The European bird monitoring programmes as examples of citizen science relevant to policy and research.

Petr Voříšek¹ (EuroMonitoring@birdlife.cz), Ruud Foppen² (Ruud.Foppen@sovon.nl), Richard Gregory³ (richard.gregory@rspb.org.uk).

Keywords: citizen science, indicator, biodiversity

1. INTRODUCTION

It has been widely recognised that biodiversity is important for human quality of life and ecosystem services. Information on biodiversity trends is therefore needed to guide policy decisions for achieving a good management of species and habitats. However, obtaining good quality information on biodiversity poses a challenge; the information is patchy and incomplete. Birds are exceptional in this context because they are very popular among the public and thousands of birdwatchers observe and report on birds as their hobby. Moreover, birds are considered to be good indicators of biodiversity. Indeed, bird indicators based on count information have been used globally, continentally and nationally. Information on (changes in) bird numbers and their distribution are used in relation to many (inter)national policy issues.

2. BIRD CENSUS – PAN-EUROPEAN COMMON BIRD MONITORING

In Europe bird monitoring techniques have developed towards highly standardized field methods, though simple enough to be performed by volunteer ornithologists across large geographical units. Bird monitoring schemes are organized nationally or regionally, mostly by non-governmental organizations, often in cooperation with universities and research institutes. Volunteer fieldworkers count birds in the breeding season (although winter counts also exist) every year providing long-term data spanning several decades in some countries. Sample plots were traditionally selected by volunteers themselves, but monitoring schemes established more recently (from 1990s) have used randomised selection of sample plots. Nowadays, European breeding bird monitoring schemes coordinated through the Pan-European Common Bird Monitoring Scheme (PECBMS)¹ provide relevant data on bird numbers from 27 European countries and more than 160 bird species. The number of fieldworkers taking part in the field surveys is estimated at well over 10 000.

Yearly population indices and trends are the most important outputs of national monitoring schemes. The index gives bird numbers to a base year, when the index value is set at 100. Usually, but not necessary, the first year of a time series is chosen as the base year. Trend values express the linear overall population change over a period of years.

National species indices are produced by the coordinators of the monitoring schemes. They compute the individual national species indices in a prescribed way using TRIM software (Trends and Indices for Monitoring data, Pannekoek & Van Strien, 2001). TRIM is a widely used freeware program (available via http://www.ebcc.info/trim.html). The national indices are collected by the PECBMS coordinator.

¹Pan-European Common Bird Monitoring Scheme & European Breeding Bird Atlas, Czech Society for Ornithology, Czech Republic
²European Bird Census Council, Dutch Centre for Field Ornithology SOVON, The Netherlands
³Pan-European Common Bird Monitoring Scheme, Royal Society for Protection of Birds, UK
After extensive data quality checks, the supranational (regional and then European) indices of species’ population change are produced. A method developed for this purpose (Van Strien et al., 2001) takes into account the differences in population sizes per country, as well as the differences in field methods and in the numbers of sites and years covered by the national schemes.

Finally, supranational species indices are combined in multispecies indicators. These are produced for groups of species according to their main habitat types (forest, agriculture etc). The rationale behind the construction of composite indicators is that each species is seen as a replicate that may respond in the same way to environmental drivers as the other species and repeats the same signal. To produce multispecies indicators, we average indices (by taking geometric means), rather than abundances in order to give each species an equal weight in the resulting indicators. The composite geometric mean represents the average behaviour of the constituent species.

PECBMS produces European species population indices and trends as well as European and regional indicators for farmland, forest and all common bird species. The outputs are published on annual basis at the website and provided also to EU institutions (e.g. Eurostat and DG Environment). One of the more prominent indicators is the Farmland Bird Indicator produced by PECBMS which has been used by the EU as one of its indicators of Sustainable Development and also as a Structural Indicator. Furthermore, the Farmland Bird Indicator has been adopted as an indicator for EU Rural Development Plans. The common bird indicator produced according to PECBMS’ methodology has been accepted as an official indicator of biodiversity by governments in at least 26 European countries.

PECBMS outputs were also successfully used in detecting an effect of climate change and developing an indicator of climatic changes in Europe. Further improvements and potential new policy relevant indicators are under development.

Apart from the widely documented decline of European farmland birds as a result of agricultural intensification, PECBMS data were used in documenting decline of long-distance migrants or the effect of climate change on bird population trends. Since 2002, the PECBMS outputs have been used in 24 scientific peer-reviewed papers.

3. SPATIAL DISTRIBUTION SURVEYS – EUROPEAN BREEDING BIRD ATLAS

However, information on relative population change is not enough for evidence-based biodiversity conservation. Information on the geographical distribution of birds and its changes in time is also needed. In Europe, an atlas of bird breeding distribution was published in 1990s. This first atlas (Hagemeijer & Blair 1997), with its main data collection period in the 1980s, was a milestone in European ornithology, and its data were used beyond the publication of the book for setting conservation strategies at European and national levels, to study the impacts of climate change and for scientific studies on a wide range of topics. However, in the thirty years since data collection, the environment but also the political context in Europe have changed and the bird distribution data are now out of date. Climate and land use changes have altered the habitats of birds across the continent and projects focusing on individual species or regions indicate effects on bird populations at a large scale. However, a continent-wide overview is lacking. Therefore, besides its main role in the PECBMS project, the European Bird Census Council (EBCC) started work on the second European Breeding Bird Atlas (EBBA2).

The EBBA2 project aims to provide up-to-date distribution maps for birds across the whole of Europe and to document changes in species distribution since the 1980s. The project will also build capacity for conservation and monitoring in areas where this is most needed.
The methodology for field data collation was developed to fit the needs of high quality data standardization and different capacities of (mostly) volunteer fieldworkers across the whole of Europe, from Azores to Russia and including Turkey (Herrando et al 2013). National coordinators are responsible for organising a fieldwork methodology and campaign, which can be either aimed at also producing data for national breeding atlases, or aimed at delivering the data for the EBBA2 project. The fieldwork for the EBBA2 project is scheduled from 2013 to 2017, the results are expected to be available in 2020. The project with 5 years of fieldwork, some 50 countries, 500 bird species, a coverage of 5000 50x50 km squares and an estimated 50 000 fieldworkers is probably the most ambitious biodiversity monitoring programme in Europe.

4. PORTALS FOR DATA GATHERING AND SHARING

Both projects take advantage of rapidly developing techniques for data analyses and particularly for data collection and sharing. On-line portals for storage, management and sharing data on bird observations have appeared in Europe and worldwide. These portals, if properly managed and organised, are a useful source of data for EBCC projects and they serve public engagement. We aim to integrate and use these technical developments more in future PECBMS and EBBA2 work. Therefore, under the umbrella of the EBCC a new project has recently started called European Bird Portals (EBP)C.

5. CONCLUSIONS

PECBMS, EBBA2 and EBP are citizen science projects based on cooperation between volunteer fieldworkers and professional researchers. Based on our experiences clear synergies in several areas have been identified: on the level of creating and maintaining networks of coordinators and fieldworkers, the use of field data use for multiple purposes, capacity building for conservation and research and policy use of the outputs.

In the near future, we expect a further integration of methodologies, data collection, data management and data analyses concerning bird monitoring (PECBMS), atlasing (EBBA2) and birdwatching portals (EBP). This enable us to accomplish a faster data delivery and presentation, to improve the quality of the data, to achieve for instance a better geographical coverage of Europe to better understand bird population changes and to achieve a greater public engagement in biodiversity monitoring and conservation. This integrated approach promises also to deliver more policy relevant information and to trigger further scientific investigations. Although the citizen science approach proved to be cost effective, financing a central coordination, analytical and training capacity remains a challenge.

A The Pan-European Common Bird Monitoring Scheme (PECBMS) has commenced in 2002 as a joined initiative of the European Bird Census Council (EBCC) and BirdLife International. Initially supported by the Royal Society for Protection of Birds (RSPB) and Statistics Netherlands, hosted by Czech Society for Ornithology (CSO) in recent years the programme has received substantial support from the European Commission.

B The European Breeding Bird Atlas (EBBA2) is a project led by EBCC. Presently the work is coordinated by staff of the Swiss Ornithological Institute, the Czech Society for Ornithology and the Catalan Ornithological Institute.

C The European Bird Portal initiative under the auspices of the EBCC is coordinated by staff of the Catalan Ornithological Institute and the Swiss Ornithological Institute and is supported by more than 15 European organisations collecting bird data by online portals.

See www.ebbc.info for more information.
6. REFERENCES


