



British Hedgehog
Preservation Society

people's
trust for
endangered
species

Guidance for detecting hedgehogs using footprint tracking tunnels



By Emily Thomas, Key Species Monitoring Officer PTES
& Emily Wilson, Hedgehog Street

Contents

Why survey for hedgehogs?	P. 3
Introduction to tunnels	p. 4
Methodology for surveying with footprint tunnels	p. 4
Potential problems and how to deal with them	p. 7
Footprint identification guide	p. 7
Appendix 1: Health and Safety	p. 23
Appendix 2: Example recording sheet	p. 27

**HEDGEHOG
STREET** 

CITY OF WILDLIFE

Hedgehog Street is a joint project run by People's Trust for Endangered Species and the British Hedgehog Preservation Society

hedgehogs@ptes.org

www.hedgehogstreet.org

Why survey for hedgehogs?



The hedgehog is one of the most popular wild animals in Britain. It is also in severe decline in rural areas, with their numbers plummeting by half since the millennium. The rate of decline is unsustainable, and although the hedgehog is currently a widespread and common species in the UK, their future is increasingly uncertain.

Hedgehogs consume a wide range of invertebrate prey and so act as indicators of a healthy natural environment. The effect of the loss of a mammal that was formally so abundant is difficult to predict, but unlikely to be positive.

Hedgehogs are notoriously difficult to study, particularly as they are nocturnal and so typically only active at night. They usually frequent habitats where access can be limited or they can be difficult to detect due to their association with dense vegetation.

Until recently we have had no reliable way to determine whether they are present or absent at a site. Distribution maps have relied on unstructured public surveys. Previous survey methods were expensive and/or involved significant periods of night-time work.

Now a simple footprint tunnel can tell you whether hedgehogs are present on your land, without the need to be out surveying at night.

Please refer to our ***Helping Hedgehogs on your land*** guide for land management actions that are hedgehog friendly.

Introduction to tunnels

The document is designed to help anyone who may want to see whether hedgehogs are present on their land.

Hedgehogs leave very distinct footprints and these can be used to determine whether they are present at a site. Footprint tunnels are simple, plastic triangular tunnels with a removable insert to which A4 paper is attached and ink painted on either side of a dish of bait (see below). As a hedgehog moves through the tunnel, it leaves footprints on the paper which can easily be identified. No species licence is required to use them.

This technique was devised from research initially undertaken by Nottingham Trent University, University of Reading and The Mammal Society, in a project funded by PTES and BHPS.

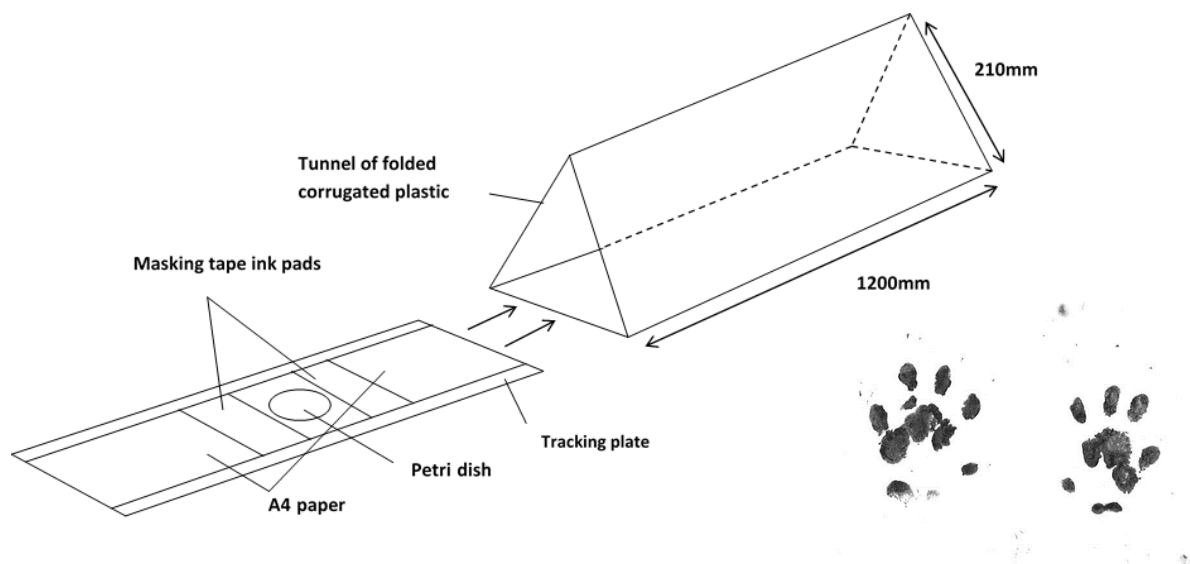


Figure 1. Hedgehog tracking tunnel diagram (adapted by Emily Thomas from Yarnell et al. 2014)

Method: Using tracking tunnels to detect hedgehog presence or absence

By placing your tunnel along different boundaries across your land, you can see whether you have hedgehogs present and if so, which areas they are using. Positioning of the tunnels is critical, and they should be checked each day. The technique can not currently be used to estimate abundance.

Timing

Hedgehogs can be surveyed for at any time during their active period, between April and October in the UK.

Ideally, its best to leave the tunnel out for 5 nights at each location across your land. All fieldwork can be undertaken during daylight hours.

Day 1	Day 2	Day 3	Day 4	Day 5	Day 6
Prepare the tunnel and put out	Check & rebait tunnel	Check & rebait tunnel	Check & rebait tunnel	Check & rebait tunnel	Final check and move to new location
Night 1	Night 2	Night 3	Night 4	Night 5	

Table 1: timeline for surveying

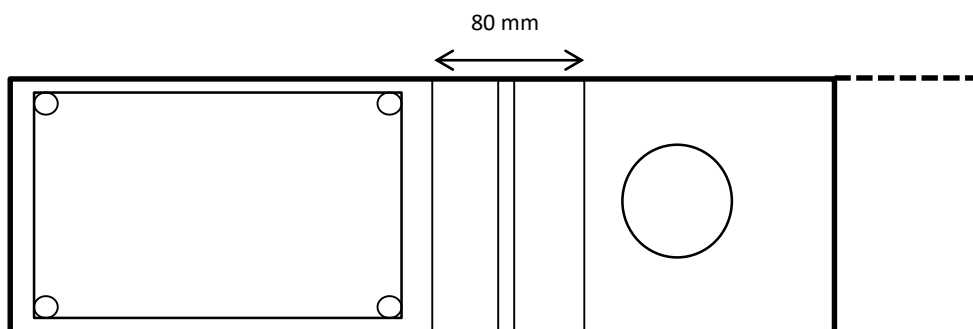
Equipment checklist for preparation day

- 1 footprint tunnel
- 1 jam jar with lid containing mix of vegetable oil and charcoal powder (powder comes with the tunnel)
- 1 pack of dry commercial hedgehog food or poultry flavoured cat biscuits
- 1 paintbrush
- 1 plastic bag to put oily kit in when not using
- Recording sheet
- A4 paper to put at either end of the tracking plate (and spare to be able to change each day)
- Butterfly fasteners (or paper clips) to fasten the paper to the tracking plate
- Masking tap
- 1 food tub (made from the bottom of a plastic container e.g. plastic picnic cup), with blue tack/doubled over sellotape on the base to attach to the tracking plate

Punch a hole in the base of the tunnel close to the edge of either end for pegging (this is best done with a hole borer or you can use a sharp pair of scissors).

Attach two sheets of A4 paper to the base plate using the 4 butterfly fasteners (or paperclips) per sheet.

Add a band of masking tape 80mm wide on either side of where the food will go, ensuring the tape overlaps itself on the underside of the tracking tape (so that it remains secure). The tape may also need to be overlapped on top to make up sufficient width to ensure the hedgehog cannot step over the 'ink' pad (see below).



Putting out the tunnel (day 1)

Choose a suitable location on your land to put out your tunnel. Placing the tunnel along boundaries where hedgehogs are more likely to be travelling or nesting is best (e.g. hedgerows, walls or fences).

Tunnels need to be

1. positioned along (i.e. in line with, lengthways) linear features (e.g. hedges, walls, fences, boundaries between different vegetation types)
2. positioned in places where hedgehogs will preferentially walk: short grass>long grass>bare soil>crop>ploughed field
3. positioned so that the entrance is flush with ground level at either end
4. located so as to minimise interference from livestock

(See examples of tunnels in position below)



When you have decided upon a position for your tunnel, assemble the tunnel. Use the paint brush to apply the carbon/oil mix (1-2mm thick) to completely cover the two areas of masking tape on the upper side of the tracking plate. Place a small handful of hedgehog food in the food tub and then attach to the middle of the tracking plate. Put the tracking plate carefully back into the tunnel, so as not to spill any. Then carefully position the tunnel, pegging it down if necessary.

Checking the tunnels (day 2-6)

Kit checklist: data recording sheet, pen, A4 paper, spare fasteners/paperclips, hedgehog food, oil/carbon mix in jar and paintbrush in bag.

This can be done at any time of day. Morning checks are likely to preserve the prints in best condition (especially in wet weather), but evening checks may avoid the bait being tampered with during the day (e.g. by dogs).

Check the tunnel for prints of all animals. Ensure the food is replenished and replace any sheets that have prints on or any damaged sheets (e.g. rain, slugs). If you have to remove the tracking plate,

then it's worth reapplying the carbon/oil mix. Make a record on the data sheet of whether prints were present.

Move the tunnel to a new location after you do the final check (day 6).

Potential problems and how to deal with them

Potential problem	Solution
Slugs eat the paper footprint sheets and damage the prints	In wet weather ensure the tunnel is checked early in the morning, and the paper sheets are refreshed.
Livestock eat or damage the tunnel	Try to avoid surveying fields with livestock present – instead place the tunnel on the other side of boundaries adjoining fields containing animals.
Tunnel blows away	Use tent pegs to secure tunnel.
Tunnel is damaged by other animals e.g. dogs, badgers	No way of avoiding this, although it should be rare. Pegging down your tunnel may help. In public areas tunnels can be located along linear features that are less accessible to dogs.
No linear features on the site	Only infrequently will sites be completely lacking of boundaries of any type. Any transition between vegetation types can be used to site the tunnels. Hedgehogs prefer to walk on grass over ploughed soil. If the site is completely homogenous place the tunnel near farm buildings or garden boundary.

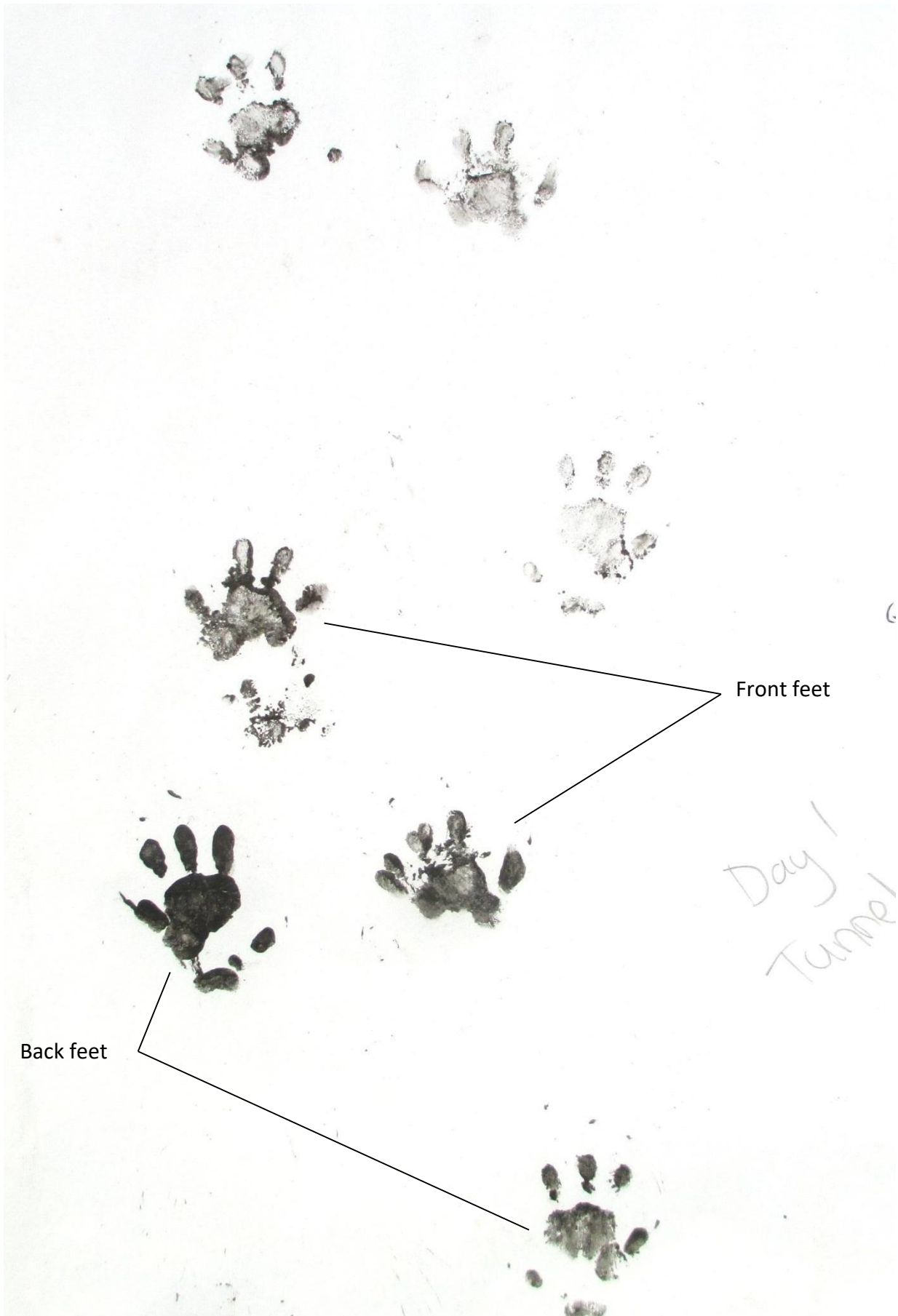
Footprint identification guide

All previous guidance on footprint identification has been based on prints from impressions in sediment, sand or snow. These will look quite different to prints made on paper by inky feet.

Below are examples of prints made in tunnels by hedgehogs and some other common species.

Scale: all footprints are scaled to be life size if page is printed on A4 paper.

1) Adult hedgehog



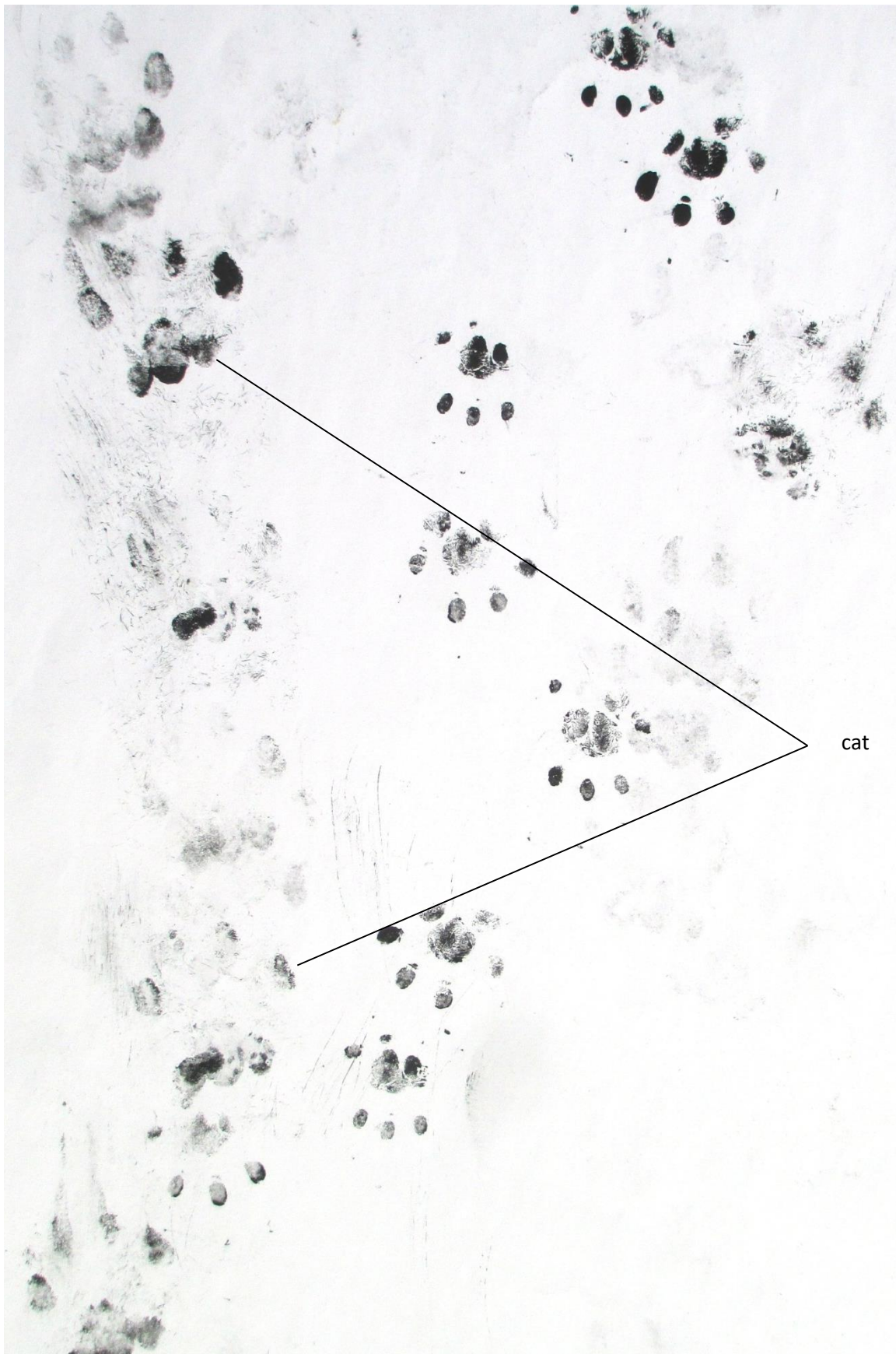
2) Adult hedgehog



3) Juvenile hedgehog



4) Hedgehog and domestic cat



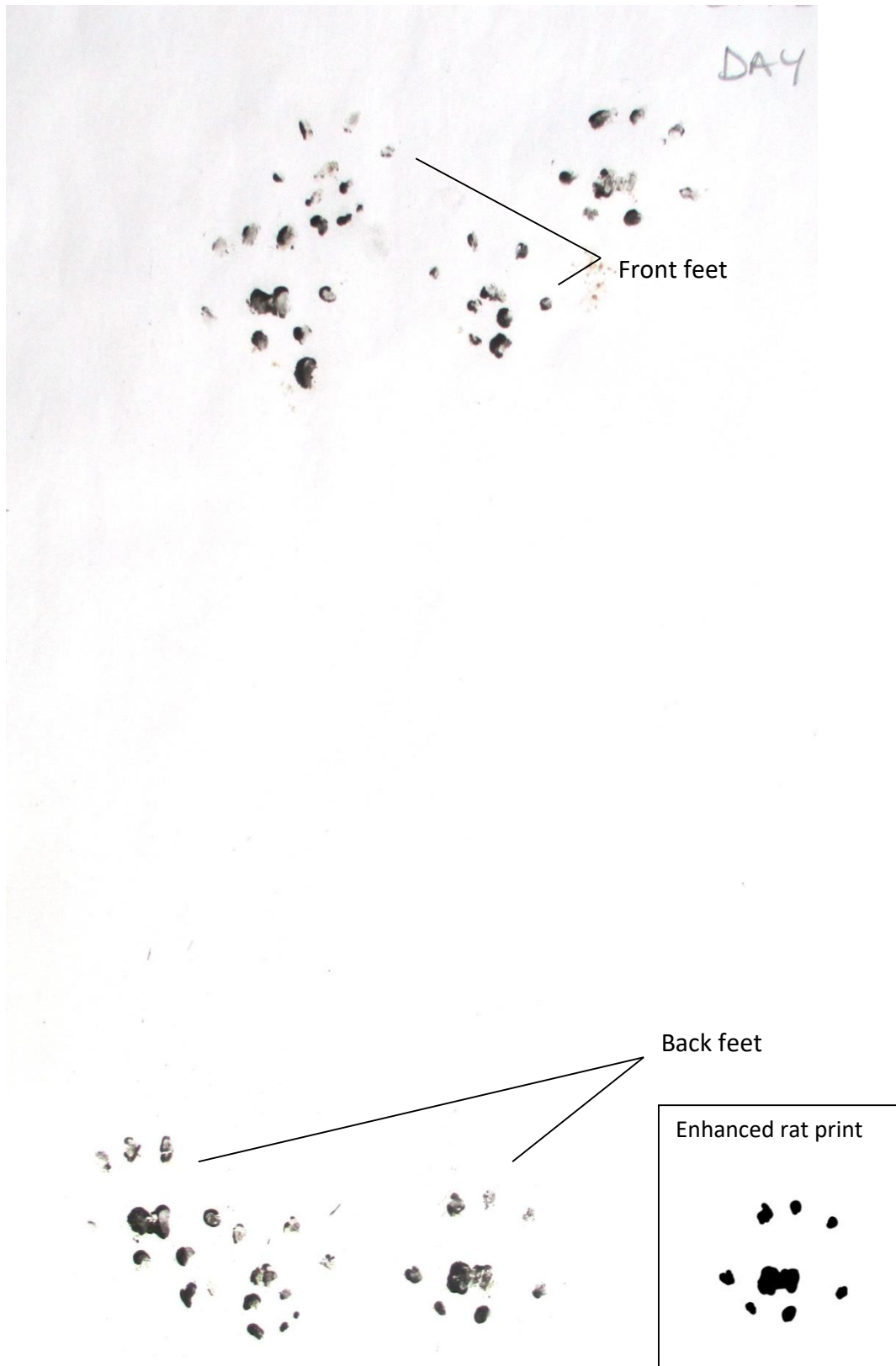
5) Hedgehogs and small rodents



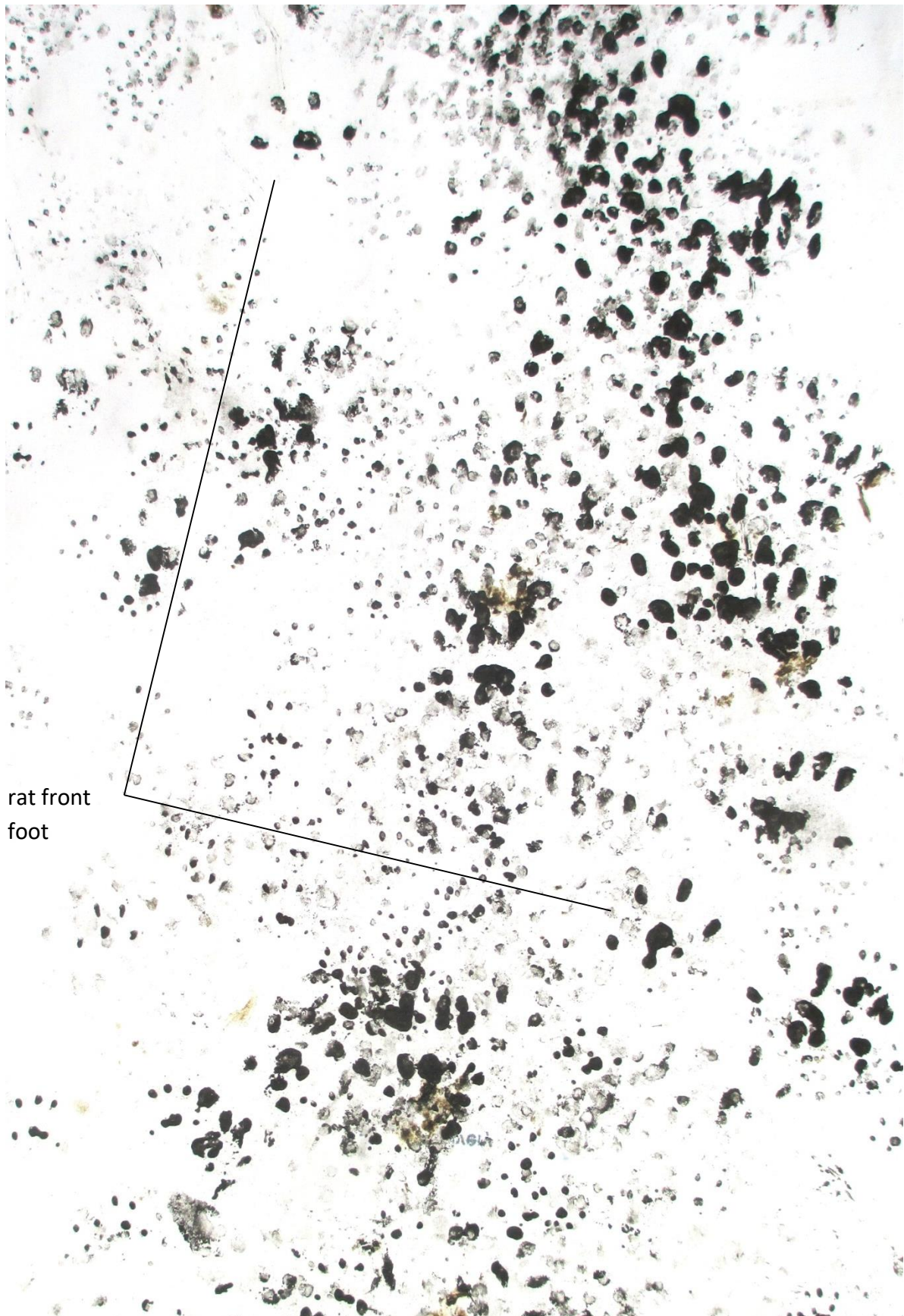
6) Hedgehog and bird



7) Brown rat



8) Brown rat and smaller rodents



rat front
foot

9) Domestic cat



10) Badger



9/15/15
10

11) Fox

450 T.
Dang
1/7



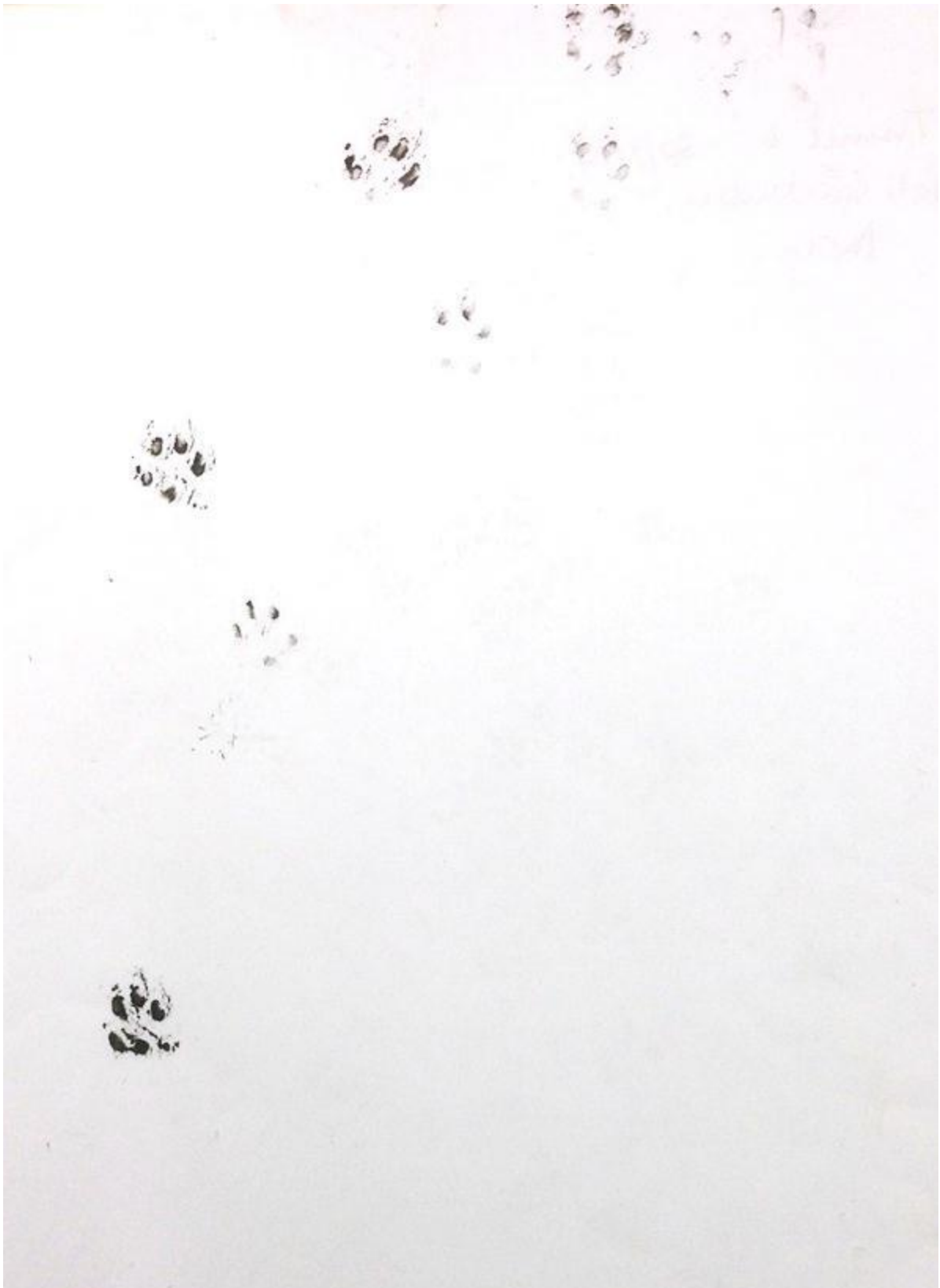
121) Grey squirrel and small rodents



Squirrel prints

Red 685
24/3/4

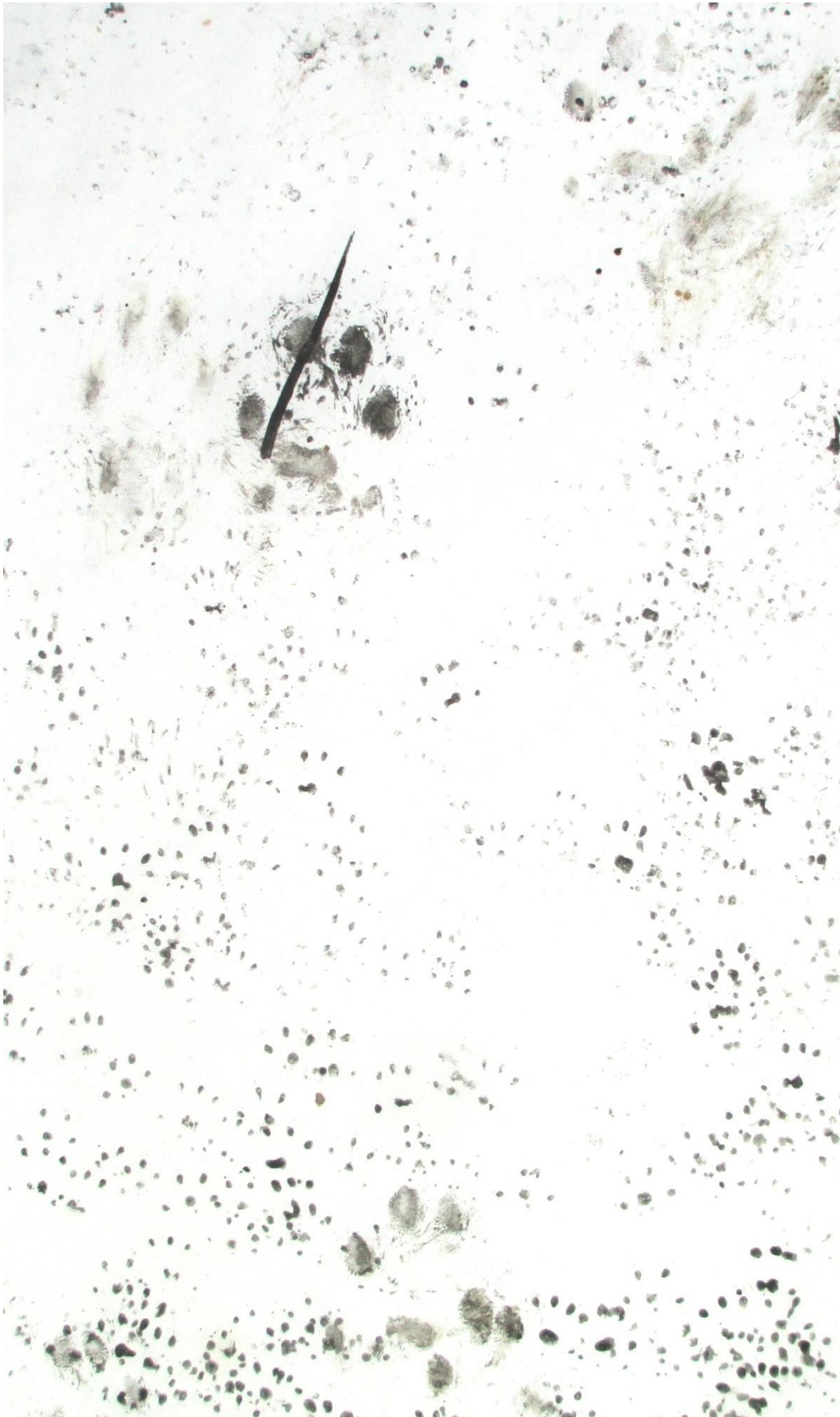
13) Weasel



14) Common toad



15) Polecat



Appendix

Appendix 1: Health and Safety

You are responsible for your own health and safety and should never put yourself or others in a position that could be dangerous. If at any point you have concerns about your own health and safety or that of others, you are strongly advised not to undertake/continue the activity.

Please take care with personal safety during the course of your survey. Field studies in the vicinity of water can be hazardous, especially if there are steep banks, so where possible it is best to work in pairs. We can take no responsibility for personal injury incurred by volunteers during the course of their surveys.

Access permission - Before commencing fieldwork you must obtain permission from the relevant landowner(s). Use this opportunity to ask landowners about the location of any potentially hazardous animals or natural features on their land. Heed any warning signs present on the land you are surveying. If access is granted but later revoked you must not continue with your fieldwork.

Park legally and sensibly, preferably off-road. Do not park in passing places. Take care to ensure entrances are not blocked and traffic is not obstructed.

Personal equipment - Wear appropriate clothing and footwear for the terrain and weather conditions you are working in. Remember that older boots and shoes may lack the grip necessary for working in and around water. The weather can be unpredictable so ensure that you have suitable clothing for all weather conditions. Carry a torch, spare batteries, a compass, whistle, first aid kit, a survival bag and high-energy food.

Be aware that it is likely you will get ink on your hands and this may transfer to your clothing and equipment. Try to use items you do not mind getting dirty as the ink may not wash off. If you are concerned please take extra care and you may want to consider using disposable gloves to protect your hands. You may want to put a plastic sheet or bin bags down in the car just in case any ink on the tunnels were to transfer to the upholstery. We are unable to reimburse you for and damage the ink may cause to any clothing, possessions, equipment or belongings of any kind.

Contact - If possible avoid lone working. However, it is recognized that in some situations it will not always be possible to avoid lone working and in these situations particular care should be taken. Never go into the field without informing a responsible person of where you are going (for more remote areas a grid reference is particularly advised) and when you expect to return, how you intend to travel to (and access) your site and who to contact if you do not return when expected. Consider also leaving your vehicle registration details with a responsible person. Ensure that you have a well formed contingency plan if you do not return when expected. Always carry a fully charged mobile telephone with you. Mobile phones may not work in some remoter areas and it is advisable to locate the nearest public telephone box or nearest inhabited house to your survey site.

Weather - Be aware that hazards may increase in rain, strong winds and thunderstorms. If particularly bad weather is encountered do not commence your survey or cease it if already started. Surveying in heavy rain, strong winds, thunderstorms and temperatures of below 70C is not advised.

Assessing your site - All fieldworkers should consider the particular hazards that are associated with their site/s. Identify potential hazards before you commence your survey. Assess your individual circumstances and medical conditions in relation to the potential hazards on your site before choosing to undertake the survey.

Health and safety reporting - If volunteers are to be accompanied by other people in whatever capacity, the information provided in this document should be passed onto these other people. Any particular health and safety concerns that you have about your site/s or the safety methods should be reported to us.

Livestock - Care should be taken when entering areas with livestock, particularly cattle, rams and horses. Do not enter fields containing bulls and be especially careful around cows with young calves as they can be particularly protective of their young. If you have any concerns remove yourself from the situation. Rutting deer can also be aggressive in autumn. If you intend to take your dog while surveying ensure that you keep it on a lead and under control at all times. If possible leave it well cared for with family or friends.

Dogs – Be aware that many farms have working dogs on them and some may be aggressive. Check with the land owner before proceeding with any field work. If you are confronted with a dog and feel unsafe, stop the survey and remove yourself from the situation. Do not run as the dog is likely to chase you; instead walk slowly and calmly away. It is likely the dog is just curious and can smell the bait you are carrying.

Farm machinery - Farm machinery should not be touched at any point. Avoid fieldwork in close proximity to working agricultural machinery. Do not stand / walk where stones and other debris may be flung up e.g. behind a flail mower.

Terrain - Please take extra care when surveying along watercourses, cliff edges, areas of boggy ground, reed beds and loose rock. Wear appropriate footwear and never cross rivers unless via a bridge. Avoid hazardous areas such as quarries, railway lines and ravines and do not attempt to climb steep slopes, walls or fences. If fieldwork is being carried out along roadsides wear bright-coloured clothing and if walking along roads ensure that you walk facing on-coming traffic. Take particular care on blind bends in the road. Have somebody keeping watch for traffic.

Where possible avoid muddy or boggy areas. If moving through these areas is unavoidable test every footstep on the ground before putting your weight on your feet. Proceed slowly and push a stick into the mud to test its consistency and depth before proceeding.

Human confrontation - If you have any concerns about your personal safety at any point then cease surveying and remove yourself from the situation. Carry a personal alarm. Carry some identification to confirm the survey you are involved with. Avoid working alone. Consider the privacy of residents, particularly when working in and around residential areas.

Diseases - Volunteers may be exposed to disease during survey work.

Handling of faecal material from wild small mammals presents no danger of disease provided that reasonable precautions are taken to minimise any possible risks. Remember to wash your hands after collecting the tunnels from the sites and after extracting faeces, and especially before eating, drinking and smoking.

Cuts or abrasions on the hands should be covered by sticking plaster or rubber gloves. Take particular care with these simple precautions at sites where brown rats are common since here there may be a risk of Weil's disease. 21

To reduce the risk of spreading disease, ensure footwear and outdoor clothing is cleaned before and after fieldwork. Follow any bio-security measures present on the land you are surveying, e.g. use disinfecting mats at gates etc.

If disease is expected or you feel unwell at any time after carrying out your survey then consult your doctor immediately explaining the type of fieldwork you have been involved in, including details of the mammal species that you have come into contact with. While not common, the following diseases can have severe effects and in rare cases can cause death:

1. Tetanus – This is caused by the bacterium *Clostridium tetani*, a common micro-organism found in soil. The infection of minor wounds and scratches can result in tetanus. All skin wounds should be covered before fieldwork is commenced and anti-tetanus treatments should be kept up to date. Always wash your hands after completing field work and before eating, drinking and smoking.

2. Leptospirosis (Weil's disease) – This bacterium is carried by rodents, particularly rats, and is excreted by their urine. This disease is commonly found in water and as for tetanus ensure that all wounds are covered and avoid contact with water that may have been contaminated by rat or cow urine. The footprint tunnels are also possible reservoirs for Weil's disease. Wash hands thoroughly before eating, drinking and smoking. If you suffer from flu-like symptoms following field work, contact your doctor immediately and mention Weil's disease.

3. Lyme disease – The bacterium that causes Lyme disease is transmitted via the ticks of various species including deer, sheep and pheasants. When surveying in long grass or forested areas with thick undergrowth wear long trousers and long socks. On completing field work check exposed skin for ticks and if found remove. If a tick is found and you contract flu like symptoms contact your doctor and explain that you may have been exposed to Lyme disease.

4. Tick-borne encephalitis – This is a viral disease carried by animal ticks. There is a vaccine for this disease if prolonged exposure to tick-infested areas is a possibility. In Britain and Ireland a similar disease known as 'Louping ill' is also present. This is particularly associated with grouse and hares in moorland regions and has similar symptoms to tick-borne encephalitis ranging from flu-like symptoms to severe symptoms requiring hospitalisation.

5. Salmonellosis – This bacterial infection is common in rats and mice. If the bacterium is ingested as a result of poor hygiene, then mild to severe food poisoning will occur.

For further information on Health and Safety issues, visit the Health and Safety Executive website www.hse.gov.uk (tel.: 0845 345 0055). The following downloadable HSE guides are particularly relevant:

INDG163(rev2): Five steps to risk assessment

INDG73: Working alone in safety

Appendix 2: Recording sheet

Tunnel location (as many as required)	Day 1		Day 2		Day 3		Day 4		Day 5		Total number of days hedgehog prints detected
	Footprints present?	Bait taken (y/n)	Footprints present?	Bait taken (y/n)	Footprints present?	Bait taken (y/n)	Footprints present?	Bait taken (y/n)	Footprints present?	Bait taken (y/n)	
1											
2											
3											
4											
5											
6											
7											
8											
9											
10											
Total											

Footprints Dash (-) = no prints; H = hedgehog; B= badger; C = cat; R= rodent; U = unknown; All other species written in full.
Please note that the prints of more than one species may be present (e.g. H + R)

Bait taken Please mark yes or no

Total Please indicate the total number of tunnel locations across your site where hedgehog footprints were detected.