

**M** TRACKING  
**Mammals**  
PARTNERSHIP

**Tracking Mammals Partnership Guidelines on  
Best Practice in Surveillance and Monitoring**

Tracking Mammals Partnership Guidelines on Best Practice in Surveillance and Monitoring .....	1
Introduction.....	3
TMP best practice guidelines .....	4
1. Geographical Coverage and Stratification .....	4
2. Survey Duration and Frequency .....	5
3. Survey Methods .....	5
4. Survey Assessment and Management.....	6
5. Data Management .....	6
6. Research projects .....	7
Example – The National Bat Monitoring Programme .....	7
References.....	8

## ***Introduction***

The main aim of the Tracking Mammals Partnership (TMP) is to provide a cohesive framework within which to develop a coordinated approach to mammal surveillance in the UK, and raise awareness generally of the importance of surveillance and monitoring in highlighting the status of species, and those in need of management.

Within that framework the TMP aims to assess, where possible, the distribution, abundance and population trends of all mammal species resident in the UK, using standardised survey designs to collect data to agreed data standards. The information collected should be sufficiently robust and at an appropriate scale to link with other surveillance and monitoring schemes, to assess possible causal factors of changes in mammal distribution and abundance. Likewise, the data provided through the TMP may assist in assessments of causal factors for changes in distribution and abundance of other taxa.

Implicit in the aims and objectives is the desire of the TMP to inform and influence the decisions of government and the devolved administrations on conservation policy in the UK, for mammals, but also more widely. To achieve this, the collection of data and the analyses and presentation of results must be of a high quality, with information available on the biases in data collection and other factors that might affect the results.

The TMP has recognised that an important part of co-ordinating a UK wide surveillance and monitoring programme for mammals involves standardising, where possible, the methods used and data collection and management, and has developed a set of best practice guidelines for designing surveillance schemes that are outlined below. It is hoped that, in the fullness of time, the standards will be applied to all surveillance and monitoring schemes for mammals at national, regional and local scales.

Schemes that become part of the TMP Surveillance and Monitoring Programme will need to:

- Comply with minimum standards set by the TMP
- Be designed to fit the purposes of the TMP
- Be designed to allow cross comparison with other schemes within the TMP
- Ensure that data are collected with known precision
- Ensure that it is possible to check for different sources of error in data collection
- Ensure that raw and analysed data are archived and stored in such a way that they are accessible at agreed levels

## ***TMP best practice guidelines***

### **1. Geographical Coverage and Stratification**

**Geographical coverage.** The TMP surveillance and monitoring programme aims to detect changes in population size and extent over time. Generally, it is better to cover as wide an area as possible, preferably collecting data across the whole of the UK. However, the distribution of some species is restricted to particular countries (*e.g.* fat dormouse found only in England at present), some species are very rare (*e.g.* Bechstein's bat), while others have disjunct distributions (*e.g.* red squirrel, pine marten). For such species, targeted surveys at country or more local levels would be appropriate.

**Geographical stratification.** The collection of data at the UK level is designed to provide UK population trends. However, it is also desirable to provide information at regional levels and to be able to compare regional trends if possible. Regional divisions should, therefore, be standardised across surveys, but there should also be realistic expectations about the scale of regional information that it is possible to obtain from a UK scale surveillance scheme.

The TMP has agreed to provide trends for as many species as possible at country scale (England, Northern Ireland, Scotland and Wales), and for England at the scale of Government Office Regions (GORs), which are now the primary classification for the presentation of regional statistics.

Environmental Zones are an alternative, and more biologically meaningful, regional division that the TMP has also agreed to use. These cover the range of environmental conditions that are found in the UK, from the lowlands of the south and east, through to the uplands and mountains of the north and west and are based on combinations of the underlying sampling units, or land classes, used for Countryside Survey 2000 (CS2000) (Haines-Young *et al.*, 2000). The series of Countryside Surveys have been based upon the approach of taking a stratified sample of 1 km squares so that different types of countryside (derived from an extensive suite of physical attributes for each 1 km square in Britain to generate the classification) are represented proportionally within the survey. Use of Environmental Zones enables representative samples to be taken and increases the predictive power of the results obtained.

The TMP recognises that some surveys designed and carried out at regional and local scales by a variety of organisations are of a very high quality and could provide very valuable data to inform the results of UK surveillance and monitoring schemes. The TMP, therefore, also intends to collect and collate information on local and regional mammal surveys and consider how these data could contribute to the distribution and abundance of mammals, including the possibility of incorporating local surveys within national schemes.

## 2. Survey Duration and Frequency

**Survey Duration.** Surveillance schemes should run on a long-term basis i.e. for decades once the pilot phase is completed. Where methods develop such that newer ones would offer significantly higher return, several years of cross-calibration would be needed.

**Survey frequency.** Surveillance schemes should collect data at frequent and regular intervals. For the majority of purposes data should be collected annually, because population trends (up or down) will be detected more quickly and with greater certainty. Furthermore, volunteer networks collecting the data are more likely to be maintained if operated annually. However, for some species less frequent surveillance may be effective.

National surveys that are carried out once or at infrequent intervals are valuable for informing the future work of the TMP, as well as for the specific information they were set up to provide. Information on such surveys, including results and reports should be made available on the TMP website. However, they cannot be considered a core part of the TMP surveillance work.

## 3. Survey Methods

**Sampling design.** Surveillance schemes should provide data on changes in mammal distribution and abundance over time, rather than attempt the more difficult, and often impossible task, of assessing total population size at any point in time. Indirect methods should be used to provide indices of relative abundance and population change in place of direct counts.

Preferably, a random sampling method should be used, and if some form of stratification is adopted then it should be based on regional or Land Class divisions. However, systematic sampling may be acceptable under some circumstances.

**Trend measurements.** The TMP has agreed to adopt the Amber (25% over 25 years) and Red Alert (50% over 25 years) levels, used for UK Birds as significant levels of decline (Gregory *et al.*, 2002). Surveys should aim to detect at least Red Alert declines, but preferably Amber as well. Conversely, surveys should be able to detect the same levels of population increase, which is particularly important for producing effective management policies for problem species.

**Species coverage.** Schemes should provide information on as many species as possible and this particularly applies to the common, widespread and more visible species. However, some species require specific surveys because of the degree of difficulty in obtaining surveillance data for them.

**Survey power.** The power of a surveillance scheme is the ability of the scheme to correctly identify an ongoing population trend and is expressed as the percentage chance that a particular design will detect a trend of the specified magnitude. Power is influenced by many factors, including the size of the population trend, between year population variation, the number of years of data, frequency of surveillance, the number of sites surveyed, proportion of samples with the species present and sampling error.

The power of surveillance schemes should be analysed in the pilot phase to assess the level of information and degree of certainty that a scheme can deliver. Sample sizes and, therefore, the level of certainty of the results will vary for different species in the same surveillance scheme (because of differences in detectability). However, it will be important to know the power of a scheme to deliver the results at any point in time.

The power of a scheme will be increased if the design includes repeating data collection at sample sites, and this should be a priority.

#### **4. Survey Assessment and Management**

**Survey assessment.** Surveillance and monitoring schemes should follow a two stage process: (i) the pilot phase, where surveillance and monitoring methods are being tested and developed and which include features such as testing for survey bias, assessing survey power etc; and (ii) established schemes that have completed the pilot phase and been accepted as part of the programme. Progression of a pilot scheme to stage ii will depend upon the results obtained during stage (i) and some schemes may not be continued beyond the pilot phase.

**Survey management.** Schemes should be actively managed to incorporate assessment of species coverage, regional differences in sample sizes and other factors that could bias results.

There should be the probability and aspiration on the part of participants that surveys will move from surveillance to monitoring (see TMP ToR for definitions of these terms).

#### **5. Data Management**

**Data collection and quality.** It is anticipated that the majority of schemes will involve engaging volunteers to collect data and it is important to have some way of verifying the data they provide. As a minimum, the information collected should include: species (sightings or signs), spatial reference (*e.g.* grid reference at 1 km<sup>2</sup> level or more detailed if possible), date, a measure of survey effort and the recorder's name. It is also important that schemes include some form of training and feedback of results to volunteers, as well as consideration of health and safety issues.

**Measuring data collection effort.** A measure of the effort involved in data collection should be incorporated. This will either require standardising the effort used in terms of time taken, distance travelled etc. or incorporating a means of assessing the effects

of different levels of effort on data collection. Standardising effort means that the results of surveys can be compared across years.

**Data storage.** Data should be stored in a format that is accessible and can be maintained in perpetuity and made available to as wide an audience as possible. This will usually involve electronic data storage and access that comply with the principles of the National Biodiversity Network.

Organisers of surveillance and monitoring schemes should have long-term (i.e. over decades) organisational, financial, data archiving and data supply structures in place, as far as practically possible. In particular procedures should exist to safeguard the forgoing irrespective of changes in personnel.

**Recording data.** Thousands of mammal records have been collected on an ad hoc basis over a number of years, providing valuable distribution information for the majority of mammal species. The TMP will maintain liaison with organisations holding recording data to assess how these data could augment the information collected through the TMP surveillance and monitoring programme.

## **6. Research projects**

Research projects are an integral part of the TMP surveillance and monitoring programme. Surveys in the pilot phase can be considered research projects, because methods are being tested. Many established schemes have ongoing elements of research as existing survey and statistical analysis methods are constantly refined, or new methods trialled. Research is also required on factors affecting the accuracy and validity of data, such as the validation and calibration of data collected by volunteers, or on design of new survey methods for the more difficult species. Such research elements are considered to be part of the TMP Research Programme.

The decision to include surveillance and monitoring schemes and research projects within the TMP will be taken by the partners, jointly via the TMP Steering Group.

*Tracking Mammals Partnership Steering Group, March 2004.*

### ***Example – The National Bat Monitoring Programme***

The National Bat Monitoring Programme was launched in 1996, as a pilot monitoring programme to assess population trends and distribution of a number of target bat species.

Run by the Bat Conservation Trust with core funding initially from Defra (then DETR) and subsequently from JNCC, the NBMP now carries out surveillance of 11 bat species using 3 main monitoring strategies: field surveys; hibernation surveys; and colony surveys. Colony and hibernation sites are not randomly selected because they are carried out at known sites. However, field surveys involve walking transects across randomly selected 1km squares, or within riparian habitat using bat detectors to identify and assess abundance of bat species.

The schemes involve stratification by country, region and Environmental Zone and have been assessed for their ability to deliver population trend information at different stratification and alert levels. For example, the NBMP data have been analysed to provide estimated minimum sample sizes to detect Red and Amber alert decline rates in the UK over 10 and 20 years of monitoring. Results show that for the common pipistrelle *Pipistrellus pipistrellus* a sample of 20 1km squares is required, repeatedly surveyed annually over 20 years, to detect an annual decline of 2.73% with 90% power. If the sample size increases to 75 1km squares, then the same rate of decline could be detected in 10 years.

The programme is being actively managed to promote repeat survey of sites as a priority. Regional differences in volunteer participation are regularly assessed, with training workshops run throughout the year and targeted at areas of low involvement. The programme is also under constant development to improve existing survey coverage and to introduce new surveys to give wider species coverage.

The data collected as part of the programme have been used to inform research projects. For example, an analysis of the Daubenton's bat project and Environment Agency's River Habitat Survey was undertaken to identify waterway features that influence Daubenton's activity (Catto *et al.*, 2003).

A new project, 'Sunrise Survey', was piloted in 2002. The pilot was successful in that 75 volunteers took part and two bat roosts were found. A website dedicated to this survey was developed and has proved a useful method of recruiting new volunteers.

## **References**

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