

ECOLOGICAL SURVEY

Small Mammal Survey at Carr House Meadows
Nature Reserve

31st August – 2nd September 2013



Wood Mouse at Carr House Meadows (Photo Julie Riley)

October 2013

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1.0 INTRODUCTION

1.1 Site

Carr House Meadows Nature Reserve comprises 15.73 hectares of farmland set on a steep north-facing slope with stunning views over the Ewden Valley. Sheffield City Council owns the site and has leased it to Sheffield Wildlife Trust on a 30 year lease since 2002. All the land is farmed by a tenant farmer. Carr House Lane bisects the reserve, with the southern half lying in the Peak District National Park, while the northern side is set within a designated Area of High Landscape Value in the Sheffield Unitary Development Plan.

The reserve consists of 17 small fields divided by dry stone walls, with boundaries of thick hedges, mature trees and narrow strips of mixed deciduous woodland. Several streams and seepages run through the site creating areas of marshy grassland. The four main habitats within the reserve are acid unimproved grassland, semi-improved neutral grassland, marshy grassland, and woodland edge and species-rich ancient hedgerows. The unimproved grassland found here is locally and nationally important due to the national decline in quality and quantity of this habitat type. The fields have been managed traditionally for the last 30 years as hay meadows and for pasture, with few or no artificial fertilisers having been applied during this time.

The species-rich hedgerows present on site are important as a refuge for mammals, birds and invertebrates. These and the bordering woodlands are of particular importance for small mammals, providing areas in which to nest, forage and travel through, while affording protection from predators. The meadows in summertime play a similar role.

1.2 Aims of study

A small mammal survey was carried out at Carr House Meadows, with specially-designed Longworth traps being placed across the site. The survey looked at the results of a previous survey carried out in 2008, and aimed to repeat the part of this survey where mammals had previously been trapped in fields 4, 12 and 13, but also to put traps in previously unsurveyed areas, particularly in fields 5/6, 7, and 16/17/18. The intention was to identify the presence or absence of small mammals in each of these areas.

In order to give the mammals time to become familiar with the presence of the Longworth traps, and to maximise capture rates, the traps were set on a Saturday morning (31st August) and then checked evening and morning over two nights, giving a total of 4 checks. 13 traps were used.

2.0 METHODOLOGY

2.1 Field survey

The survey was carried out using Longworth mammal traps, using Natural England's general licence, and followed the Mammal Society's best practice guidance as laid out in the booklet *Live Trapping Small Mammals: A Practical Guide* by J. Gurnell and J.R. Flowerdew (London: Mammal Society, 1990). The surveyors found the short Mammal Society videos available on YouTube very helpful, both in viewing how to set the traps, and in how to identify the animals caught.

Longworth traps are made of aluminium and are in two parts; a tunnel with a trap mechanism and locking door, and a nest box which is filled with nesting material (hay, shredded paper) and bait (dried mouse food, fresh chopped apple for moisture, and live casters to feed any shrews that may be trapped).

The reserve manager had asked for traps to be placed in various locations across the site (see Figure 1 below for the trap locations). This included 5 traps being placed to repeat successful traps in the 2008 survey (across the central area of the reserve), and 8 traps to be spread out across parts of the reserve not previously surveyed.

A public event was planned to coincide with the mammal trapping so the traps also had to be placed to form a route that would be easy to follow for members of the public. Bearing this in mind, the 13 available traps were placed to form a route across the site as follows:

- Trap 1 (new location) – Field 17 in the centre of the boundary with Field 16
- Trap 2 (new location) – Field 15 under the boundary hedge with Field 16
- Trap 3 (repeating Trap 3 from 2008) – Field 15 at the south boundary
- Trap 4 (repeating Trap 5 from 2008) – Field 14 at boundary between Field 14 and 12
- Trap 5 (repeating Trap 6 from 2008) – Field 12 in southwest corner
- Trap 6 (new location) – Field 7 in scrub near top of pond
- Trap 7 (new location) – Field 9 along boundary with Field 11
- Trap 8 (repeating Trap 9 from 2008) – Field 13 at north boundary
- Trap 9 (new location) – Field 3 at boundary with Field 2
- Trap 10 (repeating Trap 13 from 2008) – Field 4 at north boundary
- Trap 11 (repeating Trap 16 from 2008) – Field 4 at south boundary
- Trap 12 (new location) – Field 6 at north boundary
- Trap 13 (new location) – Field 6 near west boundary

Traps were placed in tall ruderals/bracken or scrub, along edge features such as dry stone walls, woodland edge or streamsides, to take advantage of small mammals' preference for travelling along edges where there is protective cover.

The traps were pre-filled with bedding and dry bait and taken on-site in the morning on the 31st August. Chopped apple and carrot and live casters were added on site. To ensure the traps could be easily found, their locations were marked with a cane and red tape, and their GPS position was recorded.

Each trap was positioned carefully at a downward angle to make sure water could not collect at the end of the nest box, and the tunnel entrance were level with the ground as small mammals do not like to climb up into holes. Each trap was covered with vegetation to minimise temperature variation. The traps were then set so that they would be triggered if an animal entered the nest box. All traps had been set by 12 noon.

The traps were then checked morning and evening starting at 5:30 pm on Saturday evening, i.e. every 12 hours – a total of 4 checks altogether. The last check was on Monday 2nd September at 6:10 am, at which point the traps were dismantled and removed.

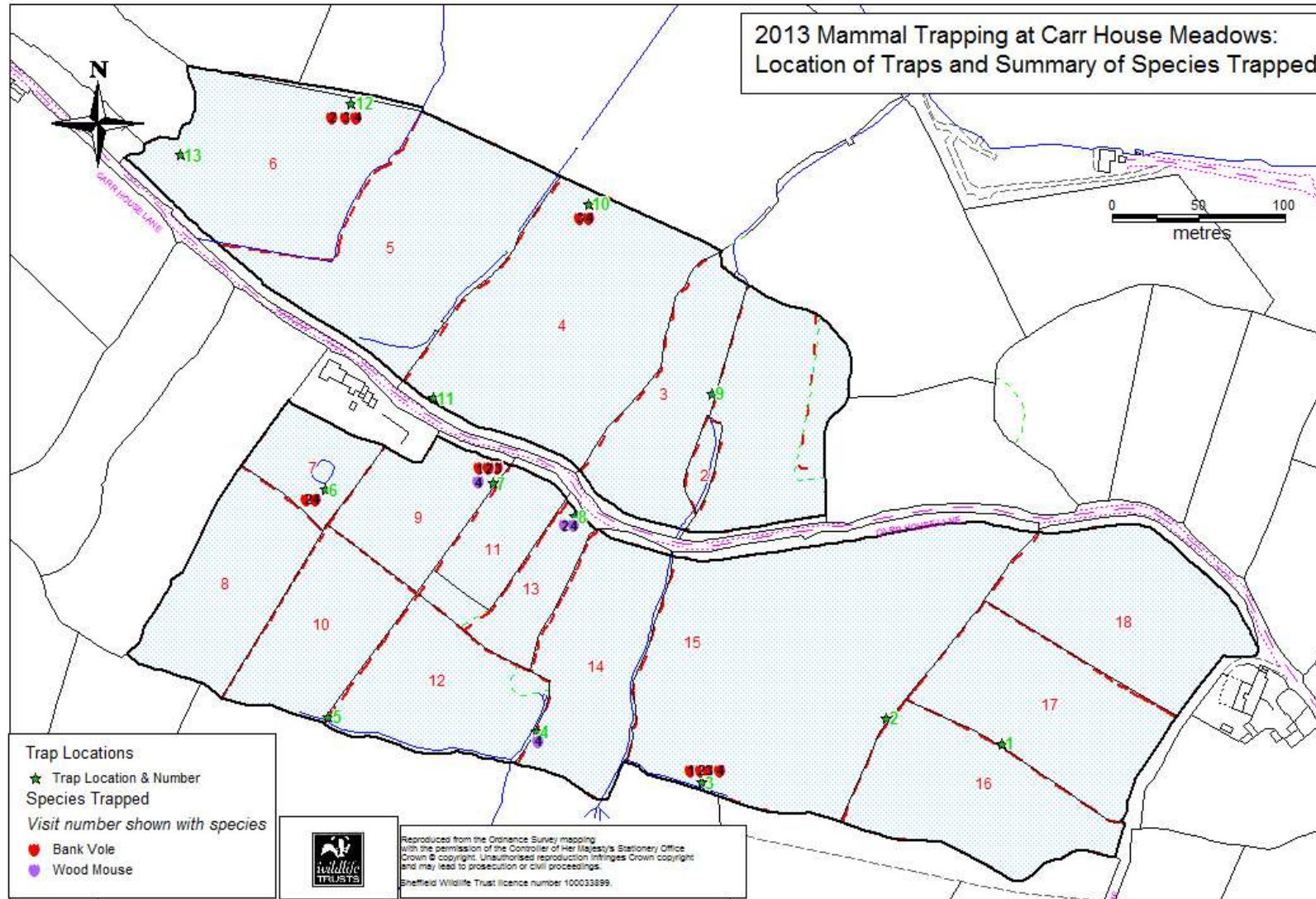
The photographs below show the habitats in which the traps were set up.







3.0 LOCATIONS
3.1 Trap Locations



3.2 Route and Elevation Map



4.0 RESULTS

4.1 Field survey

		Visit:	1	2	3	4
		Date:	31/08/2013	01/09/2013	01/09/2013	02/09/2013
		Weather:	Warm, cloudy, breezy, dry. Temp between 11 and 20° C over the weekend.			
Trap #	Location		17:30 - 19:00	06:30 - 08:30	18:00 - 19:30	06:10 - 07:50
1	Field 17. Halfway along stone boundary wall with Field 16, under oak and hazel among bracken, nettle and grasses at grid reference SK 28410 95251.		X	X	X	X
2	Field 15. Under laid blackthorn boundary hedge with Field 16, near birch trees to the E of public footpath, in long grass at SK 28343 95266.		X	X	X	X
3	Field 15. On S boundary on W edge of a patch of tall herb/fern. In bramble, bracken and long grass, next to dry stone wall and under holly tree at SK 28237 95229		Bank vole - juvenile, probably male	Bank vole - juvenile, gender undetermined	Bank vole - juvenile, gender undetermined	Bank vole - juvenile male
4	Field 14. Near gap between Fields 12 and 14, near E bank of stream under bramble and birch. (Was put at streamside for Visit 1 but then moved under bramble.) SK 28141 95258		X	X	X	Wood mouse - adult female, mated
5	Field 12. In SW corner alongside dry stone wall, underneath holly, with birch woodland adjacent. SK 28021 95267		X	X	X	X
6	Field 7. E edge of field near top of pond in birch/cherry/bramble scrub, adjacent to a stand of rosebay at SK 28019 95399		X - not tripped but apple nibbled and droppings in tunnel, probably wood mouse.	Bank vole - adult male	X	Bank vole - adult

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7	Field 9. NE edge of field, in bramble along edge of dry stone wall. SK 28116 85402	Bank vole - juvenile female, unmated	Bank vole - adult female	Bank vole - juvenile male	Wood mouse - adult male
8	Field 13. N edge of field under hawthorn and bramble scrub near the stream and marshy grassland at the bottom. SK 28163 95383	X	Wood mouse - adult	X	Wood mouse - adult male
9	Field 3. N of small wooded area, near holly and alder adjacent to stream in wet grassland area among rushes and tall/rank grasses. SK 28242 95454	X	X	X	X
10	Field 4. At N boundary, at edge of patch of encroaching bramble scrub, adjacent to coniferous woodland. SK 28171 95563	X	X	Bank vole - adult	Bank vole - adult
11	Field 4. At S boundary, underneath a big patch of bramble and long grass. SK 28081 95451	X - tipped on side, possibly in a rabbit/fox run? Moved slightly.	X	X	X
12	Field 6. At bottom of hill near boundary with woodland, to E of footpath, under bramble and goat willow abutting onto marshy grassland area. SK 28034 95621	X	Bank vole - adult male	Bank vole - juvenile	Bank vole - adult male
13	Field 6. Along W edge near boundary with woodland under edge of large bramble patch abutting onto acid grassland. SK 27935 95591	X	X	X	X

On removal, the traps were double-checked to ensure that they were still in working order, which they were.

Following are photographs of the captured species.



Bank vole (photo Julie Riley)



Wood mouse (photo Julie Riley)

5.0 DISCUSSION, CONCLUSIONS AND RECOMMENDATIONS

5.1 Discussion of results

This survey had a successful capture rate, with four wood mice and 14 bank voles being caught in the traps, a total of 18 specimens. One trap also had signs of visitation without being tripped and this has not been included in the following calculations. One trap was disturbed on one trap round and counts as a sprung, empty trap.

To enable comparison with other surveys, or surveys at other sites, the capture rate can be expressed as **Captures per 100 Trap Rounds**. (This is often known as Trap Nights but as we kept the traps open continuously and checked morning and night, I have used rounds rather than nights.)

This is calculated as follows:

X traps were set for Y rounds - 13 traps were set for 4 rounds = **52 trap rounds**.

Correcting for sprung traps and captures which means 'available' trap rounds were lost – $0.5(\text{captures} + \text{sprung, empty traps}) - 0.5(18 + 1) = 9.5$. So 52 minus 9.5 = **42.5 corrected trap rounds (CTN)** – using Beauvais & Buskirk's 1999 formula.

Index of abundance = $\frac{\text{Captures} \times 100}{\text{CTN}}$

i.e. $1800/42.5 = 42.4$ captures per 100 trap rounds.

The same calculation can be done on the survey that was carried out in 2008. Here, the results were as follows:

14 traps set for 6 rounds = 84 trap rounds

13 captures and 8 fails (discounting 4 instances of traps that showed signs of use and had not triggered, but were not stuck/faulty)

Correcting for sprung/stuck & captures = $84 - 10.5 = 73.5$ CTN

Index of abundance = **17.7 captures per 100 trap rounds**.

The calculation can also be run on the subset of 6 trap locations that were used in both the 2008 and the 2013 surveys. This gives the following results:

2013

6 traps set for 4 rounds = 24 trap rounds

9 captures and 1 fail

Correcting for sprung/stuck and captures = $24 - 5 = 19$ CTN

Index of abundance = **47.4 captures per 100 trap rounds**

2008

6 traps set for 6 rounds = 36 trap rounds

11 captures and 6 fails

Correcting for sprung/stuck and captures = $36 - 8.5 = 27.5$ CTN

Index of abundance = **40 captures per 100 trap rounds**

Comparing the captures per trap rounds between the 2013 and 2008 surveys shows an increase in the abundance of small mammals at Carr House Meadows. This could be explained by the different location of the traps, which were spread out more across the reserve, including placements in wilder/rougher areas such as Field 7 and Field 6, where the habitat may be more suitable for small mammals.

To double check this, re-running the comparison for the trap locations used in both surveys shows a smaller increase in the index of abundance – however this is still an increase of 18% from 2008 to 2013.

5.1.1 Bank Vole

The bank vole is a very common small mammal across much of mainland Britain. It supplies a large part of the diet of tawny owls and animals such as weasels and stoats, so although its population is high (estimated at 25/ha in spring according to the Mammal Society website), it is important to consider its conservation to maintain abundance.

Bank voles typically live in mature deciduous woodland, particularly where thick field and shrub layers exist, but are also found in young deciduous woodland and hedgerows or areas with dense ground cover, particularly brambles. They need a good supply of water which they typically get from their food (berries, seeds and plant leaves).

At Carr House Meadows, bank voles were the most common species trapped (14 individuals). On the northern half of the reserve, they were found in two locations – traps 10 and 12 – which were at the boundary with the coniferous woodland between the reserve and More Hall Reservoir. On the southern half of the reserve, bank voles were trapped in locations 6, 7 and 3. At location 3 bank voles were trapped every round, this trap was located at the edge of deciduous woodland next to long grass and formed a very suitable habitat. It is possible that some of the captures at this location were recaptures of the same individual. Trap 7 was near a boundary with Carr House Lane which has a strip of woodland/mature hedgerow along it, and which is adjacent to an area of plantation woodland. Trap 6 was in a very scrubby, 'wild' area near a pond. All of the locations where bank voles were trapped had suitable thick field and shrub layers and most had woodland immediately adjacent.

Recruitment into the population is at its peak at this time of year and this may be why so many bank voles were trapped; half of the voles trapped were juveniles.

In 2008 bank voles were trapped on five occasions.

5.1.2 Wood Mouse

The wood mouse is found throughout the British Isles and is our most common and widespread wild rodent. It lives mainly in woodland and fields but can be found in a variety of habitats including scrub, gardens and allotments. They are predated on by tawny owls (and presumably other birds of prey such as buzzards, one of which was sighted during the survey), foxes and weasels.

Conservation measures are not considered necessary due to the abundance of this species. They have a very catholic diet, eating seeds, green plants, fruits, buds, caterpillars, worms and centipedes, blackberries and fungi.

At Carr House Meadows, only four individuals were trapped (with a probable further individual leaving signs on an untripped trap). None were found on the northern half of the reserve. Wood mice were trapped at locations 4, 7 and 8. Traps 7 and 8 were along the bank of Carr House Lane on either side of an area of plantation woodland. Trap 4 was towards the southern boundary of the reserve, along a stream and near an area of deciduous woodland.

It is possible that fewer wood mice were trapped than might be expected because of their nocturnal nature; bank voles are active during the day, so it is possible that they located and triggered traps before the wood mice were fully active. In 2008 five wood mice were trapped.

5.1.3 Common Shrew

The common shrew is found throughout Great Britain (except Ireland) and is one of our most common mammals. It is found abundantly where low vegetation occurs, particularly in rough grass, hedgerows, scrub, deciduous woodland. The common shrew is very territorial. They are predated by owls, weasels, stoats and foxes.

They are carnivorous and insectivorous, eating slugs, insects, spiders, worms and small mice, and need to eat every 2-3 hours, as they need to consume 200%-300% of their bodyweight each day to survive. Conservation measures are not considered necessary due to their abundance.

No shrews were captured during the 2013 survey, however in 2008 three common shrews were trapped. It should not be assumed that shrews are not present; if the survey had lasted for more trap rounds it may be that shrews would have been captured.

5.2 Location of catches

Due to the size of the nature reserve and the limited number of traps available, it was not possible to cover the entire reserve. In 2008 the traps were located mainly at the centre of the reserve, so this survey aimed to repeat the most successful trap locations from the previous survey, but also to survey the east and west areas of the reserve where traps had not previously been placed.

The location of catches focussed on three main areas:

1. The northern boundary with the coniferous plantation woodland between the reserve and More Hall Reservoir;
2. The northwestern boundary of the southern section of the reserve with Carr House Lane, including the rough scrub in Field 7 and either side of the plantation woodland in Field 11;
3. The centre of the southern boundary where the reserve abuts onto Spout House Wood.

The areas where traps were successful had suitable habitat for bank voles and wood mice as per the species descriptions.

The traps that were unsuccessful were generally not located very close to woodland; for example Traps 1 and 2, despite being along a boundary between fields, were relatively isolated and not linked directly to scrub or woodland. Trap 9 was in a wetter area alongside a stream, and Trap 4 was initially placed beside a stream before being relocated under bramble. These streamside locations were not successful; however other traps located in scrub slightly away from a stream (e.g. traps 8 and 12) did catch small mammals.

Trap 5 was set in a location that had been successful in the 2008 survey, and that backed onto woodland in suitable habitat; however in this survey no small mammals were trapped. This was unexpected; perhaps it was badly placed.

It should be noted that 2013 was an excellent fruit/nut year and there were plentiful ripe blackberries and hazelnuts present across the site in the hedgerows, with plenty of field signs on the hazelnuts of squirrel, mice and voles. There was also a high level of insect activity. The abundance of wild food may have impacted on the success of the traps i.e. small mammals did not need to forage very far to find food, so were perhaps less likely to encounter the traps.

5.3 Conclusions and recommendations

The high capture rate of 42.4 per 100 trap rounds is encouraging and shows that the habitat is suitable for small mammals, particularly bank vole which were abundant on site.

Bank voles were present over the whole area of the reserve so the habitat available is obviously suitable. There are no additional management recommendations to make, other than to ensure that areas of scrub are maintained, particularly where they border woodland or Carr House Lane.

Wood mice were only trapped in the southern part of the reserve. They may be more plentiful on the reserve than the trapping indicates; the high availability of natural foods, and the possibility that bank voles may have investigated and triggered traps before the nocturnal wood mice were able to, may explain the low numbers. Alternatively it could be part of natural fluctuations in population.

Common shrews were not trapped during this survey despite being present in 2008. This is not an immediate cause for concern but may become one if none are trapped in a future survey.

The length of the survey was adequate to get a good sampling rate and any future surveys should be done over multiple nights/mornings. There did not appear to be any requirement to lock the Longworth traps open for a night to allow mammals to become familiar with them.

The location of the reserve is remote, and the reserve is large. This makes laying out, checking and retrieving the traps more difficult than on a smaller reserve such as Centenary Riverside. 13 traps took roughly 2 hours to check, walking a distance of 2.67 miles up and down an elevation range of 200 feet. Additional traps could only be used if there were a team of volunteers sharing the checking.

As small mammals are often popular with the public, a public event was held on the Sunday morning, which was attended by six people. Future small mammal surveys could provide an opportunity to get local volunteers involved as part of community engagement work. Having a larger pool of local volunteers might also mean a survey could take place over a longer time period as there would be more resource available to check and reset traps.