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**Grey long-eared bat surveillance 2012**

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## Executive Summary

The grey long-eared bat *Plecotus austriacus* is considered to be one of the rarest bat species in the UK. It may be under-recorded due to the difficulty of separating it from the more common and widespread brown long-eared bat *P. auritus*. In this study, we aimed to improve our knowledge of the distribution of grey long-eared bat across its UK range through carrying out DNA analysis on droppings collected from long-eared bat roosts in target areas to provide verified identification to species level.

A search of BCT databases identified 133 long-eared bat roosts within the study area. A mailout was sent to the property owners, including a letter describing the project and how people could help, instructions for where to look for droppings, a simple recording form, two sample tubes or bags, and a freepost padded envelope in which to return the droppings.

The search was initially confined to priority areas identified through predictive modelling (completed by Orly Razgour, University of Bristol) as having suitable habitat for grey long-eared bat within West Sussex (including sites just across the county boundary in Hampshire), Dorset and Devon. The search was subsequently extended more widely in these counties and also across Somerset and East Sussex to increase the sample size. A few roosts were also sampled in Pembrokeshire in the vicinity of a recent grey long-eared bat record identified from DNA analysis. Bat workers were also contacted within the study area and asked if they knew of roosts to be included in the study, resulting in an additional seven roosts being included in the search.

Seventy-three samples from 44 roosts were submitted to the laboratory for DNA analysis in time for the results to be included in this report. A further two samples from one roost have been received since and will be sent off for analysis.

Grey long-eared bat was confirmed at one roost located in Devon. This roost was within one of the priority areas identified by the predictive modelling; the status of the roost is currently unknown. Brown long-eared bat was confirmed at 35 roosts. Additional species were also identified: whiskered bat *Myotis mystacinus*, Natterer's bat *M. nattereri*, serotine *Eptesicus serotinus*, common pipistrelle *Pipistrellus pipistrellus*, soprano pipistrelle *P. pygmaeus*, and a non-bat species, wood mouse *Apodemus sylvaticus*.

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# 1 Introduction

The grey long-eared bat *Plecotus austriacus* is considered to be one of the rarest bat species in the UK with an estimated population of 1000 individuals (Harris *et al.* 1995). In the UK its recorded distribution is largely confined to the extreme south of the British Isles with records from Somerset, Dorset, Devon, Hampshire, Isle of Wight, Sussex and the Channel Islands (Swift & Entwistle 2008).

The grey long-eared bat is similar in appearance to the closely-related but more common and widespread brown long-eared bat *P. auritus*. Droppings of the two species are also very similar in appearance (Swift & Entwistle 2008). Echolocation calls can differ between the two species in terms of their start frequencies but recordings need to be of good quality and made within a few metres of the bat in order for these differences to be discernible (Russ 2012). Both species have very quiet calls and this increases the difficulty of identifying these species through acoustic means. Therefore the ability to positively identify grey long-eared bat is typically limited to capturing the bat and examining it in the hand, or carrying out DNA analysis on samples of droppings. For this reason, it is possible that grey long-eared bat is under-recorded across its range.

## 2 Aims and objectives

This study aims to improve our knowledge of the distribution of grey long-eared bat (GLE) across its UK range through carrying out DNA analysis on droppings collected from long-eared bat roosts in target areas to provide verified identification to species level. This has been carried out through two phases of work outlined below.

### Phase 1 (to end of March 2012)

- Identify key areas for targeting roosts within GLE distribution – with input from Orly Razgour (University of Bristol).
- Identify key sources of roost data e.g. unidentified long-eared roosts from roost visits, roosts known by bat groups.
- Develop the outline methods to generate mail-out and materials to be sent out for collecting samples.
- Research contractor options for analysing DNA samples from droppings.
- Produce an outline costed plan for work to collect and analyse samples.

### Phase 2 (to end of August 2012)

- Interrogate databases to identify target roosts within priority areas using GIS and create list of potential sites with mailing details.
- Publicise project to bat groups to bring in additional roosts.
- Organise and send out mail-out with collection materials for droppings .
- Manage return of samples.
- Contract and manage DNA analysis (of up to 100 samples).
- Map and report on findings.
- Produce a final report on the project and map of brown and grey long-eared bat roost locations, overlain onto predicted distribution.

### 3 Methods and summary of work carried out

#### 3.1 Phase 1 tasks

##### 3.1.1 Identifying key areas for targeting roosts within GLE distribution

Orly Razgour from University of Bristol has produced a habitat suitability map for the grey long-eared bat in England based on predictions from a Maxent model using broad-scale distribution data from across the UK (excluding Northern Ireland) and fine-scale radio-tracking data from bats at one colony (Razgour *et al.* 2011). The maps used in the species distribution model included climatic, topographic, land cover, geology and night light. This highlighted a potential distribution along parts of the coast of southern England from Hampshire to Devon and including the Isle of Wight (Figure 1).



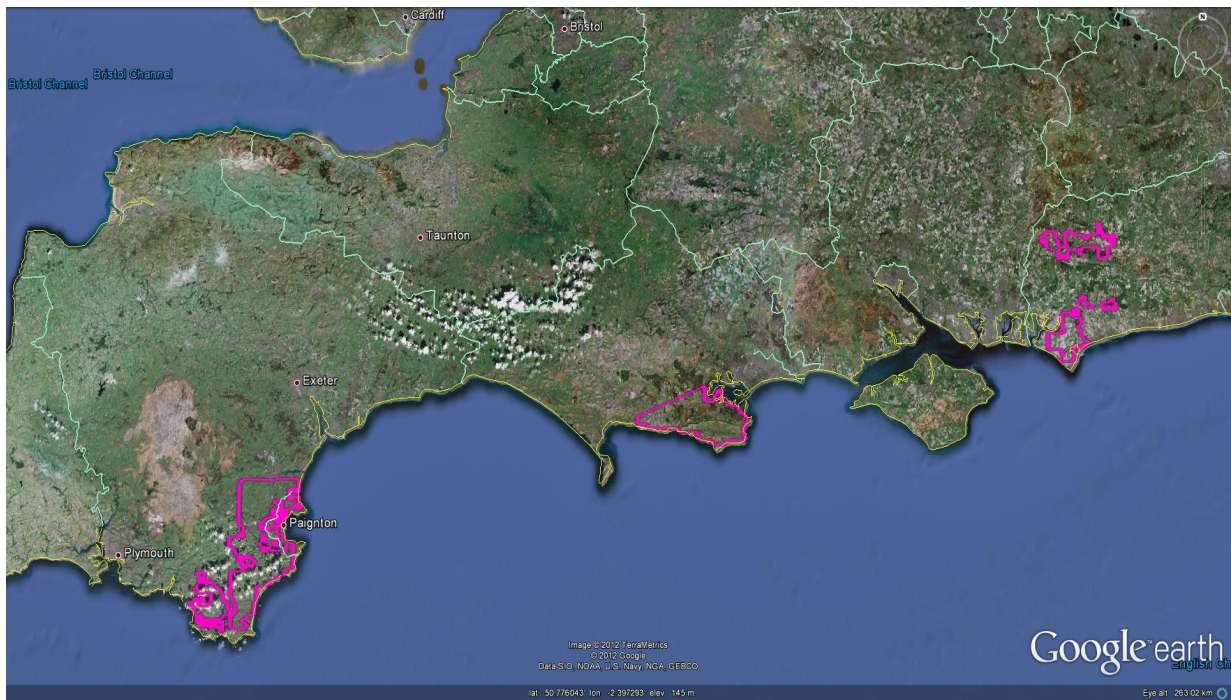
**Figure 1.** Suitable areas for the grey long-eared bat in England.  
(reproduced with permission from Orly Razgour, University of Bristol, based on Razgour *et al.* 2011)

There are also eight known grey long-eared maternity colonies and a number of other individual records. We worked with Orly to identify priority areas for further search within the predicted distribution which were selected based on habitat suitability and lack of maternity colony records from the area. The areas identified are shown in Table 1 and Figures 2 to 5 below.

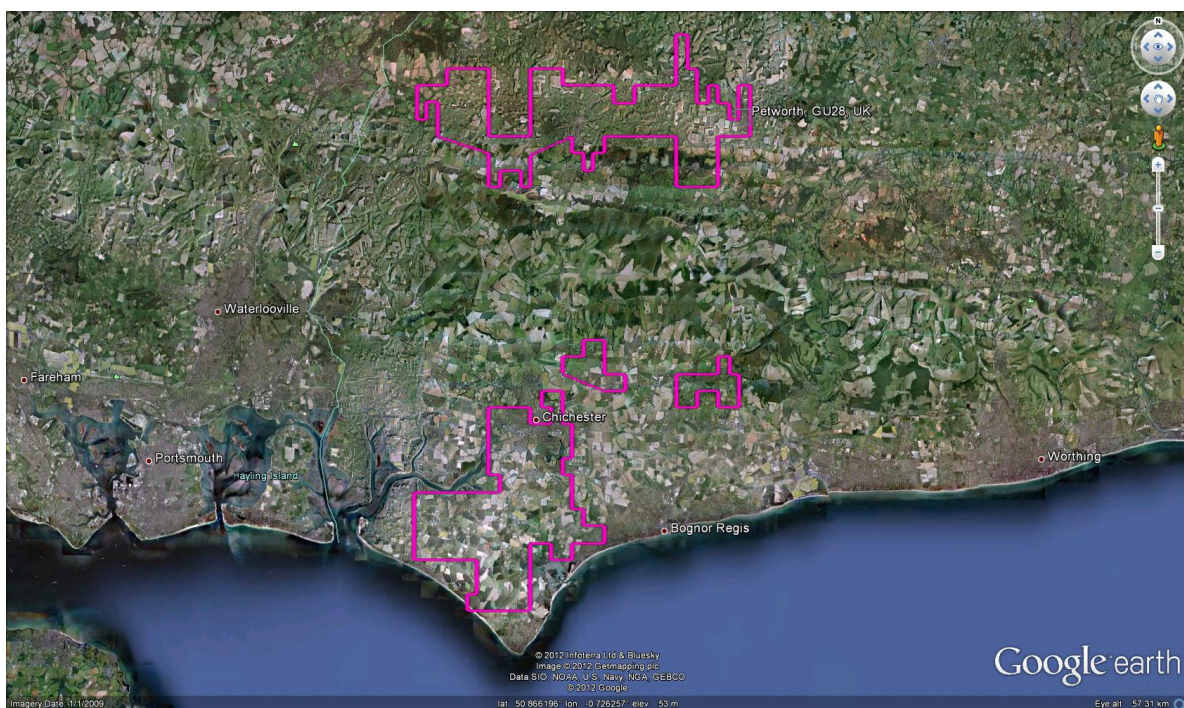
**Table 1.** Priority areas within the predicted distribution with reasons for selection

<b>County</b>	<b>Locations</b>	<b>Reasons for selection</b>
West Sussex	<ul style="list-style-type: none"> <li>• Around the old Petworth Park roost</li> <li>• Midhurst – Rogate</li> <li>• Walberton – Eastergate – Fontwel</li> <li>• Estuary south of Chichester</li> </ul>	<ul style="list-style-type: none"> <li>• Fall within priority areas</li> <li>• Petworth roost has moved, only two adult males caught in the area. Location of females unknown.</li> <li>• Some reports of potential roosts in West Sussex from Sussex bat group (Sheila Wright), though more to the east (near Lancing).</li> <li>• Potential suitable habitats around the locations – marshes, meadows, riparian</li> </ul>
Dorset	<ul style="list-style-type: none"> <li>• Isle of Purbeck: Wareham to Swanage, especially around Arne</li> </ul>	<ul style="list-style-type: none"> <li>• Fall within priority areas</li> <li>• Historic and recent records including from Arne church</li> <li>• June 2011 – pregnant grey long-eared bat female got trapped in Arne Church and died, suggesting there may be a maternity colony nearby</li> <li>• Suitable habitats, especially marshland</li> </ul>
West Devon	<ul style="list-style-type: none"> <li>• South-west of the Teign estuary, towards Dartmouth and Kingsbridge</li> </ul>	<ul style="list-style-type: none"> <li>• Fall within priority areas</li> <li>• Record of male roost in National Trust property within the area</li> <li>• Record of a single bat roost in a barn within the area</li> <li>• Suitable habitats</li> <li>• Most conservative estimations of the effective population size of the Devon population suggest that it is larger than the currently known maternity colony.</li> </ul>





**Figure 2.** The three key search areas (West Devon, Purbeck-Dorset, and West Sussex) (map exported from Google Earth)

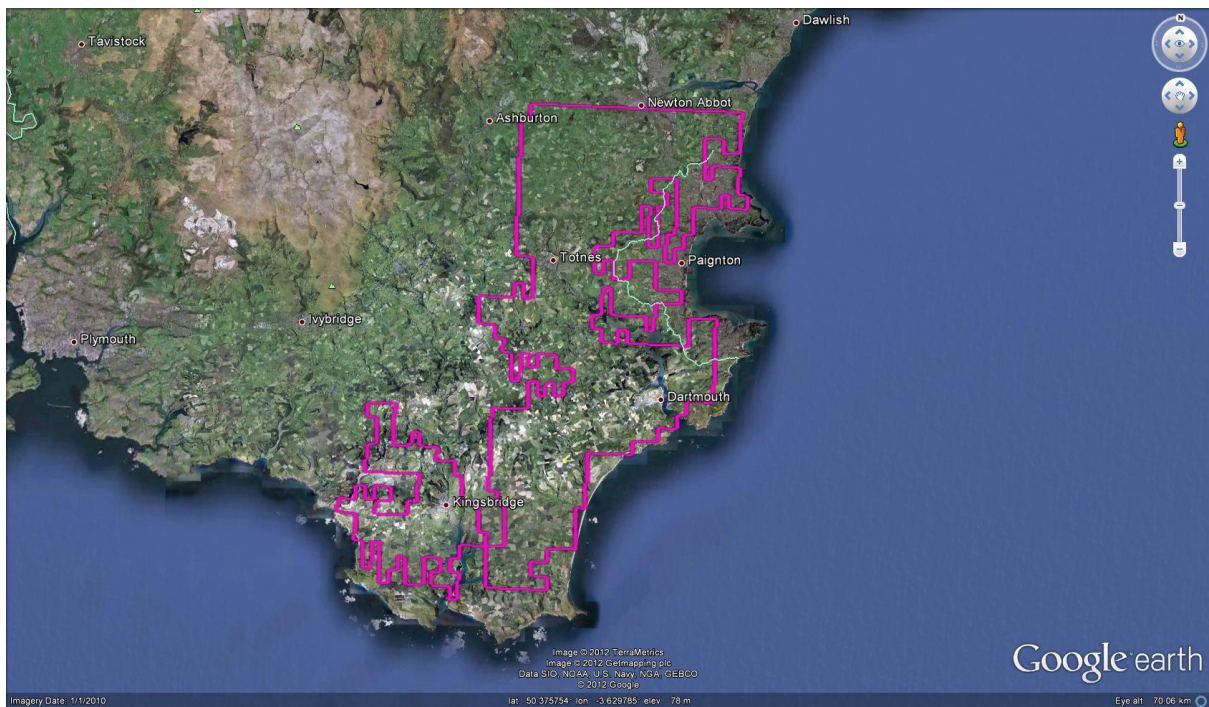


**Figure 3.** Sussex key areas (map exported from Google Earth)





**Figure 4.** Purbeck, Dorset key area (map exported from Google Earth)



**Figure 5.** West Devon key area (map exported from Google Earth)

It was also agreed with JNCC to extend the scope of the project to sample sites in Pembrokeshire. This county has been highlighted as having potential areas for grey long-eared bat from the predicted distribution model (Razgour *et al.* 2011) despite being some distance from the species' known range along the southern coast of England. In June 2012, the presence of grey long-eared bat was identified in Pembrokeshire through DNA analysis of droppings as part of a planning application (although from the lack of large roosting area

available in the building in which the bat was found, it appears unlikely this is a maternity roost). This confirmed Pembrokeshire as an additional priority area for inclusion in this project and we liaised with bat workers in Wales to identify a small number of potential roosts for sampling within this county.

### **3.1.2 Identifying sources of roost information**

The following sources of roost information within the study area were identified and investigated:

- BCT Helpline database of Natural England voluntary bat worker roost visits. For each roost record there is a species list which identifies the species or species group recorded by the bat worker who carried out the roost visit. Roosts were selected where "*Plecotus* sp" was included in the species list (in these cases it was considered likely from the information gathered on the roost visit that the roost was of long-eared bats, but it was not possible to confirm species, for example through visual records).
- BCT's National Bat Monitoring Programme database. All roosts within the study area were selected from the brown long-eared colony count. Although the species is identified as brown long-eared bat at all these roosts it is unknown whether the species has been verified by a bat worker and therefore it is possible that the species could in fact be grey long-eared bat.
- Bat groups and bat workers were approached in Sussex, Dorset and Devon to ask if they knew of any roost sites that could be potential grey long-eared roosts and that would be a high priority for species validation.
- Bat workers who already have information on possible grey long-eared bat roosts were also contacted.

### **3.1.3 Developing outline methods to generate mail-out requesting sample collection**

A letter was drafted describing the project and its aims, how property owners could help, where to look for droppings and how many to collect. As grey long-eared bats are known to roost alongside other species, if more than one distinct pile of droppings was found, people were asked to send in droppings from two piles in separate tubes, taking care not to mix them up. A simple recording form was included with the letter. The letter and recording form are reproduced in Appendix 2.

### **3.1.4 Researching contractor options for analysing DNA samples**

The two key providers of DNA dropping analysis were approached for quotations and details of their service including turnaround time. Droppings collected for analysis in this project were subsequently sent to the Waterford Institute of Technology in Ireland via their UK agents Swift Ecology for analysis.

## **3.2 Phase 2 tasks**

### **3.2.1 Interrogating databases to identify target roosts within priority areas and create list with mailing details**

The initial searches of BCT databases were based on the first half of postcodes (e.g. TQ12) that occur within the priority areas listed in Table 1 and shown in Figures 2 to 5. Although the lack of precision inherent in this approach meant that some roosts were also included just outside the priority areas, it was considered useful to broaden the search slightly in this way to maximise the number of roosts included in the mail-out. This search resulted in 55 roosts being identified for contacting in the first mail-out in mid-June. After further discussion and due to a relatively low response rate to this first mail-out, the search was widened across the counties of East Sussex, West Sussex, Devon and Somerset. This resulted in a further 78 roosts being identified for contacting in a second mail-out in mid-August. The NBMP

database was also searched for long-eared bat roosts in Pembrokeshire but only two were found, neither of which were close to the areas highlighted as having suitable habitat for this species. The Helpline database does not include confirmed roosts from Wales so was not a potential source of information on roosts in Pembrokeshire.

See Appendix 1 for a full list of roosts contacted.

### **3.2.2 Publicising the project to bat groups to bring in additional roosts**

Bat groups and bat workers within the study area were contacted in order to identify additional roosts for sampling. An item was also included in the BCT Bat Group Bulletin on 18 July 2012 asking groups for any information on possible sites for sampling to ensure complete coverage. A further seven sites were identified by bat workers following this additional effort, bringing the total number of sites included in the search to 140.

### **3.2.3 Organising and sending out mail-out with collection materials for droppings**

The first mail-out took place on 14 June 2012 and was sent out to 55 roosts in the priority search areas. Each mailing contained the letter and recording form, a padded freepost envelope, two sampling tubes and two small labels on which to write the postcode of the property for attaching to the tubes. It was requested that people return droppings by 6 July 2012 if possible, which allowed approximately three weeks in which to respond. Reminder letters were sent out to property owners who did not respond within that period and these letters were followed up with phone calls at the start of August to encourage people to help if at all possible, and to check whether they needed any further advice in terms of where to look for droppings or any problems in accessing the areas where droppings might be found.

In early August it was also decided to explore doing the wider search beyond the initial priority areas to increase the number of samples. Further sites were extracted from the Helpline and NBMP database across West Sussex, East Sussex, Devon and Somerset resulting in an additional 78 sites being identified for inclusion in a second mail-out which was carried out between 17 and 21 August 2012. We also contacted bat workers in Sussex and Devon who had offered to collect droppings from additional roosts, but time constraints have meant that it was not possible to collect all of these additional samples in time for including the results in this report. However, any further samples received will still be sent off to the laboratory for analysis in order to build on the data collected through this project.

### **3.2.4 Managing return of samples**

Returned samples were inspected for suitability (i.e. determined to be droppings), logged in a spreadsheet along with details of their origins and sent for analysis.

## 4 Results

A total of 140 roosts were contacted as part of this project (Figure 6) and analysis has been carried out on droppings from 44 roosts which we received in response to the mail-outs and requests for samples: 16 in Devon, nine in West Sussex, four in East Sussex, two in Hampshire, ten in Somerset and three in Pembrokeshire (Table 2). This includes samples from all priority areas predicted as having suitable habitat for grey long-eared bat except for Dorset. A total of 73 samples were received in time for this report, with between one and four samples submitted from each roost. Two samples from one additional roost in Somerset have been belatedly received and will be sent off for analysis (included in Table 2). Full details of roost locations are not included in this report to ensure personal details and locations of individual properties are not specifically identified.

Around the priority areas, six roosts were sampled in West Sussex plus two just across the border into Hampshire, and six roosts were sampled in Devon. Of these 14 roosts, 11 were confirmed as being long-eared bat roosts, only one of which was identified as having grey long-eared bat *Plecotus austriacus* droppings, the other ten all being identified as brown long-eared bat *P. auritus* roosts. The grey long-eared bat roost is in Kingsbridge in Devon. A second sample from this roost was identified as being from Natterer's bat *Myotis nattereri*. The volunteer bat worker who visited this roost in 2009 found droppings but did not see any bats so it is currently unknown whether this is a grey long-eared bat maternity roost. Each roost owner who submitted droppings will be contacted with the results from their roost and this will be a good opportunity to open discussions with the owner of the grey long-eared bat roost about carrying out further investigation in order to determine the status of the roost.

Across the entire search area 35 of the total of 44 sampled roosts were confirmed as having brown long-eared bat *P. auritus* droppings, three of which also had other species identified: whiskered bat *M. mystacinus*, Natterer's bat *M. nattereri*, and a non-bat species, wood mouse *Apodemus sylvaticus*. Samples from seven roosts did not include long-eared bat droppings: three of these were common pipistrelle *Pipistrellus pipistrellus* roosts, one of which also had soprano pipistrelle *P. pygmaeus* identified; the remaining four were serotine *Eptesicus serotinus* roosts. DNA testing failed on both samples from one roost, so species identification was not possible. Testing typically fails if the samples are not droppings or if DNA has been washed out or lost for other reasons.

In addition to this study, we have been provided with information on two further grey long-eared bat roost locations. A bat worker who is assisting with this project by collecting droppings from additional roosts (George Bemment, Devon) has informed us of a new grey long-eared bat record near Aveton Gifford in Devon. Visual confirmation was made of a single individual on two visits to the roost in August and September 2012. It is thought to be a non-breeding roost. This site is on the edge of one of the priority areas identified as having suitable habitat for this species. A new maternity roost of grey long-eared bat has also been identified this summer by Dr Fiona Mathews from the University of Exeter. A lactating female was caught in the Axe Estuary area and the bat was radio-tagged and tracked back to its maternity roost in the Colyford area of East Devon.

**Table 2.** Roosts from which droppings were returned and results of DNA analysis. Positive records of grey long-eared bat are shown in bold.

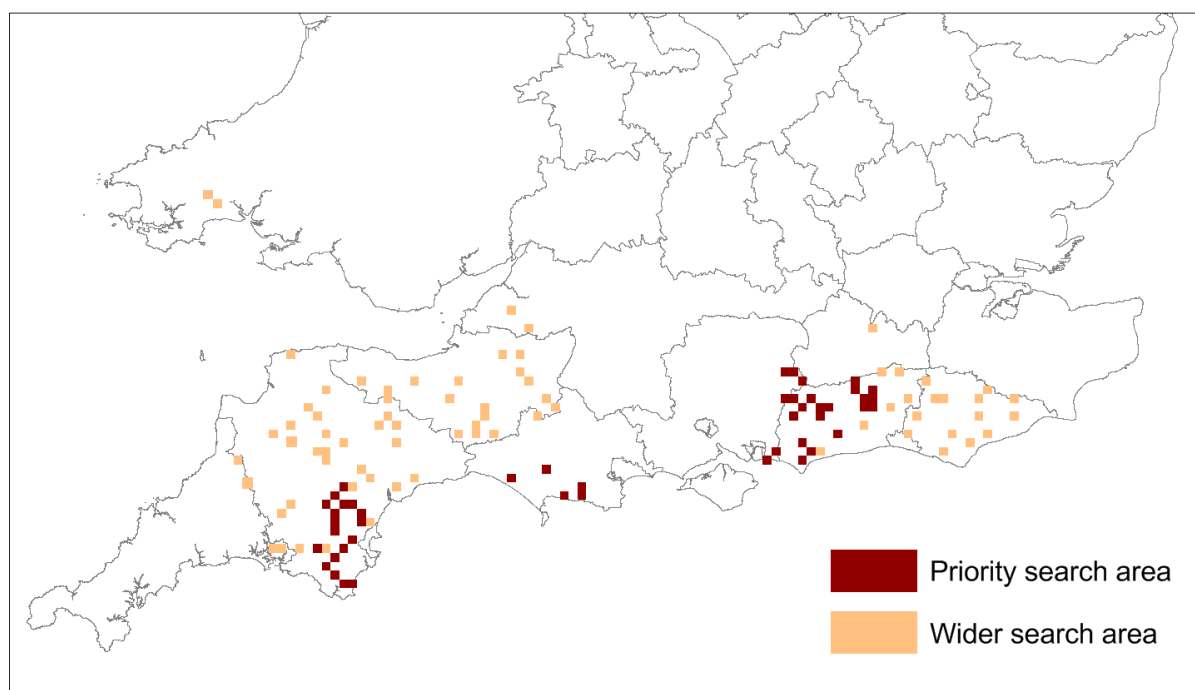
Roost ID	Location	County	Source	Search category	Sample ID	Species identification
4	Horsham	West Sussex	HL	PA	SEL 848 SEL 849	<i>Plecotus auritus</i> <i>Plecotus auritus</i>
10	Newton Abbot	Devon	HL	PA	SEL 850	<i>Plecotus auritus</i>
15	Kingsbridge	Devon	HL	PA	SEL 803 SEL 804	<i>Myotis nattereri</i> <b><i>Plecotus austriacus</i></b>
18	Newton Abbot	Devon	HL	PA	SEL 792 SEL 793	<i>Plecotus auritus</i> <i>Plecotus auritus</i>
25	Horsham	West Sussex	HL	PA	SEL 800 SEL 801	<i>Pipistrellus pygmaeus</i> <i>Pipistrellus pipistrellus</i>
26	Petworth	West Sussex	HL	PA	SEL 891	<i>Plecotus auritus</i>
31	Horsham	West Sussex	HL	PA	SEL 794 SEL 795	<i>Plecotus auritus</i> <i>Plecotus auritus</i>
38	Milland	West Sussex	HL	PA	SEL 738 SEL 739 SEL 740	<i>Apodemus sylvaticus</i> <i>Plecotus auritus</i> <i>Plecotus auritus</i>
42	Hayling Island	Hampshire	HL	PA	SEL 802	<i>Pipistrellus pipistrellus</i>
43	Bordon	Hampshire	HL	PA	SEL 798 SEL 799	<i>Plecotus auritus</i> <i>Plecotus auritus</i>
46	Midhurst	West Sussex	HL	PA	SEL 796 SEL 797	Failed Failed
48	Newton Abbot	Devon	HL	PA	SEL 741 SEL 742	<i>Plecotus auritus</i> <i>Myotis mystacinus</i>
49	Winford	Somerset	BW	WS	SEL 791 SEL 926	Failed <i>Eptesicus serotinus</i>
50	Holy	Pembrokeshire	BW	WS	SEL 743 SEL 744 SEL 745	<i>Plecotus auritus</i> <i>Plecotus auritus</i> <i>Plecotus auritus</i>
51	Penderi	Pembrokeshire	BW	WS	SEL 746 SEL 747 SEL 748 SEL 749	<i>Plecotus auritus</i> <i>Plecotus auritus</i> <i>Plecotus auritus</i> <i>Myotis nattereri</i>
52	Yelverton	Pembrokeshire	BW	WS	SEL 750	<i>Plecotus auritus</i>
55	Nr South Brent	Devon	NBMP	PA	SEL 852	<i>Plecotus auritus</i>
58	Totnes	Devon	NBMP	PA	SEL 927 SEL 928	<i>Plecotus auritus</i> Failed
59	nr Bridgewater	Somerset	NBMP	WS		Awaiting analysis
68	Hailsham	East Sussex	HL	WS	SEL 892 SEL 893	<i>Plecotus auritus</i> <i>Plecotus auritus</i>
69	Bexhill-on-Sea	East Sussex	HL	WS	SEL 854 SEL 855	<i>Plecotus auritus</i> <i>Plecotus auritus</i>
72	Wadhurst	East Sussex	HL	WS	SEL 880 SEL 881	<i>Plecotus auritus</i> <i>Plecotus auritus</i>
74	Forest Row	East Sussex	HL	WS	SEL 929 SEL 930	<i>Plecotus auritus</i> <i>Plecotus auritus</i>
80	Haywards Heath	West Sussex	HL	WS	SEL 856	<i>Plecotus auritus</i>
83	Crawley	West Sussex	HL	WS	SEL 857 SEL 858	<i>Plecotus auritus</i> <i>Plecotus auritus</i>
84	Pulborough	West Sussex	HL	WS	SEL 859	<i>Eptesicus serotinus</i>
85	Newton Abbot	Devon	HL	WS	SEL 860	<i>Plecotus auritus</i>
87	Plymouth	Devon	HL	WS	SEL 861	<i>Plecotus auritus</i>



Roost ID	Location	County	Source	Search category	Sample ID	Species identification
90	Sidmouth	Devon	HL	WS	SEL 862	<i>Plecotus auritus</i>
94	Crediton	Devon	HL	WS	SEL 863 SEL 864	<i>Plecotus auritus</i> <i>Plecotus auritus</i>
101	Umberleigh	Devon	HL	WS	SEL 865 SEL 866	<i>Plecotus auritus</i> <i>Plecotus auritus</i>
111	Exeter	Devon	HL	WS	SEL 867	<i>Plecotus auritus</i>
117	Chard	Somerset	HL	WS	SEL 868	<i>Plecotus auritus</i>
119	Taunton	Somerset	HL	WS	SEL 894 SEL 896	<i>Plecotus auritus</i> <i>Plecotus auritus</i>
121	Templecombe	Somerset	HL	WS	SEL 869	<i>Plecotus auritus</i>
122	South Petherton	Somerset	HL	WS	SEL 870 SEL 871	<i>Plecotus auritus</i> <i>Plecotus auritus</i>
123	Ilminster	Somerset	HL	WS	SEL 872 SEL 873	<i>Eptesicus serotinus</i> <i>Eptesicus serotinus</i>
126	Minehead	Somerset	HL	WS	SEL 874	<i>Eptesicus serotinus</i>
128	Crewkerne	Somerset	HL	WS	SEL 875 SEL 876	<i>Plecotus auritus</i> <i>Plecotus auritus</i>
135	Sherborne	Somerset	HL	WS	SEL 877 SEL 878	<i>Plecotus auritus</i> <i>Plecotus auritus</i>
136	Ilminster	Somerset	HL	WS	SEL 879	<i>Pipistrellus pipistrellus</i>
137	South Brent	Devon	NBMP	WS	SEL 853	<i>Plecotus auritus</i>
138	Tavistock	Devon	BW	WS	SEL 931	<i>Plecotus auritus</i>
139	Launceston	Devon	BW	WS	SEL 932	<i>Plecotus auritus</i>
140	Okehampton	Devon	BW	WS	SEL 933	<i>Plecotus auritus</i>

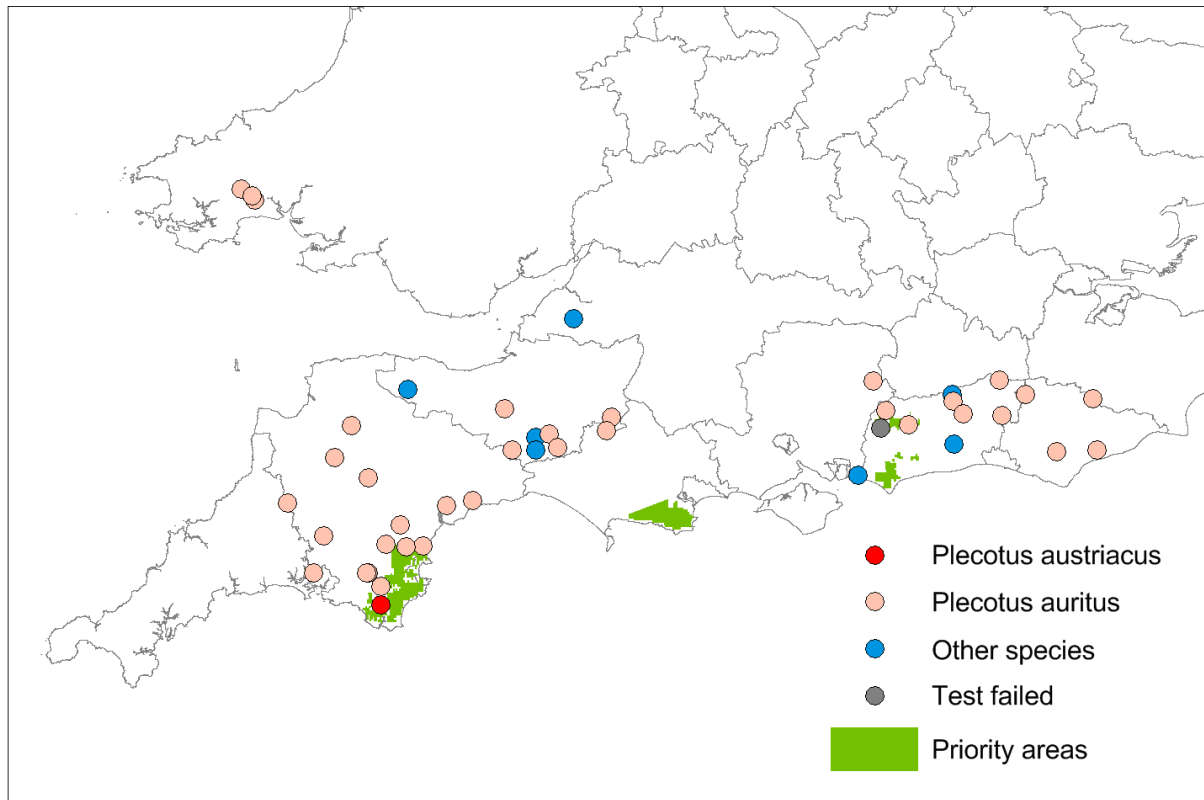
Source: HL = BCT Helpline database, NBMP = BCT NBMP database, BW = bat worker/bat group

Search category: PA = priority areas (initial search), WS = wider search





**Figure 6.** Roost locations included in the search (initial priority search areas were slightly broader than priority areas predicted to have suitable habitat shown in Figure 7).



**Figure 7.** Results of DNA analysis overlaid on priority areas predicted to have suitable habitat for grey long-eared bat (n=44).

## 5 Discussion

### 5.1 Results

Samples were analysed from 44 roosts, 14 of which are within priority areas identified from Orly Razgour's predictive model, and 30 from the wider search. Only one of these samples has been identified as being from grey long-eared bat. This was from a roost in Devon within one of the priority areas predicted to have suitable habitat for this species. Although the relatively small number of samples analysed do not enable firm conclusions, these results do not challenge the description of the current status of this species as being rare across its UK range. This may be the case even in areas predicted to have suitable habitat, since out of 11 long-eared bat roosts confirmed from the priority search areas, only one was identified as having grey long-eared bat droppings. However, a bigger sample size would be needed to confirm this species' status within such areas. The DNA analysis also produced some interesting additional species identifications, including Natterer's bat, whiskered bat and serotine which are not generally among the more commonly recorded species at roosts.

Further work will be required to follow up on the new record to determine the status of this roost. It is interesting that there is more than one species present in this building, and the presence of mixed species confirms the need to sample droppings from more than one location at each potential site.

The recent confirmation of a roost in Pembrokeshire indicates that this species occurs more widely in the UK than previously thought. It may be that this is a relict population of a species that formerly had a more continuous widespread distribution or recent population expansion as a result of climate change. The predictive model indicated that suitable climatic and environmental conditions for the grey long-eared bat are found in south-west Wales, but before the discovery of this roost it appeared uncertain whether this species would be able to colonise these areas due to the large expanse of unsuitable habitat between Pembrokeshire and the known distribution, which is mainly restricted to the south - southwest coast of England. Currently there is little evidence to suggest that this species is present in areas between its known range in England and the newly discovered roost in Pembrokeshire. Two outlier records from the West Midlands on the NBN Gateway were investigated. One of these is a record from 1984 in Worcestershire but the local record centre did not have any additional details that would help verify this record. The other record is from 2006 in Herefordshire and the local record centre has confirmed that this record is incorrect and will be removed from the NBN Gateway. The scope of this study was widened to include samples from additional roosts in Pembrokeshire and more widely across the counties in England in which the species is known to occur. The results from this wider search did not produce any new grey long-eared bat records despite the higher sample size (30 roosts in the wider search areas compared to 14 in priority areas). This may suggest that grey long-eared bat is more sparsely distributed outside areas predicted to have suitable habitat but more intensive sampling would be needed to confirm this.

Future models predict a north-west shift in the distribution of the grey long-eared bat across Europe, with conditions in the UK becoming more suitable (Razgour, pers. comm.). This means that in the next few decades we may find more records in Wales and south-central western parts of England, as winters become warmer and suitable climatic conditions for the grey long-eared bat expand. However, their ability to colonise these areas and establish viable colonies greatly depends on availability of suitable foraging habitats, which are primarily semi-unimproved grasslands and marshes and woody riparian vegetation, habitats that have become rare in southern England.

## 5.2 Data collection

The approach of asking property owners to collect droppings had the advantage of being less expensive and time-consuming than requesting bat volunteers to carry out this task which would involve more organisation and additional costs such as travel expenses. Although property owners are less likely to have experience of searching for bat droppings, in the case of long-eared bats it was considered relatively easy to locate piles of droppings, at least if it is possible to access the part of the property in which the roost is located. Simple instructions were provided to property owners on what to look for and where to look. It is also possible that some property owners may respond more positively to a request to access their loft themselves rather than having to arrange access for a volunteer. However, one property owner expressed an unwillingness to enter her loft to collect droppings but offered to grant access to a volunteer. We managed to find a local roost visitor who is making arrangements to collect droppings from this roost, further to this report.

A number of limitations became apparent with this approach to collecting droppings. The first was the low number of responses to the original mail-out. Follow-up letters and phone calls proved worthwhile, resulting in several additional samples being returned. A few roost owners reported problems with collecting droppings and these are summarised in the Notes column in the table in Appendix 1.

Despite being provided with instructions on how to identify bat droppings, two respondents sent in samples that were not droppings. Non-dropping items returned were identified as a snail shell and a seed case (one site), and a tube of dead flies was received from another roost though a second tube from the same site did contain droppings.

This study has also highlighted how difficult it is to identify new sites of a rare bat species using this method of sampling at roosts. Of 44 likely long-eared roosts sampled, only one new record of grey long-eared bat was found. It is likely that a very large number of roosts or a comprehensive search and sampling of roosts would be needed before a significant number of new roosts of grey long-eared bats might be located. However, new information on the remaining roosts was also gathered as part of this project which will contribute to distribution maps and can be used in future work.

In most cases, the small samples requested seemed sufficient for DNA analysis given the positive identifications that were returned from the lab, although analysis failed on four samples. Two of the failed samples were received from two roosts where a second sample was successfully analysed, enabling a positive identification to be made. The other two failed samples were both from the same roost, which meant that species identification was not possible at this roost. Participants were asked to collect droppings from up to two distinct piles if possible, in case more than one species was present. There may be a case for collecting more samples to reduce the chance of missing grey long-eared bat when present among other species.

## 6 Conclusions

This project has identified a single new grey long-eared bat roost. Although the number of roosts sampled was quite small, this appears to support the current status of grey long-eared bat as being rare across its UK range. The recent discovery of a grey long-eared bat roost in Pembrokeshire indicates that the species occurs outside its known core range in the south of England. It is unknown whether this indicates a wider continuous distribution or whether the Pembrokeshire roost is part of a relict population. The latter case would appear to be supported by the predictive model which did not identify suitable habitat between the known populations in southern England and south-west Wales, but wider sampling would be needed to confirm this.

This study did not involve a fully comprehensive search throughout the known range of grey long-eared bat as there is already work going on in areas such as Hampshire, East Devon and Dorset to identify this species' roosts. The aim of the project was to focus on priority areas predicted to have suitable habitat and also look at other parts of the species' range that are not already the focus of current local projects.

If similar projects are carried out in future we would recommend exploring the following additional approaches, if suitable time and budget are available:

- Advertise the project locally using various methods of raising awareness to get additional roosts included that are not already known about. This would need to be carefully targeted to avoid being inundated with pipistrelle droppings that would be time consuming and costly to process, for example asking property owners to only send in droppings if these are found in the roof void. It would also require organisation of sufficient resources in local areas to deal with enquiries coming in about bats in properties.
- Carry out a search of data from local record centres (LRCs). The limitation of this approach is that LRCs are unlikely to hold roost owners' contact details. However, it may prove possible to make contact with the recorders who submitted the records and enlist their help in collecting droppings.
- Explore working with consultants to expand sampling to roosts that are identified through commercial work, though client confidentiality might be an issue here.
- Enlist local bat workers to carry out searches for droppings. This may increase the number of roosts sampled and improve the success rate in locating droppings at roosts. A budget for expenses and resources to organise and support the volunteers would be needed.

## 7 References

Harris, S. et al. (1995) *A review of British mammals: population estimates and conservation status of British mammals other than cetaceans*. JNCC, Peterborough

Razgour, O., Hanmer, J. & Jones, G. (2011) Using multi-scale modelling to predict habitat suitability for species of conservation concern: The grey long-eared bat as a case study. *Biological Conservation* 144: 2922-2930.

Russ, J. (2012) *British bat calls: a guide to species identification*. Pelagic Publishing, Exeter.

Swift, S.M. & Entwistle, A.C. (2008) Grey long-eared bat in *Mammals of the British Isles: handbook*, 4<sup>th</sup> edition. The Mammal Society, Southampton.

## Appendix 1 – Complete list of roosts contacted

Source: HL = BCT Helpline database, NBMP = BCT NBMP database, BW = bat worker/bat group

Search category: PA = priority areas (initial search), WS = wider search

Sample ID: TBC = to be confirmed (indicates samples received and not yet processed – number of samples in brackets)

Roost ID	Location	County	Source	Search category	Sample ID	Species identification	Notes
1	Haslemere	Surrey	HL	WS			Roost owner unable to help at present time.
2	Hayling Island	Hampshire	HL	PA			
3	Newton Abbot	Devon	HL	PA			Loft space inaccessible. Samples awaited from alternative part of property.
4	Horsham	West Sussex	HL	PA	SEL 848 SEL 849	<i>Plecotus auritus</i> <i>Plecotus auritus</i>	
5	Dorchester	Dorset	HL	PA			
6	Totnes	Devon	HL	PA			Bats not present this year
7	Petworth	West Sussex	HL	PA			
8	Wareham	Dorset	HL	PA			
9	Liphook	Hampshire	HL	PA			Loft space inaccessible.
10	Newton Abbot	Devon	HL	PA	SEL 850	<i>Plecotus auritus</i>	
11	Chichester	West Sussex	HL	PA			Bats not present this year.
12	Chichester	West Sussex	HL	PA			
13	Newton Abbot	Devon	HL	PA			
14	Petworth	West Sussex	HL	PA			Returned samples but were not droppings.
15	Kingsbridge	Devon	HL	PA	SEL 803 SEL 804	<i>Myotis nattereri</i> <i>Plecotus austriacus</i>	
16	Kingsbridge	Devon	HL	PA			
17	Newton Abbot	Devon	HL	PA			
18	Newton Abbot	Devon	HL	PA	SEL 792	<i>Plecotus auritus</i>	



Roost ID	Location	County	Source	Search category	Sample ID	Species identification	Notes
					SEL 793	<i>Plecotus auritus</i>	
19	Horsham	West Sussex	HL	PA			
20	Wareham	Dorset	HL	PA			
21	Totnes	Devon	HL	PA			
22	Newton Abbot	Devon	HL	PA			
23	Kingsbridge	Devon	HL	PA			
24	Midhurst	West Sussex	HL	PA			Loft space inaccessible. Samples awaited from alternative part of property.
25	Horsham	West Sussex	HL	PA	SEL 800 SEL 801	<i>Pipistrellus pygmaeus</i> <i>Pipistrellus pipistrellus</i>	
26	Petworth	West Sussex	HL	PA	SEL 891	<i>Plecotus auritus</i>	
27	Newton Abbot	Devon	HL	PA			
28	Bordon	Hampshire	HL	PA			
29	Horsham	West Sussex	HL	PA			
30	Horsham	West Sussex	HL	PA			Roost owner doesn't want to go into loft but happy to allow access to a bat worker. Trying to arrange this.
31	Horsham	West Sussex	HL	PA	SEL 794 SEL 795	<i>Plecotus auritus</i> <i>Plecotus auritus</i>	
32	Liss	Hampshire	HL	PA			Loft space inaccessible.
33	Buckfastleigh	Devon	HL	PA			
34	Horsham	West Sussex	HL	PA			
35	Newton Abbot	Devon	HL	PA			Returned form stating that no droppings found and no knowledge of bats at site.
36	Kingsbridge	Devon	HL	PA			May be possible to collect droppings at later date.
37	Newton Abbot	Devon	HL	PA			

Roost ID	Location	County	Source	Search category	Sample ID	Species identification	Notes
38	Milland	West Sussex	HL	PA	SEL 738 SEL 739 SEL 740	<i>Apodemus sylvaticus</i> <i>Plecotus auritus</i> <i>Plecotus auritus</i>	
39	Liphook	Hampshire	HL	PA			
40	Bognor Regis	West Sussex	HL	PA			
41	Arundel	West Sussex	HL	PA			No droppings found despite extensive search.
42	Hayling Island	Hampshire	HL	PA	SEL 802	<i>Pipistrellus pipistrellus</i>	
43	Bordon	Hampshire	HL	PA	SEL 798 SEL 799	<i>Plecotus auritus</i> <i>Plecotus auritus</i>	
44	Newton Abbot	Devon	HL	PA			No bats or droppings seen but will keep looking.
45	Dorchester	Dorset	HL	PA			Roost owner does not want to take part.
46	Midhurst	West Sussex	HL	PA	SEL 796 SEL 797	Failed Failed	
47	Chichester	West Sussex	HL	PA			
48	Newton Abbot	Devon	HL	PA	SEL 741 SEL 742	<i>Plecotus auritus</i> <i>Myotis mystacinus</i>	
49	Winford	Somerset	BW	WS	SEL 791 SEL 926	Failed <i>Eptesicus serotinus</i>	Sent droppings in response to Bat Group Bulletin. First batch failed so submitted a second sample.
50	Holy	Pembrokeshire	BW	WS	SEL 743 SEL 744 SEL 745	<i>Plecotus auritus</i> <i>Plecotus auritus</i> <i>Plecotus auritus</i>	
51	Penderi	Pembrokeshire	BW	WS	SEL 746 SEL 747 SEL 748 SEL 749	<i>Plecotus auritus</i> <i>Plecotus auritus</i> <i>Plecotus auritus</i> <i>Myotis nattereri</i>	
52	Yelverton	Pembrokeshire	BW	WS	SEL 750	<i>Plecotus auritus</i>	
53	Totnes	Devon	NBMP	PA			

Roost ID	Location	County	Source	Search category	Sample ID	Species identification	Notes
54	Dorchester	Dorset	NBMP	PA			
55	Nr South Brent	Devon	NBMP	PA	SEL 852	<i>Plecotus auritus</i>	
56	Nr South Brent	Devon	NBMP	PA			
57	Petersfield	Hampshire	NBMP	PA			
58	Totnes	Devon	NBMP	PA	SEL 927 SEL 928	<i>Plecotus auritus</i> Failed	
59	nr Bridgewater	Somerset	NBMP	WS	TBC (2)		Droppings received and awaiting analysis
60	Dulverton	Somerset	NBMP	WS			
61	Hailsham	East Sussex	NBMP	WS			
62	Lewes	East Sussex	HL	WS			
63	Pevensey	East Sussex	HL	WS			
64	Falmer	East Sussex	HL	WS			
65	Rye	East Sussex	HL	WS			
66	Forest Row	East Sussex	HL	WS			Returned recording form: no droppings found currently.
67	Polegate	East Sussex	HL	WS			
68	Hailsham	East Sussex	HL	WS	SEL 892 SEL 893	<i>Plecotus auritus</i> <i>Plecotus auritus</i>	
69	Bexhill-on-Sea	East Sussex	HL	WS	SEL 854 SEL 855	<i>Plecotus auritus</i> <i>Plecotus auritus</i>	
70	Uckfield	East Sussex	HL	WS			
71	Forest Row	East Sussex	HL	WS			
72	Wadhurst	East Sussex	HL	WS	SEL 880 SEL 881	<i>Plecotus auritus</i> <i>Plecotus auritus</i>	
73	Uckfield	East Sussex	HL	WS			
74	Forest Row	East Sussex	HL	WS	SEL 929 SEL 930	<i>Plecotus auritus</i> <i>Plecotus auritus</i>	
75	Near Battle	East Sussex	HL	WS			

Roost ID	Location	County	Source	Search category	Sample ID	Species identification	Notes
76	Rye	East Sussex	HL	WS			
77	Etchingham	East Sussex	HL	WS			
78	Bognor Regis	West Sussex	HL	WS			
79	Horsham	West Sussex	HL	WS			
80	Haywards Heath	West Sussex	HL	WS	SEL 856	<i>Plecotus auritus</i>	
81	Haywards Heath	West Sussex	HL	WS			
82	Crawley	West Sussex	HL	WS			
83	Crawley	West Sussex	HL	WS	SEL 857 SEL 858	<i>Plecotus auritus</i> <i>Plecotus auritus</i>	
84	Pulborough	West Sussex	HL	WS	SEL 859	<i>Eptesicus serotinus</i>	
85	Newton Abbot	Devon	HL	WS	SEL 860	<i>Plecotus auritus</i>	
86	Exeter	Devon	HL	WS			
87	Plymouth	Devon	HL	WS	SEL 861	<i>Plecotus auritus</i>	
88	Tiverton	Devon	HL	WS			
89	Holsworthy	Devon	HL	WS			
90	Sidmouth	Devon	HL	WS	SEL 862	<i>Plecotus auritus</i>	
91	Beaworthy	Devon	HL	WS			
92	Tiverton	Devon	HL	WS			
93	Ivybridge	Devon	HL	WS			
94	Crediton	Devon	HL	WS	SEL 863 SEL 864	<i>Plecotus auritus</i> <i>Plecotus auritus</i>	
95	North Tawton	Devon	HL	WS			
96	Crediton	Devon	HL	WS			
97	Tiverton	Devon	HL	WS			
98	Exeter	Devon	HL	WS			
99	Tiverton	Devon	HL	WS			
100	Crediton	Devon	HL	WS			
101	Umburleigh	Devon	HL	WS	SEL 865	<i>Plecotus auritus</i>	

Roost ID	Location	County	Source	Search category	Sample ID	Species identification	Notes
					SEL 866	<i>Plecotus auritus</i>	
102	Winkleigh	Devon	HL	WS			
103	Umberleigh	Devon	HL	WS			
104	Tavistock	Devon	HL	WS			
105	Plymouth	Devon	HL	WS			
106	Plymouth	Devon	HL	WS			
107	Cullompton	Devon	HL	WS			
108	South Molton	Devon	HL	WS			
109	Crediton	Devon	HL	WS			
110	Exeter	Devon	HL	WS			
111	Exeter	Devon	HL	WS	SEL 867	<i>Plecotus auritus</i>	
112	Crediton	Devon	HL	WS			
113	Newton Abbot	Devon	HL	WS			
114	Kingsbridge	Devon	HL	WS			
115	Plymouth	Devon	HL	WS			
116	Ilfracombe	Devon	HL	WS			
117	Chard	Somerset	HL	WS	SEL 868	<i>Plecotus auritus</i>	
118	South Petherton	Somerset	HL	WS			Returned form: no long-eared bats present
119	Taunton	Somerset	HL	WS	SEL 894 SEL 896	<i>Plecotus auritus</i> <i>Plecotus auritus</i>	
120	Shepton Mallet	Somerset	HL	WS			
121	Templecombe	Somerset	HL	WS	SEL 869	<i>Plecotus auritus</i>	
122	South Petherton	Somerset	HL	WS	SEL 870 SEL 871	<i>Plecotus auritus</i> <i>Plecotus auritus</i>	
123	Ilminster	Somerset	HL	WS	SEL 872 SEL 873	<i>Eptesicus serotinus</i> <i>Eptesicus serotinus</i>	
124	Wells	Somerset	HL	WS			

Roost ID	Location	County	Source	Search category	Sample ID	Species identification	Notes
125	Bristol	Somerset	HL	WS			
126	Minehead	Somerset	HL	WS	SEL 874	<i>Eptesicus serotinus</i>	
127	Shepton Mallet	Somerset	HL	WS			
128	Crewkerne	Somerset	HL	WS	SEL 875 SEL 876	<i>Plecotus auritus</i> <i>Plecotus auritus</i>	
129	Templecombe	Somerset	HL	WS			
130	Martock	Somerset	HL	WS			
131	Crewkerne	Somerset	HL	WS			
132	South Petherton	Somerset	HL	WS			
133	Taunton	Somerset	HL	WS			
134	Wells	Somerset	HL	WS			
135	Sherborne	Somerset	HL	WS	SEL 877 SEL 878	<i>Plecotus auritus</i> <i>Plecotus auritus</i>	
136	Iminster	Somerset	HL	WS	SEL 879	<i>Pipistrellus pipistrellus</i>	
137	South Brent	Devon	NBMP	WS	SEL 853	<i>Plecotus auritus</i>	Additional (non-NBMP) roost sampled by an NBMP volunteer.
138	Tavistock	Devon	BW	WS	SEL 931	<i>Plecotus auritus</i>	Droppings submitted from a roost visit.
139	Launceston	Devon	BW	WS	SEL 932	<i>Plecotus auritus</i>	Droppings submitted from a roost visit.
140	Okehampton	Devon	BW	WS	SEL 933	<i>Plecotus auritus</i>	Droppings submitted from a roost visit.



## Appendix 2 – Letter to roost owners and recording form

**What type of bats are living in your roof? Looking for the rare grey long-eared bat.**

Dear ,

I am writing to you about an exciting new project we are undertaking as part of the National Bat Monitoring Programme which we hope will help increase our knowledge of the distribution of one of the UK's rarest bat species, the grey long-eared bat. We hope that you will be able to assist us with this project.



©Hugh Clark/BCT

### **Where is the grey long-eared bat found?**

Orly Razgour, a PhD student at the University of Bristol, has been working on this rare bat species for the last three years, and by looking at where these bats are currently found and what types of habitats they use, she has mapped other areas where she thinks they could be found. The map shows the likely distribution is along parts of the coast of southern England from Hampshire to Devon and including the Isle of Wight. There are only eight known grey long-eared maternity colonies in the UK and a very small number of other individual records. We now want to try to find other sites where this species lives. We have been working with Orly to highlight priority areas within the likely areas where the species could be found to search for more roosts. We now need your help to identify them.

### **How you can help**

We are contacting you because your property is within one of these priority areas and a visit from a bat worker in recent years has identified that long-eared bat roost in the property. There are two long-eared bat species, brown and grey. Brown long-eared bats are quite common, but it can be difficult to tell the two species apart, particularly without catching the bats for a close look. Newly developed research techniques means that we can now identify the species of bat that uses a roost from a single bat dropping by using DNA analysis. Please help us find new grey long-eared bat sites by collecting a few bat droppings from your roost and sending them to us in the enclosed sample tubes for analysis.



©Ann Youngman/BCT

### **Where to look for droppings**

If the bats are roosting in the roof space of the property and you are able to access the loft, then this would be the best place to look for droppings. Carry out the search as quickly and as quietly as you can in order to avoid disturbing the bats. Long-eared bats tend to roost up in the apex of the roof, so if you are using a torch then make sure you keep it pointed down on the floor.

P.T.O.

If you are not able to collect droppings from the loft then look around the edges of the building, including window ledges and on the ground next to the walls. If you know the location of access points where bats go in and out of the roost, then beneath these would be an obvious place to look. An obvious sign to look out for is discarded moth wings which will be found beneath feeding perches and will be another good place to search for droppings.

### **How many droppings to collect**

You only need to collect a few droppings to put in each tube. If you find more than one distinct pile of droppings, then please collect droppings from each pile and place them in separate tubes, making sure you do not mix them up. The droppings are simply undigested insect fragments and there are no health issues associated with handling them. However, if you prefer not to touch the droppings you could use a small implement such as tweezers or a cocktail stick to pop the droppings directly into the tube.

### **What to write on the label**

We have provided some sticky labels for your tubes. Please put your postcode on the label and stick it onto the tube.

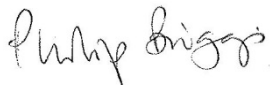
### **How to return the tube(s) to us**

Please use the padded envelope the tubes were provided in to return them to us: the envelope has a Freepost label on it so you won't need a stamp. Please also fill in the form enclosed in the envelope with some details of the roost and return it with the samples.

Please aim to return your samples by **Friday 6<sup>th</sup> July 2012** if possible. We will be in touch in due course to let you know the results of the analysis of the droppings you send to us.

We hope you are able to help us with this exciting project. If you have any questions, please contact me using the details below.

Yours sincerely,



Philip Briggs  
Projects Manager  
National Bat Monitoring Programme  
[pbriggs@bats.org.uk](mailto:pbriggs@bats.org.uk)  
020 7820 7179

## Long-eared bat dropping recording form

Please fill in the following information and return with your samples in the envelope provided<sup>1</sup>.

Name: .....

Address: .....

.....

Postcode: .....

Telephone: .....

Email: .....

Please describe where you collected bat droppings from in the property:

---

<sup>1</sup> By returning data to us you consent to your data being accessible by the Ba Conservation Trust (BCT), Joint Nature Conservation Committee (JNCC), local bat groups and others subject to the approval of JNCC and BCT. Your intellectual copyright of the data will be recognised at all times. We will be entering your personal information onto a confidential database. Please let us know if you object to this.

## Appendix 3 – DNA analysis spreadsheets

4. ANALYTICAL REPORT														
Author		P Turner		Date		31/07/2012								
SAMPLE COLLECTED BY				SAMPLE COLLECTION										
NAME	0			DATE	00-Jan-00									
COMPANY	BCT			LOCATION	0									
SAMPLE														
Code	SEL738	SEL739	SEL740	SEL741	SEL742	SEL743	SEL744	SEL745	SEL746	SEL747	SEL748	SEL749	SEL750	SEL751
Suspect species														
Species group	C	C	C	C	C	C	C	C	C	C	C	C	C	C
DNA EXTRACT														
Code	LC180712 11	LC180712 12	LC180712 13	LC180712 14	LC180712 15	LC180712 16	LC180712 17	LC180712 18	LC180712 19	LC180712 20	LC180712 21	LC180712 22	LC180712 23	LC180712 24
DNA conc.(ng/ul)	2.5	2.1	3.6	1.8	2.7	3.4	2.7	2.5	1.6	1.9	2.8	2.4	2.6	2.9
REAL TIME PCR DATA														
probe	na	na	na	na	na	na								
total cycles	na	na	na	na	na	na								
cycles to amplify (Ct)	na	na	na	na	na	na								
Data file	na	na	na	na	na	na								
SEQUENCE DATA														
primer set	cytB	cytB	cytB	cytB	cytB	cytB	cytB	cytB	cytB	cytB	cytB	cytB	cytB	cytB
Sequence length (bases)	162	165	167	162	167	166	158	162	170	171	169	151	162	159
Sequence match (%)	100	100	100	100	100	100	100	100	100	100	100	100	100	100
SPECIES	<i>Apodemus sylvaticus</i>	<i>Plecotus auritus</i>	<i>Plecotus auritus</i>	<i>Plecotus auritus</i>	<i>Myotis mystacinus</i>	<i>Plecotus auritus</i>	<i>Plecotus auritus</i>	<i>Plecotus auritus</i>	<i>Plecotus auritus</i>	<i>Plecotus auritus</i>	<i>Plecotus auritus</i>	<i>Myotis nattereri</i>	<i>Plecotus auritus</i>	<i>Pipistrellus pipistrellus</i>
haplotype	nd	nd	nd	nd	nd	nd	nd	nd	nd	nd	nd	nd	nd	nd
Data file	090812	270712	270712	270712	270712	270712	270712	270712	270712	270712	270712	270712	270712	270712
POSITIVE CONTROL SAMPLE														
source	Faecal DNA sample													
result	positive													
SPECIES	<i>Apodemus sylvaticus</i>	<i>Plecotus auritus</i>	<i>Plecotus auritus</i>	<i>Plecotus auritus</i>	<i>Myotis mystacinus</i>	<i>Plecotus auritus</i>	<i>Plecotus auritus</i>	<i>Plecotus auritus</i>	<i>Plecotus auritus</i>	<i>Plecotus auritus</i>	<i>Plecotus auritus</i>	<i>Myotis nattereri</i>	<i>Plecotus auritus</i>	<i>Pipistrellus pipistrellus</i>
COMMENTS														
Report date to SEL	14/08/2012		Report date to Client											

#### 4. ANALYTICAL REPORT

Author		P Turner		Date		27/08/2012									
SAMPLE COLLECTED BY				SAMPLE COLLECTION											
NAME	Dr Kate Barlow			DATE	01/07/2012 - 31/07/2012										
COMPANY	National Bat Monitoring Programme - Bat Conservation Trust			LOCATION	Various										

SAMPLE														
Code	SEL791	SEL792	SEL793	SEL794	SEL795	SEL796	SEL797	SEL798	SEL799	SEL800	SEL801	SEL802	SEL803	SEL804
Suspect species	long eared	long eared	long eared	long eared	long eared	long eared	long eared	long eared	long eared	long eared	long eared	long eared	long eared	long eared
Species group	C	C	C	C	C	C	C	C	C	C	C	C	C	C

DNA EXTRACT														
Code	COR150812 1	COR150812 2	COR150812 3	COR150812 4	COR150812 5	COR150812 6	COR150812 7	COR150812 8	COR150812 9	COR150812 10	COR150812 11	COR150812 12	COR150812 13	COR150812 14
DNA conc. (ng/ul)	2.7	2.7	2.5	2.1	3.2	2.4	2.1	3.5	2.6	2.1	2.4	3.5	2.9	2.4

REAL TIME PCR DATA														
probe	na	na	na	na	na	na								
total cycles	na	na	na	na	na	na								
cycles to amplify (Ct)	na	na	na	na	na	na								
Data file	na	na	na	na	na	na								

SEQUENCE DATA														
primer set	cytB+16s	cytB	cytB	cytB	cytB	cytB+16s	cytB+16s	cytB	cytB	cytB	cytB	cytB	cytB	16s
sequence length	0	156	156	169	180	0	0	161	163	129	152	146	178	252
Sequence match (%)	0	100	100	100	100	0	0	100	100	100	100	100	100	100
SPECIES	fail	<i>Plecotus auritus</i>	<i>Plecotus auritus</i>	<i>Plecotus auritus</i>	<i>Plecotus auritus</i>	fail	fail	<i>Plecotus auritus</i>	<i>Plecotus auritus</i>	<i>Pipistrellus pygmaeus</i>	<i>Pipistrellus pipistrellus</i>	<i>Pipistrellus pipistrellus</i>	<i>Myotis nattereri</i>	<i>Plecotus austriacus</i>
haplotype	nd	nd	nd	nd	nd	nd	nd	nd	nd	nd	nd	nd	nd	nd
Data file	170812 and 240812	170812	170812	170812	170812	170812 and 240812	170812 and 240812	210812	170812	170812	170812	170812	170812	170812 and 240812

POSITIVE CONTROL SAMPLE														
source	Faecal DNA sample													
result	positive													
SPECIES	fail	<i>Plecotus auritus</i>	<i>Plecotus auritus</i>	<i>Plecotus auritus</i>	<i>Plecotus auritus</i>	fail	fail	<i>Plecotus auritus</i>	<i>Plecotus auritus</i>	<i>Pipistrellus pygmaeus</i>	<i>Pipistrellus pipistrellus</i>	<i>Pipistrellus pipistrellus</i>	<i>Myotis nattereri</i>	<i>Plecotus austriacus</i>
COMMENTS	No suitable DNA could be extracted					No suitable DNA could be extracted	No suitable DNA could be extracted							
Report date to SEL	27/08/2012		Report date to Client											

Author		P Turner		Date		25/09/2012									
SAMPLE COLLECTED BY				SAMPLE COLLECTION											
NAME	Dr Kate Barlow			DATE	01/08/2012 - 04/09/2012										
COMPANY	National Bat Monitoring Programme - Bat Conservation Trust			LOCATION	Various										
SAMPLE															
Code	SEL848	SEL849	SEL850	SEL851	SEL852	SEL853	SEL854	SEL855	SEL856	SEL857	SEL858	SEL859	SEL860	SEL861	
Suspect species	long eared sp.	long eared sp.	long eared sp.	long eared sp.	long eared sp.	long eared sp.	long eared sp.	long eared sp.	long eared sp.	long eared sp.	long eared sp.	long eared sp.	long eared sp.	long eared sp.	
Species group	C	C	C	C	C	C	C	C	C	C	C	C	C	C	
DNA EXTRACT															
Code	COR170912 1	COR170912 2	COR170912 3	COR170912 4	COR170912 5	COR170912 6	COR170912 7	COR170912 8	COR170912 9	COR170912 10	COR170912 11	COR170912 12	COR170912 13	COR170912 14	
DNA conc.(ng/ul)	2.3	2.1	3.2	2.5	2.9	2.5	3.2	2.7	2.4	3.5	2.8	2.7	2.4	2.9	
REAL TIME PCR DATA															
probe	na	na	na	na	na	na									
total cycles	na	na	na	na	na	na									
cycles to amplify (Ct)	na	na	na	na	na	na									
Data file	na	na	na	na	na	na									
SEQUENCE DATA															
primer set	cytB	cytB	cytB	cytB	cytB	cytB	cytB	cytB	cytB	cytB	cytB	cytB	cytB	cytB	
sequence length (bases)	173	183	186	144	181	176	189	189	182	183	183	153	186	180	
Sequence match (%)	100	100	100	100	100	100	100	100	100	100	100	100	100	100	
SPECIES	<i>Plecotus auritus</i>	<i>Plecotus auritus</i>	<i>Plecotus auritus</i>	<i>Myotis mystacinus</i>	<i>Plecotus auritus</i>	<i>Plecotus auritus</i>	<i>Plecotus auritus</i>	<i>Plecotus auritus</i>	<i>Plecotus auritus</i>	<i>Plecotus auritus</i>	<i>Plecotus auritus</i>	<i>Eptesicus serotinus</i>	<i>Plecotus auritus</i>	<i>Plecotus auritus</i>	
haplotype	nd	nd	nd	nd	nd	nd	nd	nd	nd	nd	nd	nd	nd	nd	
Data file	190912	190912	190912	190912	190912	190912	190912	190912	190912	190912	190912	190912	190912	190912	
POSITIVE CONTROL SAMPLE															
source	Faecal DNA sample														
result	positive														
SPECIES	<i>Plecotus auritus</i>	<i>Plecotus auritus</i>	<i>Plecotus auritus</i>	<i>Myotis mystacinus</i>	<i>Plecotus auritus</i>	<i>Plecotus auritus</i>	<i>Plecotus auritus</i>	<i>Plecotus auritus</i>	<i>Plecotus auritus</i>	<i>Plecotus auritus</i>	<i>Plecotus auritus</i>	<i>Eptesicus serotinus</i>	<i>Plecotus auritus</i>	<i>Plecotus auritus</i>	
COMMENTS															
Report date to SEL	25/09/2012		Report date to Client												



SAMPLE														
Code	SEL862	SEL863	SEL864	SEL865	SEL866	SEL867	SEL868	SEL869	SEL870	SEL871	SEL872	SEL873	SEL874	SEL875
Suspect species	long eared sp.	long eared sp.	long eared sp.	long eared sp.	long eared sp.	long eared sp.	long eared sp.	long eared sp.	long eared sp.	long eared sp.	long eared sp.	long eared sp.	long eared sp.	long eared sp.
Species group	C	C	C	C	C	C	C	C	C	C	C	C	C	C
DNA EXTRACT														
Code	COR170912 15	COR170912 16	COR170912 17	COR170912 18	COR170912 19	COR170912 20	COR170912 21	COR170912 22	COR170912 23	COR170912 24	COR170912 25	COR170912 26	COR170912 27	COR170912 28
DNA conc.(ng/μl)	3.8	2.3	2.8	3.6	2.6	3.7	3.2	2.5	1.8	2.5	3.2	2.9	3.1	3.3
REAL TIME PCR DATA														
probe														
total cycles														
cycles to amplify (Ct)														
Data file														
SEQUENCE DATA														
primer set	cytB	cytB	cytB	cytB	cytB	cytB	cytB	cytB	cytB	cytB	cytB	cytB	cytB	cytB
sequence length (bases)	169	176	168	169	169	190	179	186	189	170	155	180	145	197
Sequence match (%)	100	100	100	100	100	100	100	100	100	100	100	100	100	100
SPECIES	<i>Plecotus auritus</i>	<i>Plecotus auritus</i>	<i>Plecotus auritus</i>	<i>Plecotus auritus</i>	<i>Plecotus auritus</i>	<i>Plecotus auritus</i>	<i>Plecotus auritus</i>	<i>Plecotus auritus</i>	<i>Plecotus auritus</i>	<i>Plecotus auritus</i>	<i>Eptesicus serotinus</i>	<i>Eptesicus serotinus</i>	<i>Eptesicus serotinus</i>	<i>Plecotus auritus</i>
haplotype	nd	nd	nd	nd	nd	nd	nd	nd	nd	nd	nd	nd	nd	nd
Data file	190912	190912	190912	190912	190912	190912	190912	190912	190912	190912	190912	190912	190912	190912
POSITIVE CONTROL SAM														
source														
result														
SPECIES	<i>Plecotus auritus</i>	<i>Plecotus auritus</i>	<i>Plecotus auritus</i>	<i>Plecotus auritus</i>	<i>Plecotus auritus</i>	<i>Plecotus auritus</i>	<i>Plecotus auritus</i>	<i>Plecotus auritus</i>	<i>Plecotus auritus</i>	<i>Plecotus auritus</i>	<i>Eptesicus serotinus</i>	<i>Eptesicus serotinus</i>	<i>Eptesicus serotinus</i>	<i>Plecotus auritus</i>
COMMENTS														

SAMPLE						
Code	SEL876	SEL877	SEL878	SEL879	SEL880	SEL881
Suspect species	long eared sp.	long eared sp.	long eared sp.	long eared sp.	long eared sp.	long eared sp.
Species group	C	C	C	C	C	C
DNA EXTRACT						
Code	COR170912 29	COR170912 30	COR170912 31	COR170912 32	COR170912 33	COR170912 34
DNA conc.(ng/μl)	2.8	2.6	2.9	2.7	3.1	2.7
REAL TIME PCR DATA						
probe						
total cycles						
cycles to amplify (Ct)						
Data file						
SEQUENCE DATA						
primer set	cytB	cytB	cytB	cytB	cytB	cytB
sequence length (bases)	193	189	190	167	195	195
Sequence match (%)	100	100	100	100	100	100
SPECIES	<i>Plecotus auritus</i>	<i>Plecotus auritus</i>	<i>Plecotus auritus</i>	<i>Pipistrellus pipistrellus</i>	<i>Plecotus auritus</i>	<i>Plecotus auritus</i>
haplotype	nd	nd	nd	nd	nd	nd
Data file	190912	190912	190912	190912	190912	190912
POSITIVE CONTROL SAM						
source						
result						
<b>SPECIES</b>	<i>Plecotus auritus</i>	<i>Plecotus auritus</i>	<i>Plecotus auritus</i>	<i>Pipistrellus pipistrellus</i>	<i>Plecotus auritus</i>	<i>Plecotus auritus</i>
COMMENTS						

4. ANALYTICAL REPORT						
Author		Catherine O'Reilly		Date		03/10/2012
SAMPLE COLLECTED BY				SAMPLE COLLECTION		
NAME	Dr Kate Barlow			DATE	05/09/12 - 19/09/12	
COMPANY	National Bat Monitoring Programme - Bat Conservation Trust			LOCATION	Various	
SAMPLE						
Code	SEL891	SEL892	SEL893	SEL894	SEL896	
Suspect species	long-eared sp.	long-eared sp.	long-eared sp.	long-eared sp.	long-eared sp.	
Species group	C	C	C	C	C	
DNA EXTRACT						
Code	COR280912 8	COR280912 9	COR280912 10	COR280912 11	COR280912 13	
DNA conc.(ng/μl)	2.2	3.1	2.5	1.8	3.2	
REAL TIME PCR DATA						
probe	na	na	na	na	na	
total cycles	na	na	na	na	na	
cycles to amplify (Ct)	na	na	na	na	na	
Data file	na	na	na	na	na	
SEQUENCE DATA						
primer set	Bats	Bats	Bats	Bats	Bats	
sequence length (bases)	178	199	167	173	190	
Sequence match (%)	100	100	100	100	100	
SPECIES	<i>Plecotus auritus</i>	<i>Plecotus auritus</i>	<i>Plecotus auritus</i>	<i>Plecotus auritus</i>	<i>Plecotus auritus</i>	
haplotype	nd	nd	nd	nd	nd	
Data file	011012	011012	011012	011012	011012	
POSITIVE CONTROL SAMPLE						
source	Faecal DNA sample					
result	positive					
SPECIES	<i>Plecotus auritus</i>	<i>Plecotus auritus</i>	<i>Plecotus auritus</i>	<i>Plecotus auritus</i>	<i>Plecotus auritus</i>	
COMMENTS						
Report date to SEL	04/10/2012		Report date to Client			

4. ANALYTICAL REPORT								
Author		Date						
SAMPLE COLLECTED BY				SAMPLE COLLECTION				
NAME	Dr Kate Barlow			DATE	21/09/2012 - 07/10/2012			
COMPANY	National Bat Monitoring Programme - Bat Conservation Trust			LOCATION	Various			
SAMPLE								
Code	SEL926	SEL927	SEL928	SEL929	SEL930	SEL931	SEL932	SEL933
Suspect species	LE	LE	LE	LE	LE	LE	LE	LE
Species group	C	C	C	C	C	C	C	C
DNA EXTRACT								
Code	COR121012 14	COR121012 15	COR121012 16	COR121012 17	COR121012 18	COR121012 19	COR121012 20	COR121012 21
DNA conc.(ng/μl)	2.4	3.1	2.7	2.5	1.8	2.9	2.6	2.5
REAL TIME PCR DATA								
probe	na	na	na	na	na	na	na	na
total cycles	na	na	na	na	na	na	na	na
cycles to amplify (Ct)	na	na	na	na	na	na	na	na
Data file	na	na	na	na	na	na	na	na
SEQUENCE DATA								
primer set	cytB	cytB	cytB	cytB	cytB	cytB	cytB	cytB
sequence length (bases)	160	186	nd	181	165	163	160	165
Sequence match (%)	100	100		100	100	100	100	100
SPECIES	<i>Eptesicus serotinus</i>	<i>Plecotus auritus</i>		<i>Plecotus auritus</i>	<i>Plecotus auritus</i>	<i>Plecotus auritus</i>	<i>Plecotus auritus</i>	<i>Plecotus auritus</i>
haplotype	na	na		na	na	na	na	na
Data file	161012	161012		161012	161012	161012	161012	161012
POSITIVE CONTROL SAMPLE								
source	Faecal DNA sample							
result	positive							
SPECIES	<i>Eptesicus serotinus</i>	<i>Plecotus auritus</i>	ND	<i>Plecotus auritus</i>	<i>Plecotus auritus</i>	<i>Plecotus auritus</i>	<i>Plecotus auritus</i>	<i>Plecotus auritus</i>
COMMENTS								
Report date to SEL	22/10/2012		Report date to Client					