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Progress report of the IWG on Monitoring and Indicators

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Introduction

The four year action plan for this IWG is:

- To update the list of countries needing capacity to establish monitoring
- To establish capacity programmes
- To update the list of countries /NGOs already monitoring and willing to contribute to pan-European trends
- To organize at least one workshop for those countries/NGOs that are currently monitoring to agree technical aspects of data combination and train in using TRIM.
- To build a data sharing and analysis database for ongoing management, sharing and analysis of monitoring data.

At AC16, the IWG proposed to separate work into three parallel projects, as and when funding could be obtained for each work area:

1. *Development of a prototype pan European bat population indicator based on existing data.* The plan for this was to host a workshop aimed at those running

hibernacula counts to agree approaches to combining data. Contributors to the index would use the statistical package TRIM to produce national trends, which would then be combined by a central statistical team to create pan European trends. It was expected that the first contributors to the index would be mainly those groups who already used TRIM, but that the workshop would also include training in TRIM to make wider participation possible.

2. *Build capacity for monitoring in countries which do not currently have national monitoring schemes.*
3. *Develop a data sharing structure for census data*, with statistical tools to calculate pan-European and regional trends, managed by BatLife Europe for ongoing data sharing, as laid out in the feasibility plan written for EUROBATS, agreed by AC14.

Progress since AC16

Significant progress was made in late 2011, on (1) to develop a prototype pan European population indicator and on information gathering to update the list of countries needing capacity to establish monitoring. This was achieved because of funding provided by European Environmental Agency (EEA). EEA commissioned a partnership led by BCT to undertake work that would help increase the coverage of species groups in SEBI indicator 01 'Trends in abundance and distribution of selected species' (http://biodiversity-chm.eea.europa.eu/information/indicator/F1090245995). Specifically we were invited to develop a European biodiversity indicator using bat population data, implementing the methods specified in a previous report that BCT undertook for EEA in 2008.

For completion of this latest contract, BCT formed a partnership with the Dutch Mammal Society and with Statistics Netherlands, the organization that had previously developed the statistics for combining bird and butterfly trends from different countries to create European indicators. With the help of the EUROBATS IWG on Bat Monitoring and Indicators and BatLife Europe partners, the project gathered new information on European bat monitoring efforts and brought together ten monitoring schemes from nine countries to share data. The countries in the first version of the indicator are UK, Netherlands, Latvia, Hungary, Germany (Bavaria, Thuringia), Austria, Slovenia, Slovakia and Portugal. Representatives from seven of the countries came to a two day workshop at the Dutch Mammal Society's offices in Nijmegen to be trained in the statistical

techniques and contribute to the development of the indicator. For some countries, this training enabled national population trends to be produced for the first time. Several participants were unable to travel to the workshop and generously agreed to undertake the data analyses remotely, supported by the project team.

The contributing hibernation surveillance schemes covered 6000 sites, 6 bio-geographic regions, 27 species and time series ranging from 6 to 26 years. The resulting prototype index covered the period 1993-2011 and was able to report trends at Europe scale for 16 species. Trends for species reported only from one country were not reported, and certain species combinations had to be grouped. Overall the 16 species in the prototype hibernating bat indicator were found to have increased by 43% between 1993 and 2011, with nine species showing significant increases and one a decrease.

As well as producing a prototype indicator, the project also updated summary data on national monitoring programmes and country capacity building needs through a questionnaire and correspondence. We thank all those in the IWG and EUROBATS network who responded to our request for information or helped us make contact with appropriate experts. It also reviewed recent peer reviewed publications covering bat monitoring and the development of indicators.

EEA plan to publish our work in their technical report series and we hope this prototype indicator will be adopted and expanded to incorporate more countries and species swiftly. The availability of a European indicator and European species trends provides context for interpretation of national trends and raises the profile of bats internationally. An executive summary of the report to EEA is provided in the appendix and copies of the full report are available from khaysom@bats.org.uk . The EEA publication process may generate comments on the current version of the report, which should therefore be regarded as a draft until full publication. Comments from EUROBATS technical experts may therefore be considered as part of the publication process and are welcome, either to improve the published version of the report, or to improve later revisions of the index.

Future direction

The timeframe for completion of the indicator including running the workshop, training participants in data analysis, constructing a multi-species, multi-country indicator and writing the report was extremely short (approximately 10 weeks). The most serious

constraint posed by this timeframe, was that the number of participating countries is currently relatively small. We had to adopt a very pragmatic approach to the recruitment of national schemes into the project, and accept that this initial demonstration would not incorporate several key collaborators and datasets. Many of the participating schemes already used TRIM to analyse national trends, and all were available to participate in the project at very short-notice, and were willing to analyse data within the short time-frames.

Although the number of nations participating is comparable with early stages in the development of the bird and butterfly indicators, we recognize that the indicator would become more robust if expanded to incorporate more countries and species. It is therefore our ambition to obtain funding to expand the indicator to cover at least fifteen countries at the earliest opportunity. This would have the effect of enabling more species to be represented and potentially to extend the length of the time series covered. It is also an ambition to extend the scope of the indicator to incorporate other forms of surveillance data.

Promotion of the indicator to ensure its rapid adoption as one of the measures of performance of the European biodiversity strategy is very important at this stage. Through promotion of the indicator it also becomes possible to highlight the network of surveillance schemes and current gaps, where capacity building assistance is required.

Work at AC17

At AC17 we will be presenting the prototype indicator and initiating discussions to identify:

- Feedback on the work undertaken on the pan-European indicator and options for future refinement.
- National monitoring schemes that should be incorporated into the next revision of the indicator.
- Frameworks for raising the profile of the indicator.
- Potential funding sources for extending the indicator.
- Potential funding sources for capacity building.
- Potential funding sources for the development of a data sharing structure for census data.

Figure 1. Participants at a workshop to develop a prototype European indicator of population trends in hibernating bats, 12th-13th October 2011, Nijmegen, Netherlands. Left to right Viesturs Vintulis, Tom van der Meij, Eric Jansen, Aniko Kurali, Jasja Dekker, Julia Prüeger , Wigbert Schorcht, Jon Russ, Guido Reiter, Karen Haysom, Angelica Meschede, Primož Presetnik.

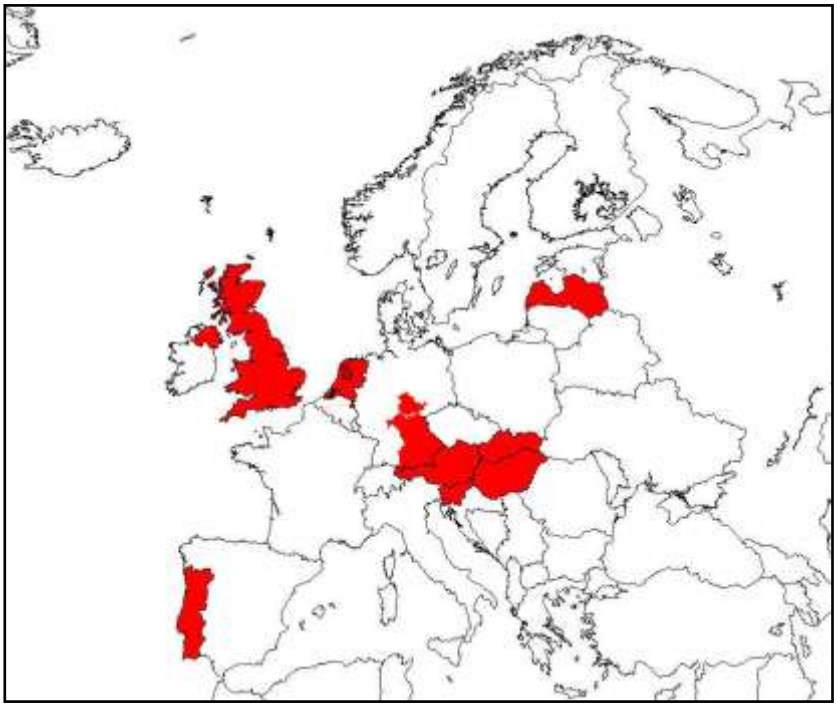

Figure 2. Map of Europe showing the countries/states participating in the prototype indicator.

Figure 6. The prototype European hibernating bat indicator

Appendix 1.

Bat Conservation Trust

Support for a project on 'Streamlining European Biodiversity Indicators (SEBI)': Development of a prototype indicator of European bat population trends

Negotiated procedure EEA/NSV/11/005

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ZOOGDIER VERENIGING

BatLife Europe

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1. EXECUTIVE SUMMARY

- This project set out to support the Streamlining European Biodiversity Indicators (SEBI) process by developing a prototype indicator of European bat population trends.

- This project builds on an earlier project EEA/BSS/07/08 which proposed a methodology for the construction of an indicator of bat population trends, by adapting and testing a statistical approach previously developed for birds and butterflies.

- The tasks comprised: a literature review and correspondence with surveillance contacts across Europe to identify new information on bat surveillance and the use of bats as indicators since 2008; establishing a collaboration between 6-8 countries engaged in bat population surveillance; collating the data from national surveillance programmes; constructing and testing a prototype indicator; reporting on the method, results, areas of uncertainty; and a brief assessment of the status of bat populations in Europe based on the indicator.

- The literature review was conducted using Web of Science and selected key words, and scanning specialist bat journals. Contacts from the EUROBATS and Batlife Europe network were sent questionnaires and invited to update the information that was gathered in 2008.

- Ten surveillance coordination points in 9 countries were identified as having suitable data from work undertaken during EEA/BSS/07/08, personal contact and literature review. Representatives were invited to contribute data from hibernation surveillance schemes to the indicator and participate in indicator construction.

- The data contributing countries were UK, Netherlands, Bavaria and Thuringia (Germany), Austria, Hungary, Slovenia, Slovakia, Portugal and Latvia. The contributing hibernation surveillance schemes cover 6000 sites, 6 bio-geographic regions, 27 species and time series ranging from 6 to 26 years.

- A workshop hosted by the Dutch Mammal Society was held on 12th-13th October 2011 in Nijmegen, the Netherlands. The workshop gave data contributors from 7 countries the opportunity to review national surveillance techniques and data, the project plan and methods, influence end outputs and receive training in the statistical program TRIM.

- The procedure for calculating the prototype indicator was based on that developed previously for birds and butterflies using the statistical program TRIM (see Gregory *et al*., 1995). Each data contributor calculated individual national species trends using a generalized linear model with Poisson error term and a log-link function using the program TRIM and its shell program Birdstats. National trends were combined into regional trends, which were further combined into European species trends and indices. Finally the European species trends were combined to form a composite prototype European hibernating bat indicator.

- Challenges to indicator construction for bats include how to deal with cryptic species (sibling species that, where they occur, together cannot be distinguished reliably in the field) and how

to weight the contribution of individual countries in the absence of accurate population estimates. Proportion of the European species range within each country was used as a proxy for population size.

- The resulting prototype hibernating bat indicator covered the period 1993-2011 and incorporated data on 16 species from 10 schemes spread over 9 countries.

- The best represented area of Europe was central mainland Europe with several contiguous countries termed “continental” for the purpose of the indicator and including continental, alpine and pannonian biogeographic regions. The Mediterranean and Boreal regions were each represented by a single country. This allowed calculation of an overall European indicator, a continental indicator, and individual European trends for 16 species.

- Overall, the species included in the indicator appear to have increased by 43% at hibernation sites between 1993-201, with a relatively stable trend since 2003. Nine of the species studied show a positive European trend, one species *Plecotus austriacus* shows a significant decline, and for two species *Myotis bechsteinii* and *Eptesicus nilssonii* no trend could be determined.

- Due to the preliminary nature of this prototype indicator, the early conclusion that bats have increased at hibernation sites should be interpreted with caution until the indicator can be expanded to cover a more representative range of European countries and species, and elements of the methodology to do with how sibling species are amalgamated be further refined.

- Since combining species trends for an indicator has the potential to mask contrasting trends at the species, or country level, national surveillance schemes should work towards wide publication of species trends in order that such disparities are known. This is likely to benefit both the understanding and interpretation of the indicator and support the prioritisation of conservation action.

- Bat populations are generally understood to have undergone significant declines throughout Europe, particularly during the second half of the twentieth century, with declines attributed to agricultural intensification, deliberate persecution, killing and destruction of roosts, habitat loss, fragmentation and degradation and the impact of persistent timber treatment toxic chemicals such as dieldrin in roofs.

- The apparent population increase of some species in the indicator may reflect the impact of national and European conservation legislation, species and site protection, targeted conservation measures and widespread awareness raising to the public and professional sectors that has been implemented through Europe, particularly under the EUROBATS agreement

- Even if the increase is proven to be robust, bats should still be considered vulnerable, due to a low intrinsic rate of population increase and the potential impact of emerging threats to populations such as wind turbines on migratory species. For example, in the US the disease

white nose syndrome has resulted in steep declines and widespread mortality in previously well-established populations.

- Work should now focus on further extending the indicator to improve its ability to represent a broader range of biogeographic regions, species and countries. For example, the Mediterranean and Boreal regions are represented by each by a single country, meaning trends of species characteristic of these regions cannot currently be displayed at European scale. Methodological development should focus on refining the treatment of sibling species and weighting.

- Since hibernation surveillance data only capture a portion of species, work should also focus on developing parallel measures reflecting bat populations at other stages of the lifecycle, for example at maternity roosts. This would both verify the trends found for species in the existing prototype, and extend the overall number of species covered.

- Further refinements include the options of separating trends for species given special conservation action, and groups of species associated with particular issues and policies, to enhance the policy relevance of the indicator. For example, species combinations relevant to the Water Framework Directive, forestry policy, climate change, sustainable development etc.

- Based on our knowledge of surveillance schemes in operation we believe it would be possible to expand the indicator to include at least 15 countries within one year and over twenty countries within three years. The mechanism for achieving this should be targeted international workshops to train in the methodology. Bat Life Europe, the new European NGO for bat habitat conservation, would be the ideal hub for coordination of an indicator, given appropriate resourcing, and the target should be for it to take on this role within three years.

- The current project has built the capacity of several countries to analyse data and produce species trends using TRIM. It has also provided a much needed point of information exchange between the coordinators of national schemes which has not formally existed. This draws attention to the need for support for networks of surveillance programmes, to encourage harmonised reporting and improve the overall effectiveness of conservation action.

- The project also draws attention to the absence of comprehensive monitoring schemes in many European countries, and the particular need for capacity building programmes in areas of eastern and southern Europe.

- Methods to promote and establish the indicator throughout Europe should include presentation to the next Advisory Committee meeting of EUROBATS, presentations to the European and International Bat Research Symposia, profiling to DG Environment and publication of popular and peer reviewed papers, including articles targeted at the volunteer surveyor network.