



SURVEILLANCE STRATEGY REVIEW AND REVISION

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JOINT NATURE CONSERVATION COMMITTEE

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1. Introduction

1.1 In 2007 JNCC reviewed the direction of its evidence programmes setting direction for each, including the surveillance and monitoring¹ programme. The programme's current scale and activities are provided in appendix 1. The review produced a proposal for surveillance and monitoring strategy in which JNCC, alongside other funders, could position its activities to provide the best return across the major drivers for evidence.

1.2 The demand for the co-ordination of surveillance, and the drivers for evidence, have now changed significantly.

- there are now UK and country level initiatives for the co-ordination of all environmental monitoring;
- there is a clearer focus on what the remaining UK level reporting needs are but country level reporting needs are just beginning to emerge;
- countries now have a statutory duty for Habitats Directive surveillance, but other drivers like PSA targets have gone, and the degree to which the Directive requirement can be part of a wider strategy at country level varies greatly;
- there is now a need for surveillance to help society, and other arms of government understand the value biodiversity in ecosystem service delivery.

1.3 The purpose of this paper is to review progress with the strategy and suggest options for its direction.

2. Establishing a strategy

2.1 In March 2008 the Committee reviewed a proposal for a Terrestrial Biodiversity Surveillance Strategy which was subsequently considered by the UK Biodiversity Partnership. The strategy was later refined and is available from <http://www.jncc.gov.uk/page-4409>.

2.2 The strategy was designed to help the funders (government/agency, research and NGO) of the many biodiversity related surveillance and monitoring activities:

- evaluate and balance the drivers for surveillance;
- understand where separate requirements can be met from common solutions;
- and then plan the most effective use or adjustment of surveillance effort.

¹ Surveillance is used as shorthand for surveillance and monitoring throughout this paper

- 2.3 The strategy provided a high level review of how well existing activities met the needs for:
- measuring the outcome of country biodiversity strategies;
 - quantifying drivers of biodiversity change;
 - detecting pressures affecting biodiversity;
 - evaluating policy responses;
 - and meeting directive requirements for biodiversity surveillance or reporting.
- 2.4 The key gaps identified included:
- cost effective mechanisms for habitat surveillance;
 - in the range of functional groups covered in species surveillance;
 - and in effective ways of aiding volunteers to make a proportionate and targeted effort to help determine BAP/Habitats Directive species trend.
- 2.5 The strategy recommended research priorities that would help agencies, JNCC and others transform their existing surveillance spend to address the gaps and also address overlaps, for example between agri-environment, SSSI and local site condition monitoring activities. DEFRA adopted some of the priorities for their biodiversity related research programme, and JNCC and DEFRA are currently funding research that is:
- Making a systematic assessment of where remote sensing has the potential to reduce cost of habitat surveillance or provide cost effective solutions to gaps;
 - Near completion of a novel analysis of existing surveillance data sets to find out how much air pollution is affecting conservation objectives and to determine the adequacy of existing surveillance for this purpose.

3. Application of the strategy so far

- 3.1 The main application of the strategy so far has been to evaluate how to meet the Habitats Directive Article 11 requirement to undertake surveillance of all habitats and species of community interest. This was triggered by a reasoned opinion from the EC in late 2008, which led to revision of the Habitats Regulations for England and Wales, Scotland, Northern Ireland and Offshore in early 2009.
- 3.2 Strategy work assessed how much the directive requirement overlapped with other drivers such as those for country biodiversity strategies, and also how much of the requirement was met from existing surveillance activities. A risk based approach was recommended and adopted in the revision, based on the limited overlap with other drivers and high cost of complete coverage. Analysis of current surveillance against the requirement found that the biggest gap was for habitats in the wider countryside, but that addressing this gap would have benefits for agri environment and BAP evidence needs.
- 3.3 The Regulations give each agency, and JNCC for Offshore, a duty to determine the need for surveillance of each species and habitat based on its conservation status, and the quality of the information currently available. Country plans for implementing the needs identified are due to be completed by April 2011 and JNCC will be proposing options for offshore in 2013. The preferred approach to filling the gaps

terrestrially is to use research and innovation to change existing surveillance over a period of time. The marine approach will be different as there is less monitoring in place to transform. More radical options to fill the terrestrial gaps quickly would mean shifting resources away from delivery into surveillance, whereas steady progress in improving surveillance is needed to manage the infraction risk.

3.4 The strategy has been used within JNCC to establish criteria for reviewing all the activities in the surveillance programme, and adjustments have been made as each activity in the portfolio of contracts/partnerships has come up for renewal. The criteria were recently refined and used to help decide how to reduce the scale of the programme under the scenario planning for the CSR. The changes driven by the reviews so far have been:

- To improve the accessibility of the results and to add interpretation of trend both at species level and thematically in relation to pressures
- To make the first phases of investment in statistical techniques/model building to obtain trends from biological recording
- To enable the production of annual nationally representative trends for a set seabirds to contribute to country strategy indicators and marine assessments.
- To shift resources to enable butterfly monitoring to be representative of the wider countryside and provide more information at a country level
- To shift resources to allow co-investment in the research priorities identified by the strategy including the application of remote sensing and the potential for re-designing plant/vegetation surveillance to meet evidence gaps.
- To focus the demographic monitoring of birds, and make first phases of model development so that bird trends can be interpreted more rapidly to explain the environmental change they are indicating..
- To inform decisions on cutting surveillance to accommodate the reduction in budget available over the last three years, and the rising real costs of the activities in the programme. The cuts included withdrawing JNCC investment in the tracking of known pollutants in bird tissues and reducing the monitoring of demographic parameters for birds. Cuts in surveillance output have largely been avoided by very tough re-negotiation of each monitoring activity reducing costs, and by making significant improvements in the efficiency of some activities eg: by investment in data handling and statistics.

4. Factors affecting the strategy

4.1 The strategy was proposed as a multi stakeholder tool at UK level to provide co-ordination of surveillance and investment activities across bodies, whilst recognising that all funding decisions are local to individual bodies and taken against their remits. The strategy has some uptake beyond JNCC with DEFRA funding some of the research priorities and the principles have informed the work the officers undertaking the NE and SNH internal strategy work.

4.2 However the function of co-ordinating spend to get best value for the tax payer, and best return of environmental information has been taken on by wider initiatives with potentially more power to influence.

- The UK Environmental Observation Framework has all the public bodies that invest in biodiversity monitoring as members. It has a whole environment remit to create the information and activities that allow bodies to see where they can gain from collaboration or streamlining spend.
 - Partly stimulated by UK EOF, there are collaborations at a country level to achieve co-ordination of evidence spend, including monitoring as a distinct theme. These are the Scotland environmental monitoring strategy as part of the CAMERAS initiative, the evidence theme supporting the Wales National Environment Framework, Northern Ireland Environment Agency is developing a management strategy for monitoring and data access, and there is now England biodiversity evidence group for DEFRA network bodies.
- 4.3 Our current assessment is that UK EOF will not create a top down framework that prioritises monitoring across the environment and potentially affects responsibilities and funding. It has created the information and tools used by DEFRA and NERC reviews of their monitoring as part of planning for CSR, and it is these reviews that have the potential to change responsibilities and funding, ie: achieve co-ordination, although there is currently slow progress. DEFRA and NERC have joined up their reviews to some extent, and this has created the opportunity to suggest a more radical look at Countryside Survey to reduce costs, involve volunteers more effectively, particularly in plant surveillance, and improve the value of wide countryside evidence.
- 4.4 UK EOF has opened up opportunities that affect all monitoring, for example establishing with DG Environment a commitment to review 'burdensome' monitoring obligations in Environmental Directives and the possibility of acting to change or remove these. The country level collaborations are at a much earlier stage than EOF and they see JNCC as running monitoring in which they have a stake and applications, and able to help interpret some key drivers, but not in a position to co-ordinate spend.
- 4.5 Natural England and Scottish Natural Heritage have made progress in integrating the drivers for monitoring within their remits, and in integrating monitoring activities to achieve greater efficiency.
- NE have created a strategy for all their monitoring (biodiversity, landscape, participation etc). The strategy has led to projects to integrate the protocols and sampling for SSSI and HLS site based assessments, has reviewed how to meet the Habitats Directive duty and re-examined commissioning of species sampling versus partnership with voluntary bodies.
 - Under the Habitats Regulations for Scotland, Scottish Natural Heritage have to implement a strategy for surveillance, and they have begun to implement this as biodiversity module of a Scotland Environmental Monitoring strategy, and looked at how to integrate habitats directive, site condition and biodiversity strategy requirements.
- 4.6 Welsh Assembly Government is developing an integrated monitoring scheme as part of the new Rural Development Programme and Glastir scheme that will further contribute to the environmental monitoring framework in Wales. This substantially funded programme will tackle biodiversity, carbon, water quality, and other monitoring. The ambition for the next 10 year period is to move towards incorporating

ecosystem service valuation and natural capital accounting, such that the measurements made can inform the values delivered. Strong frameworks such as this will have implications for UK organised monitoring, for example countryside survey and JNCC's own nationally representative schemes that have also worked to deliver information at country scales.

4.7 In May 2010 the UK Biodiversity Partnership Standing Committee agreed the drivers for future UK biodiversity reporting. The main drivers are:

- The mission targets and indicators of the Convention on Biodiversity's strategic plan to 2020 now recently agreed at Nagoya.
- The reporting requirements of the new EU Biodiversity Strategy and the existing European Directives, primarily the Habitats Directive but also the Birds Directive, the Water Framework Directive and the Marine Strategy Framework Directive.
- The reporting procedures developed under country biodiversity strategies.

4.8 The provisional implications for surveillance are:

- The CBD mission and targets retain indicators that measure trends in biodiversity but add the need to determine the resilience of ecosystems in their provision of ecosystem services, and the need to address pressures on biodiversity.
- The Habitats Directive and Birds Directive reporting requirements are being set by the EC in negotiation with member states at present. The Habitats Directive requirement is for the assessment of favourable conservation status of each species and habitat across sites and the wider countryside. The Birds Directive reporting requirement is likely to change radically from being on the measures implemented, to being an assessment of the status of bird populations. We need to understand the Water Framework requirements as these have been developed separately so far, and marine monitoring is not considered by this paper.
- Country strategies may change rapidly now broader environmental strategies using the ecosystem approach are under development, ie: the England Environment White paper, the Wales National Environment Framework, the Scottish Land Use strategy. However the country environment strategies reflect much of the CBD strategic plan's emphasis in ensuring the resilience of ecosystems and the services they provide.

4.9 There is clear accountability for implementation of the Habitats Directive surveillance requirements but not for surveillance to meet the other reporting requirements. Most of the requirements need to be met at a country level (or more locally) to support integrated strategies at this level. However surveillance from the JNCC programme will remain a cost effective way for countries to meet some Habitats Directive and many Birds Directive requirements, and will help deliver evidence at country levels. JNCC surveillance is for example currently very effective at providing data for indicators at the country level.

4.10 There are opportunities for the JNCC programme to help country strategies further by:

- Providing information that it is costly to conclude nationally, such as the impact of widespread pressures on biodiversity, and the effect of trends in biodiversity on the resilience of ecosystem services;
- Providing information to aid local decision making, for example providing the data and the means to create high resolution predicted species distributions for inclusion in land use decisions;
- Improving the data nationally organised biological recording can provide for the Habitats Directive requirement;
- Country level monitoring is primarily focussed on measuring the outcome or effectiveness of interventions, ie; SSSI condition, Rural Development Programme outcomes. There are opportunities to make the JNCC programme surveillance activities contribute more sample data to these assessments, and to provide the contextual monitoring to help discriminate between the effects of interventions, and wider drivers of change.

5. Adapting the strategy to accommodate ecosystem services and valuation

5.1 Country strategies will be based around ensuring ecosystem services are appropriately valued and the implications of this built into local decision making. There has been considerable debate within the TBSS as to how the evidence needed to value services, and determine if they are resilient, should change what is needed from biodiversity monitoring.

5.2 Several sources have now begun to make this clear. These include:

- Outputs of research eg: the EU funded Rubicode project – rationalising biodiversity conservation in dynamic ecosystems;
- UK National Ecosystem Assessment has recently published its draft synthesis of current status and recent trends;
- The ecological and economic foundation report from The Economics of Ecosystems and Biodiversity (TEEB) is now available and includes a review of indicators;
- The CBD framework of goals, targets, means and indicators for the strategic plan 2011-20 has been agreed;
- The publication of the results of the Countryside Survey Integrated Assessment.

5.3 Our provisional conclusions from these sources are:

- Habitats will be the main unit used in local/landscape scale decision making which will use information on the regulating, provisioning and to some extent cultural services that can be quantified for them. Research is needed to calibrate the levels of service from habitats in different conditions. The surveillance requirement is for rapid mapping and sampling of the location, condition and extent of habitats at a fairly fine level of classification;
- Measures of change in high profile species eg: birds, butterflies, and plants, do reflect changes in cultural values, but research is needed to develop the metrics of value and benefit;

- Species remain the most cost effective way of monitoring biodiversity (ease of quantification, engagement of volunteers, well developed ecological knowledge to interpret change). Species monitoring can contribute measures of ecosystem service resilience, as changes in functional and structural variability in species will have broad-ranging impacts on most services. The relationship to ecosystem service provision can be made through functions eg: pollination, production, predation, decomposition. Species can be related to these functions through their ecological traits;
- The implication for species surveillance is the need to be able to detect trends across taxa to pick up species with a wide range of traits, and particularly include species more directly involved provisioning and regulating services than birds and butterflies. Research is needed to improve knowledge of traits for species and how these can be related to functions.

5.4 These conclusions give new emphasis to the TBSS priorities of broadening the functional coverage of species surveillance (currently this would affect JNCC, NGO and NERC funded monitoring) and research to see if remote sensing and improvements in data analysis can provide more cost effective habitat mapping and change measurement, where agencies have the lead in delivery.

5.5 The challenge is to achieve these given the resources available for evidence production in JNCC, agencies, administrations, DEFRA and NERC will be constrained after the CSR.

6. Options for the direction of the strategy

6.1 Three options are presented covering a sliding scale of how a UK overview of surveillance needs is applied. The current environment of rapid change means flexibility is key and option two provides the most flexibility.

Option 1: Strategy only defines JNCC Surveillance Programme Priorities

6.2 The strategy's main application is to set priorities for the JNCC surveillance programme investments. Under this option JNCC would maintain a basic overview of country and UK surveillance in order to spot synergies, and would investigate new drivers for evidence, in order that we could continue to adjust, or analyse the surveillance to make appropriate contributions.

6.3 To adjust the programme to the post CSR resource levels and to accommodate the reporting and ecosystem approach priorities identified above, the activities will be adjusted to:

- Ensure they produce evidence that can be used by England, Scotland, Wales and Northern Ireland at country level;
- Contribute measures of strategy outcome (ie; indicators) for each country under their indicator frameworks which will respond to the CBD 2011-2020 strategic plan;
- Provide a better context to country level monitoring of conservation interventions though providing more samples to be used in country assessments and time series of comparable samples to help interpret the time limited country level monitoring;
- Improve modelling and interpretation of biological recording to improve the taxonomic and functional coverage of data available for

assessments (already discussed by Committee at its September meeting);

- Retain surveillance that contributes to Habitats Directive or Birds Directive reporting requirements, but only where a UK solution is the most cost effective. If reporting is the sole application of the surveillance, the surveillance frequency will be determined by risk (threat and state of knowledge);
- Build modelling and use of other environmental data to improve the ability of the surveillance to detect and attribute widespread pressures, or project the implications of their future scale.

6.4 Overall this is a recipe for less surveillance, due to resource constraints, but maximum utility from what can be undertaken.

Option 2. Strategy is used to provide advice as well as setting the direction for JNCC's programme

6.5 Under this option JNCC would add to the first option work to maintain a more comprehensive overview of country and UK surveillance, and would put more staff effort into analysing the drivers for evidence, both at UK and country levels, and ensuring this information was shared with countries.

6.6 The purpose would be to be able provide good advice to country administrations, agencies, DEFRA, NERC and NGOs on: the opportunities for redesign of surveillance activities to meet needs and to cope with limited resources; and, how requirements relate to each other, and particularly, how they relate to the few remaining UK requirements.

6.7 In practice further work is needed help the countries understand if their Habitats Directive surveillance plans will deliver usable information for reporting and if any differences increase infraction risk.

Option 3. Strategy is used to co-ordinate surveillance investment across the UK

6.8 The final option is to add to the strategy a mechanism to allow the administrations, DEFRA, NERC, agencies and JNCC to co-ordinate their investments in biodiversity monitoring. To do this it would need to be accepted as part of the Living With Environmental Change research programme and more formally as part of the Earth Observation Framework.

6.9 At present there is a nominal Terrestrial Biodiversity Surveillance Strategy Implementation group, reporting to the UK Biodiversity Partnership but its main function so far has been communication and planning the Habitats Directive Surveillance implementation, for which the accountabilities are clear.

6.10 If desired, the option of coordinating monitoring investment could be applied to specific strands of surveillance without the scale of mechanism needed to coordinate surveillance investment more generally across the UK.

Appendix 1 Current Status of JNCC's Surveillance and Monitoring Programme

Activity	Status	Current cost
JNCC/NERC partnership in the Biological Records Centre	Current 6 year investment ends in January and a radically different programme is being re-negotiated following September Committee paper on applications of biological recording. The aim within five years is to consolidate novel statistical techniques and use these to produce trends for probably two to three thousand invertebrate, lichen and bryophyte species. This will be complimented by the development of functional attributes to allow aggregate analysis of trend by function and link to ecosystem services. The flow of data from a proportion of national recording schemes will be maintained whilst more efficient on line data handling mechanisms are built. The aim is also to improve sampling strategies for rarer species to aid BAP/HSD reporting and also schemes that can provide good information on functions.	£175K
Licensing	A service contracted to BTO on behalf of the statutory licensing functions in each agency that handles licenses for ringing and visiting birds at the nest. The service cost is now larger than the JNCC allocation and relies on agency supplement which is at risk. The service ends 2012 and decisions on how to take this forward post CSR will be needed in 2011.	£92K
Breeding Bird Survey JNCC, BTO, RSPB partnership	Roughly 3,000 location wider countryside sample of breeding bird abundance change that is a major data set used in species indicators in Scotland, England and Wales, and contributes to EU indicators. It is also one of the most used research data sets for establishing the effects of land use management change on biodiversity, and in predictive work. Agri environment monitoring uses the same protocol in order to benefit from a high proportion of 'free' samples as well as the control/long term picture available from co-analysis with the long term data set.	£65K
Wetland Bird Survey JNCC, BTO, RSPB, WWT partnership	Annual sampling of all major wetlands to provide wintering and passage trends for the UK's internationally important water birds. The data provides trends at the site level that can discriminate local from wider effects and so is the mainstay of assessing site condition. It also includes a rolling programme of detailed distribution data on coastal wetlands to provide information agencies value in site casework.	£70K
Birds demographic monitoring JNCC/BTO partnership	Annual determination of bird movement, breeding success and adult survival to and the creation of models with environmental data to allow the interpretation of the Breeding Bird Survey (and some other bird survey) changes in abundance in terms of their drivers. Covers Ringing, constant effort sites, re-trapping adults for survival.	£305
Bird analysis JNCC/BTO partnership	Synthesis by species (and by 2012 thematically) of bird trends and the factors affecting them and making this available as the 'breeding birds of the Wider countryside' web resources.	£56K
Goose-Swan JNCC, SNH, WWT partnership	Annual wintering population abundance and in many cases breeding success monitoring for geese and swan species the majority of which are species where the UK has a very high international responsibility. A key data set for goose management policy in Scotland.	£36K

Rare Birds Breeding Panel – JNCC, RSPB, BTO partnership	Collation from professional and voluntary recording of data on rarer species of birds to provide population change data and detailed location information for conservation delivery at a country level. Like all of the above bird data sets except demographic monitoring this data would be used under the proposed new outcome based Birds Directive reporting.	£11K
National Bat Monitoring Programme JNCC/BCT partnership	Annual population abundance monitoring of the majority of bat species and risk based monitoring of the remainder. The data is used in UK and England indicators, and coverage is improving in Scotland and Wales. Is a preferred means for countries to meet the habitats directive surveillance requirement which applies to all bat species. Increasing in value as a research tool for climate and land use effects detection and prediction.	£95K
Other mammal trends	Analysis and publication of trends of a range of widespread mammals detected by the National Gamebag Census and the Breeding Birds Survey.	£23K
Seabird colony monitoring – JNCC with a large number of partners.	Annual population abundance and breeding success monitoring for a range of species picked for their indicator value and other species picked up as part of this effort. More detailed monitoring at small number of sites. The UK, and particularly Scotland have a very significant responsibility for seabird species as we host very high percentages of their breeding populations. The data are used in UK, Scotland and Wales indicators and will be a source contributing to good environmental status assessment under the Marine Strategy Framework Directive.	£62
Butterfly Monitoring (DEFRA led multi stakeholder)	Current arrangement ending in March 2011 and JNCC is now leading negotiation for a revised annual population abundance monitoring scheme with improved wider countryside cover as well as a significant proportion of samples on high quality habitat/sites, and improved coverage in Scotland Wales and Northern Ireland. Contributes data to UK, England and Scotland indicators, and at a European scale, Wales indicator feasible. Is a major research data source for climate and land management impacts on biodiversity.	£53K
Strategy work	Currently contributes to UK EOF, and research projects that will transform JNCC or other monitoring investment to provide a better fit with the priority evidence needs in the strategy. Currently delivering research into where a) earth observation techniques can make habitat surveillance cost effective, b) how surveillance data shows the impact of air pollution on nature conservation objectives, c) plant/vegetation surveillance methods to make this more cost effective and powerful.	£33K
Total		£1,120K