



National Earthworm Recording Scheme Earthworm Recorder Pack

Contents

The Importance of Recording Earthworms

ESB Standard Sampling Protocol

- Soil Pit Sampling
- Planning Your Soil Pits
- Microhabitat Searches

UK & Ireland Earthworm Species Checklist (Natural Environments)

Creating & Submitting Earthworm Records

Open Data Agreement for Earthworm Recorders

Field Sampling Form

Earthworm Identification Features Sheet

What species of earthworms do we have in the UK & Ireland? Where are they found? Does the vegetation above the soil make a difference to which earthworms you could expect to find somewhere? Recording data is very useful for answering these questions. If records are collected in a more structured way (such as the ESB Standard Sampling Protocol) this data can also be very useful for helping us to understand more about their ecology: why they are found in different places, what causes the differences in populations and how they are changing. This can help inform conservation of earthworms, and highlight changes in distributions if recorded over a longer time period and at a wide spatial scale.

Alternative Sampling Methods

However, non-standardised recording methods still provide valuable species data and we welcome any and all records of earthworm species. It's worth remembering that even common species of earthworm have never been recorded in some counties so even a casual record of a common species may be a very important record! Earthworm recording can be simply turning over logs or looking under pots in your back garden.

On some sites it may not be possible to get permission to dig. An alternative method of getting earthworms out of the ground is to pour a mustard solution on the ground. To make the mustard solution, add 25 ml volume of mustard powder to 0.75 litre of tap water and shake well. Keep checking the area where you poured the solution (and surrounding area) for ten minutes to see if any earthworms emerge. Any adult earthworms that appear can be taken and preserved for identification.

Health & Safety

You should carry out your own risk assessment before doing fieldwork. Don't forget to:



- Avoid doing fieldwork on your own, if you do ensure you tell someone exactly where you will be and when you expect to return.
- Always ask permission from the owner before entering land.
- Always tell a responsible adult where you are going and what time you expect to return.
- Check the weather forecast before doing fieldwork, and take appropriate clothing.
- Be aware of local hazards such as dangerous wildlife or hazardous terrain.
- Watch out for dangers such as sharp objects and broken glass in soil
- Take care to avoid hurting yourself and soil borne diseases by wearing gloves.
- Always take a mobile phone and a map of the area.
- Know who to contact in the event of an emergency and check where the nearest source of help is in case your mobile phone does not work.

Data Sharing Policy

Please note that all records submitted to the National Earthworm Recording scheme will be shared responsibly with external organisations, such as Local Biological Records Centres and the National Biodiversity Network. Earthworm records will be made freely available, alongside other wildlife records, to the general public.

Step 1 - Planning



A map of your sample site is useful to mark where you will take your samples, or for identifying different habitats in which to take samples. Look for areas that have no current records. New records on sites that have been previously sampled are still useful as you may get different results. Remember that if you do not own the land where you are sampling you will need permission from the landowner first.

Step 2 - Equipment

You will need the following:

- A spade (to dig the pits)
- 5 plastic tubes of 80% ethanol (to store and preserve earthworms)
- A sorting tray (to place the soil on in order to sort through and look for earthworms, alternatives include pots or bin bags)
- Labels and alcohol resistant pen/pencil (to label your samples and ensure they don't get mixed up)
- Notebook and map (to make note of the location, habitat and other important factors)
- Pointed non-serrated forceps (optional but useful)
- Gloves (to keep your hands clean)



Identification is made easier if you undertake the optional sixth step of relaxing your earthworms as they will be better preserved:

- A plastic take away container with lid (to relax and align your earthworms)
- A bottle of 30% ethanol (to relax your earthworms)



Step 3 - Digging

A spade can now be used to dig a soil pit. The standard pit size for the National Earthworm Recording Scheme is **25cm by 25cm, to a depth of 10cm.**

Step 4 - Sorting

The soil from the pit should be placed on the sorting tray/bin bag/pot and sort through it with your hands.



Step 5 - Earthworms

Any earthworms that are found in the soil should be removed and collected into a container.

Step 6 (optional) – Relaxing

In order to stop the earthworms being preserved in awkward positions, the earthworms can be relaxed and straightened. This will make identification of the specimens much easier.

- (i) Place the earthworms in a container of 30% ethanol.
- (ii) Leave for about 5 minutes to relax the earthworms.
- (iii) Straighten out the earthworms in the grooves of the lid.
- (iv) Pour 80% ethanol onto the earthworms.
- (v) Leave for 5-10 minutes before placing the earthworms in the plastic tube containing a label and 80% ethanol.



Step 7 - Preservation and Labelling



All the earthworms that have been collected from the pit should be placed in a tube of 80% ethanol. The size/number of tubes used will depend on how many earthworms were collected. Sometimes a pit can yield over 100 earthworms! The 80% ethanol will act as a killing agent and preserve the earthworms. However, earthworms contain a lot of fluid and will release this fluid when they are placed in the ethanol. This will dilute the ethanol and cause the earthworms to deteriorate, so the alcohol should be changed following sampling to prevent this. A label should also be placed in the tube to identify the pit and site that the sample belongs to.

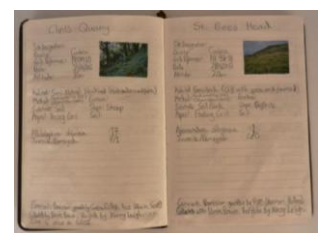
Step 8 - Replication

The standard number of pits is 5 per site for the National Earthworm Recording Scheme. This is important to get a standardised sample of the site.

Step 9 – Recording (see the our *Creating & Submitting Earthworm Records* for more details)

Site details should be recorded on site where possible:

- Who (the recorder and any helpers)
- Where (using GPS to gain latitude/longitude or a grid reference obtained from an OS map/online tool, as well as the site name and county)
- When (record the date)
- Sampling method (either enter ESB soil pit sampling standard protocol or give the pit size and number of pits if different)
- Habitat (the general habitat is useful, but also other details such plant species present and any other habitat comments that may be relevant)
- Substrate (for soil pits this will always be soil/sand)



Step 10 - Identification

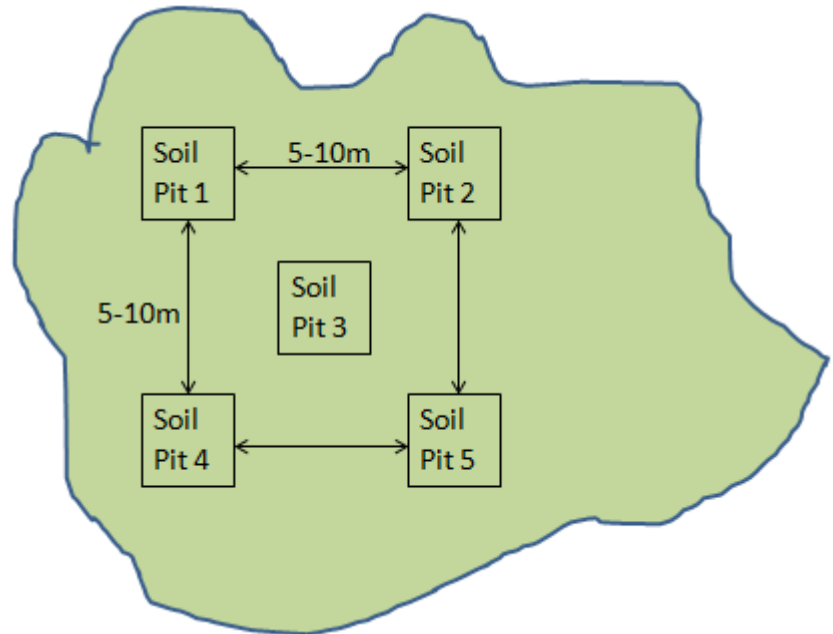
All you need to do now is identify your earthworms under the microscope. The '*Key to the earthworms of the UK and Ireland*' by Emma Sherlock was published in 2012 and is available from the FSC website.

When planning your 5 soil pits it is important that all of your five soil pits fall within the habitat you are sampling. Please note that the distances provided in the following examples do not need to be exact and are given to provide approximate guidance so that it is clear that soil pits should not be spaced a great distance apart.

Large patches of habitat

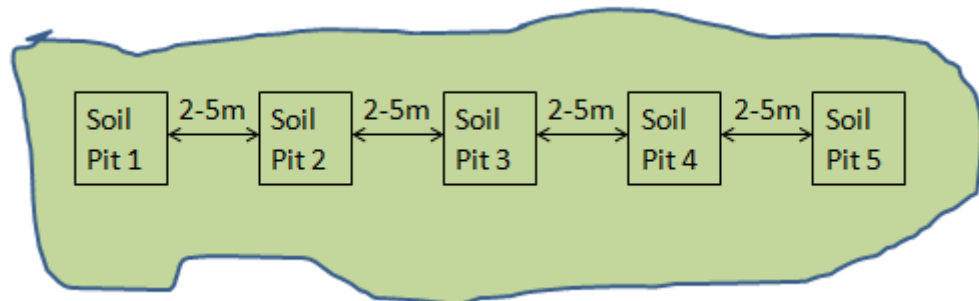
If you are sampling a habitat that covers a big enough area, soil pits can be arranged in a square formation, with one pit in each corner (for example between 5 and 10 metres apart) and one in the centre.

Examples of this type of habitat may include open fields, gardens, woodland and parks.



Linear Habitats

Some habitats are linear and, in these cases a linear transect should be used with pits spaced evenly apart (for example between 2 and 5 metres). Linear transects may not necessarily be in a straight line and may be curved.



Examples of this type of habitat may include hedgerows, riverbanks, pond edges and tree lines.

Other Habitats

In some cases neither of these arrangements will be suitable and the arrangement will need to be adapted to suit the habitat you are sampling. If the habitat is patchy, soil pits should be planned in patches of the same habitat.

Soil pit sampling allows a standardised quantitative method of sampling a site for earthworms. However, earthworms inhabit substrates other than soil so it is good practice to search any microhabitats present at each site to improve the likelihood of recording species that are less likely to be encountered in soil pits. It is advisable to only take adult earthworms (not juveniles) as this method of surveying is not quantitative.

There is no exhaustive list of habitats and microhabitats that may be present, but some examples are provided below:

Deadwood – search under deadwood (both the surface of the deadwood and the substrate it is resting on) by turning it over. Also check for earthworms under the bark and within the deadwood. When sampling deadwood destructively please ensure a minimal amount of deadwood is destroyed to maintain the microhabitat in within the ecosystem.



Dung – dung contains rich organic matter and earthworms may be found within/beneath the dung or in the top layer of soil beneath the dung.

Turnover – turning over items can often yield earthworms. Example objects to turnover would include any item resting on soil and items such as plant pots, wooden boards and bin bags on any substrate.



Leaf Litter – leaf litter can be searched by hand or sieved. Some earthworms may be found within the very top layer of the soil, whereas others may be found on the surface beneath the litter.

Hedgerows – some earthworms are thought to be associated with hedgerows and may be found in the top layer of soil beneath hedgerows.

Compost – compost heaps/bins are often home to dense populations of earthworms. They can usually be found by simply searching the top layer of the compost.



Please record the earthworms you find in microhabitats separately from those you find within the soil pits (even if a species occurs in both). Recording the presence of a species in multiple habitats or microhabitats helps us learn more about the ecology of different earthworm species and their associations with specific conditions.

Making a biological record

In order to make a biological record four pieces of information are compulsory (*who*, *what*, *where* and *when*). If any of these pieces of information are missing the record can not be accepted.

These squares indicate the compulsory fields for the National Earthworm Recording Scheme.

There is a wealth of additional information that can be provided that may add to the usefulness of the record by expanding on the four core fields (*who*, *what*, *where* and *when*). To make recording simpler, we have produced drop down menus for some of these additional fields. The options available are provided alongside the field descriptions in the guide below.

For details on how to conduct the sampling please see the *ESB Sampling Standard Protocol* (available to download from our website).

Who

Recorder

Please provide the name of the individual who collected the specimen.

Determiner

Please provide the name of the individual who identified the specimen. This may be the same individual as the recorder.

Verifier

If your identifications have been verified by another earthworm recorder or scientists, their name should be recorded in this field. This can't be the same individual as the determiner.

What

Species

Each species should be recorded using its scientific name. A separate line should be used for each species found at a location (so three species at one location would count as three records). UK species are listed below:

Allolobophora chlorotica
Allolobophora cupilifera
Allolobophoridella eiseni
Apporectodea caliginosa
Apporectodea icterica
Apporectodea limicola
Apporectodea longa
Apporectodea rosea
Dendrobaena attemsi
Dendrobaena hortensis

Dendrobaena octaedra
Dendrobaena pygmaea
Dendrobaena veneta
Dendrodrilus rubidus
Eisenia andrei
Eisenia fetida
Eiseniella tetraedra
Helodrilus oculatus
Lumbricus castaneus

Lumbricus festivus
Lumbricus friendi
Lumbricus rubellus
Lumbricus terrestris
Microscolex phosphoreus
Murchieona muldali
Octolasion cyaneum
Octolasion lacteum
Satchellius mammalis

Number

Abundance can be recorded by specifying the number of individuals found in the 'Number' column. This is particularly useful when standardised sampling has taken place as comparisons between sites are possible.

Where

Grid Reference or Latitude/Longitude

Grid references are our preferred means of location data and can be attained through the use of ordnance survey maps or online grid reference tools (<http://gridreferencefinder.com>). Please provide a 6-figure grid reference for each record. *For a better understanding of how grid references work please check out <http://www.ordnancesurvey.co.uk/blog/2013/03/map-reading-skills-learn-how-to-use-grid-references/>*

Latitude/longitude can be provided by those that have access to GPS equipment as an alternative to a grid reference.

Site Name

The site name should be recorded wherever possible. This can be the name of the site (e.g. name of reserve, school or woodland) or the address (e.g. 32 King Street).

County

Local records are held by Local Biological Records Centres (LBRCs), so providing the county improves our data sharing processes. The county should be recorded wherever possible.

When

Date

The date of specimen collection should be recorded in the standard dd/mm/yyyy format.

Additional Fields

Habitat

Pick the habitat that best describes the location. Options in upper case describe general habitats and options in lower case describe more specific habitats. If you feel the location does not fit into any of the categories below please record it as 'other' and specify in the comments box.

010 WETLAND	040 URBAN	070 SEMI-NATURAL WOODLAND
011 fen	041 park	071 deciduous
012 carr	042 orchard	072 coniferous
013 bog	043 churchyard	073 mixed deciduous/coniferous
020 HEATHLAND/MOORLAND	044 garden	080 PLANTATION WOODLAND
021 lowland wet heath	045 compost bin	081 deciduous
022 lowland dry heath	050 FARMLAND	082 coniferous
023 valley mire	051 arable	083 mixed deciduous/coniferous
024 upland heath/moor	052 pasture	090 BUILDING
030 GRASSLAND	060 SCRUBLAND	091 glasshouse (heated)
031 acid grassland	061 dense scrub	092 glasshouse (heated)
032 neutral grassland	062 scrub with open areas	100 CAVE/TUNNEL/WALL
033 calcareous grassland		110 WASTE GROUND
034 upland grassland		120 OTHER

Substrate

301 rock	307 bark surface	313 fungi
302 stone	308 dead wood	314 nest (specify)
303 shingle	309 dead wood/under bark	315 shore line jetsam
304 soil/sand	310 moss/lichen	316 human rubbish
305 leaf litter	311 dung heaps	317 other (specify)
306 tussocks/clumps	312 carrion	

Method

Different sampling methods will often yield different species as they may target different substrates or micro-habitats.

601 hand sorted soil pits (specify size)	605 Winkler bag
602 sieved leaf litter	606 pitfall trap
603 mustard extraction	607 ESB standard soil pits protocol
604 casual/turnover	

Comments Field

The comment box should be used to record any data or information it was not possible to record in the other fields (for example additional habitat details or the size and number of soil pits per site). Where you have chosen an option that states 'specify', please enter the details in the comment box.

Some earthworms exist in different morphs (for example *Allolobophora chloritica* occurs in a pink and a green form). If you are able to state what morph the species is please add this to the comments box.

Altitude information can be attained through ordinance survey maps, GPS equipment or online tools (<http://www.daftlogic.com/sandbox-google-maps-find-altitude.htm>).

Any additional fields can be entered in here such as any notes regarding species of plant present, soil texture, soil pH, soil moisture, soil temperature, aspect and slope.

Many sites across the UK are designated due to their importance to biodiversity, geology or natural beauty. Site designations can be researched online through the Natural England website or by simply asking the authority responsible for granting permission to sample in your initial correspondence. If multiple designations apply please record these in the comments box. The site designation should be recorded wherever possible.

- Special Protection Area (SPA)
- Special Area of Conservation (SAC)
- Site of Special Scientific Interest (SSSI)
- National Nature Reserve (NNR)
- Local Nature Reserve (LNR)
- Local Wildlife Site
- National Park
- Global Geopark
- County Wildlife Site
- Local Geological Site
- Regionally Important Geological Site (RIGS)
- Ramsar Site
- Area of Outstanding Natural Beauty (AONB)
- Site of Importance for Nature Conservation (SINC)
- Biosphere Reserve
- Site of Nature Conservation Importance (SNCI)

You can never provide too much information in the comments box!

Submitting your records

Please note that all records submitted to the National Earthworm Recording scheme will be shared responsibly with external organisations, such as Local Biological Records Centres and the National Biodiversity Network. Earthworm records will be made freely available, alongside other wildlife records, to the general public.

There are two methods of submitting records to the ESB:

1) Our *Earthworm Records Submission Sheet* is an excel spread sheet that is available to download at <http://www.earthwormsoc.org.uk/further-information/downloads>

This can be completed and submitted to the National Earthworm Recording Scheme at info@earthwormsoc.org.uk with the subject heading 'Earthworm Records (Your Name, Date of submission)' e.g. Earthworm Records (John Smith, 01/01/2000)

2) User of iRecord can use the Earthworm Survey form following the instructions below:

1. Log in to iRecord at www.brc.ac.uk/irecord/

Please note that you must have an iRecord account in order to submit records through the iRecord system.

2. Click on **Record** on the menu bar.

3. Select the option **Activities**.

4. Click on the **Browse all activities** tab.

5. Enter **Earthworm** into the search bar and click **Go**.

6. Click on **Enter an earthworm record** to begin using the form.

The screenshot shows the iRecord website interface. At the top, there is a navigation menu with 'Record' circled in red. A dropdown menu is open under 'Record', with 'Activities' highlighted by a red arrow. Below the menu, there is a 'Recent sightings' section with a table of records. The table has columns for Species, Site name, Grid Ref, Date, and Recorder. A search bar is visible on the right side of the page.

This screenshot shows the search results for 'Earthworm' on the iRecord website. The search bar contains 'Earthworm' and a 'Go' button. Below the search bar, there is a section titled 'Activities' with a 'Browse all activities' tab. Under this tab, there is a search bar with 'Earthworm' and a 'Go' button. Below the search bar, there is a table with columns for 'About the activity', 'Links', and 'Actions'. The 'Links' column contains a link 'Enter an earthworm records' which is circled in red. Below the table, there are navigation buttons: 'first', 'prev', '1', 'next', 'last'. At the bottom right, it says 'Showing records 1 to 1 of 1'.

The form will allow you to enter multiple records for the same site and has a great map function for finding the location data.

The Earthworm Society of Britain (ESB) actively encourage the use of our data and hope that it can be used to further the current understanding of earthworms, both nationally and internationally. We are always interested to hear about how others have used our data (whether for use in science, sociology, art or anything else) and are glad to have produced a resource that is being put to use.

We ask all of our data suppliers to read this document and only submit records to the ESB if they are happy with the policy stated below.

Access to ESB earthworm records

The Earthworm Society of Britain (ESB) has an open data policy, allowing **open access** to our earthworm records with **no constraints** to the use of the data and ensuring records are available at the **full resolution** they are accepted at.

This is achieved through the submission of our databases to the the National Biodiversity Network (NBN) Gateway, and in future the NBN's Living Atlas infrastructure projects, starting with the Atlas of Living Scotland. As a Supporter Member of the NBN we are committed to ensuring this data set is updated on a regular basis (and no less than twice per year).



Data sets that are managed by the Earthworm Society of Britain can be found through the organisation page for the ESB on the NBN Gateway:

<https://data.nbn.org.uk/Organisations/232>

Furthermore, we allow our records to be made available through the Global Biodiversity Information Facility (an international open data infrastructure, funded by governments) in accordance with their vision: *"A world in which biodiversity information is freely and universally available for science, society and a sustainable future."*

Licences and attribution

All data submitted to the Earthworm Society of Britain is assigned a *Creative Commons Attribution 4.0 International* licence as it is recommended for maximum dissemination and use of licensed materials.



It allows others to:

- **Share** — copy and redistribute the material in any medium or format for any purpose, even commercially.
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UK & Ireland Earthworm Species Checklist: Natural Environments

This list has been compiled Keiron Derek Brown on 07/02/16 using the publications below and with guidance from the Natural History Museum to take into account subsequent developments in the taxonomy of UK & Ireland earthworm species occurring in natural environments.

[Sims RW, Gerard BM \(1999\) Earthworms. Synopses of the British Fauna \(New Series\). 39. London: Linnean Society of London](#)

[Sherlock E \(2012\) Key to the earthworms of the UK and Ireland. Field Studies Council](#)

Class CLITELLATA

Subclass OLIGOCHAETA

Record verification level

Order CRASSCLITELLATA

Family ACANTHRODRILIDAE Claus, 1880

Microscolex phosphoreus (Duges, 1837)

Expert

Family LUMBRICIDAE Rafinesque-Schmatz, 1815

Allolobophora chlorotica (Savigny, 1826)

Recorder

Allolobophoridella eiseni (Levinsen, 1884)

Recorder

Aporrectodea caliginosa (Savigny, 1826)

Recorder

Aporrectodea cupulifera (Tetry, 1937)

Expert

Aporrectodea icterica (Savigny, 1826)

Recorder

Aporrectodea limicola (Michaelsen, 1890)

Expert

Aporrectodea longa (Ude, 1885)

Recorder

Aporrectodea nocturna Evans, 1946

Tutor

Aporrectodea rosea (Savigny, 1826)

Recorder

Dendrobaena attemsi (Michaelsen, 1890)

Recorder

Dendrobaena hortensis (Michaelsen, 1890)

Tutor

Dendrobaena octaedra (Savigny, 1826)

Recorder

Dendrobaena pygmaea (Savigny, 1826)

Expert

Dendrobaena veneta (Rosa, 1886)

Recorder

Dendrodrilus rubidus (Savigny, 1826)

Recorder

Eisenia fetida (Savigny, 1826)

Recorder

Eisenia andrei Bouché, 1972

Expert

Eiseniella teraedra (Savigny, 1826)

Recorder

Helodrilus oculatus Hoffmeister, 1845

Expert

Kenleenus armadas Blakemore 2012

Expert

Lumbricus castaneus (Savigny, 1826)

Recorder

Lumbricus festivus (Savigny, 1826)

Recorder

Lumbricus friendi Cognetti, 1904

Expert

Lumbricus rubellus Hoffmeister, 1845

Recorder

Lumbricus terrestris Linnaeus, 1758

Recorder

Murchieona muldali (Omodeo, 1956)

Recorder

Octolasion cyaneum (Savigny, 1826)

Recorder

Octolasion lacteum (Örley, 1881)

Recorder

Satchellius mammalis (Savigny, 1826)

Recorder

Family SPARGANOPHILIDAE Michaelsen, 1928

Sparganophilus tamesis Benham, 1892

Expert

British earthworm species checklist notes

Aporrectodea caliginosa is present as a distinctly different morph: *nocturna*. This morph is an anecic earthworm. Molecular research has indicated that this morph is a distinct species and yet to be published morphological work has confirmed this. For the purpose of the recording scheme we ask recorders to submit records of the *nocturna* morph as *Aporrectodea nocturna*. *A. nocturna* can be distinguished relatively easily as it is larger than *A. caliginosa* and has a deep red colour and flattened tail (in life only).

Eisenia andrei is extremely difficult to separate from *Eisenia fetida*, and possibly only distinguishable through molecular work. Some earthworm taxonomists believe that this *E. andrei* and *E. fetida* belong to a single species. For the purpose of the National Earthworm Recording Scheme we accept all *Eisenia* species records as *Eisenia fetida* as an aggregate species unless an earthworm taxonomist has determined that the record is of *E. andrei*.

Aporrectodea cupulifera and *Kenleenus arnatus* are known from Ireland and not from mainland Britain.

Sparganophilus tamesis may not be currently present in the UK and has only been found in proximity to gardens where it is believed it arrived with imported aquatic plants.

Numerous non-native earthworm species have been recorded in artificial environments across the United Kingdom. Any non-native species found in the UK should be verified by an expert through examination of the preserved voucher specimen. Identification of non-native earthworms is likely to require dissection of the specimen.

Verification of earthworm species identification

All records should be submitted through iRecord as per the instructions in *Creating & Submitting Earthworm Records*. Once submitted, records may require verification dependent on the species recorded and the experience of the recorder. Below is an explanation of the record verification levels we have assigned to each earthworm species:

Recorder

- Records will be accepted from ESB recorders, Trusted non-ESB recorders, ESB tutors and Experts (earthworm taxonomists).
- Verification by ESB tutor or expert required for records provided from other sources.

Tutor

- Records will be accepted from ESB tutors, Experts (earthworm taxonomists).
- Verification by ESB tutor or expert required for records provided from other sources (unless recorder has previous experience of identifying species in question)

Expert

- Records will only be accepted from Experts (earthworm taxonomists).
- Verification by expert required for records provided from any source.

If you have any questions relating to the identification of British or Irish earthworms please contact the Earthworm Society of Britain's recording officer Keiron Derek Brown at keironderekbrown@gmail.com.

Site Name:	Recorder Names:
Site Location (Grid Reference or Latitude/Longitude):	
County:	Date (dd/mm/yyyy):
Habitat:	Substrate/Sampling Method:
Comments:	
Microhabitat 1 Sampled (including addition microhabitat specific notes):	
Microhabitat 2 Sampled (including addition microhabitat specific notes):	
Microhabitat 3 Sampled (including addition microhabitat specific notes):	

