

Data from the EURING databank

Ringing locations (left) of Song Thrushes in different regions of Europe and their finding locations (right) in January and February.

A continental-scale Migration Atlas

In September, work started on the development of a Eurasian African Bird Migration Atlas. This is the first component of the Convention on Migratory Species (CMS) Global Animal Migration Atlas. The Eurasian African Bird Migration Atlas is being developed and compiled by EURING. Stephen Baillie, Franz Bairlein, Wolfgang Fiedler, Fernando Spina and Kasper Thorup outline the aims of this exciting project.

The Convention on Migratory Species, often referred to as the Bonn Convention, is an environmental treaty that operates under the aegis of the UN Environment Programme. Migration is at the heart of what CMS does, so a Eurasian African Bird Migration Atlas will provide crucial information to underpin its work. The development of the Atlas has been funded with the contribution granted by the Government of Italy under the Migratory Species Champion Programme. To this end, Italy was recognised as Champion Plus for the period 2018–21.

EURING, the European Union for Bird Ringing, has long been keen to develop a continental-scale Migration Atlas that provides an up-to-date synthesis of the migration and movements of birds that breed or winter in Europe. In 2009 we held a workshop at the Institute of Avian Research in Wilhelmshaven, Germany, (home of the Helgoland Ringing Scheme) where we drew up our initial plans. Since then we have been looking for the substantial resources that would be needed to deliver this novel synthesis of migration patterns that will provide a crucial tool for research and conservation.

INFORMATION SOURCES

The EURING Databank (EDB) was founded in 1977 and for most of its life was hosted by the Netherlands Institute of Ecology. It moved to the BTO in 2005 and since then has been managed by two very able volunteers, first Chris du Feu and currently Dorian Moss. The EDB provides a repository for all ring-recovery data gathered by European Ringing Schemes and will be the main information source underpinning the Migration Atlas. In February 2018 it

held 4,260,211 conventional ring-recovery records and a further 8,327,054 local recaptures and resightings from 40 different ringing schemes. You can find a review of the work of the EDB and of the science that it supports in the July 2016 issue of *Ringling & Migration*.

Since the early 2000s we have seen rapid development of the use of electronic devices to track migrating birds, ranging from lightweight but relatively imprecise geolocators to high-resolution satellite transmitters. This information explosion is revolutionising our understanding of bird migration, resulting in several hundred new scientific papers every year. It is vital that as much of this tracking data as possible should be incorporated into the Migration Atlas and we are therefore delighted to be collaborating with Movebank in order to achieve this.

Movebank is hosted by the Max Planck Institute for Ornithology and is the largest global repository of tracking data, holding over a billion locations of tracked animals based on 5,083 studies of 811 taxa. It will provide both a means of accessing existing datasets (with the owner's permission) and a

mechanism through which further datasets can be added to the project.

DOCUMENTING MIGRATION ROUTES

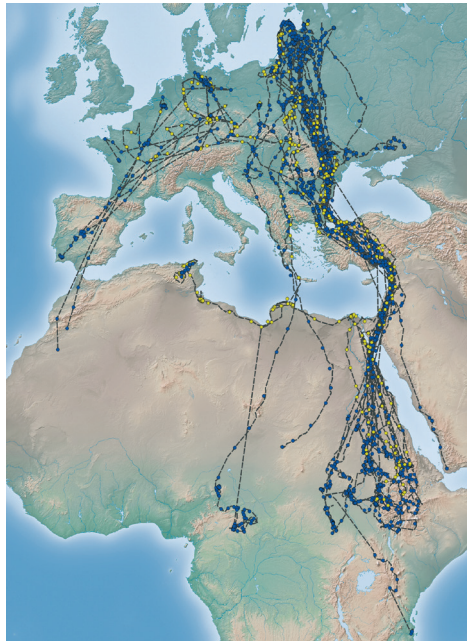
At the core of this Migration Atlas will be some 300 accounts of the migration and movements of individual species. Each account will include a set of key maps together with standard tables and a species text. Supplementary maps and tables will also be provided and there will be options for users to select from a range of static and dynamic outputs. We are planning options to display maps that include data gathered since the main Atlas project, so that aspects of the site will continue to be updated as new data become available.

We have not yet planned exactly what the Atlas will look like but the accompanying maps illustrate the sorts of material that we will be able to include. The two maps for Song Thrush show, first, the wide coverage of different European populations based on ring recoveries and, second, how birds move into west and southwest Europe in winter.

CONSERVATION INPUTS AND SYNTHESIS

CMS will set up an advisory committee that will help to ensure that atlas outputs are useful and accessible to a wide range of conservation practitioners working at national and international levels. They will also use this project to inform the broader aim of producing a Global Animal Migration Atlas. An executive summary, produced towards the end of the project, will provide a synthesis of key findings and how they can inform the conservation of migratory birds.

This project would not be possible without the huge efforts of thousands of ringers and researchers operating across Eurasia and Africa, together with the observers and members of the public who have reported ringed birds. We also thank all those who have contributed to data management and analysis. We hope that this flyway-scale migration atlas will further demonstrate the amazing ecological processes that underpin bird migration as well as providing a vital tool for bird conservation. Visit www.euring.org/migration-atlas for further information.



Tracking data will add many new dimensions to the project. Here we see the eastern flyway of Baltic Black Storks and a migratory divide in German Black Storks. Some German birds migrate through Iberia and into western Africa while others take more easterly routes into central or eastern Africa. Data by Max Planck Institute for Ornithology, stored in www.movebank.org

APPLIED RESEARCH MODULES

In order to maximise the conservation value of the Atlas we will include four modules addressing specific applied issues. Each module will be undertaken by a different research group with specialist expertise in the area concerned.

- **An analysis of the current migration seasons of quarry species** will focus on measuring the start and end dates of return migration in European Union member states to inform the EU's Key Concepts approach for the 82 species listed on Annex II of the Birds Directive. Quantifying the start of return migration is important because it is used to determine the end of the hunting season.
- **An analysis of killing of birds by man with particular reference to illegal killing** will use data on causes of recovery to assess those species that are most affected, together with the regions and time periods where most killing takes place. We will assess which species are most likely to be seriously affected and which regions should be priorities for conservation action.
- **Connectivity analyses** will be undertaken to inform the conservation of long-distance migrants. Connectivity is considered to be high where birds from particular breeding populations also winter together and low when there is extensive mixing of birds from different breeding populations across the wintering grounds. This has important implications for the ways in which populations are affected by environmental change, and will be studied for a set of species with appropriate data.
- **Work on changes in migration patterns** will assess the extent to which long-term ring-recovery data show major changes in migration routes and migratory behaviour. This will be investigated for a set of species with suitable long-term data and aims to provide a starting point for future detailed research on this important topic.