

CHAPTER 5

RESULTS

Overview

From July 2003 to January 2005 23,498 specimens were logged into a database. Included in the early analysis of the Skinner collection were 73 porcupine (*Hystrix africaeaustralis*) quills, 46 fragments from eggshells, a single feather and 42 seashell fragments. These, along with five hooves and five claw sheaths from the subsequent collections were removed from the database for analysis of the skeletal elements, leaving a total of 23,324 specimens (for breakdown of specimens per den see Chart 1). Although removed for the analysis, porcupine quills and porcupine gnawing were noted at Rietvlei Den 03, Rietvlei Den 02, Mashatu Den 4, Brown Hyaena Project dens D-P 1, D-P 2, D-P 4, D-P 9, D-P 16, D-BB 1 as well as the Skinner collection. While porcupines are known collectors of faunal remains in their own right there is little evidence that any of the studied assemblages could be solely from porcupine collecting behaviour. In addition, other carnivores inhabit the 'hyaena dens' from time to time as was observed in Brown Hyaena Project D-P 10. This den was originally scheduled for collection during the initial surveys and collections on the Luderitz Peninsula but, upon return during the second survey period, the den was in use by a pair of black-backed jackals (*Canis mesomelas*) and their three pups.

Of the 23,324 specimens 39.4% have been identified to species or class size (Brain, 1974) (Table 1), 86.8% to skeletal element and 36% have evidence of carnivore gnawing activity of some sort upon the bones. Chart 1 illustrates specimens per den and Chart 2 illustrates the breakdown of skeletal elements that have been identified,

with ribs, vertebrae, metapodials and skull fragments removed due to large numbers of each (5020 ribs, 1573 vertebrae, 1076 metapodials and 2314 skull fragments).

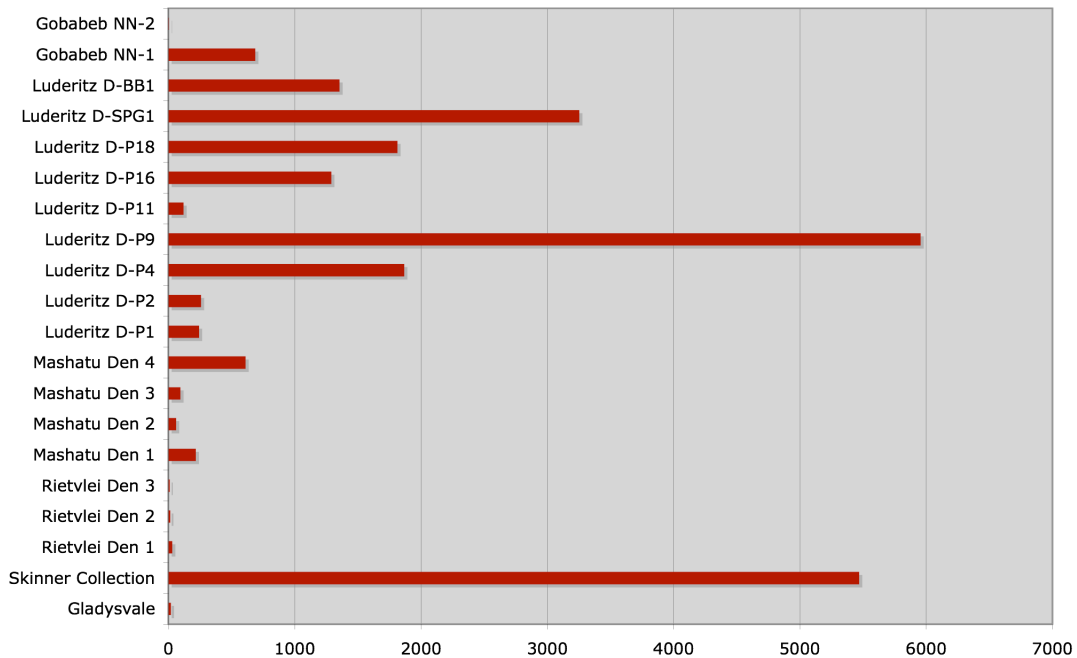


Chart 1: Specimen per den

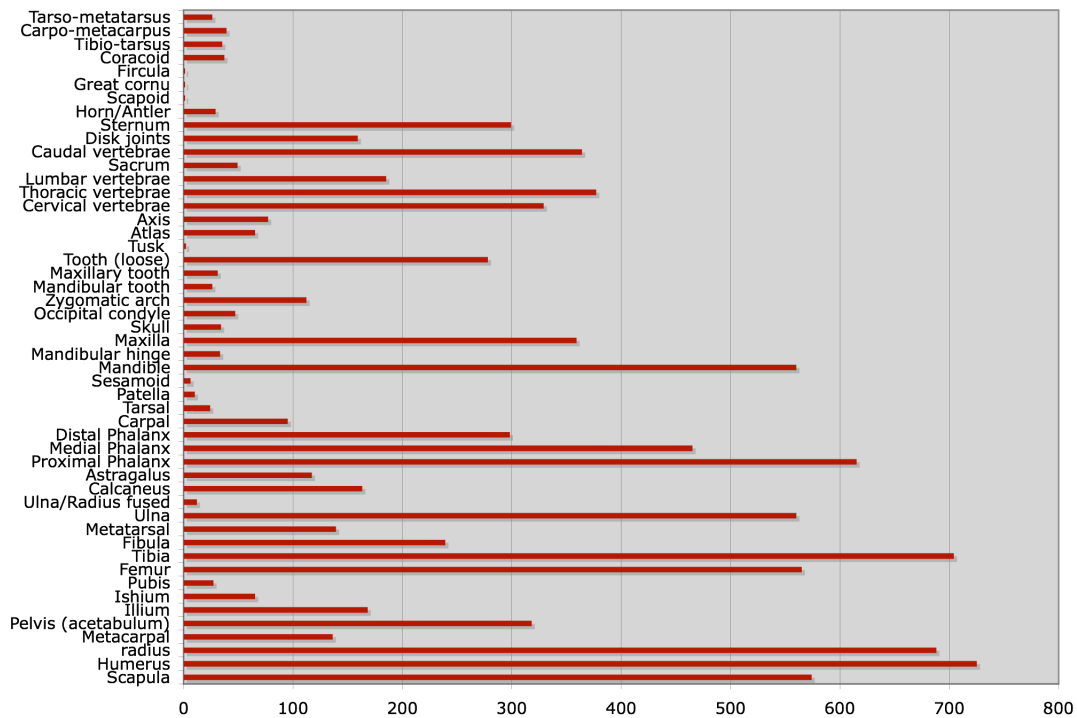


Chart 2: Skeletal Elements

The data set includes material collected from *Crocuta* and *Parahyaena* dens across southern Africa. Material from spotted hyaenas comprised 7.1% (1660 specimens) of the total database, while material collected from brown hyaena dens yielded 69.4% (16,198 specimens) of the data. The remaining 23.5% of the data comes from the previously established Skinner collection. (See previous chapter for details of specific dens and regions collected from). Each den was analysed individually and species collected, NISP (Number of Identified Specimens), MNI (Minimum Number of Individuals), skeletal elements, relative age (using fusion data), weathering and specific patterns of fragmentation and carnivore gnawing broken down. Fragmentation patterns for all the collections are illustrated in Chart 3.

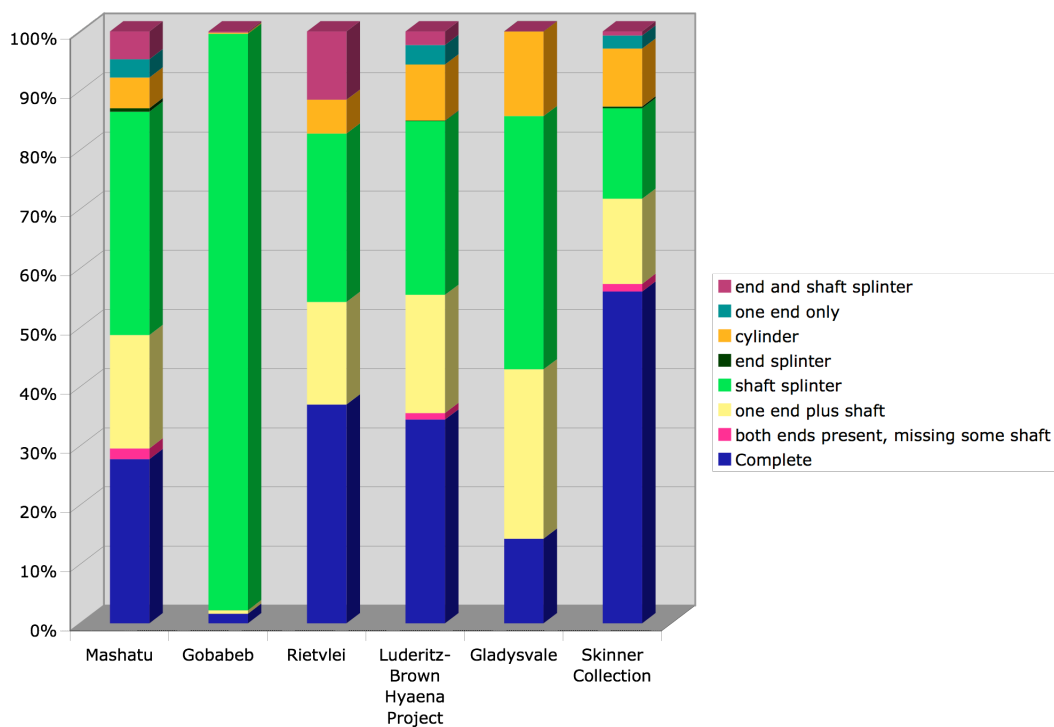


Chart 3: Fragmentation Patterns, Regions & Collections

SPECIES	NISP	SPECIES	NISP
<i>Aepyceros melampus</i>	160	<i>Hystrix africae australis</i>	1
<i>Alcelaphus buselaphus</i>	3	Leporidae	11
Amphibian	1	<i>Loxodonta africana</i>	1
<i>Antidorcas marsupialis</i>	100	Mustelidae/Viveriidae/Herpestidae	8
<i>Arctocephalus pusillus</i>	6493	<i>Oreotragus oreotragus</i>	18
Avian (large)	431	<i>Oryx gazella</i>	153
Avian (medium)	100	<i>Panthera pardus</i>	1
Avian (small)	7	<i>Papio cynocephalus</i>	8
<i>Bos</i> (domestic)	3	<i>Parahyaena brunnea</i>	59
Bovid size I	10	<i>Phacochoerus africanus</i>	31
Bovid size II	39	<i>Procavia capensis</i>	11
Bovid size III	91	<i>Raphicerus campestris</i>	10
Bovid size IV	1	<i>Redunca fulvorufula</i>	1
<i>Canis familiaris</i>	548	Reptilian (med-lg)	5
<i>Canis mesomelas</i>	244	Small mammal	18
<i>Capra hircus</i>	31	<i>Spheniscus demersus</i>	125
Cetacea	30	<i>Struthio camelus</i>	89
<i>Connochaetes taurinus</i>	13	<i>Sylvicapra grimmia</i>	4
<i>Connochaetes gnou</i>	3	<i>Syncerus caffer</i>	4
<i>Crocuta crocuta</i>	2	<i>Taurotragus oryx</i>	1
<i>Damaliscus dorcas phillipsi</i>	13	<i>Tragelaphus scriptus</i>	2
<i>Equus burchellii</i>	35	<i>Tragelaphus strepsiceros</i>	71
<i>Equus caballus</i>	6	<i>Vulpes chama</i>	33
<i>Felis</i> (domestic size)	129	Fish	19
<i>Homo sapien</i>	1	TOTAL	9178

Table 1: All species

In addition to recording general carnivore activity upon faunal remains, specific types of carnivore gnawing were also recorded (See Chart 4). These include punctates and punctate depressions (See Plate 24), acid etching, crenulated edges (See Plate 25), scouring (See Plate 26), striations and any combinations thereof (See Plate 27). Location of the damage upon the faunal remains as well as which skeletal element is damaged was also documented.

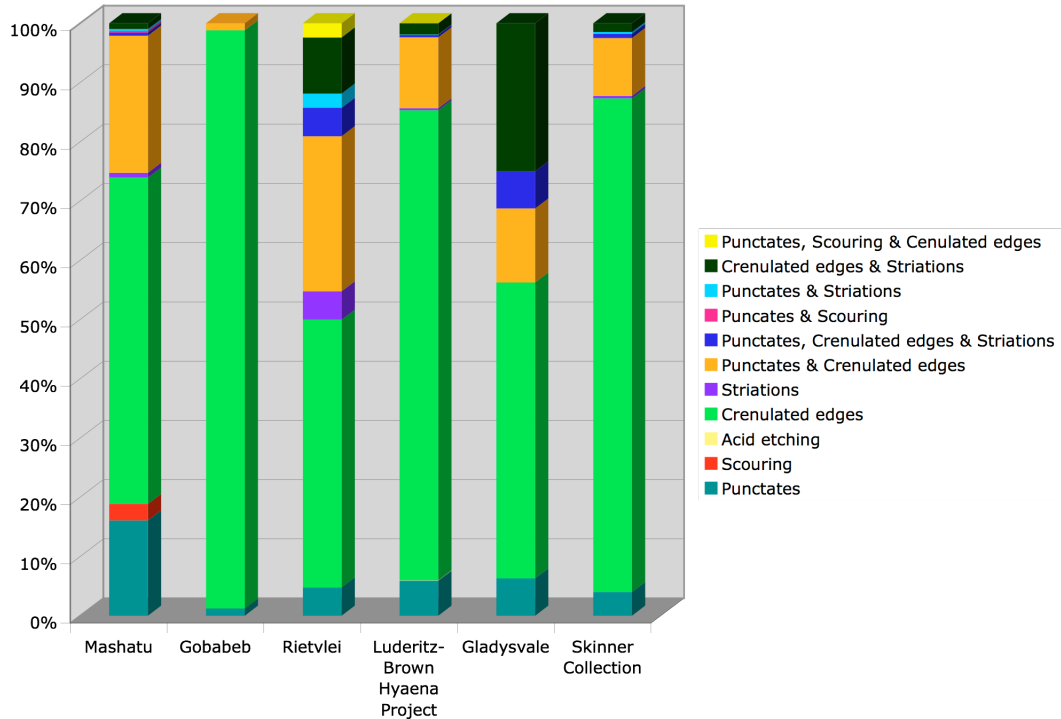


Chart 4: Carnivore Damage, Regions & Collections

Crocuta crocuta assemblages

Mashatu Den 1

Mashatu Den 1 consisted of 214 specimens, of which 64.5% were identified to species or class size. The majority of the identified remains belong to kudu (*Tragelaphus strepsiceros*) (34.1%), followed by bovid size III (31.2%), impala (*Aepyceros melampus*) (15.2%), bovid size II (10.9%), zebras (*Equus burchellii*) (2.9%), bovid size I (2.2%), hyrax (*Procavia capensis*) (1.5%), duikers (*Silvicapra grimmia*) (1.5%) and medium to large reptiles (0.7%) (See Table 2). With the exception of two hyraxes and the single reptile all of the other identified specimens were bovidae. There was a complete lack of hyaena remains as well as remains of other carnivore species.

Species	NISP	MNI
<i>Aepyceros melampus</i>	21	3 (skulls)
Bovid Size I	3	1 (right Ulna)
Bovid Size II	15	1 (left mandible)
Bovid Size III	43	1 (right astragalus)
<i>Equus burchellii</i>	4	1 (left femur)
<i>Procavia capensis</i>	2	1 (right tibia)
Reptilian (med-Ig)	1	1 (complete mandible)
<i>Sylvicapra grimmia</i>	2	1 (left tibia)
<i>Tragelaphus strepsiceros</i>	47	4 (left tibia)
Total	138	14

Table 2: Species NISP & MNI Mashatu Den 1

Of the 214 specimens collected, 74.3% were identified to skeletal element.

Breakdown of elements and species can be seen in Table 3, while a graphic representation of elements is illustrated with Chart 5. All of the long bones were represented in the collection as well as all types of vertebrae, ribs and skull bones. Skull bones include not only complete skulls and skull fragments, but mandibles, maxillae and mandibular hinges as well. Ribs and skull fragments were the most abundant (16 and 15 respectively), while tibia made up the largest grouping of long bones with ten specimens identified. Fusion data for this den indicate that all of the specimens but one unfused tibia have come from adult animals.

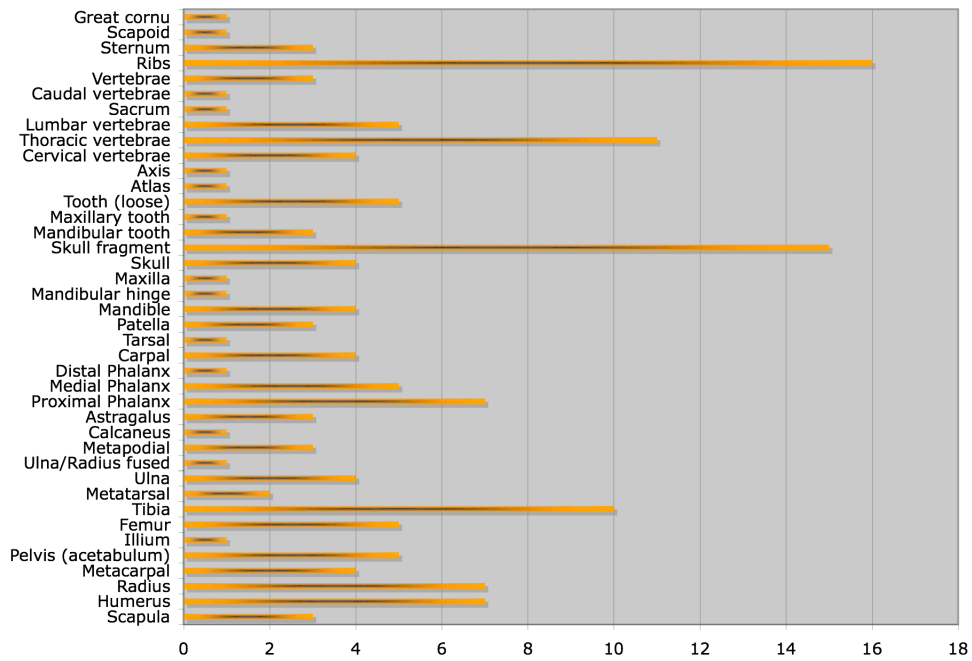


Chart 5: Elements, Mashatu Den

SKELETAL ELEMENT	NUMBER	SPECIES BREAKDOWN
Scapula	3	2 Kudu; 1 unknown
Humerus	7	4 Impala; 3 Kudu
Radius	7	3 Kudu; 3 bovid size II; 1 bovid size I
Metacarpal	4	2 Kudu; 1 Impala; 1 bovid size II
Pelvis (acetabulum)	5	2 Kudu; 2 Zebra; 1 Hyrax
Ilium	1	bovid size II
Femur	5	2 Kudu; 2 bovid size II; 1 Zebra
Tibia	10	4 Impala; 3 Kudu; 1 Duiker; 1 Hyrax; 1 bovid size II
Metatarsal	2	2 Kudu
Ulna	4	3 Kudu; 1 bovid size I
Ulna/Radius fused	1	Impala
Metapodial	3	2 bovid size III, 1 bovid size II
Calcaneus	1	bovid size III
Astragalus	3	2 Kudu; 1 bovid size III
Proximal Phalanx	7	6 Kudu; 1 Impala
Medial Phalanx	5	2 Impala; 2 bovid size III; 1 Kudu
Distal Phalanx	1	Impala
Carpal	4	2 Impala; 2 unknown
Tarsal	1	bovid size III
Patella	3	1 Kudu; 1 Duiker; 1 bovid size III
Mandible	4	2 bovid size II; 1 Kudu; 1 reptile (med-lg)
Mandibular hinge	1	Kudu
Maxilla	1	bovid size II
Skull	4	3 Impala; 1 Kudu
Skull fragment	15	14 unknown; 1 bovid size III
Mandibular tooth	3	2 Kudu; 1 bovid size II
Maxillary tooth	1	bovid size III
Tooth (loose)	5	unknown
Atlas	1	Kudu
Axis	1	Kudu
Cervical vertebrae	4	3 Kudu; 1 Impala
Thoracic vertebrae	11	6 bovid size III; 4 kudu; 1 bovid size I
Lumbar vertebrae	5	bovid size III
Sacrum	1	Kudu
Caudal vertebrae	1	bovid size III
Vertebrae	3	2 unknown; 1bovid size II
Ribs	16	14 bovid size III; 2 unknown
Sternum	3	bovid size III
Scaphoid	1	Zebra
Great cornu	1	Kudu
TOTAL	159	

Table 3: Elements with species breakdown, Mashatu Den 1

The length of 75 specimens recorded ranged from 0.5 to 44cm, a tibia from a kudu. Of these, 28 (37.3%) were complete bones; 23 (30.7%) were shaft splinters; 12 (16%) were comprised of one end plus some shaft; five (6.7%) were one end only; four (5.3%) had both ends present while missing a portion of the shaft; two (2.7%) were cylinders and one (1.3%) was an end and shaft splinter. There were no examples of end splinters (see Chart 6).

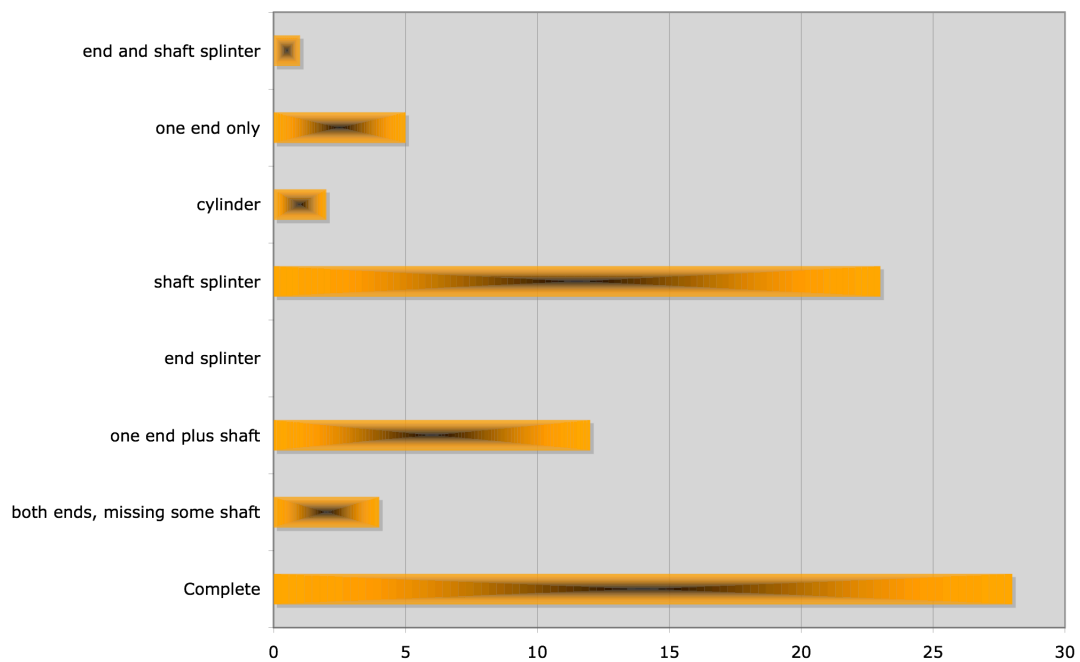


Chart 6: Fragmentation, Mashatu Den 1

Weathering data were collected from 188 (87.9%) of the specimens (see Chart 7).

Weathering information from the majority of the assemblage suggests a range of 2-6 yrs since death. The 0-3 yr range are the next most abundant, followed by 4-15 yrs.

Two samples appear to have been in the environment for 6-15 yrs and one specimen falls under the 0-1 yr category.

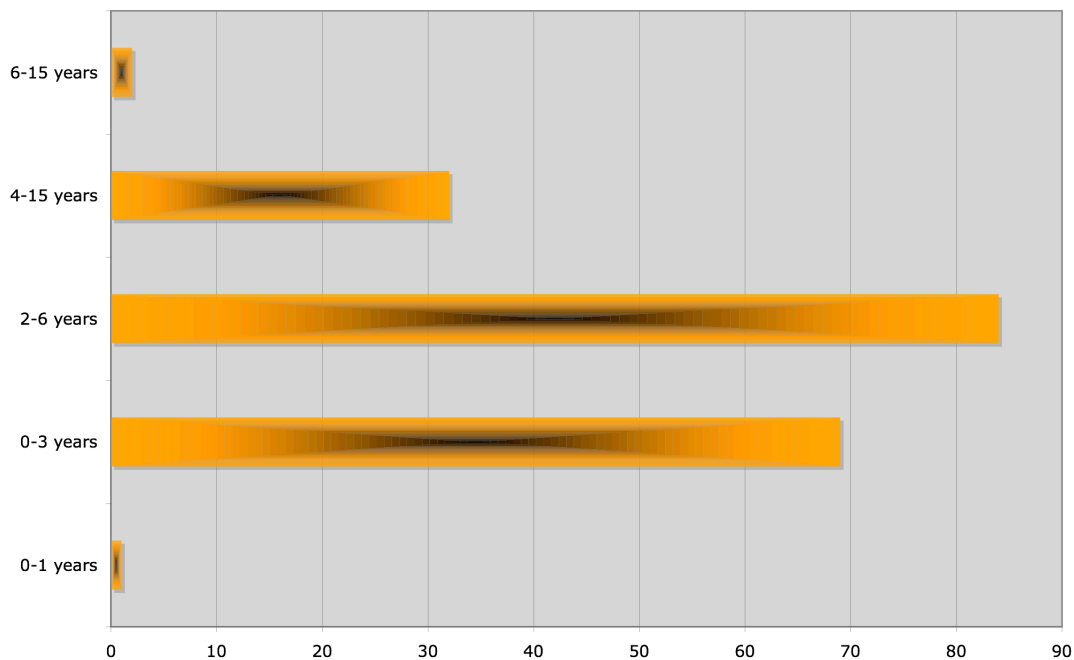


Chart 7: Weathering, Mashatu Den 1

Of the 214 faunal remains, 32.2% yielded carnivore-gnawing damage of some kind upon the bone surface. Of this crenulated edges made up 46.4%, punctate depressions 11.6%, acid etching 8.7%, striations 2.9%, scouring 0%. The combinations of punctate depressions & crenulated edges 26.1%, crenulated edges & striations 2.9% and punctate depressions, crenulated edges & striations 1.5% (see Chart 8 & Appendix A for complete breakdown of elements and specific carnivore damage and location of damage).

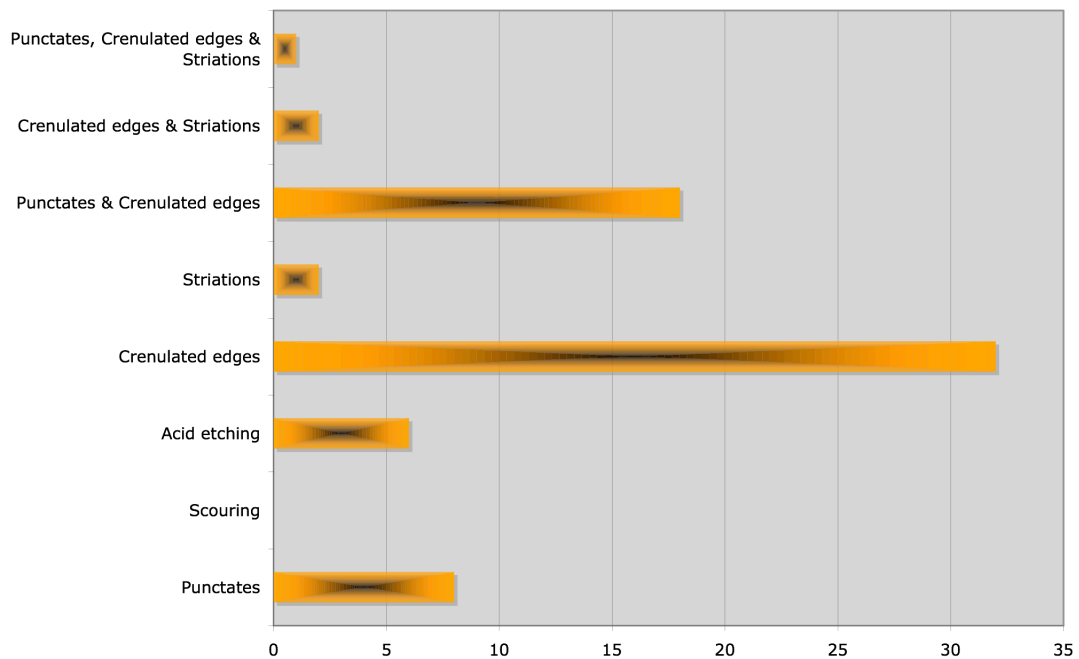


Chart 8: Carnivore Damage, Mashatu Den 1

Mashatu Den 2

Mashatu Den 2 yielded 58 samples, of which 65.5% were identified to species or class size. The majority of identified remains belong to impala (35.1%), followed by bovid class size III (21.6%), wildebeest, warthogs and hyrax, all with three specimens (8.1%), baboons (*Papio cynocephalus*), spotted hyaenas and bovid size II with two specimens each (5.4%) and a single zebra specimen (Table 4).

SPECIES	NISP	MNI
<i>Aepyceros melampus</i>	13	3 (right humerus)
Bovid size II	2	1 (right femur)
Bovid size III	8	1 (right humerus)
<i>Connochaetes taurinus</i>	3	1 (right radius)
<i>Crocuta crocuta</i>	2	1 (right ulna)
<i>Equus burchellii</i>	1	1 (right femur)
<i>Papio cynocephalus</i>	2	1 (right femur)
<i>Phacochoerus africanus</i>	3	1 (complete mandible)
<i>Procavia capensis</i>	3	1 (complete skull)
TOTAL	37	11

Table 4: Species NISP & MNI Mashatu Den 2

Of the 58 specimens collected, 67.2% were identified to skeletal element. Table 5 shows the breakdown of elements and elements per species, while Chart 9 illustrates the graphic representation of elements for this den. Of note is the absence of scapulas in the den while the remaining long bones were present. Humerus and femurs made up the majority of the assemblage, with humerus being 15.4% of the identified remains and femurs 12.8%. Mandibles and skull fragments made up 10.3% respectively, while proximal phalanges, cervical vertebrae and metapodials each represented 5.1% of the identified remains and the remaining identified elements each made up 2.6% of the assemblage. Fusion data for this den indicated at least one juvenile baboon due to the presence of an unfused proximal femur and unfused distal metatarsal. The remaining material with fusion data indicated adult individuals.

SKELETAL ELEMENT	NUMBER	SPECIES BREAKDOWN
Humerus	6	3 Impala; 2 bovid size III; 1 Wildebeest
Radius	1	Wildebeest
Metacarpal	1	Impala
Femur	5	2 Impala; 1 Zebra; 1 bovid size II; 1 Baboon
Tibia	1	bovid size III
Metatarsal	1	Baboon
Ulna	1	Spotted Hyaena
Metapodial	2	1 bovid size III; I bovid size II
Proximal Phalanx	2	Impala
Medial Phalanx	1	Impala
Distal Phalanx	1	Impala
Mandible	4	2 Impala; 1 Warthog; 1 Spotted Hyaena
Maxilla	1	Impala
Skull	1	Hyrax
Skull fragment	4	2 bovid class III; 1 Hyrax; 1 unknown
Tooth (loose)	1	Wildebeest
Atlas	1	Warthog
Axis	1	Hyrax
Cervical vertebrae	2	1 Warthog; 1bovid size III
Thoracic vertebrae	1	bovid
Lumbar vertebrae	1	bovid size III
TOTAL	39	

Table 5: Elements with species breakdown, Mashatu Den 2

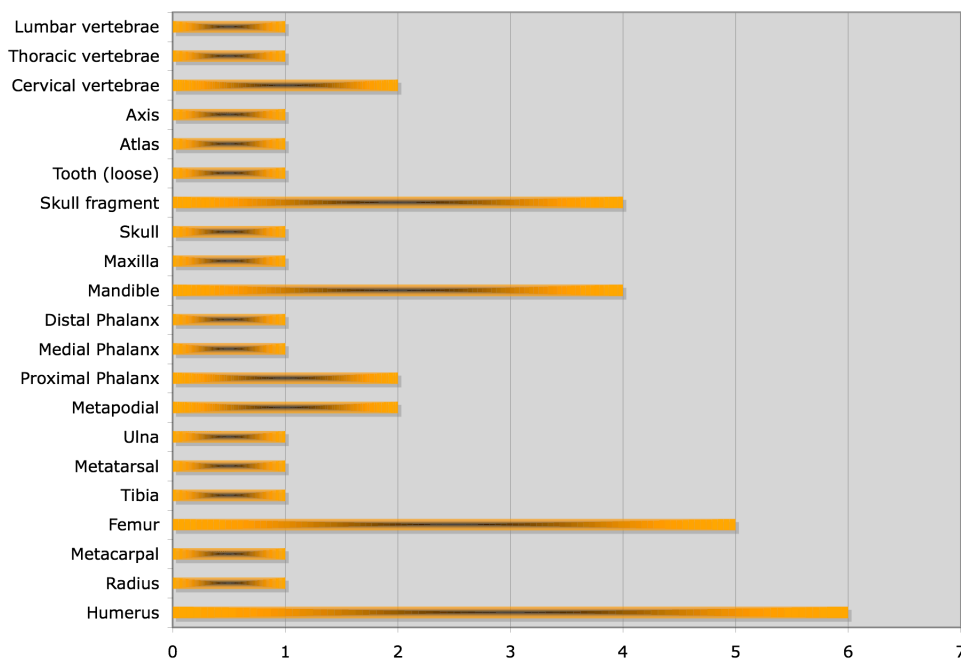


Chart 9: Elements, Mashatu Den 2

The 18 long bones measured from 2-36 cm. Of these five were one end and shaft (27.8%); there were four each complete bone, cylinders and end and shaft splinters (22.2% respectively), a single specimen made up of one end only (5.6%) and no examples of either end splinter or shaft splinter (See Chart 10).

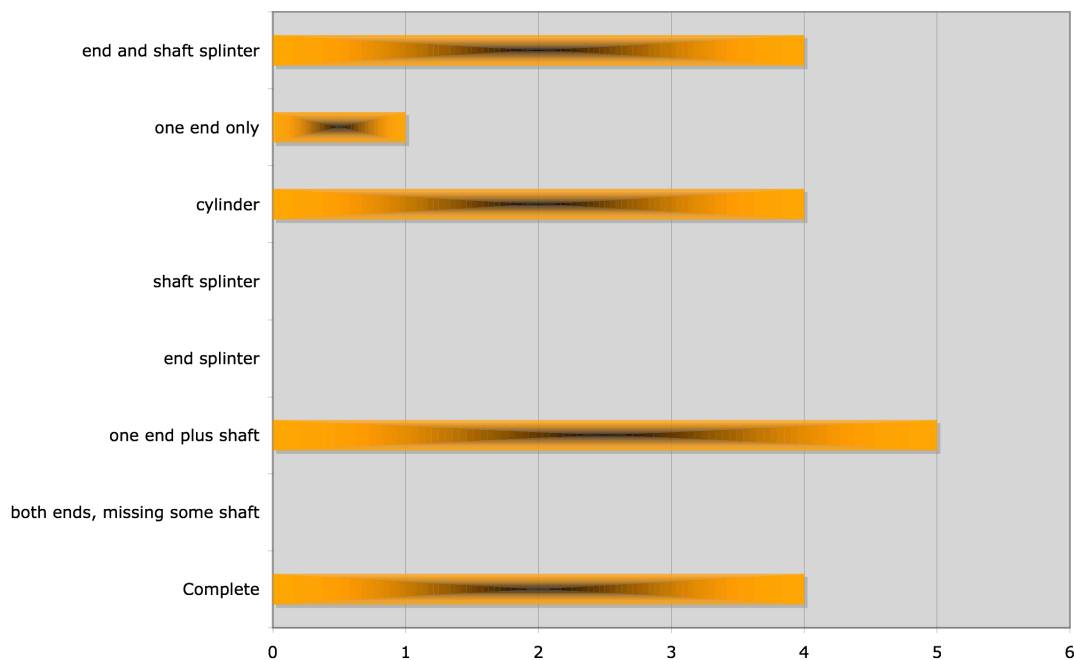


Chart 10: Fragmentation, Mashatu Den 2

Weathering data were collected from 98.3% of the specimens. The majority of the samples suggested a range since the specific animal died between 0-3 yrs. This is followed by 12 specimens indicating a range of 2-6 yrs since death and four in the range of 4-15 yrs (See Chart 11).

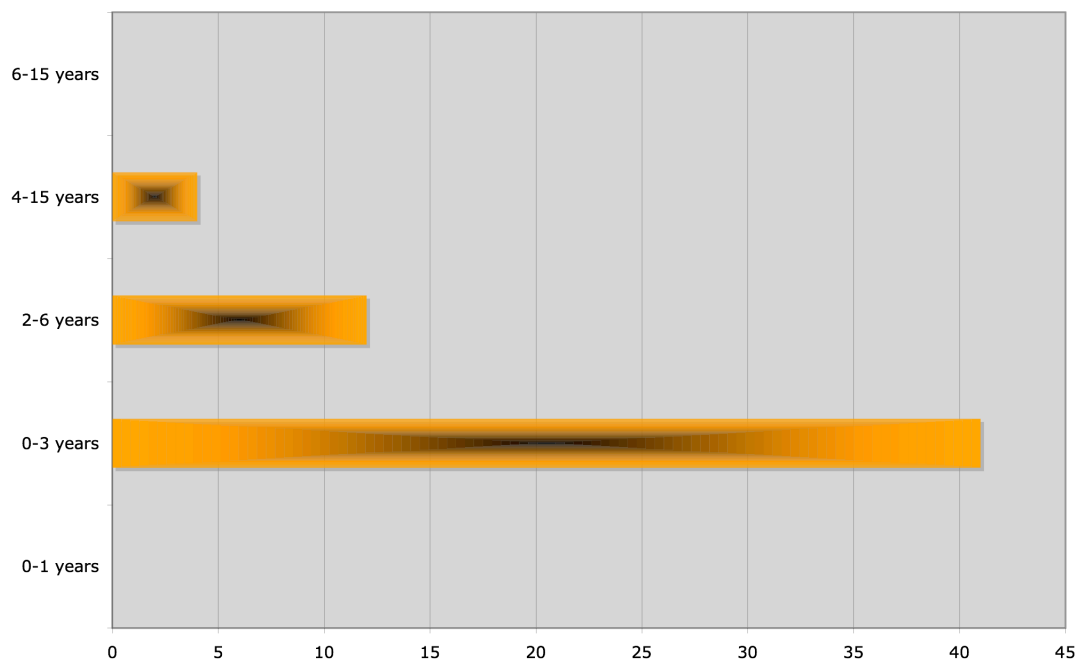


Chart 11: Weathering, Mashatu Den 2

Carnivore gnawing was recorded from 31 of the 58 samples (53.5%). Crenulated edges made up 87.1%, punctate depressions 29%, striations 9.7%, acid etching and scouring 0%. The combinations of punctate depressions & crenulated edges 19.4% and crenulated edges & striations 6.5%. (See Chart 12 & Appendix B for complete breakdown of elements and specific carnivore damage and location of damage).

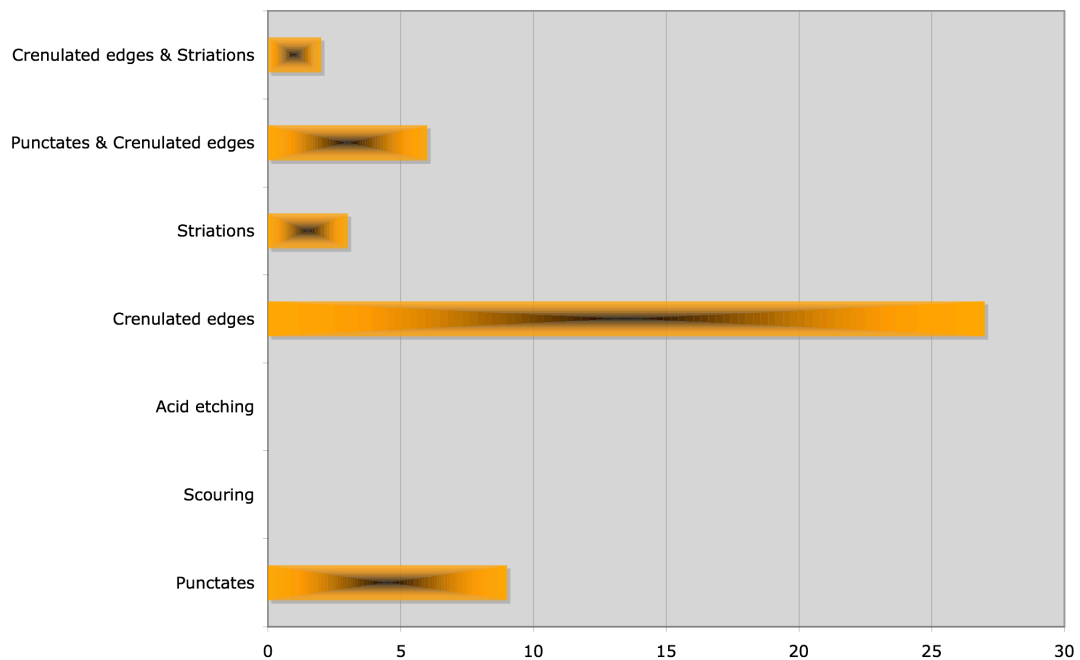


Chart 12: Carnivore Damage, Mashatu Den 2

Mashatu Den 3

Of the 93 samples collected from Mashatu Den 3, 59.1% were identified to species or class size. The majority of the remains belong to class III bovids (25.5%), followed by impala (18.2%), equids (13%), zebras (11%), warthogs (9.1%), class size II bovids (7.3%), wildebeest (3.6%), baboons (3.6%), hyraxes (3.6%), small birds, kudus and elephants (*Loxodonta africana*) (1.8% each) (See Table 6).

SPECIES	NISP	MNI
<i>Aepyceros melampus</i>	10	1 (right humerus)
Avian (small)	1	1 (carpo-metacarpus)
Bovid size II	4	1 (right humerus)
Bovid size III	14	2 (left scapula)
<i>Connochaetes taurinus</i>	2	1 (skull)
<i>Equus burchellii</i>	6	1 (right radius)
<i>Equid</i>	7	2 (left tibia)
<i>Loxodonta africana</i>	1	1 (right femur)
<i>Papio cynocephalus</i>	2	1 (left humerus)
<i>Phacochoerus africanus</i>	5	1 (right mandible)
<i>Procavia capensis</i>	2	1 (right radius)
<i>Tragelaphus strepsiceros</i>	1	1 (cervical vertebrae)
TOTAL	55	14

Table 6: Species NISP & MNI Mashatu Den 3

Of the faunal remains, 72% have been identified to skeletal elements; Table 7 shows the breakdown of elements by species while Chart 13 indicates the relative abundance of the elements in Mashatu Den 3. The only long bone missing from the assemblage is ulna, with humerus being the most abundant (10.5%), followed by tibia, femur and metacarpal (6% each), then scapula and radius (4.5% each), and finally ilium, metatarsal and metapodials (3% each). Of the non-long bones, skull fragments and thoracic vertebrae made up 7.5% of the assemblage respectively, followed by loose teeth (6%), proximal phalanges (4.5%), mandibles, vertebrae, and cervical vertebrae (3%). The remaining identified elements that made up 1.5% of the assemblage respectively were the medial and distal phalanges, carpals, patellae, mandibular hinges, maxilla mandibular teeth, skulls, sacrums, caudal vertebrae, ribs and tarso-metatarsus. With the exception of a single unfused elephant femur, all other fusion data indicated adult animals in the assemblage.

SKELETAL ELEMENT	NUMBER	SPECIES BREAKDOWN
Scapula	3	2 bovid size III; 1 Zebra
Humerus	6	2 Zebra; 1 Impala; 1 Baboon; 1 Equid; 1 bovid size II
Radius	3	1 Zebra; 1 Impala; 1 Hyrax
Metacarpal	4	2 Zebra; 1 bovid size II; 1 bovid size III
Ilium	2	Impala
Femur	4	2 bovid size III; 1 Elephant; 1 Hyrax
Tibia	4	2 Equid; 2 bovid size III
Metatarsal	2	1 Zebra; 1 bovid size III
Metapodial	2	2 bovid size II
Proximal Phalanx	3	Impala
Medial Phalanx	1	Impala
Distal Phalanx	1	Impala
Carpal	1	Equid
Patella	1	bovid size III
Mandible	2	Warthog
Mandibular hinge	1	Warthog
Maxilla	1	bovid size II
Skull	1	Wildebeest
Skull fragment	5	4 unknown; 1 bovid size III
Mandibular tooth	1	Wildebeest
Maxillary tooth	1	bovid size III
Tooth (loose)	4	2 Warthog; 1 Equid; 1 unknown
Cervical vertebrae	2	1 Kudu; 1 Equid
Thoracic vertebrae	5	3 bovid size III; 1 Equid; 1 unknown bovid
Sacrum	1	Impala
Caudal vertebrae	1	Baboon
Vertebrae	2	unknown
Ribs	1	unknown
Taros-metatarsus	1	small bird
TOTAL	67	

Table 7: Elements with species breakdown, Mashatu Den 3

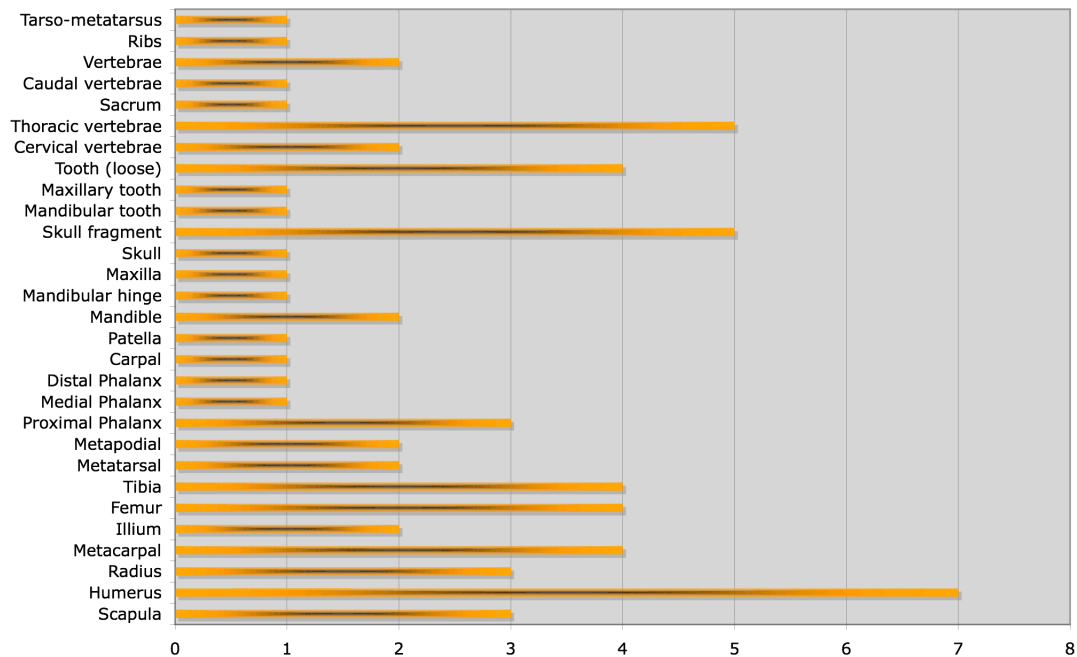


Chart 13: Elements, Mashatu Den 3

The length of the fragments ranged from 3-35 cm, a femur from a size III bovid. Shaft splinters made up 58.2% of the fragmented remains. Complete specimens at 25.5%, one end plus shaft at 9.1% follow this and cylinder fragments made up 1.8%. There were no examples of one end only, end splinter or both ends present, some shaft missing fragmentation patterns in the assemblage (See Chart 14).

Weathering data were collected from 88 of the 93 specimens and indicate that 53.4% of the specimens have been dead for 0-3 yrs. The range of 2-6 yrs since time of death is indicated by 28.4% of the remains, while 4-15 yrs is represented by 17.1% of the specimens and the 6-15 yr range was represented by a single specimen (See Chart 15).

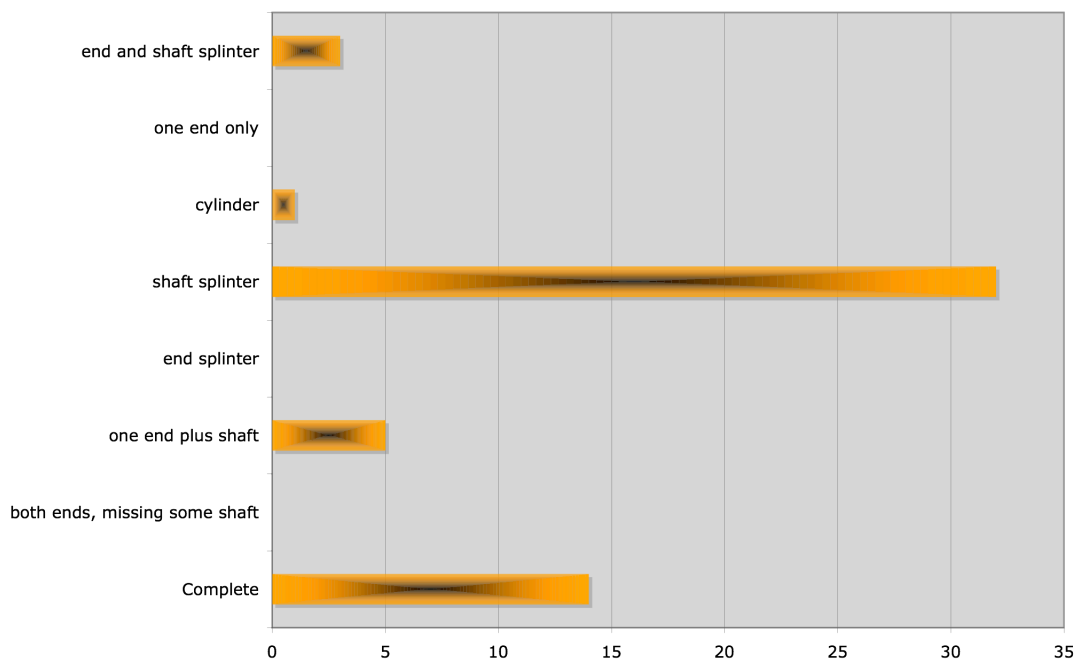


Chart 14: Fragmentation, Mashatu Den 3

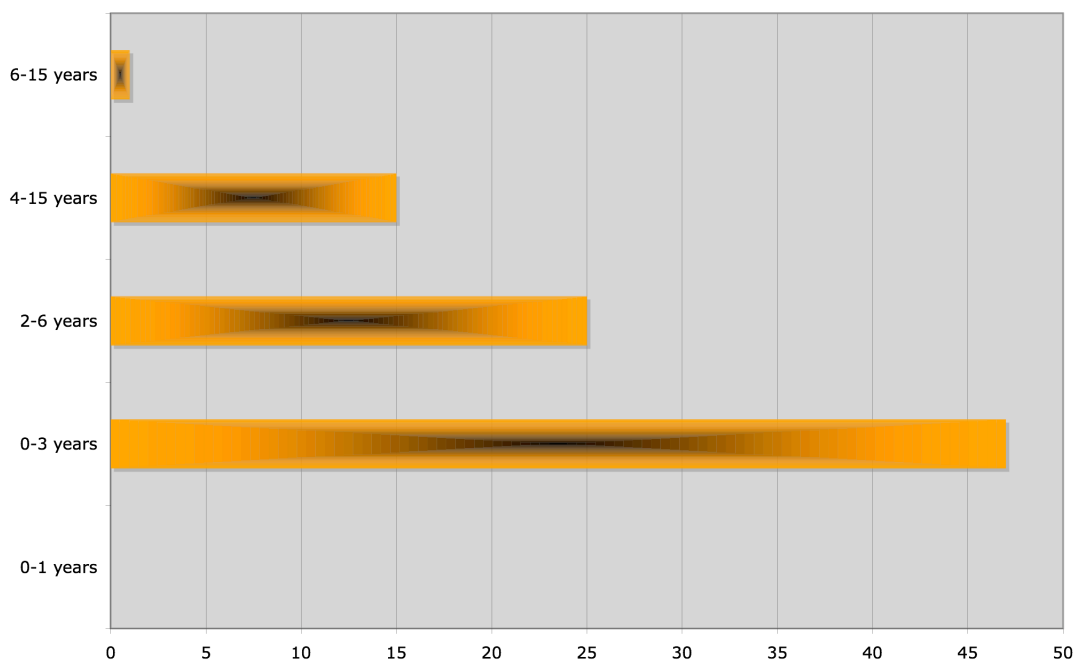


Chart 15: Weathering, Mashatu den 3

Of the 93 collected specimens, 39 (42%) of them had evidence of carnivore gnawing. In addition a single specimen, a left mandible from a warthog, had evidence of carnivore gnawing (crenulated edges at one end of the bone) and porcupine gnawing upon it. Crenulated edges were the most common type of carnivore damage present, making up 51.3% of the damage; this is followed by scouring (28.2%) and punctates (20.5%). There were no examples of either acid etching or striations (on their own) in the assemblage. However there is one example of striations with punctates on a specimen (2.5%). There is also a single specimen with both scouring and punctates upon it (2.5%) and nine examples with both punctates and crenulated edges (23.1%) (See Chart 16). Appendix C has a complete breakdown of placement of carnivore damage per element.

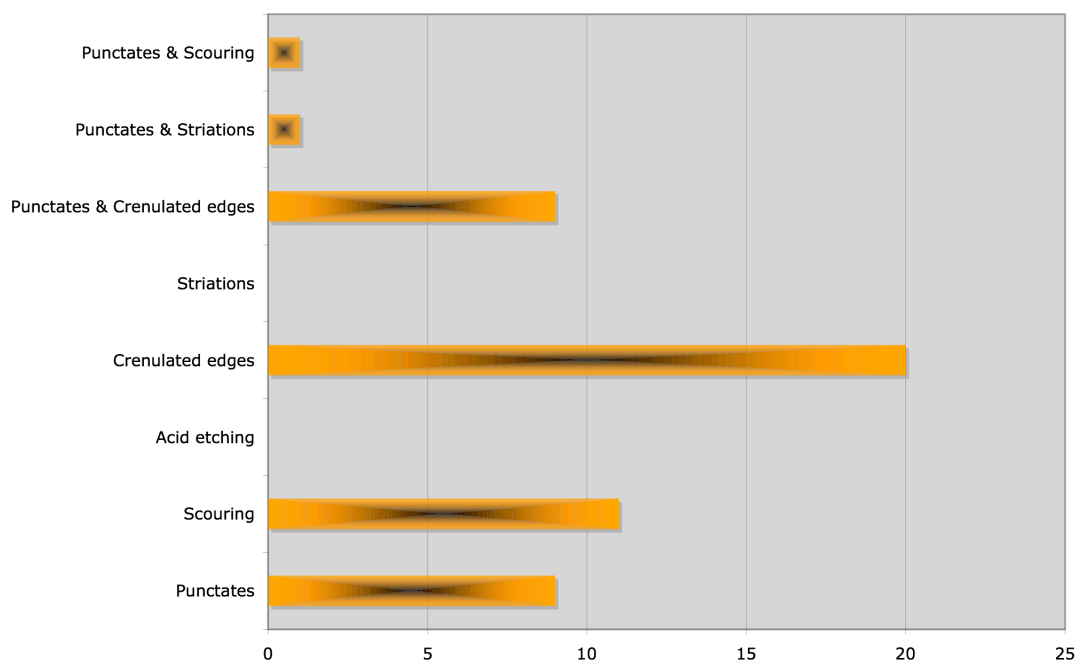


Chart 16: Carnivore Damage, Mashatu Den 3

Mashatu Den 4

Mashatu Den 4 yielded a total of 611 specimens, 51.1% of which were identified to species or class size. Impala made up the bulk of the faunal remains with 114 identified specimens and an MNI of seven (36.5%). Impala were followed in abundance by ostrich (18.3%), bovid size III (7.7%), warthogs and kudus (7.4% each), zebras (5.5%), domestic goats (3.9%), bovid size II (3.5%), wildebeest (1.9%), steenbok (1.6%), hyrax (1.3%), baboons, domestic cattle and large bird (1.0% each), klipspringers and duikers (0.6% each) and leopard, bovid size I and porcupine (0.3%) (See Table 8).

SPECIES	NISP	MNI
<i>Aepyceros melampus</i>	114	7 (right femur)
Avian (large)	3	1 (unidentified fragments)
<i>Bos</i> (domestic)	3	1 (left radius)
Bovid size I	1	1 (acetabulum)
Bovid size II	11	1 (right tibia)
Bovid size III	24	4 (left humerus)
<i>Capra hircus</i>	12	5 (4 right mandible, 1 complete mandible)
<i>Connochaetes taurinus</i>	6	3 (right humerus)
<i>Equus burchellii</i>	17	3 (right humerus)
<i>Hystrix africaeaustralis</i>	1	1 (right scapula)
<i>Oreotragus oreotragus</i>	2	1 (proximal phalanx)
<i>Panthera pardus</i>	1	1 (complete skull)
<i>Papio cynocephalus</i>	3	1 (right femur)
<i>Phacochoerus africanus</i>	23	3 (complete skulls)
<i>Procavia capensis</i>	4	1 (right femur)
<i>Raphicerus campestris</i>	5	2 (left femur)
<i>Struthio camelus</i>	57	4 (left femur)
<i>Sylvicapra grimmia</i>	2	2 (complete skulls)
<i>Tragelaphus strepsiceros</i>	23	2 (left tibia)
TOTAL	312	44

Table 8: Species NISP & MNI Mashatu Den 4

Of the 611 specimens collected, 67.8% have been identified to skeletal elements.

Table 9 shows the breakdown of elements by species. All of the long bones were present in the assemblage and Chart 17 illustrates the relative abundance of each.

SKELETAL ELEMENT	NUMBER	SPECIES BREAKDOWN
Scapula	15	8 Impala; 2 Kudu; 1 Goat; 1 Wildebeest; 1 porcupine; 2 unknown
Humerus	28	11 Impala; 6 bovid size III; 3 Zebra; 3 Wildebeest; 1 Hyrax; 1 Steenbok; 1 Kudu; 1 Goat; 1 Cow
Radius	17	7 Impala; 2 Kudu; 2 Zebra; 2 Warthog; 2 bovid size III; 1 Steenbok; 1 bovid size II
Metacarpal	18	5 Impala; 4 Kudu; 4 Zebra; 2 Warthog; 2 bovid size II; 1 Goat; 1 Equid
Pelvis (acetabulum)	10	3 Impala; 1 Zebra; 1 Ostrich; 1 Bovid size I; 4 unknown
Ilium	4	Ostrich
Femur	29	12 Impala; 6 Ostrich; 2 Steenbok; 2 bovid size II; 2 bovid size III; 1 Kudu; 1 Zebra; 1 Baboon; 1 Hyrax; 1 Warthog
Tibia	24	8 Impala; 3 Kudu; 2 Ostrich; 2 Warthog; 2 Zebra; 2 unknown; 1 Wildebeest; 1 Steenbok; 1 bovid size III
Metatarsal	15	8 Impala; 4 Kudu; 1 Warthog; 1 Wildebeest; 1 Cow
Ulna	10	3 Impala; 2 Kudu; 2 bovid size III; 2 unknown; 1 bovid size II
Ulna/Radius fused	1	Impala
Metapodial	5	2 bovid; 1 Impala; 1 Equid; 1 unknown
Calcaneus	8	3 Impala; 3 bovid size III, 1 bovid size II; 1 Goat
Astragalus	4	2 Impala; 1 Kudu; 1 bovid size III
Proximal Phalanx	24	14 Impala; 3 Equid; 2 Zebra; 1 Ostrich; 1 Klipspringer; 1 Kudu; 1 Goat; 1 Cow
Medial Phalanx	12	6 Impala; 2 Ostrich; 2 Equid; 1 bovid size III; 1 bovid size II
Distal Phalanx	8	4 Impala; 1 Kudu; 1 Zebra; 1 bovid size III; 1 unknown
Tarsal	5	2 Impala; 2 bovid size III; 1 carnivore
Mandible	15	8 Goat; 3 Warthog; 1 Kudu; 1 Zebra; 1 Hyrax; 1 bovid size II
Mandibular hinge	1	Kudu
Maxilla	1	Baboon
Skull	6	3 Warthog; 2 Duiker; 1 Leopard
Skull fragment	40	1 impala; 1 Klipspringer; 1 Warthog; 37 unknown
Maxillary tooth	1	Baboon
Tooth (loose)	5	2 Warthog; 2 bovid
Tooth Fragments	8	4 Warthog; 3 Equid; 1 bovid
Axis	1	Hyrax
Cervical vertebrae	3	2 Warthog, 1 Impala
Lumbar vertebrae	12	Impala
Sacrum	1	Impala
Vertebrae	61	35 Ostrich; 25 unknown; 1 bovid size III
Ribs	19	3 Ostrich; 2 bovid size III; 14 unknown
Horn/Antler	1	Impala
Tarso-metatarsus	2	Ostrich
TOTAL	414	

Table 9: Elements with species breakdown, Mashatu Den 4

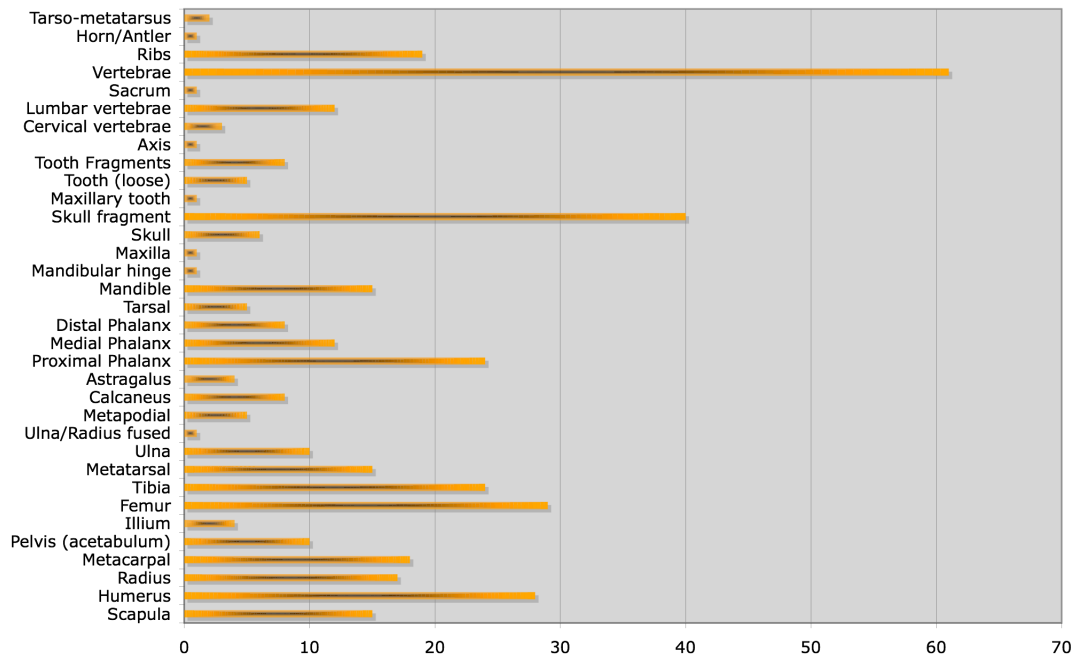


Chart 17: Elements, Mashatu Den 4

Femurs were the most prominent long bone, making up just 7% of the entire assemblage, with humerus next at 6.8%. Tibias follow with 5.8%, than metacarpal with 4.4%, radius (4.1%), scapula and metatarsal (3.6%) and pelvis (2.4%). Of the non-long bones vertebrae made up 18.1%, with skull fragments next at 9.6%. The remaining elements made up less than 15% of the assemblage when combined. Fusion data indicated that while the majority of remains come from adult animals, there were ten specific samples that came from young animals. These include four impala femurs and one kudu femur that are unfused at both proximal and distal ends, one each unfused distal radius of impala and bovid size III, two warthog radius that were unfused at both proximal and distal ends and a single warthog tibia unfused at the proximal end.

Fragments from the 343 long bones ranged in length from < 1.0-46 cm. Of these shaft splinters made up 38% of the assemblage. This was followed by complete bones (26.2%), one end plus shaft (21%), cylinder (5.3%), end and shaft splinter (4.6%), one end only (2.6%), both ends present and some shaft missing (1.5%) and end splinter (0.9%) (See Chart 18).

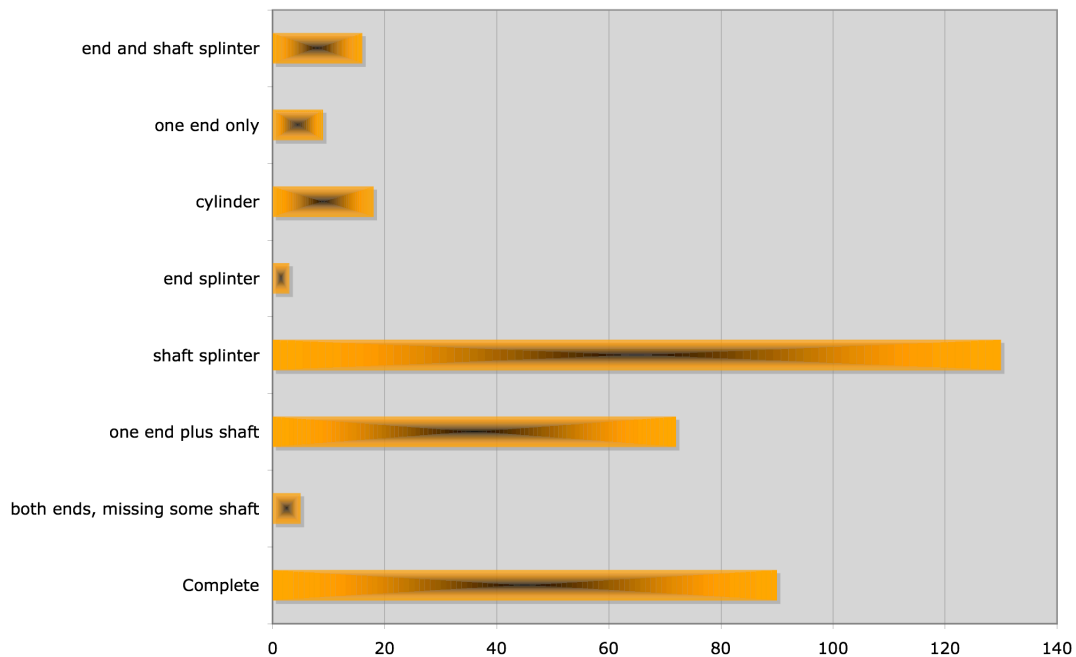


Chart 18: Fragmentation, Mashatu Den 4

Weathering data were collected from 525 of the 611 specimens, of which 52.2% indicate a time range since death of 2-6 yrs. There are no samples that yielded a time line of 0-1 yr, while 38.3% of the remains suggest a time of 0-3 yrs since death. The 4-15 yr range was found on 8.4% of the remains and the range of 6-15 yrs occurred on only 1.1% of the collected remains (See Chart 19).

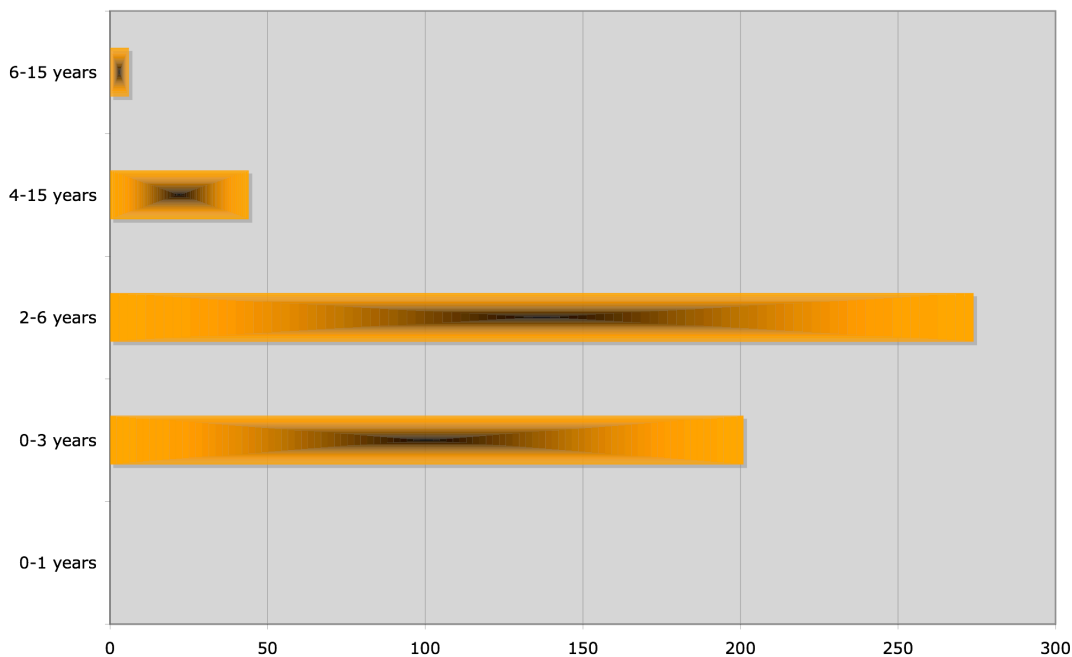


Chart 19: Weathering, Mashatu Den 4

Carnivore damage was noted on 239 of the 611 specimens collected (39.1%), with crenulated edges making up 58.6% of all the noted damage and punctates yielding 16%. There were no examples of scouring or acid etching in this assemblage, and only one example of striations. The combination of punctates and crenulated edges occurred on 25% of the faunal remains and the combination of punctates, crenulated edges and striations was identified on a single specimen (See Chart 20). For a complete breakdown of damage by element and location of damage on specific bones see Appendix D.

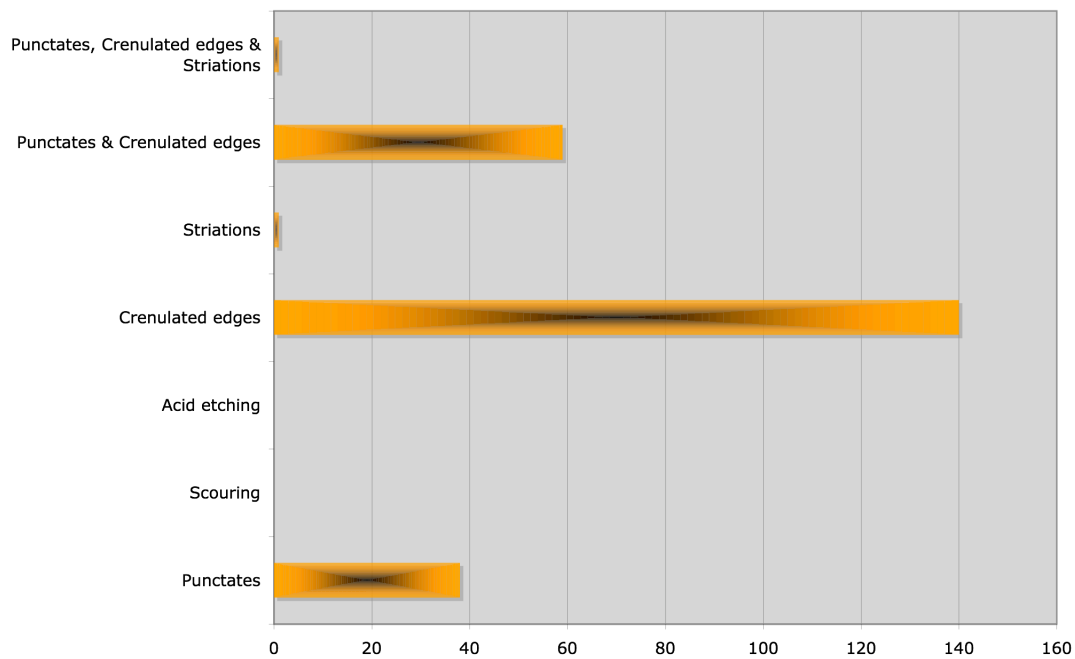


Chart 20: Carnivore Damage, Mashatu Den 4

Gobabeb Den NN-1

While previously collected (See Henschel *et. al.* 1979) Gobabeb Den NN-1 still yielded 685 specimens. Only two species were identified from this den, they are domestic goat (*Capra hircus*) and gemsbok (*Oryx gazella*) with 18 and 22 specimens respectively (See Table 10). The remaining 94.2% were either unidentified or only identified as unknown bovids.

SPECIES	NISP	MNI
<i>Capra hircus</i>	18	1 (right radius)
<i>Oryx gazella</i>	22	1 (right maxilla)
TOTAL	40	2

Table 10: Species NISP & MNI Gobabeb Den NN-1

Of the 685 specimens, only 128 (18.7%) were identified to skeletal element as seen on Table 11 and Chart 21.

SKELETAL ELEMENT	NUMBER	SPECIES BREAKDOWN
Radius	1	Goat
Metacarpal	1	Goat
Metapodial	2	Goat
Proximal Phalanx	2	Goat
Medial Phalanx	2	Goat
Distal Phalanx	3	Goat
Carpal	11	7 Gemsbok; 4 Goat
Mandible	2	Goat
Mandibular hinge	1	Gemsbok
Skull	2	Goat
Skull fragment	69	unknown
Axis	1	Gemsbok
Vertebrae	29	10 Gemsbok; 19 unknown
Horn/antler	2	Gemsbok
TOTAL	128	

Table 11: Elements with species breakdown, Gobabeb Den NN-1

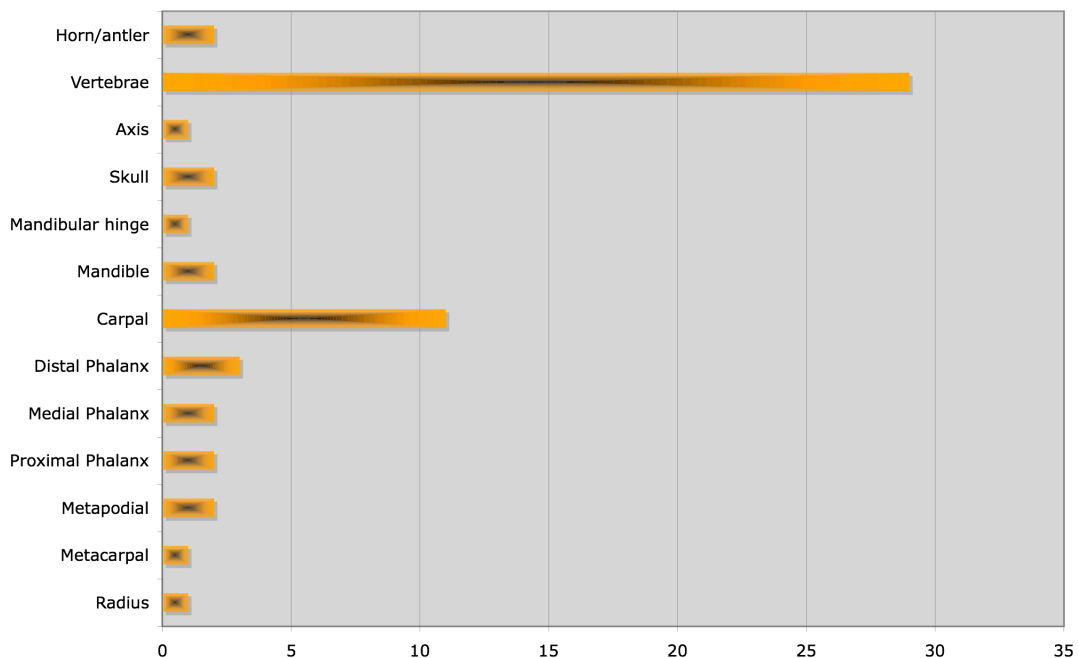


Chart 21: Elements, Gobabeb Den NN-1

The only long bone in the assemblage was the radius of a goat. The bulk of the assemblage was made up of unidentified fragments (72.9%), skull fragments (10.1%), and tooth fragments (8.3%). Fusion data from the lone radius indicated that it was from a sub-adult animal, as the distal epiphysis was not completely fused. Suggesting an age of approximately 36 months (Sliver, 1969).

Fragments measured from <1.0-7 cm, with two gemsbok horns measuring 57 cm and 74 cm. Shaft splinters made up the bulk of the assemblage with 73%. There were only eight complete bones, all of which were phalanges, two samples of one end plus shaft and one each cylinder and end and shaft splinter (See Chart 22).

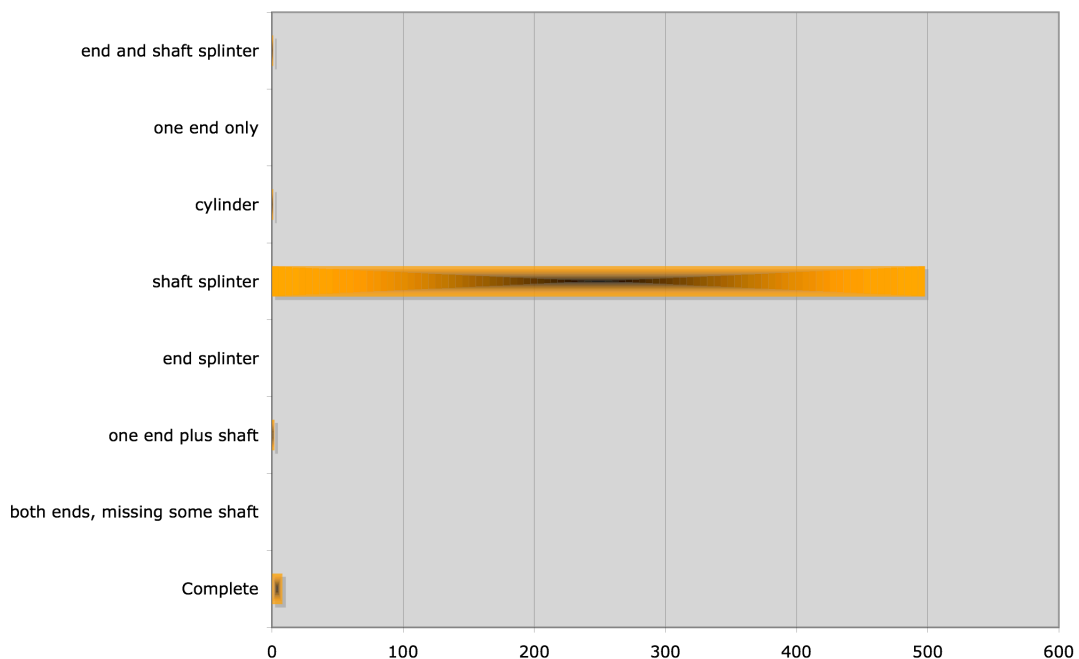


Chart 22: Fragmentation, Gobabeb Den NN-1

Weathering information was recorded from 613 specimens, 85% of which fall into the 2-6 yr and 4-15 yr ranges. There are no specimens that are less than two years old and only four in the 6-15 yr range (See Chart 23).

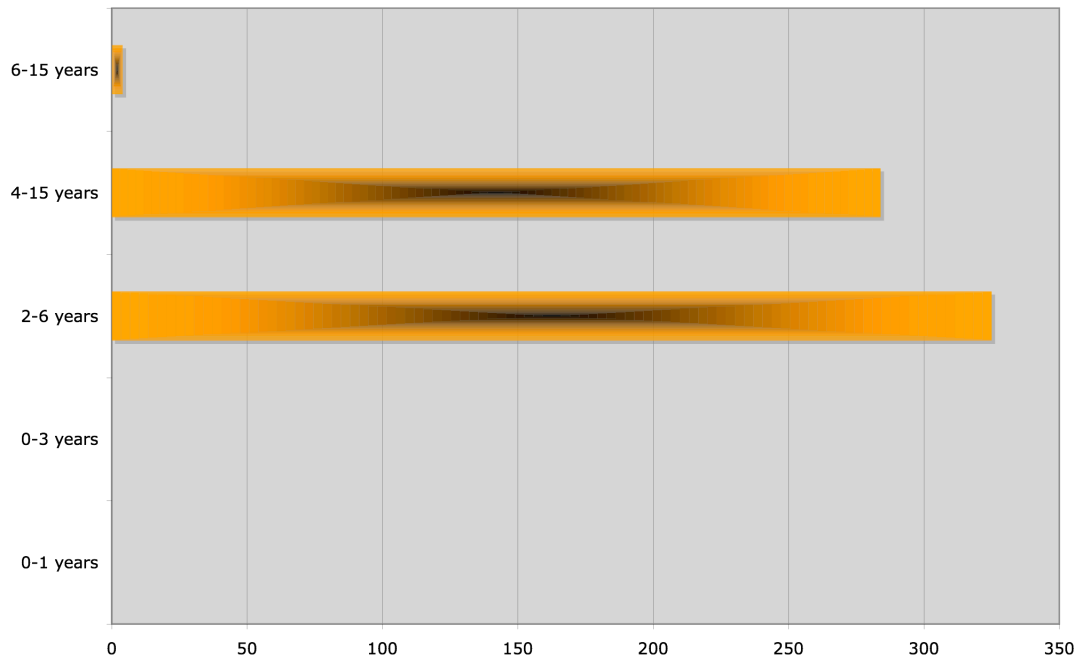


Chart 23: Weathering, Gobabeb Den NN-1

Damage due to carnivore gnawing was noted on 21% of the specimens, of which there were 79 examples of crenulated edges and a single example of punctate depressions. There were no examples of scouring, acid etching, striations or any combinations of specific damage types.

Gobabeb Den NN-2

Gobabeb Den NN-2 consisted of a single gemsbok left humerus 23 cm in length. The humerus consisted of the fused distal end plus some shaft. Weathering data puts the range since time of death at approximately 6-15 yrs. The single specimen had evidence of carnivore gnawing with punctates on the distal end and crenulated edges along the distal shaft.

***Parahyaena brunnea* assemblages**

Note: In the Brown Hyaena Project dens, all specimens identified as *Canis mesomelas* were positively identified using manuals previously mentioned, all other canid remains are listed as dog (*C. familiaris*) (the presence of dog collars in the dens indicated that domestic dogs (pets as well as feral) are part of the assemblage). All remains identified as cat could possibly be African Wildcat, as *Felis sylvestris lybica* was recently identified in the region, unfortunately there was no domestic material with which to compare the felid remains.

Rietvlei Den R01

Twenty-seven remains were recovered from Rietvlei Den R01, of which 74.1% were identified to species or class size. As seen in Table 12 there are six specimens each for both blesbok (*Damaliscus dorcas phillipsi*) and zebras, combined they make up 44% of the assemblage. There are four samples of bovid size II, two buffaloes (*Syncerus caffer*) and one each hartebeest (*Alcelaphus buselaphus*) and brown hyaena.

SPECIES	NISP	MNI
<i>Alcelaphus buselaphus</i>	1	1 (left radius)
Bovid size II	4	1 (metapodial)
<i>Damaliscus dorcas phillipsi</i>	6	1 (right ulna)
<i>Equus burchellii</i>	6	1 (left scapula)
<i>Parahyaena brunnea</i>	1	1 (right ulna)
<i>Syncerus caffer</i>	2	1 (right tibia)
TOTAL	20	6

Table 12: Species NISP & MNI Rietvlei Den R01

Of the 27 specimens collected, 81.5% of them have been identified to species or bovid class size. Chart 24 and Table 13 illustrate the breakdown of identified

elements; of note is the lack of any one element standing out numerically over the rest. With the exception of a complete radius of a hartebeest that is unfused at the distal end, all fusion data indicated adult animals in the assemblage.

SKELETAL ELEMENT	NUMBER	SPECIES BREAKDOWN
Scapula	1	Zebra
Radius	1	Hartebeest
Metacarpal	3	2 Blesbok; 1 Zebra
Femur	1	Zebra
Tibia	3	1 Buffalo; 2 bovid
Ulna	2	1 Blesbok; 1 Brown Hyaena
Ulna/Radius fused	2	1 Buffalo; 1 Zebra
Metapodial	2	bovid size II
Mandible	1	Blesbok
Skull	1	Zebra
Atlas	2	1 Zebra; 1 bovid size II
Cervical vertebrae	1	bovid size II
Horn/antler	2	Blesbok
TOTAL	22	

Table 13: Elements with species breakdown, Rietvlei Den R01

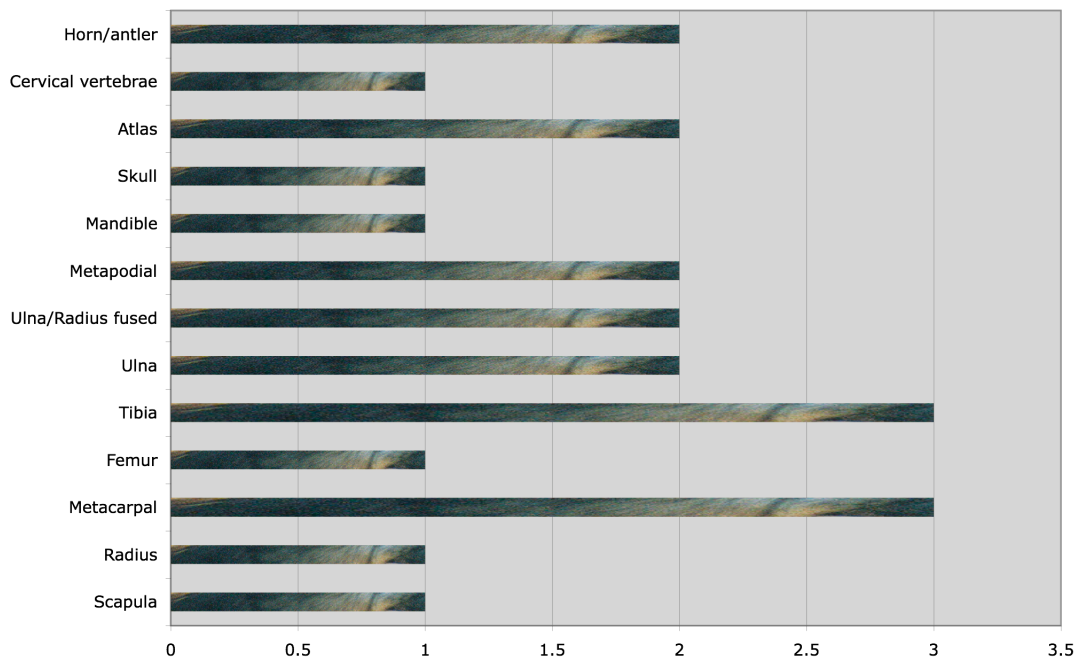


Chart 24: Elements, Rietvlei Den R01

The remains ranged in size from 4 to 47 cm, a skull of a zebra. Patterns of fragmentation are illustrated in Chart 25, where it can be seen that shaft splinters made up 36.4% of the assemblage. Complete bones were the next most prominent with 32%, followed by one end and shaft and end shaft splinter at 13.6% each. There was only a single example of a cylinder fragment and no specimens with one end only or end splinter.

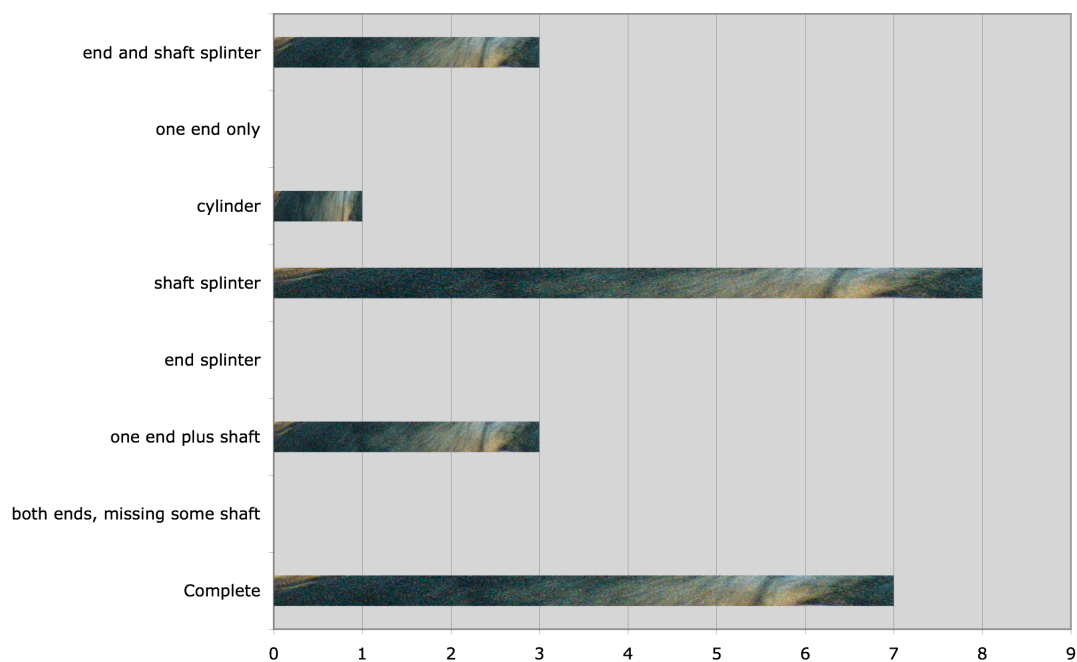


Chart 25: Fragmentation, Rietvlei Den R01

All 27 specimens yielded weathering data, all of which fall into ranges of less than six years since death. Two specimens fall into the range of 2-6 yrs, while the remaining specimens fall into the 0-3 yr range (48.2%) and the 0-1 yr range since death (44.4%) (See Chart 26).

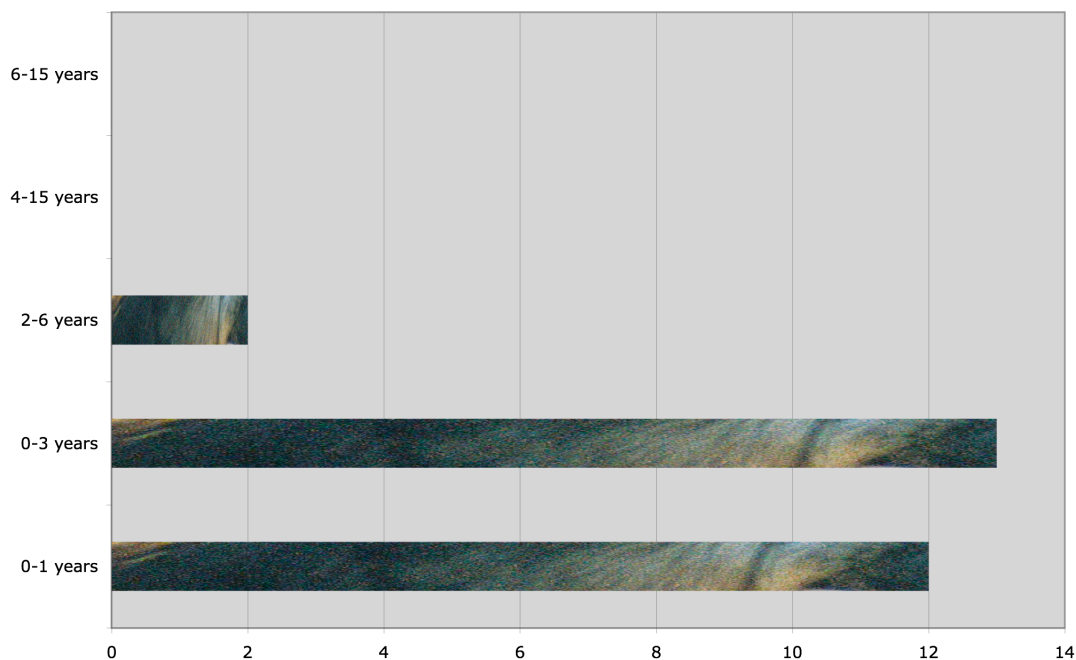


Chart 26: Weathering, Rietvlei Den R01

Twenty-four of the 27 remains (88.9%) had evidence of carnivore damage.

Crenulated edges made up the majority of noted damage (46%) with only a single example of punctates depressions and striations (on their own). There were no examples of acid etching or scouring, but there were combinations of punctates and crenulated edges (21%), crenulated edges and striations (12.5%), punctates, crenulated edges & striations (8.3%) and punctates, crenulated edges, striations & scouring (4.2%). See Chart 27 for the relative abundance of each type of damage and Appendix E for a complete breakdown of damage by element and location.

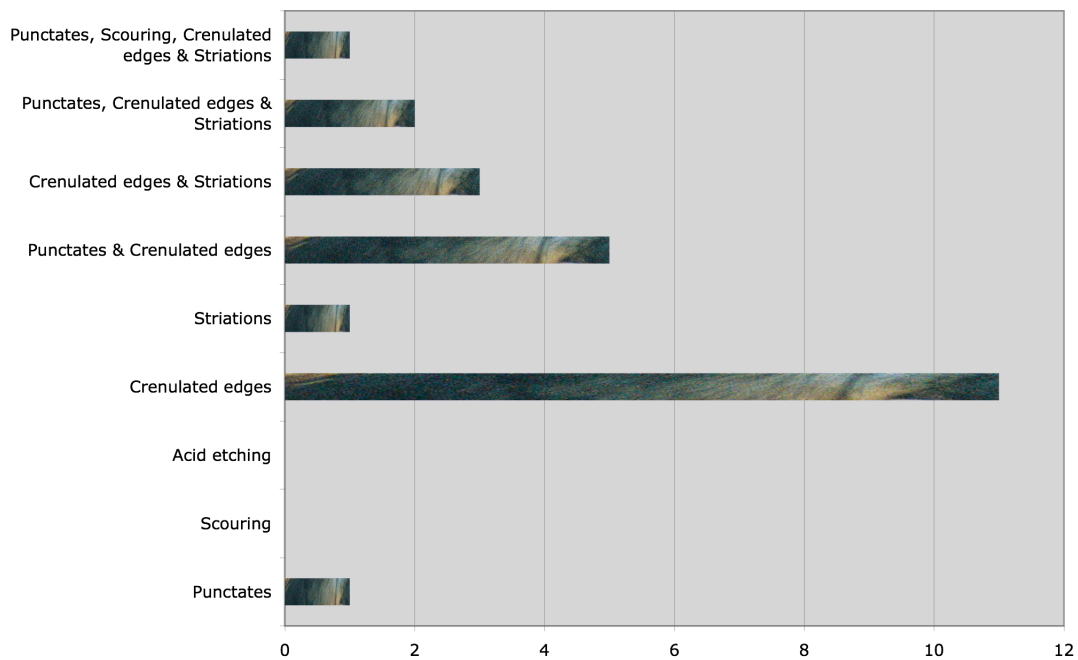


Chart 27: Carnivore Damage, Rietvlei Den R01

Rietvlei Den R02

Rietvlei Den R02 was comprised of 12 specimens, all but two of which were identified to species. As Table 14 indicates, blesbok account for 30% of the assemblage, buffaloes and black-backed jackals 20% each, and hartebeest, zebras and size III bovids 10%.

SPECIES	NISP	MNI
<i>Alcelaphus buselaphus</i>	1	1 (Complete set of horns)
<i>Syncerus caffer</i>	2	1 (left calcaneus)
Bovid size III	1	1 (left scapula)
<i>Canis mesomelas</i>	2	1 (left mandible)
<i>Damaliscus dorcas phillipsi</i>	3	1 (left mandible)
<i>Equus burchellii</i>	1	1 (left radius)
TOTAL	10	6

Table 14: Species NISP & MNI Rietvlei Den R02

Ten of the twelve (83.3%) specimens were also identified to skeletal element. Table 15 gives the breakdown of elements by species and Chart 28 illustrates the abundance of each element.

SKELETAL ELEMENT	NUMBER	SPECIES BREAKDOWN
Scapula	1	bovid size III
Humerus	2	1 Blesbok; 1 bovid
Radius	1	Zebra
Calcaneus	1	Buffalo
Mandible	2	1 Blesbok; 1 Black-backed Jackal
Cervical vertebrae	2	1 Blesbok; 1 Buffalo
Horn/antler	1	Hartebeest
TOTAL	10	

Table 15: Elements with species breakdown, Rietvlei Den R02

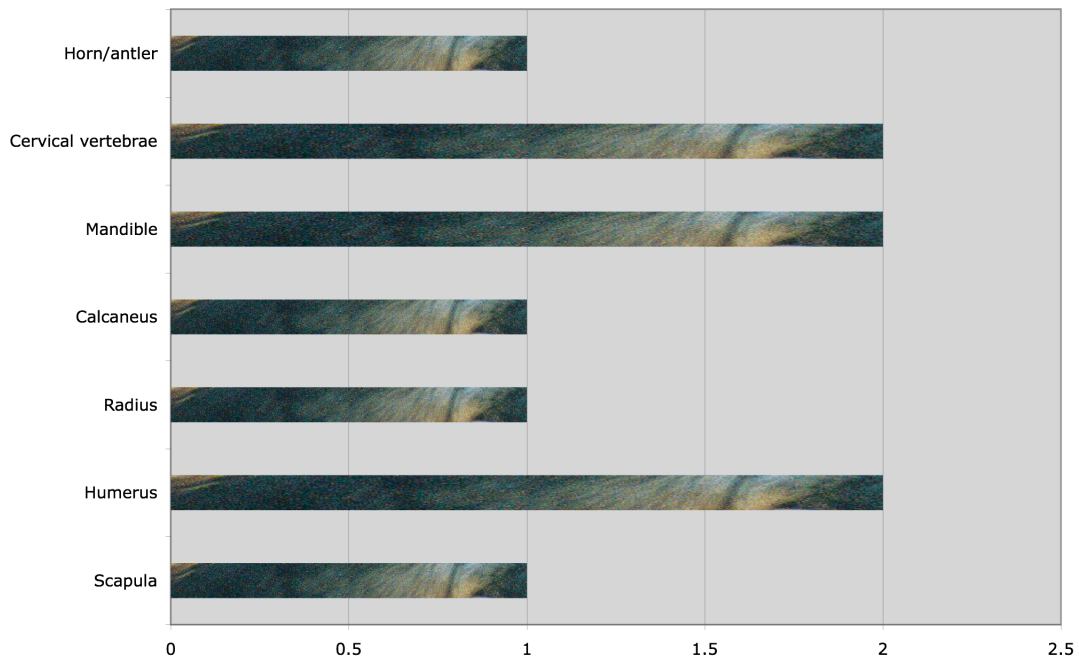


Chart 28: Elements, Rietvlei Den R02

Of the seven elements identified none are more prominent than the others, as seen in Chart 28, there were just one or two samples of each element present. Fusion data indicated that all of the animals in the assemblage were adults at the time of death.

The remains range in length from 4-35 cm, a set of hartebeest horns. Fragmentation data from nine specimens show that complete bones dominate the assemblage (55.6%), with shaft splinters making up 22.2%, cylinder and one end plus shaft yielding 11.1% each and no examples of end and shaft splinter, end splinter or both ends present some shaft missing (See Chart 29).

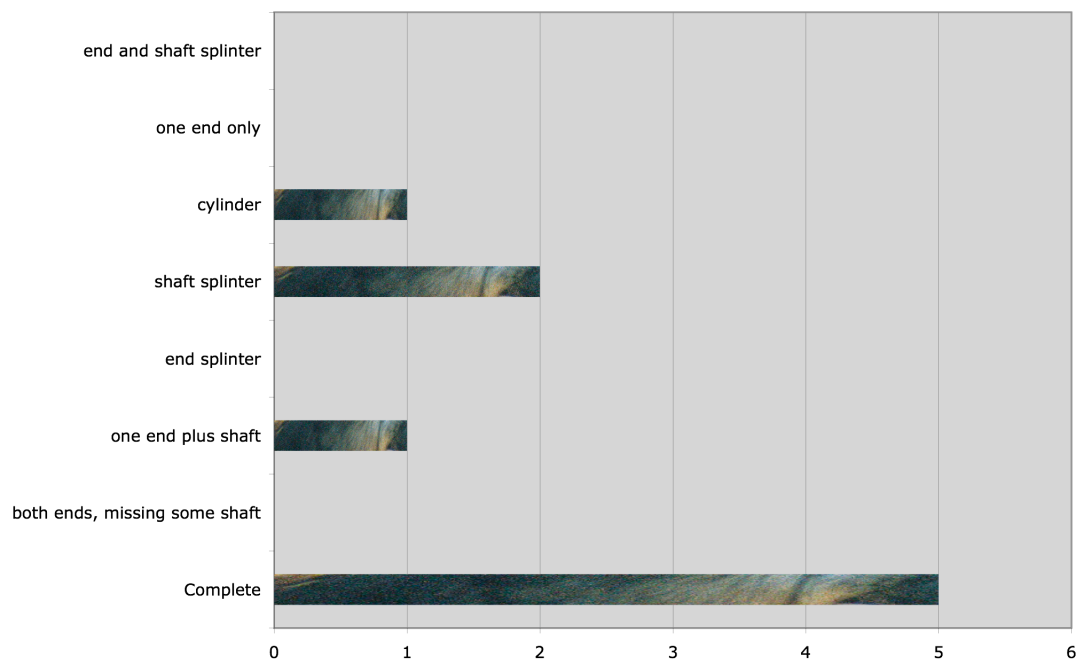


Chart 29: Fragmentation, Rietvlei Den R02

Weathering data logged from ten of the specimens indicated that all of the remains range in time since death from 0-3 yrs. Specifically six specimens fall into the 0-1 yr range and four into the 0-3 yr range (See Chart 30).

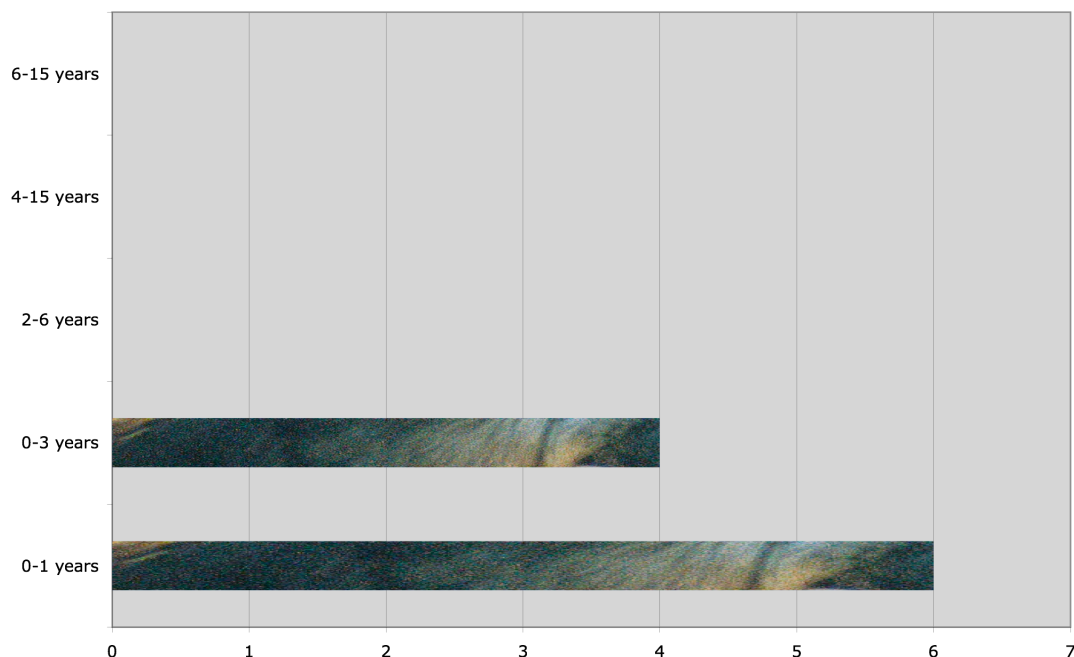


Chart 30: Weathering, Rietvlei Den R02

Eleven of the twelve specimens had evidence of carnivore gnawing upon them. One of these had evidence of both insect damage and carnivore damage and another one had both porcupine and carnivore gnawing on it. Crenulated edges were the most prominent type of damage identified (55%). Striations made up 9% of the assemblage, while there were no examples of punctates, scouring or acid etching. The combination of punctates and crenulated edges made up 18% of the assemblage while the combinations of crenulated edges and striations as well as punctates and striations each made up 9% of the assemblage (See Chart 31). Appendix F gives a complete breakdown of carnivore damage and location of said damage upon the faunal remains.

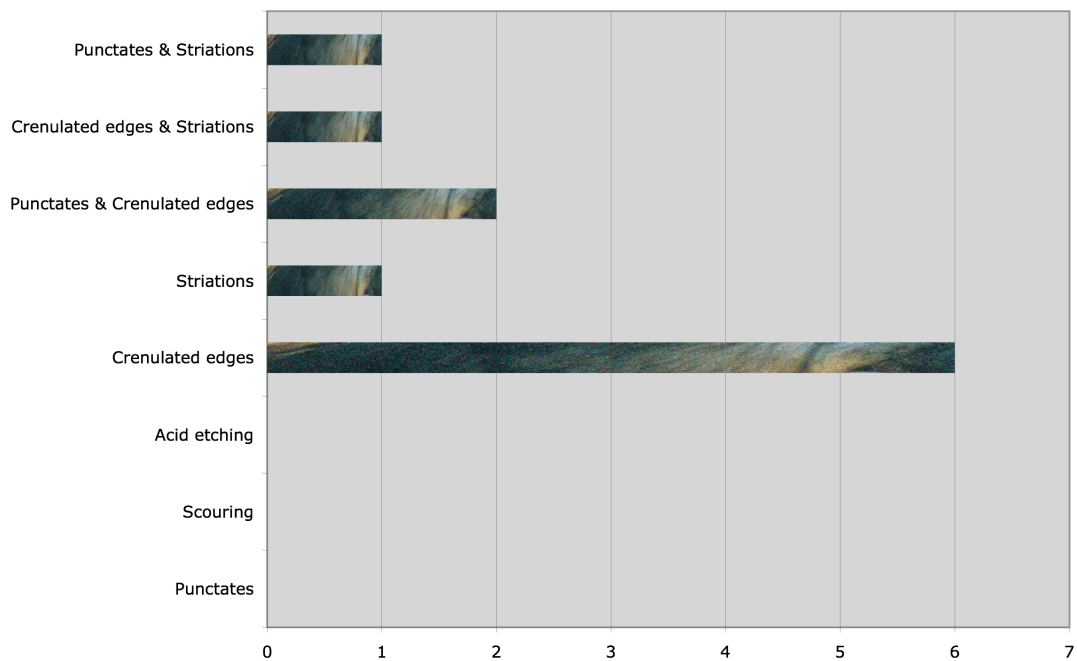


Chart 31: Carnivore Damage, Rietvlei Den R02

Rietvlei Den R03

Seven specimens were collected from Rietvlei Den R03, all of which have been identified to species. There was only one specimen each for hartebeest, blesbok, bovid size II, bovid size III and three specimens of wildebeest (See Table 16).

SPECIES	NISP	MNI
<i>Alcelaphus buselaphus</i>	1	1 (right pelvis)
Bovid size II	1	1 (right pelvis)
Bovid size III	1	1 (left radius)
<i>Connochaetes gnou</i>	3	1 (left pelvis)
<i>Damaliscus dorcas phillipsi</i>	1	1 (left humerus)
TOTAL	7	5

Table 16: Species NISP & MNI Rietvlei Den R03

All seven of the specimens have been identified to skeletal element, aside from three acetabulum there was one each humerus, radius, metacarpal and tibia (See Table 17).

Fusion data for all of the specimens except the tibia from a size II bovid indicated adult animals. The lone tibia is unfused at the distal end.

SKELETAL ELEMENT	NUMBER	SPECIES BREAKDOWN
Humerus	1	Blesbok
Radius	1	bovid size III
Metacarpal	1	Wildebeest
Pelvis (acetabulum)	3	2 Wildebeest; 1 Hartebeest
Tibia	1	bovid size II
TOTAL	7	

Table 17: Elements with species breakdown, Rietvlei Den R03

The length of the specimens ranged in size from 14 -26 cm. Of the fragmentation data recorded there were two one end plus shaft, one complete and one end and shaft splinter.

Weathering data were collected from all seven specimens and indicated a range since death of 0-3 yrs, with six of the seven specimens falling in the 0-1 yr range and the seventh specimen in the 0-3 yr range.

All of the faunal remains had indications of carnivore damage, with one specimen having both carnivore and porcupine gnawing upon it. There was one example of just punctate depressions, two of crenulated edges and four with the combination of punctate depressions and crenulated edges. There were no other types of damage, or combinations of said damage identified from this assemblage. Appendix G illustrates all of the damage types and location of damage by element.

Brown Hyaena Project D-P 1

Of the 241 specimens analysed from D-P 1, 31.1% were identified to species or class size (see Table 18). At 38.7% and an MNI of 3, seal remains made up the majority of the identified assemblage. Seal remains were followed in abundance by jackals (14.7%), dog (12%), large bird (10.7%), cat (8%), gemsbok (5.3%), brown hyaenas (5.3%), springbok (4%), and size IV bovids (1.3%).

SPECIES	NISP	MNI
<i>Antidorcas marsupialis</i>	3	1 (left & right tibia)
<i>Arctocephalus pusillus</i>	29	3 (right radius)
Avian (large)	8	1 (right femur)
Bovid size IV	1	1 (lumbar vertebrae)
<i>Canis familiaris</i>	9	1 (right ulna)
<i>Canis mesomelas</i>	11	2 (left radius)
<i>Felis</i> (domestic size)	6	2 (left femur)
<i>Oryx gazella</i>	4	1 (left femur)
<i>Parahyaena brunnea</i>	4	1 (right tibia)
TOTAL	75	13

Table 18: Species NISP & MNI Brown Hyaena Project D-P 1

SKELETAL ELEMENT	NUMBER	SPECIES BREAKDOWN
Scapula	3	1 Seal; 1 bovid; 1 unknown
Humerus	5	Seal
Radius	8	5 Seal; 2 Jackal; 1 unknown
Pelvis (acetabulum)	2	Jackal
Ilium	2	1 Seal; 1 large bird
Femur	14	2 Seal; 2 Cat; 1 Jackal; 1 Lg. bird; 1 Gemsbok; 1 Brown Hyaena; 2 bovid; 4 unknown
Tibia	8	3 Seal; 2 Springbok; 1 Brown Hyaena; 1 bovid; 1 unknown
Metatarsal	5	3 Dog; 2 Brown Hyaena
Ulna	3	1 Jackal; 1 Dog; 1 carnivore
Ulna/Radius fused	1	carnivore
Metapodial	1	unknown
Astragalus	2	Jackal
Proximal Phalanx	6	3 Cat; 2 Dog; 1 carnivore
Medial Phalanx	2	1 Seal; 1 Dog
Fibula	1	carnivore
Tarsal	1	unknown
Mandible	9	3 Seal; 2 Dog; 1 Jackal; 1 Cat; 1 Springbok; 1 Gemsbok
Maxilla	8	6 Seal; 1 Jackal; 1 Gemsbok
Skull	1	Jackal
Skull fragment	21	1 Seal; 20 unknown
Mandibular tooth	1	carnivore
Axis	1	unknown
Cervical vertebrae	8	1 Gemsbok; 7 unknown
Thoracic vertebrae	8	unknown
Lumbar vertebrae	1	bovid size IV
Caudal vertebrae	5	unknown
Vertebrae	1	unknown
Ribs	86	unknown
Tibio-tarsus	1	large bird
TOTAL	215	

Table 19: Elements with species breakdown, Brown Hyaena Project D-P 1

Of the 241 faunal remains 89.2% of the specimens were identified to skeletal element.

Table 19 gives a breakdown of the elements by species. The most prevalent elements were ribs, with four times that of any other element with a total of 86 specimens.

Removing the ribs and skull fragments (21 specimens) from Chart 32 illustrates the abundance of the rest of the elements in the assemblage.

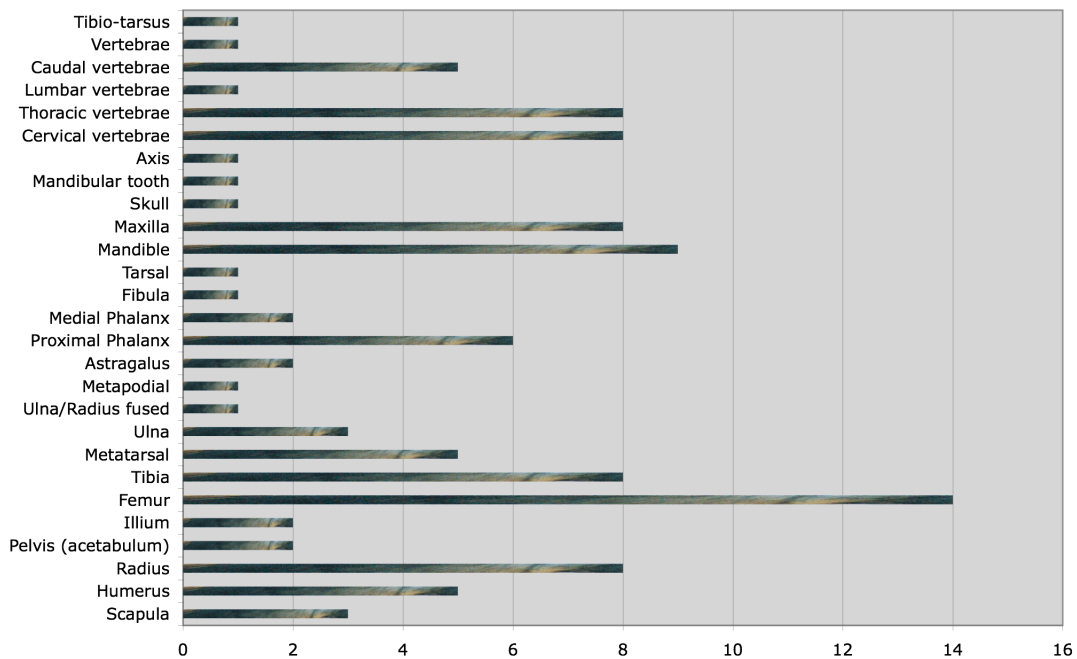


Chart 32: Elements, Brown Hyaena Project D-P 1

Aside from the ribs and skull fragments, femurs were the most abundant of the long bones with 14 specimens. Mandibles follow with nine specimens, radius, tibia and maxilla with eight, proximal phalanx with six, humerus and metatarsal with five each, scapula and ulna each with three, acetabulum, ilium, astragalus and medial phalanx with two, down to single fibula, metapodial and ulna/radius fused. Fusion data from 47 of the specimens indicated that 27.7% of the remains came from young animals. Specifically 11 of the unfused elements came from seal pups, while one came from a gemsbok femur (unfused at proximal end) and one from a brown hyaena tibia (unfused at both proximal and distal ends).

The lengths of the 86 measured fragments ranged in size from < 1.0-17 cm. Of these fragments 30% were complete bones, 25.6% shaft splinters, 23.3% one end plus shaft,

16.3% cylinders, and 1.2% one end only and end shaft splinter respectively. There were no examples of both ends present, some shaft missing in the assemblage (See Chart 33).

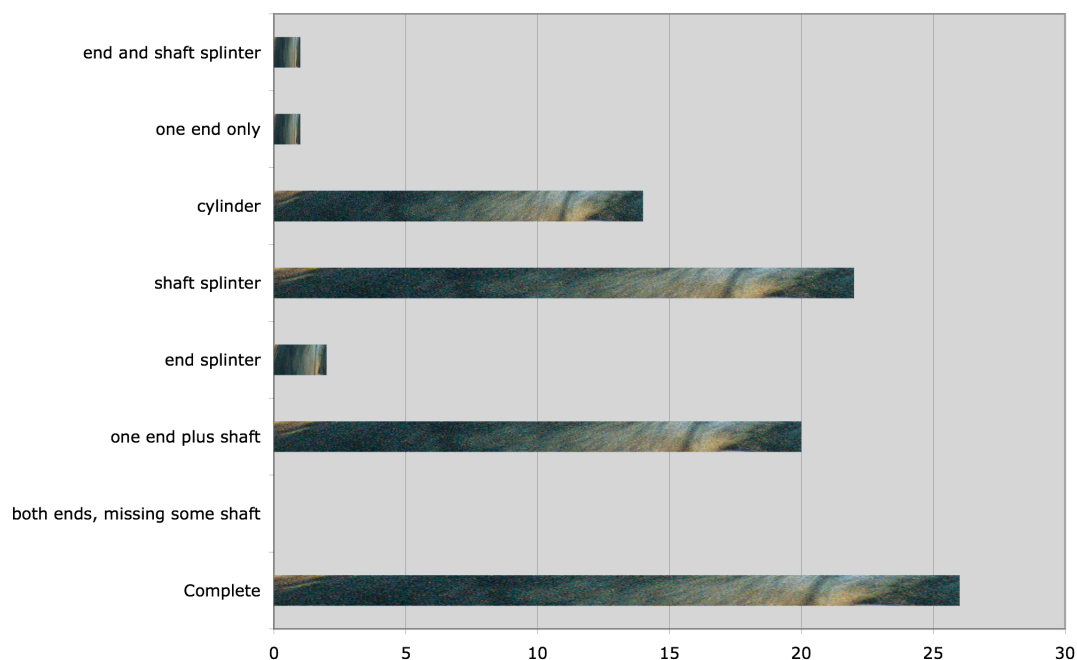


Chart 33: Fragmentation, Brown Hyaena Project D-P 1

Weathering data were collected from 229 of the specimens analysed. The majority of faunal remains are within the 2-6 yr range (74%), followed by 0-3 yrs (19.2%) and 4-15 yrs (7%) since death. There were no specimens within the ranges of 0-1 yr or 6-15 yrs (See Chart 34).

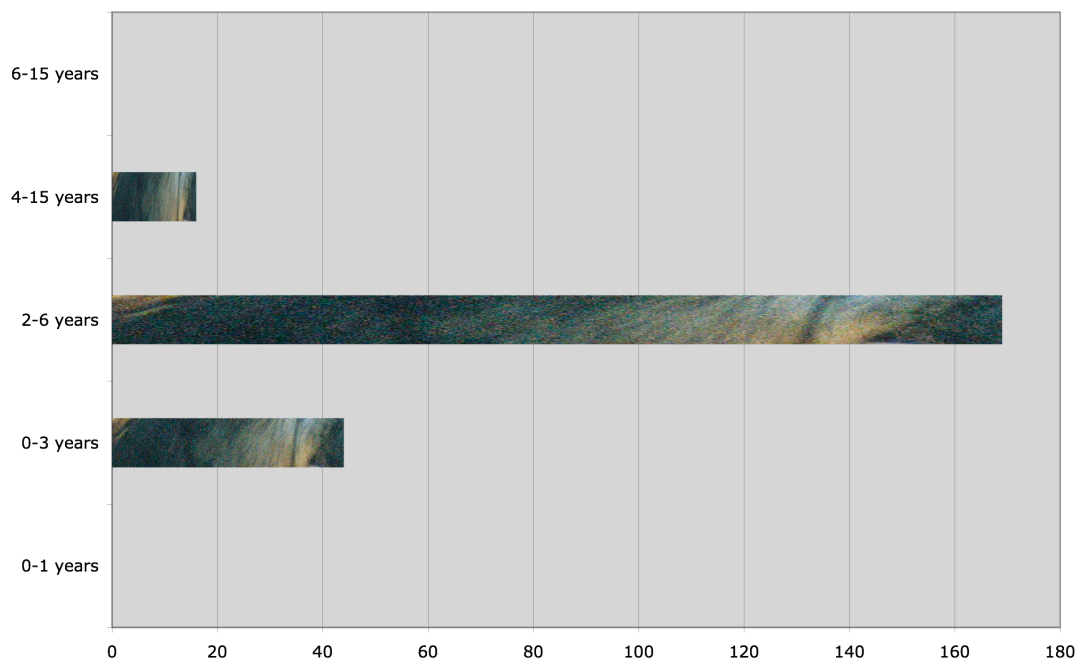


Chart 34: Weathering, Brown Hyaena Project D-P 1

Carnivore damage was found on 76 of the 241 specimens (31.5%). Of these one had both carnivore gnawing and porcupine gnawing. The element in question is a left mandible of a dog with punctate depressions on the mandibular heel and crenulated edges at both ends of the bone. The most prominent type of damage on the 75 other carnivore gnawed remains was crenulated edges (66.7%). Striations comprised 5.3% and punctates 2.7%. There was no evidence of scouring or acid etching. The combination of punctates and crenulated edges constituted 20% of the assemblage, crenulated edges and striations (2.7%) and punctates, crenulated edges and striations 1.3% (See Chart 35). For a complete breakdown of damage by element and location of damage on specific bones see Appendix H.

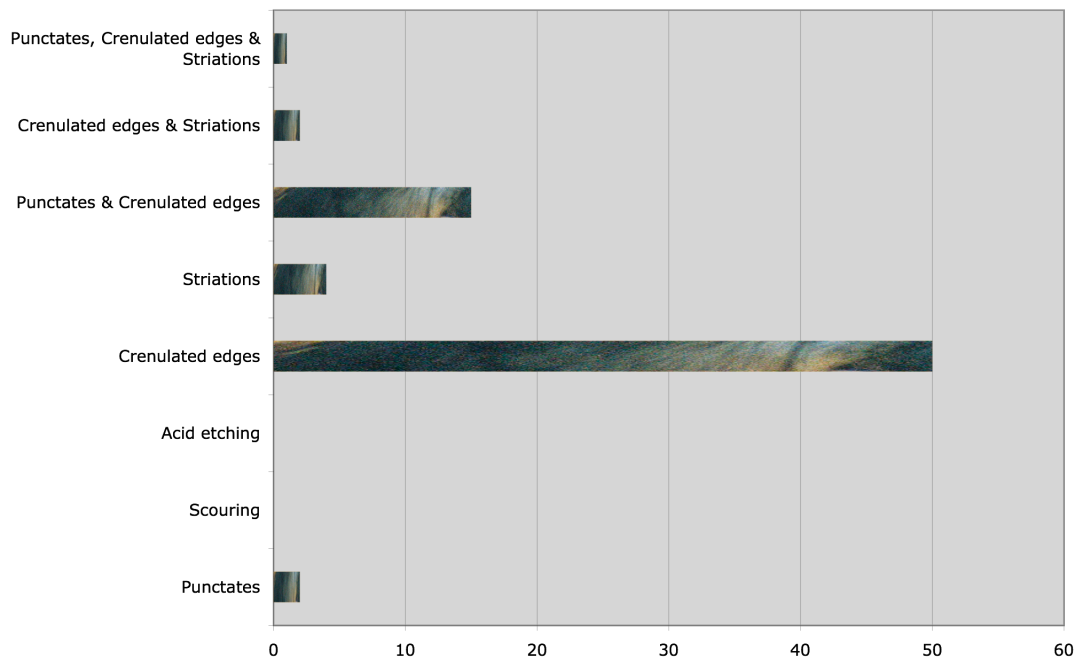


Chart 35: Carnivore Damage, Brown Hyaena Project D-P 1

Brown Hyaena Project D-P 2

A total of 256 specimens were analysed from den D-P 2 on the Luderitz Peninsula. Of this 26.2% have been identified to species or class size. The majority of remains came from seals (52.2%), followed by dog (16.4%), springbok (12%), cat (10.5%), gemsbok (6%) and large bird (2.9%) (See Table 20).

SPECIES	NISP	MNI
<i>Antidorcas marsupialis</i>	8	1 (left femur)
<i>Arctocephalus pusillus</i>	35	2 (right scapula)
Avian (large)	2	1 (unknown)
<i>Canis familiaris</i>	11	1 (right tibia)
<i>Felis</i> (domestic size)	7	1 (right tibia)
<i>Oryx gazella</i>	4	1 (right mandible)
TOTAL	67	7

Table 20: Species NISP & MNI Brown Hyaena Project D-P 2

Table 21 shows the breakdown of the 74.2% of the skeletal elements that were identified. Ribs, skull fragments and thoracic vertebrae were the most abundant identified elements, with 48, 30 and 20 specimens respectively. Chart 36 illustrates the relative abundance of the remaining elements.

SKELETAL ELEMENT	NUMBER	SPECIES BREAKDOWN
Scapula	3	3 Seal
Humerus	7	1 Seal; 1 Springbok; 5 unknown
Radius	7	2 Seal; 1 Dog; 1 Cat; 2 bovid; 1 carnivore
Metacarpal	1	Cat
Pelvis (acetabulum)	3	2 Cat; 1 Dog
Femur	8	5 unknown; 1 Cat, 1 Seal; 1 Gemsbok
Tibia	8	3 Seal; 2 unknown; 1 Springbok; 1 Dog; 1 Cat
Metatarsal	3	2 Dog; 1 Springbok
Ulna	6	5 carnivore; 1 unknown
Ulna/Radius fused	1	bovid
Metapodial	7	4 bovid; 2 Springbok; 1 Seal
Calcaneus	1	Dog
Proximal Phalanx	3	1 Seal; 1 Cat; 1 Gemsbok
Medial Phalanx	5	2 Seal; 1 Cat; 1 Gemsbok; 1 Dog
Carpal	1	unknown
Mandible	11	8 Seal; 1 Dog; 1 Gemsbok; 1 carnivore
Mandibular hinge	2	1 Seal; 1 unknown
Maxilla	8	4 Seal; 2 Dog; 1 Springbok; 1 carnivore
Skull fragment	30	1 Gemsbok; 1 Seal; 28 unknown
Mandibular tooth	1	Seal
Thoracic vertebrae	20	unknown
Lumbar vertebrae	2	unknown
Vertebrae	3	unknown
Ribs	48	unknown
Horn/antler	1	Springbok
TOTAL	190	

Table 21: Elements with species breakdown, Brown Hyaena Project D-P 2

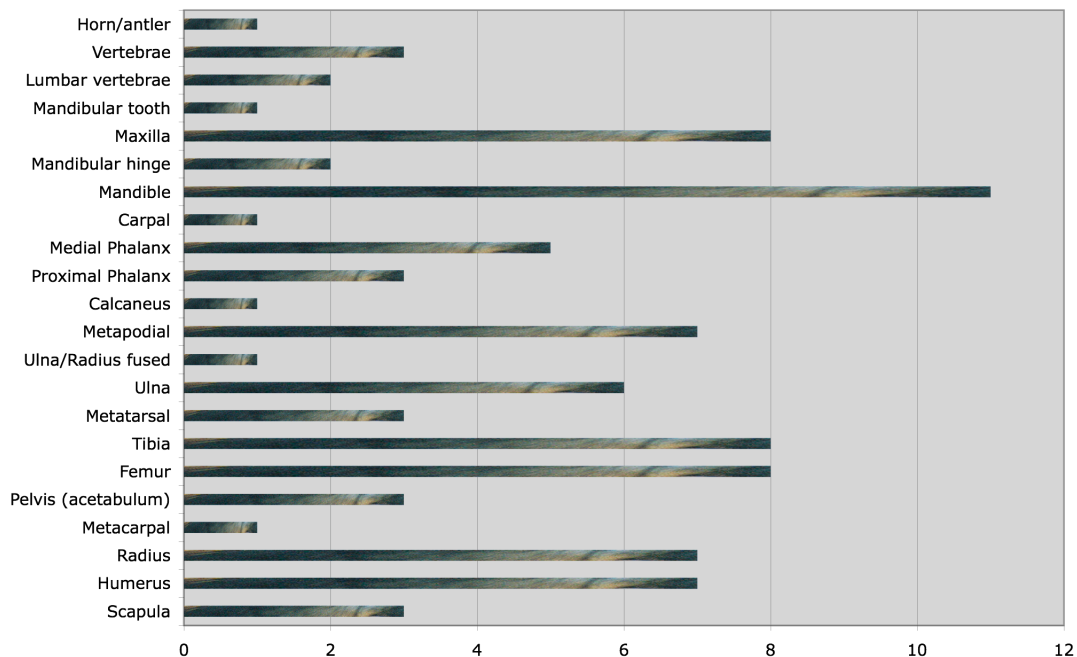


Chart 36: Elements, Brown Hyaena Project D-P 2

All long bones were represented in the assemblage, with femur and tibia contributing to 8.4% of the total. Humerus and radius combined to form 7.4% and scapula contributed 1.6% towards the total. Fusion data were recorded from 60 specimens and indicated that 15% of these specimens were from young seals. All of the remains in question were unfused tibia (3, 2 of which are unfused both distally and proximally and the other unfused proximally), scapula (2), radius (1 unfused proximally), femur (1 unfused both proximally and distally) and a single medial phalanx unfused at the proximal end.

Measured remains ranged in size from < 1.0-15 cm, a horn from a springbok. Of these the fragmentation of 122 faunal remains were recorded. As Chart 37 illustrates, there were no examples of end and shaft splinter, one end only, end splinter or both ends

present some shaft missing. The most abundant fragmentation type was shaft splinter, with 70 examples documented (54.7%). This was followed by complete (18%), cylinder (14%), and one end plus shaft (11%).

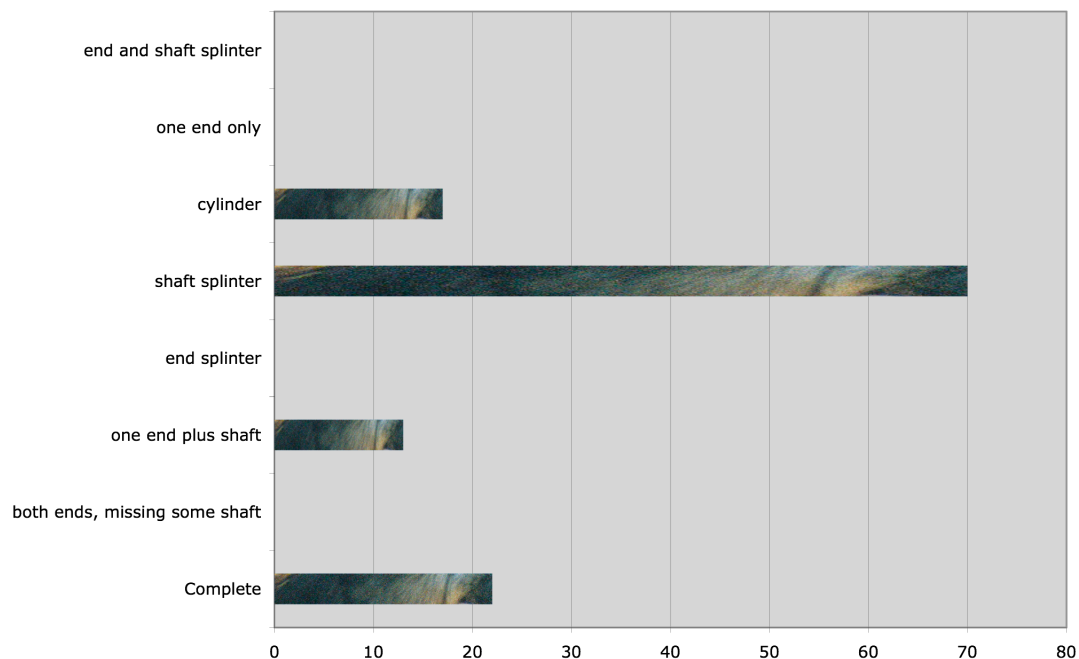


Chart 37: Fragmentation, Brown Hyaena Project D-P 2

Data from weathering were collected from 233 specimens. Of these 70% indicate an age since death of 2-6 yrs. The range from 0-3 yrs forms 24% of the collected data while the 4-15 yr range constitutes 6%. There was no evidence for the 0-1 yr range or the 6-15 yr range in the assemblage (See Chart 38).

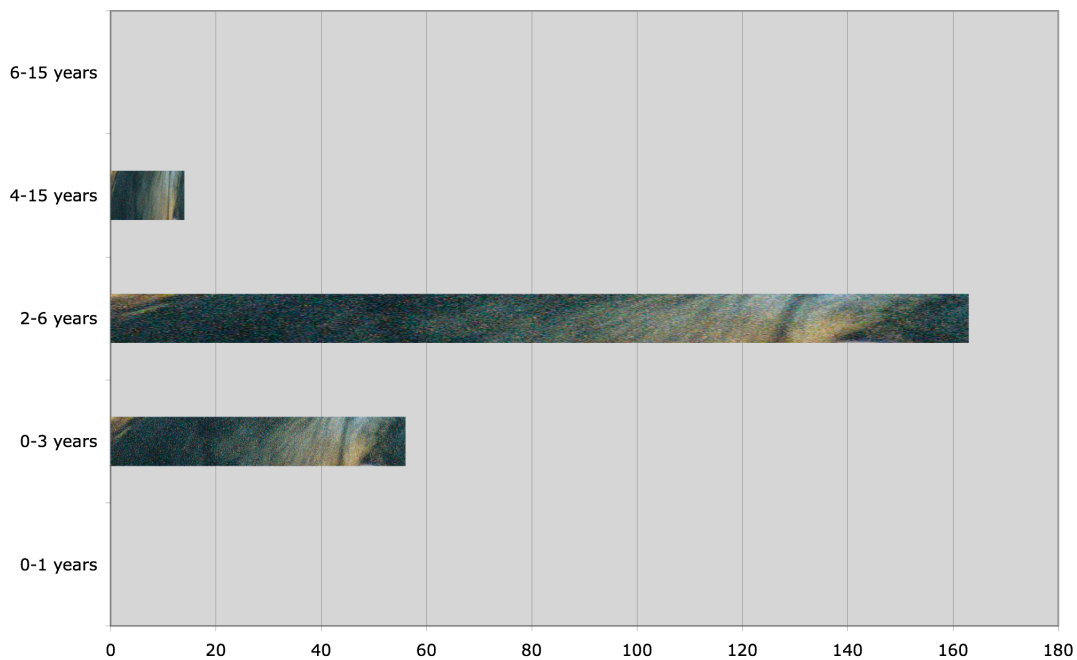


Chart 38: Weathering, Brown Hyaena Project D-P 2

Damage due to carnivore gnawing was documented on 39.5% of the 256 faunal remains. Crenulated edges were the most prominent form of damage with 68.3% of the documented damage. Punctates made up 6.9% and acid etching just 0.9%, there were no examples of scouring or striations in the assemblage. The combination of punctates and crenulated edges formed 14.8% of the total recorded damage while crenulated edges and striations made up 4.9% and punctates, crenulated edges and striations combined made up 3.9% (See Chart 39). For a complete break down of damage by element and location see Appendix I.

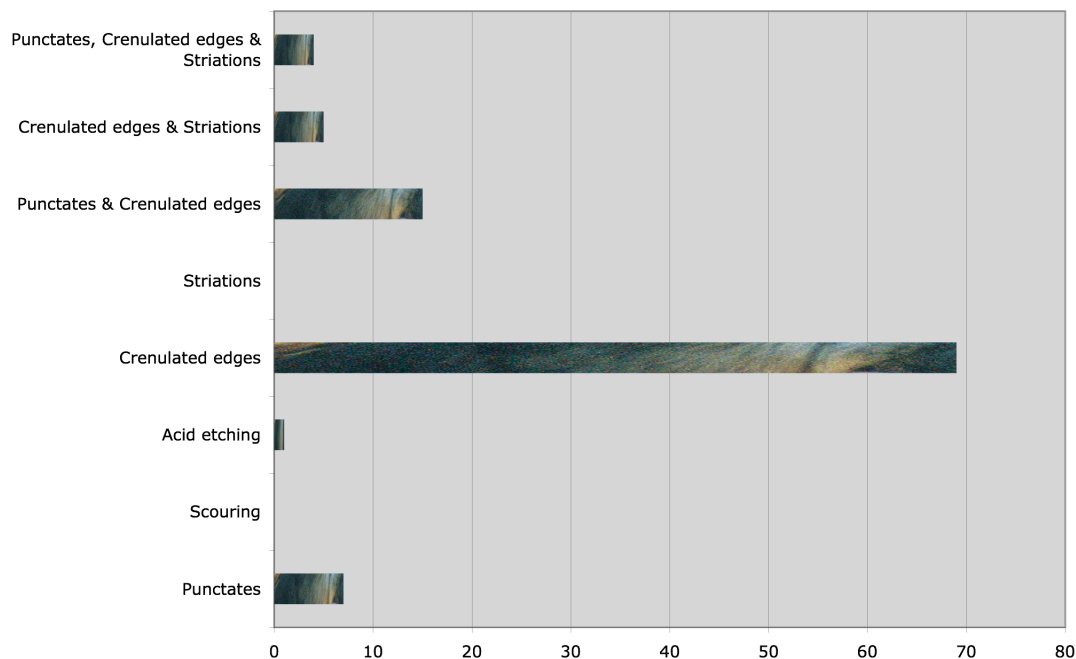


Chart 39: Carnivore Damage, Brown Hyaena Project D-P 2

Brown Hyaena Project D-P 4

D-P 4 yielded 1,865 specimens, of which 377 (20.2%) were identified down to species or class size. Seal remains, at 56%, were the most prolific species recorded from this den. Dogs were the next commonest at 16.2 %, then gemsbok (4.5%), springbok (4.2%), black-backed jackals (4.0%), ostriches (3.5%), large birds and cats (3.2% respectively), klipspringer and mustelids (1.6%), brown hyaenas (1.1%) and medium birds and Cape foxes (0.2%).

SPECIES	NISP	MNI
<i>Antidorcas marsupialis</i>	16	3 (left femur)
<i>Arctocephalus pusillus</i>	211	13 (right tibia)
Avian (large)	12	1 (right femur)
Avian (medium)	1	1 (tibio-tarsus)
<i>Canis familiaris</i>	61	8 (left tibia)
<i>Canis mesomelas</i>	15	5 (left radius)
<i>Felis</i> (domestic size)	12	4 (left acetabulum)
<i>Vulpes chama</i>	1	1 (left humerus)
Mustelidae/Viveridae/Herpestidae	6	1 (right scapula)
<i>Oreotragus oreotragus</i>	6	2 (right acetabulum)
<i>Oryx gazella</i>	17	3 (left radius)
<i>Parahyaena brunnea</i>	4	1 (right ulna)
Reptilian (med-lg)	1	1 (unknown)
Small mammal	1	1 (complete maxilla)
<i>Struthio camelus</i>	13	2 (left femur)
TOTAL	377	47

Table 22: Species NISP & MNI Brown Hyaena Project D-P 4

Upon examination 81.2% of the specimens were identified down to skeletal element (See Table 23). The most commonly identified elements were ribs (476 specimens), skull fragments (188 specimens), vertebrae (152 specimens) and cervical vertebrae (110 specimens). In order to illustrate the relative abundance of the remaining elements, the above-mentioned ribs, skull fragments, vertebrae and cervical vertebrae were removed from Chart 40 below. All long bones and major skeletal elements are represented in the assemblage with femur being the most abundant of the long bones at 3.2% of the identified remains. Tibias are the next most abundant long bone with 2.8%, followed by humerus (2.6%), ulna (2.5%), radius (2.3%), scapula (2.2%) and pelvic bones (2.1%). Fusion data from long bones implied that 7.4% of the faunal remains are from young animals, 75.2% of which were young unfused seal bones.

SKELETAL ELEMENT	NUMBER	SPECIES BREAKDOWN
Scapula	33	15 Seal; 8 unknown; 3 Springbok; 3 Ostrich; 2 Mustelidae; 1 Jackal; 1 bovid
Humerus	39	15 unknown; 11 Seal; 4 carnivore; 3 Dog; 3 Gemsbok; 2 Jackal; 1 Cape Fox
Radius	35	11 Seal; 6 carnivore; 5 Jackal; 5 unknown; 3 Gemsbok; 3 Springbok; 2 Dogs; 1 bovid
Metacarpal	7	4 Dog; 1 Gemsbok; 1 Springbok; 1 Seal
Pelvis (acetabulum)	20	5 Dog; 4 Cat; 3 Seal; 2 Klipspringer; 2 bovid; 1 Jackal; 1 Mustelidae; 1 Brown Hyaena; 1 unknown
Ilium	7	6 Seal; 1 Dog
Ishium	3	1 Seal; 1 large bird; 1 unknown
Pubis	1	Seal
Femur	48	19 unknown; 13 Seal; 5 Springbok; 4 Ostrich; 2 carnivore; 1 Dog; 1 Klipspringer; 1 large bird
Tibia	43	19 Seal; 12 Dog; 8 unknown; 1 Ostrich; 1 Gemsbok; 1 Springbok; 1 bovid
Fibula	8	Seal
Metatarsal	13	9 Dog; 3 Seal; 1 Gemsbok
Ulna	38	20 Seal; 7 Dog; 7 unknown; 1 Brown Hyaena; 1 Springbok; 1 Gemsbok; 1 unknown
Metapodial	31	19 Seal; 5 bovid; 3 Gemsbok; 3 carnivore; 1 Springbok
Calcaneus	1	Cat
Astragalus	8	5 Seal; 2 carnivore unknown; 1 Jackal
Proximal Phalanx	44	34 Seal; 4 Dog; 2 Klipspringer; 1 Cat; 1 Jackal; 1 Ostrich; 1 large bird
Medial Phalanx	6	2 Seal; 2 Cat; 1 Klipspringer; 1 Springbok
Distal Phalanx	3	2 Jackal; 1 Springbok
Tarsal	2	unknown
Mandible	59	59 Seal; 9 Dog; 8 carnivore; 5 unknown; 2 bovid; 1 Cat; 1 Jackal; 1 Brown Hyaena
Mandibular hinge	3	2 unknown; 1 Mustelidae
Maxilla	28	10 carnivore; 7 Seal; 3 Dog; 3 bovid; 1 small mammal; 1 Mustelidae; 1 Jackal; 1 Brown Hyaena
Skull fragment	188	184 unknown; 2 Gemsbok; 1 Dog; 1 bovid
Zygomatic arch	12	unknown
Atlas	5	unknown
Axis	14	unknown
Cervical vertebrae	110	unknown
Thoracic vertebrae	55	53 unknown; 2 Gemsbok
Lumbar vertebrae	4	unknown
Sacrum	1	Ostrich
Caudal vertebrae	5	unknown
Vertebrae	152	151 unknown; 1 mustelidae
Ribs	476	475 unknown; 1 Ostrich
Disk Joints	8	unknown
Sternum	4	unknown
Tibio-tarsus	2	1 medium bird; 1 large bird
Coracoid	2	1 Ostrich; 1 large bird
Carpo-metacarpus	1	large bird
TOTAL	1514	

Table 23: Elements with species breakdown, Brown Hyaena Project D-P 4

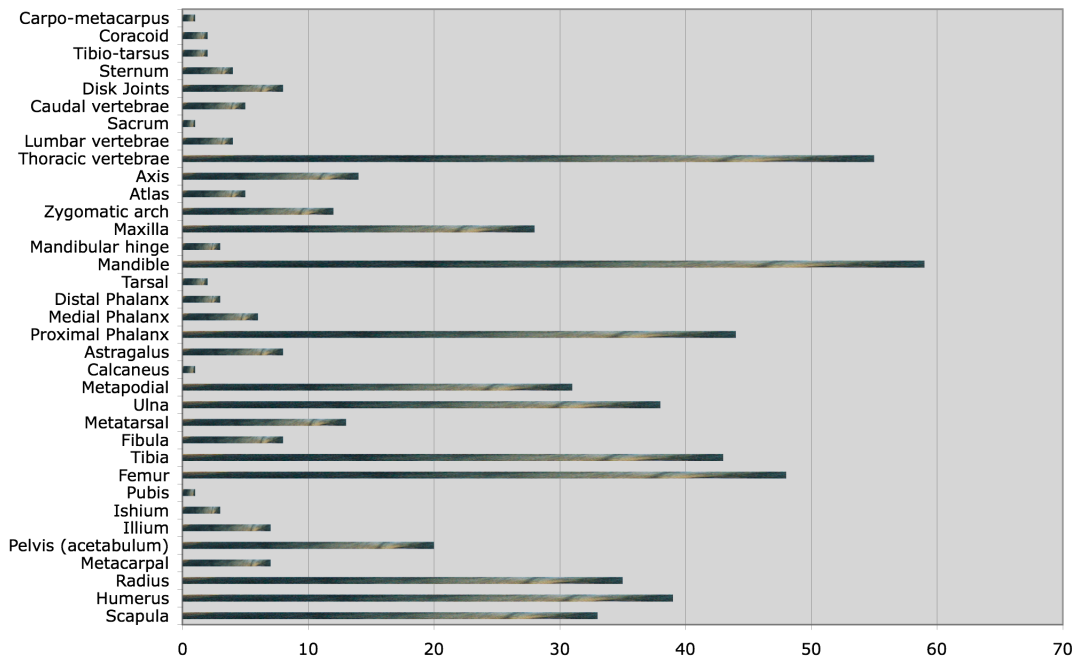


Chart 40: Elements, Brown Hyaena Project D-P 4

In total 654 specimens were measured to length and fragment type recorded.

Fragment size ranged from < 1.0-23 cm, with shaft splinters being the most common type of fragmentation (50.2%). Complete bones were 23.6% of the examined remains, followed by one end plus shaft (16.7%), cylinder (8.3%), one end only (0.8%), end and shaft splinter (0.6%) and both ends present, missing some shaft (0.2%). There were no examples of end splinter in the assemblage (See Chart 41).

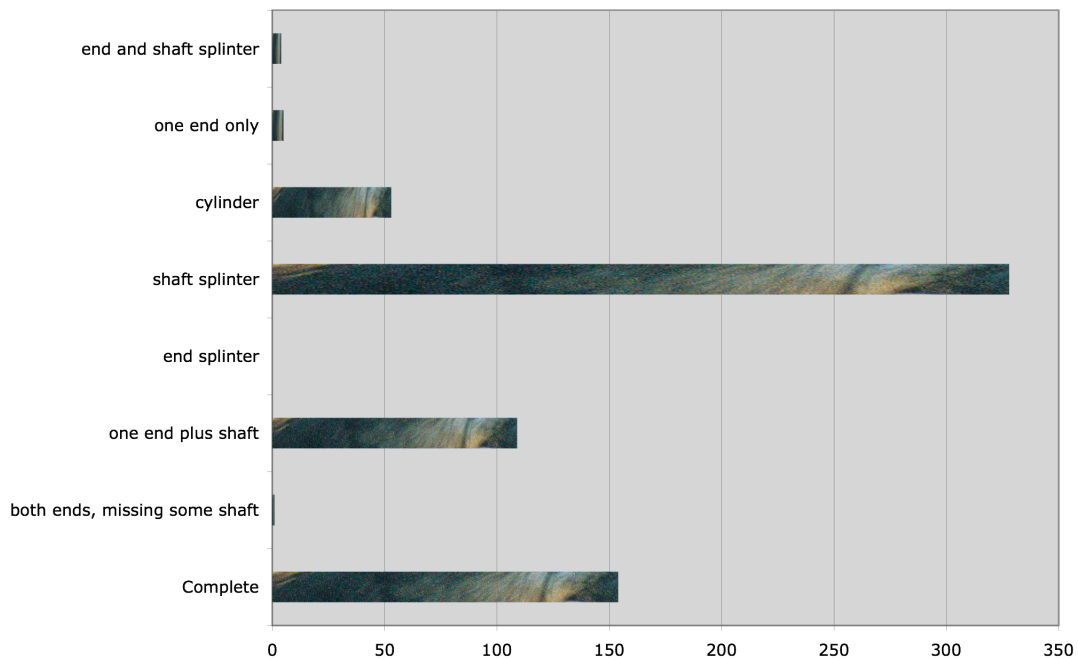


Chart 41: Fragmentation, Brown Hyaena Project D-P 4

Weathering data were documented from 1,781 specimens in the assemblage with the majority of remains indicative of the 2-6 yr range since death (82.1%). The range of 0-3 yrs consisted of 12.6% of the examined remains, with 4-15 yrs being 4.6%, 6-15 yrs at 0.6% and 0-1 yr being 0.1% of the remains (See Chart 42).

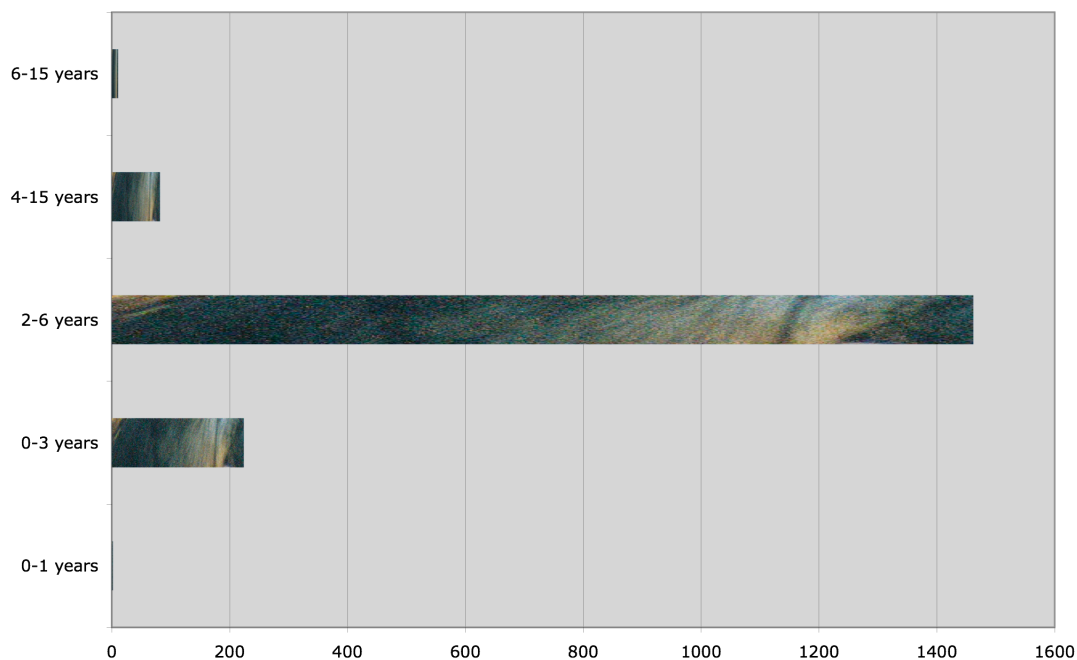


Chart 42: Weathering, Brown Hyaena Project D-P 4

Damage due to carnivore gnawing was documented on 485 of the 1865 faunal remains (26%). Porcupine gnawing was noted on three of the specimens along with carnivore gnawing. All three of these specimens were remains from gemsbok, two metapodials and one humerus. One of the metapodials had crenulated edges at the distal end while the second metapodial as well as the humerus had both crenulated edges and striations at one end of the bone. Of the remains with only carnivore gnawing upon them crenulated edges were noted on 73.6% of the carnivore gnawed assemblage. Punctate depressions comprised 7.3%, acid etching 0.6%, striations 0.4% and scouring 0.2%. The combination of punctates and crenulated edges made up 14%, while crenulated edges and striations were 2.9%, punctates, crenulated edges and striations were 0.8% and the combination of punctates, scouring, crenulated edges and striations was 0.2% (See Chart 43). See Appendix J for complete breakdown.

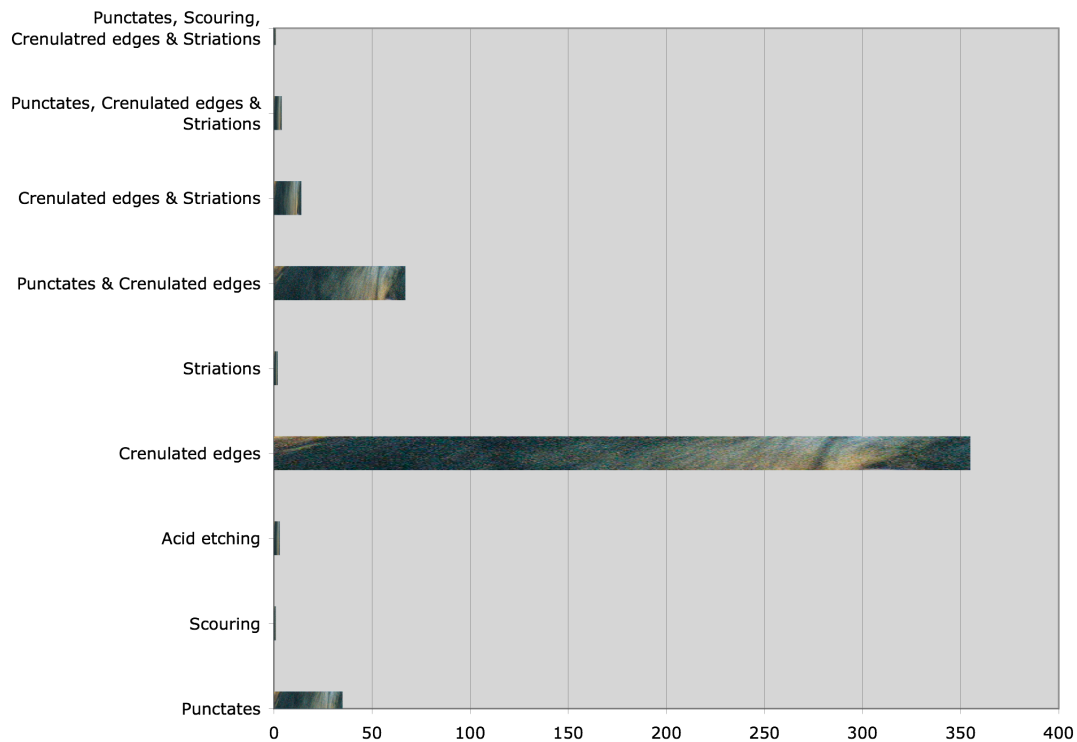


Chart 43: Carnivore Damage, Brown Hyaena Project D-P 4

Brown Hyaena Project D-P 9

A total of 5,955 specimens were analysed from den D-P 9, of which 40% were identified to 17 species. Seal remains formed the majority of identified remains with 68% of the total. Dogs followed with 13.1% of the identified remains, then large birds (8.1%), cats (3.2%), gemsbok (2%), jackals (1.1%), brown hyaenas and cetaceans (0.84% respectively), fishes (0.5%), Cape foxes, klipspringers and springbok (0.42% respectively), mustelids (0.08%) and Cape hares, ostriches and medium to large reptiles (0.04%). See Table 24 for complete breakdown of NISP and MNI for each species identified.

When broken down by skeletal element 94.6% of the faunal remains were identified (See Table 25). Ribs were the majority of identified remains, constituting 31% of the

entire assemblage. Vertebrae and skull fragments were the next most abundant identified elements, making up 9.1% and 4.1% respectively. In order to illustrate the relative abundance of identified elements, ribs and vertebrae were removed from the chart (See Chart 44). All long bones were present, with humerus being the most abundant comprising 3.8% of the identified remains. The next most abundant long bone is tibia (3.6%), then radius (3.1%), femur and ulna (2.9% each) and pelvic (2.6%). Fusion data collected from 1,646 specimens indicated that 56.3% of the examined elements came from young animals. Of these seal remains were 91% of the unfused specimens.

SPECIES	NISP	MNI
<i>Antidorcas marsupialis</i>	10	2 (left femur)
<i>Arctocephalus pusillus</i>	1619	66 (left tibia)
Avian (large)	194	15 (right humerus)
<i>Canis familiaris</i>	311	26 (left ulna)
<i>Canis mesomelas</i>	27	5 (right radius)
Cetacean	20	1 (left scapula)
<i>Felis</i> (domestic size)	76	5 (right acetabulum)
Fish	12	1 (mandible)
<i>Lepus capensis</i>	1	1 (right humerus)
Mustelidae/Viveridae/Herpestidae	2	1 (left mandible)
<i>Oreotragus oreotragus</i>	10	1 (right femur)
<i>Oryx gazella</i>	47	2 (right tibia)
<i>Parahyaena brunnea</i>	20	2 (right ulna)
Reptilian (med-lg)	1	1 (right mandible)
<i>Spheniscus demersus</i>	22	1 (humerus)
<i>Struthio camelus</i>	1	1 (tibia)
<i>Vulpes chama</i>	10	2 (right femur)
TOTAL	2383	133

Table 24: Species NISP & MNI Brown Hyaena Project D-P 9

SKELETAL ELEMENT	NUMBER	SPECIES BREAKDOWN
Scapula	142	83 Seal; 37 unknown; 14 Dog; 5 Cat; 1 Brown Hyaena; 1 Klipspringer; 1 Cetacean
Humerus	212	102 Seal; 31 large Bird; 30 unknown; 15 Dog; 10 Penguin; 7 cat; 6 Jackal; 4 bovid; 2 Gemsbok; 1 Cape Fox; 1 Cape Hare; 1 Klipspringer; 1carnivore
Radius	175	120 Seal; 15 Dog; 8 Jackal; 6 large bird; 5 cat; 5 carnivore; 4 bovid; 4 unknown; 3 Gemsbok; 3 Cape Fox; 1 Brown Hyaena; 1 Springbok
Metacarpal	38	27 Dog; 4 Cat; 2 Gemsbok; 2 Klipspringer; 2 bovid, 1 Seal
Pelvis (acetabulum)	102	47 Seal; 24 Dog; 9 Cat; 6 unknown; 5 Jackal; 4 large bird; 3 Cape Fox; 1 Brown Hyaena; 1 Springbok; 1 Gemsbok; 1 bovid
Ilium	36	35 Seal; 1 Gemsbok
Ishium	11	Seal
Femur	163	79 Seal; 35 unknown; 24 large bird; 10 Dog; 3 Cat; 3 Springbok; 2 Cape Fox; 2 Gemsbok; 1 Brown Hyaena; 1 Klipspringer; 1 Jackal; 1 carnivore; 1 bovid
Tibia	205	132 Seal; 30 Dog; 30 unknown; 5 Jackal; 4 Gemsbok; 2 Cat; 1 Ostrich; 1 Klipspringer
Fibula	63	Seal
Metatarsal	47	30 Dog; 9 Seal; 8 Cat
Ulna	163	88 Seal; 32 Dog; 20 unknown; 12 large bird; 5 bovid; 2 Cat; 2 Brown Hyaena; 2 carnivore
Metapodial	268	232 Seal; 19; 15 carnivore; 1 Klipspringer; 1 Gemsbok
Calcaneus	37	21 Seal; 16 Dog
Astragalus	42	24 Seal; 17 unknown; 1 Klipspringer
Proximal Phalanx	137	82 Seal; 25 Dog; 15 carnivore; 2 Brown Hyaena; 1 bovid
Medial Phalanx	270	229 Seal; 20 Dog; 7 Cat; 7 Gemsbok; 3 Brown Hyaena; 1 Mustelidae; 1 Klipspringer; 1 large bird; 1 bovid
Distal Phalanx	44	20 Seal; 11 Dog; 4 Penguin; 4 large bird; 2 Gemsbok; 1 Springbok; 1 Cat; 1 Brown Hyaena
Carpal	41	36 unknown; 5 Gemsbok
Skull	1	Gemsbok
Skull fragments	228	199 unknown; 14 large bird; 14 Seal; 1 Cetacean
Mandible	183	95 Seal; 33 carnivore; 24 Dog; 16 unknown; 4 Brown Hyaena; 3 Springbok; 2 Klipspringer; 1 Cat; 1 Mustelidae; 1 fish; 1 Jackal; 1 reptile (med-ig); 1 unknown
Mandibular hinge	11	unknown
Maxilla	129	56 Seal; 36 carnivore; 17 Dog; 8 Cat; 5 Gemsbok; 4 Brown Hyaena; 1 Cape Fox; 1 bovid; 1 unknown
Mandibular tooth	8	4 carnivore; 2 bovid; 1 Gemsbok; 1 Seal
Maxillary Tooth	24	15 Seal; 6 carnivore; 1 Cat; 1 Gemsbok; 1 bovid
Tooth (loose)	55	27 Seal; 27 carnivore; 1 unknown
Zygomatic arch	31	unknown
Occipital condyle	4	unknown
Atlas	21	20 unknown; 1 Gemsbok
Axis	19	15 unknown; 2 Seal; 2 Gemsbok
Cervical vertebra	48	47 unknown; 1 Seal
Thoracic vertebra	97	96 unknown; 1 Gemsbok

SKELETAL ELEMENT	NUMBER	SPECIES BREAKDOWN
Lumbar vertebra	49	48 unknown; 1 Seal
Sacrum	11	6 unknown; 5 large bird
Caudal vertebra	133	126 unknown; 6 Seal; 1 Cetacean
Disk Joints	68	67 unknown; 1 Cetacean
Sternum	64	unknown
Coracoid	10	large bird
Carpo-metacarpus	19	large bird
Tarso-metatarsus	18	10 large bird; 8 Penguin
TOTAL	5636	

Table 25: Elements with species breakdown, Brown Hyaena Project D-P 9

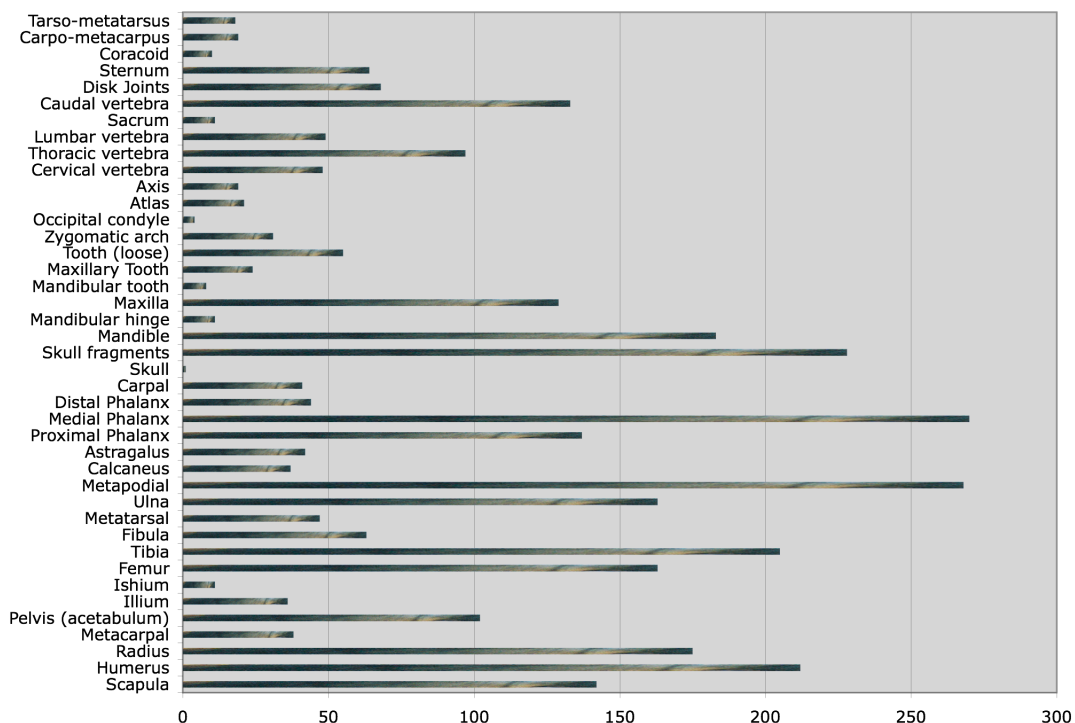


Chart 44: Elements, Brown Hyaena Project D-P 9

Fragment size ranged in length from < 1.0-36 cm, a tibia from a gemsbok. Types of fragmentation were recorded from 1,192 specimens and complete bones made up 41.8% of the examined assemblage. One end plus shaft was the next most abundant type of fragmentation with 24.6%, followed by shaft splinter (16.4%), cylinder

(10.6%), one end only (5%), end and shaft splinter (1.3%), both end present, some shaft missing (0.3%) and end splinter (0.08%) (See Chart 45).

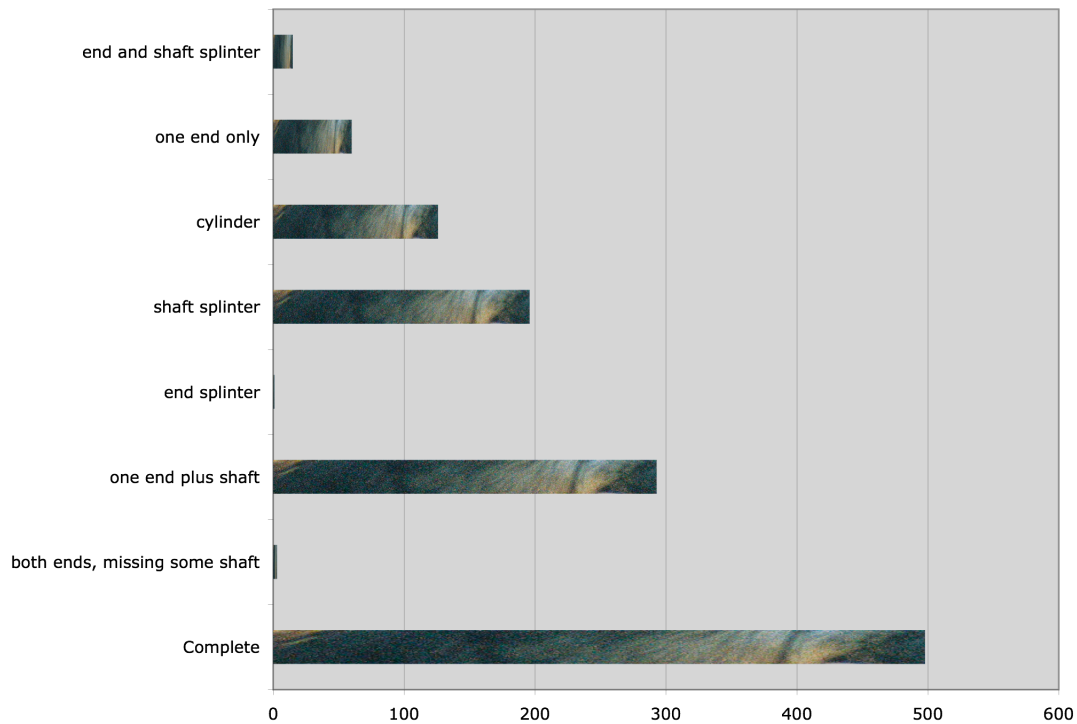


Chart 45: Fragmentation, Brown Hyaena Project D-P 9

Weathering data were logged for 5,807 of the analysed specimens in order to establish time since death of the animal. There were no samples in the range of 0-1 yr and only 0.7% of the specimens fall in the 6-15 yr range. The majority, 93.1%, of remains were indicative of 2-6 yrs since time of death. Specimens in the 4-15 yr range comprised 5.1% of the assemblage and 1.1% of the assemblage were in the 0-3 yr range (See Chart 46).

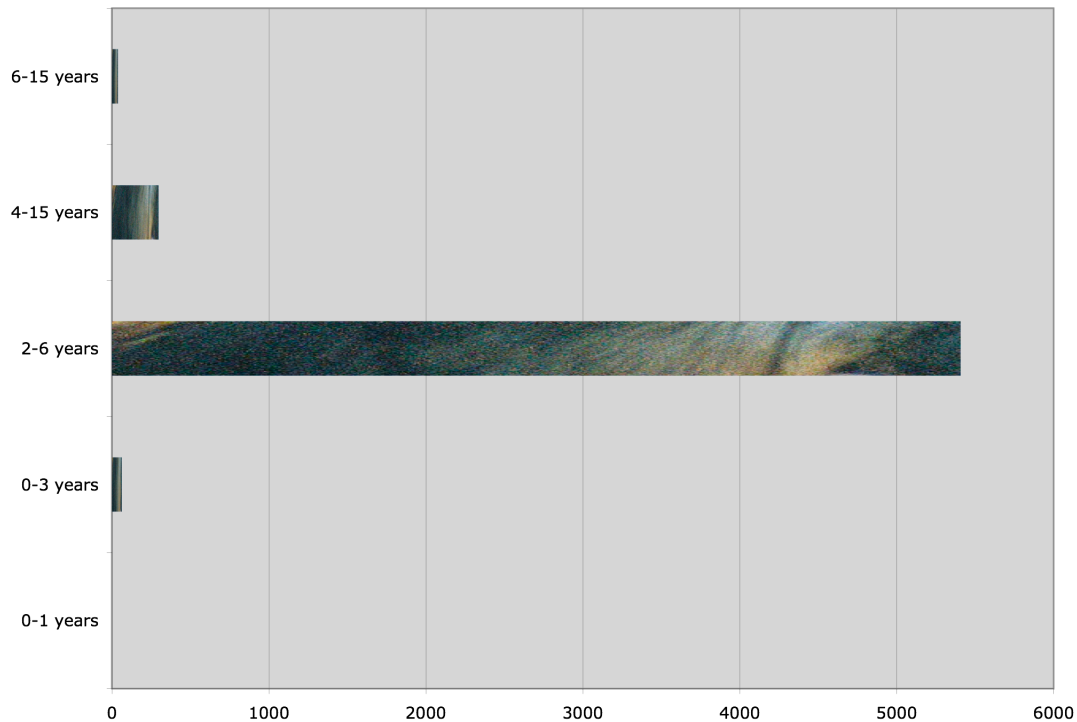


Chart 46: Weathering, Brown Hyaena Project D-P 9

Carnivore damage was documented on 1,318 specimens or 22.1% of the entire assemblage. Of this, two had both carnivore damage and porcupine gnawing upon the remains. The two specimens with porcupine gnawing were a carnivore mandible with crenulated edges over most of the bone and an unknown fragment of unknown species with punctates and crenulated edges on one end of the bone. Crenulated edges were predominant at 67.4% of the gnawed material. Punctates comprised 9%, striations 0.5% and there were no examples of either scouring or acid etching. The combinations of punctates and crenulated edges made up 18.7%, crenulated edges and striations 3.4% and punctates, crenulated edges and striations 0.8% (See Chart 47). See Appendix K for complete breakdown of carnivore damage per element and location of damage upon individual elements.

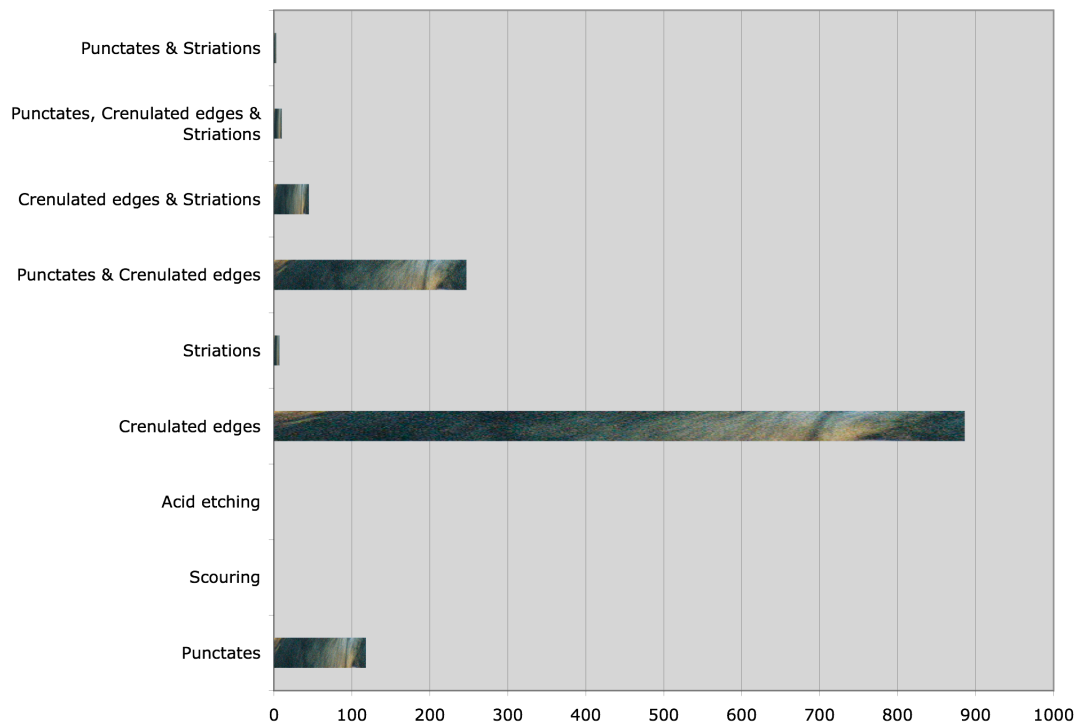


Chart 47: Carnivore Damage, Brown Hyaena Project D-P 9

Brown Hyaena Project D-P 11

Den D-P 11 yielded a total of 117 specimens, of which 24.8% were identified to species. Seal remains were the most common, making up 58.6% of the identified remains. Dogs were the next most abundant with 31% of the identified specimens, followed by large birds (6.9%) and jackals (3.5%).

SPECIES	NISP	MNI
<i>Arctocephalus pusillus</i>	17	2 (right tibia)
Avian (large)	2	1 (left tibio-tarsus)
<i>Canis familiaris</i>	9	1 (left tibia)
<i>Canis mesomelas</i>	1	1 (left humerus)
TOTAL	29	5

Table 26: Species NISP & MNI, Brown Hyaena Project D-P 11

Of the analysed remains, 80% were identified to skeletal element (See Table 27 & Chart 46). Of note is the lack of scapula, radius and pelvic bones. Ribs dominated the assemblage with 24 specimens (25.5%) followed by skull fragments with 14 of the identified specimens. Both ribs and skull fragments were removed from Chart 48 in order to show relative abundance of other elements. Tibias were the most common long bone with 5.3% of the identified remains. Fusion data were documented from 35 of the 117 specimens. Of these 28.6% of the remains indicated young animals, all of which are seal remains.

SKELETAL ELEMENT	NUMBER	SPECIES BREAKDOWN
Humerus	2	1 Seal; 1 Jackal
Metacarpal	2	Dog
Femur	1	unknown
Tibia	5	2 Seal; 2 unknown; 1 Dog
Fibula	4	Seal
Ulna	1	Seal
Metapodial	3	2 Seal; 1 unknown
Calcaneus	1	Dog
Astragalus	2	1 Seal; 1 Dog
Proximal Phalanx	8	6 carnivore; 1 Seal; 1 unknown
Medial Phalanx	6	carnivore
Carpal	2	unknown
Patella	1	Dog
Skull fragments	14	unknown
Mandible	3	2 Dog; 1 bovid
Maxilla	2	Seal
Zygomatic arch	1	unknown
Occipital condyle	1	Dog
Atlas	1	unknown
Axis	1	unknown
Thoracic vertebrae	1	unknown
Lumbar vertebrae	1	unknown
Vertebrae	2	unknown
Ribs	24	unknown
Sternum	3	unknown
Tibio-tarsus	1	large bird
Carpo-metacarpus	1	large bird
TOTAL	94	

Table 27: Elements with species breakdown, Brown Hyaena Project D-P 11

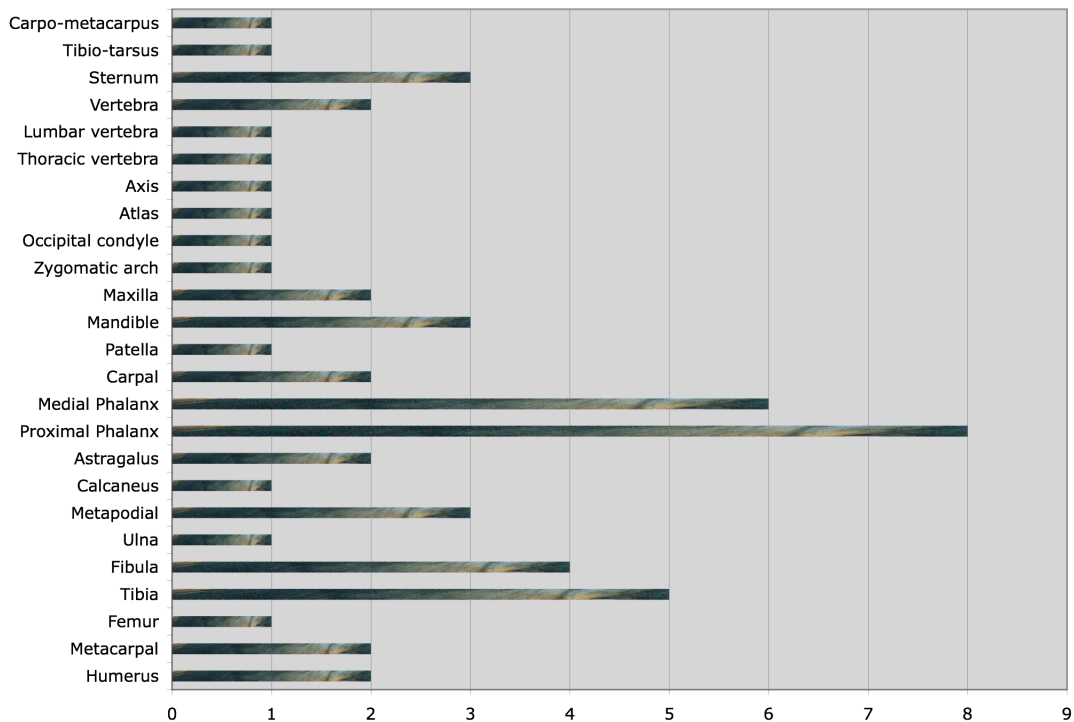


Chart 48: Elements, Brown Hyaena Project D-P 11

Fragment lengths ranged in size from < 1.0-13 cm, a tibia of a dog. Fragmentation data for 56 specimens yielded 43% complete bones, 36% shaft splinters, 14.3 % one end plus shaft and 5.4% cylinders. There were no examples of end splinter, one end only or end and shaft splinter fragmentation patterns. (See Chart 49).

Weathering data were taken from 114 of the 117 specimens. Of these 97.4% of the assemblage falls in the 2-6 yr range since death. The remaining data indicates time since death of 4-15 yrs (1.8%) and 6-15 yrs (0.8%). There were no samples in the 0-1 or 0-3 yr ranges (See Chart 50).

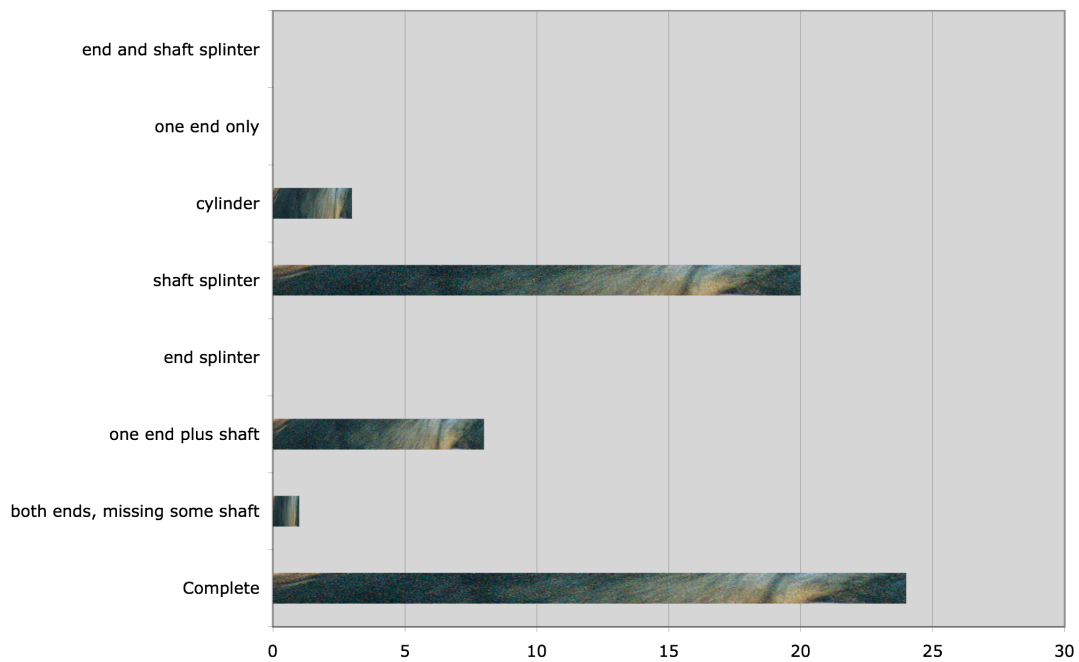


Chart 49: Fragmentation, Brown Hyaena Project D-P 11

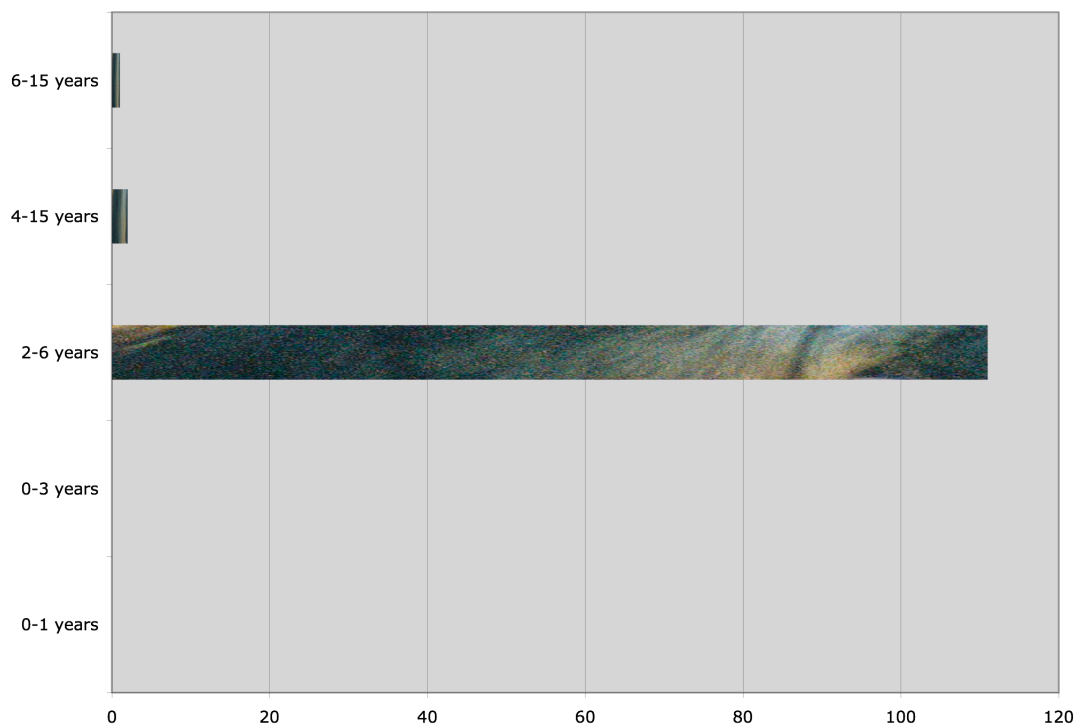


Chart 50: Weathering, Brown Hyaena Project D-P 11

Carnivore gnawing was identified on 61.4% of the assemblage. Crenulated edges were the most prolific type of damage with 84.3% of the specific damage recorded. Punctates yielded 4.3% of the assemblage and striations were 1.4%. There were no examples of either scouring or acid etching documented in the assemblage. The combination of punctuates and crenulated edges made up 8.6% of the identified damage while crenulated edges and striations were 1.4% (See Chart 51). For complete breakdown of carnivore damage per element and location on said elements see Appendix L.

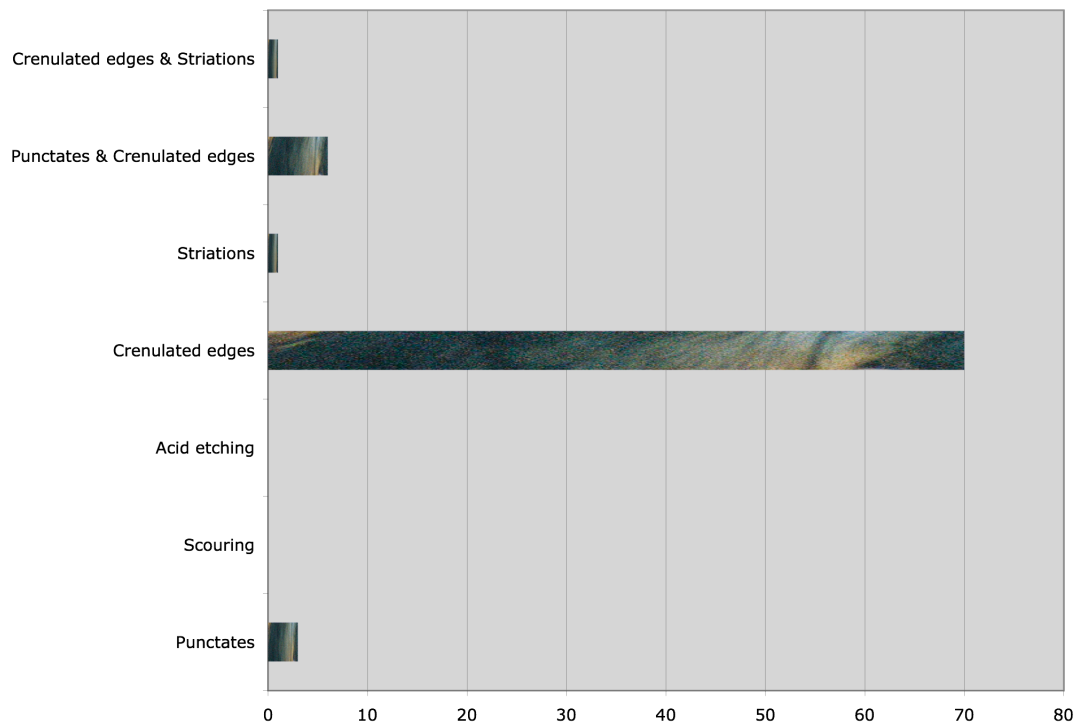


Chart 51: Carnivore Damage, Brown Hyaena Project D-P 11

Brown Hyaena Project D-P 16

D-P 16 yielded 1,287 faunal remains, of which 17.9% were identified to species or class size. Of the identified remains, seals made up 38.2%, dogs 32%, jackals and large birds 6.8% each, Cape foxes 3.2%, springbok 2.7%, small mammals 1.8%, horses 1.4%, cats 1% and fishes, Cape hares and reptiles 0.5% each (See Table 28).

SPECIES	NISP	MNI
<i>Antidorcas marsupialis</i>	6	3 (left mandible)
<i>Arctocephalus pusillus</i>	84	6 (left scapula)
Avian (large)	15	1 (right humerus)
<i>Canis familiaris</i>	70	4 (right tibia)
<i>Canis mesomelas</i>	15	2 (left humerus)
<i>Equus caballus</i>	3	1 (left humerus)
<i>Felis</i> (domestic size)	2	1 (right mandible)
Fish	1	1 (vertebrae)
<i>Lepus capensis</i>	1	1 (right ulna)
<i>Parahyaena brunnea</i>	11	3 (right ulna)
Reptilian (med-lg)	1	1 (unknown)
Small mammal	4	1 (left calcaneus)
<i>Vulpes chama</i>	7	1 (right tibia)
TOTAL	220	26

Table 28: Species NISP & MNI Brown Hyaena Project D-P 16

In addition to the above-mentioned faunal remains, the single carcass of a black-backed jackal was also present at this location. The carcass was less than a week old, as Brown Hyaena Project staff was periodically checking the den and there was no carcass present the week prior to the analysis of faunal remains

Of the 1,287 specimens, 84.4% were identified to skeletal elements. Ribs and skull fragments made up the majority of the identified specimens with 28.2% and 14% respectively. Of the long bones there were 32 examples each of humerus and ulna, 28 scapulas, 25 tibias, 22 femurs and 20 radius (See Table 29). Both ribs and skull fragments have been removed from Chart 52 in order to illustrate the relative abundance of the remaining faunal material. Fusion data collected from 219 specimens indicated that 32% of the faunal remains were from young (unfused) animals. Of the unfused elements identified to species, seals made up the bulk of the young remains (25.1%). Dogs (1.8%), brown hyaenas (1.4%), jackals (0.5%) and springbok (0.5%) made up the rest of the identified remains with fusion data.

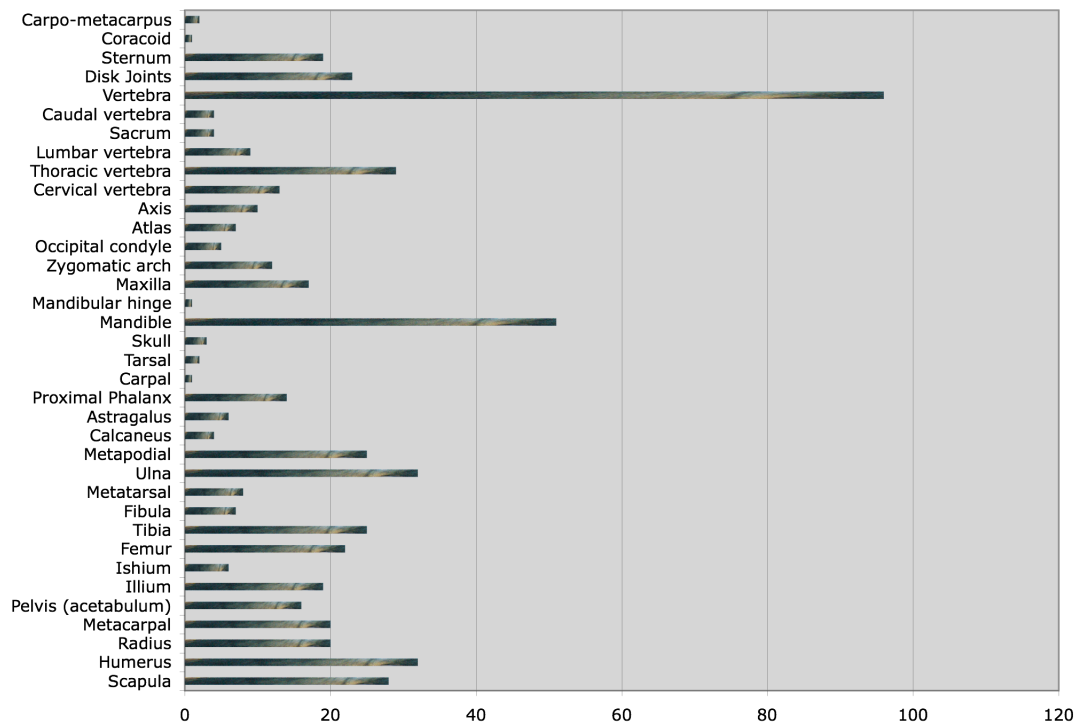


Chart 52: Elements, Brown Hyaena Project D-P 16

SKELETAL ELEMENT	NUMBER	SPECIES BREAKDOWN
Scapula	28	10 unknown; 8 Seal; 4 carnivore; 3 Dog; 1 Jackal; 1 Cape Fox; 1 small mammal
Humerus	32	18 unknown; 5 Seal; 4 Dog; 3 Jackal; 1 Horse; 1 large bird
Radius	20	5 unknown; 5 carnivore; 4 Dog; 3 Seal; 2 Brown Hyaena; 1 Jackal
Metacarpal	20	15 carnivore; 2 Jackal; 1 Dog; 1 Springbok; 1 Brown Hyaena
Pelvis (acetabulum)	16	4 Seal; 3 Jackal; 3 Dog; 2 Brown Hyaena; 2 large bird; 1 Cape Fox; 1 carnivore
Ilium	19	10 unknown; 4 Seal; 4 Dog; 1 carnivore
Ishium	6	3 Dog; 3 unknown
Femur	22	11 unknown; 5 Seal; 2 Jackal; 1 Brown Hyaena; 1 large bird; 1 Cape Fox; 1 carnivore
Tibia	25	10 Seal; 7 unknown; 5 Dog; 2 Cape Fox; 1 Cat
Fibula	7	4 Seal; 3 carnivore
Metatarsal	8	6 carnivore; 1 Brown Hyaena; 1 Springbok
Ulna	32	10 unknown; 8 Seal; 3 Dog; 3 Brown Hyaena; 3 carnivore; 2 jackal; 1 large bird; 1 Horse, 1 Cape Hare
Metapodial	25	19 Seal; 3 carnivore; 2 unknown; 1 bovid
Calcaneus	4	1 Seal; 1 Horse; 1 small mammal; 1 unknown
Astragalus	6	4 Seal; 1 Brown Hyaena; 1 Cape Fox
Proximal Phalanx	14	7 unknown; 5 Seal; 1 small mammal; 1 Dog
Carpal	1	unknown
Tarsal	2	unknown
Skull	3	2 Dog; 1 unknown
Skull fragments	140	unknown
Mandible	51	22 Dog; 11 carnivore; 6 unknown; 4 Springbok; 3 Seal; 2 Jackal; 1 Cat; 1 small mammal
Mandibular hinge	1	unknown
Maxilla	17	11 Dog; 4 carnivore; 1 Seal; 1 Cape Fox
Zygomatic arch	12	unknown
Occipital condyle	5	unknown
Atlas	7	unknown
Axis	10	unknown
Cervical vertebrae	13	unknown
Thoracic vertebrae	29	unknown
Lumbar vertebrae	9	unknown
Sacrum	4	unknown
Caudal vertebrae	4	unknown
Vertebrae	96	95 unknown; 1 fish
Disk Joints	23	unknown
Ribs	286	unknown
Sternum	19	unknown
Coracoid	1	large bird
Carpo-metacarpus	2	large bird
TOTAL	1016	

Table 29: Elements with species breakdown, Brown Hyaena Project D-P 16

The length of 386 specimens were logged and ranged from < 1.0-19 cm, a radius of a brown hyaena. Of these specimens 48.7% were typed as shaft splinter, 18.1% complete, 15.5% one end plus shaft, 9.1% cylinder, 6.5% one end only, 1% each both ends present, some shaft missing and end and shaft splinter. There were no examples of end splinter in the assemblage (See Chart 53).

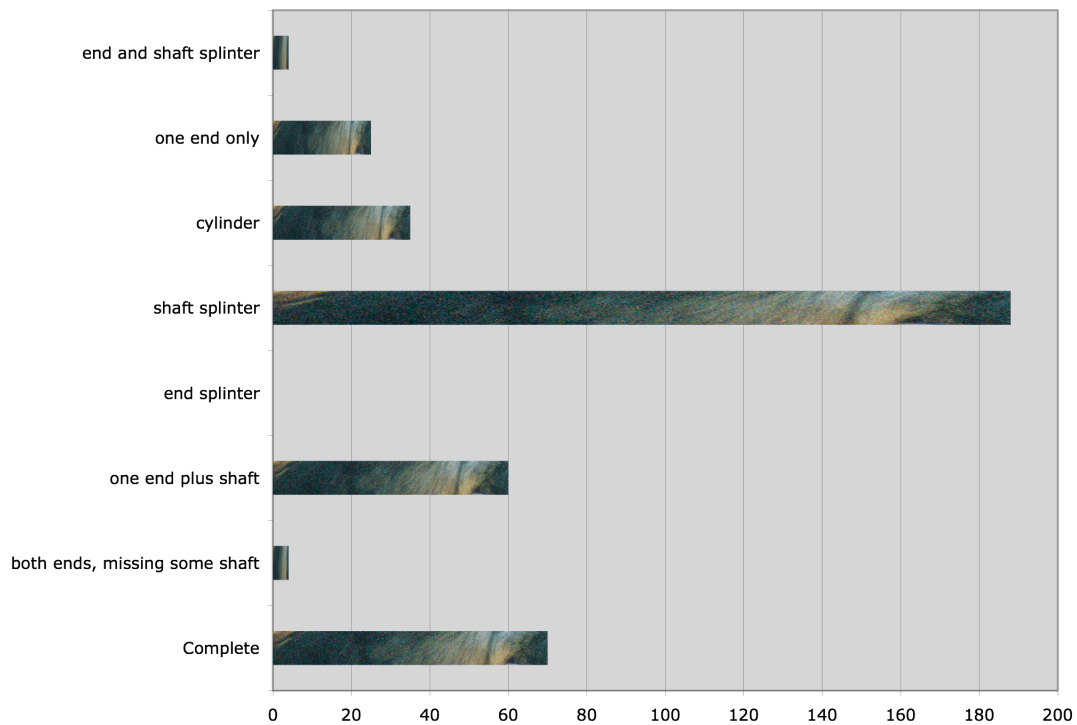


Chart 53: Fragmentation, Brown Hyaena Project D-P 16

Weathering data collected from 1,229 specimens indicated that 85% of the remains are within the range of 2-6 yrs since death. The rest of the faunal remains are divided between ranges from 0-15 yrs. Specifically 9.4% from 0-3 yrs, 4.5% from 4-15 yrs, 1% from 0-1 yr and 0.08% from 6-15 yrs (See Chart 54).

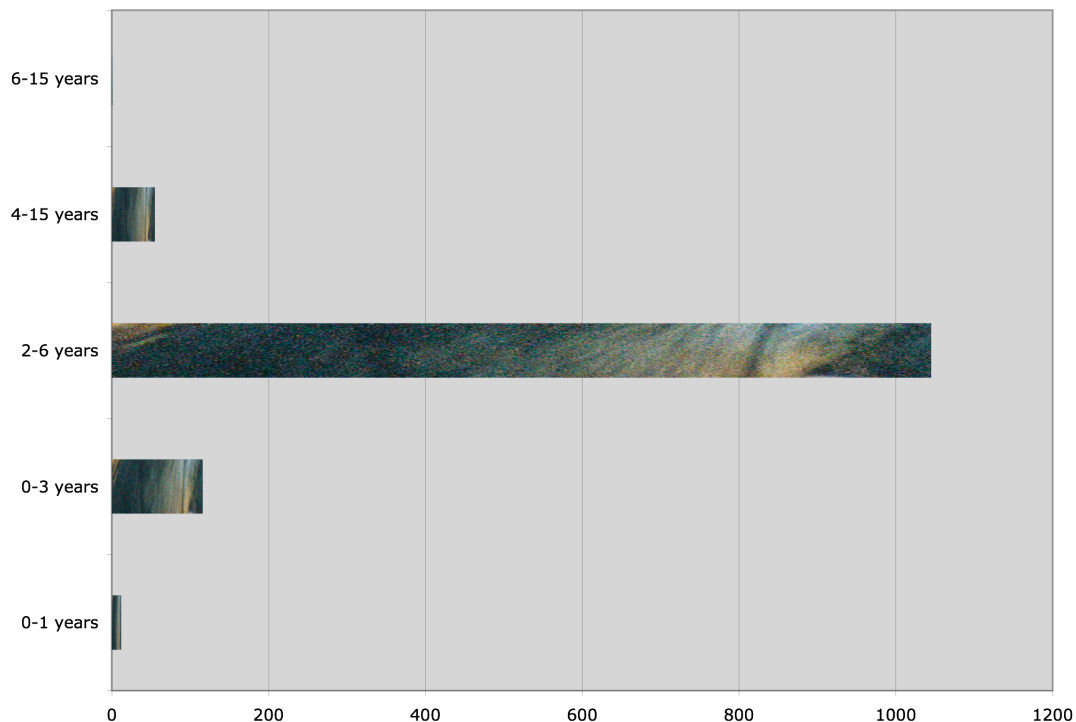


Chart 54: Weathering, Brown Hyaena Project D-P 16

Damage due to gnawing was recorded from 757 specimens, one of which was indicative of both carnivore and porcupine gnawing activity. The specimen in question was an unidentified mandible with crenulated edges along one edge of the bone. Crenulated edges comprised 87.4% of the carnivore damaged remains. Punctates made up 2.4% and there were no examples of scouring, acid etching or striations in the assemblage. The combination of punctates and crenulated edges totalled 6.9% of the assemblage and crenulated edges and striations were 1.5% of the carnivore gnawed material (See Chart 55). See Appendix M for breakdown of damage type per element and location.

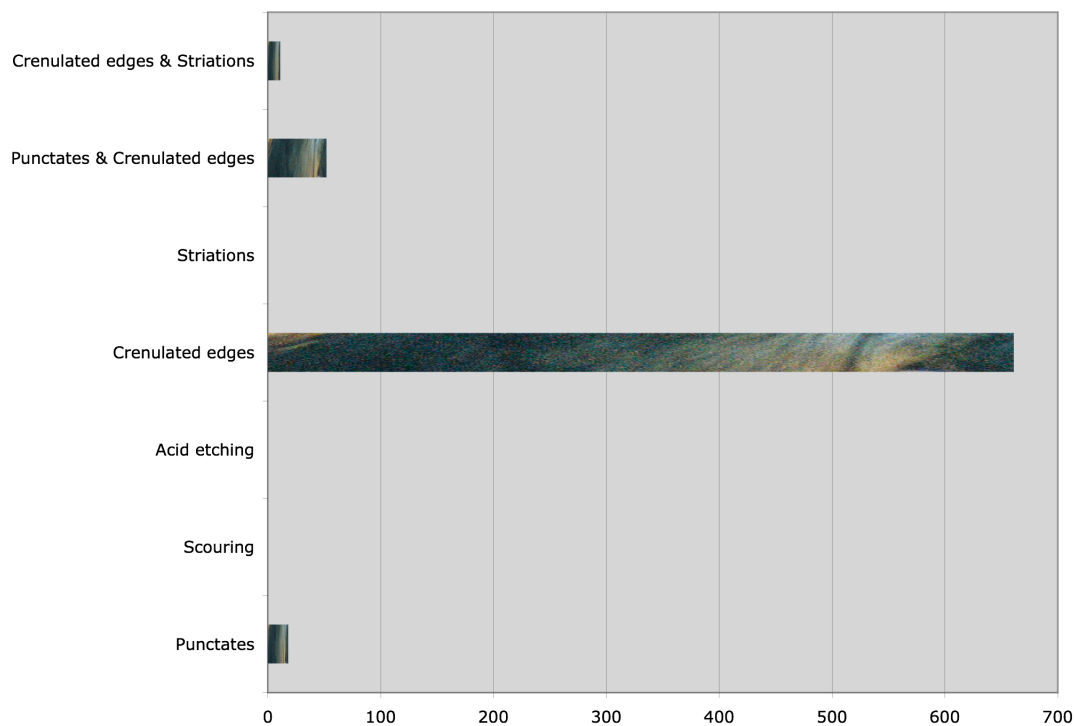


Chart 55: Carnivore Damage, Brown Hyaena Project D-P 16

Brown Hyaena Project D-P 18

Den D-P 18 consisted of 1,811 documented remains, plus 14 carcasses of seal pups, all of which had their skulls bitten through as seen in Plate 17. Of the logged remains 36.1% were identified to species, with seal comprising the majority at 71.4%. Large bird remains yielded 16.1%, dogs 2.8%, Cape foxes 1.4%, small mammals and medium birds 1.2% each, Cape hares 1.1%, brown hyaenas and fishes 1% each, jackals, ostriches and steenbok 0.6%, cats and cetaceans 0.3% and horses, small birds, gemsbok and reptiles 0.1% (See Table 30).

SPECIES	NISP	MNI
<i>Arctocephalus pusillus</i>	466	14 (left scapula)
Avian (large)	105	4 (left femur)
Avian (medium)	8	1 (humerus)
Avian (small)	1	1 (carpo-metacarpus)
<i>Canis familiaris</i>	18	1 (right femur)
<i>Canis mesomelas</i>	4	1 (right humerus)
Cetacean	2	1 (vertebrae)
<i>Equus caballus</i>	1	1 (left metacarpal)
<i>Felis</i> (domestic size)	2	1 (complete maxilla)
Fish	6	1 (mandible)
<i>Lepus capensis</i>	7	2 (left ulna)
<i>Oryx gazella</i>	1	1 (tooth)
<i>Parahyaena brunnea</i>	6	1 (left mandible)
<i>Raphicerus campestris</i>	4	1 (right radius)
Reptilian (med-lg)	1	1 (unknown)
Small mammal	8	1 (right femur)
<i>Struthio camelus</i>	4	1 (unknown)
<i>Vulpes chama</i>	9	2 (left tibia)
TOTAL	653	36

Table 30: Species NISP & MNI Brown Hyaena Project D-P 18

Of 1,811 specimens, 86.3 % were identified to skeletal element. Ribs, skull fragments and vertebrae made up the majority of the assemblage (26.4%, 13.2% and 12.6% respectively). As such these elements are removed from Chart 56 in order to illustrate the relative abundance of the remaining identified elements. Femurs are the most abundant of the long bones at 2.6% of the assemblage, followed by tibia (2.2%), radius (2%), scapula (1.9%) and humerus (1.8%) (See Table 31). Fusion data from 457 identified specimens indicate that 50.3% of the assemblage is from young (unfused) animals. Of these 95.7% were seal remains, 1.3% dog, 0.9% bovid, 0.9% carnivore, 0.4% brown hyaena and 0.4% small mammals.

SKELETAL ELEMENT	NUMBER	SPECIES BREAKDOWN
Scapula	30	22 Seal; 8 unknown
Humerus	29	18 Seal; 3 large bird; 2 medium bird; 2 Jackal; 2 Cape Fox; 2 unknown
Radius	31	14 Seal; 9 carnivore; 3 medium bird; 3 bovid; 2 Steenbok
Metacarpal	7	2 Brown Hyaena; 2 Dog; 2 Cape Fox; 1 Horse
Pelvis (acetabulum)	15	10 Seal; 4 Cape Hare; 1 Dog
Ilium	2	Seal
Ishium	2	Seal
Pubis	1	Seal
Femur	41	19 Seal; 8 large bird; 6 unknown; 3 carnivore; 2 bovid; 1 Cape Hare; 1 small mammal
Tibia	35	26 Seal; 3 Cape Fox; 2 unknown; 1 Dog; 1 Steenbok; 1 carnivore
Fibula	18	Seal
Metatarsal	8	5 Dog; 2 Brown Hyaena; 1 Cape Fox
Ulna	41	21 Seal; 12 large bird; 2 Cape Hare; 2 bovid; 2 unknown; 1 carnivore
Metapodial	81	78 Seal; 1 small mammal; 1 carnivore; 1 unknown
Calcaneus	3	2 Seal; 1 Dog
Astragalus	6	2 Seal; 2 Jackal; 1 Cape Fox; 1 Steenbok
Proximal Phalanx	76	70 Seal; 5 carnivore; 1 small mammal
Medial Phalanx	21	9 Seal; 6 bovid; 6 carnivore
Distal Phalanx	9	5 Seal; 2 Dog; 1 Cat; 1 small mammal
Carpal	20	Seal
Patella	1	unknown
Skull	1	Seal
Skull fragments	207	199 unknown; 5 Seal; 2 large bird; 1 medium bird
Mandible	34	22 Seal; 5 carnivore; 2 Brown Hyaena; 2 unknown; 1 Dog; 1 fish; 1 small mammal
Mandibular hinge	1	unknown
Maxilla	24	17 Seal; 2 Dog; 2 carnivore; 2 small mammal; 1 Cat
Zygomatic arch	9	unknown
Occipital condyle	2	1 Seal; 1 unknown
Atlas	4	3 unknown; 1 small animal
Axis	1	Seal
Thoracic vertebrae	61	33 Seal; 28 unknown
Lumbar vertebrae	7	unknown
Sacrum	7	4 large bird; 2 medium bird; 1 unknown
Caudal vertebrae	19	unknown
Vertebrae	197	180 unknown; 7 large bird; 5 fish; 3 medium bird; 2 cetacean
Disk Joints	34	unknown
Ribs	413	381 unknown; 38 Seal
Sternum	27	26 unknown; 1 Seal
Fircula	1	large bird
Tibio-tarsus	8	large bird
Coracoid	16	large bird
Carpo-metacarpus	12	11 large bird; 1 small bird
Tarso-metatarsus	1	large bird
TOTAL	1563	

Table 31: Elements with species breakdown, Brown Hyaena Project D-P 18

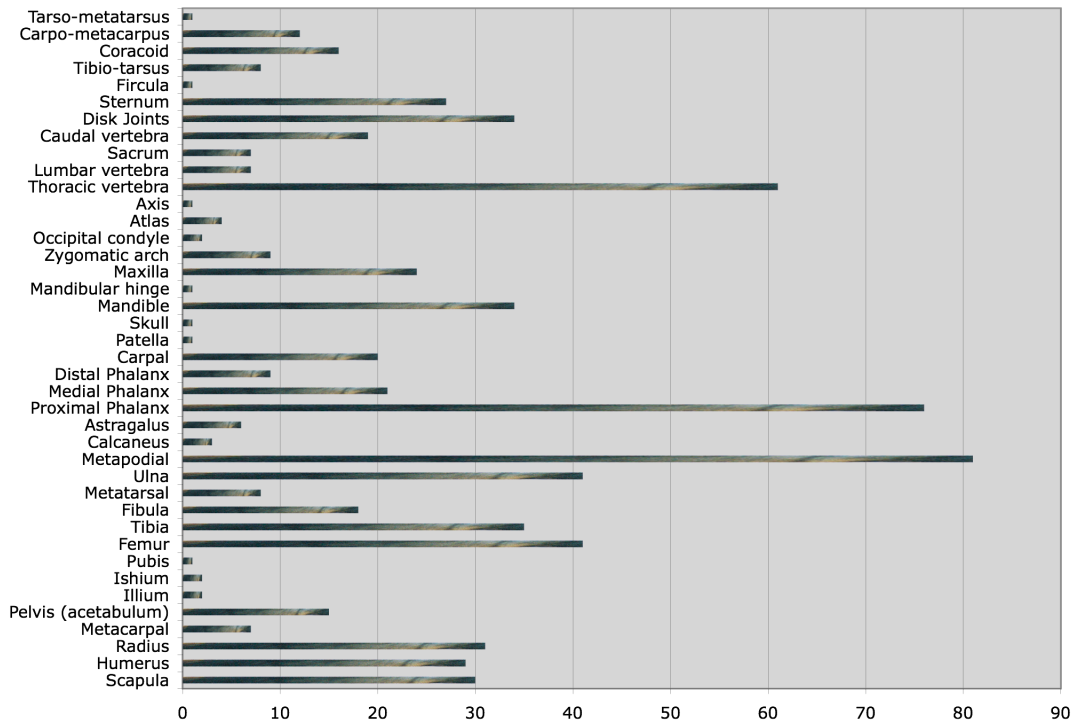


Chart 56: Elements, Brown Hyaena Project D-P 18

Measured fragments ranged in length from < 1.0-14 cm. Of these 43.7% were complete bones, 27.8% shaft splinters, 18.1% one end plus shaft, 5.9% cylinder, 2.1% one end only, 1.9% end and shaft splinter and no examples of both ends present, missing some shaft (See Chart 57).

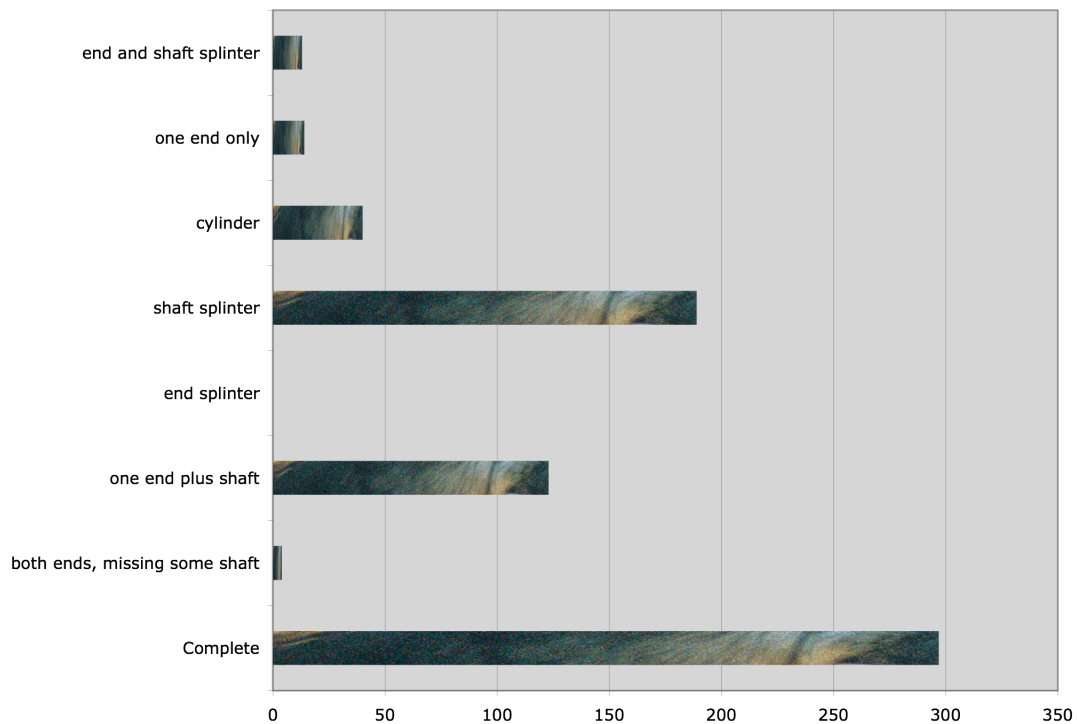


Chart 57: Fragmentation, Brown Hyaena Project D-P 18

Weathering data were recorded from 1,789 specimens, of which 96.7% suggest a time range of 2-6 yrs since death. There were no samples in the 0-1 or 0-3 yr ranges and only 3.2% in the 4-15 yr range and 0.1% in the 6-15 yr range (See Chart 58).

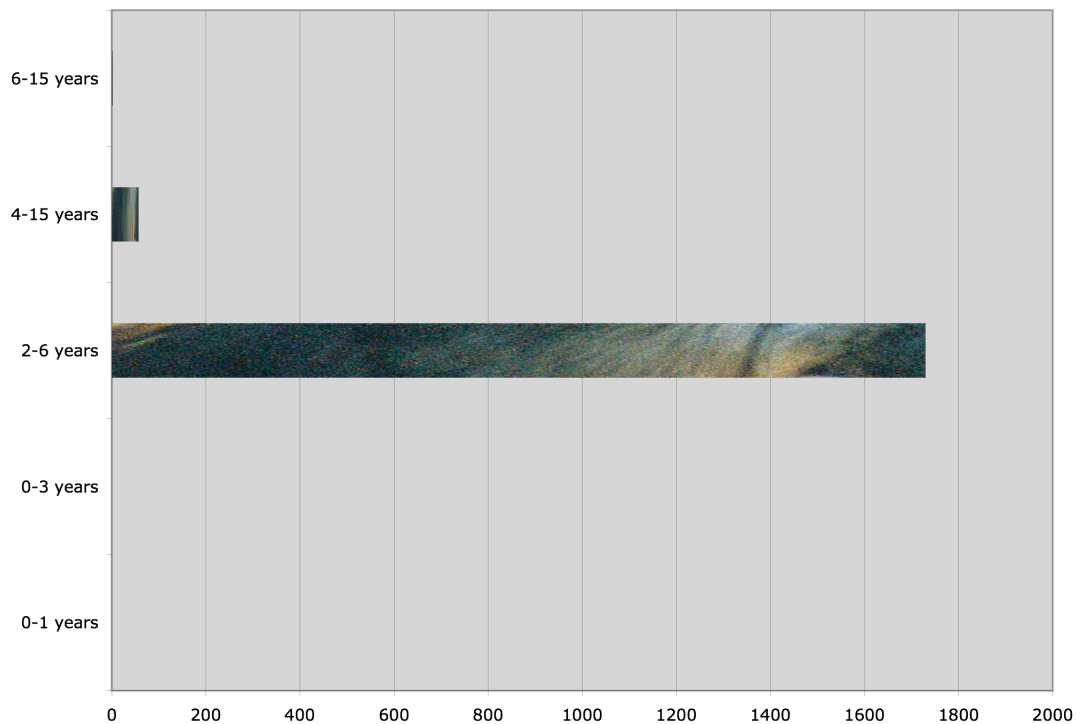


Chart 58: Weathering, Brown Hyaena Project D-P 18

Carnivore gnawing was documented on 64.4% of the assemblage. Crenulated edges made up 87.4% of the documented carnivore damage. Punctates constituted 3%, striations 0.7% and there were no examples of scouring or acid etching recorded in the assemblage. The combinations of punctates and crenulated edges were 7.2%, crenulated edges and striations were 1.1% and punctates, crenulated edges and striations made up 0.7% of the recorded carnivore damage (See Chart 59). Appendix N gives a complete break down of carnivore damage per elements and location of damage on said element.

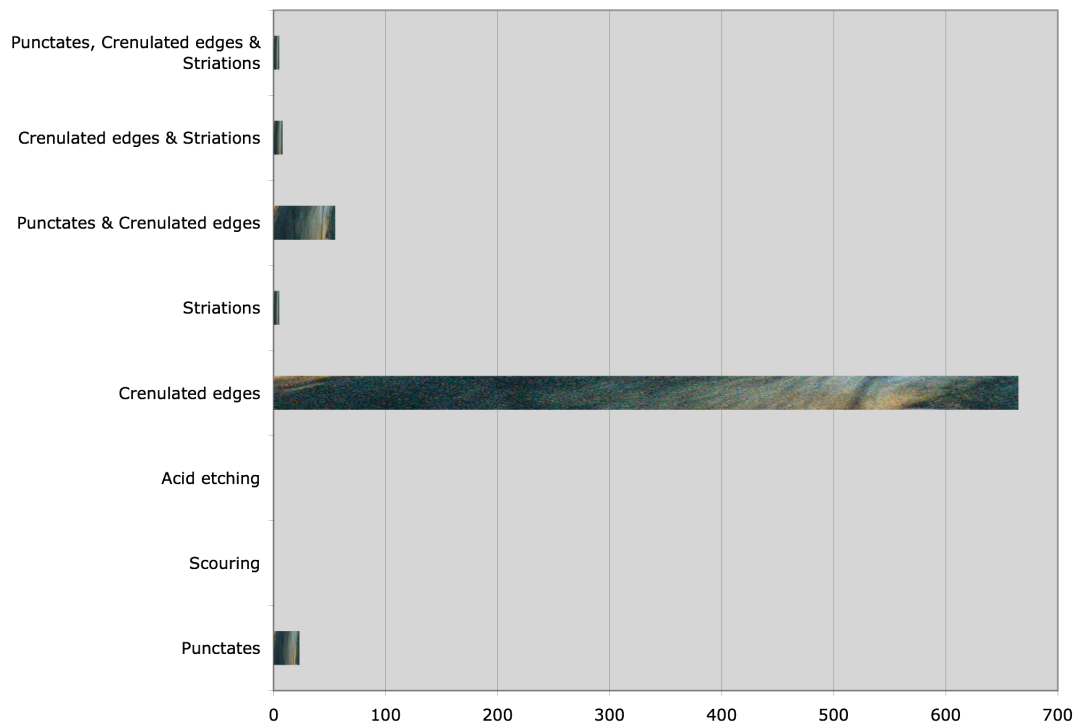


Chart 59: Carnivore Damage, Brown Hyaena Project D-P 18

Brown Hyaena Project D-SPG 1

Of the 3,252 total specimens recorded, 46% were identified to species or class size. Seal remains comprised 96.5% of all identified remains. Remains of large birds followed with 1.5%, dog remains at 1.3%, then jackals (0.3%), brown hyaenas (0.2%), horses (0.1%) and ostriches and medium birds each with 0.07% (See Table 32). In addition to the identified remains listed above, there were also 17 seal pup carcasses associated with the den. All of the carcasses had very distinctive bite marks on the skulls as seen in Plate 17.

SPECIES	NISP	MNI
<i>Arctocephalus pusillus</i>	1441	71 (left radius)
Avian (large)	22	1 (right femur)
Avian (medium)	1	1 (left humerus)
<i>Canis familiaris</i>	19	2 (right femur)
<i>Canis mesomelas</i>	4	1 (right radius)
<i>Equus caballus</i>	2	1 (right tibia)
<i>Parahyaena brunnea</i>	3	1 (left ulna)
<i>Struthio camelus</i>	1	1 (radius/ulna fused)
TOTAL	1493	79

Table 32: Species NISP & MNI Brown Hyaena Project D-SPG 1

Complete analysis identified 97.9% of the specimens to skeletal element. Ribs were the most prominent identified element with 25.5% of the assemblage. Skull fragments made up 13.2%, seal metapodials 11.5% and vertebrae 9.7%. These four elements have been removed from Chart 60, which illustrates the relative abundance of the remaining elements. Of the long bones, radius was the most abundant at 4.4% of the identified elements. Radius were followed by tibia (4.3%), ulna (3.7%), scapula (2.8%), femur (2.8%) and humerus (2.5%) (See Table 33). Fusion data were recorded for 715 specimens, of which 76.5% were from young (unfused) animals. Seals made up the majority of unfused data with 99.3% of the identified remains. Other unfused specimens were from brown hyaenas (0.5%), large birds (0.4%) and dogs (0.2%).

SKELETAL ELEMENT	NUMBER	SPECIES BREAKDOWN
Scapula	90	64 Seal; 22 unknown; 3 bovid; 1 carnivore
Humerus	80	71 Seal; 4 unknown; 3 Dog; 1 Jackal; 1 large bird; 1 medium bird
Radius	140	131 Seal; 3 Dog; 3 large bird; 2 Jackal; 1 unknown
Metacarpal	3	2 Brown Hyaena; 1 Dog
Pelvis (acetabulum)	43	39 Seal; 4 unknown
Ilium	43	Seal
Ishium	18	Seal
Pubis	9	Seal
Femur	89	78 Seal; 6 unknown; 2 Dog; 2 large bird; 1 Jackal
Tibia	137	133 Seal; 2 unknown; 1 Dog; 1 Horse
Fibula	50	Seal
Metatarsal	2	Dog
Ulna	117	114 Seal; 2 carnivore; 1 Brown Hyaena
Metapodial	366	Seal
Calcaneus	39	38 Seal; 1 Dog
Astragalus	36	Seal
Proximal Phalanx	154	152 Seal; 2 Dog
Medial Phalanx	18	16 Seal; 1 large bird; 1 Dog
Radius/Ulna fused	1	Ostrich
Carpal	4	unknown
Tarsal	4	unknown
Skull	1	large bird
Skull fragments	419	unknown
Mandible	52	41 Seal; 8 unknown; 3 carnivore
Mandibular hinge	7	6 unknown; 1 Seal
Maxilla	36	30 Seal; 3 carnivore; 2 Dog; 1 unknown
Zygomatic arch	12	unknown
Occipital condyle	3	unknown
Atlas	1	unknown
Axis	2	1 Seal; 1 unknown
Cervical vertebrae	1	unknown
Sacrum	2	unknown
Vertebrae	308	307 unknown; 1 Horse
Disk Joints	12	unknown
Ribs	810	unknown
Sternum	64	63 unknown; 1 large bird
Tibio-tarsus	4	large bird
Coracoid	2	large bird
Carpo-metacarpus	2	large bird
Tarso-metatarsus	1	large bird
TOTAL	3182	

Table 33: Elements with species breakdown, Brown Hyaena Project D-SPG 1

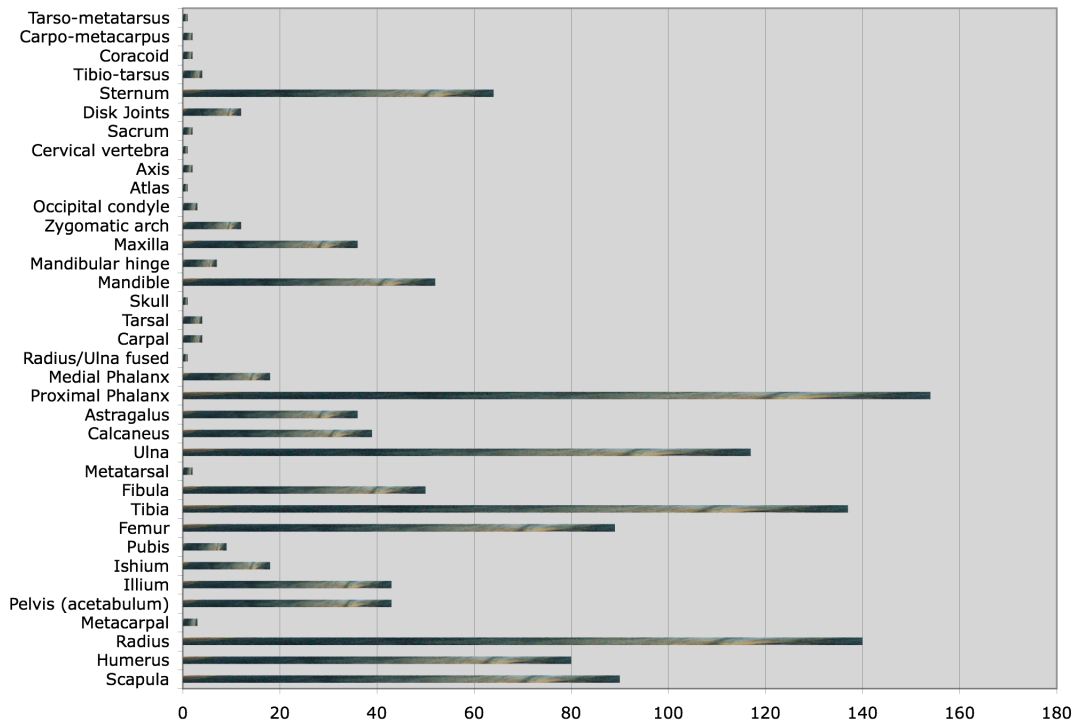


Chart 60: Elements, Brown Hyaena Project D-SPG 1

Measurements were taken from 680 specimens and ranged from < 1.0-32 cm, a tibia from a horse. Of the recorded fragment types complete bones made up 57.5% of the measured specimens. One end plus shaft yielded 21%, cylinder 10.6%, shaft splinter 4.3%, both ends present, missing some shaft 3.2%, one end only 2.9%, end and shaft splinter 0.4% and no examples of end splinter (See Chart 61).

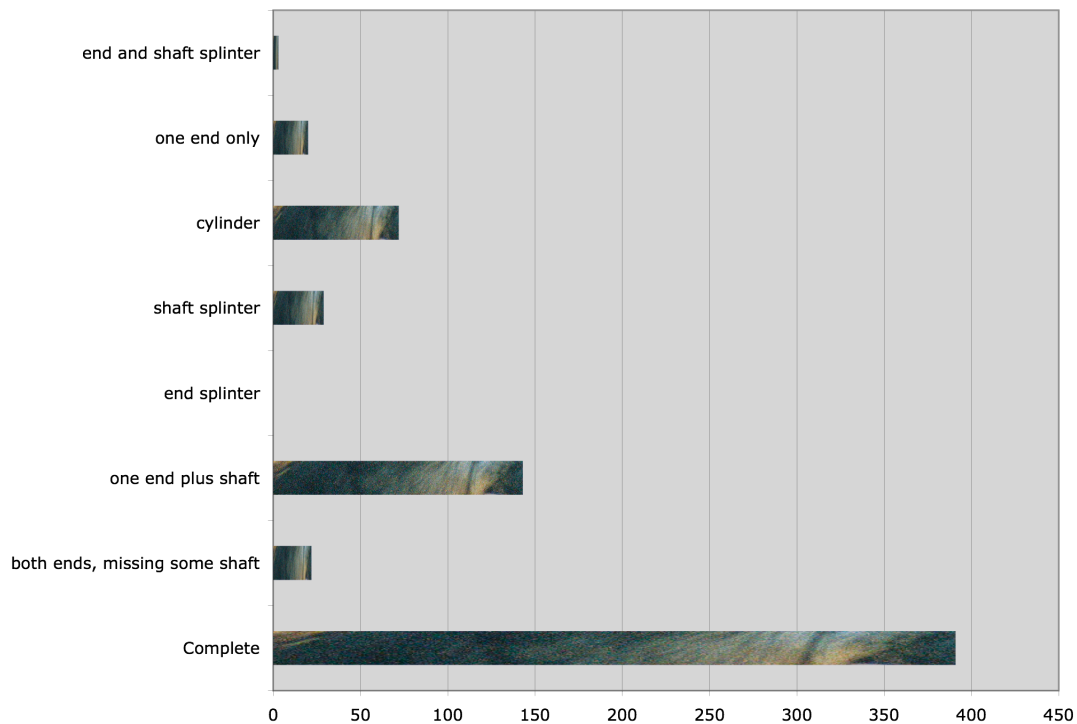


Chart 61: Fragmentation, Brown Hyaena Project D-SPG 1

Weathering data from 3,241 specimens places the majority of remains in the range of 2-6 yrs since death (84.1%). The range of 4-15 yrs contained 15.5%, 6-15 yrs 0.4%, 0-3 yrs 0.03% and there were no specimens in the 0-1 yr range (See Chart 62).

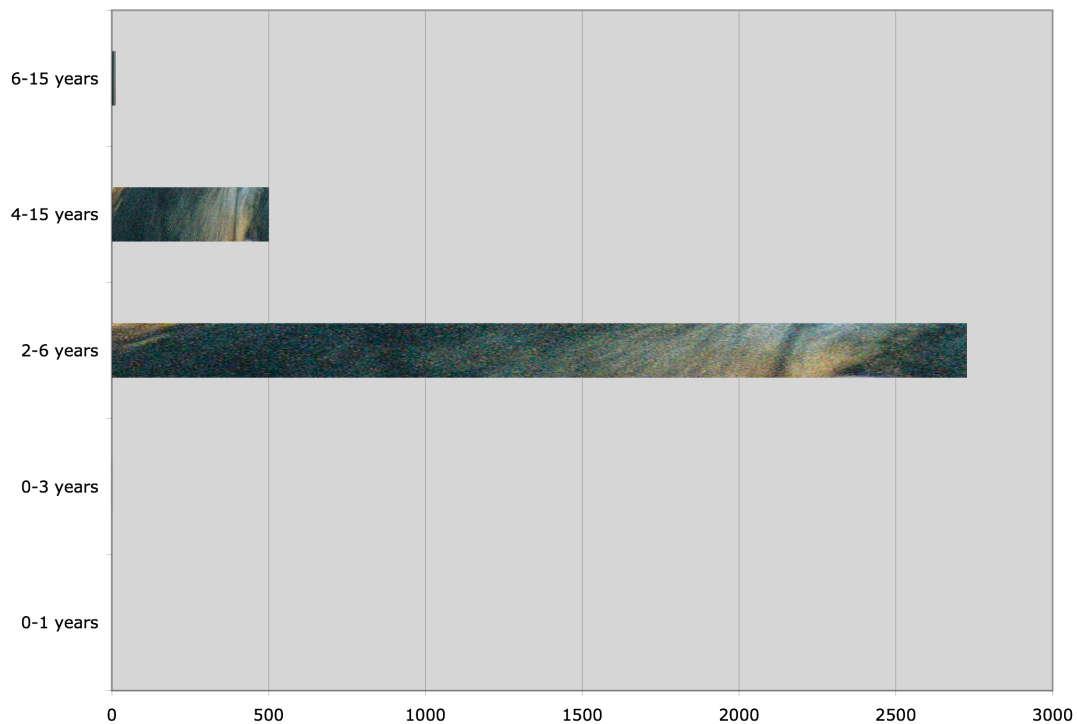


Chart 62: Weathering, Brown Hyaena Project, D-SPG 1

Carnivore damage was noted on 31.4% of the total assemblage. Crenulated edges made up 83% of the documented damage, punctates 6.3% and there were no examples of scouring, acid etching or striations. The combination of punctuates and crenulated edges made up 11% of the carnivore gnawed specimens (See Chart 63). Appendix O gives a complete breakdown of carnivore damage per bone and location of damage on said bones.

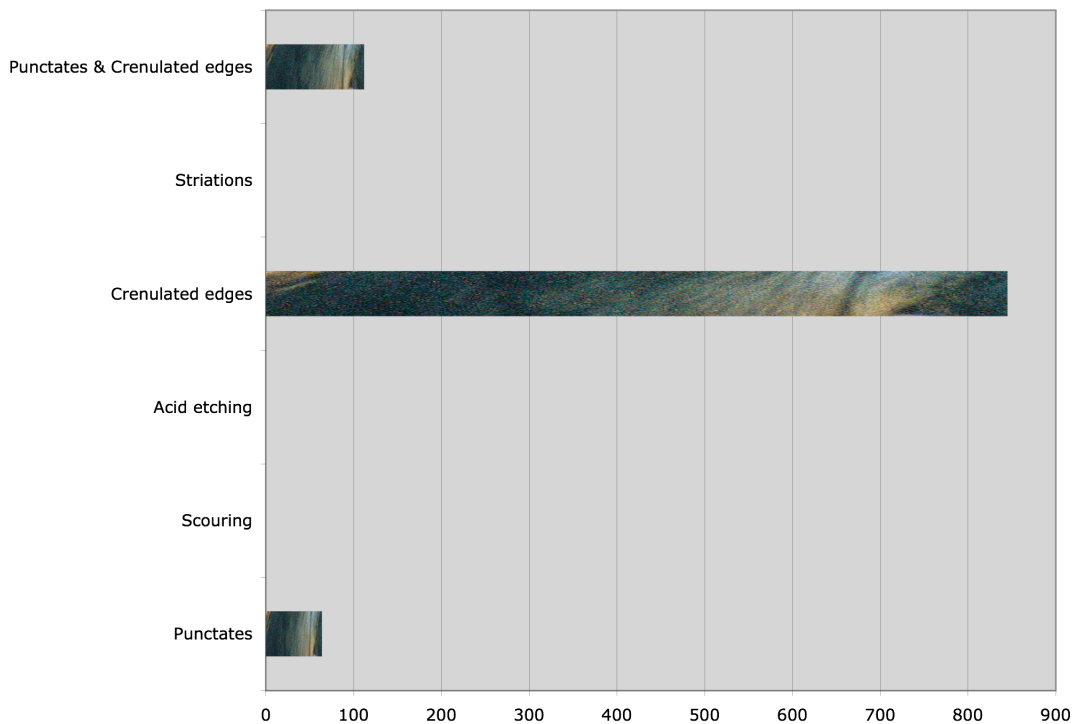


Chart 63: Carnivore Damage, Brown Hyaena Project D-SPG 1

Brown Hyaena Project D-BB 1

The Bakers Bay den yielded 1,351 specimens, of which 37.8% were identified to species or class size. Seal remains constituted the majority of faunal material identified to species with 59.6%. The rest of the identified remains consisted of gemsbok (9.6%), springbok (8.2%), large birds (7.7%), dogs (6.1%), ostriches (2.4%), jackals (1.6%), brown hyaenas and cetaceans (1.2% each), size I bovids (1%), Cape foxes and small mammals (0.6% each) and baboons and medium birds (0.2% each) (See Table 34).

SPECIES	NISP	MNI
<i>Antidorcas marsupialis</i>	42	2 (left radius)
<i>Arctocephalus pusillus</i>	304	29 (right humerus)
Avian (large)	39	4 (left femur)
Avian (medium)	1	1 (unknown)
Bovid size I	5	1 (left radius)
<i>Canis familiaris</i>	31	4 (left tibia)
<i>Canis mesomelas</i>	8	2 (left femur)
Cetacean	6	1 (vertebrae)
<i>Oryx gazella</i>	49	4 (right femur)
<i>Papio cynocephalus</i>	1	1 (left humerus)
<i>Parahyaena brunnea</i>	6	2 (right mandible)
Small mammal	3	1 (left femur)
<i>Struthio camelus</i>	12	1 (right tibia)
<i>Vulpes chama</i>	3	2 (left acetabulum)
TOTAL	510	55

Table 34: Species NISP & MNI Brown Hyaena Project D-BB 1

Of the examined specimens, 75.9% were identified to skeletal element. Of these ribs and skull fragments were the most prolific with 14.5% and 12.7% respectively. Of the identified long bones humerus made up the majority with 8.3%. Humerus were followed in abundance by femur (5.7%), tibia (4.9%), scapula (4.7%), and radius (3.9%) (See Table 35 and Chart 64). Fusion data were recorded from 398 long bones, of which 22.6% were from young unfused animals, 91.1% of them being seal remains.

SKELETAL ELEMENT	NUMBER	SPECIES BREAKDOWN
Scapula	48	29 Seal; 11 unknown; 4 bovid; 3 Gemsbok; 1 Springbok
Humerus	85	57 Seal; 14 unknown; 3 Gemsbok; 2 Springbok; 2 Brown Hyaena; 1 Baboon; 1 Cape Fox; 1 Jackal; 1 Ostrich; 1 large bird; 1 bovid; 1 carnivore
Radius	40	29 Seal; 5 Gemsbok; 2 Dog; 2 Springbok; 1 Jackal; 1 bovid size I
Metacarpal	13	5 Dog; 3 Springbok; 3 bovid; 2 Gemsbok
Pelvis (acetabulum)	20	7 Seal; 3 carnivore; 2 Gemsbok; 2 Cape Fox; 2 bovid; 1 Springbok; 1 Dog; 1 large bird; 1 unknown
Ilium	4	2 Seal; 1 bovid; 1 carnivore
Ishium	2	Seal
Pubis	1	Seal
Femur	58	20 Seal; 11 unknown; 9 large bird; 8 Gemsbok; 4 Dog; 2 Jackal; 2 small mammal; 1 Ostrich; 1 carnivore

SKELETAL ELEMENT	NUMBER	SPECIES BREAKDOWN
Tibia	50	30 Seal; 6 Gemsbok; 6 unknown; 4 Dog; 2 Springbok; 2 Ostrich
Fibula	13	11 Seal; 2 unknown
Metatarsal	9	3 Dog; 2 Gemsbok; 2 Springbok; 2 bovid
Ulna	42	37 Seal; 3 Dog; 2 large bird
Metapodial	34	25 Seal; 7 bovid; 1 Gemsbok; 1 Springbok
Calcaneus	3	2 Seal; 1 Gemsbok
Astragalus	3	2 Gemsbok; 1 carnivore
Proximal Phalanx	8	4 Seal; 2 Dog; 2 Gemsbok
Medial Phalanx	3	1 Seal; 1 Dog; 1 Gemsbok
Distal Phalanx	5	2 Seal; 2 Springbok; 1 Gemsbok
Carpal	3	unknown
Tarsal	3	unknown
Patella	1	Gemsbok
Skull	7	5 Seal; 1 Jackal; 1 bovid
Skull fragments	130	unknown
Mandible	57	23 Seal; 7 Springbok; 7 unknown; 6 Dog; 6 bovid; 3 Brown Hyaena; 3 Gemsbok; 1 Jackal; 1 small mammal
Mandibular hinge	5	3 unknown; 1 Seal; 1 bovid
Maxilla	30	16 Seal; 5 Springbok; 4 Gemsbok; 2 Jackal; 1 Brown Hyaena, 1 carnivore; 1 bovid
Zygomatic arch	6	unknown
Occipital condyle	1	unknown
Atlas	4	unknown
Axis	4	unknown
Cervical vertebrae	8	unknown
Thoracic vertebrae	19	unknown
Lumbar vertebrae	6	unknown
Sacrum	12	unknown
Caudal vertebrae	5	unknown
Vertebrae	95	90 unknown; 3 large bird; 2 Cetacean
Disk Joints	14	12 unknown; 2 Cetacean
Ribs	149	unknown
Sternum	6	5 unknown; 1 medium bird
Tibio-tarsus	8	large bird
Coracoid	6	large bird
Tarso-metatarsus	5	Ostrich
TOTAL	1025	

Table 35: Elements with species breakdown, Brown Hyaena Project D-BB 1

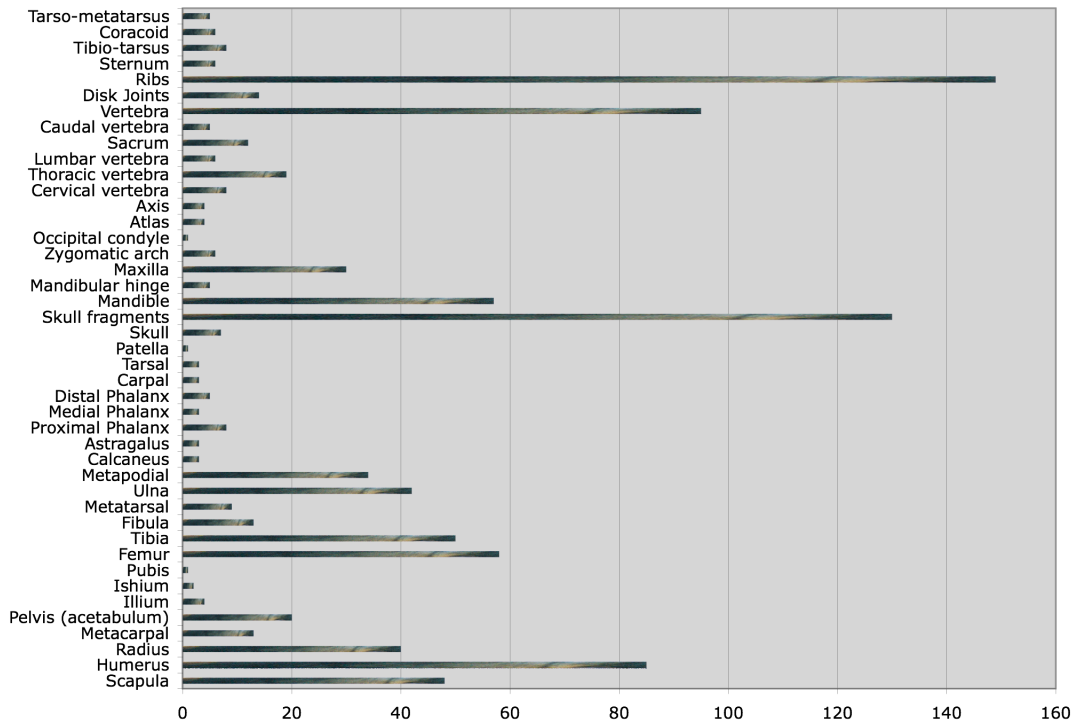


Chart 64: Elements, Brown Hyaena Project D-BB 1

Length was measured from 613 specimens and ranged from < 1.0-48 cm. Of the measured specimens 43.4% were shaft splinter, 20.2% complete, 19.1% one end plus shaft, 10.4% cylinder, 3.4% one end only and 2.1% both ends present, missing some shaft. There were no examples of end splinter (See Chart 65).

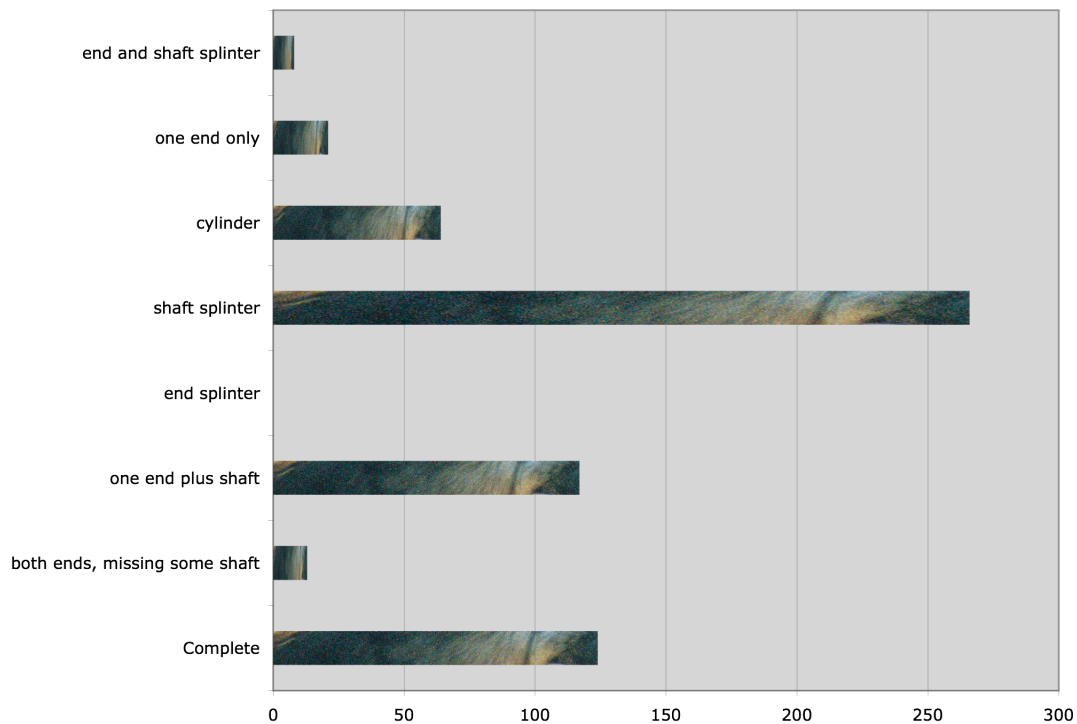


Chart 65: Fragmentation, Brown Hyaena Project D-BB 1

Weathering data were taken from 1,289 specimens. No remains were in the 0-1 yr range since death. The majority of remains were indicative of a range of 2-6 yrs since death (55.1%). This was followed by the 4-15 yr range (31%), 0-3 yr range (11.5%) and 6-15 yr range (See Chart 66).

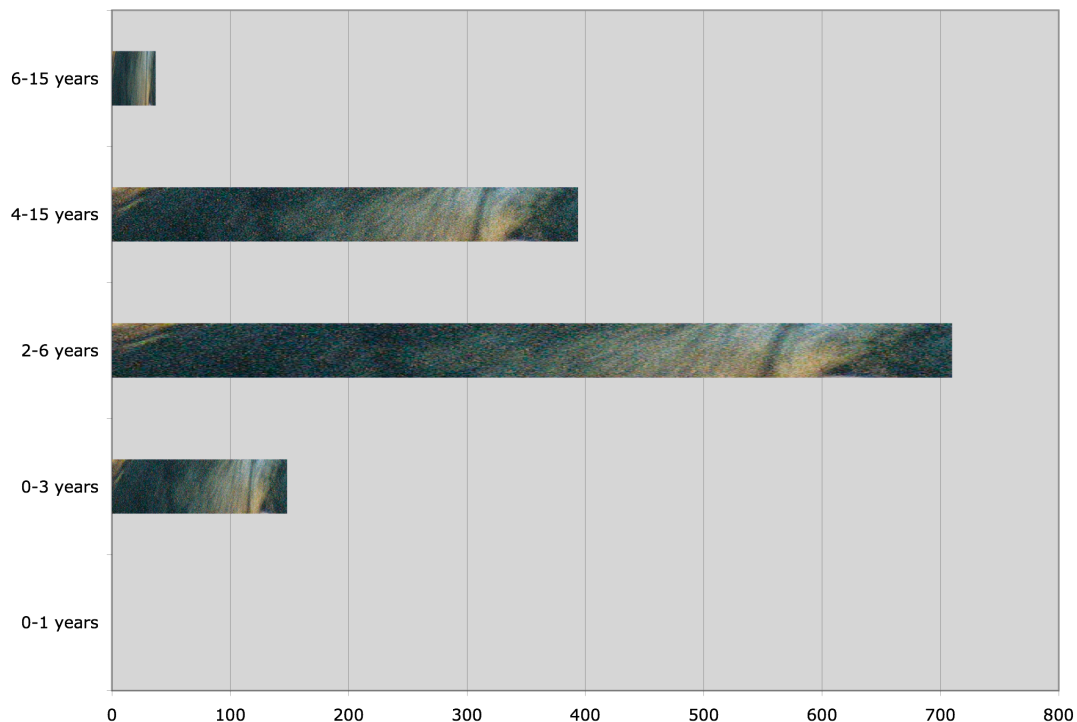


Chart 66: Weathering, Brown Hyaena Project D-BB 1

Damage due to carnivore activity was documented on 66% of the specimens, one of which had both carnivore and porcupine gnawing upon it. The carnivore gnawing for this particular specimen was crenulated edges over most of an unidentified fragment. Of the other 891 specimens with identified carnivore damage crenulated edges comprised 81.5%. Punctates made up 5.6%, striations 0.1% and there were no examples of either scouring or acid etching. The combinations of punctuates and crenulated edges produced 9.4%, crenulated edges and striations 2% and punctuates and striations 0.1% (See Chart 67). Appendix P shows a complete breakdown of elements, type of carnivore damage, and location of damage on bones.

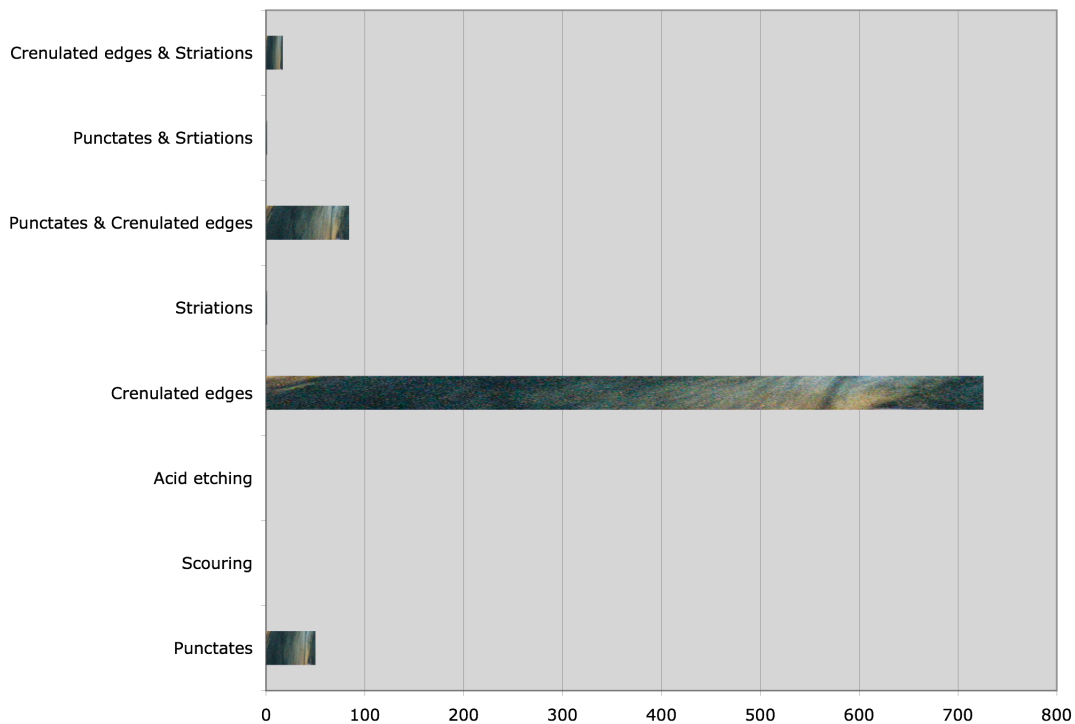


Chart 67: Carnivore Damage, Brown Hyaena Project D-BB 1

Skinner Collection

A total of 5,466 specimens made up this assemblage and were re-examined for this study. Of the 5,466 specimens, 50.4% were identified to species or class size. Seals were by far the most prolific of the identified remains with 82.6%. Birds in general combined to form 8.6%, followed by jackals (5.5%) then cats (1.1%), springbok (0.6%), dogs (0.4%), gemsbok (0.3%), bovid size I (0.2%), brown hyaenas (0.15%), Cape foxes and ostriches (0.1% each), cetaceans and small mammals (0.07% each) and steenbok, horses and amphibians 0.04% (See Table 36).

SPECIES	NISP	MNI
Amphibian	1	1 (skull fragment)
<i>Antidorcas marsupialis</i>	16	2 (left tibia)
<i>Arctocephalus pusillus</i>	2277	76 (right scapula)
Avian (large)	29	8 (right radius)
Avian (medium)	87	2 (right tibia)
Avian (small)	5	1 (left radius)
Bovid size I	5	1 (left radius)
<i>Canis familiaris</i>	12	2 (right scapula)
<i>Canis mesomelas</i>	153	5 (left femur)
Cetacean	2	1 (right radius)
<i>Equus caballus</i>	1	1 (skull fragment)
<i>Felis</i> (domestic size)	29	1 (left tibia)
<i>Homo sapien</i>	1	1 (maxillary tooth)
<i>Lepus capensis</i>	2	1 (right acetabulum)
<i>Oryx gazella</i>	9	2 (right acetabulum)
<i>Parahyaena brunnea</i>	4	1 (right ulna)
<i>Raphicerus campestris</i>	1	1 (left femur)
Small mammal	2	1 (fibula)
<i>Spheniscus demersus</i>	115	16 (radius)
<i>Struthio camelus</i>	3	1 (vertebrae)
<i>Vulpes chama</i>	3	1 (right humerus)
TOTAL	2757	125

Table 36: Species NISP & MNI Skinner Collection

Of the faunal remains stored and re-examined, 85.6% were identified to skeletal element (See Table 36). Ribs and skull fragments combined for 37.5% of the entire identified assemblage (20.3% and 17.3% respectively). Of the long bones radius was the most prolific at 4.3%, followed by humerus (3.9%), scapula (3.7%), tibia (3%), ulna (2.1%) and femur (1.7%). In order to illustrate the relative abundance of the remaining elements, ribs and skull fragments were removed from Chart 68. Fusion data were recorded for 2,065 specimens, of which 60.5% were from young unfused animals, seals being the most abundant with 89.8% of the unfused assemblage.

SKELETAL ELEMENT	NUMBER	SPECIES BREAKDOWN
Scapula	174	159 Seal; 7 Jackal; 4 unknown; 3 Dog; 1 Cat
Humerus	181	143 Seal; 16 Penguin; 7 unknown; 5 Jackal; 5 medium bird; 1 Cetacean; 1 Cape Fox; 1 Dog; 1 bovid
Radius	199	135 Seal; 26 Penguin; 16 large bird; 5 Jackal; 5 medium bird; 5 unknown; 2 carnivore; 2 bovid; 1 Springbok, 1 small bird
Metacarpal	12	6 Seal; 2 Springbok; 2 Cat; 1 Jackal; 1 unknown
Pelvis (acetabulum)	78	56 Seal; 9 Penguin; 6 Jackal; 2 Gemsbok; 1 medium bird; 1 small bird; 1 Cape Hare; 1 Dog; 1 Cat
Ilium	47	43 Seal; 3 Penguin; 1 Cape Hare
Ishium	23	Seal
Pubis	15	Seal
Femur	77	52 Seal; 8 Penguin; 6 Jackal; 6 unknown; 2 medium birds; 1 Steenbok; 1 Dog; 1 Brown Hyaena
Tibia	142	118 Seal; 7 Jackal; 3 medium bird; 3 unknown; 2 large bird; 2 Springbok; 2 Dog; 1 Cat; 1 Gemsbok; 1 Cape Fox; 1 Brown Hyaena
Fibula	75	71 Seal; 1 large bird; 1 medium bird; 1 small mammal; 1 unknown
Metatarsal	24	15 Jackal; 7 Cat; 1 Gemsbok; 1 bovid size I
Ulna	100	83 Seal; 12 Jackal; 2 medium bird; 1 Gemsbok; 1 Cape Fox; 1 Brown Hyaena
Radius/ulna fused	5	Penguin
Metapodial	244	225 Seal; 8 Jackal; 6 unknown; 3 Penguin; 2 carnivore
Calcaneus	63	56 Seal; 6 Cat; 1 Springbok
Astragalus	5	4 Seal; 1 Cat
Proximal Phalanx	127	103; 9 Jackal; 6 Cat; 5 Penguin; 2 medium bird; 1 Dog; 1 small mammal
Medial Phalanx	110	98 Seal; 4 Penguin; 2 Jackal; 2 medium bird; 2 cat; 1 medium bird; 1 Springbok
Distal Phalanx	223	208 Seal, 9 Penguin; 3 Jackal; 2 Cat; 1 Springbok
Carpal	7	5 Seal; 2 unknown
Tarsal	6	5 unknown; 1 Seal
Patella	3	2 unknown; 1 Seal
Sesamoid	6	unknown
Skull	3	2 Seal; 1 Brown Hyaena
Skull fragments	804	671 unknown; 118 Seal; 8 Jackal; 2 Springbok; 1 large bird; 1 medium bird; 1 amphibian; 1Gemsbok; 1 Horse
Horn/antler	3	2 Springbok; 1 unknown
Mandible	67	53 Seal; 7 Jackal; 2 Penguin; 2 unknown; 1 medium bird; 1 Springbok; 1 Gemsbok
Mandibular hinge	1	unknown
Maxilla	70	51 Seal; 12 Jackal; 2 unknown; 1 Springbok; 1 Gemsbok; 1 Dog; 1 bovid
Mandibular tooth	12	11 Seal; 1 Springbok
Maxillary Tooth	5	1 Human; 1 Seal; 1 Jackal; 1 Springbok; 1 Gemsbok
Zygomatic arch	29	23 Seal; 4 unknown; 1 Jackal; 1 Dog
Occipital condyle	31	27 Seal; 4 Jackal
Atlas	18	unknown
Axis	21	unknown
Cervical vertebrae	127	unknown

Fragmentation data were recorded from 1,517 specimens ranging in length from <1.0-28 cm. Complete bones made up 56.1% of the measured assemblage. Shaft splinter followed with 15.3%, then one end plus shaft (14.4%), one end only (2.2%), both ends present, missing some shaft (1.3%), end and shaft splinter (0.7%) and end splinter (0.3%) (See Chart 69).

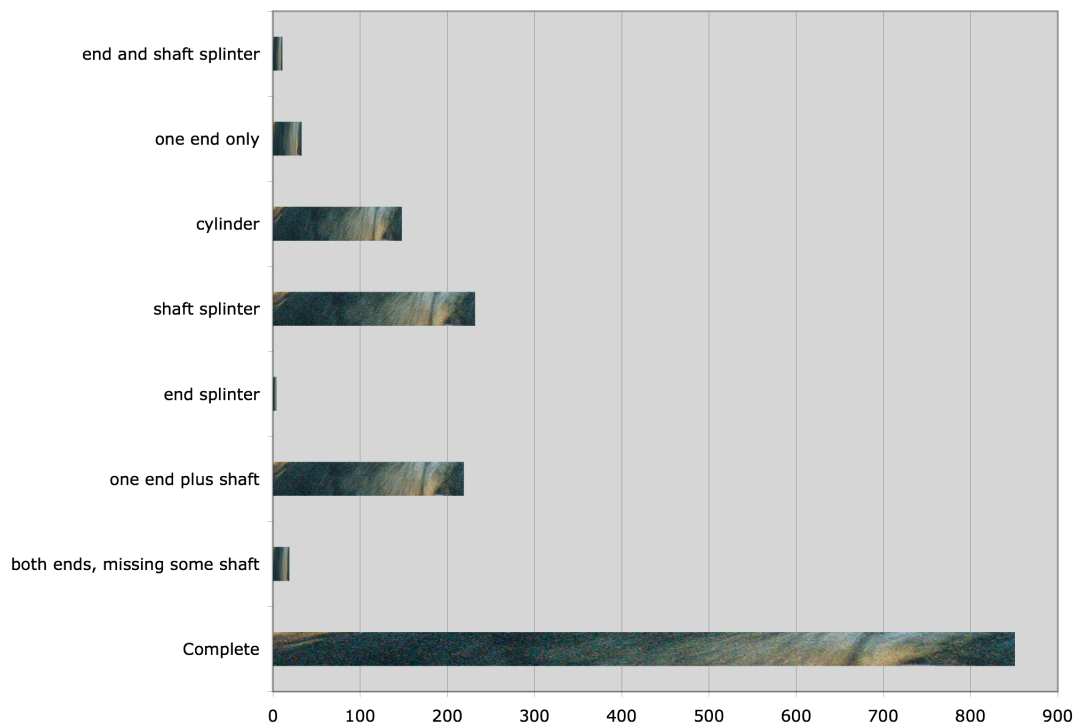


Chart 69: Fragmentation, Skinner Collection

Weathering information was not documented as it was unknown which specimens were collected from interior of dens or aprons.

Carnivore inflicted damage was recorded on 43.2% of the assemblage. Crenulated edges were the most common type of damage recorded, occurring on 82.8% of all the damaged specimens. Punctates were found on 3.9% of the remains, striations 0.4% and there were no examples of scouring or acid etching. The combinations of punctate and crenulated edges was documented on 9.7% of remains, crenulated edges and

striations on 1.5%, punctates, crenulated edges and striations on 0.7% and punctates and striations on 0.3% (See Chart 70).

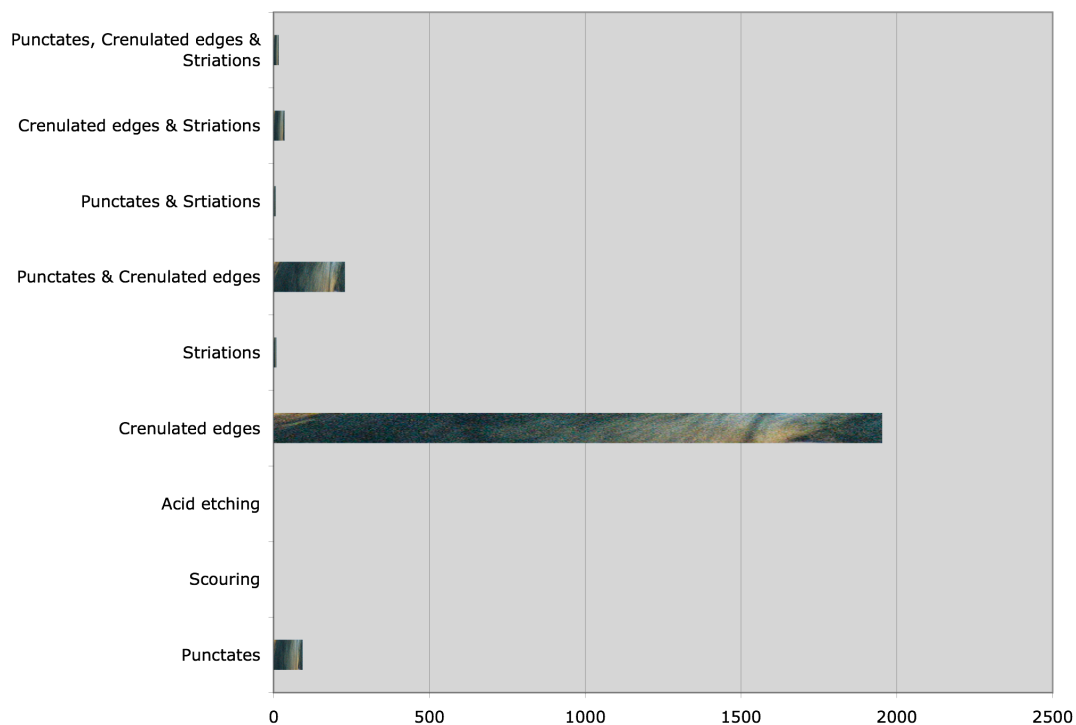


Chart 70: Carnivore Damage, Skinner Collection

Gladysvale

Only 17 specimens were collected and logged from the dens near the Gladysvale palaeontology site. Of these 16 were identified to species (94.1%) and all 17 identified to skeletal element (See Tables 38 & 39). All fusion data indicated adult animals.

SPECIES	NISP	MNI
Bovid size II	3	1 (right humerus)
<i>Canis mesomelas</i>	4	2 (1 complete maxilla, 1 right maxilla)
<i>Connochaetes taurinus</i>	2	1 (right tibia)
<i>Damaliscus dorcas phillipsi</i>	3	1 (left radius)
<i>Redunca fulvorufula</i>	1	1 (left mandible)
<i>Taurotragus oryx</i>	1	1 (right calcaneus)
<i>Tragelaphus scriptus</i>	2	1 (right mandible)
TOTAL	16	8

Table 38: Species NISP & MNI Gladysvale

SKELETAL ELEMENT	NUMBER	SPECIES BREAKDOWN
Humerus	2	bovids size II
Radius	1	Blesbok
Pelvis (acetabulum)	1	Blesbok
Tibia	3	1 Wildebeest; 1 bovid size II; 1 unknown
Calcaneus	1	Eland
Skull	2	1 Jackal; 1 Blesbok
Mandible	4	2 Bush Buck; 1 Mountain Reed Buck; 1 Jackal
Maxilla	3	2 Jackal; 1 Wildebeest
TOTAL	17	

Table 39: Elements with species breakdown, Gladysvale

Fragmentation patterns for seven long bones, <1.0-22 cm in length, yielded 3 shaft splinter, 2 one end plus shaft, 1 complete, 1 cylinder and no examples of both ends present, missing some shaft, end splinter, one end only or end and shaft splinter (See Chart 71).

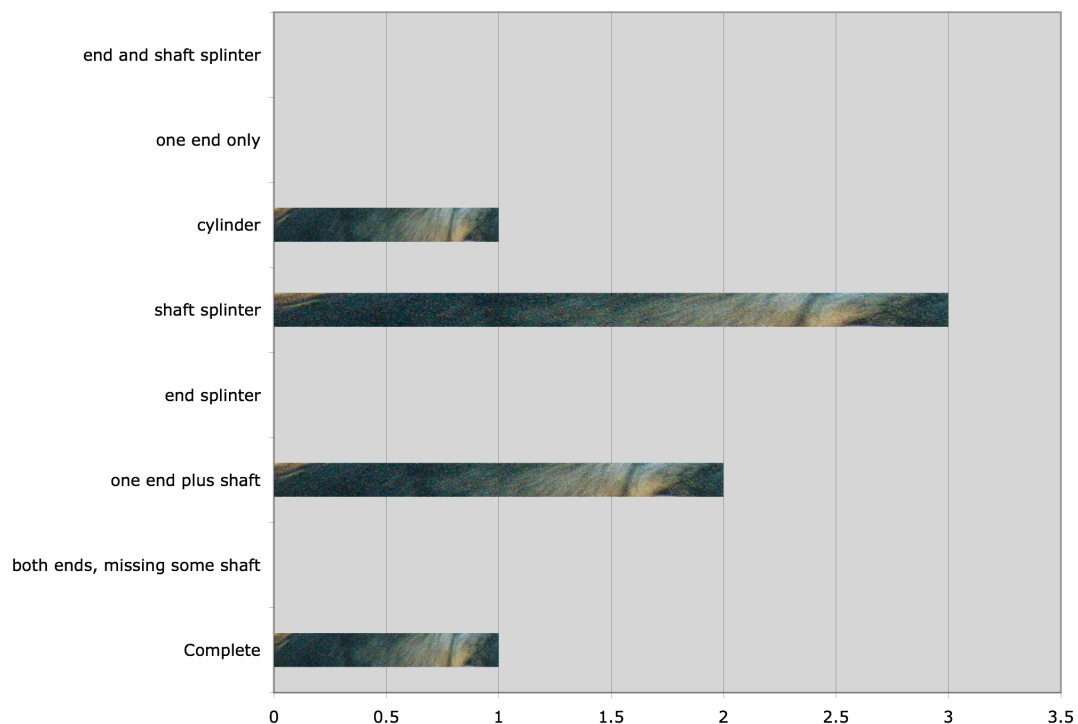


Chart 71: Fragmentation, Gladysvale

All weathering information from all 17 specimens places them in the 0-1 yr since death range.

Carnivore damage was noted on 16 of the 17 specimens. Crenulated edges made up 50% of the carnivore damage. Punctates yielded 6.3% and there were no examples of scouring, acid etching or striations. The combinations of crenulated edges and striations made up 25%, punctuates and crenulated edges 12.5% and punctates, crenulated edges and striations 6.3% (See Chart 72). Appendix R gives a complete breakdown of damage by element and location upon said elements.

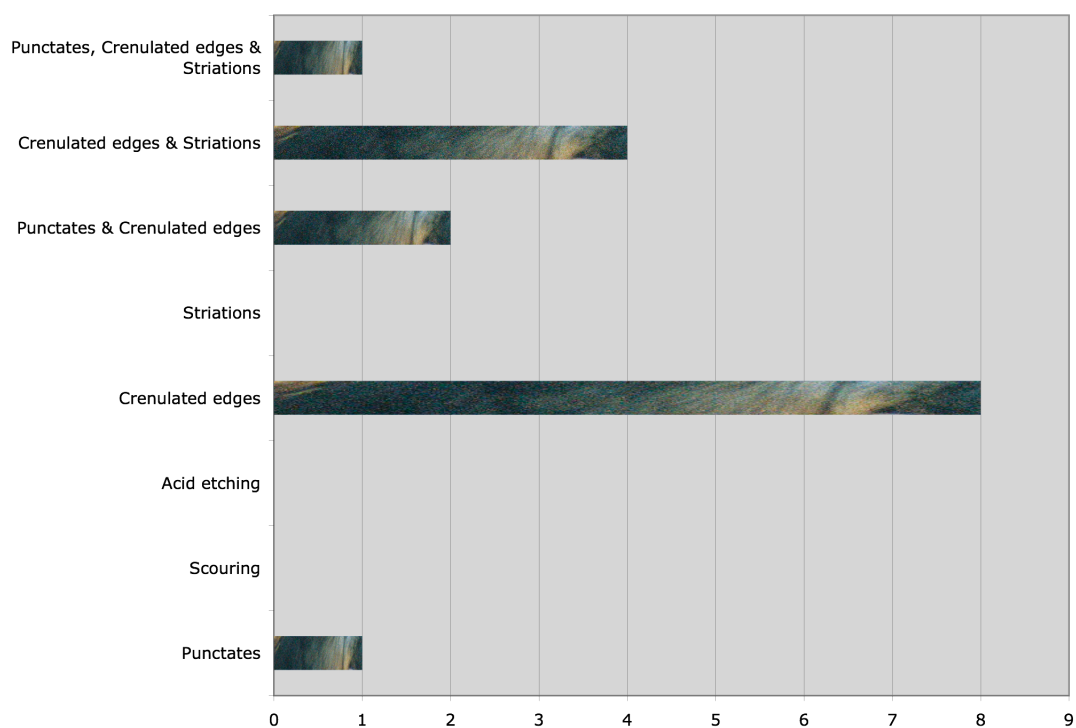


Chart 72: Carnivore Damage, Gladysvale