

Animal bone from Northumberland Bottom, Southfleet, Kent (ARC 330 98B, ARC HRD 99, ARC WNB 98)

Introduction

The animal bone assemblage for Northumberland Bottom was recovered from three areas of excavation, Zone 330 Area B, Hazells Road diversion and West of Northumberland Bottom army camp. As the sites are archaeologically and spatially different the assemblages are reported separately.

Zone 330 Area B

A total of 2973 (19091g) fragments were recovered from the excavations at ARC 330 98B. A further 1224 (147g) were recovered from sieved samples. A total of 2465 (13986g) fragments of the hand-collected assemblage and 1076 (36g) fragments from the sieved assemblage came from Early/Middle Iron Age Pit [147] (80% of NIF).

Species Present and Quantification

Tables 1 and 2 summarise fragment numbers by phase for hand-collected and sieved material.

Micro mammal taxa dominate the assemblage; a total of 1024 fragments from both the hand and sieve collected remains, the majority of which were recovered from the sieved assemblage. Because of the large number of fragments species was only determined for readily identifiable elements, such as mandible and maxilla, it is assumed that these are representative of the whole assemblage. Shrew (*soricidae sp.*), field vole (*microtus agrestis*), wood mouse (*apodemus sp.*) and pygmy shrew (*sorex minutus*) were present.

Excluding the micro mammal remains; cattle are the most abundant species, followed by Red Deer. The abundance of these bones is skewed by the presence of several partially articulated skeletons of both species from pit [147]. Sheep/goat is more abundant than pig. Equid, dog, cat (*felis sp.*) and pine marten (*martes martes*) are present in small numbers. A single herring vertebra and an unidentified fish bone were also recovered from the sieved assemblage.

Due to the large number of bones and the special nature of pit [147], table 3 has been constructed to show the total number of identified fragments, with the assemblage from [147] removed. As can be seen cattle are still the most abundant domestic species within the assemblage, although the numbers are greatly reduced, followed closely by sheep/goat, pig, dog and then equid, only a single red deer tooth was recovered outside of pit [147].

Table 4 below compares the minimum number of individuals (MNI) for each identified species within each phase. The small size of the assemblage limits the observable patterns throughout the phases of the site occupation. The MNI table suggests a predominance of cattle through out most of the phases of the site, although based on a very small number of bones.

Table 4. MNI of Identified Domestic Species by Phase

Taxon	Early /Middle Iron Age	Early Roman	Middle Roman	Post Medieval	Modern
Cattle	8	1	0	1	1
Sheep/Goat	2	1	1	0	0
Pig	1	1	0	0	0
Equid	2	1	0	0	0
Dog	0	1	1	0	0

Preservation and Alteration

Condition

Tables 5 and 6 below summarise the condition of the bone from the hand-collected and sieved assemblage by phase using the Lyman criteria (1996). As can be seen the assemblage is quite varied in condition. The best preserved bone is from the Early/Middle Iron Age phase. Bone from the later phases is in poorer condition. The sieved assemblage follows a similar pattern.

The overall condition of the assemblage for both hand-collected and sieved material is around grades 2 and 3, generally in a good to moderate condition.

Table 5, Condition of the Hand-collected assemblage, by phase.

	Condition					
Phase	1	2	3	4	5	Total
Early/Middle Iron Age	4%	66%	26%	2%	2%	100%
Middle/Late Iron Age				57%	43%	100%
Early Roman		9%	44%	7%	40%	100%
Middle Roman				58%	42%	100%
Late Roman			100%			100%
Post Medieval				100%		100%
Modern		100%				100%
Unphased			2%	69%	29%	100%
Grand Total	3%	62%	26%	5%	4%	100%

Table 6, Condition of the Sieved assemblage, by phase.

	Condition					
Phase	1	2	3	4	5	Total
Early/Middle Iron Age	0%	74%	12%	13%	1%	100%
Late Roman				100%		100%
Unphased		11%	19%	62%	8%	100%
Total Percentage	0%	72%	12%	15%	1%	100%

Burning

A total of 20 fragments of burnt bone were recovered from the hand-collected assemblage, an additional 67 fragments were recovered from the sieved assemblage. The burnt bone came from the Early/Middle Iron Age pits [109], [113], [118], [142], [156], [205] and the upper deposits of pit [147] from the same phase. A sheep/goat metapodial was recovered from pit [109] and a sheep/goat radius was recovered from pit [205], but the remaining burnt fragments for this phase were unidentifiable to species.

A single unidentified burnt fragment was recovered from Early Roman ditch [1049], and four fragments from Middle Roman ditch [285]. A burnt cattle humerus was recovered from modern test pit [7].

Butchery

A total of 12 fragments of bone with butchery marks were noted. Eight were from Early Middle Iron Age pit [147]. A single pig radius with meat removal cut marks was recovered. An equid tibia with disarticulation and meat removal cut marks was recovered along with a medium mammal sized rib with meat removal cut marks. The remaining fragments appear to belong to a single calf. The cut marks are small and appear at muscle insertion points, possibly representing disarticulation or filleting. A cattle atlas, possibly from the same animal, displayed evidence of head removal.

A medium mammal sized rib and a sheep/goat atlas from the sieved assemblage with disarticulation cut marks came from early /middle Iron Age pit [156]. A cattle femur and an ulna with disarticulation cut marks were recovered from early /middle Iron Age pits [205] and [313].

Gnawing

A total of 19 fragments of bone displayed evidence of gnawing. Ten of these fragments were recovered from the Early/Middle Iron Age pit [147]. Three cattle innominates, a sacrum, a scapula and a femur had carnivore gnaw marks, along with a red deer scapula and three large mammal sized vertebra.

A cattle humerus, a metacarpal, and a metatarsal with carnivore gnaw marks were recovered from Early/Middle Iron Age pits [118], [156] and [313]. Also from this phase a fragment of medium mammal sized skull, a sheep/goat radius and tibia from pit [205] had evidence of carnivore gnawing. A single fragment of medium mammal sized long bone from Early/Middle Iron Age pit [111] had evidence of carnivore/omnivore gnawing on the shaft.

A pig humerus and an ulna with carnivore gnawing were recovered from Early Roman ditches [59] and [1049].

Species Descriptions

Cattle

Cattle are the most abundant taxon apart from micro mammals. Most skeletal elements are represented, even when discounting the remains from pit [147], suggesting that the entire carcasses were present on site.

A total of seven cattle bones display butchery marks all consistent with disarticulation and meat removal, as discussed above.

There is not sufficient data to construct age at death profiles. Outside of pit [147], the majority of the bone fragments are from skeletally mature individuals. A single humerus from an animal aged below 42 months was recovered from early/middle Iron Age pit [118].

The tooth eruption and wear ageing data can be assessed from 12 mandibles, 9 of which are from pit [147], these are discussed separately.

From Early/Middle Iron Age pit [313] a mandible from an old adult and from Late Roman ditch [558] a mandible from a senile individual were recovered. From the Early Roman phase a mandible from an animal aged 8-18 months was recovered from ditch [1063].

The evidence of old adult and senile animals may suggest that cattle were kept for traction and milk production as well as utilised for meat.

Cattle from Early/Middle Iron Age Pit [147]

The majority of cattle remains from the assemblage were recovered from early/middle Iron Age pit [147]. All skeletal elements were represented within the pit. The elements represented suggest that approximately only one complete individual was present within the assemblage, the majority of the assemblage is from single bones or partially articulated limbs/ partial carcasses.

Cattle withers heights could be calculated (Matolsci 1970; Fock 1966) from three bones from pit [147]. Two right radii gave a shoulder height of approximately 1.11m, and a metacarpal gave a shoulder height of 1.0m.

There is a range of age score data available from the pit assemblage. All of the mandibles from pit [147] belong to animals aged 8-18 months, MNI of 5 individuals. The epiphyseal fusion data from the assemblage is a little more varied.

Based on the state of epiphyseal fusion of individual bones, featured in table 7, the minimum number of individuals (MNI) was calculated at each age stage.

Table 7. MNI of epiphyseal fusion ages from pit [147]

Age Stage	MNI
<6 Months	5
<7 Months	4
<12 Months	2
<24 Months	3
<36 Months	1
<42 Months	2
>42 Months	2

The assemblage from [147] is unusual due to its context and therefore the presence of these animals all at the same age range may not be a true representation of the animal utilisation.

Red Deer

The majority of the red deer remains of the site were recovered from Early/Middle Iron Age pit [147]. A single red deer tooth was recovered from Early/Middle Iron Age pit [156].

Red Deer from Pit [147]

The red deer in [147] are represented by most skeletal elements. All of the elements within the pit are unfused. As with the cattle remains the bones do not represent complete individuals, therefore table 8 has been constructed to show the MNI represented at each age stage. As all of the bones are unfused it is possible that all the individuals represented within the pit could be below 5 months of age, although as the assemblage is of more than one individual it would be difficult to confirm.

Table 8. MNI of epiphyseal fusion ages from pit [147]

Age Stage	MNI
<5 Months	1
<8 Months	1
<12 Months	1
<17 Months	1
<20 Months	2
<26 Months	3

A pair of red deer mandibles from the assemblage show evidence of the eruption of the first molars, indicating an age of approximately 6 months old (Analla et al, 2002).

A metatarsal from the pit assemblage had a slight curvature to the midshaft of the bone and flaring of the diaphysis. This could be due to a mechanical failure of the diaphysis, probably through poor mineralisation during rapid growth. Therefore likely to be environmental (poor forage, low calcium and magnesium content of forage), although the pathology itself is strictly speaking traumatic, as the metatarsal shaft is warping under the animal's weight (T. O'Connor, pers. comm).

No evidence of butchery was noted on any of the bones. A single red deer scapula from pit [147] displayed evidence of carnivore gnawing.

Sheep/Goat

Sheep/goat are considerably less abundant than cattle. A single skull fragment with attached horncore from Early Roman ditch [59] was positively identified as sheep. No differentiation could be made for the remaining fragments.

Most skeletal elements were present indicating that the whole carcass was utilised and disposed of on site. A single astragalus from the sieved assemblage recovered from Early/Middle Iron Age pit [156] had disarticulation cut marks.

The ageing data from the assemblage is too limited to provide an age at death profile. Four mandibles were stageable (Grant, 1982). Three mandibles were from animals aged 1-3 months, one from Early/Middle Iron Age pit [147] and two from Early/Middle Iron Age pit [205]. A single mandible from Early Roman ditch [59] was from an animal aged 5-8 years. The fusion data is limited. Where it is possible to assess most of the skeletal elements appear to be from skeletally mature individuals. An unfused tibia from an animal aged below 36 months was recovered from Early/Middle Iron Age ditch [91]. An unfused first phalanx from an animal aged below 6-16 months and metatarsal from an animal aged below 18-28 months, were recovered from Early/Middle Iron Age pit [142].

The presence of very young animals on site suggests that sheep/goat were lambing onsite or close by. Older animals may suggest that the animals were kept for wool production as well as meat and/or milk.

Pig

Pig remains are quite limited. A range of skeletal elements is present, which may suggest the entire carcass was present on site. A radius recovered from the Early/Middle Iron Age pit [147] is from a very large pig, most likely wild boar. The radius also displayed butchery evidence consistent with disarticulation and meat removal. No other evidence of butchery was recorded.

A pig humerus and an ulna with carnivore gnawing were recovered from Early Roman ditches [59] and [1049].

A total of 6 mandibles were stageable (Grant 1982), all from Early Roman ditch [1049], possibly including two pairs; 2 mandibles were from juvenile animals and 4 from immature individuals.

The fusion data indicate a slightly wider range of ages. All of the ageable remains are from young individuals. From Early/Middle Iron Age pit [142] 3 unfused metatarsals from an animal aged below 24 months, and a tibia from an individual aged below 24 months were recovered. From the Early/Middle Iron Age pit [147] a second phalanx of an animal aged below 12 months was recovered. From Early/Middle Iron Age pit [156] a femur from an individual aged below 42 months was recovered.

Only two bones show evidence of fusing. The wild boar radius from the Early/Middle Iron Age pit [147] was from an animal aged over 12 months and a tibia from an animal aged over 24 months was recovered from Early Roman ditch [1049].

Pigs provide little in the way of secondary products and would have most likely have been kept for meat.

The presence of wild boar suggests that suitable habitat was available nearby in the early/middle Iron Age and that hunting occasionally took place.

Equid

A total of 7 fragments of equid remains were recovered from the assemblage. Four of the bones came from pit [147]. From the primary context of the pit a complete adult tibia with butchery marks consistent with disarticulation and meat removal was recovered, which gave an estimated withers height of 1.39m. From the upper contexts of the feature a fragment of humerus, tibia and a mandible from animal aged 9.5-11.5 years were recovered.

A femur fragment was recovered from unphased ditch [1268]. An equid tooth and an equid humerus were recovered from Early Roman ditches [24] and [1063].

Equids would have been used for traction, riding, and there is definite evidence that they were processed for meat after death in the Early/Middle Iron Age.

Dog

A total of 7 fragments of dog were recovered from the assemblage. A mandible was recovered from unphased ditch [1284]. A skull along with an articulated forelimb and several ribs were recovered from Early Roman ditch [1049]. A left radius, right ulna and two metapodials were recovered from Middle Roman ditch [285]. A single dog innominate was recovered from Late Roman ditch [558].

Dogs would have been present on site as scavengers or working animals, for guarding, hunting or herding.

Micro Mammals and Amphibians

Micro mammals are abundant. No evidence of amphibians was noted. A total of 1024 micro mammal bones were recovered from the assemblage, 92 fragments from the hand-collected assemblage and 932 from the sieved collected assemblage. 1018 of the micro mammal fragments were recovered from pit [147]. A pair of wood mouse mandibles and two micro mammal sized bones were recovered from the sieved assemblage of Early/Middle Iron Age pit [156]. Two micro mammal sized bones were recovered from the sieved assemblage of Early/Middle Iron Age pit [142].

Minimum numbers of individuals were calculated for the species present in pit [147]. The assemblage represents a minimum of 3 field voles, 4 wood mice, 2 shrews and 1 pygmy shrew. The large number of micro mammals from a single feature is unusual; the abundance is largely due to the good preservation and good use of sampling strategies. There are several possible explanations for the presence of these taxa. They are all burrowing species and therefore may have burrowed into the feature, the pit may have been open for some time and the taxa may have been unfortunate scavengers, or the taxa may have been purposely collected for deposition within the pit, discussed further below.

Fish

A single fragment of herring vertebra and an unidentified fragment of fish bone were recovered from unphased pit [562] and unphased ditch [593]. Little further information can be gained, save their presence on site.

Early/ Middle Iron Age Pit [147]

Pit [147] dominates the entire assemblage for Zone 330 area B. The pit contained a total of 2465 (11965g) hand-collected fragments and 1076 (36g) fragments from the sieved assemblage. The pit contains:

- A minimum number of 6 individuals of partially articulated calf skeletons. 7 scapulae from animals, MNI 4, aged below 7 months, all except two of the long bones were unused therefore from animals under 3-3.5 years. Two animals aged approximately 42 months were also represented.
- A minimum of two cattle forelimbs from skeletally mature individuals, no evidence of articulation.
- A minimum of 3 juvenile red deer articulated partial skeletons.
- Two equid tibiae, a mandible and a humerus
- Sheep/goat ulna, atlas, metacarpal, tibia, and single tooth.
- A fragment of pig skull, first phalanx and a fragment of pig maxilla.
- A pine marten tibia

- Two cat canines, it is uncertain if from domestic or wild.
- 4 wood mice, 3 field voles, 2 shrews and a pygmy shrew.
- A wild boar radius

Analysis of the juvenile cattle and red deer would suggest that the assemblage is made up of a mix of partially articulated remains, photographs of the pit from the time of excavation support this. There are possibly entire individuals within the pit. However the number of skeletal elements suggest that some of the individuals are only partially represented. It is possible that the bones represent large joints of meat.

Most of the elements within the pit, although with some amount of articulation such as entire vertebral columns or limbs, do not equate to entire individuals for the most part. Preservation may be a factor in this, though the good recovery of small (micro mammal) bones makes this unlikely. This suggests that the animals were disarticulated or jointed before deposition.

Only one individual appears to have any evidence of butchery, possibly one whole calf, the butchery evidence is consistent with disarticulation/filleting and occurs mainly on the long bones. A single equid tibia displayed evidence of meat removal.

Carnivore gnawing on the bones may suggest deposition of the carcasses into the pit was not an immediate event.

The collection of juvenile partial skeletons are unusual for a common domestic waste, suggesting special deposition. The assemblage could be resultant of the deposition of diseased meat, feasting remains or some form of sacrifice.

The feature contains a large number of micro mammal bones. As discussed earlier, the presence of these species could be accidental or on purpose. However the presence of insectivores such as shrews and pygmy shrew may support the theory that the pit had been left open, allowing access to insects and larvae. The large number of these micro species within the pit, suggest that the pit was possibly open during the spring/summer when these animal are mainly active in the collection of foods and breeding. The suggestion of an insect rich deposit through the presence of insectivores would also support this as insect activity is generally at its height during this season. Additionally the presence of these micro species within the pit would suggest the local environment consist of grassland or sparse woodland.

There is also a mix of wild and domestic species within the assemblage. This may suggest that hunting was regularly used to supplement the domestic animals for food or fur. Or that the species incorporated into the pit may have had special significance to the local inhabitants.

As there is butchery evidence and disarticulation within the remains it is possible that these are remains from a feast, or a series of feasts. Evidence of burnt bone is limited to the upper deposits, which may limit but not total invalidate this theory.

The pit assemblage is definitely unusual and does hint at special significance. Further investigation into the remaining contents of the pit such as pottery, should give a more complete impression of domestic or ritual status.

Site Interpretation

The assemblage for the site spans several phases of activity. However, the main period of activity in the terms of the animal bone assemblage is the Early/Middle Iron Age phase, with smaller assemblages from the Roman phases.

As the majority of the assemblage was recovered from the Early/Middle Iron Age pit [147], it would be difficult to assess the assemblage as a true representation of animal husbandry due to the unique nature.

The site assemblages for the Early/Middle Iron Age and the Early Roman period are small but do make some slight suggestions to the husbandry strategies for the area.

The cattle remains are mainly from older adults and senile animals, which may suggest retaining animals for traction and dairying as well as meat production. Sheep/goat would have been kept for meat, milk and wool. Pigs would have been retained for meat. Dogs and equids would have been present on site as working animals, dogs for guarding, herding, hunting or some times as pets or scavengers. Equids would have been retained for traction, riding and sometimes processed for meat after death.

The wild species within the species are from a specialised contexts which is discussed earlier, however, the presence of such a wide range of wild species suggests that a suitable dwelling environment, such as woodland and uncultivated scrub land is within the locality.

Similarly the large number of micro mammals are discussed more thoroughly above. Micro mammal remains are to be expected on any semi-rural site with open refuse. The fish remains provide little further information save their presence on site.

Hazells Road Diversion

282 (4358g) fragments were recovered from the excavations at ARC HRD 99, a further 173 (443g) fragments were recovered from sieved samples.

Species Present and Quantification

Tables 9 and 10 summarise fragment numbers by phase for hand-collected and sieved material.

Cattle dominate the assemblage followed by sheep/goat, pig and then equid. Dog is present in small numbers along with domestic fowl, red deer, amphibians and micro mammals.

Preservation and Alteration

Condition

The assemblage bone covered a range of condition, however, the majority falls generally within grades 3 on the Lyman criteria (where 1 is pristine, 5 is just recognisable), i.e. moderate condition overall.

Burning

A total of 19 fragments of burnt bone were recovered, 8 fragments from the hand-collected material and a further 11 from the sieved assemblage. All of the hand-collected bone is from the Late Roman phase of the site from layers [7], [135] and pit [70]. Only a sheep/goat metatarsal and a cattle metacarpal from pit [70] were identifiable to species. The burnt sieved material was recovered from the Late Roman layers [69], [218] and pit [70], none of the remains were identifiable to species. Burnt bone was also recovered from the sieved samples from Medieval demolition layer [15]; two sheep/goat teeth were the only fragments identifiable to species.

Butchery

A total of 7 fragments of bone were recovered with evidence of butchery. A large mammal sized rib fragment from Middle Roman layer [86] displayed evidence of disarticulation. A cattle innominate from the Late Roman corn drier/malting kiln [191] displayed evidence of meat removal. A medium mammal rib from Late Roman pit [70] and a fragment of cattle skull from Late Roman layer [69] displayed evidence of disarticulation. A cattle metacarpal from Late Roman pit [70] had been split for marrow removal.

A medium mammal sized rib and a cattle radius from medieval demolition layer [15] and ditch [52] display evidence of meat removal.

Gnawing

A total of 5 fragments display gnawing evidence, all from the hand-collected assemblage. A medium mammal sized mandible and a pig femur from the Late Roman layers [67] and [7] display evidence of carnivore gnawing. A sheep/goat radius from Late Roman pit [70], a sheep/goat humerus from Late Roman ditch [55] and a sheep/goat tibia from Early Medieval layer [179] all display evidence of carnivore/omnivore gnawing.

Species Descriptions

Cattle

Cattle are the most abundant species. Most skeletal elements are represented, suggesting that the entire carcass was utilised on site. Butchery marks (chops and cuts) were seen on several skeletal elements consistent with the processes of carcass division, meat and marrow removal.

No tooth wear ageing data was available for cattle. The majority of the assemblage is from skeletally mature individuals. From the Late Roman corn drier/malting kiln [191] a cattle tibia from an animal aged approximately 24-30 months was recovered. Additionally an unfused tibia from an animal aged below 42 months was recovered from Late Roman layer [7].

Sheep/goat

Sheep/goat are the most predominant taxa within assemblage after cattle. No differentiation between sheep and goat could be made. Most skeletal elements are represented; indicating the entire carcass was present. No evidence of butchery was noted on the sheep/goat remains.

A single sheep/goat mandible from an animal aged 10-20 months was recovered from Early Medieval ditch [155]. All of the elements appear to be from skeletally mature animals. The limited amount of age data makes the determination of husbandry strategies difficult for this assemblage. The utilisation of sheep for wool, milk and meat would probably be common practice.

Pig

Pig is not as well represented, a total of 18 fragments 7 of which are loose teeth. No evidence of butchery was noted any of the bones.

No tooth wear was recorded. Three bones from the assemblage were recorded as foetal, a first phalanx and a femur from Late Roman layer [7] and a fibula from Late Roman layer [69]. An unfused first phalanx from an animal aged below 24 months was recovered from medieval ditch [52]. A juvenile maxilla was recovered from the Late Roman layer [69].

All of the pig remains, where recordable, were from young individuals. The assemblage may be small due to lack of preservation of small bones.

Equid

A total of 10 fragments of equid bone were identified. An equid scapula was recovered from Middle Roman layer [86]. An equid astragalus and navicular-cuboid were recovered from the Late Roman corn drier/malting kiln [191]. An equid tooth from an animal aged 7.5-9 years was recovered from Late Roman layer [67]. Three fragments of equid innominate and a third phalanx were recovered from Late Roman layer [7]. An equid metapodial was recovered from Late Roman pit [70] and a very fragmented equid radius was recovered from medieval ditch [52]. All of the remains appear to be from skeletally mature individuals. No evidence of butchery, gnawing or pathology was noted.

Dog

Four fragments of dog were identified from the assemblage, two from the sieved assemblage two from the hand-collected. All were recovered from the Late Roman phase. A loose tooth and a mandible were recovered from pit [79]. A mandible was recovered from pit [70] and a maxilla was recovered from the corn drier/malting kiln [191]. No further information can be gained save the presence on site.

Red Deer

A single red deer metacarpal was recovered from the Late Roman layer [67]. The presence of this species on site suggests that there was a suitable habitat of scrub/woodland in the locality. Red deer may have been hunted to supplement diet and provide craft working materials for antler and bone working.

Birds

A single domestic fowl femur was recovered from medieval ditch [52]. An unidentified burnt bird fragment was recovered from Late Roman layer [218]. No further evidence can be gained save their presence on site.

Micro mammals and Amphibians

Single amphibian bones were recovered from most phases of this site, from the middle/Late Roman hearth [1], Late Roman pit [79], Early Medieval ditch [155] and medieval ditch [57]. Little can be established from these bones save the presence of the species.

A single wood mouse mandible was recovered from the Late Roman pit [79]. A further 8 micro mammal bones were recovered within the Late Roman phase, from layer [7], Pit [70] and [79]. A single micro mammal sized tooth was recovered from the Early Medieval ditch [155].

The presence of these small creatures on site may suggest that features were left open to scavengers. However, the small numbers may suggest that the remains were residual in the soil. Poor preservation may have also reduced the representation of these species.

Site Interpretation

The assemblage for this site is small and provides little in information on husbandry practices. The Late Roman phase provides the most abundant amount of animal bone; the remaining phases have small assemblages, which provide little information save the presence of the species.

Cattle are the most abundant species. Butchery evidence indicates that cattle were utilised for meat and marrow. The lack of ageing data provides little on the further usage of cattle, however it would not unusual for cattle to also be utilised for traction, milk, leather and horn.

The utilisation of sheep for wool, milk and meat would probably be common practice. Pigs provide little in the form of secondary products and are often kept for meat. In this capacity pigs are often slaughtered young, as is reflected. Equids and dogs would have been present as working animals. Equids would have been used for riding and traction. Dogs often have hunting or guarding roles, but are sometimes present as scavengers. Domestic fowl was present during the medieval phase of the site, and was possibly used for the provision of meat and eggs.

Red deer was present in the Late Roman phase of the assemblage. The presence of deer indicates some uncultivated areas within range of the site.

Amphibian, wood mouse and vole remains are to be expected on any semi-rural site with open refuse or waterlogged features.

West of Northumberland Bottom Army Camp

A total of 2023 (25965g) fragments were recovered from excavations at ARC WNB 98, a further 465 (199g) fragments were recovered from the sieved samples.

Species Present and Quantification

Tables 11 and 12 summarise fragment numbers by phase for hand-collected and sieved material. The only substantial assemblage is from the Early Roman phase. This includes a complete horse burial (n=845 fragments). Discounting this, cattle are predominant, followed by almost equal amounts of sheep/goat and pig, and a few equid fragments. Single fragments represent dog, roe deer and lagomorph. Domestic fowl and goose are present in small numbers, along with a single fragment of rook and corvid. A small number of fish are present, gadids are the only taxa identifiable.

Table 12. Minimum Number of Individuals (MNI) Summarised by Phase

Species	Early/Middle Iron Age	Late Iron Age/ Early Roman	Early Roman	Early/Middle Roman	Roman/ Medieval	Early Medieval	Medieval
Cattle	1	1	3	1	1	3	1
Sheep/Goat	1	0	4	1	0	2	2
Pig	4	1	2	0	1	1	2
Equid	1	0	5	1	0	1	1

As can be seen from table 12, different species are important for each phase. In the Early/Middle Iron Age phase pigs are the most prominent species. The assemblage from the Late Iron Age/Early Roman is too small to suggest more than the cattle and pigs were present. In the Early Roman phase equids are particularly common, which may suggest that they had an important role at this time. Sheep/goat are the next predominant species followed by cattle and then pig. There is little information for the Early/Middle Roman and the Roman/Medieval phases bar the presence of the species. The Early Medieval phase shows a predominance of cattle followed by sheep/goat, then pig and equid. In the Medieval phase sheep/goat and pig are predominant followed by cattle and equid.

The fluctuations in species composition reflect changes in the husbandry strategies for different phases of the site.

Preservation and Alteration

Condition

Table 13 summarises the condition of the bone from both the hand-collected and the sieved assemblages. The bone from each phase follows a similar pattern and therefore has been generalised in the table above. The condition of the assemblage falls between grade 3 and 4 of the Lyman criteria (where 1 is pristine, 5 is

just recognisable), i.e. moderate condition overall. The sieved assemblage is in slightly poorer condition i.e. moderate to poor.

Table 13. Summary of Condition

Condition (Lyman 1996)	Percentage of Hand- collected Assemblage	Percentage of Sieved Assemblage
1	0%	
2	8%	
3	48%	28%
4	35%	54%
5	9%	18%
Total Percentage	100%	100%

Butchery

A total of 6 fragments of bone were recovered displaying evidence of butchery. A cattle tibia from Early/Middle Iron Age ditch [512] displays butchery cuts consistent with disarticulation. A cattle horn core from Early Roman ditch [540] displays butchery evidence consistent with horn removal. A cattle innominate from the same feature displayed evidence of disarticulation. A cattle humerus from Early Medieval ditch [884] and a cattle first phalanx from Early Medieval ditch [208] display butchery cuts consistent with disarticulation.

A single large mammal sized rib from the Roman/Medieval ditch [948], displays evidence consistent with meat removal.

Burning

A total of 5 fragments of burnt bone were recovered from the hand-collected assemblage, all from the Early Roman phase. A further 82 fragments were recovered from the sieved assemblage, all unidentifiable to species.

A single pig first phalanx, the only fragment identified to species, was recovered from Early Roman ditch [301].

Gnawing

12 fragments of bone display evidence of gnawing. A single sheep/goat first phalanx from Early Roman ditch [1049] displayed evidence of rodent gnawing.

A cattle metacarpal, a sheep/goat metatarsal and a medium mammal sized with evidence of carnivore/omnivore gnawing were recovered from Early Roman pits [886] and [611]. A sheep/goat radius also with evidence of carnivore/omnivore gnawing was recovered from Medieval pit [320].

Two large mammal sized long bone fragments along with an innominate and rib fragment with evidence of carnivore gnawing were recovered from the Early Roman phase, from ditch [540], pit [611] and ditch [540]. A sheep/goat femur with carnivore gnawing was recovered from Early Roman pit [870] and a sheep/goat metatarsal and a cattle humerus with carnivore gnawing were recovered from the Early Medieval ditch [884].

Species Descriptions

Cattle

Cattle are the most abundant species (excluding the horse burial). Most skeletal elements are represented, suggesting the entire carcass was present.

Within Early Roman ditch [208] there is a dominance of cattle lower leg bones, metapodials carpals and tarsal. It is possible that this is a dump of primary butchery waste.

A cattle horn core from the Early Roman ditch [540] shows evidence of horn removal, which may suggest horn working may have taken place on site. Four cattle bones display evidence of butchery, all are consistent with disarticulation and meat removal.

Measurements from a metatarsal from Early Roman pit [963] provides a withers height of 1.08m and a metatarsal from Early Medieval ditch [208] provides a withers height of 1.15m.

The majority of the remains are from skeletally mature individuals. A pair of femurs from an animal aged below 42 months was recovered from the Late Iron Age/Early Roman hollow way [386]. Two unfused metacarpals from individuals aged below 24 months were recovered from the Early Roman ditch [525]. A humerus from animal aged approximately 42 months was recovered from Early Roman pit [415]. And a humerus from an animal aged below 42 months was recovered from Early Roman ditch [1133].

Only two mandibles were able to provide tooth wear ageing data, a mandible from an animal aged 18-30 months was recovered from Early Roman pit [415] and a mandible from a young adult was recovered from unphased post hole [749].

Butchery evidence suggests cattle were used for meat and horn. The presence of mainly skeletally mature individuals may suggest an emphasis on dairying and traction.

Sheep/goat

Sheep/goat are less abundant than cattle. 6 fragments from the Early Roman, Early/Middle Roman and Early Medieval phases have been positively identified as sheep. No differentiation could be made for the remaining fragments.

Most skeletal elements were present indicating that the whole carcass was butchered and disposed of on site. No evidence of butchery was noted on any of the remains.

A total of 7 mandibles provided tooth wear ageing data. A pair of mandibles from Early Roman pit [886] was from an individual aged 3-5 years. A mandible from Early Roman ditch [1131] and a mandible from pit [870] were both from animals aged 3-5 years. A mandible recovered from Early Roman ditch [1049] was from an animal aged 3-10 months. From the Early Medieval ditch [884] a mandible from an animal aged 5-8 years was recovered. A mandible from an animal aged 2-5 years was recovered from Medieval pit [320].

Most of the represented elements are from skeletally mature individuals. From the Early Roman phase, a first phalanges from an animal aged below 6 months was recovered from ditch [1049], a first phalanx from an animal aged approximately 6-16 months was recovered from oven [697]. From the Medieval layer [894] a first phalanx from an animal aged below 6 months was recovered.

The presence of a majority of adults would suggest that sheep would have been primarily kept for wool production. It would also be common practice to keep sheep/goat for milk and meat.

Pig

Pig remains are almost as abundant as sheep/goat. Where possible to assess the majority of the remains appear to be from juvenile/sub-adult individuals. Only three fragments showed fusion ageing older than 18-24 months. Two fused humeri came from Early/Middle Iron Age ditch [271] and Late Iron Age/Roman hollow way [386] and a fused tibia from Early Roman ditch [572]. The remaining bones with fusion data are mainly from the Early/Middle Iron Age ditch [271] all below 42 months, most elements suggesting even young ages (below 12 months). From Early Medieval ditch a humerus from animal aged below 42 months and from Early Roman ditch [392] a first phalanx from an animal aged below 24 months was recovered.

A total of 5 mandible fragments provided tooth wear ageing data from the assemblage. A mandible fragment from an adult animal was recovered from Early Roman pit [415]. From the same phase three mandibles from sub-adult animals were recovered from pit [415] and pit [503]. A single sub-adult mandible was recovered from Early Medieval pit [884].

The majority of the pig remains assemblage for the Early/Middle Iron Age phase was recovered from a single deposit within ditch [271]; the assemblage represented a minimum of four individuals. It is difficult to establish if this is a typical representation of pig usage at this time or whether it is a one off dump of food/butchery waste.

The presence of both juvenile and adult bones suggests the rearing of pigs for meat with a few adults retained for breeding.

Equid

There are a large number of equid bones from the horse burial in the Early Roman phase, which accounts for 92% of the equid remains. The remaining assemblage includes most skeletal elements, suggesting the entire carcass was present. All of the remains, where possible to assess, were from skeletally mature individuals.

From Early Roman ditch [540] a total of 17 fragments identified as equid were recovered. Most skeletal elements were present within the ditch representing a minimum of 2 individuals. Tooth wear measurements indicate an animal aged 7-8.5 years and an animal aged 8-11 years were present.

From the Early Roman phase four loose teeth and a mandible that were able to provide ageing data were recovered. A mandible was recovered from Early Roman ditch [1049] from an animal aged 7.5-8.5 years. Two teeth recovered from ditch [525] and a tooth from pit [611] were all from animals aged between 6-9 years. A tooth from Early Roman hollow way was from an animal aged 12-14 years +.

Single fragments of equid bone were recovered from Early/Middle Iron Age ditch [367], Early Roman pit [503], Early Roman ditch [1133], Early/Middle Roman ditch [1267] and Medieval pits [320] and [891].

Early Roman Horse Burial [437]

The horse burial consists of one complete fully articulated individual, skeletally mature. Tooth height measurements provided an age of 11-15.5 years (Levine 1982). Measurements of the complete long bones gave an estimated withers height of 1.42 -1.49m. The skeleton displays two forms of pathology. The 13th and 14th thoracic vertebra and the 1st lumbar display signs of osteophytic lipping around the margins of the centrum. In the case of the 13th and the 14th thoracic, the vertebrae are in the process of fusing. The fusing of lower thoracic vertebra can often be seen as a stress response to traction and riding stressors (Levine et al, 2000).

Dog

A single dog mandible fragment was recovered from Early Roman ditch [1049].

Wild Species

A single roe deer radius fragment was recovered from Early/Middle Iron Age ditch [279]. The presence of post cranial deer remains on site suggests that an uncultivated area suitable for a habitat was close by.

Micro Mammals and Amphibians

A single fragment of micro mammal femur, similar to a water vole, was recovered from Roman/Medieval ditch [948].

Birds

Several fragments of bird bone were found. A corvid scapula was recovered from Early Roman ditch [1049]. A rook tarso-metatarsus was recovered from Early Roman ditch [540]. Three domestic fowl bones were recovered, a carpo-metacarpus from Early Roman ditch [1131], a femur from Roman/Medieval ditch [948] and a tibiotarsus from unphased pit [667]. A goose radius was recovered from unphased pit [667]. A bird rib fragments were recovered from unphased pit [667]. A bird vertebra was recovered from Early Medieval surface (292) from building [896].

Rooks and other birds of the corvid family are scavenger birds and can occur with the assemblage as natural casualties or hunted for a variety of reasons such as game, protection of lambs etc. Domestic fowl were often kept for meat and eggs.

Fish

A Gadidae (Cod family) cleithrum was recovered from Early Roman pit [886] and a gadid vertebra was recovered from unphased posthole [649].

Site Interpretation

The activity on at West of Northumberland Bottom Army Camp spans several phases. In terms of the animal bone the main phase of activity is during the Early Roman phase with smaller assemblages during the Early/Middle Iron Age, Early Medieval and Medieval phases. The remaining phases provide us with little further information save the presence of the species on site at that time.

The husbandry strategies differ in the different phases. In the Early/Middle Iron Age phase pigs dominate the assemblage followed by cattle, then sheep/goat. However, the pig remains are almost all from a single deposit it is difficult to suggest that this is a true representation of the animal utilisation at the time. The deposit itself may be a dump of butchery/food waste from a single event. A large number of pig remains within the assemblage may suggest that the local environment may have been wooded, providing

adequate pangs for pigs and limiting the pasture for the other domestic species, hence the high number of pig remains.

In the Early Roman phase cattle are dominant closely followed by sheep/goat, then pig. Similarly, in the Early Medieval period there is a similar pattern, cattle are dominant followed by sheep/goat and pig. In the Medieval phase, however, sheep/goat are more abundant, followed by almost equal numbers of cattle and pig. In the later medieval periods the growth of the wool trade deeply influenced the sheep farming economy, which may suggest why the numbers of sheep/goat rise in the assemblage.

Cattle were utilised for meat and horn, the predominance of skeletally mature animals may suggest an emphasis on dairying and traction usage. Sheep/goat are also predominantly adults, suggesting that there was an emphasis on maintaining sheep for wool as well as meat, although the use of sheep/goat for milk and horn should not be ruled out. Pig would have been primarily raised for meat as they produce little in the form of secondary products.

Equids are present in varying numbers throughout most of the phases of the site activity. Equid remains were quite prominent within the Early Roman period, this possibly indicates that activities on site at this time would require a number of equids. Equids would possibly be kept as working animals, used for traction and riding.

Dog would have been present on site as a working animal, scavenger or pet.

A single fragment of roe deer radius suggests that deer were utilised on site within the Early/Middle Iron Age phase. The presence of deer indicates some uncultivated areas within range of the site.

The small number of bird remains does not provide any real additional information to the dietary or environmental evidence for this site, save their presence.

Similarly the small mammal and fish remains give little information beyond their presence on the site.

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Zone 330 Area B

Table 1, Number of fragments of each taxon from the hand-collected material, summarised by phase

Taxon	Phase								Total
	Early/Middle Iron Age	Middle/Late Iron Age	Early Roman	Middle Roman	Late Roman	Post Medieval	Modern	Unphased	
Cattle	343		4		2	1	1	4	355
Sheep/Goat	42		5	2				5	54
Sheep			1						1
Pig	17		4					1	22
Equid	4		2					1	7
Cat (<i>Felis.sp</i>)	2								2
Dog			7	4	1			1	13
Red Deer (<i>Cervus elaphus</i>)	86								86
Pine Marten (<i>Martes martes</i>)	1								1
Shrew (<i>Soricidae sp.</i>)	7								7
Field Vole (<i>Microtus agrestis</i>)	1								1
Wood Mouse (<i>Apodemus sp.</i>)	3								3
Large Mammal	1063	4	10	2				50	1129
Medium Mammal	128		10	1				12	151
Small Mammal	3								3
Micro Mammal	81								81
Unidentified	988	3	54	3				9	1057
Total	2769	7	97	12	3	1	1	83	2973

Table 2, Number of fragments of each taxon from the sieved material, summarised by phase

Taxon	Phase			Total
	Early/Middle Iron Age	Late Roman	Unphased	
Sheep/Goat	3			3
Pig	1			1
Field Vole (<i>Microtus agrestis</i>)	6			6
Wood Mouse (<i>Apodemus sp.</i>)	52			52
Shrew (<i>Soricidae sp.</i>)	7			7
Pygmy Shrew (<i>Sorex minutus</i>)	2			2
Vole	14			14
Mouse (<i>Muridae sp.</i>)	15			15
Herring (<i>Clupea harengus</i>)			1	1
Fish			1	1
Large Mammal	3		2	5
Medium Mammal	6		2	8
Micro Mammal	840			840
Unidentified	256	13	20	289
Total	1205	13	26	1244

Table 3. Number of hand collected identified fragments, without Pit [147]

	Phase								
Taxon	Early/Middle Iron Age	Middle/Late Iron Age	Early Roman	Middle Roman	Late Roman	Post Medieval	Modern	Unphased	Total
Cattle	30		4		2	1	1	4	42
Sheep/Goat	28		5	2				3	38
Sheep			1						1
Pig	12		4					1	17
Equid			2					1	3
Dog			7	4	1			1	13
Red Deer (<i>Cervus elaphus</i>)	1								1
Large Mammal	51	4	10	2				50	117
Medium Mammal	49		10	1				6	66
Small Mammal	3								3
Unidentified	84	3	53	1				9	150
Total	258	7	96	10	3	1	1	75	451

Hazells Road Diversion

Table 9, Number of fragments of each taxon from the hand-collected material, summarised by phase

Taxon	Phase							Total
	Middle Roman	Middle/Late Roman	Late Roman	Roman/ Medieval	Early Medieval	Medieval	Unphased	
Cattle	2		26	1	3	5	1	38
Sheep/Goat			18		6	4	1	29
Pig			9	2	2	2		15
Equid	1		8			1		10
Dog			2					2
Red Deer (<i>Cervus elaphus</i>)			1					1
Large Mammal	3	1	80		6	3	4	97
Medium Mammal		1	17		2	3		23
Unidentified	4		57		3	3		67
Grand Total	10	2	218	3	22	21	6	282

Table 10, Number of fragments of each taxon from the sieved material, summarised by phase

Taxon	Phase					Total
	Early/Middle Roman	Middle/Late Roman	Late Roman	Early Medieval	Medieval	
Cattle			3			3
Sheep/Goat			4		2	6
Pig			2	1		3
Dog			2			2
Fowl					1	1
Bird			1			1
Amphibian		1	1	1	1	4
Wood Mouse (<i>Apodemus sp.</i>)			1			1
Large Mammal			8		2	10
Medium Mammal			2			2
Micro Mammal			8	1		9
Small Mammal				1		1
Unidentified	8	4	92	1	25	130
Grand Total	8	5	124	5	31	173

West of Northumberland Bottom Army Camp

Table 11, Number of fragments of each taxon from the hand-collected material, summarised by phase

Taxon	Phase								Total
	Early/Middle Iron Age	Late Iron Age /Early Roman	Early Roman	Early/Middle Roman	Roman/Medieval	Early Medieval	Medieval	Unphased	
Cattle	8	3	65	6	1	20	7	3	113
Sheep/Goat	2		56			10	27	3	98
Sheep			2	1		3			6
Pig	37	2	26		1	9	6	3	84
Equid	1		431*	4		1	3		440
Dog			1						1
Roe Deer (<i>Capreolus capreolus</i>)	1								1
Lagomorph					1				1
Corvid			1						1
Fowl			1		1			1	3
Goose								1	1
Rook (<i>Corvus frugilegus</i>)			1						1
Bird								1	1
Gadidae (<i>Cod Family</i>)			1					1	2
Fish						1			1
Large Mammal	32		216	9	3	47	16		323
Medium Mammal	24		36	1	1	10	22	10	104
Small Mammal			1					5	6
Micro Mammal					1				1
Unidentified	81		613	7		70	13	7	791
Grand Total	186	5	1451	28	9	171	94	35	1979

* Fully articulated skeleton

Table 12, Number of fragments of each taxon from the sieved material, summarised by phase

Taxon	Phase				Total
	Early/Middle Iron Age	Early Roman	Early/Middle Roman	Early Medieval	
Cattle		1			1
Sheep/Goat		1			1
Pig	9	1		1	11
Bird				1	1
Medium Mammal	6	1			7
Small Mammal				14	14
Unidentified	53	20	63	27	163
Grand Total	68	24	63	43	198