

Workshop Session Digest: Workshop on realistic solutions for addressing evidence gaps

Aims and purpose

During the Terrestrial Evidence Partnership of Partnerships (TEPoP) 2nd annual meeting on 4th October, there were presentations on the biodiversity information needs of agencies. Andy Nisbet (Natural England) focussed on the policy drivers, specifically that:

- protected sites and species are important;
- the need to think and act beyond sites and individual species;
- and the need to show what biodiversity does for us.

Michael Pocock (Centre for Ecology & Hydrology: CEH) summarised a JNCC published report [http://jncc.defra.gov.uk/pdf/Report_618_WEB.pdf] showing that the UK's public environmental bodies use biodiversity information for statutory reporting, operational needs (e.g. planning advice and regulation) and for strategic needs (influencing policy-making and assessing the impact of policy). Overall, there was confidence in the current biodiversity surveillance (most of which is through JNCC Surveillance Schemes and undertaken by volunteers), which helps organisations to meet their reporting obligations and some of their operational needs.

However, despite the considerable success of our existing biodiversity monitoring and surveillance, there are gaps in our knowledge. At the workshop, we presented draft figures showing that our ability to produce trends in occupancy (from 'unstructured' recording, such as that undertaken by the National Recording Schemes and Societies, supported by the Biological Records Centre at CEH) and trends in abundance (from 'structured' recording schemes including many supported through JNCC's surveillance programme) varies across regions, across habitats and by taxonomic groups. These gaps, and how they might be addressed, need to be considered in the light of the needs of government agencies, the motivations of volunteers and the opportunities provided through new technology.

The aim of the workshop was to:

- Identify specific, important (& solvable) knowledge and data gaps
- Propose solutions
 - Solutions should consider resources currently available (data, budgets, methods, volunteers)
 - Solutions can enhance, augment or supercede current monitoring
 - Solutions could be 'disruptive' (including lowered cost of technological solutions)

The overall output was a range of ideas to help guide and inspire future development funded under the Terrestrial Surveillance Development and Analysis (TSDA) partnership.

Participants split into three groups, each moderated by a member of the TSDA team.

Discussions in the groups overlapped to some extent, so here we draw out the main themes raised, identifying, where possible the specific knowledge and data gaps that were discussed

and potential solutions identified. Although some of these data gaps and solutions were identified in the context of particular issues they will be relevant to other issues.

Reflections on the workshop

Overall, the aims of the workshop were challenging. We found that it was challenging as a group to develop new ideas; to strike a balance between generalised solutions (that fail to be specifically applicable) and specific solutions (that result in being 'niche' solutions). We also found that in the relatively short period of time of the workshop, it was challenging for the group to assimilate evidence across many different levels (from strategic evidence to detailed facts), to propose novel and specific solutions and to identify the development needs for solutions to be acted upon.

Overall, the workshop has helped us have greater understanding of the range of possible solutions and the level at which they have impact. It may be helpful to consider 'readiness levels' of development needs - some require basic research to understand gaps, others require scoping or provision of evidence, others require investment in implementation. The workshop also helped us consider the challenges and processes for successfully consulting and co-creating solutions to gaps in our biodiversity monitoring.

In the light of future work under the TSDA partnership, we have the opportunity to undertake specific pieces of work for development of biodiversity monitoring - with the same remit as the workshop. We would welcome specific suggestions from and discussion with workshop participants about important gaps and/or potential solutions for biodiversity monitoring.

Themes raised in the group discussions

How to assess state of, and changes in, Natural Capital?

Knowledge Gaps:

- What are the most relevant functional groups, and how do we define the species composition of these? Can the example of pollinators be replicated more widely?
- How do species contribute differentially to Natural Capital (some species are inevitably more 'valuable' than others)?
- What methods are required to synthesize diverse data sources?

Data Gaps:

- Need for information at county or landscape scales, regional scales are less useful
- Increasingly, there is a need to assess the success or otherwise of particular interventions, so there is a need for fine scale inference
- Where is the Natural Capital? Is it possible to generate high resolution maps of priority areas?
- Assessing what represents natural capital and how to quantify it - is there such a thing as 'sufficient' Natural Capital, and can some qualifying level be set?

Solutions:

- For some groups, there is a need to improve analytical methods to produce transparent and robust trends with appropriate measures of uncertainty, building on a review of indicators (<http://jncc.defra.gov.uk/page-7331>)

How can species monitoring provide information on ecosystem health?

Increasingly there is a requirement for a more comprehensive assessment of ecosystem health or condition, rather than solely the status of particular species groups in their own right. Increasingly, this is framed in terms of ecosystem services, which represent ecological flows or processes (usually for anthropogenic benefit)

Knowledge Gaps:

- How do species indicate healthy ecosystems -
- What is the best way to combine indices/data products with transparent methods?
- Which are the most critical monitoring targets, and the most reliable proxies?

Data Gaps:

- What is a healthy ecosystem - knowledge of functioning food-webs/assemblages is scant outside particular research studies?
- Which areas are most likely to undergo habitat transitions (e.g. to arable/urban)?
- Carabids are functionally important as pest controllers - a key ecosystem service

Monitoring the state of urban habitats

Because most of the population lives in urban areas, it represents an important, but, habitat, but one that is also under-survey, and under pressure and changing as the density of use increases.

Knowledge Gap:

- How does urban biodiversity link to human benefits e.g. health and well-being?
- How important is green infrastructure to different sorts of wildlife?
- What do we mean by 'urban' biodiversity? Many species from the wider habitat occur in urban areas, utilising e.g. greenspace, to what extent should this be considered urban biodiversity? Or should the focus be on those dependent on more typically urban habitats, such as brownfield sites?

Data Gap:

- Poor understanding of the distribution urban habitats in the urban environment, such as brown field/green space areas

Solutions:

- Volunteer recording should be possible since high levels of engagement, and recording should be local

Using biodiversity to measure of water quality

Some elements of biodiversity are highly dependent on good quality water resources, therefore their occurrence/abundance can be used as an holistic complement to a network of sensors of physical and chemical measures of water quality.

Knowledge Gap:

- What are the best biodiversity measures of water quality
- How does biodiversity contribute to nutrient flows between terrestrial and freshwater habitats
- Presence of freshwater invasives, particularly in Northern Ireland

Solutions:

- There are opportunities for co-location of environmental and biodiversity recording to provide wider-scale monitoring of aquatic ecosystems. This would involve a hierarchy of sites from those run fully by researchers (such as the Environmental Change Network) to those recorded entirely by volunteers.
- Volunteer deployment of low-cost sensors has the potential to greatly expand the spatial resolution of our understanding of water quality
- Build links with the wider sector, e.g. Environment Agency

Biodiversity in upland habitats

Despite occupying substantial areas, knowledge of the status, and trends in, the biodiversity of uplands lags behind other areas;

Data Gaps:

- Moorland, heath and bog habitats were identified as particularly data deficient

Solutions:

- Sampling biodiversity through the presence of environmental DNA (eDNA) might offer a way to undertake more extensive assessment at relatively low cost
- Encouraging data sharing between organisations