



## **The UK Terrestrial Biodiversity Surveillance Strategy**

### **A Proposal for Terrestrial Biodiversity Surveillance and Monitoring Strategy**

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# A PROPOSAL FOR A TERRESTRIAL BIODIVERSITY SURVEILLANCE AND MONITORING STRATEGY

## 1. Purpose

- 1.1 The purpose of the strategy is to aid decisions by agencies, departments, specialist societies and NGOs and research bodies on the direction and coverage of the terrestrial and freshwater biodiversity<sup>1</sup> surveillance and monitoring that they support or undertake, in order to provide balanced support for the country and UK biodiversity strategies.
- 1.2 The strategy sets out a framework of surveillance to deliver the requirements of three surveillance objectives. This framework can then be used to assess the coverage of current surveillance, and to identify gaps and overlaps. There are already known to be persistent gaps in the information that current surveillance can provide, and there is an increasing need for evidence to support policy. The strategy provides a mechanism that will allow the gaps and overlaps in coverage to be addressed by an efficient adjustment to existing schemes, or, if there is no alternative, it can identify the additional surveillance which is required.
- 1.3 Currently, around 70 separate surveillance and monitoring schemes include biodiversity, and running the schemes involves around 30 bodies making an annual equivalent spend of approx £7 million, with the value of volunteer effort at least three times this figure. This is probably around 2% of the total biodiversity conservation budget overall<sup>2</sup>. Many of these schemes have been planned in isolation from one another, and the data generated may only be used within single reporting requirements.
- 1.4 The strategy provides a framework for integrating the many separate requirements for biodiversity surveillance, compares this with the schemes in place, and with what can be achieved through realistic levels of adjustment, partnership and innovation. This process can provide the long term co-ordination needed to influence surveillance activities, as many of these cannot change quickly, and new requirements will need to be assessed. Work to develop the strategy has already identified some short term priorities for action to improve coverage.
- 1.5 The strategy aims to create a flexible and fit for purpose surveillance and monitoring framework by a process of evolution and development of existing schemes to meet the needs of:
  - country and UK biodiversity strategies and their indicators;
  - maintaining ecosystem services;
  - SSSI condition;

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<sup>1</sup> The strategy for marine biodiversity surveillance and monitoring is being developed as part of the UK Marine Monitoring and Assessment Process.

<sup>2</sup> Total annual spend on biodiversity by government and NGOs estimated at £400 million in 2005/6 – see <http://www.defra.gov.uk/environment/statistics/supp/spkf20.htm>

- agri-environment biodiversity objectives;
- Habitats and Birds Directives;
- Biodiversity, Ramsar and other Conventions;
- Non-native species policy and implementation;
- climate change impact on biodiversity and adaptation;
- mitigating pollutant impacts on biodiversity; and
- Biodiversity Action Plan priority species and habitats.

1.6 Complementary and supporting work on data access and reporting will be essential. The value of datasets will be enhanced by efficient mechanisms for sharing and integrating the data.

## 2. Surveillance Framework Objectives

2.1 The framework for surveillance has three overarching and hierarchical objectives. The first objective establishes the broad framework of surveillance schemes needed to monitor the general state of, and trends in, biodiversity and to track progress in the delivery of the country and UK biodiversity strategies. The second objective requires surveillance of any additional elements needed to detect and track the relative impact of pressures on biodiversity. The third objective requires surveillance of any additional elements, not already catered for, needed to meet reporting requirements.

2.2 Extensive work and consultation with key bodies has been undertaken to identify existing surveillance schemes, and analyse coverage in relation to these objectives. The results are summarised below for each objective. Coverage (including schemes), gaps, and recommendations are stated when they are first identified, even if they are relevant to more than one objective.

2.3 **Objective 1: to measure stock, status and trends of a framework of habitats, species, and their ecosystem functions, sufficient to inform the delivery of the outcomes required by UK and country biodiversity strategies.**

### *Current coverage*

Coverage is partial for habitats and moderate for species, and provides support for current country/UK indicators. Important schemes delivering relevant information for objective 1 include:

- Countryside Survey including Land Cover Mapping
- Common Standards Monitoring, Agri-environment Monitoring
- Stratified surveys of habitats (currently only a few, and England only)
- Breeding Bird Survey, Wetland Birds Survey
- Wetland Birds Survey
- Butterfly Monitoring Scheme and moth schemes
- Mammals including bats within Tracking Mammals Partnership schemes
- Recording schemes and Atlases, including Biological Records Centre support to schemes.

### *Gaps*

The main gaps are:

- proven methods for repeated measurement of habitats at the landscape scale (*e.g.* area, patch-size, pattern, conversion rates)
- repeated representative surveillance within each habitat type and validated rapid assessment methods for condition more widely
- sensitive (in time) surveillance of a more balanced set of species<sup>3</sup>
- improving the ability of survey schemes to provide country and regional-level information
- coverage of species within uplands and possibly also freshwaters.

### *Overlaps*

The main overlaps are that surveillance of local site, agri-environment and SSSI condition all visit a proportion of habitats but do not, collectively, provide a representative picture of change across all habitats at country/national scales.

### *Recommendations*

- i. improve data collation and access to data for site surveillance schemes; confirm that overlaps are minimised and ensure that they collectively provide representative coverage of habitat quality and change;
- ii. exploit advances in processing aerial and satellite remote sensing data to create methods that can measure change in area, distribution and pattern of semi-natural habitat;
- iii. improve coverage of existing species schemes to provide country-level and upland information;
- iv. investigate the potential for a more balanced set of species recording schemes to provide regular repeat surveillance; species groups for which it may be possible to improve coverage include moths and plants.

## 2.4 **Objective 2: to detect the impacts of pressures affecting biodiversity by interpreting objective 1 trends using Environmental Observation Framework<sup>4</sup> data, or if necessary, by supplementing schemes.**

### *Current coverage*

The main pressures affecting biodiversity are, habitat transformation, over-exploitation, the impacts of non-native species, climate change, and pollution. Coverage is good for some pressures, *e.g.* exploitation, but partial for most. The main schemes in addition to those identified in Objective 1 are:

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<sup>3</sup> Balance in terms of species depending on different scales of feature in the landscape, representing different functions and representing public value/interest in biodiversity.

<sup>4</sup> The Environmental Research Funders Forum is co-ordinating all environmental surveillance and monitoring within an 'Environmental Observation Framework'

- Environmental Change Network
- Goose and Swan monitoring

### *Gaps*

The main gaps, in addition to those for objective 1, are:

- a good knowledge of the functional roles performed by the species in existing surveillance schemes;
- a good understanding of the policy questions and the levels of confidence needed in evidence to answer them;
- cross-cutting analysis drawing on data from many schemes, together with better access to Environmental Observation Framework data;
- access to biodiversity data across Europe and low levels of surveillance in many countries<sup>5</sup>;
- early detection and alert systems for invasive non-native species across all schemes and identification of likely pathways;
- regular assessment of population trends of exploited plants, and fungi;
- risk-based methods triggering assessment of eco-toxological chemical impact on biodiversity and strategic support to tissue collection schemes.

### *Overlaps*

The main overlaps are:

- duplication between one-off research, long term measurement against a range of variables, and analysis comparing biodiversity and other schemes to determine likely causes of change.
- Analyses undertaken many times by different research teams/agencies, for specific purposes, with the data and results not sufficiently shared.

### *Recommendations*

- i. collate research to identify the ecosystem functions measured by existing species surveillance, and to identify the species which can address the main gaps most cost-effectively surveillance;
- ii. make best use of existing surveillance and research results to answer policy questions through cross-cutting analysis projects e.g. BICCONET<sup>6</sup>;
- iii. use these projects to identify the priorities for adjusting surveillance, and the best balance and linkage of this work with other research ;

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<sup>5</sup> Data across Europe can help with understanding climate impacts, pollution impacts, and invasive non native risk

<sup>6</sup> Proposed DEFRA project to provide synthesis of climate impacts and adaptation across schemes and related research.

- iv. continue with improved support to schemes to detect and report non-native species data through NBN;
- v. engage proactively in efforts to improve the accessibility of biodiversity data across Europe using initiatives such as GBIF, and promote comparable surveillance without increasing the reporting burden through GMES, voluntary networks, EEA.

**2.5 Objective 3: To provide the information needed to report on the status of species and habitats covered by legislation and policy, by supplementing the framework of objective 1 and 2 schemes where it does not already include them.**

*Current coverage*

Coverage is good for the Birds Directive, moderate for species and poor for habitats covered by the Habitats Directive, and poor for habitats and some species groups included in the Biodiversity Action Plan, (see Appendix 1). The main schemes not already identified in objectives 1 and 2 include:

- many single habitat and species surveillance schemes, e.g. for mammals (e.g. Dormouse), invertebrates (e.g. greater stag beetle, noble chafer), [Birds (BTO studies)]
- mechanisms that group separate targeted species surveys (e.g. Plantlife's Back from the Brink scheme); SCARABBS
- mechanisms that target volunteer effort across several species e.g. Scottish Raptor Group, Rare Breeding Birds Panel. Habitat inventory work underway by Scottish Natural Heritage and Natural England.

*Gaps*

The main gaps in addition to those identified for objectives 1 and 2 are:

- the frequency of surveillance for plants, lichen, bryophyte fungi and invertebrate species;
- targeted periodic surveys for a relatively small proportion of other species and habitats.

*Overlaps*

The main overlaps are:

- single species surveys where advances in methods would allow multiple species, or species and habitat features to be measured.

### *Recommendations*

- i. identify coverage and gaps in the repeat sampling of species by ensuring that all Local Records Centre, Agency and Society-collated recording data is available through the NBN;
- ii. adopt a risk-based method for surveillance rather than aiming for completeness within each reporting cycle;
- iii. increase support for plant, lichen, bryophyte and invertebrate surveillance in order that they can supplement existing sampling most effectively, and adopt the risk based approach;
- iv. integrate needs for targeted periodic surveys to incorporate methods that can realistically be undertaken at the same time;
- v. adjust frequency of current surveys for particular habitats and species to allow consistent and appropriate reporting.

### **3. Early implementation tasks**

3.1 In order to make real progress with the Terrestrial Surveillance Strategy a number of key tasks have been identified which are recommended for early delivery. These are listed below and are mainly research tasks to help existing schemes improve coverage whilst controlling cost.

#### *3.2 Re - Objective 1*

- i. Identify a stratified sampling frame capable of enabling the sufficient surveillance<sup>7</sup> of a range of priority habitats. Identify the options for achieving effective coverage frame through existing schemes. Cost £50k.
- ii. Using new satellite and aerial data processing methods, pilot surveillance for a selected priority habitat to determine how it can make habitat surveillance more cost effective/or viable, including its contribution to inventory creation, establishing the sampling frame, and measuring change quality and area. Evaluate the implications for existing scheme methods. Cost £50k pa for 3 years.

#### *3.3 Re - Objective 2*

- iii. Identify the capability of existing surveillance schemes to reflect trends in pressures and ecosystem services, and determine whether changes to plant/vegetation and moth surveillance could fill important gaps in this. Cost £70k.

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<sup>7</sup> Sufficient to provide a representative measure of condition, and detect change given likely scales of impact from land use, and climate.

- iv. Determine whether existing European data and co-ordination mechanisms (*e.g.* EEA, GBIF, NGO networks etc) are capable of providing data that can improve UK identification of species responses to pressures such as climate change and pollution, and the spread and impact of non-native species. Cost £30k.

#### 3.4 *Re - Objective 3*

- v. provide support to risk-based (*i.e.* prioritised) enhanced surveillance of lichen, bryophyte, vascular plant and invertebrate species listed on the UK BAP, Habitats Directive, and SSSI selection guidelines, through relevant specialist schemes, for a pilot 3 year period and evaluate results. Cost £120k pa for 3 years.

3.5 The habitat surveillance pilot recommendations, referred to in paragraph 3.2 above, would, if successful, be rolled out to the other habitats through modification of existing surveillance mechanisms (*e.g.* habitat inventories, habitat surveys underpinning Common Standards Monitoring, Countryside Survey). The species surveillance enhancement, referred to in paragraph 3.4.v above, would, if successful, be continued and refined as necessary.

3.6 It is recommended that a Surveillance Implementation Group be established to determine how best the above actions can be implemented and financed.

#### 4. **Longer-term implementation**

4.1 In the longer-term, implementation of the Terrestrial Surveillance Strategy will be through a process which will include:

- i. Communicating value of the surveillance strategy, the role of surveillance/monitoring, the use of its results, and progress made, in order to achieve/retain buy-in to the strategy,
- ii. helping governmental and non-governmental sectors use the strategy as a decision tool to re-balance effort as existing surveillance schemes come up for reconsideration and renewal, or new schemes are considered..

4.2 The Surveillance Implementation Group referred to in paragraph 3.6 above, could also help to oversee the longer-term implementation.

4.3 Early consideration should be given to considering the future direction of schemes being considered in 2008/09, for example the Butterfly Monitoring Scheme, National Amphibian and Reptile Recording Scheme (second phase) and the Targeted Monitoring Network.

#### 4. Appendix 1

**Table to illustrate coverage for BAP, Habitats and Species directive and Birds Directives**

<b>Group</b>	<b>Adequate surveillance coverage for UK BAP reporting</b>	<b>Adequate surveillance coverage for UK Habitats and Bird Directives<sup>8</sup> reporting</b>
Amphibians and reptiles	30% (3/10)	50% (3/6)
Birds	91% (54/59)	95% (21/22)
Bryophytes	2% (2/100)	33% (2/6)
Butterflies & moths	85% (149/174)	100% (3/3)
Invertebrates (other than moths and butterflies)	23% (55/237)	63% (5/8)
Fish	Unknown	75% (9/12)
Fungi	0% (0/77)	Not applicable
Lichens	1% (1/138)	0% (0/1)
Mammals	67% (12/18)	59% (13/22)
Vascular plants	12% (26/212)	72% (8/11)
Terrestrial and freshwater habitats	21% (9/42)	6% (4/69)
Mammals	67% (12/18)	59% (13/22)

<sup>8</sup> Existing information allowed Habitats Directive reporting for most non-bird species and habitats. The figures in this column assess whether there is surveillance in place to measure trends, and so contribute to future reporting rounds.