Spot A Hog

Instruction for citizen scientists

General description of the project

"**Spot a hog"** is a pilot project to test the potential of monitoring hedgehogs in gardens using camera traps owned by the public. Our focal species is **the West European Hedgehog** Erinaceus europaeus, whose population has been undergoing **a historic decline** in the UK. To identify the reasons for, and the extent of, this decline we need data from across the country.
Camera traps, also known as trail cameras, are widely applied in wildlife monitoring. Some amazing initiatives, such as the National Hedgehog Monitoring Programme, use camera traps to estimate the density of various species. However, camera traps are also increasingly used by private users **to** observe wildlife in their gardens. This data holds great potential for monitoring urban species, as it can provide **information on a range of species** in a habitat often not represented in scientific studies. This is also an especially important habitat for hedgehogs, as currently they are more frequently observed **in urban than in rural areas**.
In this study we would like to test the potential of using data obtained from privately owned camera traps for monitoring hedgehogs and estimating their density**:** a **'gold standard'** in wildlife monitoring. We will be using a **novel method** that requires some additional steps to work out how animals move in front of the camera, and we need your help to do it!

We welcome anyone who already has a camera trap (or will get one before the start of the survey) in **May 2025**. You will need to set up your camera according to a protocol (described below), record some information about your camera's field of view and leave it on for a maximum of **1 month**. After this, we ask that you upload the images to MammalWeb.org, which is a citizen science platform for camera trap research. The images will then be available to the public for **spotting** (i.e. classifying images by species) and the results will be analysed by the project team. We will also ask you to fill in an anonymous **online survey**, asking about your experiences and suggestions for future improvements to our method.
Participation in the project is voluntary and only for people above 18 years old, but children can join if supervised by an adult.
For terms and conditions and our GDPR policy, please see Appendix 1 of this document.

Impact of the project

The West European Hedgehog population is in decline in the United Kingdom. Currently, hedgehogs are classified as **"Near Threatened"** with extinction in Europe by the International Union for Conservation of Nature (IUCN). To understand the reasons for this decline, we need to identify habitats that sustain healthy hedgehog populations, as well as factors that contribute to declines in hedgehog numbers. This can be done by collecting data of high quality on a national scale. This project will investigate if the citizen science approach can help us to collect this type of data and answer the questions of importance for the conservation of hedgehogs.

Spot A Hog

Instruction for citizen scientists

Who can join?

- participation is free
- we welcome anyone! (children should be supervised by an adult)
- you need to have your own camera trap by the start of the survey in May 2025
- we collect data from the UK only, but future surveys may extend to other European countries

How does it work?

- set up a camera trap before May following our protocol
- calibrate the camera using our instructions
- leave the camera for the maximum of 30 nights
- upload the images to a citizen science platform MammalWeb.org

Steps in project participation

1. Installing the camera trap
2. Calibrating the camera trap
3. Uploading the images to MammalWeb.org
4. Classifying images (optional).

Installing the camera trap

1.Camera requirements

Camera traps, or **trail cameras**, are devices used for monitoring wildlife. Depending on the type, they can be activated by triggers or sensors and take images and/or videos, when activated.

There are different brands of camera traps available. **Good news- we accept all of them!** However, to ensure that we can compare the data between the different camera trap types, we need to ensure that each camera trap is working on similar settings.

- If you already have a working camera trap, please adjust the settings for the period during which you participate in the survey.

- Please note- we do **not accept** footage from CCTV-like cameras with continuous recording; also, we cannot make use of isolated photos of animals.

Installing the camera trap

2. Settings of the camera

Below you will find the list of settings to use on your camera trap. This is to ensure that we can compare the results obtained by different cameras. If you have questions regarding your camera settings, please email paulina.pawlikowska@ntu.ac.uk.

- **Photos only**

Please set your camera for photos only. Unfortunately, we cannot accept video footage, due to challenges associated with storing and analysing this format of data.

- **Burst mode/sequence/ continuous shooting**

Set your camera to take multiple images (3-10) once activated. This will increase the probability that the animal will be captured in the image if it is present in the area.

- **Correct time and date**

Set the correct date and time on your camera trap. Make sure that the camera has enough battery and memory card space before the start of the survey. If your camera has an option of timestamp- please turn it on.

Please note that some camera traps operate on the US date formats (MM/DD/YYYY). Please make sure that the month and day are set accordingly on your camera.

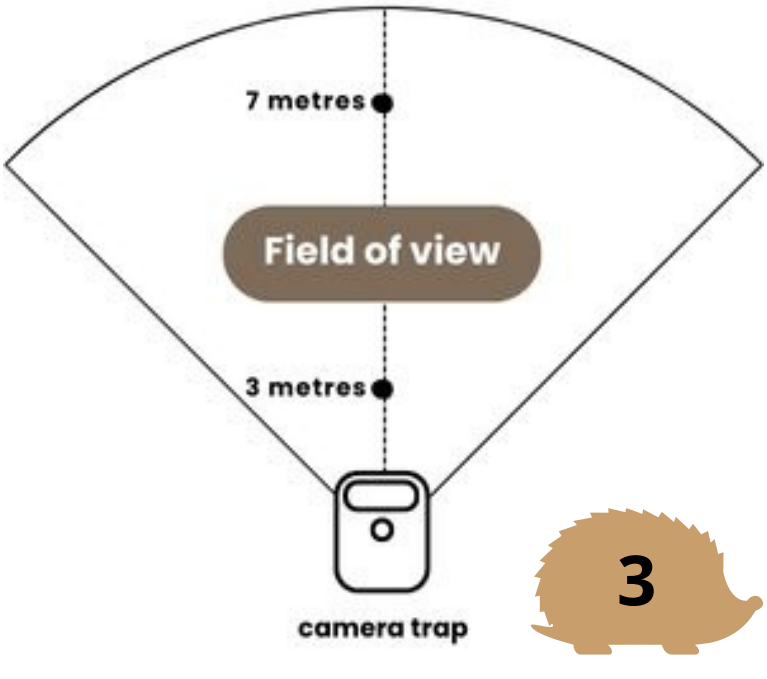
- **Day and night recording/ 24h recording**

Please set your camera for 24h/ day and night recording. Hedgehogs are a nocturnal species but can be spotted during the day too.

3. Installing the camera- you can also check our video tutorial here

- Find an appropriate location

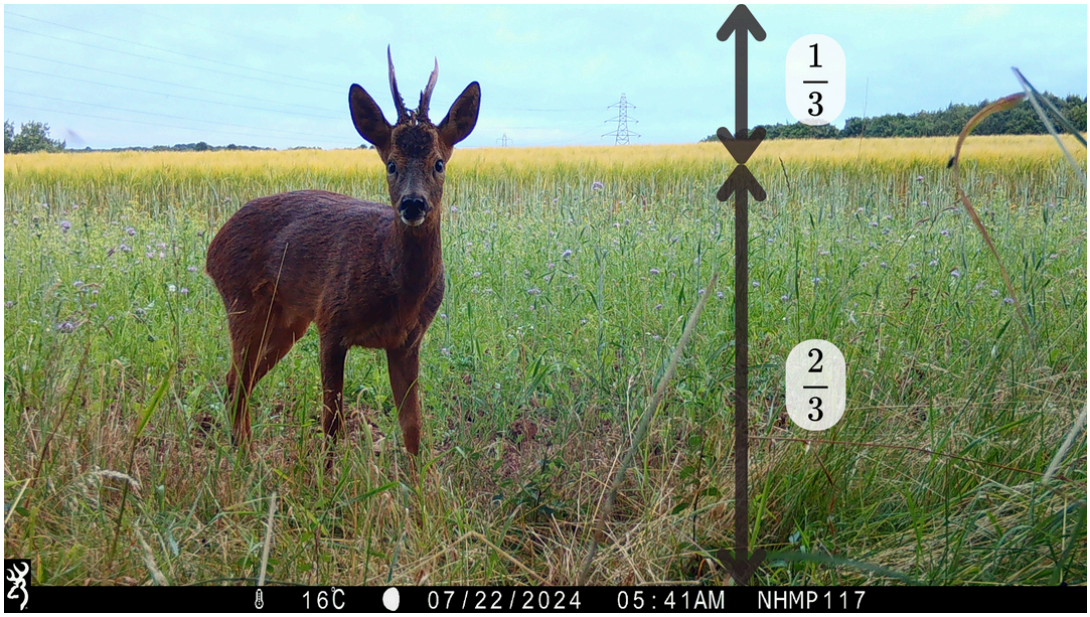
Find a vertical attachment point (fence post or small tree or similar) in your garden that provides a satisfactory field of view for the camera. Field of view is the space in which your camera trap is capturing animals. A satisfactory field of view will cover at least 3 metres back (ideally 7m) and 3 metres wide.



Installing the camera trap

- Attach the camera

Attach the camera tightly, at around 25cm above the ground. It is important that the camera is not moved during the 1-month survey. If you already have a camera, move it to a desirable height. When attaching the camera, pay attention to how it is angled. You want it to be capturing hedgehogs, so it shouldn't point to the ground, as this will miss the hedgehogs that are further away, nor to the sky, as this will miss hedgehogs in front of it. A rule of thumb is that the ground covers 2/3 of the view, while the sky covers the remaining 1/3 (see picture below).



TIP: You can check your camera's field of view by turning the camera on and taking a look at the LCD screen (if your camera has one) if the proportions are as described above. If your camera doesn't have the screen, activate it once attached and check on your computer if the field of view matches the requirements. Adjust it as necessary.

- Clear the field of view of the camera

Remove the vegetation in the immediate surroundings of your camera trap. This is to ensure that the vegetation will not unnecessarily trigger the camera, filling up the camera's memory card.

Well done, your camera is now properly installed! Don't forget to turn it on before the next step!
The survey will take place for **30 days in May**. This means that you need to set up your camera no later than in the first week of May and keep it running for 30 nights. If it is not possible to collect it right after 30 days, up to 7 days of additional recordings is accepted.
Now it's time to calibrate your camera!

Calibrating the camera trap

Why calibrate the camera?

To allow for estimation of population size of hedgehogs, we need to extract certain metrics required by the analytical model that we use. This data includes: the angle of your camera trap's field of view, the distance of the animal to the camera trap and the speed of animal passing in front of the camera. We will extract this data from your camera trap footage, but for us to be able to do this we need you to calibrate your camera. Visit the website of the project if you would like to learn more about the methods of estimating density from camera trap footage.

1.Preparing a calibration pole
First you need to start by preparing a calibration pole. This will work as an object of known size that will help us to understand the distances to animals that will be captured by your camera trap. Below you will find a step-by-step description on how to prepare it. You can also see our video tutorial.
What you will need:

- a 1m pole* that you can buy in a hardware store or online if you haven't got one; the diameter should be at least 25mm
- black tape (2 cm wide) and white tape (5cm wide)
- scissors

*You can also use a broomstick that is longer than 1m, but please make sure that the bars are at appropriate heights as described in the tutorial and that you cover it with a white tape

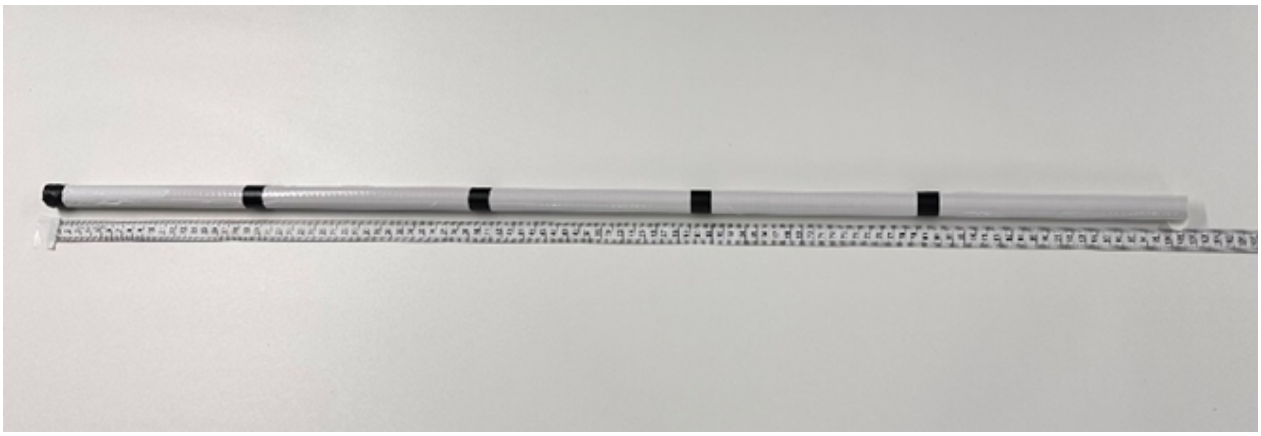
- Cover the pole with white tape

Wrap the pole in the white tape. This step is optional but will help the AI software to recognise the pole for future analysis.

Calibrating the camera trap

- Add black stripes at 20 cm intervals

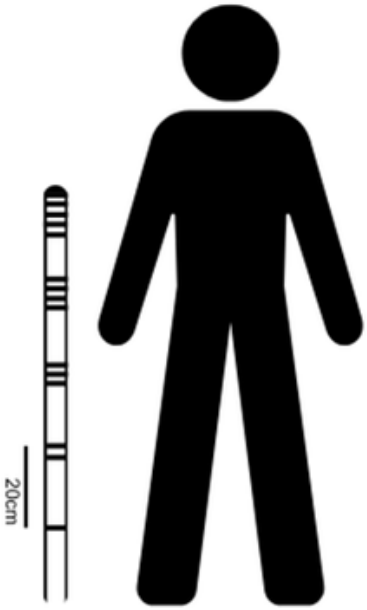
Mark the pole at every 20 cm with a stripe of black tape as depicted below.

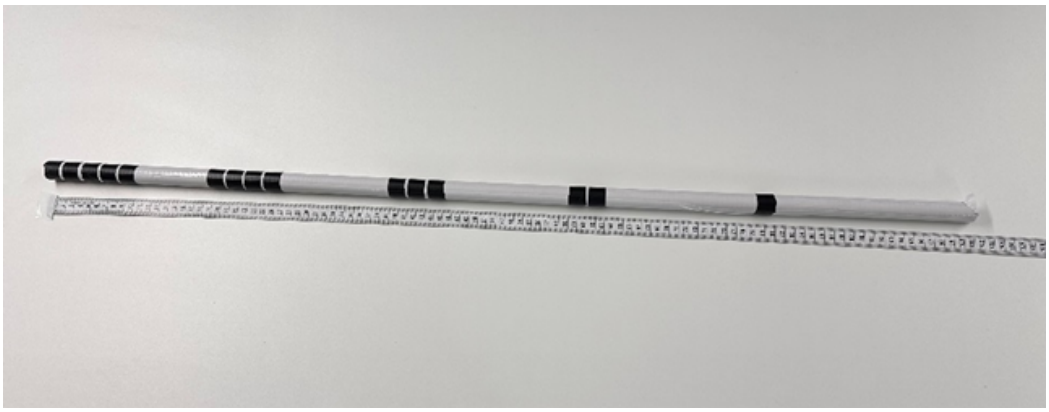


- Add additional bars

Add additional bars of tape below the initial ones.
There should be a total of:

- 2 bars at 40cm,
- 3 bars at 60 cm
- 4 bars at 80 cm
- 5 bars at 100cm, see the graph to the right:





1.Calibrating the camera
Once you have the calibration pole ready, you can proceed with the calibration of the camera trap. This step consists of taking approximately 15-20 images in your camera's field of view. The images have to be at specific distances to the camera (**very important!**). This will let us analyse the distance of the animal from the camera trap and the animal's speed.

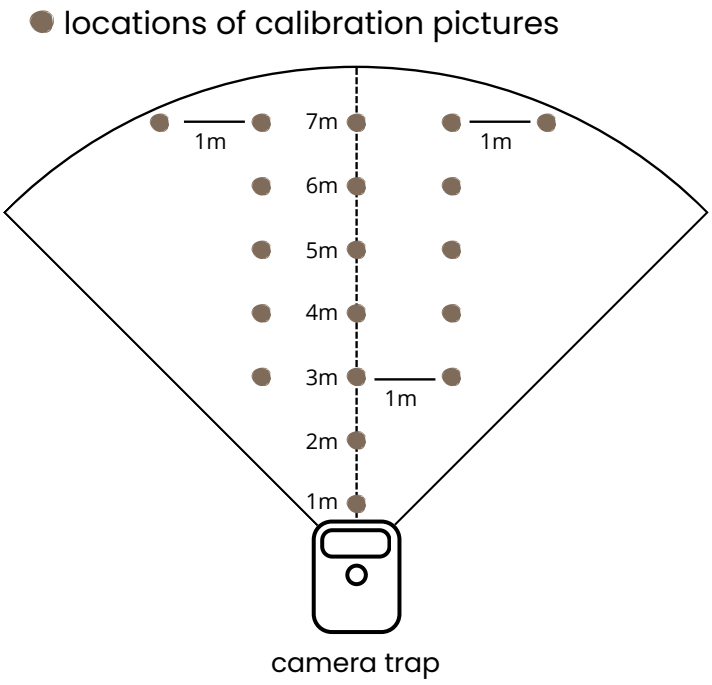
Please see our video tutorial or scroll down for a step-by-step instructions.

Calibrating the camera trap

The goal is to take:

- 1 image at 1 metre from the camera
- 1 image at 2 metres from the camera
- 3 images at 3 metres
- 3 images at 4 metres
- 3 images at 5 metres
- 3 images at 6 metres
- 5 images at 7 metres

The image locations should be 1 metre from each other. Please see the grid on the right:

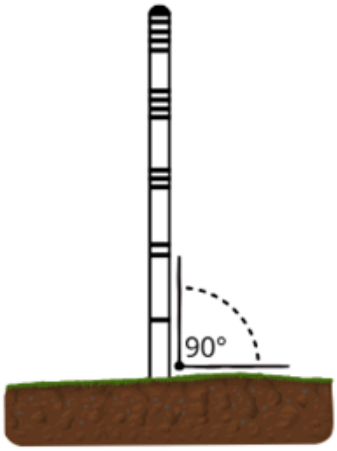


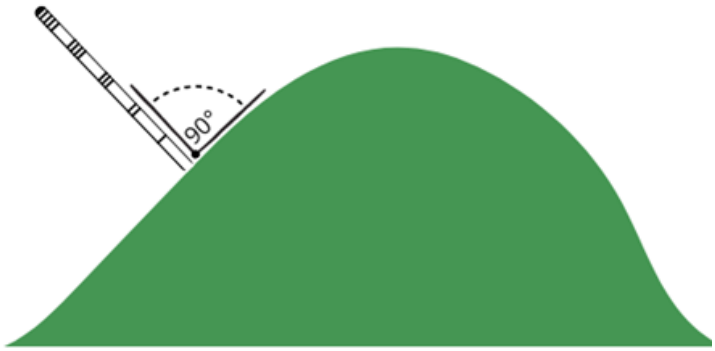
- Start by measuring the distances with a measuring tape. Mark the locations where you need to take the images, following the grid presented above. You can mark them with anything that will be visible to you during the calibration, such as garden pegs, stones etc. Please check on your camera trap if all markers are within the camera's field of view, before moving to the next step.

Calibrating the camera trap

- Take calibration images at previously marked locations

Grab your calibration pole so that you have 5 black stripes at the top. Place it in the previously marked location at a 90-degree angle to the ground. If you are on a hill, still place the pole perpendicular to the ground (even if it seems counter-intuitive!).





Hold the pole in a way that you **do not cover the stripes.** You can for example press the pole on the top with an open palm of your hand. The pole should be touching the ground when you take calibration images.

As most of the camera traps get activated by motion, you will need to make some movement for the camera to take an image. You can try waving your other hand or leg for **10 seconds** to give the camera enough time to take an image. Make sure that you **don't change the position of the pole** while making the move!

Calibrating the camera trap

Now move to the next location and take images there as well. Follow the procedure until you have taken images in **all previously marked locations**. You can remove the markers after the calibration.

Well done! Your camera has been successfully calibrated!
Now please record the **date and time** of the start of the survey and leave the camera undisturbed for at least 30 nights. It can be a few nights more, but please make sure to upload them by the **30th of June 2025.**

If you have any questions regarding the calibration step, please email paulina.pawlikowska@ntu.ac.uk

Data collection

Completion of the survey

After 30 nights, please record the date and time of the completion of your survey. If you notice that your camera has been moved since the start of the survey, please re-do the calibration step. Then, please take out the SD card or connect the camera through a cable to your computer and upload the images to MammalWeb- details below.

Uploading images to MammalWeb

MammalWeb is platform for citizen science research using camera traps. To upload the images you will need to create a free account, unless you already have one. On the platform there are two main functions you can have: a Spotter or a Trapper. A Trapper is a person uploading camera trap footage and a Spotter is a person classifying the images by species. Here you will find the MammalWeb's tutorial on becoming a Trapper: MammalWeb
Below you will find a step-by-step tutorial on how to upload your footage to this project. Once you are logged in, go to Contribute->Trapper from the top bar of the website

- **Add site**

Click on "Add site". Create the site name following the example: XXYY_Spotahog_May25, where XX are two first letters of your favourite city name and YY is a randomly chosen number between 10 and 99. This will help us in the data analysis process.

- **Site location**

Now you will be asked for the site location. As described in our data use policy, the specific locations of the camera traps will only be available to the project team, for the purpose of analysis with remote sensing. The location of your camera trap presented to spotters on MammalWeb will be a rectangle of between 60 and 70 square kilometres to avoid the identification of individual locations.
You can mark your location by dragging a pin to a relevant point on the map on MammalWeb. Please zoom in on the map to provide an accurate location. You can also put the Latitude and Longitude location of the site. You can check your location by using one of the apps available for smartphones, such as What3Words. Another option is to provide the OS Grid Reference of your site location.

- **Habitat**

Under habitat section, please choose "garden" from the drop-down menu (or other habitat type, as appropriate)

- **Can you or the camera see water?**

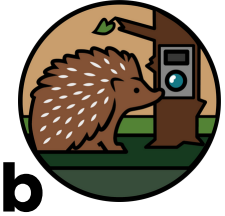
Please answer according to the location of your camera.

- **Purpose of Study**

Under this section please choose "Part of scientific study- random"

- **Camera Type**

Please choose the model of your camera from the drop-down menu. If your camera is not listed there, please choose "not listed" and provide the type of your camera at the end, in the "Notes" section



Uploading images to MammalWeb

- **Camera Height**

Please put the height at which your camera is attached. Our protocol suggests 25cm.

- **Projects**

Please choose “Spot a hog” from the drop-down menu.

- **Bait**

If you have been providing supplementary food for hedgehogs or other wildlife, please choose “Yes”. Please do not start feeding hedgehogs during the survey if you haven’t been doing that previously, as it can affect the results.

- **Time of day**

Please choose according to the settings of your camera. Our protocol suggests night and day recording

- **Notes**

Here you can put any potential errors that may have affected the camera, e.g. if your camera has been moved, or the site location, e.g. fencing was changed, restricting the movement of animals.

Now please select the timezone for Europe/London, choose YES in the section “Was the camera time set to Daylight Saving Time?” and select the correct deployment and collection dates. Click on “Upload” and start uploading your footage.

Please upload all relevant images from the survey period, **including calibration images**. You can do this by simply choosing all of the images (Ctrl+A) and uploading them- the integrated AI system will remove images of humans (including calibration images) and images of vegetation and these images will not be shown to the public. Only the project team will have access to calibration images, as they are necessary to extract the metrics for density estimation. If your camera has captured any images that may be considered sensitive, please remove them before uploading the data. The AI system is constantly being improved but it can still make errors. **Please do not remove any images of animals**, regardless of the species, as well as the **images of vegetation** (you may miss something that would otherwise be spotted).
Try to not upload more than **1 thousand images** at once, as it may slow down your computer and extend the upload time.
Once the images are uploaded, they will be included in this study and provide valuable data about hedgehogs in the UK, **thank you for your help!**

Questionnaire

This pilot study aims to identify the potential of monitoring the density of small mammals in gardens using a citizen science approach. To understand the limitations of this approach and potential barriers to participation, we would like to **ask you a few questions** about your experience of joining the study, the challenges and your suggestions for improvement in future studies.

The survey is fully **anonymous** and can be accessed through a link that will be published on the project's website. Please fill in the survey by the 31st of July. This step is optional, so you can upload your footage to the study without filling out the survey.

Spotting on MammalWeb

What is spotting?

Spotting is the process of **classifying** camera trap images uploaded to MammalWeb, by assigning a species category to each of them. Anyone can become a MammalWeb Spotter, even if you haven't uploaded any images! It is a great way of helping with research, as camera traps produce large numbers of images and classification of them can be challenging. It is also a great way to **learn more** about the animals living in the UK.
Below you will find a step-by-step tutorial on how to start spotting images from this project. All the images from all locations will be pooled together and presented randomly to citizen scientists.

How to become a MammalWeb Spotter?

1. Log in to your MammalWeb account if you already have one. If not, create an account: https://www.mammalweb.org/en/ (free and quick)
2. Under "Projects" choose the "Spot a hog" project (see the step-by-step guide: https://www.mammalweb.org/en/view=projecthome&option=com_biodiv&project_id=373)
3. Start classifying- How to classify data on MammalWeb (tutorial: https://www.youtube.com/watch?v=WHyrERtMNqw)
4.If you want to practice before spotting, there are some demos available on the MammalWeb as well: https://www.mammalweb.org/en/training-view

Results

Once all the images are uploaded and spotted by citizen scientists, the data will be downloaded and analysed. Updates will be shared in the project's newsletter and on the project's website. Sign up if you would like to receive updates. You can also check our social media. Data collected within this project will be used in a postgraduate dissertation and potentially in scientific publications.
Thank you for your participation and contribution to hedgehog conservation. Your support will help us to understand the processes happening in the hedgehog population and find new approaches for efficient monitoring of the species.

With any questions, please contact me via email: paulina.pawlikowska@ntu.ac.uk

Frequently Asked Questions

My camera has been moved
After the camera has been moved you can still upload the footage. However, you will need to do the calibration step again. Please make sure that the camera is securely attached and is not moving during deployment.

My camera broke during the deployment, can I still send the footage?
Yes, you can still upload the footage to MammalWeb, but please make sure when uploading the footage to MammalWeb to set the correct first and last day of recording (the date of the last image captured). The same applies if you cannot continue the survey for any other reason but would still like to upload the footage.

The camera ran out of memory/battery mid deployment
To allow for estimating the distances of the animals to the camera trap, we need very precise measurements collected through the calibration step. Because of that, any disturbance or movement of the camera can affect those measurements and final results. To avoid that, it is best not to move the camera during the deployment. If your camera cannot run for the whole duration of the survey, the best way will be to change the batteries as needed and to calibrate the camera after each disturbance.

Can I check the photos during the survey?
As above, any disturbance to the camera trap may affect the measurements, so we advise avoiding interfering with the camera for the duration of the survey.

Appendix 1
Safety rules and GDPR policy

Safety rules

For safeguarding reasons, we only accept participants above 18 years old, children can join if supervised by an adult. Participation in the study is voluntary.
You can withdraw from the study at different stages:

- Before submitting any images: you can withdraw at any point by not submitting the images to MammalWeb
- After you have uploaded the images: we follow the MammalWeb GDPR policy, where you have the right to remove your images from the platform in certain circumstances by contacting the MammalWeb team, however after the 30th of July 2025 the data will be downloaded, personal identifiers will be removed, and it will not be possible to withdraw your data from this project.
- Withdrawing from the online questionnaire: you can withdraw at any point of the questionnaire, by closing your browser or choosing not to click the “Submit” button on the final page of the questionnaire. However, once you submit your answers it will not be possible to withdraw the information provided, as the anonymity of the questionnaire ensures that your answers cannot be linked back to you.
- The images you upload as a part of this survey will be managed by MammalWeb.org. Please see the link for their data policy: MammalWeb. When uploading the images to the platform, you do so under the Creative Commons Attribution-ShareAlike 4.0 International License.

The images you upload will be run through artificial intelligence (AI) software that should remove all images of humans and images of vegetation (called ‘blanks’). Blanks will be available to the project team, but not to the general public. However, the AI system can make errors, so if your camera trap captured images that may be considered sensitive- please remove them before uploading to the platform.
Additionally, the platform provides a “Report” button. If you come across a human/ other sensitive images while spotting, please press the button and this image will not be displayed to spotters.

Appendix 1
Safety rules and GDPR policy

GDPR policy

The potentially sensitive data, such as personal identifiers and locations of the camera trap will only be collected as a part of data upload to the MammalWeb.org. This will adhere to the platform's GDPR policy. The locations of the camera trap visible to the public will be shared as a rectangle on the map of 0.1x0.1 degree, so around 60- 70km2 in the UK, and account information will be kept at a secure server- AWS (Amazon Web Services) Ireland, click for Mammalweb full policy.

After the data collection for this project is complete, a dataset consisting of data from all camera traps will be downloaded from MammalWeb to a secure data storage and personal identifiers will be permanently removed. The exact locations of the camera traps will be used for the purpose of remote sensing and statistical analysis and will be kept on a secure data storage. This data will not be shared with the public. After the study, the data without personal identifiers and exact locations will be made available via a data repository for 10 years.

The data from the survey will be fully anonymous, so personal identification will not be possible. The anonymised data will be analysed by the research project team at Nottingham Trent University and will form a part of a PhD thesis. The data may also be used in scientific publications and made available in research data repositories.

If you sign up for the optional newsletter of the project, we will also store information on your email address for the purpose of sending the newsletter. Your email address will be stored on a secure data storage for the maximum of 10 years for us to be able to contact you if the project is continued in the following years. You can unsubscribe from the newsletter at any time and your email address will be permanently removed from the data storage.