'Delivering systematic monitoring to contribute to country biodiversity strategies and UK reporting'

The JNCC–BTO Partnership

WHY BIRDS?

Birds are a popular and widely appreciated wildlife resource with the UK hosting internationally important numbers of a range of species. Birds are well studied relative to many taxa and have proved sensitive indicators of a broader range of environmental issues including the ecological effects of pesticides, loss of farmland biodiversity and marine fisheries interactions. Work supported by the Partnership has contributed to this understanding and has also identified particular areas where changes in bird populations and assemblages can identify components of wider environmental change[1].

WHAT WE DELIVER

The Partnership between the Joint Nature Conservation Committee (JNCC) and the British Trust for Ornithology (BTO) underpins the longest running programme that contributes to understanding the state of wildlife at UK and country levels.

With 50,000 skilled volunteers, this monitoring is of sufficient scale to track environmental changes over more than five decades across the full range of habitats, from urban and farmland to semi-natural and upland areas.

We can monitor and interpret changes in populations of birds and selected other wildlife in a consistent way across the landscape, providing important context for understanding the factors affecting individual sites.

Partnership schemes have identified major changes in environmental quality affecting biodiversity, causing declines in farmland and woodland birds, wintering waterfowl and summer migrants.

By examining the causes and consequences of changes to wild bird populations, the Partnership has provided impartial evidence to address policy-relevant issues, ranging from the development of agri-environment schemes to understanding climate change impacts. Data and analytical techniques established by the Partnership have been used to benefit other work commissioned by government and agencies, such as assessing potential impacts of renewable energy and the role of wild birds in the transmission of diseases such as avian influenza (H5N1)[2].

The Partnership provides cost-effective delivery of both national and international statutory reporting requirements, and wider evidence needs. JNCC and BTO funds leverage additional support from the Royal Society for the Protection of Birds (RSPB) and the Wildfowl and Wetlands Trust (WWT). The Partnership is therefore an efficient way for countries to secure evidence through shared investment.

This evidence is used by:

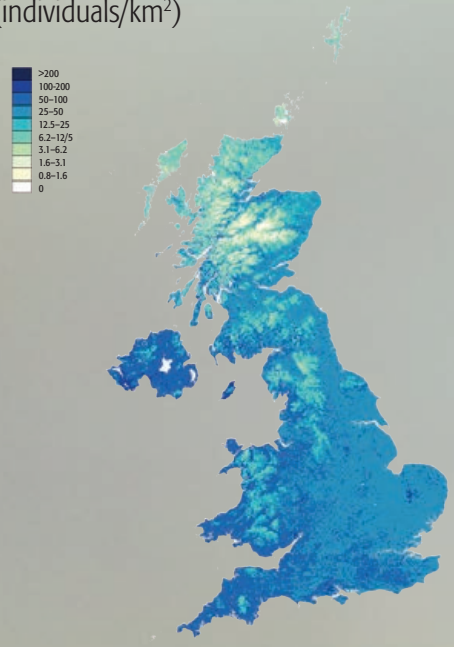
Government and its agencies to inform environmental policy needs and decisions, and to support UK international obligations, such as reporting trends and population estimates for the Birds Directive, Convention on Migratory Species and the Ramsar Convention.

Conservation NGOs, such as the Wildlife Trusts, who need sound information on which to base their conservation activities.

Researchers and academics who need high quality data for ecological research, and to understand in depth the drivers of environmental change and the wider implications for society.

A wider society, desiring a rich and diverse environment in which wildlife contributes significantly to human well-being and the quality of life for many people.

Wren – Breeding density 2007–2009 (individuals/km^2)



Research using BBS data has shown how populations of small resident passerines, like Wren, have increased in response to warmer winters and are more abundant in the south.

MONITORING AND REPORTING

The JNCC-BTO Partnership supports monitoring schemes that provide critical data on the abundance of bird populations required for statutory reporting (e.g. Article 12, Common Standards Monitoring), and insights into the demographic mechanisms necessary to understand those changes.

The Wetland Bird Survey (WeBS) provides both site-based data and national overviews for internationally important populations of migrating and wintering waterbirds in the UK, and hence is essential both for casework and in larger analyses, including UK indicators and assessment of climate change impacts.

The Breeding Bird Survey (BBS) monitors the abundance of over 100 bird species throughout the UK, as well as widespread and detectable wild mammals. The stratified random design used for the survey is optimised to provide both regional and national trends.

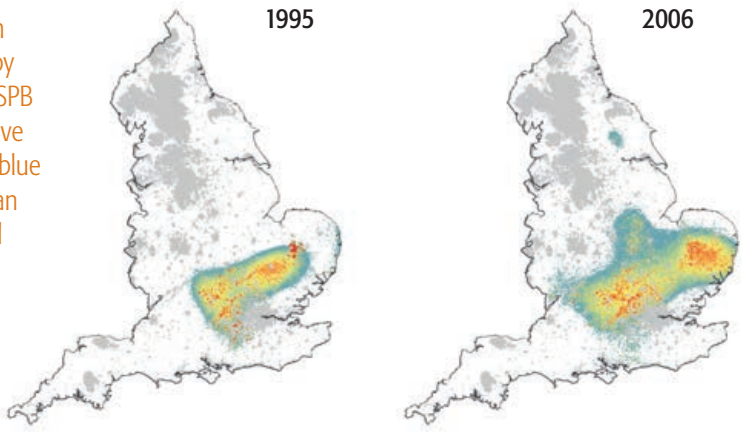
The Nest Record Scheme and Ringing Scheme allow breeding success and survival, important for identifying the causes of population change, to be estimated for a wider range of bird species. Combined analyses from these schemes, and from BBS, provide a greater understanding of the reasons for change than do count data alone.

We have developed innovative online reporting systems, such as BirdTrends and WeBS Report Online, to provide efficient access to relevant data for a wide range of users.

BEYOND BIRDS

Our track record on bird monitoring through the Partnership enables BTO to have an important national role in promoting large-scale environmental monitoring of a wider-range of biodiversity. This can be achieved through partnership with other taxon specific organisations and the BTO's own volunteer and site network (e.g. mammal and butterfly recording on BBS squares), increasing what monitoring can deliver without the costs of setting and running whole new schemes. Both BTO and JNCC feel that established recording networks could help meet a wider range of requirements, and that the participants are willing to take on new and interesting challenges if motivated appropriately.

The spread of Muntjac from 1995 to 2006, as revealed by data from the BTO/JNCC/RSPB Breeding Bird Survey. Relative abundance increases from blue to red; grey represents urban and upland areas, excluded from the modelling[3].



SCIENTIFIC APPLICATIONS AND INTERPRETATION

The Partnership has made significant advances in identifying the causes and consequences of changes in bird populations that have occurred over recent decades. Complementary funding from the UK government and Statutory Nature Conservation Bodies (SNCBs) enables research using data generated by the Partnership.

The results of Partnership research secured significant profile in documenting the causes of farmland bird declines and in the drive for management solutions. Recent analyses of BBS data under Natural England, Defra and Welsh government funding indicate that Agri-environment Schemes may have slowed declines or, in some cases, started to increase some farmland bird populations[4]. BBS is central to ongoing evaluation of the Glastir and Countryside Stewardship schemes in Wales and England, respectively.

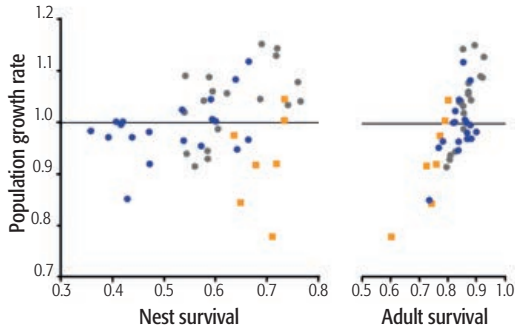
Climate change is expected to be a major driver of biodiversity change. We have already documented significant changes to the mechanisms underpinning population responses[5]. Our continued ability to contribute valuable evidence for the Climate Change Risk Assessment (CCRA), and to inform future updates of climate change report cards, is reliant on the continued long-term data collection and interpretation provided through the Partnership.

Populations of long-distance migrants have declined strongly in recent decades. Analyses of Partnership data have allowed the effect of different mechanisms of change to be tested[6]. Strong spatial gradients in population trends, revealed through BBS analysis, are most positive in Scotland. Similar trends in reproductive success, shown by Constant Effort Site Scheme (CES) ringing taking place across Europe, suggest breeding conditions may play a part in regulating populations[3].

Addressing the potential rise in invasive non-native species is a key priority. Not only can Partnership schemes track changes in the populations of key species, but analysis of their data, including under the Partnership, has quantified their impacts[7].

Advances in GIS and statistical methods have allowed increased integration of Partnership data with other sources. This allows us to understand how the resilience of systems may be decreasing, making them more vulnerable to other pressures[8]. A wide-range of conservation and policy-relevant products, such as the State of UK Birds and the National Ecosystem Assessment, rely on the effective interpretation of Partnership monitoring data[9]. Making Space for Nature not only used evidence provided by the Partnership, but subsequent Partnership interpretation has addressed knowledge gaps relevant to implementing its recommendations.

Together we design, and BTO delivers, the evidence required for Defra, JNCC and the SNCBs respective policy and statutory roles. BTO provides responsive analytical solutions which JNCC ensures contribute to reporting and assessment cycles, and support a range of policy areas from biofuels to landscape-scale conservation.



Integrated analysis of ringing and nest record data in the Partnership has identified the mechanisms of species' decline. Lapwing population trends are strongly correlated with nest survival (left panel). Lower nest survival since the 1990s (blue dots) compared to 1966-1984 (grey dots) are associated with more negative population trends. Strong declines in the late 1980s (orange squares) were due to low adult survival caused by severe winter weather (right panel)[8].

ENHANCING FUTURE MONITORING

At this time of continued environmental change Partnership monitoring schemes are needed more than ever. However, during this period of financial constraint, there is a need for greater efficiency, as already delivered by the new WeBS Report Online and redevelopment of the ringing database to speed data processing[10]. Embracing opportunities created by new technologies will be important.

Being volunteer-based, the Partnership schemes are the most cost-effective means to achieve the systematic long-term and large-scale monitoring required. They are designed to be scientifically rigorous, supported by professional scheme organisers and IT and database experts, and the results carefully analysed to generate robust conclusions.

The results of the Partnership will continue to require careful analysis and reporting to a range of audiences, from volunteers to decision-makers, so that they can inform a wide-range of policy and evidence needs, often required and delivered at short notice.

Ways in which partnership working and analysis could help meet requirements include:

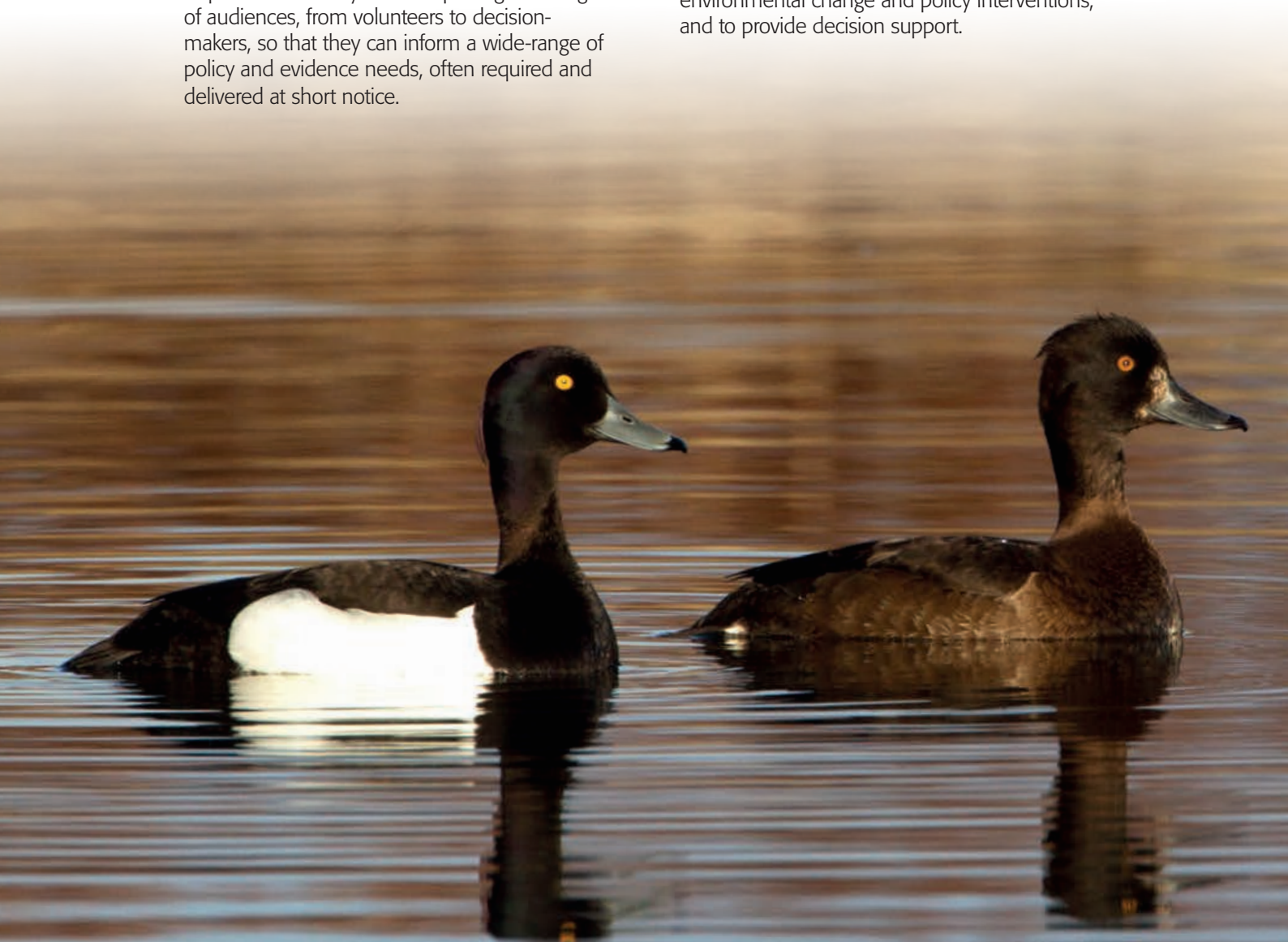
Increasing coverage in important habitats to allow habitat-specific analysis and reporting.

Further integration of schemes with the collection of additional environmental or biodiversity data in order to give greater power to analyse change.

Utilising scheme data on habitats to ground-truth and interpret remote-sensing of habitat condition.

Developing alternative analyses of scheme data that can provide inputs to natural capital accounting, local spatial planning and measures of adaptation.

Undertaking predictive modelling to identify likely responses of species and communities to environmental change and policy interventions, and to provide decision support.



SUMMARY

The Partnership can continue to deliver excellent scientific evidence because:

It utilises data from large numbers of dedicated and well-trained volunteers delivering extensive and long-term monitoring cost-effectively.

There is excellent communication and feedback to the volunteers by BTO scheme organisers and other staff.

Close integration between research and monitoring staff at the BTO ensures the Partnership monitoring schemes are well-designed and structured in order to deliver the data required for robust reporting and inference.

Careful analysis and reporting of the data by highly qualified BTO staff delivers user needs. A proven track record of publishing outputs in peer-reviewed scientific journals provides additional, independent quality assurance.

Data and information products are reported efficiently through advanced web-based products in a highly accessible manner at an appropriate level of detail.

Close working between BTO, JNCC, SNCBs and other users delivers appropriate flexibility so that results address changing UK and country policy and evidence needs.

Substantial financial inputs from BTO, combined with those from JNCC and other partners, make the Partnership highly cost-effective for government.

The Joint Nature Conservation Committee (JNCC) is the statutory adviser to the UK Government and devolved administrations on UK and international nature conservation. Its work contributes to maintaining and enriching biological diversity, conserving geological features and sustaining natural systems.

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