Terrestrial Evidence Partnership of Partnerships Meeting

Manchester, 10th October 2017

Partnerships/schemes represented

ADS: Avian Demographics Scheme
BRC: Biological Records Centre
BBS: Breeding Bird Survey
GSMP: Goose and Swan Monitoring Programme
NBMP: National Bat Monitoring Programme
NNSIP: Non-Native Species Information Portal
NPMS: National Plant Monitoring Scheme
PMRP: Pollinator Monitoring and Research Partnership
TSDA: Terrestrial Surveillance Development and Analysis contract
UKBMS: UK Butterfly Monitoring Scheme
WeBS: Wetland Bird Survey

Organisations represented

BC: Butterfly Conservation
BCT: Bat Conservation Trust
BSBI: Botanical Society of the British Isles
BTO: British Trust for Ornithology
CEH: Centre for Ecology and Hydrology
JNCC: Joint Nature Conservation Committee
NRW: Natural Resources Wales
Plantlife
RSPB: Royal Society for the Protection of Birds
WG: Welsh Government
WWT: Wildfowl and Wetlands Trust

INTRODUCTION TO TEPoP AND TSDA (CHRIS CHEFFINGS, JNCC)

Who is involved

TEPoP involves **partnership** between the **UK schemes** JNCC supports involved in generating **terrestrial (i.e. non-marine) data.** (Includes the cross cutting Terrestrial Surveillance Development and Analysis project).

TEPoP's purpose

- Sustaining data provision
- Sharing best practice
- Assessing new surveillance/analytical methods etc
- Disseminating information

TSDA

The first science meeting today also included an introduction to the Terrestrial Surveillance, Development and Analysis (TSDA) contract, and was designed to provide an opportunity to shape this year's work and provide ideas for work it covers in the future.

TSDA is about **developing and improving surveillance**, and carrying out **cross-taxon analytical innovation**. The idea is that **TSDA should benefit all schemes**, for example by **increasing value** from them through cross cutting analyses, and through **provision of advice on surveillance development** (note – only advice, not a take-over bid!).

TSDA's objectives

- Improve geographical representation and identify best practice
- Assess the need for new parameters and new techniques
- Cross-taxon analytical innovation and development

TEPoP and TSDA align with JNCC's new strategy priorities, which include for example, provision of high quality evidence, and shared solutions.

UK BUTTERFLY MONITORING SCHEME (TOM BRERETON, Butterfly Conservation)

Overview of UKBMS

UKBMS is a transect based surveillance scheme that has been running since 1976 as the Butterfly Monitoring Scheme, and in its current form since 2004. It is a partnership between BC, CEH, JNCC and BTO, with co-investment from all. A new MoA has just been agreed with 5 more years of funding. The data is well used in research – circa 160 peer reviewed papers. Data is collected by volunteer surveyors in a number of ways.

- Traditional transects (self-selected sites walked weekly through summer) at about 1500 sites, and increasing.
- Special methods for rare species (e.g. Marsh Fritillary larval web counts), currently stable at 110 sites.
- Wider Countryside Butterfly Survey was introduced in 2009, with random stratified 1km survey squares, more standardised transect routes, and surveys conducted 2-3 times per year. There are currently 780 WCBS squares, with the sample size being fairly stable.

There is wide geographical coverage but gaps in places, eg N and W Britain.

Successes and new developments

- Regional co-ordinator network (volunteers)
- Working with BTO (Many BBS volunteers carry out WCBS on their squares)
- A new GAI analytical approach is being developed ready for next season (see Dennis et al 2016). This uses mixed methods, which is more efficient and can give demographic and phenological parameters.

Challenges

- Collecting and making better use of site-based data. (i.e. capturing exact routes, and habitat and management data)

- Understanding implications of new data protection regulations on dealing with volunteer networks.

BBS AND WeBS (DAWN BALMER, BTO)

Overview of BBS

BBS was set up in 1994 as a replacement of the Common Birds Census. The scheme involves 2,796 volunteers in a network of 3,837 squares. It involves 2 visits a year to random stratified 1km squares. In addition to recording birds, 90% squares have mammals recorded, and many volunteers also do the WCBS on their square. Population trends are produced for 111 common breeding birds and 9 mammal species. Data feed into pan European trends.

Successes/recent improvements

- Good at feedback
- Detection type (ie how bird was first detected) has been added as a recording option and has 70% uptake. This should improve analyses.
- 40-50 squares in under recorded upland areas have been covered by 'Roving Recorders' (i.e. people who happen to be in the area e.g. on holiday and record the square).

Challenges

- How to better collect more useful habitat data (not a popular aspect for recorders)? Are we missing any key aspects, eg related to vegetation type?
- Could we use volunteers to collect field data that aren't available from other sources, and to ground truth EO data?

Overview of WeBS

WeBS counters self-select sites inland and coastal, and visit them monthly in core months of September to March, although year-round counting is encouraged. There are 2800 core count sites. The scheme records water bird trends and distribution, and enables winter population estimates.

Successes

- Feeds into international estimates and the International Waterbird Census
- The number of taxa recorded has increased over time.
- Outputs are made available online, and the results are widely used in research

Challenges

- Because sites are self-selected they are not very representative. Whilst 3.5M waterbirds are recorded, 75% of these are from 20 sites. There is a recording bias towards big estuaries rather than smaller inland sites, but the latter are still important. BTO have been doing some work to address this, flagging up sites to recorders, encouraging specific dispersed waterbird surveys and adjusting trends to account for sampling bias.

BIOLOGICAL RECORDS CENTRE (DAVID ROY, BRC)

Overview

The BRC supports and works with 80-85 different recording schemes. It helps with aspects such as development of online tools to help with data entry and verification (e.g. iRecord), and with analysis. It helps with collation, data cleaning, modelling, mapping and combining biodiversity data with other types of data (e.g. work on neonicotinoids).

Future work and collaboration

BRC believe that working together with others in the common interest would be helpful in several areas. (Note BRC have already done some work in these areas, but would be keen to work together more).

- Sharing systems (e.g. input systems)
- Understanding recorder behaviour and motivation
- Downscaling predictions for local use (regions, habitats functional groups of species)
- Integrating schemes with common measures (combining data across monitoring/recording schemes).
- Future prediction under informed scenarios (BRC has access to lots of data to feed into models)
- Framework for metrics we are producing (standardised intermediate products, e.g. model ready datasets)

NATIONAL BAT MONITORING PROGRAMME (PHILIP BRIGGS, BCT)

Overview of NBMP

The NBMP records bats to produce trends and biodiversity indicators, which feed into legal obligations and inform conservation priorities. The scheme started in 1997. It currently covers approximately 2000 sites per year, and produces trends for 10 species (or species groups). There are 4 core surveys (field survey, waterways survey, hibernation surveys, and roost counts) as well as specific targeted surveys for barbastelle and nathusius pipistrelle, and the entry level 'sunset to sunrise' survey focussing on engaging new surveyors and capturing some distribution information. The NBMP strategy includes goals to increase the number of species we can produce trends for, monitor under-represented habitats, and engage with new technologies and new audiences.

New developments

- BCT are engaged with the FuSe project – funded by NERC innovation fund, and led by UCL, Oxford University, and BTO. The project is developing a method to increase the number of species for which we can get trends. The project includes:
    - **Development of acoustic sensor design.** Oxford and Southampton universities have developed a cheap (approx. £40) open source multispectral sensor – the 'audiomoth'. It is currently being tested in different habitats and the microphone deterioration being monitored.
    - **Automated call recognition.** UCL have led in the development of open source autoID software, using Deep Learning. The software enables detection of bat

calls in a noisy environment and is currently being tested for effectiveness with a low cost sensor.

- **Getting feedback from volunteers in deploying the technology as a new survey.** A pilot survey has been carried out in Scotland led by BCT and BTO. NE funding enabled BTO to produce an app for submitting recordings. Volunteers are provided with feedback on the pilot in form of paper newsletters. This will become an online resource, and is being shaped by questionnaire returns from the volunteers. Further piloting aspects are being carried out in 2017 and 2018.
- This development work will inform a new UK-wide static multi-spectral bat detector survey to be launched as **BBats - the British Bat Survey**. BCT are currently developing the survey protocol, which will be critiqued by statisticians. A key issue to be decided is how to fund the roll out of the scheme.

GOOSE & SWAN MONITORING PROGRAMME (COLETTE HALL, WWT)

Overview

The GSMP reports and/or supports a range of surveys to determine abundance, breeding success, survival, and movement. The GSMP also collates this information for use in e.g. indicators, adaptive management, incorporation into WeBS, flyway-scale assessments etc.

Objectives

- Winter population size and trends at national and flyway scales
- Identification and monitoring of sites of national/international importance
- Annual breeding success

Successes

- The communication of results to volunteers and other interested groups through web resources and newsletters is an area that is working well.

Challenges

- Some problems are quite scheme-specific, whereas others are more general:
  - Maintaining and expanding the volunteer network
  - Collecting and collating relevant data from other sources to use for analysing e.g. causes of population trends
  - Volunteers sometimes do not submit data if it will be used to manage populations
  - Lack of bag statistics make it hard to understand hunting impact or to provide management recommendations

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UK POLLINATOR MONITORING AND RESEARCH PARTNERSHIP (HELEN ROY, CEH)

Overview

The PMRP uses a combination of volunteers (experts and non-experts) and professionals to collect data at different levels, from opportunistic recording through to more systematic and

intensive surveys. The PMRP also contains workstreams on data management to produce new metrics, and on identifying additional research funding to support the programme. Focal taxa are bees, hoverflies and others.

Successes

- The scheme design makes it accessible to people with a range of abilities, and will hopefully lead to recorders progressing from opportunistic to more intensive surveys.
- Project design and testing, integration with National Pollinator Strategies

Challenges

- Combining data from different survey types
- Currently trends can be detected at group, but not at species level
- Recruitment of volunteers to the different types of surveys.

NON-NATIVE SPECIES INFORMATION PORTAL (HELEN ROY, CEH)

Overview

The NNSIP is a core database with information on non-native species in Britain. The database contains a list of 2,000 established non-native species, 1,600 of which are plants, and a further 1,000 species that have been seen but have not yet established in the UK. The Alert system allows anyone to report non-native species via e-mail or iRecord.

Successes

- Excellent partnership with BTO, MBA and BSBI on the database and Alerts
- Good links across Europe. Lead the development of the wider list of invasive species from which the European list of INNS was drawn

Challenges

- Large numbers of reports of potential non-natives are received, **but** these are usually false positives. Dealing with the volume of reports is a substantial burden, so better verification methods would be valuable
- A further area for improvement is reliably assessing the impacts of non-native species (i.e. which ones are likely to cause problems and turn invasive), and incorporating this into the database.
- How to identify those non-native species that will threaten biodiversity
- How to make database more robust with including managing evidence of impacts, more case studies

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NATURAL RESOURCES WALES (DAVID ALLEN)

Overview

New legislation is making new concepts more prominent, in particular: ***(i)*** the sustainable management of natural resources, and ***(ii)*** resilience. This is leading to new monitoring

requirements and outputs, notably the State of Natural Resources Report (SoNaRR) to assess national status and trends in natural resources. Alongside national indicators, NRW also need local-scale evidence, e.g. to inform the management of protected sites. Other ongoing NRW work includes monitoring Glastir, and using Earth Observation to provide near real-time information on environmental change. Plans to set up a Wales monitoring co-ordination group to involve NWR, Welsh Government and others.

Key Questions/Challenges

- Can data at the country-level and smaller scale be improved, and how do we maximise the value of the data that are collected?
- What can we reliably say about data on smaller scales?
- If data are limited for Wales, to what extent can we apply other techniques (e.g. modelling) to use the available data more effectively?
- How feasible is it to bridge the gap between current and desired levels of monitoring?
- To what extent will data limitations affect an ecosystem-level focus, or attempts to develop combined metrics?

AVIAN DEMOGRAPHICS SCHEME (ROB ROBINSON, BTO)

Overview

ADS encompasses several schemes, eg. ringing and nest recording schemes, to monitor bird survival and productivity. 600 nest recorders. Tracking is not a replacement to ringing, at least yet. Tags expensive, not feasible (too large), short-lived. This allows the causes of population trends to be explored in a way that is not possible with BBS, WeBS etc.

Successes

- The BirdTrends site allows volunteers and other interested groups to quickly access summary information, interpretation, and species-level data
- Examples of the type of knowledge generated through analysing ADS data on individual species include ***(i)*** attribution of a period of population decline in lapwing to reduced adult survival caused by cold winters, and ***(ii)*** attribution of spatial differences in trends for willow warbler between England and Scotland to differences in productivity

Challenges

- There are lots of people collecting the data, but analysing the data and bringing it together can be tricky. The bottleneck is resourcing the analysis
- Getting volunteers in the right place to capture spatial variation in trends
- Finding and using suitable environmental datasets to link with data from ADS

EARTH OBSERVATION (PAUL ROBINSON, JNCC)

Overview

Targeting and measuring impact of interventions over large areas of protected sites is a huge challenge, especially in a climate of reducing resources. New technologies, among others EO, can make a huge difference. The launching of several satellites in the Copernicus programme is leading to a big increase in the accessibility and quality of EO data. This is freely available (although there is a cost associated with initial processing) and can be used e.g. to detect management activity, habitat condition etc. EO data and outputs cannot replace field surveillance, but the two approaches can benefit from, complement, and inform each other.

Questions/Opportunities

- Field data on habitat type and/or management is very important for validating EO
- Similarly, EO data might be useful e.g. for analysing and interpreting species trends, or for designing/improving monitoring
- It would be valuable to more specifically discuss if/how monitoring schemes can support EO, and if/how EO data can be used by monitoring schemes

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NATIONAL PLANT MONITORING SCHEME (OLI PESCOTT [CEH], HAYLEY NEW [Plantlife])

Overview

The NPMS has three levels of participation, requiring increasing levels of expertise. The hope is that this will encourage non-experts to participate, and then move on to the more comprehensive surveys.

Successes

- Working with a range of different local and national organisations to promote NPMS widely and increase volunteer numbers
- Working more closely with landowners (e.g. National Trust) to increase the sustainability of monitoring sites and uptake in more remote areas

Challenges

- The key analytical challenge is in developing indicators that ***(i)*** use the data from the different survey types effectively, and ***(ii)*** account for the different habitats in which surveys are conducted

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SHARED THEMES ARISING FROM THE TALKS

Communication and Volunteer Engagement

- The communication of results to volunteers and other interested groups (via web resources, newsletters etc.) is an area that is working well in several schemes
- Equally, maintaining and expanding the volunteer network can be difficult – particularly where volunteers are primarily in older age groups
- There may be opportunities to work with other organisations to promote schemes

- Different levels of survey are used by some schemes to allow participation for a range of abilities. This will hopefully assist non-experts in progressing to more comprehensive surveys over time.

Data Analysis

- Finding and using suitable external datasets to better analyse the causes of population trends was highlighted as a problem by several schemes
- Schemes collecting data using different levels of survey require methods to combine and use each of these different sources effectively
- There may be opportunities for the species surveillance schemes to provide data that are valuable for Earth Observation and vice versa