10) and one teardrop-shaped shell pendant (Op. 32D, Lot 2, Figure 3b), which may be associated with Protoclassic human skeletal remains found in the Tigre plaza chultun (Hansen, 1990: 89).

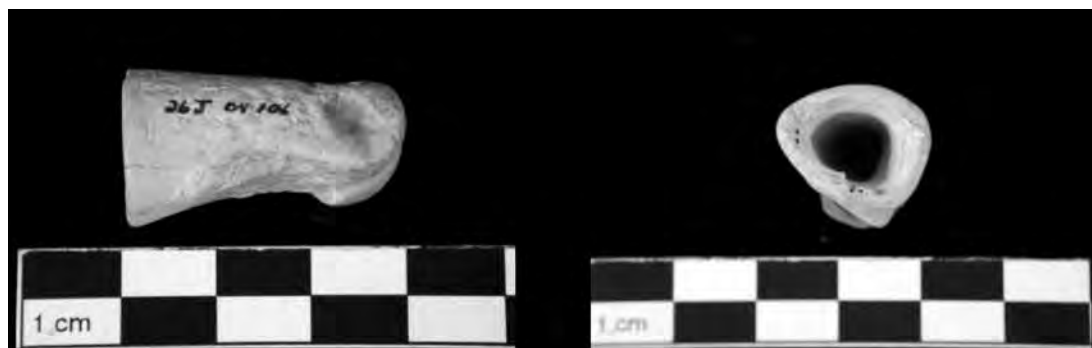


FIGURE 13

White-tailed deer (*Odocoileus virginianus*) proximal phalanx cut (a) and polished at proximal end (b) (631.0404; 26/J/4/106 – Late Preclassic).

Artificially modified bones at El Mirador represent items intended for both personal adornment and utilitarian use. The most common bone adornments in the sample are large tubular beads created from short sections of hollow bone cut transversely at each end and polished on the exterior surface (Figure 11). In one instance, the tube was also coated in black paint (Op. 31A, Lot 8). Most of the tubular beads were made from mammalian long bone shafts, but the tibia tarsus of a large galliform bird (likely turkey) was also modified in a similar manner. Specimens of this type were recovered from Late Preclassic fill deposits in Structure 34 and beneath the Tigre Plaza (Op. 32B, Lot 14), and from Late Classic residential groups. A much smaller cylindrical bone bead decorated with two transverse incisions was also found in Op. 32B.

Several thin, tapered and polished fragments of thick cortical bone are also present in the sample (Figure 12). Many of these artifacts are broken and

they likely represent fragments of bone awls or picks. At El Mirador, these artifacts are primarily associated with Op. 17, a Late Classic residential group, but in many cases it is difficult to distinguish fragments of bone awls/picks from slightly modified bone debitage. Other bone artifacts found at the site include a white-tailed deer phalanx that has been hollowed out and polished at the proximal end (Figure 13), and one perforated fragment of turtle carapace that may have been part of a drum, rattle or pendant (Figure 7).

The assortment of shell objects are all items of personal adornment, and are primarily made from non-local marine species. *Spondylus* shell artifacts include a small pink, cylindrical bead (Op. 26A), two almost complete perforated valves with the exterior spines and ridges removed (Op. 26K, 32D), and one shaped flat piece of shell that may have been a mosaic inlay (Op. 35A). Tinklers made from alphabet cone and olive shells are also present at the site. Shell tinklers are common artifacts in

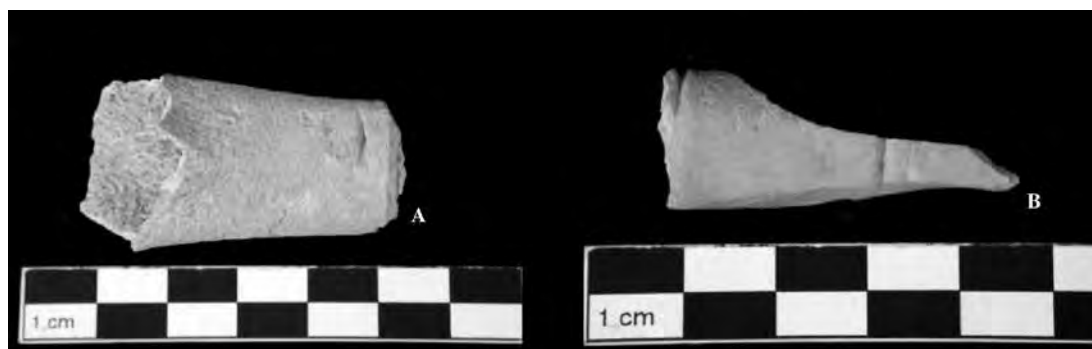


FIGURE 14

A. White-tailed deer (*Odocoileus virginianus*) femur shaft cut through horizontally at distal end (631.0004;31/A/1/95 – Late Classic); B: Large mammal long bone shaft cut horizontally at proximal and distal ends (631.0402;26/J/19/4– Late Preclassic).

Provenience (Op./Sub. Op./Lot)	Time Period	Quantity (fragments)	Description (age/sex: elements identified) * most elements are fragmentary
17/C1/00	Late Preclassic or Late Classic	9	1 adult: Cranial fragments
21/I/9	Early Classic?	2	Ulna
21/I/11	Early Classic?	2	Cranial fragments, phalanx
21/I/14	Early Classic?	1	Patella (right)
21/I/15	Early Classic?	1	Second cuneiform
21/I/27	Early Classic?	3	Metacarpal/metatarsal, phalanx, humerus (right)
32/B/24	Late Preclassic	2	1 adult: humerus (right)
32/D/3-4	Late Preclassic/ Protoclassic	159	2 adults – 1 male/1 indeterminate sex: cranial fragments, mandible (enamel very worn), upper first molar (left), vertebrae, clavicle (2 - right), scapula (right), ribs (right/left), humerus (right/left), ulna (right/left), radius (left), capitate (left), triquetral, os coxa (right), femur, tibia (right/left), fibula, talus (2 right), calcaneus (2 right, 1 left), navicular, first metatarsal (left), second metatarsal, third metatarsals (2 left, 1 right), fifth metatarsal (left), phalanges
unknown	unknown	130	1 juvenile (1-3 years old): temporal (right/left), zygomatic (left), occipital, mandible, atlas, axis, cervical vertebrae, thoracic vertebrae, ribs (right/left), clavicle (left), radius (left), os coxa (left), femur (left), metacarpals/metatarsals
TOTAL =		309	NOTE: It is unclear how many individuals are represented by the isolated human remains recovered in Operation 21 (salvage excavations in a plaza group near the Mono Complex)

TABLE 8
Human skeletal elements identified among the El Mirador zooarchaeological remains

Maya assemblages. They are made from modified marine gastropod shells with the spire removed and with a transverse slit perforation cut into the anterior body whorl. Broken tinklers were found in both public ceremonial (Op. 26O) and elite residential contexts (Op. 47D). Other marine shell artifacts from El Mirador include a set of three rectangular pectoral pendants likely made from the shell of a large species of conch (Op. 36A, Lot 13), and a thick cube of marine shell cut on all four sides (Op. 36A, Lot10). Despite their highly nacreous shell, freshwater clams (Unionidae) were used to a much lesser extent as shell artifacts. Examples include one freshwater clam shell that was perforated along the hinge area (Op. 17B3), one fragment of a shaped and perforated adornment (Op. 17B1), and one teardrop-shaped pendant from the Tigre chultun (Op. 32D).

Overall, there is little shell debitage at El Mirador, which suggests that the marine shells were imported to the site as finished artifacts, or that shell artifact production was taking place in an area of

the site not yet excavated. In contrast, bone working appears to have been taking place on-site (Figure 14). Small amounts of bone debitage is found in Late Preclassic and Late Classic deposits across the site including units in Operations 17, 26, 31, 32 and 47. Evidence of bone and shell artifact production appears in both elite residential and ceremonial areas, but residential compounds have a slightly higher ratio of debitage to finished artifacts.

HUMAN REMAINS

The remains of at least four adults and one child (approximately 1-3 years old) were identified in the El Mirador assemblage. A summary of the human remains found among the zooarchaeological materials is presented in Table 8. Isolated adult human bones of unknown sex were recovered from a plaza group near the Monos Complex (Op. 21), and from a floor fill deposit in the Tigre Plaza (Op.

32B). Skeletal remains of two adults were also found in the lower levels of the Tigre plaza chultun (Op. 32D, Lots 3-4). One of the adults is known to be a male based on the shape and breadth of the greater sciatic notch, but the other individual is of indeterminate sex. No evidence of disease or injury was observed on the relatively complete skeletons found in the chultun, but the single mandible showed extensive wearing of the tooth enamel. The juvenile remains at El Mirador are of unknown provenience.

SUMMARY AND CONCLUSIONS

The El Mirador faunal assemblage provides information regarding the role of faunal resources in subsistence, ritual and exchange networks in the Central Maya lowlands from Late Preclassic to Late Classic times. Throughout the site's occupation, large terrestrial mammal species such as white-tailed deer, brocket deer, and peccaries were used intensively. Domestic dogs were also kept at the site and may have also been consumed particularly during the Late Preclassic. A diversity of other medium to small-bodied terrestrial mammals and large galliform birds, such as the turkey and curassow, also fit into the highly terrestrial pattern of subsistence observed at El Mirador. Although on-site reservoirs, or wetland habitats, surrounding the site could have provided easy access to aquatic resources such as apple snails and small turtles, these habitats do not appear to have been a significant source of faunal resources for the site's elite until the Late Classic. This seems to argue against suggestions of anthropogenic *bajo* alteration to create increased habitat for aquatic species during the primary period of site occupation. However, since the faunal remains analyzed in this report were excavated exclusively from elite contexts, it is possible that we are only seeing one part of the larger animal use patterns practiced at El Mirador.

Intra-site differences between residential and ceremonial contexts also suggest preferential use of particular species for public ritual or elite feasting. Dogs were primarily found in association with public ceremonial architecture within the Tigre Plaza, while other important taxa such as deer, peccaries and large galliform birds were more evenly distributed across the site. Late Preclassic dog use at El Mirador may therefore have focused

on using this reliable resource as a feasting component or sacrificial animal. This finding, however, should be interpreted with caution. Dogs at El Mirador are primarily associated with Late Preclassic deposits, which come primarily from the site's public ceremonial areas. The association of dogs with ceremonial structures may therefore be an artifact of intra-site sampling.

Access to marine resources through trade is evidenced by the presence of a parrotfish and multiple species of marine molluscs. The parrotfish may have been imported as a subsistence resource, but the other marine fauna were likely exploited purely for ornamental and ritual use. The lack of marine shell debitage at the site suggests that these exotic resources were imported as finished artifacts from coastal localities. The extent of coastal trade is difficult to assess from the present sample. The diversity and abundance of marine fish present at the site is not likely to be represented by the El Mirador assemblage due to lack of fine screen recovery techniques. In addition, the specimens analyzed for this report do not represent the entire invertebrate assemblage recovered from the site. However, it is interesting to note that the El Mirador inhabitants imported marine resources from both the Atlantic and Pacific coasts. This animal resource acquisition pattern reinforces earlier propositions of El Mirador's importance in north-south, as well as east-west, trade interactions between the coasts and the interior Maya lowlands (Hansen, 1990: 211). The identification of *Melagris gallopavo* at El Mirador provides additional evidence for the site's role in long distance exchange networks. Although the ocellated turkey (*Meleagris ocellata*) was locally available, tamed or domesticated wild turkeys may have been obtained through trade connections with northern or central Mexico. These animals could have been raised on-site in domesticated form for use as subsistence or ritual resources. The identification of *Meleagris gallopavo* in Late Preclassic deposits at El Mirador represents the earliest record of this species within the Maya region.

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APPENDIX 1

* = terrestrial landsnail (likely intrusive)

LIST OF EL MIRADOR ZOOARCHAEOLOGICAL REMAINS BY PROVENIENCE

Provenience: Operation/Sub-Operation/Lot/
Bag – predominant period

16/A1/2 – Late Preclassic

1 Tayassuidae: lower fourth premolar, anterior 0.75

16/A1/4 – Late Preclassic

1 Mammalia (medium/large): long bone shaft fragment

16/A2/8

13 Mammalia (large): long bone shaft fragment

4 *Odocoileus virginianus*: antler fragment

16/A2/13/57 – Early Classic

4 Aves (large): tibiotarsus (left) distal 0.3 of shaft, in four fragments

16/A2/19/72 – Late Preclassic

2 *Canis lupus familiaris*: upper fourth premolar (right), in two fragments

17A(Tr2)/4 – Late Preclassic (mixed)

11 Vertebrata: 7 unidentified bone fragments, 4 long bone shaft fragments

1 Mammalia (large): long bone shaft fragment

1 Mammalia (large): long bone shaft fragment, snapped longitudinally and polished (bone spatula or perforator)

4 Tayassuidae [subadult]: parietal (left and right); radius/ulna (right) proximal 0.75; canine

1 *Odocoileus virginianus* [subadult]: long bone epiphysis fragment

17/A(Tr2)/5 – Early Classic

1 Vertebrata: long bone shaft fragment

4 Emydidae: hyoplastron (right), rib (right?)

15 Mammalia: long bone shaft fragment

1 Mammalia: maxilla/mandible tooth row fragment

7 Mammalia (large): long bone shaft fragment

3 cf. *Cuniculus paca* [subadult]: parietal (left), in three fragments

1 Cervidae: zygomatic (right)

1 *Mazama* sp.: zygomatic (right)

1 *Odocoileus virginianus*: metapodial shaft fragment

3 Tayassuidae: maxilla (left) fragment, in three fragments

17/A(Tr2)/6/122 – Late Preclassic (mixed)

1 Kinosternidae: seventh marginal (right)

1 Mammalia (large): long bone shaft fragment, snapped longitudinally and polished (bone perforator)

1 *Sylvilagus* sp.: femur (right) proximal 0.75

1 *Dasyprocta punctata*: radius (left)

1 Felidae (large) [subadult]: metapodial, proximal 0.75 of shaft

1 Cervidae (cf. *Odocoileus virginianus*): lumbar vertebra

3 *Odocoileus virginianus*: proximal phalanx (left), humerus (right) distal epiphysis, patella (right)

17/A1/1/11 – Late Classic

7 Mammalia (medium/large): unidentified bone fragment

17/A1/6/29 – Late Classic

1 *Mazama* sp.: upper molar (right)

17/A1/5/26 – Late Classic?

1 Bivalvia: valve fragment

17/A3/4/78 – Late Classic

1 Mammalia (large): long bone shaft fragment

2 cf. *Odocoileus virginianus*: femur (left?) proximal/anterior 0.25 of shaft, in two fragments

17/A4/3/90 – Late Classic

4 Vertebrata: unidentified bone fragments

8 Mammalia (medium/large): 4 long bone shaft fragments; 4 unidentified bone fragments

17/A4/4/93 – mixed

1 *Mazama* sp.: metatarsal (right) proximal 0.5, rodent gnawed

17/B1/1/18 – Late Classic

1 *Mazama* sp.: mandible (left) posterior 0.5 of tooth row

17/B1/4/34 – Late Classic

5 Mammalia (medium/large): 1 cranial fragment; 1 long bone shaft fragment (snapped longitudinally and polished); 3 unidentified bone fragments

2 *Mazama* sp.: metatarsal (left) proximal 0.5, in two fragments

17/B1/5/38 – Late Classic?

1 Mollusca: shell fragment

17/B1/5/42 – Early Classic

9 Mammalia: 2 rib fragments; 7 unidentified fragments

1 Mammalia (large): rib fragment

1 *Dasyprocta/Cuniculus* sp.: rib (right) medial 0.5

3 *Mazama* sp.: sixth lumbar vertebra, in 3 fragments

17/B1/6/46 – Classic (mixed)

Mammalia: 1 vertebra fragment; 5 unidentified bone fragments

Mazama sp.: lower third molar (left); ulna (right) proximal 0.25, burnt

17/B1/6/152 – mixed

4 cf. *Canis lupus familiaris*: second, third and fifth metatarsals; phalanx

4 *Mazama* sp.: humerus (right) distal 0.75; radius (right) (unfused distal epiphysis)

17/B1/7/54 – Late Classic

2 Mammalia (large): long bone shaft fragment

17/B1/10/65 – Late Preclassic

2 Mammalia: unidentified bone fragment

1 Cervidae (cf. *Mazama* sp.): rib (right) medial 0.3

1 *Mazama* sp.: calcaneus (left)

17/B1(TP2)/4/115 – Late Classic

3 Vertebrata: unidentified bone fragments

5 Mammalia: 1 cranial fragment; 4 unidentified bone fragments

5 Mammalia (medium): long bone shaft fragment

3 Mammalia (large): long bone shaft fragment

2 *Mazama* sp.: astragalus (right), in two fragments

17/B1(TP2)/5/144 – Early Classic

9 Mammalia: 6 cranial fragments; 1 sacrum fragment; 2 unidentified bone fragments

6 Mammalia (large): 1 rib fragment; 4 long bone shaft fragments; 1 tibia proximal shaft fragment

5 *Cuniculus paca* [subadult]: 2 thoracic vertebrae; 2 lumbar vertebrae; 1 sacral vertebra

3 Cervidae: femur (right) distal epiphysis (right) unfused, in two fragments; proximal phalanx distal 0.75

6 *Mazama* sp.: femur (right) distal 0.25 of shaft; humerus (left) middle 0.75 of shaft and proximal epiphysis; os coxa (right) middle 0.75; middle phalanx

17/B3/5/112 – Late Classic?

1 cf. Unionidae: hinge fragment, two perforations below hinge

17/B3/5/119 – Late Classic

1 Cervidae: metapodial, anterior/distal 0.5 of shaft

1 *Odocoileus virginianus*: thoracic vertebra

17/B4/9/195 – Late Classic

Vertebrata: unidentified bone fragments

32 Testudines: carapace/plastron fragments

2 Emydidae: third neural; fifth neural

1 Aves: tibiotarsus? shaft fragment

2 Mammalia: unidentified bone fragment

17/B5/7/168 – Late Classic

54 Vertebrata: unidentified bone fragments

1 Testudines: carapace/plastron fragment

1 *Dermatemys mawii*: hyoplastron (left)

10 cf. *Dermatemys mawii*: hyoplastron (right); neural fragment; rib fragment

17/B5/10/180 – Late Classic

1 Mammalia (medium): long bone shaft fragment

17/B5/18/200 – Late Classic

1 cf. Carnivora: mandible (left) ascending ramus fragment

17/B5/5/130 – Late Classic

Vertebrata: unidentified bone fragments

3 Testudines: carapace fragment

17/B5/7/141 – Late Classic

11 Vertebrata: unidentified bone fragments

28 Testudines: carapace fragments

4 Emydidae: first rib; fifth rib; epiplastron; plastron fragment

17/B5/7/167 – Late Classic

2 Testudines: carapace fragments

11 *Dermatemys mawii*: second rib (right); third rib (right and left); second neural; third neural; hyoplastron (left); hypoplastron (right); 2 marginal fragments; 2 rib fragments

17/C1/0/1 – Late Preclassic/Late Classic (mixed)

12 Vertebrata: unidentified bone fragments

17/C2/1/30 – Late Classic

1 Aves (large): proximal phalanx

17/C2/2/27 – Classic?

1 Mammalia (small): long bone shaft fragment

1 *Ototylomys phyllotis*: mandible (right)

17/C4/1/32 – unknown (Late Classic?)

1 *Didelphis* sp.: mandible (left)

1 *Dasybus novemcinctus*: seventh cervical vertebra

1 *Canis lupus familiaris*: radius, middle 0.7 of shaft, rodent gnawed

1 Tayassuidae: upper first incisor (left)

17/C5/5/59 (floor 2) – unknown (Late Classic?)

4 Vertebrata: unidentified bone fragments

10 Mammalia: long bone shaft fragments

1 Mammalia: long bone shaft fragment, split longitudinally and polished, in two fragments

19/A1/9 – Late Preclassic?

1 Mollusca: shell fragment, possibly polished

19/B/12 – mixed

1 Mammalia (large): long bone shaft fragment

21/I/1/2 – Classic

1 Mammalia (large): long bone shaft fragment, heavily eroded

21/I1/7 – Early Classic

1 Mammalia: femur? shaft fragment, rodent gnawed

21/I1/11/26 – Classic

25 Vertebrata: unidentified bone fragments

21/I1/14 – mixed

1 Gastropoda: shell fragment

21/I1/14/34 – mixed

3 Vertebrata: unidentified bone fragments

21/I1/9/19 – Classic/Early Classic

1 Mammalia: long bone shaft fragment

21/I1/11/26 – Classic

4 Mammalia: unidentified bone fragments

21/I1/13/30 – Early Classic

8 Mammalia: unidentified bone fragments

21/I1/14/34 – Early Classic

10 Mammalia: 5 long bone shaft fragments;

5 unidentified bone fragments

21/I1/27 – Early Classic

29 Vertebrata: unidentified bone fragments

24 Mammalia: unidentified bone fragments

6 Mammalia (large): long bone shaft fragments

21/--/1 – mixed

5 Mammalia: unidentified bone fragments

4 Mammalia (large): 3 long bone shaft fragments; 1 unidentified bone fragment

3 Mammalia (medium): long bone shaft fragments

- 1 Tayassuidae: metapodial, middle 0.5 of shaft
- 26/1/4/107 – Late Preclassic
- 1 *Pomacea flagellata*: shell
- 26/A/4 – Late Preclassic
- 1 *Pomacea flagellata*: shell
- 26/A/9/216 – Late Preclassic
- 1 *Spondylus* sp.: cylindrical shell bead
- 26/B/10/32 – Late Preclassic
- 18 Vertebrata: unidentified bone fragments
- 13 Mammalia (small/medium): long bone shaft fragments
- 1 Mammalia (medium/large): long bone shaft fragments
- 2 Mammalia (medium): metapodial, distal 0.25, in two fragments
- 26/C/4/61 – Late Preclassic
- 4 Mollusca: shell fragments
- 26/D/12/261 – Late Preclassic
- 3 *Pomacea flagellata*: shell fragments
- 26/H/3/81 – Late Preclassic
- 1 *Mazama* sp.: calcaneus (left)
- 26/J/2/104 – Late Preclassic
- Mammalia (large): long bone shaft fragment, cut longitudinally and polished
- 26/J/4/106 – Late Preclassic
- 30 Vertebrata: unidentified bone fragments
- 1 *Sparisoma* sp.: dentary
- 1 Aves (large): long bone shaft fragment
- 1 *Meleagris gallopavo* [male]: tarsometatarsus (right), distal 0.5 of shaft
- 14 Mammalia: unidentified bone fragments
- 4 Mammalia (medium/large): long bone shaft fragments
- 1 Mammalia (large): long bone shaft fragment
- 3 *Canis lupus familiaris*: lower canine; phalanx; radius, middle 0.25 of shaft
- 1 Cervidae: metapodial shaft fragment
- 2 *Odocoileus virginianus*: middle phalanx; proximal phalanx, cut through horizontally and polished at proximal end
- 26/J/14/120 – Late Preclassic
- 33 Vertebrata: unidentified bone fragments
- 1 Tayassuidae: maxilla (right), anterior/lateral fragment
- 1 *Meleagris gallopavo* [male?]: ulna (left), middle 0.3 of shaft
- 2 Mammalia: unidentified bone fragments
- 2 *Canis lupus familiaris*: canine, in two fragments
- 1 Tayassuidae: humerus (left), distal 0.25
- 1 *Odocoileus virginianus*: proximal phalanx (right)
- 26/J/19/4 – Late Preclassic
- 3 Vertebrata: unidentified bone fragments
- 1 Aves: long bone shaft fragment
- 1 Aves (large) (cf. *Meleagris* sp.): ulna (right), middle 0.3 of shaft
- 10 Mammalia: 2 long bone shaft fragments; 8 unidentified bone fragments
- 1 Mammalia (large): long bone shaft fragment, shaft cut horizontally at proximal and distal ends, polished exterior
- 1 Mammalia (large): long bone shaft fragment, cut horizontally along at proximal and distal ends
- 3 *Canis lupus familiaris*: maxilla (right); upper canine (right); upper third incisor (left)
- 3 *Mazama* sp.: 1 metacarpal (left); 2 distal metapodial fragments
- 26/K/4 – Late Preclassic
- 1 *Spondylus* sp.: valve (right), spines abraded off, two perforations along on edge. Very similar to valve in found in 32/D1/4/121.
- 26/K/4/96 – Late Preclassic
- 1 *Meleagris* sp.: femur (left) shaft fragment, rodent gnawed
- 26/O/5/246 – Late Preclassic
- 1 *Conus spurius*: shell tinkler – horizontal slit cut through anterior body whorl
- 26/O/8/259
- 1 *Euglandina* sp.*

26/O/24/273 – Late Preclassic

2 *Canis lupus familiaris*: mandible (right), in two fragments

26/O/25-27/281 – Late Preclassic

4 Vertebrata: unidentified bone fragments

1 Aves (large): long bone shaft fragment

1 *Meleagris* sp.: carpometacarpus (left)

1 *Meleagris gallopavo* [male]: ulna (right)

1 *Meleagris* cf. *gallopavo* [female?]: tarso-metatarsus (right)

1 Mammalia (small/medium): radius, middle shaft fragment

1 Mammalia (large): long bone shaft fragment, one end snapped longitudinally, polished

1 Mammalia (large): long bone shaft fragment

1 *Canis lupus familiaris*: radius (right), proximal 0.3

26/P/9/29 – Late Preclassic

1 Mammalia: long bone shaft fragment

2 Mammalia (large): long bone shaft fragment, in two fragments

26/P/17/286 – Late Preclassic

36 Vertebrata: unidentified bone fragments

4 Aves (large): long bone shaft fragment

5 Mammalia: unidentified bone fragment

4 *Mazama* sp.: ox coxa (left), middle 0.75, in four fragments

26/P/25/292 – Late Preclassic

4 Mammalia: 2 long bone shaft fragments; 2 unidentified bone fragments

1 *Canis lupus familiaris*: upper canine (left)

1 cf. *Odocoileus virginianus*: ischium (left) fragment

26/P/25/295 – Late Preclassic

2 Vertebrata: unidentified bone fragments

8 Mammalia: unidentified bone fragments

2 Mammalia (large): femur? shaft fragments

1 *Canis lupus familiaris*: upper canine (left)

1 *Odocoileus virginianus*: femur, proximal 0.25

26/P/26/246 –

1 *Bulimulus unicolor**

27/B3/1 – Late Preclassic

1 *Crax rubra* [subadult]: coracoid (right)

30/A/15/40 – unknown (Late Classic?)

1 Lacertilia: quadrate

24 Mammalia (small): 4 caudal vertebrae; 6 rib fragments; 1 scapula, 13 unidentified bone fragments

23 Muridae: 1 temporal; 1 incisor; 2 maxilla fragments; 2 humerus (left); 3 ulna (left); 1 femur (right); 1 tibia (right); 1 thoracic vertebra; 5 lumbar vertebrae; 4 metapodials; 2 phalanges. Likely intrusive

12 *Ototylomys phyllotis*: 2 mandible (left); 1 occipital; 1 atlas; 1 scapula (left); 2 femurs (left); 1 tibia (left); 2 os coxae (left); 2 os coxae (right). Likely intrusive

31/A/1/95 – Late Classic

1 *Mazama* sp.: calcaneus (left)

2 *Odocoileus virginianus*: femur (right) shaft cut through horizontally at distal end; ischium (right) posterior fragment

31/A/2/97 – Late Classic

1 Aves (large): long bone shaft fragment

1 *Sylvilagus* sp.: tibia (left) proximal 0.3

31/A/3/101 – Late Classic

1 Emydidae: eighth rib (right)

31/A/4/107 – Late Classic

1 *Odocoileus virginianus*: lumbar vertebra

31/A/5/125 – Late Classic

1 Mammalia (large): tibia (right), shaft cut through horizontally at proximal and distal ends, polished

31/A/5/124 – Late Classic

13 Mammalia (large): long bone shaft fragments, 1 fragment burnt

5 *Odocoileus virginianus*: femur (right), metatarsal, proximal phalanx

31/A/6/138 – Late Classic

17 *Odocoileus virginianus* [subadult]: 1 me-

tacarpal (right); 6 os coxae (left and right) fragments; 4 sacrum fragments; 6 lumbar vertebrae fragments

31/A/8/158A – Late Classic

1 Mammalia (large): long bone shaft fragment, tubular bone bead polished and blackened

31/D/19/165 – Late Classic

4 Tayassuidae: mandible (left and right), in four fragments

31/D/20/166 – Late Classic

1 Aves [subadult]: tarsometatarsus, middle shaft fragment

1 cf. Aves [subadult]: coracoid? fragment

2 Aves (medium): tibiotarsus (left)

3 *Ortalis vetula*: femur (left and right); tibiotarsus (left)

1 Sciuridae: tibia (left)

32/B/10/23 – unknown

12 Mollusca: shell fragments

5 Gastropoda: shell fragments

3 *Pomacea flagellata*: shell fragments

2 cf. *Chondropoma* sp.*

2 *Euglandina gheisbreghtii**

2 *Euglandina* sp.*

3 *Orthalicus princeps**

6 *Praticolella* cf. *griseola**

2 *Neocyclotus dysoni**

32/B/11/29 – Late Preclassic

8 Vertebrata: 1 long bone shaft fragment; 7 unidentified bone fragments

1 *Rhinella* cf. *marina*: thoracic vertebra

1 Testudines: rib fragment, possibly polished on one edge

1 Emydidae: eleventh? marginal (left)

1 Colubridae: thoracic vertebra

6 Mammalia: unidentified bone fragments

3 Mammalia (medium): 2 long bone shaft fragments; 1 femur (cf. *Cuniculus paca*), middle shaft fragment

7 Mammalia (large): long bone shaft fragment

6 *Canis lupus familiaris*: mandible (left) middle 0.5; lower canine (right); canine fragment; ulna (left) proximal 0.75, in three fragments

1 Cervidae: phalanx

2 *Mazama* sp.: metacarpal (right) proximal/lateral 0.6 of shaft; radius (left) proximal 0.75

2 *Odocoileus virginianus*: femur (right) proximal epiphysis (unfused); femur shaft fragment

32/B/11/30 – unknown

1 Mollusca: shell fragment

3 *Orthalicus princeps**

1 Polygyridae or Sagidae*

32/B/12/32 – Late Preclassic

1 Vertebrata: cylindrical bone bead with two fine grooves around circumference

32/B/13/34 – unknown

2 Bivalvia: valve fragments

32/B/13/37 – Late Preclassic

1 Aves: long bone shaft fragment

4 Mammalia (large): long bone shaft fragments

2 *Canis lupus familiaris*: mandible (right); upper canine (right)

2 cf. *Canis lupus familiaris*: rib (right); metapodial fragment

3 Cervidae: metapodial shaft fragment

1 *Mazama* sp.: metacarpal, middle 0.5 of shaft

2 *Odocoileus virginianus*: astragalus (left); metatarsal shaft fragment

32/B/14/38 – Late Preclassic

1 Aves (large): tibiotarsus (right), distal shaft fragment, grooved and snapped at proximal end

1 *Odocoileus virginianus*: proximal phalanx (left)

32/B/18/49 – Late Preclassic

1 *Staurotypus triporcatus*: neural

1 Felidae (large): canine

32/B/21/52 – Late Preclassic

- 2 Testudines: carapace fragments; one fragment is perforated
- 1 Kinosternidae: rib fragment
- 1 Emydidae: third rib (left)
- 2 Aves (medium/large): radius (left) distal 0.25; tibiotarsus (left) shaft fragment
- 1 Aves (large) – cf. *Meleagris* sp.: tibiotarsus? shaft fragment
- 6 Mammalia: unidentified bone fragments
- 5 Mammalia (medium): long bone shaft fragments
- 22 Mammalia (large): 1 frontal (left) fragment; 21 long bone shaft fragments
- 3 Canidae: femur (right) proximal fragment; metapodial shaft fragment; radius (left) middle shaft fragment
- 4 *Canis lupus familiaris*: second metatarsal (left); lower second premolar (left); maxilla with upper first molar (right)
- 5 Cervidae: os coxa (right) middle 0.5; metapodial distal shaft fragment
- 4 *Odocoileus virginianus*: molar; 2 tibia (left) fragments; phalanx

32/B/22/55 – Late Preclassic

- 18 Vertebrata: unidentified bone fragments
- 8 Mammalia (large): unidentified bone fragments
- 1 *Canis lupus familiaris*: tibia (right) distal 0.25, cut mark above distal epiphysis on anterior surface
- 6 *Odocoileus virginianus*: scapula (right) in three fragments; femur (right) shaft fragment; middle phalanx; proximal phalanx

32/B/24/60 – Late Preclassic

- 5 Mammalia (large): 1 scapula fragment; 2 long bone shaft fragments; 2 unidentified bone fragments
- 6 *Odocoileus virginianus*: 3 scapula (right and left) fragments; humerus (left) distal 0.75; humerus (right) distal 0.2; os coxa (right)

32/B1/15/41 – Late Preclassic

- 4 Vertebrata: unidentified bone fragments
- 3 Mammalia: long bone shaft fragments

1 Felidae (large): humerus (right) shaft fragment

2 *Canis lupus familiaris*: canine; humerus (left) distal 0.5 of shaft

2 *Odocoileus virginianus*: radius (right) proximal 0.3; femur (left) proximal 0.5, possible cutmarks on femur head

32/C/2/47 - unknown

4 Mollusca: shell fragments

32/D/2/96 - Late Preclassic/Protoclassic

1 cf. Unionidae: teardrop-shaped shell pendant, perforated twice along midline

32/D/4/91 – Late Preclassic

1 Mammalia: unidentified bone fragment

32/D/4/96(103?) – Late Preclassic

7 Vertebrata: unidentified bone fragments

1 Aves: long bone shaft fragment

2 Mammalia: unidentified bone fragments

1 Mammalia (large): long bone shaft fragment

1 Tayassuidae: temporal (left) petrous portion

32/D1/3/80 - Late Preclassic/Protoclassic

10 Mollusca: shell fragment

32/D1/2/102 – Protoclassic

1 Tayassuidae: lower canine, perforated through root

32/D1/3/82 – Protoclassic

1 Vertebrata: unidentified bone fragment

1 Mammalia (large): long bone shaft fragment

32/D1/3/85 – Late Preclassic/Protoclassic

4 Vertebrata: unidentified bone fragments

9 Mammalia (large): 3 long bone shaft fragments; 1 vertebra fragment; 4 unidentified bone fragments, 1 fragment grooved longitudinally at one end

32/D1/3/92 – Late Preclassic/Protoclassic

10 Mollusca: shell fragments

12 Gastropoda: shell fragments

1 *Pomacea flagellata*: shell fragment

6 cf. *Chondropoma* sp.*

3 Spiraxidae*

9 *Euglandina gheisbreghtii**

7 *Euglandina* sp.*

1 *Bulimulus* sp.*

28 *Pratichoella* cf. *griseola**

2 *Neocyclotus dysoni**

17 Mammalia (large): long bone shaft fragments

32/D1/3/98 - Late Preclassic/Protoclassic

1 Mollusca: shell fragment

18 Gastropoda: shell fragments

3 cf. *Chondropoma* sp.*

3 *Euglandina* sp.*

1 *Bulimulus unicolor**

2 *Orthalicus princeps**

12 *Pratichoella* cf. *griseola**

4 *Neocyclotus dysoni**

7 Mammalia (large): long bone shaft fragments

32/D1/3/104 - Late Preclassic/Protoclassic

16 Mammalia (medium/large): unidentified bone fragments

48 Mammalia (large): 22 rib fragments; 2 vertebrae fragments; 19 long bone shaft fragments, 1 burnt; 5 unidentified bone fragments

32/D1/4/82 - Late Preclassic/Protoclassic

3 Mollusca: shell fragments

1 Gastropoda: shell fragment

2 *Pomacea flagellata*: shell fragments

1 *Helicina* sp.*

2 Sprixidae*

2 *Orthalicus princeps**

10 *Pratichoella* cf. *griseola**

2 *Neocyclotus dysoni**

32/D1/4/87 - Late Preclassic

20 Vertebrata: unidentified bone fragments

18 Mammalia: unidentified bone fragments

25 Mammalia (large): 20 long bone shaft fragments; 5 rib fragments

1 Felidae (cf. *Leopardus pardalis*): femur (ri-

ght) shaft fragment

1 Cervidae [male]: antler fragment

16 *Odocoileus virginianus* [large adult male]: antler fragment; cranial/antler fragment

32/D1/4/88 - Late Preclassic

6 Vertebrata: unidentified bone fragments

7 Aves (large): long bone shaft fragments

3 Mammalia (medium): long bone shaft fragments

6 Mammalia (medium/large): 1 sternum fragment; 5 long bone shaft fragments

151 Mammalia (large): 14 rib fragments; 4 vertebrae fragments; 46 long bone shaft fragments; 87 unidentified bone fragments. Some remains are likely human.

32/D1/4/91 - Late Preclassic

10 Vertebrata: unidentified bone fragments

14 Mammalia: 2 long bone shaft fragments;

12 unidentified bone fragments

32/D1/4/121 - Late Preclassic/Protoclassic

1 *Spondylus* sp.: valve (right), spines abraded off, two perforations along on edge. Very similar to valve found in 26K/4.

32/D1/4/122 - Late Preclassic

5 Vertebrata: unidentified bone fragments

65 Mammalia (large): 1 vertebra fragment; 2 long bone shaft fragments; 23 unidentified bone fragments

1 *Odocoileus virginianus*: atlas

32/D1/4/123 - Late Preclassic

6 Mammalia (large): unidentified bone fragments

32/E/3/113 - Late Preclassic

2 Mollusca: shell fragments

1 Scaphopoda: shell bead

3 Gastropoda: 1 body whorl fragment; 2 spire fragments

35/A/12/17 - Late Preclassic

1 cf. *Spondylus* sp.: cut fragment of valve with spines removed, possible mosaic inlay

35/B/5/22 – Late Preclassic

- 9 Vertebrata: unidentified bone fragments
- 1 *Meleagris* sp.: carpometacarpus (right), middle 0.5 of shaft
- 8 Mammalia (medium/large): long bone shaft fragment
- 1 *Canis lupus familiaris*: canine

36/A/10/24 – Late Preclassic

- 1 cf. Strombidae: cut cube of shell, polished (likely debitage from marine shell artifact production)

36/A/13/84 – unknown

- 3 cf. Strombidae: rectangular shell pectorals perforated twice along edge

39/A/1 – unknown

- 1 Mollusca: shell fragment
- 2 Subulinidae*

40/IL1/4/32 – Late Preclassic?

- 1 Mollusca: shell fragment
- 1 *Strombus* sp.: spire

46/B/14 – Late Preclassic

- 8 *Crassostrea virginica*: 2 valves (left); 6 valve fragments

47/D/6 – Late Preclassic

- 1 *Oliva* sp.: shell tinkler fragment, horizontal slit cut in anterior body whorl, apex/spire removed

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- 1 *Spondylus* cf. *calcifer*: whole articulated valves (right and left)

Unknown provenience

- 1119 Vertebrata: unidentified bone fragments

1 Testudines: carapace fragment

1 Kinosternidae: marginal (right)

1 Aves (large): vertebra fragment

178 Mammalia: unidentified bone fragments

8 Mammalia (small/medium): 1 metapodial; 1 tibia; 1 rib; 1 femur; 4 vertebrae

69 Mammalia (medium): 1 thoracic vertebra fragment; 55 rib fragments; 13 long bone fragments

95 Mammalia (medium/large): 83 cranial fragments; 11 vertebra fragments; 1 unidentified bone fragment

109 Mammalia (large): 34 cranial fragments; 4 rib fragments; 6 carpal/tarsal fragments; 34 long bone shaft fragments; 31 unidentified bone fragments

2 *Dasypus novemcinctus*: femur (right); dermal scute

2 *Dasyprocta/Cuniculus* sp.: vertebra fragments

2 *Cuniculus paca*: rib; thoracic vertebra

2 *Dasyprocta punctata*: tibia (left), in two fragments (unfused proximal epiphysis)

5 cf. Canidae: 1 femur shaft fragment; 4 humerus shaft fragments

4 Artiodactyla: lumbar vertebra fragments

6 Tayassuidae: cuneiform (left); unciniform (left); scaphoid (right); carpal/tarsal; metapodial; ulna (right) distal epiphysis

1 Cervidae: radius (right) distal epiphysis

6 *Mazama* sp.: radius (left and right) distal 0.25; metacarpal (left) proximal 0.5; 3 proximal phalanges

9 *Odocoileus virginianus*: 2 lumbar vertebra fragments; 2 metapodial distal epiphysis fragments; cubonavicular (right); 3 distal phalanges; phalanx fragment

