

## THE SIGNIFICANCE OF FAUNAL REMAINS INCLUDING LYNX, WOLF AND WILDCAT FROM LOCH BORRALIE CAVE, NEAR DURNESS, N. SCOTLAND

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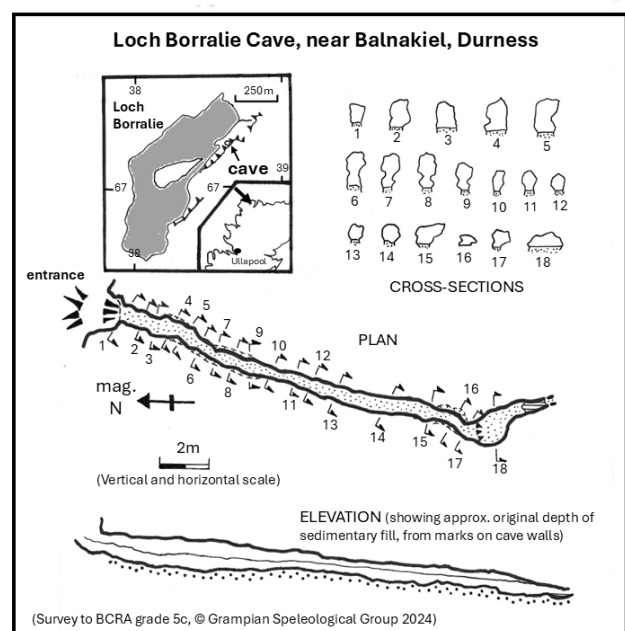
### The site

Faunal remains were uncovered in a narrow cave near Durness in northern Scotland in the 1990s during the removal of part of the sedimentary infill to aid exploration. Some of the identified species (lynx, wolf and wildcat) are of national significance. We present radiocarbon dates from lynx and wildcat; the lynx date is the oldest so far recorded from a Scottish site. Human remains were also recovered and dated to the Neolithic period, when burial of at least partial remains in caves was a fairly common phenomenon.

### The site

The entrance to the cave (NGR 3864 6730) is situated at about 30 m O.D. on a low crag overlooking the SE side of Loch Borrallie, 1.7 km WSW of the village of Durness (Fig. 1, inset). The cave is developed in the Croisaphuill Formation (Early Ordovician) near the top of the Durness Group of carbonate rocks. It developed as a phreatic tube which descends gently into the hillside at an average slope of 8°; some poorly-developed solution scalloping on the walls suggests water flow during formation was from the back of the cave towards the entrance.

The cave was discovered by a local resident, Mr Colin Coventry, in 1992. At that time only the first 5 m or so of the cave were accessible (F. Eadie, *pers. comm.*). Over a number of years of sporadic digging, Mr Coventry worked to open up the cave until his untimely death in 2019. Unfortunately, he did not keep detailed written records of this excavation but he did send the larger bones he uncovered to National



**Figure 1.** showing the cave plan, elevation and selected cross-sections. The inset shows the cave's situation on the east side of Loch Borrallie, and location in northern Scotland.

Museums Scotland, where they have been curated. Some of these finds are of national importance, hence this attempt to bring them to a wider audience. Nowhere has the cave been excavated down to bedrock, and the sedimentary infill that remains still contains faunal material.

The cave comprises a narrow tube of broadly ovoid cross-section with a 'shelf' on either side approximately 1 m from the roof (Figs 1 and 2). Mr Coventry often referred to the cave as "Egg Timer Dig" or "The Lesser Northern Egg Timer" on account of this shape. Without further excavation down to

bedrock, it is not clear whether the cave passage was formed originally by two phreatic tubes following a line of weakness in the limestone, subsequently breached by solution of the intervening rock, or the creation primarily of a classic ‘keyhole-shaped’ profile from an initial phreatic phase of formation followed by vadose entrenchment as water tables fell. What is clear is that deposits of a hardened but tufaceous flowstone cover most of these side ledges and have augmented the characteristic passage cross-section (Fig. 2). They are not found below the shelf and may therefore represent speleothem development down and onto clastic sediments in the bottom half of the passage, which were partly removed by Mr Coventry. Some 18 m inwards from the entrance a narrow zig-zag squeeze allows access to a small chamber. A sketch survey of the cave made by Mr Coventry indicates that the larger faunal remains were found in this chamber, but this is difficult to corroborate as smaller bone fragments are currently found throughout the existing sedimentary fill leading to the chamber. After wet weather a shallow pool forms towards the back of the cave, with the tube continuing beyond mostly blocked with sediment and currently impenetrable.



**Figure 2.** Photograph at approximately point 6 on the cave plan (Fig. 1), looking into the cave, illustrating the typical ‘egg-timer’ cross-section. On left side of the cave, a geological hammer (with a 25cm handle) indicates the scale.

## The clastic sediments

During a visit to the cave in November 2023, a small exploration trench (approximately 15 cm deep x 10 cm wide x 30 cm long) was opened up against the NW wall some 3 m inside the entrance. Against the wall, small limestone blocks and cobbles created an open framework with voids, some containing smaller pebbles which exhibited a degree of rounding of corners. This coarser layer may extend beneath the main sediment in the cave, but the need to preserve the integrity of the deposits meant that this idea was not pursued at the time. The remaining deposits comprise a lower very dark grey-brown, clay-rich mud (Munsell colour 10YR 3/2) containing limestone breakdown, overlain by 10 cm of silty brown mud (Munsell colour 10YR 5/3) which contains some individual rounded and more angular limestone clasts up to 20 mm diameter. Small bones and bone fragments were found throughout the uppermost layer, but it was not possible to be sure whether the lowermost layer also contained faunal material without more extensive excavation. The clastic fill shows all the characteristics of having been introduced into the cave from the entrance by wash and creep processes, progressively moving sediment down the low-angled cave passage through time. Details of the lithostratigraphy require further investigation, which is being planned.

## The faunal remains

Table 1 lists the animal bones excavated by Mr Coventry that were identifiable to species level.

*Table 1.* A list of the non-human mammalian finds excavated from the cave by Colin Coventry. (‘MNI’ = minimum number of individuals present.)

Latin name	Common name	No. of finds	MNI
<i>Vulpes vulpes</i>	Red fox	65	5
<i>Meles meles</i>	Badger	11	2
<i>Canis lupus</i>	Grey wolf	5	1
<i>Felix silvestris</i>	Wildcat	15	1
<i>Lynx lynx</i>	Eurasian lynx	40	2
<i>Oryctolagus cuniculus</i>	European rabbit	18	2
<i>Ovis aries</i>	Sheep	39	3
<i>Sus domesticus</i>	Pig	1	1

One canine tooth attributed to grey wolf might have come from domestic dog (*Canis familiaris*). Seven further bones could only be assigned to unidentifiable artiodactyls (i.e. either sheep or deer) as they were morphologically undiagnostic, as were two bones of a large mammal (a cranial fragment might be lynx), 27 bones from medium-sized mammals (some possibly small wolf/fox/wildcat), two microtine rodents (one of comparable size to water vole), and five bone fragments that defied any form of identification). There were also several bones that were clearly human (*Homo sapiens*), including a small mandible with very worn teeth, the upper part of a femur, and another part of a limb (fibula, radius or ulna?). Mr Coventry also excavated 11 mammal teeth from the cave, now also in the National Museums Scotland collection. One appears to be that of a grey wolf (*Canis lupus*), four are domestic dog (*Canis familiaris*), two of red fox (*Vulpes vulpes*) and two are the teeth of seals, one of which has been identified as grey seal (*Halichoerus grypus*). The November 2023 visit also recovered a large number of small bones and bone fragments that were washed out of the surface layers by roof drip. Two cockle shells (*Cardium edulis*) were found, although the cave is over 1 km from the coast. These finds await detailed investigation.

Four of the bones excavated by Mr Coventry were submitted to the Scottish Universities Environmental Research Centre AMS Facility for radiocarbon dating. The calculated dates are given in Table 2.

Calibrated age ranges are given at the 95.4% confidence level and rounded to the nearest 10 years. The date for the wildcat remains has not been corrected for any marine reservoir effect as its  $\delta^{13}\text{C}$  value indicates that it had a relatively fish-enriched diet (Ascough et al. 2004), so the suggested age might be a few hundred years too old (K. Britton, pers. comm.).

### Significance of the faunal remains

Loch Borrallie Cave is significant for the number of skeletal remains from carnivorans. No other site in

Scotland has yielded so many lynx bones (n=40) and few other sites in Scotland have produced wolf (n=4) and wildcat (n=15) bones. The radiocarbon date for the lynx femur is the only confirmed record of Mesolithic lynx in Scotland and collectively the bones represent at least two individuals, one of which is probably a male based on size. There is a possibility of confusion between wolf and domestic dog bones, which will require analysis of aDNA to confirm species' identification. Certainly, some of the canine teeth are too small to be wolf teeth and too large to be fox teeth, so that these are probably from domestic dogs.

Further radiocarbon dating is required in order to understand when different species' remains accumulated within the cave.

The presence of human remains within the cave is problematic, given the very constricted means of access to the small chamber where it is believed they were found. The radiocarbon dates obtained from two of them are of similar age to four dates on human bones excavated from Reindeer Cave on the Creag nan Uamh in Assynt (in Saville 2005), some 55 km to the SSW. This confirms the local presence of Neolithic humans, and the cultural use at that time of caves as sites for interment (Bonsall et al. 2012), at least for partial skeletal remains. Alternatively, in the case of this specific site, human remains might have been introduced into the cave by one of the larger predators. A detailed taphonomic study of these bones is required to test the latter suggestion.

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**Table 2.** A list of AMS radiocarbon dates obtained from selected bones recovered from the site.

Species	Sample no.	$\delta^{13}\text{C}$ (‰)	$\delta^{15}\text{N}$ (‰)	C/N ratio	$^{14}\text{C}$ age (yrs BP)	Calibrated age (IntCal20)
Eurasian lynx	SUERC-44164	-21.1	5.9	3.2	7258 ± 24	8170-8010 cal. BP
Wildcat	SUERC-57754	-18.1	9.3	3.3	2917 ± 30	3160-2960 cal. BP
Human	SUERC-57755	-20.7	9.3	3.3	4743 ± 31	5590-5320 cal. BP
Human	SUERC-57756	-19.7	9.7	3.3	4875 ± 32	5710-5480 cal. BP

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## References

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