# *Darwin Initiative Annual Report*

**Submission deadline 30 April 2009**

## Darwin Project Information

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| Project Ref Number | EIDPO036 (Original Project Reference 15/033) |
| Project Title | Monitoring biodiversity indicators through volunteer networks across Eurasia |
| Country(ies) | Romania, Bulgaria, Hungary, Ukraine, Russia |
| UK Contract Holder Institution | Institute of Zoology, Zoological Society of London |
| Host country Partner Institution(s) | The Romanian Bat Protection Association, The Green Balkans, The Institute of Zoology Bulgarian Academy of Sciences, The Bulgarian Bat Research and Protection Group, Nature Foundation (Hungary), Animal Research and Protection Association (Ukraine) and Peresvet (Russia). |
| Other Partner Institution(s) | The Bat Conservation Trust |
| Darwin Grant Value | £197,039 |
| Start/End dates of Project | 1st April 2009 to 31st March 2010 |
| Reporting period (1 Apr 2009 to 31 Mar 2010) and annual report number (1) | 1st April 2009 to 31st March 2010. Annual Report 1 |
| Project Leader Name | Dr. Kate E. Jones |
| Project website | http://www.ibats.org.uk and photos can be found at http://www.flickr.com/photos/ibatsprogram/ |
| Author(s) and main contributors, date | Kate E. Jones, Jon Russ, Abigel Szodoray-Paradi, Farkas Szodoray-Paradi, Elena Tilova, Ivan Pandourski, Andriy-Taras Bashta and Igor Prokofev. 31st March 2010 |

## 1. Project Background

The project builds on the success of a previous Darwin Initiative Project 15/033 (May 2006-Aug 2009) where we generated population data on important biodiversity indicators by developing bat biodiversity monitoring programmes for two countries in Eastern Europe (Romania and Bulgaria). We developed a volunteer biodiversity monitoring network (of over 180 people) across this region, providing extremely valuable biodiversity data over 304 transects (covering 11,109 km of road networks) for conservation planning and assessment of the impact of future global change. With the post-project funding, we are building on this initial success to maintain the projectôs momentum to increase its sustainability and legacy across the region. We also aim to extend the project further across Eurasia particularly Hungary, Ukraine and Western Russia, involving new groups and building a centre of excellence in Romania (Fig 1 for a map of the region).


**Figure 1**. Transects carried out in Eastern Europe from July 2006-Oct 2009, including new transects in Hungary, Ukraine and Western Russia. Blue and red circles represent survey and monitoring transects, respectively. Colours represent WWFôs Ecoregions.

## 2. Project Partnerships

### Project Partnerships

***Partnership between UK lead institution and host country partner(s).***

Romania Bat Protection Association (RBPA) (Romania). The Zoological Society of London (ZSL) has strengthened the links with our Romanian collaborators over the projectôs fourth year. In May 2009, RBPA hosted the 1st International Indicator Bats Global Monitoring Workshop in Savadisla, Romania, with 21 Romanian volunteers attending and representatives from the other existing projects (total of 52 participants, from 10 countries). This acted to strengthen RBPAôs regional influence and its reputation as a centre of excellence. RBPA volunteers have successfully completed and uploaded 84 transects for 2009 (60 expected).

The Green Balkans (Bulgaria). ZSL strengthen our collaboration with The Green Balkans. 10 participants attended the 1st International Indicator Bats Global Monitoring Workshop in May 2009 in Romania. Green Balkan volunteers have successfully completed and uploaded 73 transects for 2009 (60 expected).

Nature Foundation (Hungary). Three representatives of the Nature Foundation attended the 1st International Workshop in May 2009. These volunteers completed and uploaded the 20 required transects for 2009. This was followed up in October 2009 by Dr. Kate Jones (ZSL), Abigel and Farkas Szodoray-Paradi (RBPA) and Dr. Zoltan Bilhari (Nature Foundation) attending the VIIth Hungarian National Bat Conservation Conference in Felsotarkany Hungary, relating to their involvement with the iBats project. The meeting generated more interest from bat researchers in Hungary and four more teams have volunteered for the project from different parts of Hungary for 2010.

Animal Research and Protection Association (ARPA) (Ukraine). Two representatives from ARPA, including the chair Dr. Andriy-Taras Bashta attended the 1st International Indicator Bats Global Monitoring Workshop. Following the successful survey season where 7 volunteers collected, analysed and uploaded 23 transects, Dr. Kate Jones (ZSL) and Dr. Jon Russ (BCT) visited Dr. Andriy-Taras Bashta in Lôviv, Ukraine (23-26 November 2009) to discuss project progress and the nature of the volunteer network across Ukraine. We also gave talks at the Institute of Ecology of the Carpathians, National Academy of Sciences of Ukraine in Lôviv and visited a number of the field sites surveyed the previous summer. The visit generated more interest in the project and four more teams from different parts of Ukraine have been identified to carry out the project in 2010.

The Grassroots Alliance (Peresvet) (Russia). Five representatives of The Grassroots Alliance (Peresvet) attended the 1st International Indicator Bats Global Monitoring Workshop in May and subsequently completed, analysed and uploaded 20 monitoring transects throughout the Bryansk region of Russia. Dr. Kate Jones (ZSL) and Dr. Jon Russ (BCT) visited Bryansk, Russia (26 November ï 1 December 2009) and met with Dr Igor Prokofev and other members of Peresvet to discuss project progress and the nature of the volunteer network in Russia. We gave presentations at 2 schools in the region (run by members of Peresvet) and visited sites surveyed the previous summer. Dr. Kate Jones assisted Alexander Gorbachev from Peresvet to apply and successfully obtain funding to attend The Student Conference on Conservation Science in Cambridge in March 2010 and for a one month internship at ZSL learning analytical techniques to analyse the data from the project. Dr. Kate Jones will jointly supervise Alexanderôs PhD project to start in October 2010. Dr Igor Prokofev, Natalia Koryagine and Oleg Zavarzin (Peresvet) also attended the Cambridge Student Conference at the invitation of Dr Kate Jones and visited ZSL offices learning about NGO development and projects. Peresvet also visited the Bat Conservation Offices in London on 19th March 2010. They attended short presentation by key members in staff involved with the National Bat Monitoring Programme, Training, The Helpline, Bat Groups and Education and were presented with a variety of BCT publications to support their project in Russia. We also applied for a Darwin Initiative Fellowship for Alexander Gorbachev to offer further analytical and statistical training in the UK.

***Partnerships between other UK or regional partner(s)?***

The partnership between the Zoological Society of London (ZSL) and The Bat Conservation Trust (BCT) continues to be excellent and we have regular meeting to review project progress. As a member of the board of trustees at BCT (and proposed chair in September 2010), Dr Kate Jones has helped BCT with their new 5 year strategic development plan. The Darwin project forms an important part of BCTôs international development plan and part of the newly formed BatLife-Europe jointly run by BCT. Dr Kate Jones assisted BCT to successfully apply for extra funding for the Ukraine and Russia parts of the project from The Rufford Maurice Laing Foundation (£10,000). Dr. Jon Russ and Kate Jones ran two iBats workshops at Bat Conservation Trustôs National Bat Conference in UK in September 2009 to further promote the project.

**Other Collaboration**

The Bats & Roadside Mammals Survey, a partnership project between the Bat Conservation Trust and the Mammals Trust UK, has now been fully integrated into the iBats Program. The data generated since its inception in 2005 is being transferred to the iBats web portal by members of the South Lancashire Bat Group and an MSc student (Annie Pagan, Imperial College).

Following the bat pilot project in Mongolia in 2008 (funded by the Darwin Initiative ï Scoping Award), ZSL has been awarded a grant from the World Bank to develop a Mongolian mammal monitoring program. Dr Kate Jones trained Dr Sue Parsons (ZSL) to carry out bat biodiversity monitoring. Data collection will start in summer 2010 for three years.

With funding from The Leverhulme, Dr. Kate Jones visited The University of Auckland, New Zealand to collaborate with Dr. Stuart Parson to develop methods to automatically identify and extract calls from long call sequences and to automatically parameterize calls. In addition, a pilot project was launched using the iBats methodology to investigate distributions of long-tailed bats (*Chalinlobus tuberculata*) in New Zealand and data collection will start in summer 2010.

With funding from the Japan Fund for Global Environment, Dr Kate Jones collaborated with Dr. Dai Fukui to launch a pilot iBats project in Japan in 2010. We will hold a training workshop in July 2010 with data collection to follow during summer 2010.

Charlotte Walters started her PhD in Oct 2009 to investigate the habitat and climate associations of Eastern European bats collaborating with our partners. We also have a MSc student from Imperial College, London (Annie Pagan) investigating ôStatus of UK Batsô This project will estimate population abundances of bats in the UK obtained from the iBats programme to investigate any trends over the last 5 years and compare these results to other more traditional surveys carried out by the National Bat Monitoring Programme.

We invited a number of representatives from other similar monitoring projects to the workshop in Savadisla, Romania in May 2009 to strengthen links with these organisations. These included representatives from Ireland (Bat Conservation Ireland), UK (The South Lancashire Bat Group), France (Museum National d'Histoire Naturelle, Paris), USA (The American Museum of Natural History) and Belgium (Natuurpunt).

## 3. Project progress

### 3.1 Progress in carrying out project activities

All activities have been carried out in the manner and the time that they were planned.

**Project Outputs: (1) *Ongoing statistically defensible monitoring programme for Romania and Bulgaria* and (2) *Development of statistically defensible monitoring programme for Hungary, Ukraine and Russia***

**Activity 1.1 (Year 1, Months 1-3): International monitoring workshop hosted by Romanian and Bulgaria (assisted by UK partners) inviting key participants from Hungary, Ukraine and Western Russia to introduce the project and train key personnel.**

*Progress*: We held the workshop in Savadisla, Tordaszentlaszlo, Romania from 15-18th May 2009 which was organised by the Romanian Bat Protection Association (RBPA) and attended by representatives and volunteers from RBPA, Bulgaria (The Green Balkans), Hungary (Nature Foundation), Ukraine (Animal Research and Protection Foundation), Russia (Peresvet), and UK (ZSL, The Bat Conservation Trust). We also took this opportunity to invite representatives from other similar monitoring projects that this project has been involved with and representatives attended from Ireland (Bat Conservation Ireland), UK (The South Lancashire Bat Group), France (Museum National d'Histoire Naturelle, Paris), USA (The American Museum of Natural History) and Belgium (Natuurpunt). Country representatives presented the results from their monitoring projects or their potential for their involvement in the project and a number of workshops were then held to train new volunteers in the iBats monitoring method. These were iBats Monitoring techniques; Sonogram Analysis; Bat Biology, Evolution and Conservation; iBats Website. Fifty-two volunteers attended the workshop with 12 new volunteers being trained. Individual sessions were held for volunteers from Romania, Bulgaria, Hungary, Ukraine and Russia to plan their projects for the forthcoming year. In addition to the above workshops we also visited the projects in Hungary (16-18 Oct 2009), Ukraine (23-26 Nov 2009) and Russia (26 Nov - 1st Dec 2009) and gave presentations and held meetings.

**Activity 1.2 (Year 1, Months 1-3): Equipment bought and transferred for Hungary, Ukraine and Western Russia and replacement equipment purchased for Romania and Bulgaria.**

*Progress*: Hungary, Ukraine and Russia each received 2 sets of equipment in May 2009 for surveying in 2009 (6 sets in total). We also bought 13 additional sets of to be distributed to the new countries in the 2010 field season, maps and hard discs for data storage. We also replaced damaged equipment in existing projects.

**Activity 1.3 (Year 1, Months 1-4): Ongoing monitoring data collected by network of volunteer personnel in Romania and Bulgaria. Pilot data collected by Hungary, Ukraine and Western Russia. 60 transects for Romania and Bulgaria and 20 transects for additional countries**

*Progress*: During 2009, volunteers have collected data from 226 driven transects in Romania, Bulgaria, Ukraine, Russia and Hungary (Table 1, Fig 1). In Romania 84 transects have been driven making a total of 210 transects (8,400 km) surveyed since 2006. Of these, 102 are separate routes. In Bulgaria 69 transects were driven making a total of 234 transects (9,360 km) surveyed since 2007, 77 of which are separate routes. In Russia, 20 transects (1,200 km) of 11 different routes have been driven. Of the 37 volunteers registering with the project, 27 participated in the surveys. In Ukraine, 23 transects (920 km) of 15 different routes have been

driven. Of the 11 volunteers registering with the project, 7 participated in the surveys. In Hungary, 26 transects (1,040 km) of 16 different routes have been driven adding to the existing data collected by Isvan CsR,sz (MSc student). Of the 32 volunteers registering with the project, 24 participated in the surveys. Across the region, data from a total of 529 driven transects of 226 different routes have been collected (21,160 km).

| ***All*** | **Country** | | | | | | |
|---|---|---|---|---|---|---|---|
| **Year** | **Romania** | **Bulgaria** | **Hungary** | **Croatia** | **Ukraine** | **Russia** | **Regional** |
| 2006 | 16(15) | | | | | | 16(15) |
| 2007 | 52(40) | 74(46) | 8(6) | 1(1) | | | 135(93) |
| 2008 | 58(40) | 87(53) | 7(5) | | | | 152(98) |
| 2009 | 84(48) | 73(43) | 26(16) | | 23(15) | 20(11) | 226(133) |
| *Total* | *210(102)* | *234(77)* | *41(20)* | *1(1)* | *23(15)* | *20(11)* | *529(226)* |
| ***Monitoring*** | **Country** | | | | | | |
| **Year** | **Romania** | **Bulgaria** | **Hungary** | **Croatia** | **Ukraine** | **Russia** | **Regional** |
| 2006 | 2(2) | | | | | | 2(2) |
| 2007 | 22(13) | 53(27) | 4(2) | | | | 79(42) |
| 2008 | 29(19) | 64(31) | 4(2) | | | | 97(52) |
| 2009 | 51(28) | 60(31) | 20(10) | | 16(8) | 10(5) | 157(82) |
| *Total* | *104(29)* | *177(31)* | *28(10)* | | *16(8)* | *10(5)* | *335(83)* |

**Table 1. Number of events (number of routes) for all transects and monitoring transects conducted from 2006-2009 across Eastern Europe. Monitoring transects are transects repeated in July and August and will contribute to monitoring population trends across the region.**

**<u>Activity 1.4 (Year 1, Months 9-12)</u>. All data uploaded to the online web database and analysed.**

*Progress*: All of the data has been uploaded to the iBats web portal and all the agreed transects have been analysed (60 each for Romania and Bulgaria, 20 each for the other countries). The analysis of the additional transects are in progress.

**<u>Activity 3.1 (Year 1, Months 9-12)</u>. Analysis of the Yr 1 data from all countries.**

*Progress*: Charlotte Walters has begun collating the iBats data from Europe as well as additional data from the literature to carry out a Europe-wide analysis as part of her PhD (University of Kent and ZSL) to investigate the habitat and climate associations of European bats. Charlotte has carried out preliminary habitat niche analysis models for Eastern Europe and will apply these models to the larger European dataset once collation is complete. Charlotte presented her results at the British Bat Research Symposium in April 2010. Huma Pearce (an intern at ZSL) is investigating the association of micro-habitats with the iBats data (road-side design) using aerial photographs from Google Earth. The project is focussing on UK data, but the methodology will be applied to our Eastern European data. Anniel Pagan (MSc Imperial College) is investigating the effectiveness of data obtained using iBats data in comparison to existing bat monitoring programs in the UK. These results will be used to understand the power and effectiveness of iBats data to monitor bat populations globally. Alexander Gorbachev created the first habitat niche model for Western Russia using the iBats data as part of his research project for his BSc (University of Bryansk) and presented this at Cambridge University Student Conservation Conference in March 2010 and at the British Bat Research Symposium in April 2010. Péter GyR,rfi used the data he collected as part of the iBats Hungary project as his research project for his BSc in Hungary. Isvan Csosz presented his analysis of the data he collected in Hungary at the VIIth Conference of Bat Conservation in Hungary conference in Oct 2009 and Abigel Szodoray-Paradi presented her analysis of the Romanian data also at the Hungarian conference.

**Project Output: (3) *Ongoing improved online international spatial and temporal database on bat species abundances and distributions***

**<u>Activity 2.3 (Years 1 and 2, Months 1-24)</u>. Improvements to the online data portal.**

*Progress*: After initial discussions with a number of software companies we have a contract with MSM (http://www.msmsoftware.com/) to produce a new updated version of the web portal which will include EchoBank (a global echolocation call database). MSMÕs health check of the

existing iBats web portal pointed out some non-updatable, out of date and non-compliant code which needs to be rewritten. The new web portal will incorporate transect data gathered using the application for the iPhone we are currently developing (see next section). Initial testing on the site has begun and the projected final delivery date is December 2010 (although the old version of web portal will continue to be operational until next year).

**Project Output: (4) *Improved analysis techniques to automatically detect and identify bat calls from transect data and improved equipment***

**<u>Activity (2.1, Years 1 and 2, Months 1-24)</u>. Development of new analytical techniques to automatically analyse and identify acoustic data.**

*Progress*: Alanna Maltby (PhD student, ZSL & University College London) in collaboration with bat researchers around the world, have developed a global echolocation call database (EchoBank) which will help identify species collected within the iBats project. Charlotte Walters (PhD, University of Kent & ZSL) is building a neural automatic identification network for European calls with Dr. Stuart Parsons (University of Auckland). She has extracted 72 call parameters from 17, 639 echolocation calls from the 38 European species in EchoBank using the spectrum analysis software package Sonobat (Figure 2). We have been working with the software developer Dr. Joe Szewczak (University of California, Davis) to modify the Sonobat software to automatically extract bat calls from long sequences as used in the iBats Program.

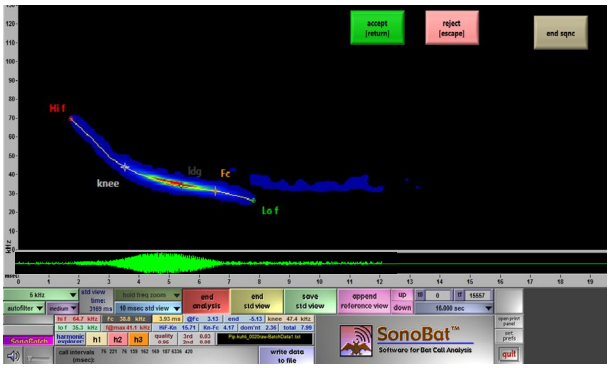


**Figure 2**. Sonobat software used to extract parameters from echolocation calls.

In addition, Dr. Jonathan Krieger (Natural History Museum London), Alanna Maltby, Stuart Parsons and Kate Jones funded by a small grant from The Centre for Ecology and Evolution in London, began to investigate better ways of parameterising bat echolocation calls (Figure 3) by extracting measurements using three-dimensional eigenshape analysis. We tested this system with *Myotis* bats, commonly considered the most difficult to identify acoustically from their echolocation calls and found that this method outperforms the classification obtained with traditional parameters. This research was presented at University College London in May 2010. We are now working on neural classification networks to identify echolocation calls to species using these new as well as the traditional parameters extracted using Sonobat.

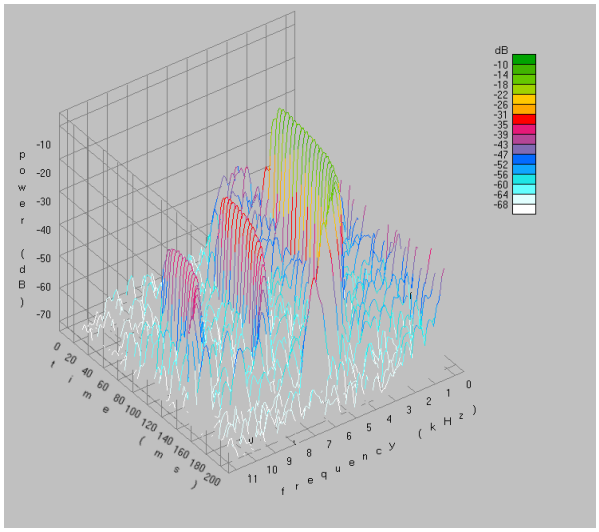


**Figure 3**. 3D representation of the echolocation calls of *Eptesicus serotinus*

**<u>Activity 2.2 (Years 1 and 2, Months 1-24)</u>. Development of new detector**

*Progress*. The equipment kits we currently use are complex to put together and to explain in other languages and we have experienced the loss of the data from a number of transects due to this problem. We investigated the potential for developing hardware that integrated an ultrasonic microphone, a GPS, a user interface and a flash drive for easier and more efficient bat monitoring. However, this proved to be unfeasible due to cost and development time. Therefore we decided to integrate existing hardware through developing a new piece of software. In collaboration with Dr. George Roussos and Brock Craft at Birkbeck (University of London) we have been developing an application for the iPhone which can be directly attached to the ultrasonic detector with the geo-referenced sound files being automatically uploaded onto

the web portal (Figure 4). A MoU between ZSL and Birkbeck was signed in September 2009 and a 3 month contract to develop the software application commenced at the beginning of October 2009 and we tested a beta version of the software during March and April 2010. We will be carrying out testing during the 2010 field season before making the application available for free through the iPhone application store (iTunes).


In collaboration with Dr Roussos, an MSc student at Birkbeck is to developing a similar application for Google's Android operating system.

We have also been working with Lars Pettersson of Pettersson Elektronik AB to modify an existing widely used ultrasonic detector (D240x) for use in the iBats project which will enable a greater number of people to take part in the surveys.

**Figure 4**. Screenshots from the iBats iPhone application

### 3.2 Progress towards Project Outputs

**Project Output: (1) *Ongoing statistically defensible monitoring programme for Romania and Bulgaria***

The Romanian Bat Protection Association (RBPA) organised a training workshop in Savadisla, Romania in May 2009 which was attended by representatives and volunteers from Romania and Bulgaria (and Hungary, Russia and Ukraine). During the 2009 field season 84 transects were driven in Romania making a total of 210 transects (8,400 km) surveyed since 2006 and in Bulgaria 73 transects were driven making a total of 234 transects (9,360 km) surveyed since 2007. All of the data has been uploaded to the iBats web portal and all the agreed transects have been analysed (60 each for Romania and Bulgaria).

**Project Output: (2) *Development of statistically defensible monitoring programme for Hungary, Ukraine and Russia***

We have made excellent progress with this output. Key personnel from Russia, Ukraine and Hungary were trained at the May 2009 workshop in Romania in survey methods and sound analysis techniques. In addition, we visited the projects in these counties in late 2009 to strengthen our relationships with these countries. Using the two sets of equipment purchased for each country for the 2009 field season, 20 transects (1,200 km) of 11 different routes were driven in Russia, 23 transects (920 km) of 15 different routes were driven in Ukraine and 26 transects (1,040 km) of 16 different routes were driven in Hungary. All of the data has been uploaded to the web portal and analysed.

**Project Output: (3) *Ongoing improved online international spatial and temporal database on bat species abundances and distributions***

We have employed MSM to produce a new updated version of the web portal which will additionally incorporate transect data gathered using the application for the iPhone. We expect this new website to be completed and fully functional by December 2010.

**Project Output: (4) *Improved analysis techniques to automatically detect and identify bat calls from transect data and improved equipment***

We have identified a method to identify and extract calls from long call sequences and have made excellent progress in establishing a method to identify bat species from their echolocation calls. We have obtained and extracted call parameters from almost 18,000 echolocation calls from 38 European species. In addition, we have investigated a novel method of parameterising echolocation calls using three-dimensional eigenshape analysis. We are working on neural classification networks to identify echolocation calls to species using these new and traditional parameters.

**Project Output: (5)** ***Knowledge of how change in human development and climate impacts bat biodiversity***

We are making good progress towards analysing and writing up these results for publication.

### 3.3 Standard Measures

**Table 1 Project Standard Output Measures**

| Code No. | Description | Year 1 Total | Year 2 Total | Year 3 Total | Year 4 Total | Total to date | Number planned for this reporting period | Total planned from application |
|---|---|---|---|---|---|---|---|---|
| 1A | Number of people to submit PhD thesis | 0 | 1 | 0 | 2 | 0 | 0 | 3 (Abigel Szodoray-Paradi, Charlotte Walters and Alexander Gorbachev) |
| 3 | Number of other qualifications obtained | 1 | 0 | 0 | 0 | 1 | 0 | 1 (Internship for Alexander Gorbachev) |
| 6A | Number of people receiving other forms of short-term education/training | 52 | 50 | 0 | 0 | 52 | 52 | 102 (International iBats workshop for 52 people and meetings in Hungary, Ukraine and Russia) |
| 6B | Number of training weeks not leading to formal qualification | 4 | 5 | 0 | 0 | 4 | 1 | 6 (1 x International workshop and 3, x meetings in Hungary, Ukraine and Russia) |
| 7 | Number of types of training materials produced for use by host country(s) | 7 | 0 | 0 | 0 | 7 | 7 | 7 (Updated talks on Bat biology, echolocation, monitoring biodiversity, protocols for monitoring, echolocation analysis, species identification, using the website) |
| 8 | Number of weeks spent by UK project staff on project work in host countries | 9 | 10 | 0 | 0 | 9 | 3 | 24 days (1 week for Charlotte Walters, 4 weeks each for Kate Jones and Jon Russ) |
| 9 | Management plans for host countries | 0 | 5 | 0 | 0 | 0 | 0 | 5 |
| 10 | Number of formal documents produced to assist work related to species identification, classification and | 2 | 0 | 0 | 0 | 2 | 2 | 2 Online manuals for classification and 1 peer reviewed paper |

| | | | | | | | | |
|---|---|---|---|---|---|---|---|---|
| | recording | | | | | | | |
| 11A | No of papers published or accepted for publication in peer reviewed journals | 3 | 1 | 0 | 0 | 3 | 1 | 3 1 peer reviewed paper (Jones et al.) and 2 conference proceedings |
| 11B | No of papers submitted for publication in peer reviewed journals | 0 | 4 | 0 | 0 | 0 | 0 | 4 We are planning to submit papers on habitat modelling of European bats, species neural identification network for European bats, Suitability of iBats data to monitor bats, population status of bats in Eastern Europe |
| 12A | Computer databases enhanced | 3 | 5 | 0 | 0 | 3 | 3 | 5 (Romania, Bulgaria and Hungary) and available to host country |
| 12B | Computer databases established | 2 | 0 | 0 | 0 | 2 | 2 | 2(Ukraine and Russia) and available to host country |
| 13A | Number of species reference collections established and handed over to host country | 1 | 0 | 0 | 0 | 1 | 1 | 1 iBats database contains echolocation call data for different species within each country |
| 14A | Conferences/meetings organised to disseminate findings | 4 | 5 | 0 | 0 | 4 | 1 | 9 |
| 14B | Conferences/meetings attended to disseminate findings | 14 | 2 | 0 | 0 | 14 | 4 | 6 |
| 15A | National Press Releases (host country) | 2 | 5 | 0 | 0 | 2 | 2 | 7 |
| 15B | Local Press Releases (host country) | 0 | 5 | 0 | 0 | 0 | 0 | 5 |
| 15C | National Press Releases (UK) | 2 | 1 | 0 | 0 | 2 | 2 | 3 |
| 15D | Local Press Releases (UK) | 0 | 1 | 0 | 0 | 0 | 0 | 1 |
| 20 | Estimated value of physical assets handed to host country | £21,226 | 0 | 0 | 0 | £21,226 | 0 | £21,600 (19 sets of equipment plus replacement equipment, hard discs, books |
| 23 | Value of additional resources raised for | £49,500 | £35,000 | 0 | 0 | £49,500 | £35,000 | £70,000 (£70,000 Leverhulme and |

| | | | | | | | | |
|---|---|---|---|---|---|---|---|---|
| | project | | | | | | | £10,000 Rufford Foundation, £2,000 Cambridge University Student Conference internship, £2500 Centre for Ecology and Evolution) |

**Table 2 Publications**

| Type (eg journals, manual, CDs) | Detail (title, author, year) | Publishers (name, city) | Available from (eg contact address, website) | Cost £ |
|---|---|---|---|---|
| Website | Indicator Bats Program | iBats | www.ibats.org.uk | Free |
| Online Manual | Instructions for using the iBats website | iBats | www.ibats.org.uk | Free |
| Online Manual | Monitoring Protocol (for Garmin GPS and Zoom H2) | iBats | www.ibats.org.uk | Free |
| Online Manual | Monitoring Protocol (for PDA with Memory Map) | iBats | www.ibats.org.uk | Free |
| Online Manual | Monitoring Protocol (for PDA with GPSTuner) | iBats | www.ibats.org.uk | Free |
| Online Manual | Sonogram Analysis Protocol | iBats | www.ibats.org.uk | Free |
| Online Manual | Bat Call Guide | iBats | www.ibats.org.uk | Free |
| Online Database | Database of georeferenced calls | iBats | www.ibats.org.uk | Free but access limited to project participants |
| Peer-reviewed paper | Jones et al. in press. Monitoring ultrasonic biodiversity: using bats as biodiversity indicators | In: Biodiversity monitoring and conservation: bridging gaps between global commitment and local action (eds. Collen et al.) Blackwell Press, London | | Unknown |
| Conference proceeding | A. Szodoray-Paradi & F. Szodoray-Paradi. 2009. Results of the Romanian Indicator Bats Programme | In: Proceedings of the VII th Conference on Bat Conservation in Hungary, Felsotarkany | | |
| Conference proceeding | C. Istvan & F. Szodoray-Paradi. 2009. The use of time expansion ultrasound detectors in the Hungarian bat research | In: Proceedings of the VII th Conference on Bat Conservation in Hungary, Felsotarkany | | |

### 3.4 Progress towards the project purpose and outcomes

We are making good progress towards the project purpose of generating long-term population data on biodiversity indicators to assess the impact of global change by firstly maintaining and enhancing bat biodiversity programmes in two Eastern European countries (continuing the Romanian and Bulgarian programmes) and secondly extending the programme to three other countries by establishing the project in Hungary, Ukraine and Russia. We are working on making the monitoring more sustainable by developing methods to make the sonogram analysis and species identification automatic, and developing software to use existing hardware in the monitoring project, thus opening up the project to more people. We also are working towards submission of our project results for publication.

### 3.5 Progress towards impact on biodiversity, sustainable use or equitable sharing of biodiversity benefits

This project is generating data on distributions and abundances of biodiversity indicator species. Trends in these data can be used to inform policy makers about the state of biodiversity and their success in meeting CBD 2010 (and beyond) targets. These data also increase understanding of the causes of biodiversity loss and help to predict possible future loss under different global change scenarios which will help to minimise the impact of human de and climate change. By generating biodiversity along road-networks, the project has also raise awareness of the variety of biodiversity that can exist along well designed roads. Reports of the initial base-line bat distribution data along roads and their habitat and environmental associations will inform the National Road Authorities as to best practices for road design to maximise biodiversity.

## 4. Monitoring, evaluation and lessons

Monitoring and evaluation of the project is made easy by the online data portal which can track the progress of each countryÕs project making a web-based system critical to the projectÕs success. However, our web portal does need re-development and during this year we were reminded again about the complex and risky nature of new software development and how extraordinarily long such systems take to develop, even with professional companies. We also note that our previous model in approaching NGOÕs with a history of volunteer involvement was also successful in the three new countries we recruited, enabling more stable biodiversity networks to be developed.

## 5. Actions taken in response to previous reviews (if applicable)

The reviewer for the final report 15/033 congratulated us on a very successful project but noted that although the majority of the results have not been submitted for publication although the reviewer had every confidence that they would be by the end of the project. We hope that we have provided enough evidence in this report of research in progress.

## 6. Other comments on progress not covered elsewhere

None.

## 7. Sustainability

The majority of the cost for this project after the initial purchase of equipment and training is the software analysis costs. We are working on new methods to tackle this problem to be completed by the end of the project. With the involvement of the host countries, we are also writing new funding proposals to continue the projects in each country once the Darwin Initiative Project is completed.

## 8. Dissemination

We have disseminated the project to a wide audience of scientists, NGOs, conservationists and the wider public. Project staff and volunteers have presented the results of the project at 14 venues over the past 12 months: May 2009 – iBats International workshop, Romania; June 2009 – Max Planck Institute of Ornithology, Germany; July 2009 – Biodiversity Monitoring and Conservation Symposium, Zoological Society of London; September 2009 – The Bat Conservation Trust, York; November 2009 – Hungarian Research Conference, Hungary; November 2009 – Ukraine Academy of Sciences, Lõviv, Ukraine; December 2009 – University of Bryansk and local schools, Bryansk Russia; December 2009 – Bat Conservation Ireland, Dublin; Feb 2010 – Gloucester Bat Group, Gloucester UK; Feb 2010 – University of Auckland, New Zealand; March 2010 – Leicester and Rutland Bat Group, Leicester UK; March 2010 – Cambridge University Student Conference, Cambridge; March 2010 – British Bat Research Symposium, London; March 2010 – Midlands Bat Conference, Warwick University.

We have also had a number of articles in local and national UK media: An article about the iBats project appeared the Zoological Society of Londonôs Magazine, Wild About in August 2009, ZSL annual report in October 2009; Bat Conservation Trust annual report in March 2010. The iBatsUK project was featured in the BBC programme Autumn Watch on 9th October 2009 (http://www.flickr.com/photos/ibatsprogram/4011024145/). Dr Kate Jonesôresearch (including iBats) was featured on the BBC Radio 4 programme, Tribes of Science. In Romania there was a national press release on 9th October 2009 and 3 articles about the iBats Romania project were published in local newspapers (two from Satu Mare, one from Sibiu). Peresvet (iBats Russia) started two childrenôs clubs for bats (Domoshovsky and Bryansk schools) developing their own research projects. Peresvet are also forming an Association for Protection of Bats and planning a Russian language website for the organisation.

## 9. Project Expenditure

**Table 3 Project expenditure during the reporting period (Defra Financial Year 1 April 2008 to 31 March 2009)**

| Item | **Budget** (Email: 3/2/2010 ) | **Expenditure** | **Variance** |
|---|---|---|---|
| Overhead costs (ZSL) | | | |
| Travel and subsistence | | | |
| Operating Costs | | | |
| Capital items/equipment (iBats equipment (x19), iBats replacement equipment (x1), hard disks (x5)) | | | |
| Others (Bank charges, postage, mini disks, flash disks, head torches, equipment bags, conference materials, bat detector clamps, books and maps) | | | |
| Salaries (specify by individual) | | | |
| Dr. Kate Jones (Program Manager) | | | |
| Bat Conservation Trust (Project Manager) | | | |
| Ms. Abigel Szodoray-Paradi (Romania) | | | |
| Ms. Elena Tilova (Bulgaria) | | | |
| Dr. Zoltan Bihari (Hungary) | | | |

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|---|---|
| Dr. Andriy Taras-Bashita (Ukraine) | |
| Dr. Igor Prokofyev (Russia) | |
| Dr. Jon Russ (Consultant) | |
| Dr. Ivan Pandourski (Consultant) | |
| TOTAL | |

Note that funds for Andriy Taras-Bashita salary, operating costs, and travel and subsistence were allocated a code by mistake in the accounts as overhead costs. However, the right amount was paid by making up the difference by leaving money in travel and subsistence, operating costs and capital items budget.

## 10. OPTIONAL: Outstanding achievements of your project during the reporting period (300-400 words maximum). This section may be used for publicity purposes

We held our first international workshop in Romania, inviting representatives from 10 countries to co-ordinate and disseminate information to our global network of bat biodiversity monitoring volunteers. We have successfully continued to collect data from our existing networks of volunteers in Romania and Bulgaria and started the project in Hungary, Ukraine and Russia. We have developed strong ties with NGOõs in these new countries, in particular obtaining external funds for an internship and conference attendance for a student from Peresvet (iBats Russia). We have developed an application for the iPhone which will enable a greater participation in the project and will simplify the monitoring protocols.

I agree for LTS and the Darwin Secretariat to publish the content of this section

# Annex 1 Report of progress and achievements against Logical Framework for Financial Year: 2009/10

| Project summary | Measurable Indicators | Progress and Achievements April 2009 - March 2010 | Actions required/planned for next period |
|---|---|---|---|
| ***Goal:*** *To draw on expertise relevant to biodiversity from within the United Kingdom to work with local partners in countries rich in biodiversity but constrained in resources to achieve*<br>*The conservation of biological diversity,*<br>*The sustainable use of its components, and*<br>*The fair and equitable sharing of the benefits arising out of the utilisation of genetic resources* | | UK expertise has been used to help train and sustain national networks to generate long term monitoring data for biodiversity indicator species. These data can be used to monitor the impacts of global change which will help future development to be sustainable. | *(do not fill not applicable)* |
| **Purpose**<br>To generate long-term population data on biodiversity indicators to assess the impact of global change by maintaining and enhancing bat biodiversity programmes in two Eastern European countries and extending the programme to three other countries | Continued online database of abundances and distribution of bats in Romania and Bulgaria and new data for bats in Hungary, Ukraine and Western Russia. | Online database continues to hold projects data and data from 2009 survey season added for all participating countries. | Further collection for 2010 of bat abundances and distributions. |
| | Maintenance or establishment of monitoring personnel in each country | Maintained network of volunteers from Romania, Bulgaria, and trained new ones in Hungary, Ukraine and Russia. | Further workshops in Romania. Bulgaria, Russia, Ukraine and Hungary in May 2010. |
| | Development of new techniques in analysis of acoustic data, improvements to the web data portal and the production of new detector equipment | Web portal currently under development. iPhone application near completion. Currently testing and refining methods of call extraction from long-sequences and identification. | Complete web portal, iPhone application and methods for extracting and identifying calls. |
| | Production of papers on bat distribution and habitat use to determine effect of future global change on bat populations | One paper in press and two conference proceedings in Hungarian | Papers of habitat modelling of European bats, species neural identification network for European bats, Suitability of the iBats data to |

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| | | | monitor bats, Population status of bats in Eastern Europe |
| **Output 1.**<br>Ongoing statistically defensible monitoring programme for Romania and Bulgaria | Maintenance of the volunteer network and 60 transects completed per year per country | Volunteer network maintained. In Romania 84 transects have been driven making a total of 210 transects surveyed since 2006. Of these 102 are separate routes. In Bulgaria 73 transects were driven making a total of 234 transects surveyed since 2006, 77 of which are separate routes. | |
| Activity: (1.1, Year 1, Months 1-3) International monitoring workshop hosted by Romanian and Bulgaria (assisted by UK partners) inviting key participants from Hungary, Ukraine and Western Russia to introduce the project and train key personnel. | | Workshop held in Savadisla, Romania from 15-18th May 2009 and attended by representatives and volunteers from RBPA, Bulgaria (The Green Balkans), Russia (Peresvet), Ukraine (Animals Research and Protection Foundation), Hungary (Nature Foundation) and UK (Institute of Zoology, The Bat Conservation Trust). | |
| Activity (1.2, Year 1, Months 1-3) Equipment bought and transferred for Hungary, Ukraine and Western Russia and replacement equipment purchased for Romania and Bulgaria. | | Hungary, Ukraine and Russia each received 2 sets of surveying equipment each for surveying in 2009 (but also bought 13 extra sets of equip to be distributed in the 2010 field season.), maps and hard discs for data storage. We also replaced damaged equipment in Bulgaria. | |
| Activity (1.3, Year 1, Months 1-6) Ongoing monitoring data collected by network of volunteer personnel in Romania and Bulgaria. Pilot data collected by Hungary, Ukraine and Western Russia. 60 transects for Romania and Bulgaria and 20 transects for additional countries. | | In Romania a total of 210 transects surveyed since 2006 In Bulgaria a total of 234 transects surveyed since 2007. In Russia, 20 transects have been driven. In Ukraine, 23 transects. In Hungary, 26 transects in 2009 and 41 in total (adding to the 2007-2008 pilot data). | |
| Activity (1.4, Year 1, Months 7-12). All data uploaded to the online web database and analysed | | All survey data has been uploaded to the iBats website and the majority of the sound analysis data. | |
| Activity (3.1, Year 1, Months 9-12) Analysis of the Yr 1 data from all countries | | Charlotte Walters has begun collating the iBats data from Europe as well as additional data from the literature to carry out a Europe-wide analysis as part of her PhD to investigate the habitat and climate associations of Eastern European bats. Annie Pagan will assess suitability of iBats data to monitor bat populations, Alexander Gorbachev produced the first habitat model for Russian bats, Romanian and Hungarian iBats data was analysed and presented at international workshops. | |
| **Output 2.**<br>Development of statistically defensible monitoring programme for Hungary, Ukraine and Russia | Key personnel and 10 volunteers trained in survey methods per country<br><br>Further workshops run by host countries | We have added to our network of 180 existing volunteers across the region by adding 32 in Hungary, 37 in Russia, 11 in Ukraine.<br><br>We ran an international workshop in Romania in May 2009 which was attended by all of the host countries. Further meetings were held in | |

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| | Training material produced | Hungary, Ukraine and Russia meeting with the project leaders.<br><br>Existing survey and analysis protocols were updated and new ones relating to the use of the web portal were created and distributed. |
| Activities as for Output 1. | | |
| **Output 3.**<br>Ongoing improved online international spatial and temporal database on bat species abundances and distributions | Survey data collected from 60 transects from Romania and Bulgaria and 20 transects collected from each additional country in Yr1 and 30 in Yr 2<br><br>Functionality and appearance of the online database improved | A total of 529 surveys were carried out across the region in 2009, exceeding expectations.<br><br>We have contracted a company to work on the new version of the iBats web portal which should be completed at the end of 2010. |
| Activity (2.3, Years 1 and 2, Months 1-24)) Improvements to the online data portal | | We have contracted a company to work on the new version of the iBats web portal which should be completed at the end of 2010. |
| **Output 4.**<br>Improved analysis techniques to automatically detect and identify bat calls from transect data and improved equipment | Analysis of sonograms no longer a bottleneck to the analysis.<br>Production of a new bespoke detector | We have identified a method to identify and extract calls from long call sequences and have made excellent progress in establishing a method to identify bat species from their echolocation calls. We have obtained and extracted call parameters from almost 18,000 echolocation calls from 38 European species. In addition, we have investigated a novel method of parameterising echolocation calls using three-dimensional eigenshape analysis. We are working on neural classification networks to identify echolocation calls to species using these new and traditional parameters. |
| Activity (2.1, Years 1 and 2, Months 1-24) Development of new analytical techniques to automatically analyse and identify acoustic data | | We are developing a neural identification network for European calls. We are also making good progress on automatically locating and extracting calls from long recordings. |
| Activity (2.2, Years 1 and 2, Months 1-24) Development of new detector | | We have the first version of the iPhone application ready for testing over summer 2010 and we hope to integrate the data collection method with the new web portal at the end of 2010. |
| **Output 5.**<br>Knowledge of how change in human development and climate | Statistical analysis of spatial distributions and abundances with habitat and environmental | We are making good progress towards analysing and writing up these results for publication. |

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| impacts bat biodiversity | conditions<br>Analysis of predicted impacts on bat populations with change in human impacts and climate | |

# Annex 2 Project's full current logframe

| Project summary | Measurable Indicators | Means of verification | Important Assumptions |
|---|---|---|---|
| Goal:<br>Effective contribution in support of the implementation of the objectives of the Convention on Biological Diversity (CBD), the Convention on Trade in Endangered Species (CITES), and the Convention on the Conservation of Migratory Species (CMS), as well as related targets set by countries rich in biodiversity but constrained in resources. | | | |
| Sub-Goal: Biodiversity across five countries in Eurasia is monitored sustainably and effectively, providing information on how to minimise the impacts of global change on ecosystems and ecosystem services. | Biodiversity population data collected yearly by a national network to provide statistically robust population trends over time and beyond the lifetime of the project. | Analysis of data collected by the project. | |
| Purpose<br>To generate long-term population data on biodiversity indicators to assess the impact of global change by maintaining and enhancing bat biodiversity programmes in two Eastern European countries and extending the programme to three other countries | Continued online database of abundances and distribution of bats in Romania and Bulgaria and new data for bats in Hungary, Ukraine and Western Russia.<br>Maintenance or establishment of monitoring personnel in each country<br>Development of new techniques | Data available from the data portal and continuing annual entry from host countries<br>New techniques incorporated into the analysis, production of a new detector and web site functionality improved<br>Results of the analyses published in peer reviewed journals | Host countries can recruit and maintain a sufficient volunteer network<br>New techniques and equipment are successfully developed.<br>Host countries willing to share data |

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|---|---|---|---|
| | in analysis of acoustic data, improvements to the web data portal and the production of new detector equipment<br>Production of papers on bat distribution and habitat use to determine effect of future global change on bat populations | | |
| Outputs (add or delete rows as necessary)<br>1. Ongoing statistically defensible monitoring programme for Romania and Bulgaria | Maintenance of the volunteer network and 60 transects completed per year per country | Data available from the data portal and continuing annual entry from host countries | Romania and Bulgaria can recruit and maintain a sufficient volunteer network |
| 2. Development of statistically defensible monitoring programme for Hungary, Ukraine and Russia | Key personnel and 10 volunteers trained in survey methods per country<br>Further workshops run by host countries<br>Training material produced | Contact details of volunteers and workshops recorded<br>Training material available for download from the website | Ability of host countries to recruit volunteers (risk reduced as Hungary has already recruited some volunteers) |
| 3. Ongoing improved online international spatial and temporal database on bat species abundances and distributions | Survey data collected from 60 transects from Romania and Bulgaria and 20 transects collected from each additional country in Yr1 and 30 in Yr 2<br>Functionality and appearance of the online database improved | Verification of the quality and quantity of survey data. GPS log can be used to verify position of the recordings. | Survey data is collected correctly<br>Website can be accessed by host countries |
| 4. Improved analysis techniques to automatically detect and identify bat calls from transect data and improved equipment | Analysis of sonograms no longer a bottleneck to the analysis.<br>Production of a new bespoke detector | Algorithms incorporated into analysis<br>Designs for new detector produced and new detectors made and incorporated into the | Algorithms do not work.<br>Detector is not produced. |

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| | | monitoring programme | |
| 5. Knowledge of how change in human development and climate impacts bat biodiversity | Statistical analysis of spatial distributions and abundances with habitat and environmental conditions<br>Analysis of predicted impacts on bat populations with change in human impacts and climate | Production of peer-reviewed papers | Sufficient data is collected for analysis |

# Annex 3 Onwards – supplementary material (optional but encouraged as evidence of project achievement)

This may include outputs of the project, but need not necessarily include all project documentation. For example, the abstract of a conference would be adequate, as would be a summary of a thesis rather than the full document. If we feel that reviewing the full document would be useful, we will contact you again to ask for it to be submitted.

Talks: iBats Intro - http://dl.dropbox.com/u/3038285/iBats_Intro_0510.ppt

Talks: iBats Project Updates - http://dl.dropbox.com/u/3038285/Day1_iBats_ProjectUpdates_0510.ppt

Talks: Bats and Sounds Talk - http://dl.dropbox.com/u/3038285/bats%20and%20sound1.ppt

Monitoring Protocol: iBatsUK protocol 2009-GARMIN vista hcx or legend hcxandZOOMH2 - http://dl.dropbox.com/u/3038285/iBatsUK%20protocol%202009-GARMIN%20vista%20hcx%20or%20legend%20hcxandZOOMH2.doc

Sonogram Analysis Protocol: iBats Sonogram Analysis Protocol 2009 - http://dl.dropbox.com/u/3038285/iBats%20Sonogram%20Analysis%20Protocol%202009.doc

iBats Website: http://www.ibats.org.uk

Photos can be found at http://www.flickr.com/photos/ibatsprogram/

## *Checklist for submission*

| | Check |
|---|---|
| **Is the report less than 5MB?** If so, please email to Darwin-Projects@ltsi.co.uk putting the project number in the Subject line. | y |
| **Is your report more than 5MB?** If so, please advise Darwin-Projects@ltsi.co.uk that the report will be send by post on CD, putting the project number in the Subject line. | y |
| **Have you included means of verification?** You need not submit every project document, but the main outputs and a selection of the others would strengthen the report. | y |
| **Do you have hard copies of material you want to submit with the report?** If so, please make this clear in the covering email and ensure all material is marked with the project number. | y |
| Have you involved your partners in preparation of the report and named the main contributors | y |
| Have you completed the Project Expenditure table fully? | y |
| Do not include claim forms or other communications with this report. | |