BTO
Looking out for birds

Migration and the Ecology of Migrant Birds

BTO has a long history of migration research underpinned by over a century of bird ringing and 70 years of nest-recording. Rapid declines in the number of long-distance migrants point to an urgent need for research with a strong international dimension. We are using recent technological developments to give new impetus to migration research.

Monitoring bird movements and habitat use in West Africa

BTO, in partnership with RSPB and the Ghana Wildlife Society and Naturama (Birdlife partners in Ghana and Burkina Faso), has developed a research programme on the ecology of Palaearctic-African migrants on their wintering grounds in West Africa. Many of these species are declining across Europe, potentially as a result of changes in land-use or climate in West Africa. To understand the possible causes of decline we are studying the ecology of migrants and monitoring patterns of bird movements and habitat use from the arid Sahel in northern Burkina Faso to the humid rainforests of southern Ghana.

Please contact to discuss how BTO can help you:

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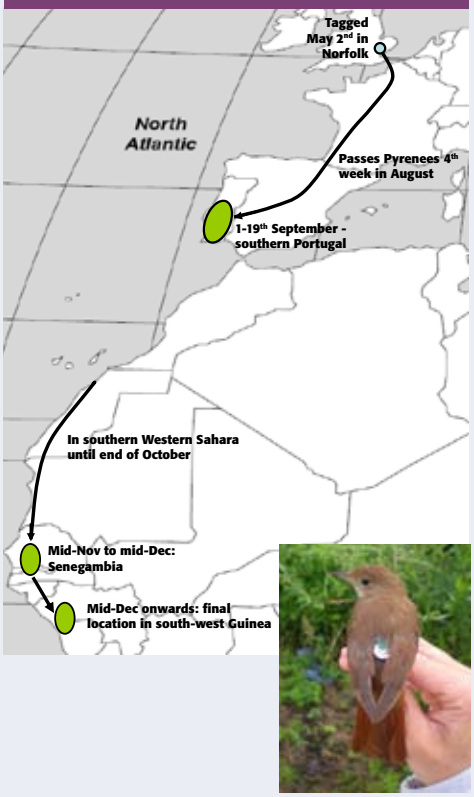
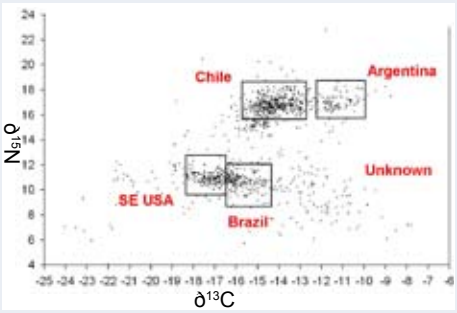
Photographs: Mark Hulme, Chris Orsman, Mark R Taylor, Jill Pakenham, Chas Holt

'We are using our expertise to undertake detailed ecological studies on individual species as well as tracking and following migrants to understand the factors in Europe and Africa that could be causing rapid declines in many of our long-distance migrants'

The journey of the tagged Nightingale



Using a small wing feather from a Knot we can find out where it spent the winter



Migrants in the UK

Many of our summer migrants are decline in number. Unusually, Willow Warblers are declining in southern Britain, but increasing in the north. This difference in population trajectories has provided the opportunity for a BTO/University of East Anglia research student to use BTO data to help to understand why Willow Warbler numbers are falling and to help us to explore causes of broader declines.

Tracking migration routes and wintering locations in long-distance migrants

Tracking devices are getting smaller and smaller and are revolutionising our understanding of migration. Nightingale populations are in rapid decline and, in partnership with the Swiss Ornithological Institute, we have used remote tracking devices ('geolocators', which are day-length monitoring cells), to track the migration routes of Nightingales and their winter movements in Africa. This knowledge will help us to understand environmental or anthropogenic pressures on migrants, target our research effort and to provide appropriate conservation advice.

Understanding the migration ecology of waders in Delaware, USA

Red Knot in Delaware Bay rely on the eggs of Horseshoe Crabs for fattening on their northward spring migration to Arctic breeding grounds. Overharvesting of Horseshoe Crabs has reduced food availability for birds and their survival rate has fallen. Understanding the migration ecology of Knot, using technological advances in the form of stable isotopes to identify and model shorebird wintering populations, has contributed to the development of an adaptive management plan for Horseshoe Crab fishery incorporating bird conservation.

The graph shows we can confidently use Carbon and Nitrogen stable isotope ratios in flight feathers to determine the wintering area of most knot passing through Delaware Bay. The main clusters are in Bahia Lomas (Chile), Rio Grande (Argentina), south-east USA and Brazil.

Looking to the future

With technology moving on apace there are tremendous opportunities to use satellite tracking and geolocators to finally unravel such mysteries as where species like Cuckoos and House Martins go in winter, and we welcome partnerships to develop this work further, leading to exciting new opportunities for research into migration and migrant ecology.

Partners: State of Delaware; US Fish & Wildlife Service

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Expertise Brochure

The British Trust for Ornithology (BTO) is one of the world's leading scientific research organisations specialising in birds and habitats. We are based in Thetford, Norfolk, England, with offices in Scotland, Wales and Northern Ireland.

We undertake impartial research and analysis, relating to birds, other wildlife and habitats, to advance the understanding of natural systems. The BTO provides high quality, impartial and policy-relevant data and information, relied upon for informed decision making. We work in partnership with the academic and conservation science communities, with Government Departments and Agencies, and with the private and voluntary sectors. The BTO has a unique combination of professional scientists and volunteers, and undertakes modern statistically robust surveys with web-based on-line data entry and retrieval. We add value to data through high powered analysis and a strong modelling capability.

Please contact to discuss how BTO can help you:

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Photographs: Dawn Balmer, Sarah Eglington, John Harding, Cathy Ryden, 1-Vision

BTO Strategy

The BTO has a vision of a world in which nature conservation and sustainable development are founded on evidence-based decision-making, and in which society understands, values and contributes to that process. We are in a time of unprecedented awareness and acknowledgement of environmental change, and the human response to that change must be informed by knowledge and understanding of species and habitats - the ecosystems that underpin our planet's life support. The BTO has a vital role to play in the provision of that knowledge, with citizen science being core to the delivery of the BTO strategy.

BTO Science Themes

Monitoring changing bird populations

Our ability to coordinate thousands of motivated and skilled volunteers, together with professional expertise, enable us to track many aspects of birds' lives. We provide facts, figures and indicators that Government and decision-makers use to inform policy, and which is the context for measuring change in our environment.

Black-tailed Godwit being colour-marked as part of an international migration project

Population dynamics and modelling

We integrate records collected by volunteers from many aspects of birds' life-cycles, through nest recording, ringing, and survey monitoring. This integrated population modelling means we are well placed to investigate the effects of environmental change on bird populations.

Ecosystems: from territories to landscapes

We are at the forefront of land-use issues in ornithology, with unique expertise of studying bird ecology in farmland, woodland, upland and urban habitats at multiple spatial scales. We employ traditional field approaches, innovative technology and state-of-the-art analytical techniques to investigate the consequences of land-use change.

Migration and the ecology of migrant birds

Understanding the ecology of migration, as birds move between habitats and countries is important if we are to understand the effects of environmental changes at a global scale. Our underpinning knowledge comes from a century of bird ringing and nest recording, and we are now using modern transmitter technology to unravel the ecology of migrant birds.

Climate change

Climate change impacts on biodiversity become apparent over long timescales, and the BTO's long-term datasets are ideally suited to understanding the underlying processes. We develop indicators and provide advice to Government, international and national bodies to inform policy.

Dr Phil Atkinson Head of International Research demonstrating research results to, the BTO's Patron, HRH The Duke of Edinburgh KG KT during a visit to BTO HQ

Wetland and marine research

Inland, coastal and marine waters of the UK all hold internationally important bird populations. BTO is at the forefront of delivering information on waterbirds in response to the requirements of legislation, infrastructure development and policy development. We are actively investigating energy developments offshore.

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