AGREEMENT FOR THE CONSERVATION OF BATS IN EUROPE (EUROBATS)

Update report on the implementation of the Agreement in the United Kingdom

2012

This document reports on actions undertaken by the United Kingdom (UK) in 2012 to meet its obligations under the Agreement.

A. GENERAL INFORMATION

Party: United Kingdom

Date of Report: April 2013

Period Covered by Report: January – December 2012

Competent Authority: The Department for Environment, Food and Rural Affairs (Defra)

Changes Regarding:

Competent Authority -

Appointed member of the Advisory Committee -

Membership of other committees/working groups -

A. Abbreviations

BCT	Bat Conservation Trust
CCW	Countryside Council for Wales
Defra	Department for Environment, Food and Rural Affairs
Fera	Food and Environment Research Agency
JNCC	Joint Nature Conservation Committee
NBMP	National Bat Monitoring Programme
NE	Natural England
NERC	Natural Environment Research Council
NRW	Natural Resources Wales (new title for CCW from 1 April 2013)
SAC	Special Area of Conservation
SNH	Scottish Natural Heritage
SSI	Site of Special Interest (Jersey classification)
SSSI	Site of Special Scientific Interest
UK	United Kingdom

B. STATUS OF BATS WITHIN THE TERRITORY OF THE PARTY

1. Summary Details of Resident Species

UK
There are 17 breeding resident species of bat in the UK.

Gibraltar
There are currently 3 species of bat in Gibraltar; Soprano pipistrelle (*Pipistrellus pygmaeus*), Schreiber's bat (*Miniopterus schreibersii*) and the European free-tailed bat (*Tadarida teniotis*).

Jersey, Channel Islands
Although 12 species of bats have been recorded in Jersey it is likely that the Island is host to only 9 or 10 of these with other species occurring as either seasonal migrants or occasional vagrants.

As an island positioned 15 miles from the French mainland with offshore reef systems providing convenient stepping stones, occasional vagrants are more than likely. France is known to host over 25 species of bat.

2. Status and trends

UK
Status of UK's bat species monitored by the National Bat Monitoring Programme (NBMP) carried out by Bat Conservation Trust (BCT)

Table 1 below summarises NBMP trends for 2011. This information and full details of NBMP survey and analysis methods are available in the online NBMP 2011 Annual Report which can be read on the following pages:http://www.bats.org.uk/pages/nbmp_annual_report.html

Analysis of the data collected during 2012 is currently in progress and the online report will be updated to include these results during May 2013. Further explanation for some species is provided via a short explanatory discussion below.

At present sufficient data are collected by the programme to produce population trends for 11 of the UK's 17 resident bat species. In 2011, five species showed statistically significant increases in at least one survey. Significant positive trends were reported for the following species:

1. **Greater horseshoe bat** *Rhinolophus ferrumequinum* (Colony Count)
2. **Lesser horseshoe bat** *Rhinolophus hipposideros* (Hibernation Survey & Colony Count)
3. **Natterer's bat** *Myotis nattereri* (Hibernation Survey)
4. **Whiskered/Brandt's bat** *M. mystacinus/brandtii* (Hibernation Survey)
5. **Common pipistrelle** *Pipistrellus pipistrellus* (Field Survey)

From these results we conclude that the lesser horseshoe bat population is increasing as both sources of data are indicating the same trend. We also conclude that the common pipistrelle and soprano pipistrelle populations are increasing as the Field Survey data showed a significant increase. Although significant negative trends were reported for these species in the Colony Count, these negative trends may be highly influenced by the mobility of these species. Also the Field Survey trends are considered to be more reliable than Colony Count data for this species. It is less clear whether the increasing trend seen in Natterer's bat from the Hibernation survey is a real reflection of population increase or other

factors as the Colony Count data do not support the increase. The significant increase recorded for whiskered/Brandt's bat this year should be treated with caution as this trend comprises data from more than one species and is less likely to be reliable. The greater horseshoe bat trend should also be treated with some caution. This is mainly due to the short duration of use of a consistent survey protocol in the Colony Count for this species, and the trend is not supported with a similar result from the Hibernation Survey.

The remaining species: **Daubenton's bat** (*M. Daubentonii),* **brown long-eared bat** (*Plecotus auritus),* **soprano pipistrelle** (*Pipistrellus pygmaeus),* **noctule** (*Nyctalus noctula_* and **serotine** (*Eptesicus serotinus)* all showed no significant trends in 2011.

The Daubenton's bat trend from both Hibernation and Waterway Survey data has been fairly stable, although there has been a slight, but not significant decline since 2005. Brown long-eared bat had shown a slight increase since 2005, but lower counts in 2008 and 2009 have resulted in no overall significant trend from either the Hibernation Survey or Colony Count. Soprano pipistrelle showed a borderline significant increase in the Field Survey in 2010 but this has not been sustained into 2011. Noctule had started to show an increase due to very high counts in 2008 but counts have returned to previous levels and the overall trend is not significant. No significant trend has been shown for serotine from either the Field Survey or Colony Counts. Sample sizes are small and confidence intervals large for this species, however, as it is encountered infrequently and has a restricted range in the UK, and it may be difficult to detect trends.

Whilst these are positive results, it should also be taken into account that these trends reflect changes in bat populations from 1997 and it is likely that prior to this, there were significant declines in bat populations in the second half of the twentieth century.

Table 1: UK long-term population trends and average annual percentage change

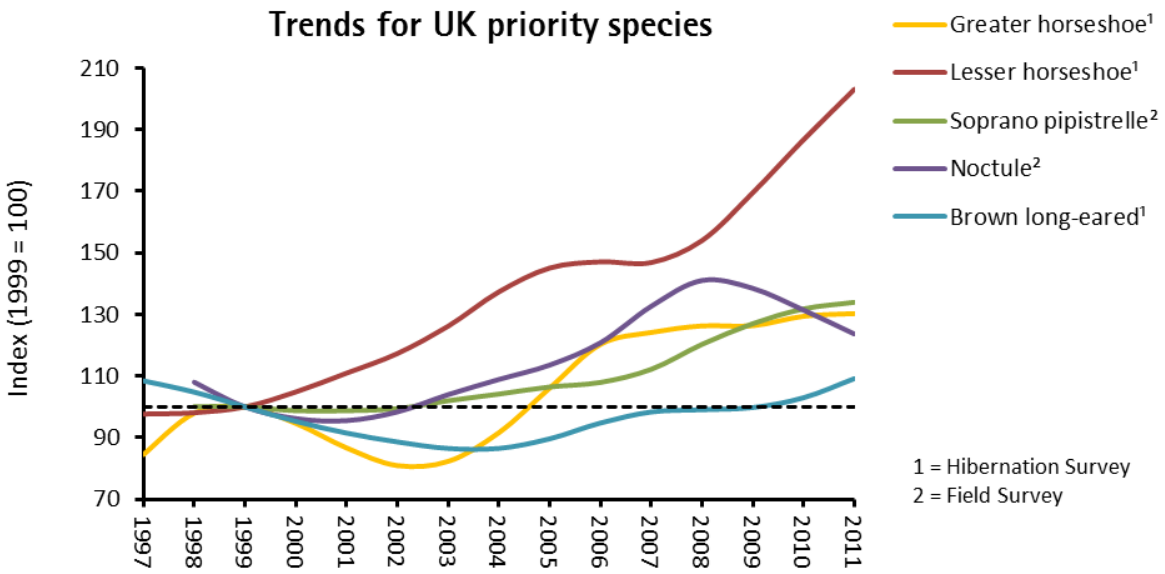
Species	Status	Survey	Trend time period	Long-term trend %	Average annual change %	Comments
Rhinolophus ferrumequinum	Rare	Hibernation Colony	1997-2011 1997-2011	30.3 **101**	2.2 **6.0**	Statistically significant increase from Colony Counts
Rhinolophus hipposideros	Rare	Hibernation Colony	1997-2011 1997-2011	**103** **67.4**	**6.1** **4.4**	Statistically significant increase on both surveys
Myotis mystacinus / M. Brandtii	Common in N and W England, rare elsewhere	Hibernation	1997-2011	**49.4**	**3.4**	Statistically significant increase
Myotis nattereri	Common	Hibernation	1997-2011	**79.7**	**5.0**	Statistically significant increase from Hibernation Survey

Species	Status	Survey	Trend time period	Long-term trend %	Average annual change %	Comments
		Colony	2000-2011	-13.6	-1.3	
Myotis daubentonii	Common	Hibernation Waterway	1997-2011 1997-2011	7.3 3.4	0.6 0.3	Both surveys show no statistically significant change
Eptesicus serotinus	Widespread but scarce in southern Britain	Field Colony	1998-2011 1997-2011	32.1 -25.7	2.4 -2.5	No statistically significant change from either survey
Nyctalus noctula	Uncommon	Field	1998-2011	23.7	1.8	No statistically significant increase
Pipistrellus pipistrellus	Common	Field Colony	1998-2011 1997-2011	**65.3** **-49.2**	**4.3** **-5.5**	Both changes statistically significant; Field Survey considered more robust, therefore considered to be increasing
Pipistrellus pygmaeus	Common	Field Colony	1998-2011 1997-2011	34.0 **-39.4**	2.5 **-4.1**	Field Survey considered more robust, no statistically significant change
Plecotus auritus	Common	Hibernation Colony	1999-2008 2001-2011	9.2 14.0	0.7 1.3	No statistically significant change from either survey

The total NBMP site network now stands at 5,330. In 2011 a total of 2024 sites were monitored by 1135 dedicated NBMP volunteers. For the core surveys, 89% of these were repeat sites.

Figure 1: NBMP trends to 2011 for a) UK priority species and b) other species.

a)



b)

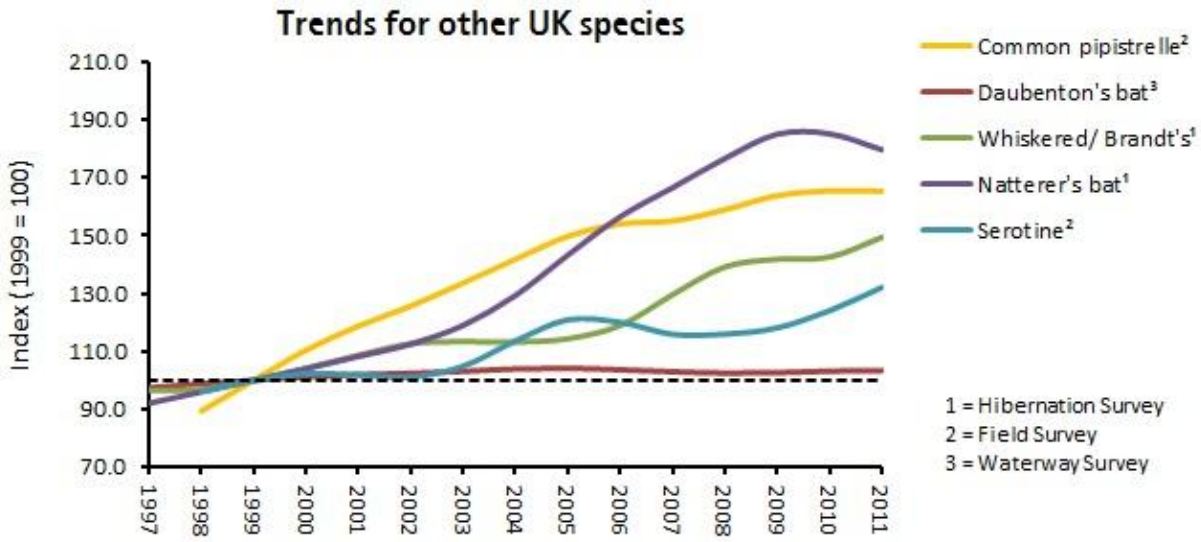


Table 2: Summary information for species with limited trend data

Species	Status	Survey	Trend time period	Long-term trend %	Average annual change %	Comments
Myotis bechsteinii	Very rare	No trend data available; baseline distribution survey completed in 2011				
Nyctalus leisleri	Scarce in GB, common in Ireland	Recorded on Roadside Survey but more data needed to detect trends				

Species	Status	Survey	Trend time period	Long-term trend %	Average annual change %	Comments
Pipistrellus nathusii	Rare	Recorded on Roadside Survey but more data needed to detect trends. Systematic distribution survey piloted since 2009.				
Barbastella barbastellus	Rare	Recorded on Woodland Survey but more data needed to detect trends.				
Plecotus austriacus	Very rare	No trend data available.				
Myotis myotis	Status unconfirmed	Only one individual known in UK at present; recorded on hibernation survey.				

For the remaining UK bat species (**Bechstein's bat**, **Alcathoe bat**, **Leisler's bat**, **Nathusius' pipistrelle**, **barbastelle**, **grey long-eared bat**) there are insufficient data available at present to allow calculation of population trends (Table 2).

Bechstein's bat *(M. Bechsteinii)*
This rare species, which is associated with semi-natural woodlands, is difficult to survey using standard methods as it produces low intensity echolocation calls which are difficult to pick up on a bat detector, and spends much of its time foraging high up in the canopy. The Bechstein's bat Project, which ran from 2007-2011, used survey techniques specifically designed for Bechstein's bats to establish baseline distribution data on this species from woodlands in southern England and South Wales, and to gather information to inform future conservation policy and woodland management. Between 2009 and 2011, 199 target woodlands were surveyed in which 838 bats of 12 species were caught, identified and released. This included 57 Bechstein's bats (29 female and 28 males) at 37 sites. The full report was completed in January 2012 and can be downloaded here: http://www.bats.org.uk/pages/bechsteins_bat_project.html

Barbastelle *(B. Barbastellus)*:
The NBMP Woodland Survey was originally piloted in 2004 by BCT as a new method to survey and monitor bats in woodlands with particular focus on barbastelle. It has been further developed and is funded by Natural England with the key aim of monitoring woodland sites that are designated as Special Areas of Conservation (SACs) due to the presence of barbastelles. Currently, Natural England fund monitoring of barbastelles using the Woodland Survey method as part of the NBMP, principally at sites that have been designated as SACs for this species' presence. Seven sites are currently targeted for surveying using the Woodland Survey method. Six of these sites were surveyed in 2011: Ebernoe, The Mens, Eversden and Wimpole Woods, Exmoor and Quantocks Woodland, Mottisfont and North Pembrokeshire Woodlands. All sites had confirmed presence of barbastelles.

Nathusius' pipistrelle*(P. nathusii)*:
Nathusius' pipistrelle is generally not encountered during standard surveys. 136 volunteers have taken part in the pilot Nathusius' pipistrelle survey (2009 - 2011) surveying 163 sites. The survey continues in 2012; sites with unverified records will be a priority for revisiting with broadband detectors and recording equipment.

Nathusius' pipistrelle presence has been verified through sound analysis at 49 sites (30% of sites surveyed), 16 of which were new site records in 2011. A further 59 sites (36% of sites surveyed) have had possible but unconfirmed Nathusius' pipistrelle records. These include sites where Nathusius' pipistrelle was reported but recordings were not made that would enable verification, and ambiguous calls identified from recordings.

Grey long-eared bat *(P. austriacus)*:
The grey long-eared bat is one of the rarest bat species in the UK. It may be under-recorded due to the difficulty of separating it from brown long-eared bat. In 2012, Joint Nature Conservation Committee (JNCC) provided funding for a project to improve our knowledge of the distribution of grey long-eared bat across its UK range. The project involved carrying out DNA analysis on droppings collected from long-eared bat roosts in target areas to provide verified identification to species level. We enlisted the help of long-eared bat roost owners within the species' known range and asked them to collect and return droppings from their roosts. As part of the project, 73 samples from 44 roosts were submitted to the laboratory for DNA analysis. A single new grey long-eared roost was identified in Devon; the status of the roost is unknown, follow up work will be completed in 2013.

Jersey, Channel Islands

This status report is t a culmination of data from 2006 to 2012. Trend data is reliant on having sufficient data to report on and although baseline data was established in 2001, monitoring methodologies have since been adapted to better reflect the species composition and available sampling resource.

Jersey has adopted iBats as the primary monitoring methodology however additional data is available from roost exit surveys, isolated samples and studies, VLA submissions and the genetic analysis of droppings. Meaningful trend analysis depends on sufficient sample data which is not yet available.

Table 3

Species	Status	Comment
Rhinoloplus ferrumequinum	Unknown	Last record 1959 – One was reported in error in 2006
Myotis nattereri	Uncommon resident	Present in 2010 (2nd Jersey Bat Report)
Myotis mystacinus	Uncommon resident	Roost discovered 2012 through DNA analysis of droppings.
Plecotus austriacus	Relatively common resident	Present in 2010 (2nd Jersey Bat Report)
Plecotus auritus	Uncommon resident	5 pregnant females recorded 2011.
Pipistrellus pipistrellus	Common resident	Present in 2010 (2nd Jersey Bat Report)
Pipistrellus pygmaeus	Relatively common resident	Present in 2010 (2nd Jersey Bat Report)
Pipistrellus nathusii	Relatively common resident	Present in 2010 (2nd Jersey Bat Report)
Pipistrellus kuhli	Uncommon resident	2 dead bats found in 2011
Pipistrelles savii	Unknown	Likely uncommon resident or vagrant. Last definitive record 1996
Eptesicus serotinus	Unknown	Believed uncommon resident
Nyctalus leisleri	Unknown, possible vagrant	One male individual recorded 20.5.02

3. Habitats and Roost Sites

UK

The British Standard Institute has tasked a panel chaired by BCT to produce a Code of Practice for surveying bats in trees and woodland.

Jersey, Channel Islands

Habitats are designated as Sites of Special Interest (SSI) sites through the Planning and Building (Jersey) Law 2002. The States of Jersey Island Plan 2011 specifically targets: conservation and enhancement of biological diversity, species protection, wildlife corridors and trees, woodland and boundary features. The Conservation of Wildlife (Jersey) Law 2000 protects all species of bats and their roosts.

4. Threats

Main threats to bat conservation within the UK are:

- Building demolition;
- Maintenance and alterations to buildings (including inappropriate timing of works);
- Woodland management and tree work;
- Barn conversions;
- Loss of habitat due to development;
- Loss of traditional farmland landscape and agricultural practices;
- Disturbance to underground sites;
- Lack of knowledge on what mitigation approaches are successful;
- Potential impact of wind farms;

- Inappropriate management or clearance of key habitats for foraging, commuting and roosting bats (including inappropriate timing of habitat management).
- Habitat fragmentation
- Zero/low carbon new build which does not include space for bats

In addition there is a threat which, although it is not new, is increasing.

- Tree diseases requiring active measures to control/contain

The main threat to bats in Jersey is the loss or damage of roost sites. This can come about through the maintenance alteration and demolition of buildings, the conversion of older structures or associated tree work, habitat loss through development and habitat fragmentation. All bat species found in Jersey can be found roosting in buildings.

The move to low carbon new build construction techniques is likely to exclude bats from new structures at least for some species of bats. The upgrading of current housing stock to increase energy efficiency may also compromise current roosts.

5. Data Collection, analysis, interpretation and dissemination

UK

The National Bat Monitoring Programme (NBMP)

NBMP has been run by BCT since 1996. Since 2001, NBMP has been a partnership with JNCC, including funding from NE. In 2012 two new partners joined the programme, Defra and CCW. It is the longest running purpose-built multi-species monitoring programme for mammals in the UK, producing statistically robust population trends for 11 of the UK's resident bat species. Four core survey methods are employed to monitor the UK's bats:

• Field surveys with bat detectors;
• Hibernation site surveys;
• Summer maternity colony counts; and
• Car survey with broadband detectors.

Trends (see Table 1 and Figure 1) and methods are reported annually on the BCT website. Current work is focusing on completing a literature review to identify potential drivers of population change, and extending the applications of the data through research collaborations including several PhD research studentships that are utilising NBMP data (see section 12). Work has started to replace the existing NBMP database and to develop online data entry for volunteers taking part in the programme; the first phase of the online reporting will be launched in 2013. Geo-referencing of NBMP survey data has also taken place during 2012 to allow future spatial representation and analysis of data from the programme.

Jersey, Channel Islands

Indicator Bats Program (iBats)

Jersey completed its second year of the iBats monitoring programme initiated 2011 in line with established protocol, in order to:

- to provide long-term monitoring at the local, national and regional level.
- to increase the number of records of mammals (primarily bats) along roads;
- to determine which roadside habitats are important for bats;

Car transects covering 280km of road are surveyed twice a year. Repeat surveying of transects over time will produce population trend data.

iBat transects recording Jersey bats

Jersey Bat Group roost exit survey program

The Jersey Bat Group holds records of known roosts and has a rolling program to maintain and update the register through visit and surveys. Newly identified roosts and queries made by the public are also assessed and added to the roost register.

C. MEASURES TAKEN IN ACCORDANCE WITH ARTICLE III TO THE AGREEMENT

6. Legal measures taken to protect bats, including enforcement action

UK

Bat crime has been confirmed once again as one of the UK's wildlife crime priorities and has equal standing with issues of raptor persecution and the illegal trade in endangered species. The BCT's Investigations Project continued to operate during 2012 and they have been working with government agencies to raise awareness of, prevent and investigate bat crime. BCT can now submit intelligence directly to the National Wildlife Crime Unit (NWCU).

In 2012, BCT logged 359 incidents of bat crime (339 in 2011). Of those incidents 134 were reported to statutory organisations for investigation (138 in 2012). Anecdotal evidence from bat workers, the general public, and building and forestry professionals indicate that these figures represent only a small percentage of actual incidents. The building development and maintenance sector were the focus of the vast majority of referred incidents.

2012 saw three incidents of bat crime being heard by the courts, results were mixed with one offender receiving a reprimand whilst another was fined £7600 in addition to costs he had incurred in mitigating his actions (£1000).

Further details on the Investigations Project can be found at:
http://www.bats.org.uk/pages/bat_crime_investigations.html

In north & mid Wales 16 incidents were reported, no prosecutions were taken forward but cautions were issued in 1 case and another 4 were dealt with by official warnings or advice. One is still under investigation. (Data not received for south Wales)

Jersey, Channel Islands
The Conservation of Wildlife (Jersey) Law 2000 protects all species of bats found in Jersey under Schedules 1 (protected wild animals) and 3 (animals which may not be killed or taken by certain methods).

Locations of known roosts are held by the Jersey Bat Group on a register that enables the cross-referencing of development applications and a process for identifying potential roosts has been developed.

In 2012, 1,551 planning applications were checked for their likely impact on bats of which 396 underwent a more detailed investigation. Of these applications 146 permits were issued that held conditions directly relating to the protection of bats.

All properties identified for government support under the energy efficiency service were checked against the list of known roosts prior to undergoing enhancement.

7. Sites identified and protected which are important to the conservation of bats

England
Natural England commissioned BCT to complete a review of sites within the NBMP database that match the SSSI designation criteria in England. The work involved extracting sites from the NBMP database that match the JNCC SSSI criteria for bats and had at least 5 years of monitoring data, checking against existing SSSI sites, gathering additional information on the sites from the volunteers involved in their monitoring and mapping the sites using GIS. A number of potential SSSI sites proposed by Natural England were also assessed. The work was completed between December 2011 and March 2012 and a report was provided to Natural England on the site assessments. In 90 cases at 80 sites the SSSI criteria were met (at least to some extent) for bats.

Wales
One new SSSI was designated for bats in Wales comprising a breeding roost of about 250 lesser horseshoe bats and habitat used as flight routes from the roost.

Jersey, Channel Islands
Two key woodland sites are proposed SSIs – St Catherine's Wood and St Peter's Valley. Both sites were due to be designated in accordance with revised procedures in 2005. Designation is awaiting final sanction. No sites have yet been designated purely on their value for bats.

8. Consideration given to habitats which are important to bats

UK
Churches
Many ancient churches are also traditional roosting places for bats. Although congregations often coexist with small numbers of bats, larger roosts can create problems because of the quantity of droppings and urine produced in the summer. In this situation, people may be deterred from holding services and other events at the church, cleaning the church may be difficult or expensive, and artefacts or the church fabric may be damaged. Church communities lack the information and support they need to manage bat issues confidently.

The *Bats, Churches and Communities* pilot project has been funded by NE between November 2012 and March 2013 to focus initially on improving the guidance and support available to churches that have problematic bat roosts, bringing together bat experts and people responsible for looking after the church buildings, improving information exchange and working towards solutions that benefit people and bats.

Defra is also funding a project to look at whether deterrents would be effective in churches to keep bats away from precious artefacts. Tests are being conducted using light and acoustics in selected churches in the East of England where most of the problems have been identified. Bats will not be excluded from these churches and their welfare is monitored carefully.

Jersey, Channel Islands

The States of Jersey Island Plan 2011 targets wildlife corridors and trees, woodland and boundary features.

9. Activities carried out to promote the awareness of the importance of the conservation of bats

Wales

The Countryside Council for Wales (CCW) continued their funding support for the Wales Bat Project albeit at a slightly reduced level. The aims of this project are to contribute towards bat conservation in Wales and the UK by working:

1. To engage with the political network especially the Welsh Government as well as the Wales Biodiversity Partnership and its sub groups;
2. To maintain and enhance support for extant volunteer bat groups and their bat workers;
3. To recruit new volunteers, and to build on newly formed relationships; and
4. To provide support and advice to those who make decisions in relation to bats in a professional capacity

During 2012, the main focus of work has been on working in partnership with environmental NGOs to influence the Welsh Government in their thinking on future delivery of biodiversity, planning and sustainable development.

Scotland

The Scottish Bat Project continued to promote awareness of bats and encourage bat conservation by working with a variety of audiences. These ranged from professionals such as council architects, planners and countryside rangers through to school groups and the general public. The Scottish officer worked with bat groups across all Scotland ranging from Inverness in the North of Scotland south to the Scottish Borders. Scottish Natural Heritage (SNH) continued their funding support for the Scottish Bat Project albeit at a slightly reduced level.

Particular highlights of the year include;

- Work on the distribution of Leisler's bats in SW Scotland has extended to the island of Arran. A preliminary survey in September 2012 confirmed (for the first time) the presence of Leisler's bats. The results have significantly extended the known range of these bats in Scotland. Further survey is planned for summer 2013 on the island.
- The Scottish bat workers conference in November. This attracted 120 attendees who enjoyed updating their bat knowledge though talks, workshops and networking.

- Training for council staff to raise awareness of bats and ways of protecting bat roosts and habitats. (Around 120 staff in 3 Council regions attended the training sessions.)
- Training in handling bats for the National Trust for Scotland.
- Training to bat groups, wildlife groups, college and university students in using bat detectors and carrying out surveys.
- Two training events for bat carers in Scotland, totalling just under 60 attendees.
- Over 20 media items were produced or initiated as a result of the Scottish project. These items ranged from TV and radio interviews to website articles, blogs, "tweets" and more conventional newspaper and magazine items.
- Work with schools and youth groups led to a review of bat books for children by a local primary school: cub and scout projects to help bats and special needs students in Stirling used bats as a focus for their work in gaining a John Muir environmental award.
- Around 12 talks and bat walks were delivered to the public and special interest groups by the Scottish officer (many more appeared on the BCT events calendar)
- A new full colour leaflet "Bats in Scotland" was printed in spring 2012.

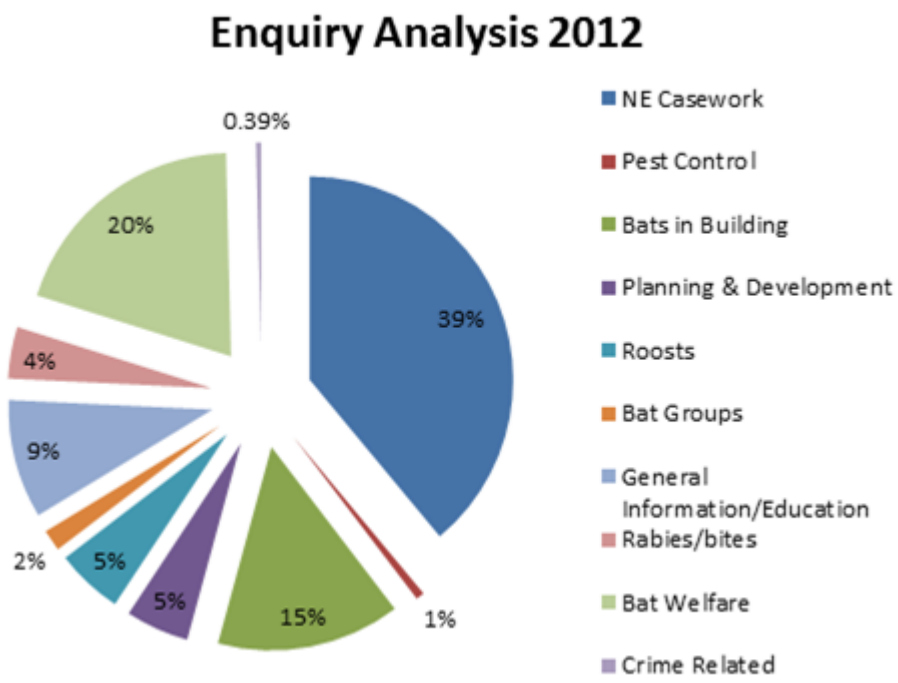
National Bat Helpline

In 2012 the Helpline fielded a total of 11,279 bat-related enquiries (calls, emails and letters). This was slightly lower than in 2011, when 12,352 were received and represents a reduction of 8.6% in enquiries received by BCT. The Out of Hours service received another 1506 calls on top of this, and peaked at 47 calls on Saturday 21st July 2012.

Over the summer period of June, July and August, the total number of enquiries received on the Helpline was 5,970 (of which 5,139 were via phone and post and 831 were via email). The average number of enquiries received per day in the summer period was 65.

NE casework is an important part of the work that the Helpline does. 39% of calls taken were regarding a roost/potential roost in one of the 21 regions for which BCT organised visits on behalf of NE in 2012. Thanks to the Helpline number being widely available, it is very often the first number people call after discovering a bat roost in their property.

The pie chart below highlights the sheer variety of calls that the Helpline dealt with over the year; from general queries about bats, to specific questions about a roost; help and advice about a development or just reassurance and information.



Woodlands

BCT has continued working to counter the threat to bats from woodland management and tree work by:

- Acting for bats as a member of both the England Woodland Biodiversity Group (EWBG) and the England Woodland and Timber Partnership (EWTP).
- Developing in partnership with other biodiversity groups a pilot multi-taxa toolkit giving guidance for woodland managers to provide the range of habitat mosaics within a wood to help priority species.
- Producing a woodland owners guide to managing woodlands containing Bechstein's bats
- Working closely with other NGOs to advise on an appropriate response to the threat of ash dieback and the implications for biodiversity including bats
- Continuing to work closely with the Defra working group on Common Agricultural Policy (CAP) reform of the Woodland Grant Scheme and agri-environment schemes for England.

Jersey, Channel Islands

Publication of articles by the Department of the Environment for the general public about their responsibilities in relation to building works, the law and protection of bats; Entitled Bats, Buildings and the Law.

In 2013 the Department aims to launch a series of species advice notes for a wide ranging audience. The bat document will discuss the Law in relation to activities which may be harmful to bats.

The Jersey Bat Group (JBG) in close association with the Jersey Dept of the Environment implemented the second in a series of industry training sessions designed to raise awareness of bat issues amongst architects and other building professionals. Other activities included a program public bat walks.

10. Responsible bodies, in accordance with Article III.5 of the Agreement, nominated for the provision of advice on bat conservation and management

- Natural England
- Countryside Council for Wales[1]
- Scottish Natural Heritage
- Department of Environment Northern Ireland
- Joint Nature Conservation Committee
- Bat Conservation Trust
- Environment Department of the States of Guernsey
- La Societe Guernesiaise
- Nature Conservancy Councils (Gibraltar)
- Gibraltar Ornithological and Natural History Society
- The States of Jersey Department of Environment

11. Additional action undertaken to safeguard populations of bats

The screening of planning applications has identified a further 24 bat roosts in Jersey.

12. Recent and ongoing programmes (including research and policy initiatives) relating to the conservation and management of bats. In the case of research, summaries of completed projects should be provided, giving references where possible and acknowledging the sources of funding.

UK

University of Bristol - Prof. Gareth Jones

Mitigating the impacts of bats in historic buildings and houses, with a focus on churches (Defra and the SITA Trust, in collaboration with BCT)).

Researching what happens to soprano pipistrelles when they are excluded from roosts in buildings, and how to reduce problems caused by Natterer's bats roosting in churches. Lead researcher is Dr Matt Zeale. Madeleine Ryan (PhD student) is investigating the use of churches by soprano pipistrelles in East Anglia.

The impacts of climate change on bats.

Gareth Jones and Dr Hugo Rebelo have completed a book chapter on the effects of climate change on bats for *Bat Evolution, Ecology and Conservation*, ed. By R. Adams and S. Pedersen for Springer Verlag). Also investigating links between climatic change, distributions, and genetic diversity (Rebelo et al. (2012) and long-term changes in the timing of breeding and phenotypic plasticity (with Helen Ward, Stephen Rossiter and Roger Ransome – NERC-funded).

The impacts of street lighting on bats.

Investigate how bats respond behaviourally to lighting (lead researcher Dr Emma Stone). Investigating the impacts of new lighting technologies (Jennifer Singh, NERC) and the effects of lights of bat prey (insects, Andy Wakefield, NERC)

[1] With effect from 1 April 2013, CCW ceased to exist as their functions were transferred to a new body called Natural Resources Wales.

Using high throughput sequencing to study the diets of insectivorous bats.
PhD student Matt Zeale developed arthropod-specific primers that can be used to amplify insect DNA in bat droppings (Zeale et al. (2011) *Molecular Ecology Resources* 11: 236-244). Kristine Bohmann (Bristol and Copenhagen) is undertaking a PhD project investigating geographical and long-term temporal change in the diets of horseshoe bats using high-throughput sequencing.

Using species distribution modelling to predict bat distributions.
In collaboration with BCT, Lia Gilmour (MSc) is using these methods to locate new populations of Bechstein's bats at the edge of their range in Britain. Lia is also studying the effectiveness of calls emitted cvia acoustic lures for attracting bats of a range of species.

Bats and wind turbines.
Gareth Jones continues to serve on the scientific committee of the Bats and Wind Energy Co-operative in North America (http://www.batsandwind.org/). An MSc student (Heather Nichol) is looking at acoustic activity of bats at height (in collaboration with Dr Simon Pickering of Ecotricity).

Molecular ecology of bats.
Bristol continue to research population genetics and molecular ecology of bats in Europe (grey long-eared bats – Orly Razgour, greater horseshoe bats Helen Ward – lead supervisor Dr Stephen Rossiter, QMUL), investigating the importance of populations at the edges of their edges, and the fitness consequences of genotypic variation.

Hibernation activity in bats
Paul Hope is using infrared loggers and bat detectors to monitor activity patterns in hibernating Natterer's bats. These data may be useful to establish natural hibernation behaviours that may change if populations become affected by white-nose syndrome or climate change. He has just completed a morphological analysis of winter diet in Natterer's bats, and this is being supplemented with DNA barcode data.

Bats in riparian landscapes.
Sarah-Jane Scott (jointly supervised by Professor Stephen Harris) is studying the effects of riparian buffer zones on bat activity for her PhD, and has recently focussed on edge effects.

Ecology of small *Myotis* bats.
Phil Brown is designing a study to investigate distribution and resource partitioning between *Myotis mystacinus*, *M. brandtii* and *M. alcathoe*.

Publications relevant to bat conservation in Europe

HOPE, P.R. & JONES, G. 2012. Warming up for dinner: torpor and arousal in hibernating Natterer's bats studied by radio telemetry. *Journal of Comparative Physiology 182B:* 569-578.

REBELO, H., FROUFE, E., FERRAND, N. & JONES, G. 2013. Integrating molecular ecology and predictive modelling for the conservation of rare bat species. *European Wildlife Research,* in press.

REBELO, H., FROUFE, E., BRITO, J.C., RUSSO, D., CISTRONE, L., FERRAND, N. & JONES, G. 2012. No barriers for postglacial colonization of Europe by the barbastelle bat, *Barbastella barbastellus*: agreement between molecular data and past predictive modelling. *Molecular Ecology* **21**: 2761-2774.

STONE, E.L., JONES, G. & HARRIS, S. 2012. Conserving energy at a cost to biodiversity? Impacts of LED lighting on bats. *Global Change Biology*, **18**: 2458-2465.

ZEALE, M.R.K. & **JONES, G.** 2012. *Home* range use and habitat selection by barbastelle bats (*Barbastella barbastellus*): implications for conservation. *Journal of Mammalogy* **93**: 1110-1118.
WALTERS, C.L., FREEMAN, R., DIETZ, C., FENTON, M.B., **JONES, G**., MALTBY, A., OBRIST, M.K., PUECHMAILLE, S.J., SATTLER, T., SIEMERS, B.M., PARSONS, S. & JONES, K.E. 2012. A continental-scale tool for acoustic identification of European bats. *Journal of Applied Ecology*, doi: 10.1111/j.1365-2664.2012.02182..
RUSSO, D., CISTRONE, L. **& JONES, G**. 2012. Sensory ecology of water detection by bats: a field experiment. *PLoS ONE* 10: e48144.
STONE, E.L., **JONES, G**. & HARRIS, S. 2013. Mitigating the effect of development on wildlife: impact and effectiveness of mitigation licensing for bats in England. *Conservation Biology*, in press.
HOPE, P.R. & **JONES, G**. 2013. An entrained circadian cycle of peak activity in a population of hibernating bats. *Journal of Mammalogy* **94**, in press.
SANTOS, H., RODRIGUES, L., **JONES, G**. & REBELO, H. 2013. Using species distribution modelling to predict bat fatality risk at wind farms*. Biological Conservation* **157:** 178-186.

University of Exeter (Fiona Mathews)

Impact of Wind Turbines on British Bats

Data are urgently required on the effects of wind turbines on bats throughout Europe. This project investigates bat activity and mortality at large wind energy installations in Britain. A total of 29 sites have now been surveyed and funding has been secured for the monitoring of an additional 14 sites. The project uses a combination of fatality surveys and acoustic monitoring at height and at ground level. In addition, the links between bat casualty rates and weather, habitat and invertebrate activity are being investigated, with the aim of producing site-specific models that can be used to guide mitigation action.

Lead investigators: Fiona Mathews & David Hosken, University of Exeter; PhD student Suzanne Richardson
Funders: Defra, Department for Energy and Climate Change, CCW, SNH, RenewableUK, NE.

Effects of mid-sized wind energy installations on bats

There has been little research on the implications of mid-sized single or double-pole wind energy installations on bats, despite the rapid expansion in this sector. Of particular concern is the low-level of preconstruction survey effort usually required by Statutory Authorities. In addition, they are frequently situated in areas of high bat activity and in strongholds for rarer species. This 3-year project focuses on areas known to have high bat biodiversity in South-West England and South Wales. In addition to monitoring casualty rates, the project is investigating the behaviour of bats near to turbines using a combination of thermal imaging and acoustic techniques. The potential impact on bat populations will be modelled at a landscape-scale, and recommendations for the future positioning of turbines will be developed.

Lead Investigators: Fiona Mathews & David Hosken, University of Exeter; PhD student Alistair Moyle
Funders: Natural Environment Research Council (NERC), CCW, Devon County Council.

Impacts of Street-lighting on Biodiversity

The amount and intensity of roadside illumination is increasing exponentially. The ecological impacts of these changes are poorly understood, and very little is known of the relative impacts of newer, energy-efficient, light-sources which have different spectral compositions compared with traditional lighting. This project focuses on the effect of night lighting on bats and their invertebrate prey species. The work is conducted at a landscape scale and

investigates issues such as thresholds in the size and connectivity of darkened areas required for an area to be used by bats. It will also examine the effect of lighting regimes around maternity roosts on emergence and return times and colony productivity. The project has a particular focus on light-sensitive species including Greater and Lesser Horseshoe bats, but also includes comparative analyses of more light tolerant species.

Lead Investigators: Fiona Mathews & Kevin Gaston, University of Exeter in partnership with The Vincent Wildlife Trust
Funders: Defra

The ecology of woodland bats and the epidemiology of their parasites and pathogens
Diseases of bats have potentially important consequences for both bat conservation and human health. This project investigates the parasites and pathogens of Daubenton's, Natterer's and Brown long-eared bats in the context of their community ecology. It has identified Coronavirus for the first time in British bats (*M. nattereri* and *M daubentonii*). Prevalence was high in the Natterer's bats, with approximately two-thirds of animals being infected. In contrast, parasite burdens in Daubenton's bats, particularly among females, were markedly higher than those observed in Natterer's. Network analyses revealed strikingly different social structures in sympatric Natterer's and Daubenton's bats: Natterer's bats formed discrete mixed-sex social groups, with few linkages between the groups; whereas Daubenton's bat social groups were segregated by sex, with males, but not females, having frequent associations across social groups. There was no evidence of the sexual segregation in Daubenton's being driven by microclimate or proximity to key foraging areas. Male avoidance of parasite transmission may therefore be a driver of this behaviour. Work to understand more fully the social network of the population is ongoing, and non-invasive methods of monitoring reproductive state and stress hormone levels within the population are being developed.

Lead Investigators: Fiona Mathews, University of Exeter & Miles Nunn, Centre for Ecology and Hydrology; PhD student Tom August
Funders: NERC

Ecology and conservation of greater horseshoe bats using hibernation sites
This long-term project monitors the movement of greater horseshoe bats between hibernaculae, and their habitat use during spring and autumn. Through the analysis of ringing data, it has shown extensive movement across a network of alternative roosts during the winter. Radiotracking studies have identified roost sustenance zones and key flyways, and have also identified previously unknown mating and maternity sites. Social network analysis is now being used to understand the relative importance of linkages between different sites, and predict likely responses to loss of nodal roosts. This project, which focuses on Wiltshire and East Devon, is being used directly by local agencies to influence conservation management for the species.

Lead investigator: Fiona Mathews, University of Exeter
Funders: Wiltshire County Council, East Devon Area of Outstanding Natural Beauty Partnership

Population ecology and genetic structure of serotine bats
Serotine bat population structures are poorly characterised. This study has sampled bats from a range of roosts across southern Britain. Using a combination of population genetics and stable isotope analysis, it explores the linkages between British serotine populations and those of Northern Europe, as well as characterising population structures within the UK.

Lead Investigators: David Hosken, Stuart Bearhop, Fiona Mathews; PhD student Caroline Moussy

Funders: Food and Environment Research Agency (Fera)

Grey long eared bat distribution in East Devon
Very few roosts of Grey long-eared bats are known in the UK. Lack of data makes assessment of the conservation status of the species extremely difficult. This project uses genetic analysis of droppings, together with netting, to identify previously unknown roosts. Radiotracking is then used to identify foraging areas.

Lead investigator: Fiona Mathews
Funders: East Devon Area of Outstanding Natural Beauty Partnership; The Vincent Wildlife Trust

University of Leeds **(**Prof. John Altringham)

John Altringham, Anita Glover, Chloe Bellamy, Chris Scott, Anna Berthinussen and Emma Grubb

Developing an effective method for the systematic surveillance of bats in woodland habitats
Survey protocols are being designed by UoL to gather systematic and reproducible abundance and diversity data on UK woodland bat species. Data will come from acoustic transects, using automated call extraction and identification tools. Existing software is currently being modified to improve its reliability with a wider range of time-expansion and direct-sampling detectors. The aim is to devise a method that can be used on a large scale by trained volunteers, without compromising scientific rigour. The methods will be piloted by volunteers with the aim of rolling it out nationally. Chris Scott & John Altringham in collaboration with the BCT. Funded by Defra, 2012-2014. In the longer term, funding permitting, the data will be used for GIS-based Habitat Suitability Modelling of woodland bats.

Multiscale Habitat Suitability modelling for bats
UoL is using data gathered from systematic acoustic transects (with automated call extraction and species identification) to build GIS-based, species-specific, multiscale Habitat Suitability Models (HSMs) for national parks in the north of England. Maps are complete for the Lake District National Park and a revised paper has recently been resubmitted to a major journal describing the methods and results. Maps have recently been completed for the Yorkshire Dales NP and North York Moors NP and two adjacent AONBs. The maps have been tested on independent data and have proven to be reliable predictors of the distribution of most species and they are now being used by the national parks for conservation planning and management. A second paper will be written describing the process of model transfer and assessment. Chloe Bellamy, John Altringham Andy Torsney, Ellie Brown & Chris Scott. Funded by the University of Leeds, PTES, Forestry Commission, North York Moors National Park, Yorkshire Dales National Park, Howardian Hills and Nidderdale AONBs, 2008-2013.

The effects of roads on bats and the effectiveness of mitigation
Researchers at UoL have recently tested the effectiveness (as opposed to simply use) of underpasses and gantries at guiding bats safely across roads. Results show that wire gantries are ineffective and underpasses of variable effectiveness. Anna Berthinussen & John Altringham. Funded by the University of Leeds, 2009-2012. Researchers have just begun a collaborative project with Fera to assess the utility of radar in studying how bats interact with roads and crossing structures and this and related work will be done by NERC-funded PhD student Emma Grubb. Berthinussen A, Altringham JD (2012) Do bat gantries

and underpasses help bats cross roads safely? PLoS ONE. 7(6): e38775. doi:10.1371/journal.pone.0038775.

A global conservation intervention synopsis for bats
Researchers at UoL are writing a conservation intervention synopsis for bats for www.conservationevidence.com. Synopses summarise published, quantitative evidence on the consequences of direct action taken to conserve species, communities or habitats. These give busy conservation practitioners up to date, objective and accessible summaries to support policy and management decisions. Synopses can be downloaded free as pdfs. The bat synopsis will be available in April or May 2013. Anna Berthinussen, Olivia Richardson and John Altringham with Bill Sutherland at Cambridge University. Funded by NE.

University of Stirling (Dr Kirsty Park)
Assessing effects of small wind turbines on wildlife
Project summary: Whilst the majority of wind turbines worldwide are over 100m tall and installed in wind farms, a more recent development is that of Small Wind Turbines (SWT), up to 30m hub height and usually installed singly. Wind turbines can adversely affect wildlife in a variety of ways including direct collision mortality and disturbance effects. The majority of microturbine installations currently need planning permission. For this reason, better understanding of both (i) the potential wildlife impacts of and (ii) public attitudes towards SWT is vital, because these are two of the criteria used by planning officers assessing applications.

i) In spite of numerous studies on the effects of large wind turbines on wildlife, there is little information on the impacts of SWT which are likely to affect a different suite of species under quite different situations. Research at Stirling University has been aimed at quantifying effects of SWT on wildlife (see papers 1, 2 below).
ii) To date all studies on public attitudes in relation to wind energy technology have focused on large-scale developments. Given the recent expansion of small turbines which is set to continue in the foreseeable future, a better understanding of public attitudes towards small-scale installations is required. These issues are now being addressed by an interdisciplinary studentship which will look at the degree to which potential turbine owners may be prepared to incur financial losses to mitigate against wildlife losses, and the degree of public acceptance of this expanding technology.

Researchers & partners: Dr Jeroen Minderman (Postdoctoral researcher), Cerian Tatchley (PhD student), Dr Kirsty Park (Biological & Environmental Sciences, Univ. of Stirling), Prof Nick Hanley (Dept of Economics, Univ. of Stirling), Dr Chris Pendlebury (Natural Power), Dr James Pearce-Higgins (BTO).
Funding bodies: Leverhulme Trust, Natural Environment Research Council (NERC) / Economic and Social Research Council, Stirling University, People's Trust for Endangered Species.
Project start / end date: Dec 2009 – Oct 2015 (further funding is currently being sought)
Scientific papers published:

1. Minderman, J., Pendlebury, C.J., Pearce-Higgins, J.W. & Park, K.J. Experimental evidence for the effect of small wind turbine proximity and operation on bird and bat activity. *PLoS One* 7(7): e41177. doi:10.1371/journal.pone
2. Park K, Turner A & Minderman J (2013). Integrating applied ecology and planning policy: the case of micro-turbines and wildlife conservation. *Journal of Applied Ecology* 50, 199-204.

Scientific papers pending:

3. Minderman, J., Fuentes-Montemayor, E., Pendlebury, C., Pearce-Higgins, J.W. & Park, K.J. Correlates of bird and bat mortality at small wind turbine sites in the UK. To be submitted to: *Journal of Applied Ecology*.

Agri-environment schemes and bats

Project summary: Agri-environment schemes (AES) are potentially beneficial to bats and nocturnal insects, but the response of these taxa to their implementation had not been assessed prior to this study. In this project the potential benefits (or otherwise) that bats and their insect prey species gain from the implementation of certain AES management prescriptions (field margins, water margins, hedgerows, species rich grassland) was assessed. Some AES prescriptions aim to increase the amount and quality of woodland on agricultural land, but little is known about how woodland character relates to bat abundance and insect prey availability; therefore, recommendations for woodland creation and management rarely consider the requirements of foraging bats. This project also examined the influence of woodland character (e.g. vegetation structure and patch configuration) and the surrounding landscape (e.g. % and connectivity of woodland) on bats and nocturnal insects was assessed.

The work described above was conducted as a PhD studentship – follow up work (analysis ongoing) has used a GIS database of AES woodlands created throughout various grant schemes to assess the contribution that farm woodland creation schemes are making in providing suitable roosting and foraging resources for bats.

Since January 2013 this project has expanded in scope to consider other taxa and a collaboration has been developed with Forest Research, NE and SNH – a project website "*New woodlands and ecological networks*" will be launched later in 2013.

Researchers: Dr Elisa Fuentes-Montemayor (Postdoctoral researcher), Dr Kirsty Park, Prof Dave Goulson (Univ. of Stirling)
Project start / end date: Aug 2007 – Jan 2015 (further funding is currently being sought for field expenses)
Funding bodies: Mexican Government, University of Stirling, Glasgow Natural History Society, Peoples Trust for Endangered Species, British Ecological Society, Carnegie Trust for the Universities of Scotland, Forest Research, Natural England, Scottish Natural Heritage.
Published and pending papers: (bat papers only – also two publications on moths):

1. Fuentes-Montemayor E, Goulson D & Park KJ (2011). Pipistrelle bats and their prey do not benefit from four widely applied agri-environment management prescriptions. *Biological Conservation* 9: 2233-2246
2. Fuentes-Montemayor E, Goulson D, Cavin L, Wallace JM & Park KJ. Effects of woodland character and configuration on bats and nocturnal insects within farmland: implications for woodland management and creation schemes. Under review: *Agricultural Ecosystems and Environments.*
3. Fuentes-Montemayor, E. & Park, K.J. Assessing the effectiveness of woodland creation schemes for the defragmentation of Scottish landscapes. In preparation (to be submitted to: *Forest Ecology and Management*).
4. Fuentes-Montemayor, E. & Park, K.J. Are farm woodland planting schemes providing suitable resources for bats and moths?. In preparation (to be submitted to: *Agriculture, Ecosystems and Environment*).

Ecology and conservation of urban bats

Project summary: Whilst some studies have shown a general avoidance of urban areas by bats, others have suggested that urban environments may have a positive role to play in resource availability for some bat species, particularly in landscapes dominated by intensive

agricultural land use. The aim of this PhD studentship is to investigate the effect of urbanisation on bat ecology and conservation in the UK. This project will operate at a range of scales, regional to UK-wide. In 2011, urban woodlands within Central Scotland were surveyed for bats, using a combination of detection and capture methods, and their prey base. Here researchers will examine the influence of woodland character (e.g. vegetation structure and patch configuration) and the surrounding landscape (e.g. % and connectivity of woodland) on bats and nocturnal insects. Future work planned will use field survey data collected across the UK by volunteers in collaboration with the BCT. This will examine foraging patterns in relation to urbanisation of the two sympatric pipistrelle species, *P. pygmaeus* and *P. pipistrellus*.

Key researchers: Paul Lintott (PhD student), Dr Kirsty Park, Prof Dave Goulson (Univ. of Stirling)
Project start / end date: Oct 2010 – Oct 2015
Funding bodies: University of Stirling, British Ecological Society
Papers in preparation: Four manuscripts are pending from work already conducted; 1. Bat use of urban woodlands; 2. Moth communities in urban woodlands; 3. A methods paper comparing techniques for surveying bats in woodlands; 4. Use of waterways by bats in urban landscapes.

Bats without Borders: the distribution of cave dwelling bats in southern Africa
Project summary Determining a species' distribution is essential for any ecological or conservation research, such as understanding the implications of anthropogenic impacts on biodiversity. As with other species, bats are threatened by anthropogenic pressure. Climate change and extensive land use change are universally recognised as being the biggest threats to bat conservation globally. Southern Africa is an environmentally vulnerable region ill equipped for coping with extreme events, such as flooding or drought. As such, climate change is likely to have a significant impact on biodiversity in this region, which is rich in bat fauna. When research is undertaken in areas that are ecologically diverse but have little biological data, as in the case with bats in southern Africa, modelling can be a fundamental tool. This study will focus on cave-dwelling species which are very vulnerable to human impacts and considered to be a priority for conservation efforts as limited distribution data have hindered research into their ecology and conservation. To understand current and future conservation challenges, spatial distribution models will be employed to: (i) predict current distributions (ecological requirements) of focal species, (ii) direct fieldwork efforts, (iii) predict potential future shifts in distributions.

Researchers and partners: Rachael Cooper-Bohannon (PhD student), Dr Kirsty Park, Prof Gareth Jones (Univ. of Bristol), Dr Hugo Rebelo (CIBIO, Portugal) Mr Marthin Kasaona (Etosha National Park, Namibia), Dr Woody Cotterill (Univ. of Cape Town), Ass. Professor Ara Monadjem (Univ. of Swaziland), Dr Corrie Schoeman (Univ. of KwaZulu-Natal), Ass. Professor Peter Taylor (Univ. of Venda).
Project start / end date: Oct 2010 – Oct 2013
Funding bodies: University of Stirling, Rufford Small Grants
Papers: Data collection completed; analysis underway.

How do silvicultural practices influence bat populations in commercial coniferous plantations?
Project summary: Currently approximately 70% of woodland in the UK consists of forestry plantations, much of which is intensively managed, using a limited number of exotic fast-growing conifers and employing a variety of silvicultural practices to prepare sites for planting, thinning and clear-cut harvesting. A common perception of plantation forests is that they are ecological deserts and there is a long standing debate about the potential, and realised, role of plantation forestry in biodiversity conservation. There is now a body of evidence from numerous countries, however, to suggest plantation forests can provide

habitat for a wide range of native forest plants, animals, and fungi. In the UK there have been fundamental changes to silvicultural practices over last 30 years as a result of policy changes which have placed a greater emphasis on maximising biodiversity benefits of plantations.

Many bat species in Europe have undergone declines over last century, driven primarily by habitat loss as a result of agricultural expansion and urbanisation. Woodland is acknowledged as being one of the most important habitats for bats as it offers the potential for both roosting and foraging. In the UK, almost all bat habitat surveys have found that coniferous plantations are avoided by, or at best of marginal use to, bats. Perhaps as a consequence of this the effects of forestry practices on bat populations has been largely ignored in the UK, and surprisingly little is known about their use of commercial forests. Whilst native woodlands are likely to offer the most optimal conditions for bats, numerous studies have shown that plantations can offer valuable resources to bats. However, we lack an understanding of how populations of different species are affected by current silviculture practices, and how changes to forest policy (for example, the use of different crop species as a result of climate change) may influence bats in the future. The aim of this project is to address the existing knowledge gaps between stand management and biodiversity, focussing on bats and their nocturnal insect prey.

Researchers and partners: Lucinda Kirkpatrick (PhD student), Dr Kirsty Park, Dr Daisy Dent (Univ. of Stirling), Dr Sallie Ballie (Forestry Commission).
Project start / end date: November 2012 – November 2016.
Funding bodies: University of Stirling, Forestry Commission.

University College London (James Hales**)**
Project Title: "Bats in Churches: An objective assessment of a perceived problem"
Researcher: James Hales
Institution: Institute of Archaeology, UCL
Funded by: Pilgrim Trust
Completion date: September 2014

The purpose of the project is to gain a better understanding of damage and deterioration mechanisms, thought to be associated with the deposition of bat droppings and urine within historic churches in the U.K.

To this end work is being carried out to investigate the effect of bat droppings and urine on a range of materials commonly found within the interiors of historic churches. Physical, chemical and visual changes occurring as a result of bat dropping and urine deposition will be recorded and investigated.

The practical outcomes of the research are, that as a result of an improved understanding of the chemical interaction taking place between bat excreta and the fabrics commonly found within historic church buildings, UCL believe they are also be better able to do the following:

- Assess the susceptibility of different materials to deterioration
- Relate the frequency of deposition to the severity of the problem
- Discover if any damage mechanism is a rapid onset event or a process of gradual attrition
- Design better mitigation strategies
- Recommend improved cleaning conservation approaches

Fera (James Aegeter)

Fera has been undertaking ongoing surveillance and research into lyssavirus infection in English bats, specifically European Bat Lyssavirus (EBLV)2 in Daubenton's bat and Bokeloh bat lyssavirus (BBLV) in Natterer's bat (with Animal Health Veterinary Laboratories Agency).

Fera has been collaborating with the University of Exeter on research into the social and spatial dynamics of the Serotine in England. This is using population genetics (both microsatellite and mtDNA approaches) as well as stable isotope approaches (for C, N and H) to infer the structure and movements of the bats at a range of scales, from the local to the continental. Samples were collected from west and north of the species 'traditional' range (in north and south Wales) and these are currently being analysed for comparison with the English data.

In addition has been pursuing a range of research tasks to undertake predictive modelling of bat population dynamics using mechanistic (process) models. Whilst the initial focus of this work is to form the foundation of a strong epidemiological analysis of current and future diseases of policy concern, the findings of the work are likely to inform very many fundamental issues in bat conservation and management.

Queen's University, Belfast (Ian Montgomery)
Queens's is part of the Centre for Irish Bat Research. This comprises Ian Montgomery and Prof Paulo Prodohl at Queen's and Prof Emma Teeling at Univ Coll Dublin. Projects include: phylogeography, molecular ecology and spatial ecology of *Myotis* species (Natterer's and whiskered); location and use of swarming sites; bat activity and impact on bats around wind turbines; and use of veteran trees by bats. There is also earlier work on the phylogeography, molecular ecology and ecology of Leisler's bat, as well as a review of impact of climate change on bats, in process of publication.

Jersey, Channel Islands
Bats and churches
An initial project undertaken in 2012 determined the use of churches by bats. A sample of 21 churches was surveyed, of which 12 showed signs of bats. Bat presence was determined by conducting evening surveys, overnight recordings or finding droppings. Four species were recorded during the project; common pipistrelle, serotine, Nathusius's pipistrelle and long-eared species. If is hoped that a further project on 'Bats in Churches' will stem from this work in 2013.

13. Consideration being given to the potential effects of pesticides on bats, and their food sources and efforts to replace timber treatment chemicals which are highly toxic to bats

In **Jersey,** standing advice continues to be issued on the use of approved timber treatment pesticides for use in bat roosts. This work is ongoing and forms part of the standing statutory advice in relation to bats.

D. FUNCTIONING OF THE AGREEMENT

14. Co-operation with other Range States

Jersey contributes recovered dead bats to the Health Protection Agency, Animal Health and Veterinary Laboratory Agency as part of the UK wide passive monitoring programme.

15. Measures taken to implement Resolutions adopted by Meetings of Parties

Resolution 6.6 England has produced a draft White Nose Syndrome (WNS) contingency plan which it hopes to finalise in the next few months.

Resolution 6.11 Great Britain (GB) is funding a project to assess the effect of wind-turbines on bat populations. It is hoped that the results will allow us to update current guidelines.

Resolution 6.12 The NBMP Woodland Survey has continued. BCT produced a woodland owners guide to managing woodlands containing Bechstein's bats.