Bird Numbers 2010

"Monitoring, indicators and targets"

18th Conference of the European Bird Census Council

Book of Abstracts

22-26 March 2010
Cáceres • Extremadura • Spain

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Organizing Committee:
Juan Carlos del Moral, Fernando Barrio, Virginia Escandell, Laura Trapero, Ana Bermejo, Blas Molina, David Palomino, Arantza Leal, Javier de la Puente, Carmen Fernández, Josefina Maestre & Marcelino Cardalliaguet.

Scientific Committees:
EBCC: Dr Richard D. Gregory, Dr Hans-Günther Bauer, Dr Anny Anselin, Dr Ruud P. B. Foppen, Dr Åke Lindström, Dr Frederic Jiguet, Dr Alexander Mischenko, Dr Svetoslav Spasov, Dr Ian Burfield, Dr David Noble & Dr Petr Voríšek.
Local: Dr Alejandro Sánchez, Dr David Serrano, Dr Javier Seoane, Dr Lluís Brotons, Dr David Palomino, Dr Ana Bermejo & Juan Carlos del Moral.

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SEO/BirdLife
C/ Melquiades Biencinto 34
E-28053 Madrid. Spain
seo@seo.org
Phone: +34 914 340 910
Fax: +34 914 340 911
www.seo.org

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PROGRAMME

Tuesday 23 March 2010

Time		Room 1 "MALINCHE" ROOM	Room 2 "GARCÍA MATOS" ROOM
9:00	9:45	**Micheal O'Briain:** The contribution of species/site monitoring to biodiversity and nature conservation in Europe	Plenary
		Session 1 BIODIVERSITY INDICATORS I: POLICIES	**Session 2** BEYOND DATA GATHERING
9:45	10:05	Towards developing a global Wild Bird Index. Danaë K. Sheehan, Mark Eaton & Richard D. Gregory	Using fine-grained bird atlases to develop maps of conservation value. Sergi Herrando, Lluís Brotons, Santi Guallar & Javier Quesada
10:05	10:25	SEBI 2010 project - lessons learnt and future challenges. Katarzyna Biała & Frederik Schutyser	Calculating national breeding bird abundances on the basis of the German Common Breeding Bird Survey. Rainer Droeschmeister, Holger Heidrich-Riske, Kai Lorentz, Alexander Mitschke & Christoph Sudfeldt
10:25	10:45	Pan-European Common Bird Monitoring Scheme by 2010. Petr Voříšek, Arco van Strien, Jana Škorpilová, Alena Klvanova & Richard D. Gregory	Enhancing volunteer bird monitoring coverage of the uplands: experiences from the Building Bird Monitoring in Scotland initiative. Mandy Cook, John Calladine* & Chris Wernham
10:45	11:05	Plea for a new type of aggregated common birds indicator measuring biodiversity loss. Martin Flade & Johannes Schwarz	Monitoring of breeding birds in the international Wadden Sea: an example of cross-border cooperation in monitoring and management. Kees Koffijberg, Lieuwe Dijksen, Bernd Hälterlein, Karsten Laursen, Gerold Lüerßen, Petra Potel & Stefan Schrader
11:05	**11:30**	**Coffee break**	
11:30	12:15	**Gregory S. Butcher:** Using birds as indicators of the health of the environment in the USA	Plenary
		Session 3 BIODIVERSITY INDICATORS II: DEVELOPMENT	**Session 4** COMMON BIRD MONITORING
12:15	12:35	Spatial mismatch between biodiversity components in birds: new challenges for global conservation strategies. Vincent Devictor, David Mouillot, Christine Meynard, Frédéric Jiguet, Wilfried Thuiller & Nicolas Mouquet	Common bird monitoring in Flandes, Belgium: changing densities in forest and farmland birds. Glenn Vermeersch, I. Lewylle & Anny Anselin
12:35	12:55	Dynamics of bird distribution in Mediterranean mosaic landscapes affected by large forest fires: An application of a large-scale monitoring database. Elena L. Zozaya, Lluís Brotons, Sergi Herrando & Pere Pons	Population trends of common breeding birds in Lombardy, Northern Italy, 1992-2009. Dario Massimino, Valerio Orioli & Luciano Bani
12:55	13:15	Mind the gap! Which European bird species need better monitoring, and where? Ian Burfield	Beyond birds: how other taxa can be effectively monitored by volunteer bird surveyors. Kate Risely & David Noble
13:15	13:35	Are raptors good indicators of overall biodiversity? A case study from Dadia National Park. Stefan Schindler, Vassiliki Kati, Martin Prinz & Kostas Poirazidis	Habitat specialization in Latvian forest birds – suggestions to forest bird index. Ainārs Auniņš, Jānis Priednieks, Māris Strazds & Viesturs Ķerus
13:35	**15:00**	**LUNCH**	
15:00	15:45	**Manuel B. Morales:** Recent trends in steppe bird populations: influence of climate, land use and agriculture intensification	Plenary
		Session 5 FARMLAND I: CONSERVATION ISSUES	**Session 6** WATERBIRDS

Time		Room 1 "MALINCHE" ROOM	Room 2 "GARCÍA MATOS" ROOM
15:45	16:05	Linking farmland bird abundances and agri-environment schemes in France using Bayesian models. Karine Princé & Frédéric Jiguet	Using Wetlands International's Waterbird Population Estimates series to produce global waterbird indicators. Simon Delany & Szabolcs Nagy
16:05	16:25	Effectiveness of the Italian national protected areas system in conservation of farmland birds: a gap analysis. Guido Tellini Florenzano, Tommaso Campedelli, Guglielmo Londi, Simonetta Cutini & Lorenzo Fornasari	Countrywide hunting ban on waterbirds in Slovakia in the year 2006 – unexpectedly successful experiment. Katarína Slabeyová
16:25	16:45	Farmland birds do better in High Nature Value (HNV) Farmlands. Aggeliki Doxa, Maria Luisa Parrachini & Frédéric Jiguet	The International Waterbird Census: The world's most extensive site-based bird monitoring system. Simon Delany & Stephan Flink
16:45	17:05	Is the Atlantic metapopulation of Common Quail (Coturnix coturnix) declining? Preliminary results of a transnational monitoring programme. José Domingo Rodríguez-Teijeiro, Francesc Sardà-Palomera, Inàcio Alves, Yannick Bay, Agostinho Beça, Bernard Blanchy, Bernard Borgogne, Bernard Bourgeon, Pedro Colaço, Jacky Gleize, Antonio Guerreiro, Mohammed Maghnouj, Christophe Rieutort, Denis Roux & Manel Puigcerver	Use of Species Distribution Modelling based on data from the African Waterbird Census to predict waterbird distributions in Africa and identify gaps in knowledge of distribution. José Manuel Ochoa-Quintero & Szabolcs Nagy
17:05	**17:30**	**Coffee break**	
		Session 7 WORKSHOP: ATLAS	**Session 8** ECOLOGICAL BASES OF THREAT
17:30	17:50	**A new European Breeding Bird Atlas?** Ruud Foppen, David Noble, H.-G. Bauer, Frédéric Jiguet, Ian Burfield & Lluís Brotons	Assessing the ecological basis of conservation priority lists for bird species in an island scenario. Javier Seoane, Luis M. Carrascal & David Palomino
17:50	18:10		Sustainable breeding populations of Annex I species: how to reach and secure them? Anny Anselin, Glenn Vermeersch, Jos Rutten, Koen Devos, Peter Adriaens & Gerald Louette
18:10	18:30		Population changes in Czech passerines: quantifying the effects of life histories, ecological requirements and phylogeny. Jiří Reif, Zdeněk Vermouzek, Petr Voříšek, Karel Šťastný, Vladimír Bejček, Jiří Flousek, Josef Chytil & Tomáš Telenský
		ATLAS	Development and use of national habitat-specific bird-indicators. Henning Heldbjerg & Jørn Lennart Larsen
18:30	18:40	Bird Atlas 2007-11 in Britain and Ireland: summary of methods and provisional findings. Dawn Balmer, Simon Gillings, Brian Caffrey & Bob Swann	
18:40	18:50	Catalan Winter Bird Atlas: an analytical overview. Santi Guallar, Sergi Herrando, Javier Quesada, Lluís Brotons, Joan Estrada & Marc Anton	
		NEW BBS	Migration counts as a tool for bird conservation: the case of the Strait of Gibraltar. Gonzalo M. Arroyo, Luis Barrios, Alejandro Onrubia, Antonio Román Muñoz, Miguel Ferrer, Keith Bildstein, Chris Farmer, Andrés de la Cruz, Juan Ramírez, Miguel González, Javier Elorriaga, Blanca Pérez & Carlos Torralvo
18:50	19:00	Common Bird Monitoring in Romania between 2006-2009. Zoltán D. Szabó, Cristi Domşa, Nagy H. Beáta & Fenesi Annmária	
19:00	19:10	The state of Bulgaria's common birds 2010: results from the common bird monitoring scheme for the period 2005-2009. Iordan Hristov	
19:10	19:45	**POSTER SESSION**	**Spatial Modelling of Bird Monitoring Data** Henk Sierdsma & Lluís Brotons

Wednesday 24 March 2010

Time		Room 1 "MALINCHE" ROOM	Room 2 "GARCÍA MATOS" ROOM
9:00	9:45	**Ian Newton:** Migration and bird numbers	Plenary
		Session 9 MIGRATION AND MONITORING	**Session 10** FARMLAND II: POPULATION TRENDS
9:45	10:05	A different perspective on the monitoring of migratory birds. Javier Pérez-Tris	Changes in agricultural management and farmland bird populations in Poland following accession to the European Union. Fiona Sanderson, Marta Kucharz, Marek Jobda & Paul Donald
10:05	10:25	Delayed departure and shifted wintering ranges of waterfowl in Northern Europe. Aleksi Lehikoinen, Kim Jaatinen & Risto A. Väisänen	Temporal changes in winter abundance of common farmland birds in France covary with large-scale climatic conditions. Cyril Eraud, Denis Roux, Jean-Marie Boutin & Hervé Lormée
10:25	10:45	Life-history and ecological correlates of population change in European birds, with particular reference to Afro-Palearctic migrants. Steven Ewing, Richard D. Gregory, Arco van Strien, Adam Butler & Petr Voříšek	Population trends of farmland birds in farmland and non-farmland habitats. Ola Olsson, Martin Green, Åke Lindström, Richard Ottvall, Martin Stjernman & Henrik Smith
10:45	11:05	Changes in the timing of visible bird migration in The Netherlands in autumn. Chris van Turnhout	Comparing land sparing and land sharing strategies for the conservation of farmland and forest birds in exploited landscapes. Yves Bas & Frédéric Jiguet
11:05	**11:30**	**Coffee break**	
11:30	12:15	**Luis M. Carrascal:** Modelling bird distribution and abundance with different subset of predictive variables	Plenary
		Session 11 MODELLING I: GENERAL ISSUES	**Session 12** STEPPE BIRDS
12:15	12:35	Using the NDVI for modelling bird distributions in changing farmland landscapes: predicting the dynamic distribution of the common quail Coturnix coturnix. Francesc Sardà-Palomera, Manel Puigcerver, Lluís Brotons & José Domingo Rodríguez-Teijeiro	Meadow bird monitoring in France and Russia: first results of comparative researches. Joël Broyer, Alexander Mischenko, Olga Sukhanova & Laurence Curtet
12:35	12:55	Checklist programs as a source of data for bird monitoring: designing analyses and model validations to account for unequal spatial and temporal sampling effort. Wesley M. Hochachka, Daniel Fink & Steve Kelling	The impact of post-Soviet land use change on steppe bird populations in Kazakhstan. Johannes Kamp, Paul F. Donald & Norbert Hölzel
12:55	13:15	Phenological and resource use traits explain long term population trends in UK passerine birds. Lara Salido, B. Purse, R. Marrs, D. Chamberlain & S. Shultz	Assessing the conservation status of the steppe habitat in Andalusia (S Spain) through the long-term monitoring of steppe birds. José R. Garrido, Marcos Moleón, Matías de las Heras & Francisco Romero
13:15	13:35	Report of the EBCC Spatial Modelling Group: update on spatial modelling of bird monitoring data in Europe. Henk Sierdsema, Lluís Brotons, Stuart Newson, Frédéric Jiguet, Marc Kéry & Richard D. Gregory	Using multi-source remote sensing data for describing steppe bird landscape requirements in the Castro Verde SPA, Portugal. Pedro J. Leitão, Francisco Moreira & Patrick E. Osborne
13:35	**15:00**	**LUNCH**	
15:00	15:45	**Christiaan Both:** Climate change and birds: from phenology to population trends	Plenary
		Session 13. GLOBAL CHANGE I: HABITAT APPROACHES	**Session 14** TRAINING SESSION: BIRDSTAT

Time		Room 1 "MALINCHE" ROOM	Room 2 "GARCÍA MATOS" ROOM
15:45	16:05	Predicting the potential impacts of future land cover changes on breeding bird communities in the Italian Alps. Marco Girardello, Simone Tenan & Paolo Pedrini	**The use of BirdStats** Tom van der Meij, Arco van Strien & Mark Eaton
16:05	16:25	How much have recent changes in forest age structure influenced habitat quality of common bird species in Latvia? Elmārs Pēterhofs	
16:25	16:45	Abundance and immunocompetence of alpine passerines in the Cantabrian Mountains: potential impact of climate change. Leandro Meléndez, Jesús Ángel Lemus, Guillermo Blanco, Mónica García, María José Bañuelos & Paola Laiolo	
16:45	17:05	The effects of N.A.O. and land use change on distribution an abundance of Falco naumanni in Sicily. Maurizio Sarà	
17:05	**17:30**	**Coffee break**	
17:30	19:10	**BOARD MEETING**	**Presentation of** **"Conservation Status of** **Birds in Spain in 2010"** Spanish Environment Minister & Presindent and Chairman SEO/BirdLife
19:10	19:45	**POSTER SESSION**	**POSTER SESSION**

Fryday 26 March 2010

Time		Room 1 "MALINCHE" ROOM	Room 2 "GARCÍA MATOS" ROOM
9:00	9:45	**Richard D. Gregory:** Climate change indicators: new generation indicators	Plenary
		Session 15 GLOBAL CHANGE II: INDICATORS	**Session 16** WEB TOOLS
9:45	10:05	The role of EBCC monitoring data in climate change research. Ruud B. Foppen, Chris van Turnhout, Richard D. Gregory, Arco van Strien & Vincent Devictor	Integrating web-technology and ornithological atlasing: experiences from Bird Atlas 2007-11 in Britain and Ireland. Simon Gillings, Dawn Balmer, Iain Downie & Karen Wright
10:05	10:25	A vulnerability index for breeding birds in changing climate and land use. Ramona Maggini, Boris Schröder, Niklaus E. Zimmermann, Janine Bolliger, Anthony Lehmann, Ruud Foppen, Hans Schmid & Niklaus Zbinden	Emerging issues in web-based collection of ornithological data: the UK perspective. Andy Musgrove
10:25	10:45	A climate change indicator for Swedish birds. Åke Lindström, Vincent Devictor, Martin Green, Richard Ottvall & Henrik Smith	Do we need a European database for bird sightings and if yes, what is the role of the EBCC? Hans Schmid
10:45	11:05	Climate change and bird population trends: Evidence from 40 years of monitoring in the UK. Sarah Eglington, Stuart Newson & Dan Chamberlain	Potential uses of ad hoc data from birdwatchers for monitoring and conservation: the World-birds family of web tools. Johannes Kamp, Stephen R. Baillie, Paul F. Donald, Mark A. Eaton, Ian J. Fisher & Richard D. Gregory
11:05	**11:30**	**Coffee break**	
11:30	12:15	**Marc Kéry:** Hierarchical modeling of distribution and abundance in metapopulation designs	Plenary
		Session 17 MONITORING METHODS	**Session 18** GLOBAL CHANGE III: PHENOLOGY AND DISTRIBUTION
12:15	12:35	Detection probability analysis offers new opportunities for bird census work. Arco van Strien, Chris van Turnhout, Henk Sierdsema, Ruud Foppen & Leo Soldaat	Could climate change have something to do with changes in bird distribution in Latvia? Viesturs Ķerus, Ainārs Auniņš, Māris Strazds & Jānis Priednieks
12:35	12:55	Hierarchical models for smoothed population indices: the importance of considering among-site variations in population trends. Tatsuya Amano, Hiroshi Okamura & William J. Sutherland	Changes in bird distribution due to global warming – a first high resolution modelling approach for German. Thomas K. Gottschalk, Christoph Sudfeldt, Alexander Mitschke & Rainer Dröschmeister
12:55	13:15	Time means… species! On the performance of species richness estimators and different sampling schemes. Pedro A. Salgueiro, Hugo Costa & J. E. Rabaça	Birds and butterflies tracking climate change: which are faster? Vincent Devictor, Chris van Swaay, Tom Brereton, Lluís Brotons, Dan Chamberlain, Janne Heliölä, Sergi Herrando, Romain Julliard, Mikko Kuussaari, Åke Lindström, Jiri Reif, David Roy, Arco van Strien, Oliver Schweiger, Constantí Stefanescu, Zdenek Vermouzek, Chris van Turnhout, Michiel Wallis de Vries & Frédéric Jiguet
13:15	13:35	Swift counts: a new methodological approach. Pedro Pereira, Pedro Salgueiro & Carlos Godinho	Population decline of long-distance migratory species in Hungary. Tibor Szép, Károly Nagy, Zsolt Nagy & Gergő Halmos
13:35	**15:00**	**LUNCH**	
15:00	15:45	**Daniel Sol:** The paradox of invasions in birds	Plenary
		Session 19 INVASIVE BIRDS AND HUMAN EFFECTS	**Session 20** WORKSHOP: INTERNET PLATFORMS

Time		Room 1 "MALINCHE" ROOM	Room 2 "GARCÍA MATOS" ROOM
15:45	16:05	Population change of avian predators and grey squirrels in England: is there evidence for an impact on avian prey populations? Stuart E. Newson, Eric. A. Rexstad, Stephen R. Baillie, Stephen T. Buckland & Nicholas J. Aebischer	**Internet/web-based monitoring platforms**
16:05	16:25	Site-based monitoring and assessment breeding bird communities of the protected mires in Estonia: the effect of recreational disturbance on habitat use of birds. Agu Leivits, Aivar Leito, Ivar Ojaste, Meelis Leivits & Murel Merivee	
16:25	16:45	Habitat and landscape assessment of the impact of ski-runs on alpine grassland bird communities. Enrico Caprio, Marco Isaia & Antonio Rolando	
16:45	17:05	Following raptors and soaring birds populations in wind farms: a methodological protocol. Ana Teresa Marques, Joana Bernardino, Hugo Costa & Miguel Mascaranhas	
17:05	**17:30**	**Coffee break**	
		Session 21 WORKSHOP: PARTNERSHIPS	**Session 22** MODELLING II: APPLICATIONS
17:30	17:50	**Developing partnerships between countries to improve breeding bird monitoring schemes in Europe** Petr Voříšek & Jana Škorpilová	How far do we stand from the truth : featuring four types of phenological modeling methods using simulated data. Jean-Pierre Moussus, Romain Julliard & Frédéric Jiguet
17:50	18:10		Using atlas and census data of Montagu's and hen harriers in Spain to obtain favourability areas and forecast the implications of climate change on both species. Alba Estrada, Beatriz Arroyo & Ana Luz Márquez
18:10	18:30		Multispecies synchrony with climatic variables in the study of seabird adult survival at the Isle of May (Scotland). José J. Lahoz-Monfort, Byron J. T. Morgan, Michael P. Harris, Sarah Wanless & Stephen Freeman
18:30	18:40		Spatial distribution models for the Lesser Kestrel Falco naumanni in central Greece. Antonia Galanaki & A. Fielding
18:40	19:10		A protocol for setting quantitative targets for species recovery. Mark A. Eaton, Andy Evans, David G. Noble, Nicholas A. Aebsicher, Andy F. Brown, Richard D. Gregory, Andy J. Musgrove, Peter Cranswick, David W. Gibbons, Phil V. Grice, Leigh Lock & Robin Wynde

ABSTRACTS OF PLENARY LECTURES AND ORAL COMMUNICATIONS

Session 1. BIODIVERSITY INDICATORS I: POLICIES

THE CONTRIBUTION OF SPECIES/SITE MONITORING TO BIODIVERSITY AND NATURE CONSERVATION IN EUROPE

Micheal O'Briain*, Angelika Rubin & Anne Teller
DG Environment, European Commission
* Corresponding author:
micheal.o'briain@ec.europa.eu

It is clear that both the current global target of significantly reducing biodiversity loss worldwide by 2010 as well as the more ambitious EU target of to halt biodiversity loss in the EU by 2010 will not be achieved. Implementation of the EU biodiversity action plan has also revealed that the knowledge base is still not adequately developed and that there are limited monitoring tools at the EU scale to assess progress towards meeting biodiversity objectives.

The strongest EU monitoring frameworks are linked to reporting on implementation of environmental legislation. Biodiversity indicators, including species and site indicators, have also been developed within the framework of the EEA led project on streamlining of biodiversity indicators in Europe (SEBI 2010). The PECBMS and the Wild Bird Indicators are strategically valuable schemes to inform EU policies including Sustainable Development and Rural Development Indicators. There is a need to continue to ensure the robustness of these key bird data sets.

The Habitats Directive aims to achieve 'favourable conservation status' for species and habitat types of EU conservation concern and provides a mechanism for their regular surveillance at biogeographical level. The first 2009 conservation status assessment revealed that only 17% of assessments were favourable and represents a key baseline against which to assess future progress. It also showed a severe gap of knowledge and data in some Member States and especially the marine environment, a clear sign that monitoring systems need to be strengthened or set-up in first place. The Birds Directive, which provides a framework to protect all wild birds species in the EU, does not set out such a clear overall conservation objective or mechanisms for monitoring by Member States. To date the only European scale conservation status assessments have been those published by BirdLife International in 1994 and 2004, the most recent of which indicates that 48% of species have an unfavourable status. The possibilities of strengthening bird monitoring and reporting under the Birds Directive by EU Member States are being examined.

EU Member States have provided an initial conservation assessment of the species and habitats within each of their Natura 2000 areas as part of the site notification process. A key challenge over the coming decade will be determining the contribution of these sites to the attainment of conservation goals, the setting of clear 'conservation objectives', and the putting in place of effective management and restoration measures, underpinned by monitoring systems.

EU nature legislation will continue to play a central role in the post 2010 EU biodiversity strategy. However, there is also increasing focus on ecosystem services, inspired by work on the economics of ecosystems and biodiversity (TEEB). Development of the concept of a 'green infrastructure' may provide a unifying perspective to ensure that biodiversity and ecosystem services are adequately addressed in major land and water use policies, including in the context of climate change. This is likely to lead to a stronger 'ecosystem' dimension to future monitoring and assessments. The extent to which bird monitoring and research can usefully contribute to assessing the healthy func-

tioning of ecosystems and their services has still to be determined.

TOWARDS DEVELOPING A GLOBAL WILD BIRD INDEX

Danaë K. Sheehan*, Mark A. Eaton & Richard D. Gregory
Royal Society for the Protection of Birds, Sandy, Bedfordshire, SG19 2DL, UK
* Corresponding author:
danae.sheehan@rspb.org.uk

The Global Wild Bird Index (WBI) project began in 2007, coordinated and funded by the RSPB and BirdLife International, with additional support from the 2010 Biodiversity Indicators Partnership, with the ultimate aim to develop a Wild Bird Index to monitor and report on the impact of environmental change on bird populations worldwide.
Following a review of ongoing bird monitoring activities in Africa, a detailed global review of existing bird monitoring schemes, and capacity assessment of potential participating countries, is currently being carried out. In some countries counts of particular species or groups are well established, popular and extend back some time. Some of these existing schemes could be expanded, whilst others could be harmonized, enhanced and joined up to maximise their effectiveness and usefulness.
The methodology for producing WBIs is well developed; WBIs are well-established in Europe, with a Pan-European WBI being used to measure progress towards the EU's aim of halting biodiversity loss by 2010. WBIs have recently been published for the United States and an indicator initiative has begun in Australia. By incorporating data from formally designed surveys only, and using advanced statistical techniques, such projects can deliver scientifically robust and representative indicators. Since contributing data are generated at the local level, WBIs are scalable and can be aggregated or disaggregated at the global, regional and national (sub-national) level, or by habitat, guild, or aspects of species ecology. However, data coverage is currently patchy and the WBI is not presently applicable at a global scale; if representative global coverage can be achieved, the WBI stands to become one of the leading measures of global biodiversity change.
The project is working with local partner organisations in a number of countries with the intention of building local and regional capacity for Bird Population Monitoring (BPM) schemes with long-term sustainability by engaging volunteer observers in simple and rewarding bird monitoring with clear objectives and conservation value. Where such schemes already exist, the project will develop WBIs from national population monitoring schemes, coordinating and facilitating the collation of species' indices. Where there are no schemes, it will provide tools and support to implement similar data collation and synthesis in a representative set of countries across regions.
The project is already supporting the establishment of several new bird-monitoring schemes in Africa (e.g. Botswana, Uganda, Rwanda) to extend the scope of the WBI project. The project is also implementing online data collection through bespoke new development of the 'Worldbirds' system.

SEBI 2010 PROJECT - LESSONS LEARNT AND FUTURE CHALLENGES

Katarzyna Biala* & Frederik Schutyser
European Environment Agency, Kongens Nytorv, 6, DK-1050 Copenhagen K, Denmark
* Corresponding author:
katarzyna.biala@eea.europa.eu

SEBI 2010 (Streamlining European Biodiversity Indicators for 2010) is a process initiated in 2005 to select a set of indicators to monitor progress towards 2010 in Europe. Its institutional partners are the European Environment Agency (and its European Topic Centre on Biological Diversity), the European Centre for Nature Conservation, the United Nations Environment Programme World Conservation Monitoring Centre (UNEP-WCMC), the European Commission, the Joint Secretariat of the Pan-European Biological and Landscape Diversity Strategy (PEBLDS), and the

Czech Republic (as lead country for the Kiev Resolution on Biodiversity's Action Plan on Monitoring and Indicators). The SEBI 2010 process covers 53 countries across Europe.

SEBI 2010 built on the conceptual framework provided by the CBD, and worked with a set of headline indicators within the CBD focal areas.

Key lessons from SEBI 2010 to date include the following:

- Policy context and organisation of the process: experts, countries, institutional partners: SEBI 2010 benefited from existing networks and processes.
- Selection of the indicators: a thorough selection process was used to select specific indicators. The final selection was of course to some extent based on expert opinion and driven by the need to select at least one indicator per headline.
- Strengths and weaknesses of the process and the set: the process was transparent and involved a wide range of experts from governments, research and NGOs. Stronger direct links with countries to compare national sets with the SEBI set would be useful. While geographical coverage is good for EU countries and EEA member states, coverage for European countries further East is not satisfactory.

The set must be considered the best available now, but there certainly is room for improvement. Some indicators provide specific measurements and trends on genetic, species and ecosystem/landscape diversity, but many have a much more indirect link to biodiversity. Very few were established specifically to assess biodiversity. Coverage of the components of biological diversity needs to be improved and the focal areas of access and benefit-sharing and sustainable use need to be strengthened. Establishing stronger links between the indicators is essential to draw policy relevant conclusions.

Challenges for 2010 and beyond: The indicator framework for monitoring progress towards the new post-2010 target could be based on the current CBD framework around focal areas, but add specific targets on threats and ecosystem services. This would allow for a stronger sectoral approach and focus on drivers, which would be required to influence sectors more effectively.

PAN-EUROPEAN COMMON BIRD MONITORING SCHEME BY 2010

Petr Voříšek[1]*, Arco van Strien[2], Jana Škorpilová[1], Alena Klvanova[1] & Richard D. Gregory[3]

[1] Pan-European Common Bird Monitoring Scheme, Czech Society for Ornithology, Na Bělidle 252/34, CZ-150 00 Prague 5, Czech Republic

[2] Statistics Netherlands, PO Box 24500, 2490 HA The Hague, The Netherlands

[3] Royal Society for Protection of Birds, The Lodge, Sandy Bedfordshire, SG19 2DL, UK

* Corresponding author: euromonitoring@birdlife.cz

Since its commencement in 2002, The Pan-European Common Bird Monitoring Scheme (PECBMS) has produced five updates of European species population indices and indicators; the next update is planned for June 2010. While the data quality and geographical and temporal coverage has been increasing, the outputs of the scheme has confirmed repeatedly dramatic decline of European common farmland birds. The European farmland bird indicator fell down the level of 50% recently in comparison to early 1980s and the population trends have been mimicked by an index of biomass too. The trends of farmland birds have been less negative in new EU Member States than those in Old EU States suggesting a link to changes in land and crop management. Using a risk assessment framework, we expect that populations of farmland birds will decline further, especially if agriculture intensification is accelerated in Eastern European countries. Loss of set-asides and continuing land abandonment can have detrimental effect too.

The groups of common forest birds and all common birds have declined moderately, though significantly. The PECBMS outputs have also confirmed that climate change is

already having detectable effect on bird populations at European scale.
According to PECBMS results, the European nature conservation appears to fail to achieve the target to halt decline in biodiversity by 2010. The wild bird indicators are used by policy makers as official biodiversity indicators at both, national and European scales.
Despite wide acceptance and use of the wild bird indicators, the PECBMS aims to improve a process of data quality control, the quality of species trends and indicators too. We also aim to improve geographical coverage: the 2009 update of indices is based on data from 22 countries and it is expected that this figure will be higher with each update.
The most updated results and new findings from PECBMS will be presented too.

PLEA FOR A NEW TYPE OF AGGREGATED COMMON BIRDS INDICATOR MEASURING BIODIVERSITY LOSS

Martin Flade[1]* & Johannes Schwarz
[1] Landesumweltamt Brandenburg, Dorfstr. 60, D-16230 Brodowin, Germany
* Corresponding author: flade@dda-web.de

Combined or aggregated common birds indicators, consisting of mean population index curves of a set of common breeding bird species, are used by the European Commission and national governments as biodiversity indicators, e.g. to measure conservation or agricultural policy success. In the European Union, the 'wild bird indicator' was recently adopted to assess the progress towards the policy target of halting the loss of biodiversity until 2010, and the 'farmland bird indicator' is taken to measure the success of agricultural policy and agri-environmental schemes. Without any doubt this is a big success of the Pan-European Common Birds Monitoring Scheme of the EBCC and of high importance for the further development of European conservation strategies.

But in course of the discussion of establishing further indicators for other habitat types than farmland the question came up: what do these indicators really measure? Up to now, the established indicators calculate annual increase rates against decline rates. That means, theoretically, if 50% of the species would constantly increase at a certain rate and 50% would decrease at the same rate, that in a medium or long term we would lose 50% of the species while the aggregated indicator would remain more or less stable. Even worse: if - hypothetically - species would become completely extinct, the aggregated indicator would react positively afterwards, because the rate of decline of that species would not influence the mean multi-species indicator anymore. Thus, the recently used indicators do measure anything but certainly NOT biodiversity or biodiversity loss. This implies, for instance, that the progress towards the target of halting or slowing down the loss of biodiversity can definitely not be measured with such type of indicator. Nevertheless, for a certain period of time the farmland birds indicator did mirror the effects of adverse large-scale changes of farmlands to birds, since the majority of farmland birds, and thus the combined index as well, showed declines. But in habitat types where only a certain group of species is on decline and others are increasing, the recently used indicators will not work anymore.
Based on the data of the German common birds survey (period 1989-2008) we will demonstrate several options of a new type of a simple aggregated indicator on an annual basis that really measures biodiversity loss against policy targets, and is independent of more or less arbitrarily chosen target values, as used until now in some countries (like Germany, for instance). Especially with regard to combined biodiversity indicators for other habitat types than farmland (e.g. forest bird indicator, urban birds indicator, wetland birds indicator, overall wild bird indicator) it is recommended to switch to such new type of biodiversity loss indicators.

Session 2. BEYOND DATA GATHERING

USING FINE-GRAINED BIRD ATLASES TO DEVELOP MAPS OF CONSERVATION VALUE

Sergi Herrando[1]*, Lluís Brotons[1, 2], Santi Guallar[1] & Javier Quesada[1]
[1] Catalan Ornithological Institute, Museu de Ciències Naturals de la Ciutadella, Passeig Picasso s/n, 08003 Barcelona, Catalonia, Spain
[2] Centre Tecnològic Forestal de Catalunya, Àrea de Biodiversitat, Carretera de Sant Llorenç, km 2, 25280 Solsona, Catalonia, Spain
* Corresponding author: ornitologia@ornitologia.org

Bird atlases constantly improve our understanding on species distributions, population sizes and trends, which represent crucial elements to determine the threat status of the species all over the studied areas. On the other hand, conservation planners require quantitative criteria to decide where biodiversity preservation should be prioritary, and in which cases it should be balanced with other human activities. We used data from the Catalan Breeding Bird Atlas 1999-2002 (CBBA) to develop a simple quantitative method to assist in the decision making process of the landscape planning by integrating information of species distribution and their individual IUCN extinction risks. We generated an Index of Cumulative Threat Status (ICUTS) from the summation of the numerical threat status (LC = 1, NT = 2, VU = 3, EN = 4 and CR = 5) of each species present in a given UTM square to the nth power (n from 1 to 7). Using a heuristic approach, we selected a power of n = 5 after comparing the results of this series of indexes with those provided by 10 experts on the avifauna of the region. Then, we generated maps of conservation value by applying the ICUTS to each 10 x 10 km square of Catalonia.
The CBBA provides 10 x 10 km distributions for all the breeding species in Catalonia but only shows 500 x 500 m distributions for 83% of them. As our objective was to create one fine-grained conservation value map, we checked the spatial robustness of our method when using only the species that have 500 x 500 m distribution maps by generating two maps of conservation value based on the ICUTS at 10 x 10 km resolution: one comprising all breeding bird species in the study region (219 species, recent colonizers and exotics excluded), and a second one with only those bird species for which fine-grained distributions (500 x 500 m) were also available in the CBBA (182 species). In spite of the difference in the number of species included in the two 10 x 10 km maps, we found similar geographical patterns and considered that the fine-grained conservation value map represent the whole breeding avifauna of Catalonia.
This conservation map has been already used by the Barcelona Province Government and by the Catalan Government in several projects of landscape planning. The approach developed in this study represents a meaningful synthesis of an entire atlas that has resulted particularly helpful in landscape planning because of its spatial continuity, fine-grained resolution and easy interpretation.

CALCULATING NATIONAL BREEDING BIRD ABUNDANCES ON THE BASIS OF THE GERMAN COMMON BREEDING BIRD SURVEY

Rainer Droeschmeister[1]*, Holger Heidrich-Riske[2], Kai Lorentz[2], Alexander Mitschke[3] & Christoph Sudfeldt[3]
[1] Federal Agency for Nature Conservation, Konstantinstraße 110, 53179 Bonn, Germany, droeschr@bfn.de
[2] Federal Statistical Office, Gustav-Stresemann-Ring 11, 65189 Wiesbaden, Germany, holger.heidrich-riske@destatis.de, kai.lorenz@destatis.de
[3] Federation of German Avifaunists, Zerbster Str. 7, 39264 Steckby, Germany, mitschke@dda-web.de, sudfeldt@dda-web.de
* Corresponding author: droeschr@bfn.de

The German Common Breeding Bird Survey (GCBBS) is the main scheme for monitoring German common and widespread breeding

bird species. The GCBBS is organized by the Federation of German Avifaunists (Dachverband Deutscher Avifaunisten, DDA) and was launched in 2004 in order to provide better habitat and geographical coverage of Germany compared with the former German Common Bird Census (GCBC). National coordination and data analysis of GCBBS is funded by the Federal Agency for Nature Conservation (Bundesamt für Naturschutz), nature conservation administrations of the German Länder (Federal German States) and the DDA. GCBBS has been developed in cooperation with the Federal Statistical Office (Statistisches Bundesamt Deutschland).
GCBBS has a total of 2,637 plots of 1 km^2 size which are open for recording. Plots have been selected using a stratified random sample design. The complete terrestrial area of Germany was stratified using a combination of land use and ecological regions. In 2009 more than 1,300 of these plots were monitored by highly qualified volunteers in the course of four visits per breeding season (10 March-20 June) using the so-called line mapping method, which is a simplified territory mapping method along a line transect of around 3-4 km length inside each recording plot. Recorded territories of one breeding season are assigned to one of 13 predefined habitat types along the line.
Densities of breeding birds are calculated using results from distance sampling studies taking into account different detection probabilities in different habitat types. Species densities are calculated as mean densities for each habitat type in each ecological region. Mean densities are multiplied by the area of a single stratum and abundances are added for all occurring strata in order to calculate projected abundance estimates for common breeding birds in Germany as a whole or the German Länder separately.
A first analysis of the new approach resulted in projected abundances on a scale similar to expert estimates. For most common and widespread species with stable (e.g. Chaffinch, Blackbird) or increasing trends (e.g. Blackcap and Great Tit) the projected abundances are greater than expert estimates. Species abundances for species with declining trends such as Willow Warbler, Linnet and House Sparrow were lower than the expert estimates. This can be interpreted as a delayed perception of declines by experts compared with events in the real world.
The new GCBBS provides statistically founded abundance estimates and can also detect trends, which can be calculated using projected results for species abundances in land-use types, ecological regions, the German Länder or on a national level. These trends will be compared in the future with those calculated by the well known software TRIM, which is used by most of the EBCC partners.
For more information on GCBBS visit: http://www.dda-web.de.

ENHANCING VOLUNTEER BIRD MONITORING COVERAGE OF THE UPLANDS: EXPERIENCES FROM THE BUILDING BIRD MONITORING IN SCOTLAND INITIATIVE

Mandy Cook, John Calladine* & Chris Wernham
BTO Scotland, University of Stirling, FK9 4LA, UK
* Corresponding author: john.calladine@bto.org

UK bird populations are some of the most effectively monitored in the world, thanks to thousands of dedicated volunteer birdwatchers. Around 5,000 volunteers in Scotland submit bird data to BTO recording programmes annually, providing scientifically rigorous and cost-effective information for conservation science. Despite this, Scotland's generally low population density, its aggregated human population, and its remote and challenging terrain, still present considerable challenges when seeking representative monitoring of the uplands in particular.
The Building Bird Monitoring in Scotland project is a three-year joint initiative between the BTO and the Scottish Ornithologists' Club that aims to support the existing network of bird recorders and volunteer coordinators in Scotland, principally through the provision of free training events, supporting promotional materials and a series of work-

shops for exchange of ideas and experience. Part of the training is aimed at increasing the confidence and skills base of existing volunteers. The project is also working actively to explore novel survey approaches, and to find (through appropriate advertising and partnership working), train and motivate new groups of volunteers (such as hillwalkers and land managers). Currently 358 volunteers have attended 17 training events and the success of the events is being monitored via questionnaires to participants and subsequent registration for BTO recording schemes. The immediate aim will be to learn from experiences and feedback from participants to ensure that training evolves to deliver the maximum benefits in terms of the number and skills base of new recruits to Scottish bird monitoring schemes. The uplands of Scotland are especially important in that they occupy over 70% of the country's land surface, include the most extensive areas of semi-natural habitat, the majority of the land that is either designated under the EU Birds directive or occupied by Annex 1 species and arguably present some of the greatest opportunities for conservation management. An ultimate aim of the project is to deliver habitat and regional specific trends for species in the uplands for the purposes of monitoring and conservation guidance.

MONITORING OF BREEDING BIRDS IN THE INTERNATIONAL WADDEN SEA: AN EXAMPLE OF CROSS-BORDER COOPERATION IN MONITORING AND MANAGEMENT

Kees Koffijberg[1]*, Lieuwe Dijksen[1], Bernd Hälterlein[2], Karsten Laursen[3], Gerold Lüerßen[4], Petra Potel[5] & Stefan Schrader[2]

[1] SOVON Dutch Centre for Field Ornithology, Rijksstraatweg 178, NL-6573 DG Beek-Ubbergen, The Netherlands, kees.koffijberg@sovon.nl, lieuwe.dijksen@sovon.nl

[2] National Park Agency Schleswig-Holsteinisches Wattenmeer, Schloßgarten 1, D-25832 Tönning, Germany, bernd.haelterlein@lkn.landsh.de, stefan.schrader@gmx.net

[3] National Environmental Research Institute, Grenåvej 12, DK-8410 Rønde, Denmark, kl@dmu.dk

[4] Common Wadden Sea Secretariat, Virchowstrasse 1, D-26382 Wilhelmshaven, Germany, luerssen@waddensea-secretariat.org

[5] National Park Agency Niedersächsisches Wattenmeer, Virchowstrasse 1, D-26382 Wilhelmshaven, Germany, petra.potel@nlpv-wattenmeer.niedersachsen.de

* Corresponding author: kees.koffijberg@sovon.nl

The Wadden Sea between Den Helder in The Netherlands and Esbjerg in Denmark is well-known for its large numbers of migratory and wintering waterbirds. Besides, it also represents a core breeding area for many coastal breeding birds. Since 1991, surveys of breeding birds have been internationally co-ordinated within the Trilateral Monitoring and Assessment Program (TMAP), a trilateral co-operation between The Netherlands, Germany and Denmark. The monitoring scheme aims to assess and detect population size, distribution and population trends, in order to develop and evaluate trilateral management strategies that are reviewed regularly during governmental conferences. It focuses on 35 bird species that are considered characteristic for the Wadden Sea ecosystem. Common breeding birds (8 species) are counted annually in 103 representative census areas. Colonial and rare breeding birds (27 species) are counted by annual complete counts all over the area. Once every 6 years, a total count of all species, including common species, is organised. Fieldwork is highly standardised and carried out by nearly 500 ornithologists, mainly consisting of staff of NGOs, governmental bodies, site managers and volunteers.
Reliable trend estimates are available for 29 species for a period of 16 years. Nearly half of the monitored species (13) have been in decline since 1991. Furthermore 8 species have increased whilst 7 species have remained stable over the years or do not show any significant trend (1 species). With 11 out of 13 declining species, strongest declines have been observed in waders. Largest increases have been observed in a number of colonial breeding birds. In some species, trends differ within the Wadden Sea. Espe-

cially in The Netherlands, shellfish-eating species have suffered declines due to overfishing of mussel- and cockle stocks. From 2010 onwards, also breeding success will be monitored in a selection of species, enhancing possibilities to link changes in numbers to demographic processes. Since most species dealt with are long-lived, monitoring of breeding success is thought to provide management with an early-warning system to forecast population changes.

Session 3. BIODIVERSITY INDICATORS II: DEVELOPMENT

USING BIRDS AS INDICATORS OF THE HEALTH OF THE ENVIRONMENT IN THE USA

Gregory S. Butcher[1]*, John R. Sauer[2], William A. Link[2] & Daniel K. Niven[3]
[1] National Audubon Society, 1150 Connecticut Avenue NW, Suite 600, Washington DC 20036, USA
[2] USGS Patuxent Wildlife Research Center, 12100 Beech Forest Road, Laurel, MD 20708, USA
[3] National Audubon Society, USA
* Corresponding author: gbutcher@audubon.org

The Breeding Bird Survey (BBS) started in 1966. It covers most of the contiguous 48 states of the USA, plus southern Canada. It is a half-day roadside survey repeated each year at more than 3,000 locations. Annual summaries of long-term trends and annual indices for species and species groups have been available since 1986. The Christmas Bird Count began in 1900; it now involves more than 60,000 participants at more than 2,000 locations in the United States and southern Canada. Long-term trends and annual indices are available for species and species groups back to the winter of 1965-66 to allow comparisons with BBS trends and indices. Breeding Waterfowl Counts have been done by the U.S. Fish and Wildlife Service and Canadian Wildlife Service since the mid-1950s and provide the best data on trends and indices for several dozen waterfowl species. Trends and indices from the waterfowl surveys are used to set harvest seasons and bag limits each year; trends and indices from the BBS and CBC are used to determine international and national bird conservation priorities as reflected in the Red List of IUCN and BirdLife International, the WatchList of Audubon and the American Bird Conservation, and the list of Birds of Conservation Concern by the U.S. Fish and Wildlife Service. In addition, trends and indices from all three datasets are valuable as indicators of the health of the environment in the USA and Canada and in subsets thereof. The BBS web site has included species group trends by habitat, migratory status, and nest type for many years; Butcher and Niven summarized those data as a state of the birds report in Audubon magazine in 2004. We developed a grassland indicator that was presented to this group in 2007. In 2009, we created indicators for many habitat and species groups that were presented in "State of the Birds United States of America 2009" under the auspices of the U.S. Committee of the North American Bird Conservation Initiative. Authors of the report included many biologists from the U.S. Fish and Wildlife Service, U.S. Geological Survey, and several national non-governmental organizations.

The report was widely covered in the press and has resulted in proposals for increased conservation funding both within the administration and the legislature. In February of 2009, we demonstrated northward winter range shifts of a large number of bird species over the past 40 years by correlating CBC data with state-by-state data on average yearly winter temperatures. In March of 2010, we and the larger group of authors will create a new state of the birds report focused on habitat-specific analysis of vulnerability traits of North American birds. We will discuss both the data limitations and the policy implications of these analyses and propose future directions for this research program.

SPATIAL MISMATCH BETWEEN BIODIVERSITY COMPONENTS IN BIRDS: NEW CHALLENGES FOR GLOBAL CONSERVATION STRATEGIES

Vincent Devictor*, David Mouillot, Christine Meynard, Frédéric Jiguet, Wilfried Thuiller & Nicolas Mouquet
* Corresponding author: vincent.devictor@univ-montp2.fr

Functional diversity is now acknowledged as essential for maintaining ecosystem functioning and supplying ecosystem goods and services, while the protection of phylogenetic diversity is needed to handle long-term global changes. Biodiversity turnover among sites, so-called beta-diversity, has also been raised in theoretical and applied ecology as a key component to preserve biodiversity at multiple spatial scales.
However, the spatial congruence of taxonomic, functional and phylogenetic diversities and their respective turnovers remains unknown. Using high-resolution data on the spatial distribution and abundance of birds at a country scale, we found a substantial amount of spatial mismatch between each biodiversity component. This spatial mismatch inevitably leads to unequal representation of each component in protected areas: functional diversity is significantly under-represented while taxonomic turnover is significantly over-represented.
Our results challenge the use of any one diversity component as a surrogate for other components and stress the need to adopt an integrative approach to biodiversity conservation. We provide a simple conceptual and practical solution to map each component of biodiversity allowing the identification of additional conservation needs.

DYNAMICS OF BIRD DISTRIBUTION IN MEDITERRANEAN MOSAIC LANDSCAPES AFFECTED BY LARGE FOREST FIRES: AN APPLICATION OF A LARGE-SCALE MONITORING DATABASE

Elena L. Zozaya[1]*, Lluís Brotons[1, 2], Sergi Herrando[2] & Pere Pons[3]
[1] Forest Technology Centre of Catalonia, Biodiversity Department, Landscape Ecology Group, Ctra. St. Llorenç de Morunys a Port del Comte km 2, 25280 Solsona, Spain
[2] Catalan Ornithological Institute, Museu de Ciències Naturals de la Ciutadella, Passeig Picasso s/n, 08003 Barcelona, Spain
[3] University of Girona, Environmental Sciences Department, Campus de Montilivi, 17071 Girona, Spain
* Corresponding author: elena.zozaya@ctfc.cat

Wildfires represent an important natural disturbance in Mediterranean terrestrial ecosystems, shaping the landscapes into their present mosaic-like patterns. At present, we know very little on how fires affect patterns of species distribution. In order to understand the effects of fire on species dynamics, we are creating a large-scale database (DINDIS-Bird distribution dynamics in Mediterranean landscapes affected by fires), started in 2006, with all areas affected by large wildfires since 2000 in Catalonia (NE Iberian Peninsula). DINDIS will allow us to identify factors acting at different spatial and temporal scales affecting species dynamics, such as ecological phenomena determining colonisation and extinction processes. In this sense, this database could be used to identify ecological processes affecting species dynamics, giving additional information on the causes under general trends observed using other monitoring systems. With this purpose, within each fire perimeter we establish a series of line transects in order to describe bird community and vegetation structure. Each line transect is defined as the distance covered during 15 minutes walk at a speed of about 2 km/h. We use time rather than distance to standardise sampling in order to facilitate bird censuses in rough terrain. Censuses are conducted once

every year in good weather conditions and during the first 3 hours after sunrise. They are performed by experienced ornithologists during the breeding season (15th May-15th June).
Here, we present an example of the application of this database to study the spatial dynamic of a bird population. Adopting a large scale perspective, we assessed to what degree colonisation of recently burnt areas is constrained by dispersal or by the amount of post-fire suitable habitat for an open habitat bird species. We estimated the potential dispersal flux received by each recently burnt area using available large-scale atlas data and connectivity metrics based on graph theory and evaluated our predictions using the database presented in this work. We found that connectivity plays a major role in colonisation suggesting that the prediction of species' responses to disturbances at large spatial scales should explicitly integrate species responses to habitat changes but also information on dispersal constraints imposed by species ecology.

MIND THE GAP! WHICH EUROPEAN BIRD SPECIES NEED BETTER MONITORING, AND WHERE?

Ian Burfield
European Division, BirdLife International, Wellbrook Court, Girton Road, Cambridge, CB3 0NA, UK
ian.burfield@birdlife.org

In recent years, inspired by long-running schemes in other countries, and encouraged by the EBCC through the Pan-European Common Bird Monitoring Scheme (PECBMS), the number and quality of national common bird monitoring schemes in Europe has increased dramatically. In part, this also reflects increased state funding for the monitoring of farmland birds under the EU Rural Development Regulation. All of this is very welcome, and means we now have better information then ever before about the status and trends of common and widespread birds. This is especially true for passerines and near-passerines whose populations are concentrated in farmland, forest or urban habitats in western and central Europe. There are also promising signs of expansion east.
Similarly, thanks to the International Waterbird Census (IWC) coordinated by Wetlands International, we also have good information about the status and trends of many waterbirds in Europe, especially from the annual midwinter counts. Some other groups of species are also monitored reasonably well across Europe, either because they are very popular (e.g. raptors, storks), breed colonially (e.g. seabirds, herons), or are endangered and therefore subject to conservation projects that often include monitoring (e.g. globally threatened species on the IUCN Red List).
However, there are a number of species groups that are not well covered by current monitoring efforts, and whose status and trends remain very poorly known. In this contribution, I aim to draw attention to these birds and use the limited information that is available to show that some of them may be in real trouble and in urgent need of more attention. To identify these species and the parts of Europe where more monitoring is needed, I will use the information collated in the two volumes of Birds in Europe, as well as a new assessment of the general state of knowledge about each species, based on an analysis of the number of scientific publications featuring them.
Building on the outcomes of a workshop at the 2007 EBCC Conference, I will use the Ring Ouzel (*Turdus torquatus*) as an illustrative example of one group, comprising upland and montane species, which we already know is particularly poorly monitored. There are of course logistical problems associated with monitoring such species, including low human (volunteer) densities, remoteness, difficult terrain and problematic weather. But in countries where these challenges have been overcome, the trends detected by monitoring indicate that some of these species are declining fast. Given their potential exposure to the impacts of climate change, it is all the more urgent that other monitoring schemes are initiated to tell us how they are faring more widely.

ARE RAPTORS GOOD INDICATORS OF OVERALL BIODIVERSITY? A CASE STUDY FROM DADIA NATIONAL PARK

Stefan Schindler[1, 2]*, Vassiliki Kati[3], Martin Prinz[1] & Kostas Poirazidis[2, 4]
[1] Dptm. of Conservation Biology, Vegetation & Landscape Ecology, University of Vienna, Rennweg 14, 1030 Vienna, Austria
[2] WWF Greece-Dadia Project, Dadia, GR-68400 Soufli, Greece
[3] Dptm. of Environmental & Natural Resources Management, University of Ioannina, Seferi 2, 30100 Agrinio, Greece
[4] Dptm. of Ecology & Environment, Technological Education Institute of Ionian Islands, 2 Calvou sq, 29100 Zakynthos, Greece
* Corresponding author:
stefan.schindler@univie.ac.at

The suitability of top predators, particularly birds of prey, as indicators of biodiversity was heavily discussed during the last years. One main conclusion was that despite much debate there is very few data on the topic. In this study, we evaluate if local biodiversity can be indicated by raptor species richness. We use datasets from Dadia National Park, a Mediterranean forest mosaic and local biodiversity hotspot in north-eastern Greece. The reserve is famous for its assemblage of diurnal raptors, a community exceeding 19 breeding species and 300 territories. Raptor data were sampled systematically for the years 2001-2005 and maps of breeding territories resulted for 17 territorial species. We evaluated for 30 biodiversity plots sampled in the years 1999-2000, how often they were covered by raptor territories, and calculated for each raptor species the probability of 'territory occurrence' at each biodiversity plot. We correlated (a) the probability of territory occurrence for each raptor species, and (b) the average number of raptor species per year, whose territory covered the biodiversity plot, with the plots' species richness of woody plants, orchids, orthopterans, amphibians, reptiles and small birds as well as with its overall species richness.
We did not find significant correlations of raptor species richness with the species richness of any of the six taxa, nor with overall species richness. Also the occurrence probability of the single raptor species performed rather badly as indicator of biodiversity. Only for the Golden Eagle (*Aquila chrysaetos*) it correlated significantly with overall species richness. We conclude that at local scale a coverage by territories of many raptor species does not necessarily imply a high biodiversity for other taxa that perceive the landscape at much smaller scale. Raptors as a guild include generalists as well as specialists for different habitats and different preys, which have a hierarchical multiscale habitat selection that probably differs from other taxa. However, more research and further approaches of assessment are needed to better understand the potential of raptors as indicators of biodiversity.

Session 4. COMMON BIRD MONITORING

COMMON BIRD MONITORING IN FLANDERS, BELGIUM: CHANGING DENSITIES IN FOREST AND FARMLAND BIRDS

Glenn Vermeersch[1]*, Iwan Lewylle[2] & Anny Anselin[1]
[1] Research Institute for Nature and Forest, INBO, Kliniekstraat 25, B-1070 Brussels, Belgium, glenn.vermeersch@inbo.be, anny.anselin@inbo.be
[2] Natuurpunt.vzw, Natuurpunt.Studie, Coxiestraat 11, B-2800 Mechelen, Belgium, iwan.lewylle@natuurpunt.be
* Corresponding author:
glenn.vermeersch@inbo.be

A common bird census monitoring scheme is established in Flanders (northern part of Belgium) since 2007. About 400 volunteers take part in this project coordinated by the Research Institute for Nature and Forest (INBO) and Natuurpunt.vzw, an NGO and BirdLife

partner. It is part of the integrated bird monitoring programme, run by INBO.
In a three-year cycle, a minimum of 900 randomly stratified 1 x 1 km plots is surveyed based on point counts. The plots were stratified following 6 major habitat types: urban, suburban, forest, farmland, heathland and marshland (incl. open water). In each plot, six points have to be visited 3 times (following fixed time-windows) during 5 minutes in a breeding season. All potential breeding birds are counted and all the data can be passed online through http://broedvogels.inbo.be.
In 2009, the first cycle ended and the method was evaluated. During the first cycle (2007-2009) professionals conducted a parallel survey in a selection of 85 plots. Visits per point were longer (10 minutes) and all species/territories were noted on detailed maps. This study allowed us to create density-models for a number op species specific for different habitat types. The data were also used to calculate the number of 'missed species' per habitat type in the normal survey. Finally, the data of the parallel survey were compared to detailed inventories from the 2000-2002 atlas period. This comparison showed remarkable shifts in densities in forest and farmland birds and - to a lesser extent - also in heathland birds.
From this year on, the Flemish common bird census data are available for the Pan-European Common Bird Monitoring and they will be merged with the data from Brussels and Wallonia.

POPULATION TRENDS OF COMMON BREEDING BIRDS IN LOMBARDY, NORTHERN ITALY, 1992-2009

Dario Massimino*, Valerio Orioli & Luciano Bani
Department of Environmental and Landscape Sciences, University of Milano-Bicocca, Piazza della Scienza 1, I-20126 Milano, Italy
* Corresponding author:
dario.massimino@unimib.it

The assessment of population trends over time is a key issue in conservation biology, but requires highly resource-demanding monitoring programmes in order to analyse several species over large areas. For this reason, the use of all available data, even if coming from different survey projects whose purpose is not necessarily monitoring, is extremely useful to investigate historical demographic trends. In this research we developed a method to assess population trends by using census data acquired with the same survey technique but different sampling schemes.
We set up the method using data coming from different point count surveys performed in the 23,800 km^2 Lombardy region (northern Italy) between 1992 and 2005 and tested it on three bird species (Skylark *Alauda arvensis*, Swallow *Hirundo rustica* and Nightingale *Luscinia megarhynchos*). We corrected the bias due to the different sampling schemes by defining a population index as the ratio between the numbers of observed and expected (from a generalised linear model of habitat suitability) bird pairs in each point count. We then applied this method to 59 common bird species breeding in the region. For each species, the overall trend for the period 1992-2009 was assessed by fitting a growth curve to the series of annual population indexes calculated for each year. Among the nine species that showed a significant decline, seven are associated with farmlands.
The Red-Backed Shrike (*Lanius collurio*) and the Skylark showed a serious population crash, with a reduction in population of about 75% and 83%, respectively, in 18 years. The Chiffchaff (*Phylloscopus collybita*) and the Goldcrest (*Regulus regulus*) were the only declining forest species. Fourteen positive trends, mainly of forest birds, were also recognised. This research supports the evidence that the general decline of farmland bird species in Europe is also occurring at regional scale in Lombardy. Specific monitoring schemes would be necessary to better understand the processes that negatively affect their populations.

BEYOND BIRDS: HOW OTHER TAXA CAN BE EFFECTIVELY MONITORED BY VOLUNTEER BIRD SURVEYORS

Kate Risely* & David Noble
British Trust for Ornithology, The Nunnery, Thetford, Norfolk, IP24 2PU, UK
* Corresponding author: kate.risely@bto.org

Bird monitoring across Europe relies on the efforts of thousands of skilled and motivated volunteers - in the UK alone there are some 30,000 individuals who take part in bird surveys for the British Trust for Ornithology (BTO). Birdwatching is a popular pastime in many parts of the world, and numerous national bird monitoring schemes are built upon this pre-existing knowledge base.

General public interest in recording other groups, such as butterflies, moths, dragonflies, bumblebees, mammals, and plants, is lower than for birds, and these remain more specialist pursuits. As a result, our knowledge of these groups is less detailed than for birds, a matter of concern for policymakers and conservationists alike. However, within the UK birdwatching community, enthusiasm for cross-taxa recording is growing, partly due to an overall cultural shift, and partly driven by better and more accessible field and site guides, particularly for butterflies, moths and dragonflies. Therefore, to increase the national monitoring capacity for other groups, it may well prove more productive to target birdwatchers, rather than the general population.

Further to this, the extensive experience of bird monitoring organisations in large-scale surveys, including mobilising volunteers on a national scale, survey design, and analysis of results, could be effectively used in collaborations with other organisations seeking to develop their monitoring operations.

This talk will explore these ideas, using examples mainly from the BTO/JNCC/RSPB Breeding Bird Survey (BBS), the primary scheme for monitoring the UK's bird species. Since 1995, BBS volunteers have counted mammals seen on their BBS squares, as well as recording indirect evidence of their presence, with the result that BBS count data are now used to calculate national population trends for a number of mammal species. More recently, a survey has been launched in partnership with the UK organisation Butterfly Conservation, in which BBS volunteers are asked to carry out additional surveys along their BBS route to record butterflies, dragonflies and day-flying moths, using slightly modified methods. The response to this has been encouraging, and initial results, and feedback from volunteers, will be presented, along with thoughts on how national-scale cross-taxa monitoring can be developed in the future.

HABITAT SPECIALIZATION IN LATVIAN FOREST BIRDS - SUGGESTIONS TO FOREST BIRD INDEX

Ainārs Auniņš*, Jānis Priednieks, Māris Strazds & Viesturs Ķerus
Dept. of Zoology and Animal Ecology, Faculty of Biology, University of Latvia, Kronvalda bulv. 4, LV-1010 Riga, Latvia
* Corresponding author: ainars.aunins@lu.lv

Farmland bird index has been widely accepted by decision makers and scientific community as an indicator of agricultural policy and has obtained official status in EU. Development of similar indicator for the other most important terrestrial biome - the forests - would be anticipated and has been expected by policy makers. However, the recent attempts to propose a European forest bird index (FBI) based on a simple list of forest specialist species met critique from ornithologists and organizations specialising in forest conservation. Even after choosing the biogeographical approach to the species selection process, the concerns regarding subjectivity involved in the species inclusion and the indicative value of the index itself are still valid.

We used data from the Latvian common bird monitoring scheme, forest stand level GIS database (containing information on its type, tree species composition, age, etc.) and landscape ecological covariates characterising forest patch structure. Species-habitat models

were created for all bird species recorded in sufficient numbers in the sections of the monitoring transects located in forest. We evaluated the obtained models and assessed the degree of specialization of the focal species. We identified those particular forest structures or features each species is indicating. A species selection procedure was developed to create a list of species to be used for calculation of a composite index that would best represent state and pressures to Latvian forests. The obtained index was compared to another version of FBI that was calculated using the Boreal list of forest specialists adopted by PECBMS and which was agreed on consensus of national experts. We discuss the performance of the calculated species-habitats models, differences in the two obtained versions of composite forest bird indices and their potential of indication.

Session 5. FARMLAND I: CONSERVATION ISSUES

RECENT TRENDS IN STEPPE BIRD POPULATIONS: INFLUENCE OF CLIMATE, LAND USE AND AGRICULTURE INTENSIFICATION

Manuel B. Morales
Grupo de Investigación en Ecología y Conservación de Sistemas Terrestres, Departamento de Ecología, Universidad Autónoma de Madrid, Spain
manuel.morales@uam.es

European steppe and dry farmland bird populations show a common and general pattern of decline. Numerous studies have identified agriculture intensification and land-use changes (mainly abandonment) as the driving process behind those trends, although changing climate conditions may be boosting population decreases, especially in Mediterranean Europe. In this presentation I review evidence pointing on this direction, based mainly on recent studies on bustards and other Mediterranean pseudo-steppe birds, discussing the implications on population management and conservation.

LINKING FARMLAND BIRD ABUNDANCES AND AGRI-ENVIRONMENT SCHEMES IN FRANCE USING BAYESIAN MODELS

Karine Princé* & Frédéric Jiguet
CRBPO, UMR 7204 MNHN-CNRS-UPMC 'Conservation des Espèces, Restauration et Suivi des Populations', 55 rue Buffon, CP 51, 75005 Paris, France
* Corresponding author: karine.prince@gmail.com

Agri-environmental schemes (AES) are an increasingly important tool for the maintenance and restoration of farmland biodiversity in Europe but their ecological effects are poorly known. However, their effects have often been studied at local spatial scale and they remain controversial. Here we assess the overall impacts of AES on trends in birds with two indicators of diversity, at the national level. We tested the responses to AES of (1) the abundance of 20 bird species, those specialized to agricultural habitats and (2) the agricultural community trophic index (CTI). Only 25% of species respond significantly to AES. Declining farmland species were those with higher local abundance with increasing AES subscription. The trophic level of the farmland bird communities was not revealed as affected by the implementation of AES. Nevertheless, we were able to highlight a positive trend in the trophic global index in farmlands over time, suggesting an improvement in the quality of agricultural habitats. Additional studies more accurate at spatial scales, targeting some measures and including other biodiversity indicators, would decide more precisely on the effectiveness of the AES.

EFFECTIVENESS OF THE ITALIAN NATIONAL PROTECTED AREAS SYSTEM IN CONSERVATION OF FARMLAND BIRDS: A GAP ANALYSIS

Guido Tellini Florenzano, Tommaso Campedelli*, Guglielmo Londi, Simonetta Cutini & Lorenzo Fornasari

MITO 2000 National Committee, Italy
* Corresponding author: tcampe1@hotmail.it

Conservation measures, and particularly the selection of protected areas, at least in Italy, have always preferred areas characterised by low levels of human presence and intervention. The causes of this situation, similarly to what we can find in other countries, could be searched in a cultural approach that considers human presence and activities *a priori* in contrast with nature ('wilderness'), combined with a series of objective constraints linked with private economic interests contrasting with nature conservation, above all in a country characterized by a very low amount of land of public property. One of the most evident consequences of this situation is the great disparity in the protection level afforded to the species with different ecological needs, e.g. those linked to woodland vs. those living in open habitats, above all in farmland.
The object of this paper is to stress the effectiveness of the Italian protected areas network, including Natura 2000 sites, in the protection of bird species breeding in agricultural landscapes, taking into account both common and conservation-concern ones. Starting from a national farmland bird list, for each species, we have built for each of them, using the data of the MITO 2000 project (Italian breeding birds monitoring project), a national-scale ecological model, testing, besides the effect of some general environmental variables (e.g. land-use, land morphology, latitudinal gradient), that of specific parameters linked to farm structure, available at national scale thanks to the last census of agricultural (ISTAT). Ecological models were built with a presence-only maximum entropy approach, using MaxEnt, which returns suitability values for the entire territory.
To evaluate the efficiency of national protected areas system, we have compared, for each species, the percentage of suitable habitat, and that of real presence data, occurring inside and outside protected areas; specific analysis have been made also among different protected areas type (National Parks, Natura 2000 sites).
Our results show, although with some differences among species, how the national protected areas system does not afford an acceptable level of protection to the open-habitat species, above all to the true farmland ones. We therefore stress the need, for Italy, for a national conservation strategy that has to take into consideration this severe gap, both in designing new protected areas and in planning large-scale conservation actions.

FARMLAND BIRDS DO BETTER IN HIGH NATURE VALUE (HNV) FARMLANDS

Aggeliki Doxa[1]*, Maria Luisa Parrachini[2] & Frédéric Jiguet[1]
[1] UMR 7204 MNHN-CNRS-UPMC 'Conservation des Espèces, Restauration et Suivi des Populations', 55 rue Buffon, CP 51, 75005 Paris, France
[2] Joint Research Center of the European Commission, Institute for Environment and Sustainability, Rural, Water and Ecosystem Resources Unit, TP 262, 21020 Ispra (VA), Italy
* Corresponding author: doxa@mnhn.fr

High Nature Value farmlands have been defined in France using data on agriculture statistics on crop yields and rotation and landscape elements. Hence a HNV score was available to be confronted to breeding bird survey data, to evaluate the effective biodiversity value of HNV farmlands. Analysis of bird local abundance showed that populations of species under a particular conservation status (SPEC as defined by Tucker, 1997) were larger in HNV than predicted from random. Most interestingly, while HNV farmland covers only 24% of the national farmed territory, 43% of these species had more than 25% of their national populations included in HNV. A few species (14%) were under-represented in HNV (less than 15% of their national populations), being either crop specialists (e.g. *Perdix perdix*) and/or having low altitude habitats preferences (e.g. *Vanellus vanellus*). The results obtained with the community indices (species richness, specialist species richness, and community specialisation index) indicated that HNV farmland

does not hold more bird species but more specialized bird communities than non-HNV sites. In the global framework of biotic homogenization following human impacts on its environment, the observed pattern is consistent to the general observation of the replacement of specialist species by generalist ones, in coincidence with agricultural intensification. The most interesting results came from the calculation of the EU Farmland Bird Indicator for HNV and non-HNV sites. We observed significantly higher trends of the FBI in HNV areas than in non-HNV areas, indicating that the abundances of the 20 most common farmland bird species are significantly higher in HNV farmland. In the unfavourable context of global farmland bird declines facing agriculture intensification in Europe, HNV farmland seems efficient to provide favourable conditions for bird populations in France. Finally, the analysis of the evolution of HNV scores between 1970 and 2000 will be presented.

IS THE ATLANTIC METAPOPULATION OF COMMON QUAIL (*COTURNIX COTURNIX*) DECLINING? PRELIMINARY RESULTS OF A TRANSNATIONAL MONITORING PROGRAMME

José Domingo Rodríguez-Teijeiro[1], Francesc Sardà-Palomera[1], Inàcio Alves[2], Yannick Bay[3], Agostinho Beça[2], Bernard Blanchy[4], Bernard Borgogne[3], Bernard Bourgeon[4], Pedro Colaço[5], Jacky Gleize[3], Antonio Guerreiro[5], Mohammed Maghnouj[6], Christophe Rieutort[3], Denis Roux[7] & Manel Puigcerver[8]*

[1] Dep. de Biología Animal, Fac. de Biología, Univ. de Barcelona, Avda. Diagonal 645, 08028 Barcelona, Spain
[2] Federaçao de Caçadores da Primera Região Cinegética, Apartado 144, R. Dr. António Oliveira Cruz, Edificio MADRP Casa 4, 5340 Macedo de Cavaleiros, Portugal
[3] Fédération Départementale des Chasseurs de La Lozère, 56 Route du Chapitre, BP 86, 48003 Mende, France
[4] Fédération Départementale des Chasseurs de L'Aveyron, 9 rue de Rome, Bourran, BP 711, 12007 Rodez, France
[5] Confederaçao Nacional dos Caçadores Portugueses, Plaça Diogo Fernandes 23, 1º D, 7800-428 Beja, Portugal
[6] Centre National de la Recherche Forestière, Haut Commisariat aux Eaux et Fôrets et à la Lutte Contre le Désertification, Quartier Administratif, Chellah, Rabat, Morocco
[7] Office National de la Chasse et de la Faune Sauvage, Maison Guende, Rue Porte Royale, BP 20, 84390 Sault, France
[8] Dep. de Didàctica de les Ciències Experimentals i la Matemàtica, Fac. de Formació del Professorat, Univ. de Barcelona, Passeig Vall d'Hebron 171, 08035 Barcelona, Spain
* Corresponding author: mpuigcerver@ub.edu

The Common Quail (*Coturnix coturnix*) is a Galliformes species with an unfavourable conservation status in Europe (SPEC 3), with depleted populations and a large historical decline. In the Atlantic metapopulation it is considered that Portuguese, Spanish and French populations would remain stable; however, there are some evidences of a declining trend in Spain and France. This may be due to the high mobility of the species, which makes it very difficult to achieve reliable population estimates.

The aim of this study is to carry out a monitoring programme of Common Quail populations during the period 2005-2008 in 11 sites of four countries (Morocco, Portugal, Spain and France), which are considered key in the Atlantic metapopulation, to determine population trends and to verify the species status by providing a new census methodology, based in three different data sources: (a) Census of calling males throughout the breeding season; (b) Capture and ringing of males; (c) Monitoring adults and broods during harvesting.

Results show that populations remain fairly constant throughout the period 2005-2008. The abundance index found in the irrigated perimeter sampled in Morocco is more that three times that of the observed in Europe, suggesting that habitat conditions are extremely favourable for the species. Finally, brood monitoring allowed us to classify the study areas in three different categories with different conservation implications.

Session 6. WATERBIRDS

USING WETLANDS INTERNATIONAL'S WATERBIRD POPULATION ESTIMATES SERIES TO PRODUCE GLOBAL WATERBIRD INDICATORS

Simon Delany* & Szabolcs Nagy
Wetlands International, PO Box 471, 6700 AL Wageningen, The Netherlands
* Corresponding author:
simon.delany@wetlands.org

Wetlands International produced four editions of the publication Waterbird Population Estimates between 1994 and 2006. This publication includes data on numbers, distribution and population trends of 878 species from 33 families recognised as waterbirds, divided into 2,305 biogeographic populations. Most of the data cover the period between 1980 and 2005. One of the principal stakeholders in the publication is the Ramsar Convention Secretariat, which uses it as the definitive basis of the 1% thresholds used to designate wetlands of international importance under the Convention. The 2010 BIP (Biodiversity Indicator Partnership) project, which includes the Ramsar Secretariat as a partner, is seeking datasets that will allow an indicator to be constructed that demonstrates historic rates of change in wetland quality worldwide. Because of their dependence on wetlands, waterbirds can be good indictors of wetland quality, and changes in their numbers are often an acceptable proxy for changes in wetland quality. Wetlands International has produced a series of global waterbird indicators, using the data from the four editions of Waterbird Population Estimates as a time series to demonstrate the different rates of change in wetland ecosystems in different continents, and in different waterbird groups. These indicators are unique in their application to wetland ecosystems at a global scale.

COUNTRYWIDE HUNTING BAN ON WATERBIRDS IN SLOVAKIA IN THE YEAR 2006 - UNEXPECTEDLY SUCCESSFUL EXPERIMENT

Katarína Slabeyová
Katedra Zoologie, PřF UK, Viničná 7, Praha 2, CZ-128 44, Check Republic
slabeyova@vtaky.sk

Winter waterbird census in Slovakia in the international count date in January is realized since 1991 and in five count dates from November to March and seven from October to April since winter seasons 1998/99 and 2003/04, respectively. In winter 2005 was in Slovakia counted 478 sites, what stands for approximately 2,634 km of water courses and 153 km^2 of still waters. From 2006 to 2009 was the number of counted sites about the same as in the year 2005 and it was possible to cover more than 80% of wintering populations of most species of ducks and geese. Therefore, data from the winter waterbird census is a good base for evaluation of factors influencing the abundance of waterbirds in Slovakia.

Winter 2005/06 was in whole Europe specific with increased attention paid to avian influenza. Similar situation was also in Slovakia, where after first recorded cases at wild birds hunting on feathered game was banned from November 2005. Using the program TRIM 3.54 were calculated trends of waterbird abundance for each month separately for the purposes of evaluation of changes in abundance at national level.

Recorded numbers and differences between years refer to the fact that the hunting ban affected the abundance of water birds in Slovakia. The most significant was this influence visible at geese, particular White-fronted Goose (*Anser albifrons*). From December 2005 to February 2006 were in Slovakia recorded one among the highest numbers of White-fronted Goose in the history of systematic monitoring of their abundance in

Slovakia. These numbers were also higher than in the comparable harsh winter 2008/09 when there was no ban on hunting imposed. In December 2005 were in Slovakia recorded 9,858 individuals of White-fronted Goose, in December 2008 it was only 1100 ex.
Changes in abundance were also visible at Mallard (*Anas platyrhynchos*), which is the most abundant waterbird species wintering in Slovakia, when in November 2005 were recorded the second highest number of Mallards since the beginning of census in that month in the year 1998.

THE INTERNATIONAL WATERBIRD CENSUS: THE WORLD'S MOST EXTENSIVE SITE-BASED BIRD MONITORING SYSTEM

Simon Delany* & Stephan Flink
Wetlands International, PO Box 471, 6700 AL Wageningen, The Netherlands
* Corresponding author:
simon.delany@wetlands.org

The International Waterbird Census (IWC) coordinated by Wetlands International provides the basis of one of the world's most extensive biodiversity databases. Data have been collected in every year since 1967, and in recent years about 15,000 observers in 110 countries have submitted standardised counts of 30 to 40 million waterbirds from 10,000 sites. This effort adds up to about 50,000 hours of fieldwork every year. Results are summarised in continental scale reports and in publications produced on behalf of international agreements such as the Ramsar Convention on Wetlands and the African-Eurasian Migratory Waterbird Agreement (AEWA) under the Convention on Migratory Species, but in recent years the scientific potential of the data have not been fully realised.
Current efforts to modernise the database by allowing online submission, manipulation and storage of data, and by linking data to a GIS will result in a more flexible and powerful application with considerable potential for innovative analyses at international scales. The newly cleaned and expanded site data are now more accessible and available for analyses of waterbird numbers, distribution and population trends in relation to environmental factors such as climate change, changes in water quality and transmission of diseases such as Avian Influenza.

USE OF SPECIES DISTRIBUTION MODELLING BASED ON DATA FROM THE AFRICAN WATERBIRD CENSUS TO PREDICT WATERBIRD DISTRIBUTIONS IN AFRICA AND IDENTIFY GAPS IN KNOWLEDGE OF DISTRIBUTION

José Manuel Ochoa-Quintero & Szabolcs Nagy*
Wetlands International, PO Box 471, 6700 AL Wageningen, The Netherlands
* Corresponding author:
szabolcs.nagy@wetlands.org

The Wings over Wetlands (WOW) UNEP GEF Project coordinated by Wetlands International, BirdLife International and other partners in the African/West Eurasian region will end in 2010. One of the achievements of the project has been the development of an innovative and powerful web portal known as the Critical Site Network (CSN) Tool. The web Portal combines data from Wetlands International's International Waterbird Census (IWC) Database, BirdLife International's World Bird Database (WBDB), the Ramsar Sites Information Service and the World Database of Protected Areas maintained by the World Conservation Monitoring Centre (UNEP-WCMC). It will make these currently dispersed data relating to 300 waterbird species available in a central, open and searchable Web-based interface.
One of the difficulties encountered when developing the CSN Tool was the lack of knowledge of waterbird numbers, distribution and sites in parts of Africa. To identify areas of limited knowledge an approach relating occurrence records from the African Waterbird Census with 24 environmental variables was adopted. The work aimed to model the distribution of 47 waterbird species with limited cover by the network of Important

Bird Areas in sub-Saharan Africa using the Maximum Entropy Model for Species Distribution (Phillips *et al*., 2006). Based on the probability of presence, meaningful regions to perform a gap analysis were identified. This information will underpin the Critical Site Network Tool of the WOW project by allowing the importance of these areas to be verified.

Session 7. WORKSHOP: ATLAS - BBC NEWS

BIRD ATLAS 2007-11 IN BRITAIN AND IRELAND: SUMMARY OF METHODS AND PROVISIONAL FINDINGS

Dawn Balmer*, Simon Gillings, Brian Caffrey & Bob Swann
British Trust for Ornithology, The Nunnery, Thetford, Norfolk, IP24 2PU, UK
* Corresponding author: dawn.balmer@bto.org

There has been one previous Winter Atlas (1981-84) and two previous Breeding Atlases (1968-72 and 1988-91) in Britain and Ireland. Bird Atlas 2007-11 is a four year project that will map the distribution and relative abundance of birds in the winter and the breeding season throughout Britain and Ireland. The first Winter Atlas collected records at the 10-km scale only so new methods have been developed for the Winter fieldwork to allow timed counts to be made at the tetrad level (2 x 2 km square) so they can be used to estimate relative abundance at the 10-km level. We also introduced the concept of Tetrad Population Estimates which is a modification of those used by the Catalan Atlas and Netherlands Atlas. Methods of gathering information on colonial nesting species were also developed. Breeding evidence is collected using 16 EBCC codes in three categories of breeding probability (possible, probable and confirmed breeding). New codes have been introduced to record birds flying over, migrants and summering non-breeders. Data from other BTO and BirdWatch Ireland surveys will be used to 'top-up' gaps in coverage. The paper will present our progress in terms of coverage and initial results from the fieldwork. We will focus on those species where range expansions or range contractions may be important in a European context. Data from previous atlases in Britain and Ireland will allow us to assess range changes over the last 40 years.

CATALAN WINTER BIRD ATLES: AN ANALYTICAL OVERVIEW

Santi Guallar[1]*, Sergi Herrando[1], Javi Quesada[1], Lluís Brotons[1, 2], Joan Estrada[1] & Marc Anton[1]
[1] Catalan Ornithological Institute, Museu de Ciències Naturals de la Ciutadella, Passeig Picasso s/n, 08003 Barcelona, Catalonia, Spain
[2] Centre Tecnològic Forestal de Catalunya, Àrea de Biodiversitat, Carretera de Sant Llorenc¸ km 2, 25280 Solsona, Catalonia, Spain
* Corresponding author: atles@ornitologia.org

The Catalan Winter Bird Atlas 2006-2009 was a project that aimed at providing thorough information about the bird species present in Catalonia in the winter season. Its main objectives were describing their spatio-temporal distribution, habitat and altitudinal range selection, trend and population size. Data were gathered following a stratified random design of three types of standardized field surveys, although data from other sources were also incorporated. The gathered data allowed us to define three categories of species: common, uncommon and scarce. Only the common ones received full analytical treatment, the uncommon species were analysed variously according to their sample size, and the scarce ones were only described through the raw data.
We determined the geographic and temporal differences in abundance for the majority of the species by means of a GLMMIX Abundance = zone + winter + period + zone*winter + period*zone (abundance~Poisson). The number of fine grained maps (at 500 x 500 m resolution) shown was related to the differences found in this model.

Thus, for instance, we presented as many maps as between-winter significant differences were found; if none, only one map is shown. The distributions have been modelised by means of MaxEnt software using 80 ecological and geographic descriptors.
Population size for each common species has been estimated for each time period shown as a map. To do that, we firstly divided the range of probabilities of occurrence of abundance maps in percentiles, then estimated the density for every area defined by each percentile by means of the software Distance 5.0, and finally we calculated the Catalan population size. The procedure used for uncommon species varied with the data availability (winter wetland censuses, observers' qualitative evaluation at each 10 x 10 square, etc.). Habitat and altitudinal selection for common species were analysed by means of Distance 5.0 as well. In this case, we estimated the density by habitat and by altitudinal range for each of the six winter-period combinations and represented their average and the range. For uncommon species we presented graphs of habitat and altitudinal selection based on raw data corrected by the available area of each category.
Data for the winter population trends were obtained only for wetland and common species. The first were derived from winter wetland surveys (starting in the 1980s), and the second from the common bird surveys (starting in 2002). Indices and trends were obtained using TRIM. Finally we explored the ringing recoveries in Catalonia to ascertain the origin and time of residence in the winter quarters of about 20 species.

COMMON BIRD MONITORING IN ROMANIA BETWEEN 2006-2009

Zoltán D. Szabó[1, 2]*, Cristi Domşa[2], Nagy H. Beáta[2] & Fenesi Annmária[2]
[1] Dept. of Taxonomy and Ecology, Babeş-Bolyai University, 400006 Cluj, str. Clinicilor 5-7, Romania
[2] SOR/BirdLife Romania, Cluj, str. Gh. Dima 49/2, Romania
* Corresponding author:
szabodz@hasdeu.ubbcluj.ro

The Common Bird Monitoring scheme was launched in 2006 in Romania. Volunteers were asked to indicate a large area of approximately 10 x 10 km around their home from which a 2 x 2 km square was randomly selected. The survey was made twice per season on 15 points, birds being recorded in four distance categories in and around of a 100 meter circle. At each point observation lasted for 5 minute. Observers are supplied with materials including survey forms, coordinates of survey points for GPS navigation, topographic maps and satellite images. Volunteers are constantly encouraged to deliver data by organizing an annual meeting at the end of the year where the results of the program are presented and presents are awarded. The recruitment was assured by organizing training workshops in different parts of the country. The main habitat types of the country were equally represented in the surveyed areas, with a slight bias towards the over-represented agricultural habitats. The number of surveyed squares fluctuated annually between 17 and 61. Unfortunately, only about 25-30 squares were surveyed repeatedly, making trend analysis difficult. The species recorded the most frequently were: Skylark, Red-backed Shrike, Starling, House Sparrow, Magpie, Great Tit and Tree Sparrow. Based on the actual data, none of the species analysed showed marked fluctuation in the past years.

THE STATE OF BULGARIA'S COMMON BIRDS 2010: RESULTS FROM THE COMMON BIRD MONITORING SCHEME FOR THE PERIOD 2005-2009

Iordan Hristov
Bulgarian Society for the Protection of Birds (BSPB)/BirdLife Bulgaria, PO Box 50, Sofia, Bulgaria
iordan.hristov@bspb.org

The majority of recent assessments on the state of birds in Bulgaria are based on expert opinion. However, the need for specific conservation measures sets requirements for

specific evidence. In 2004 a common bird monitoring scheme was initiated in the country. The first year of the initiative was used to test the methodology and to recruit and train an initial group of volunteer observers. Thus the data analysed does not include 2004. The paper presents the trends of 38 common bird species for a five year period 2005-2009. The trends are produced using TRIM software and are presented per individual species and per groups of species including a farmland bird index for Bulgaria. The results are discussed in the context of habitat alteration and land use change in Bulgaria. The trends from the country are compared to the ones known in Europe. Habitat management implications are given with regards to the trends of the bird species analysed.

Session 8. ECOLOGICAL BASES OF THREAT

ASSESSING THE ECOLOGICAL BASIS OF CONSERVATION PRIORITY LISTS FOR BIRD SPECIES IN AN ISLAND SCENARIO

Javier Seoane[1]*, Luis M. Carrascal[2] & David Palomino[3]
[1] Dept. Interuniversitario de Ecología, Facultad de Ciencias, Universidad Autónoma de Madrid, 28049 Madrid, Spain, javier.seoane@uam.es
[2] Dept. Biodiversidad y Biología Evolutiva, Museo Nacional de Ciencias Naturales, CSIC, C/ José Gutiérrez Abascal 2, 28006 Madrid, Spain, mcnc152@mncn.csic.es
[3] Área de Estudio y Seguimiento de Aves, SEO/BirdLife, C/ Melquiades Biencinto 34, 28053 Madrid, Spain, dpalomino@seo.org
* Corresponding author: javier.seoane@uam.es

Proneness to extinction varies naturally and continuously according to the ecological phenomena that compound rarity even before anthropogenic effects may play a role. This is particularly obvious in islands, where populations tend naturally to be small and fragmented and, consequently, conservation priority lists may have a large number of species clustered unhelpfully in the higher threat categories. In this study we propose a simple model of threat based on natural descriptors of rarity and taxonomic distinctiveness (area of occupancy, population abundance and trend, and endemicity), assess its correlation with ecological features of the species (habitat preferences and body size) and test whether a normative conservation priority list (the Canary Islands Catalogue of Threatened Species and its administrative revision) includes these ecological bases for birds. We found that a large variation in threat (42.3%) was explained by phylogeny, habitat breadth and preference for urban areas (with a negative effect), and preference for agricultural environments (a positive effect). The administrative lists tested are poorly related to descriptors ordering the extinction risk and loss of taxonomic singularity, so some changes would make their categories more coherent. We contend that the ecological bases of rarity should be taken into account to understand why some populations/species are at higher extinction risk whereas others remain relatively safe, as this would provide firmer grounds on which to base conservation priorities.

SUSTAINABLE BREEDING POPULATIONS OF ANNEX I SPECIES: HOW TO REACH AND SECURE THEM?

Anny Anselin[1]*, Glenn Vermeersch[1], Jos Rutten[2], Koen Devos[1], Peter Adriaens[1] & Gerald Louette[1]
[1] Research Institute for Nature and Forest, INBO, Kliniekstraat 25, B-1070 Brussels, Belgium, anny.anselin@inbo.be
[2] Flemish Agency for Nature and Forest, Koning Albert II-laan 20, B-1000 Brussels, Belgium, jos.rutten@lne.vlaanderen.be
* Corresponding author: anny.anselin@inbo.be

In the framework of the EU-Habitats and Birds Directive, each member state has the obligation to improve or maintain the conservation status of habitats and species of the Annexes to the level of 'favourable status'. This favourable status is assessed with a

standardised method which uses changes in parameters such as range, trend and habitat quality compared to a chosen 'historical reference period'. For Flanders (Belgium) we assessed this conservation status for 31 regularly breeding species of Annex I of the Birds Directive, and used as historical reference period the mid-1970s. This resulted in 16 species classified with a favourable status and 15 with an unfavourable-bad status. Next we determined sustainable (target) populations for each species taking into account their conservation status and using the historical reference period as a base. We discuss the method used. Then we calculated for each species their 'distance to target' and their relative importance in each Special Protection Area (SPA) as a percentage of the total population inside all Flemish SPAs and for the total Flemish population. At present the breeding population of about one third of the species is still under 50% of its target population. Several species have substantial populations outside the SPAs. This analysis provides a guideline for targeting the important sites for each species. We chose four different cases to demonstrate the variety of target populations, habitat area requirements and management actions that have been proposed within and outside the Special Protection Areas and discuss their feasibility. The first two examples treat species with a favourable conservation status but which are recently declining or have undergone important population losses due to external disturbances. The other two examples deal with species classified as unfavourable-bad. One is mainly confined to SPAs while the other holds a substantial population outside the Special Protection Areas.

POPULATION CHANGES IN CZECH PASSERINES: QUANTIFYING THE EFFECTS OF LIFE HISTORIES, ECOLOGICAL REQUIREMENTS AND PHYLOGENY

Jiří Reif[1]*, Zdeněk Vermouzek[2], Petr Voříšek[1], Karel Šťastný[1], Vladimír Bejček[1], Jiří Flousek[1], Josef Chytil[2] & Tomáš Telenský[1]

[1] Czech Society for Ornithology, Praha, Czech Republic

[2] Ornithological Station of Comenius Museum, Přerov, Czech Republic

* Corresponding author: jirireif@yahoo.com

Environmental changes such as climate change or habitat alteration affect bird populations worldwide. Species' susceptibility to such changes might be predicted by their ecological characteristics and life-history traits. However, the effects of such characteristics have not yet been tested using a comprehensive set of explanatory variables. Moreover, it is still unclear to what extent phylogeny affects patterns in the interspecific variability of population changes. We have focused on explanations of the interspecific variability in long-term population trends and population fluctuations of passerine species in the Czech Republic, testing the effects of seven life-history traits and five ecological characteristics. The analyses were performed with and without controlling for phylogeny, and applying variance partitioning of continuous variables among three taxonomic levels. We have found that r-selected species (i.e. species with fast life-history strategies) had more negative population trends than K-selected species (i.e. species with slow life-history strategies), and that seed-eaters declined compared to insectivores and omnivores. There was also positive relationship between population variability and species' habitat specialisation. Our results indicate that r-selected species probably suffer more from global changes. Decline of granivores is in accord with findings from other European countries and highlights possible adverse effects of lower food supply in winter months caused by changes in the agriculture. We did not detect significant influence of broadly defined habitat groups on interspecific differences in population changes. Although finer bird-habitat associations explain patterns in population trends within habitat-specific species groups, the variability in trends between groups is relatively low and differences insignificant. Variance partitioning

showed that both population trends and fluctuations as well as habitat specialisation expressed the highest variability at the species level, but most of the life-history traits at higher taxonomic levels. These results explain the loss of statistical power in the relationship between life histories and population trends after controlling for phylogeny. However, we argue that a lack of significance after controlling for phylogeny should not reduce the value of the results for conservation purposes. We can propose that declining seed-eaters would benefit from agri-environmental schemes enhancing winter food supply and that the most declining r-selected species should be listed among species protected by the Czech national conservation law.

DEVELOPMENT AND USE OF NATIONAL HABITAT-SPECIFIC BIRD-INDICATORS

Henning Heldbjerg* & Jørn Lennart Larsen
BirdLife Denmark (Dansk Ornitologisk Forening), Vesterbrogade 140, DK-1620 Copenhagen V, Denmark
* Corresponding author:
henning.heldbjerg@dof.dk

Denmark and the rest of EU are required to stop biodiversity loss by 2010 (following the Gothenburg Summit 2001). This calls for development of objective measurements of biodiversity in order to evaluate if the target is met.
The existing analyses on diversity of birds on a European level are based on a joint set of indicator species selected by experts. This method has its problems: The species are not selected in an objective way from their habitat preferences and the habitat preference might also differ between the included countries.
The use of habitat specific indicators derived from species utilizing the particular habitats has the potential to estimate the status and trend of biodiversity in each single habitat in an objective way giving a more realistic and unbiased description of the change in biodiversity in the different habitat types.
Here we present the results from a study in two steps: firstly we used the data from the Danish Common Bird Census to describe the habitat preference of the 106 most common breeding bird species, creating lists of species associated with each of nine habitat types and secondly we produced habitat specific indicators by using the species lists gained in the first step.
We give examples of the habitat classification for each species and present and discuss single habitat indicators as well as combined habitat indicators. We compare this new set of indicators with the formerly used indicators and discuss the perspectives of using this approach on a broader European scale.

MIGRATION COUNTS AS A TOOL FOR BIRD CONSERVATION: THE CASE OF THE STRAIT OF GIBRALTAR

Gonzalo M. Arroyo[1]*, Luis Barrios[1], Alejandro Onrubia[1], Antonio Román Muñoz[1], Miguel Ferrer[2], Keith Bildstein[3], Chris Farmer[3], Andrés de la Cruz[1], Juan Ramírez[1], Miguel González[1], Javier Elorriaga[1], Blanca Pérez[1] & Carlos Torralvo[1]
[1] Fundación Migres, Huerta Grande, Pelayo, Algeciras, 11390 Cádiz, Spain
[2] Dpt. Biodiversity Conservation, Doñana Biological Station, CSIC, C/ Américo Vespucio s/n, Isla de la Cartuja, 41092 Sevilla, Spain
[3] Hawk Mountain Sanctuary, 410 Summer Valley Road, Orwigsburg, PA 17961, USA
* Corresponding author:
gonzalo.munoz@fundacionmigres.org

Recent evidences have revealed the urgent necessity of standard indicators to monitor bird population dynamics all around the world. Migratory population indices emerge as particularly suitable indicators, since migratory bird species are suitable targets to illustrate the deep links between climate change and its consequences on animal ecology and behaviour.

Accurate quantitative estimates of the volume of bird migration, abundance and migratory flux are crucial not only for their intrinsic biological interest but are also fundamental to the application of conservation planning and action, since it allows to identify species at risk, important sites for birds, to suggest potential limiting factors and to provide feedback for management actions. Migration counts in specific key migratory sites, when developed using standardised and long term schemes, may offer a suitable and cost-effective procedure to obtain indicators indices that allow highlighting changes in migratory population in a broader scale.
We illustrate an example of this kind of monitoring programs, the Migres Program. This is a long term monitoring program of birds migrating across the Strait of Gibraltar, one of the key sites for bird migration in the Palaearctic Migratory System. This project has been promoted by the Regional Government (Junta de Andalucía) and coordinated by the Fundación Migres, and it has been carried out since 1997. This project aim to (1) to detect long-term population trends of several groups of birds, both in Spain and in the rest of Western Europe, by obtaining population indexes of species during migration; and (2) to detect changes on the migratory patterns of birds when passing through the Straits of Gibraltar (phenology, migratory strategies, etc.). Thus, systematic censuses of several groups of birds using specific count methodologies provide the following quantitative indices: (1) annual abundance index; (2) phenological index; and (3) Global Migratory Population Estimates. Here we show diverse example of these indices on raptors and seabirds. We also show the statistical procedure to develop robust migratory indices.

Session 9. MIGRATION AND MONITORING

MIGRATION AND BIRD NUMBERS

Ian Newton
Centre for Ecology & Hydrology, Benson Lane, Crowmarsh Gifford, Wallingford, OX10 8BB, UK
ine@ceh.ac.uk

Seasonal migrations cause huge latitudinal changes in the distributions of birds between summer and winter. From low to high latitudes, progressively greater proportions of breeding species leave for the winter, and few species remain north of the tree-line during the coldest months. In resident bird species, which live year-round in one place, population levels are determined entirely by local conditions. But in migratory species, population levels may be influenced by conditions encountered in breeding, migration or wintering areas, which can together span more than one continent. Problems in one area can affect the numbers of birds which appear in another. Migrants can also be killed in large numbers by adverse weather encountered on their journeys, a hazard to which resident species are not exposed. In recent years, as the numbers of many migratory bird species have declined, the question has arisen as to where the causes lie. This talk will examine the relative importance of conditions in breeding, migration and wintering areas in limiting the numbers of different migratory bird species. Adverse conditions anywhere on the migration route can affect the birds at the time they occur, or they can have carry-over effects which become apparent at a later date in a different area. Thus winter conditions can affect subsequent breeding success, while summer conditions can affect subsequent survival.

A DIFFERENT PERSPECTIVE ON THE MONITORING OF MIGRATORY BIRD POPULATIONS

Javier Pérez-Tris
Departamento de Zoología y Antropología Física, Facultad de Biología, Universidad Complutense de Madrid, 28040 Madrid, Spain
jperez@bio.ucm.es

The observation of great numbers of birds at migration observatories has persuaded many

ornithologists that the monitoring of migratory bird populations is best approached by counting individuals at migration bottlenecks or setting networks of constant effort ringing sites. That such monitoring programmes have greatly contributed to our knowledge of migration patterns and processes is self evident; therefore, I will discuss other implications of bird migration, which are less widely recognised but may be important for the design of bird monitoring schemes.

Migration causes the turnover of individuals, populations or communities in the same habitat. Because of this reason, a monitoring scheme that is designed to value the importance of habitats for the preservation of birds will be critically influenced by the migration patterns of each species. For example, some Mediterranean environments are important breeding habitats for trans-Saharan warblers, but also sustain important populations of European thrushes during winter. However, summer and winter visitors often have different interests in the same habitat (nesting places or food resources, respectively), a circumstance which needs to be taken into account in a monitoring programme that aims to identify which elements of the habitat are important for the long-term sustenance of bird populations. A similar line of reasoning may be necessary to understand the factors determining bird distribution in areas where migratory wintering birds meet resident conspecifics in the same habitat. In these circumstances, detailed knowledge of the environmental requirements of birds with different migratory behaviour may prove instrumental for designing specific monitoring programmes. Migration may also influence large-scale patterns of distribution and abundance of breeding and wintering bird populations if the annual colonization of habitats located at variable distances from the main migration pathways involves variable costs. In these circumstances, the geographic configuration of migration corridors may be an important factor to consider if we are to understand variation in bird numbers across sites included in large-scale networks of monitoring sites. In sum, migration has a pervasive effect in the biology of birds, affecting their distribution and abundance in various, often subtle ways. Understanding these effects may contribute, sometimes critically, to improve the monitoring of migratory bird populations outside migration periods.

DELAYED DEPARTURE AND SHIFTED WINTERING RANGES OF WATERFOWL IN NORTHERN EUROPE

Aleksi Lehikoinen[1]*, Kim Jaatinen[2] & Risto A. Väisänen[1]
[1] Finnish Museum of Natural History, PO Box 17, FI-00014 University of Helsinki, Finland
[2] ARONIA Coastal Zone Research Team, Åbo Akademi Univ. & Novia University of Applied Sciences, Raseborgsvägen 9, FI-10600 Ekenäs, Finland
* Corresponding author: aleksi.lehikoinen@helsinki.fi

Global climate change has been highlighted as one of the most serious threats for wildlife and climatic conditions are becoming increasingly unfavourable for many species. The expected increase of the mean global surface temperature will be 1.8-4.0°C by the end of the century. In Northern Europe, winter and spring temperatures have been predicted to increase more rapidly than summer and autumn temperatures. The maximum ice cover of the Baltic Sea shows a decreasing trend since the 1960s, and the timing of ice-break has advanced. These changes may be influential for wintering waterfowl, since large bodies of water may become available as potential wintering habitat. Our results, based on migration data from Hanko Bird Observatory, Finland, show that autumn migration has been significantly delayed in the five out of 14 waterfowl species during 1979-2008. On average species show a delay of at least 10 days over the past 30 yeas. Furthermore, midwinter counts show that the numbers of wintering waterfowl, such as Goosander, Goldeneye and Tufted Duck, have heavily increased along the Finnish coast since the 1970s, despite decreasing or stable breeding

population trends of these species. We show that some waterfowl species respond rapidly to climate change by delaying autumn migration and shifting their wintering range margins north.

LIFE-HISTORY AND ECOLOGICAL CORRELATES OF POPULATION CHANGE IN EUROPEAN BIRDS, WITH PARTICULAR REFERENCE TO AFRO-PALEARCTIC MIGRANTS

Steven Ewing[1]*, Richard Gregory[1], Arco van Strien[2], Adam Butler[3], Petr Voříšek[4], Jiří Reif[5], Jiří Flousek[6], Karel Šťastný[7], Jaroslav Cepak[8], Henning Heldbjerg[9], Risto Väisänen[10], Frederic Jiguet[11], Hans-Günther Bauer[12], Wolfgang Fiedler[12], Tibor Szép[13], Ainārs Auniņš[14], Jānis Priednieks[15], Chris van Turnhout[16], Lluís Brotons[17], Åke Lindström[18], Verena Keller[19], Hans Schmid[19] & Rob Robinson[20]

[1] RSPB, Sandy, UK. [2] Statistics Netherlands, Voorburgh, The Netherlands. [3] BIOSS, Edinburgh, UK. [4] Czech Society for Ornithology, Prague, Czech Republic. [5] Charles University, Prague, Czech Republic. [6] Krkonose National Park and Biosphere Reserve, Czech Republic. [7] Czech University of Agriculture, Prague, Czech Republic. [8] Bird Ringing Centre, National Museum, Prague, Czech Republic. [9] DOF, Copenhagen, Denmark. [10] Finnish Museum of Natural History, Helsinki, Finland. [11] CRBPO, Paris, France. [12] Max Planck Institute for Ornithology, Radolfzell, Germany. [13] College of Nyiregyhaza, Nyiregyhaza, Hungary. [14] Latvian Fund for Nature, Riga, Latvia. [15] University of Latvia, Riga, Latvia. [16] SOVON, Beek-Ubbergen, The Netherlands. [17] Centre Tecnològic Forestal de Catalunya, Solsona, Spain. [18] University of Lund, Lund, Sweden. [19] Swiss Ornithological Institute, Sempach, Switzerland. [20] BTO, Thetford, UK
* Corresponding author:
steven.ewing@rspb.org.uk

Recent decades have witnessed complex population changes in European birds, with some species having declined markedly, while yet others have increased. To begin to understand this diversity of population change, correlative analyses have increasingly been employed to investigate factors that account for interspecific variation in population trends, and these have provided some key insights. For example, recent studies have shown that population change of European bird species varies predictably with migration strategy, breeding habitat, and anticipated susceptibility to climate change. The objective of this study was to similarly examine which key life-history and ecological variables accounted for significant variation in the population trends of European birds derived from the Pan-European Common Bird Monitoring Scheme (PECBMS). However, whereas previous investigations of bird population changes in Europe have assumed that life-history and ecological covariates are fixed across their European range, a novel feature of this study was that we collaborated with representatives from 12 PECBMS member countries to collate country-specific information for several variables, including migration strategy, breeding habitat and degree of specialism. For migratory birds, we also gathered data on migration route and wintering area. Modelling of the effects of country-specific covariates against country-specific population trends was undertaken using a generalised linear mixed model framework. The findings of this study provide further evidence of the importance of migration strategy in dictating the population trends of European birds, but a finer-scale analysis also demonstrated that the population trends of migratory species varied according to their wintering areas. Patterns of population change, in addition, were related to covariates representing breeding habitat, breeding behaviour and susceptibility to climate change. Finally, we discuss the key drivers of population change in European birds, but particularly in relation to Afro-Palearctic migrants.

CHANGES IN THE TIMING OF VISIBLE BIRD MIGRATION IN THE NETHERLANDS IN AUTUMN

Chris van Turnhout
SOVON, Dutch Centre for Field Ornithology, The Netherlands

chris.vanturnhout@sovon.nl

Counts of visible bird migration over land have a long tradition in The Netherlands, which is quite unique from an international perspective. Counting effort has varied throughout the years, peaking in the 1980s when studies were coordinated by a national working group and after 2000, when possibilities to share data via the internet (www.trektellen.nl) have stimulated a growing number of birdwatchers to establish observation sites and count migration. Meanwhile a long term data series has been established, covering the period 1980-2006. We analysed these data in order to detect possible long-term changes in timing of inland broad-front migration in autumn. Such an analysis is an useful addition to existing studies on changes in timing of migration, which are predominantly based on data from standardized mist netting, and cover partly different sets of species. Overall, a slight advancement in migration patterns of 0.11 days per year was found, i.e. three days in the period 1980-2006. It was mainly the start of migration that advanced, whereas the end of migration activity was delayed, extending the main migration period. There were no consistent differences between long-distance migrants and migrants moving over shorter distances. We will discuss these results in relation to climate change and other possible causes. www.trektellen.nl now covers observation sites outside The Netherlands in Belgium, UK and Germany, as well as seawatch sites in France and Spain. In total over 400 sites are occupied. We will discuss the possibilities to expand the network further across Europe, and make recommendations concerning standardisation of counting efforts and methods, in order to enhance data analysis of visible bird migration.

Session 10. FARMLAND II: POPULATION TRENDS

CHANGES IN AGRICULTURAL MANAGEMENT AND FARMLAND BIRD POPULATIONS IN POLAND FOLLOWING ACCESSION TO THE EUROPEAN UNION

Fiona Sanderson[1]*, Marta Kucharz[2], Marek Jobda[2] & Paul Donald[1]
[1] Royal Society for the Protection of Birds, The Lodge, Sandy, Bedfordshire SG19 2DL, UK
[2] OTOP, ul. Odrowaza 24, 05-270 Marki k. Warszawy, Poland
* Corresponding author:
fiona.sanderson@rspb.org.uk

Poland is one of the most important new European Union Member States for farmland birds, holding more than a quarter of bird populations dependent on farmland in those 12 countries. 71 farmed 1 km squares were surveyed for breeding birds in 2002 and 2009, before and after Poland's accession to the European Union, in three regions of varying agricultural intensity. Crop cover and the cover of unfarmed habitats such as treelines and farm woods were also recorded in order to relate changes in farmland bird populations directly to habitat change. A number of habitat changes took place over the study period, including a decline in cover of grassland, changes in cropping patterns and a decrease in the area of fallow land. There have also been changes in some farmland bird populations, although these changes vary between regions. We examine the impact of habitat change on farmland bird populations and consider the implications for farmland birds in Poland and hence in the European Union as a whole.

TEMPORAL CHANGES IN WINTER ABUNDANCE OF COMMON FARMLAND BIRDS IN FRANCE COVARY WITH LARGE-SCALE CLIMATIC CONDITIONS

Cyril Eraud[1]*, Denis Roux[2], Jean-Marie Boutin[1] & Hervé Lormée[1]

[1] Office National de la Chasse et de la Faune Sauvage, DER-CNERA Avifaune Migratrice, Station de Chizé, Carrefour de la Canauderie, 79 360 Villiers-En-Bois, France
[2] Office National de la Chasse et de la Faune Sauvage, DER-CNERA Avifaune Migratrice, Station de Sault, Maison Guende, Rue Porte Royale, BP 20, 84 390 Sault, France
* Corresponding author:
cyril.eraud@oncfs.gouv.fr

There is overwhelming evidence that climate is a major environmental driver of many ecological processes in a wide variety of taxa, including birds. Therefore, in the context of climate change, uncovering the influences of weather on bird populations and predicting bird responses to future climate change are becoming a priority.

During the past decades, temporal changes in breeding range, phenology and in migratory behaviour in response to fluctuating climatic conditions have been already documented by a large number of studies. However to date, few studies have investigated temporal changes in the distribution and abundance of common wintering landbirds in relation to climatic conditions. Here, we addressed this question for 11 farmland bird species that commonly winter in France: Lapwing, Golden Plover, Woodpigeon, Collared-dove, Skylark, Redwing, Song Thrush, Fieldfare, Mistle Thrush, Blackbird and Starling.

Data on the distribution and winter abundance of the 11 bird species were collected from 2000 to 2008 over 1,045 grid cells (28 x 20 km) covering the whole France. Each grid cell included five point counts spaced along a route, which was visited once a year during the winter (15th-21st January).

The annual distribution and abundance of each species were characterized by using respectively (1) the mean geographical coordinates of the counting routes wherein a species was present, weighted by its local abundance and (2) the mean number of individuals per route. Large scale annual climatic conditions prevailing at the start of the wintering season were characterized using the monthly North Atlantic Oscillation (NAO) index averaged for the two months (i.e. November-December) preceding the counting period. A positive NAO index denoted warm and wet conditions over Northern Europe whereas a negative NAO index indicated cold and dry conditions.

Our results revealed important year-to-year variability in both distribution and abundance indices for all species and that these patterns showed marked temporal differences depending on the species. We found no evidence that annual changes in wintering distributions of the studied species in France were linked to temporal trends in climatic conditions. In contrast, a significant proportion of temporal variance in abundance index was explained by the NAO index. More precisely, the abundance of some completely (Redwing; figure 1) and partially migratory species (Song Thrush, Blackbird, Skylark) declined as NAO index increased.

These results emphasize that some common birds wintering in France exhibit a year-to-year plastic response to climatic conditions. Since climate change scenarios suggest the NAO phase would become more positive in the future, the winter abundance of some of these bird species might be expected to decline in France.

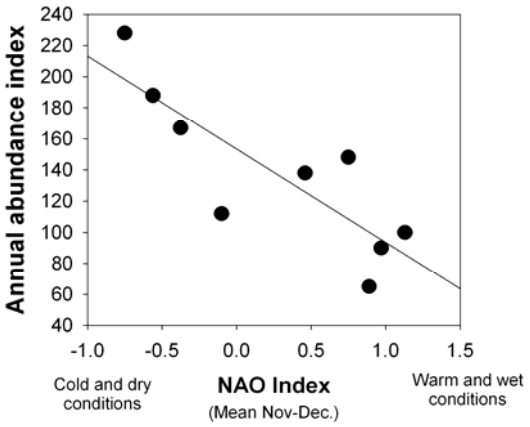

Figure 1. *Relation between NAO index and annual abundance index.*

POPULATION TRENDS OF FARMLAND BIRDS IN FARMLAND AND NON-FARMLAND HABITATS

Ola Olsson*, Martin Green, Åke Lindström, Richard Ottvall, Martin Stjernman & Henrik Smith
Animal Ecology, Lund University, Sweden
* Corresponding author: ola.olsson@zooekol.lu.se

We have analyzed the habitat associations and population trends of the 14 species that constitute the Swedish Farmland Bird Index. The analysis was made for the period 1998-2008 using the Swedish Fixed Routes scheme and spatial explicit agricultural data from the Swedish Board of Agriculture. All 14 species had as high or higher densities in farmland than in other habitats. However, only half of the species (Tree Sparrow, Starling, Greater Whitethroat, Linnet, Lapwing, Rook, and Skylark) had more than 75% of their populations in farmland. The remaining species (Meadow Pipit, Yellow Wagtail, Ortolan Bunting, Red-backed Shrike, Whinchat, Yellowhammer, and Swallow) had 60% or less of their populations in farmland. Several of these species breed in other open habitats, such as mires and alpine areas, in the northern part of the country, but some of them also regularly use forest clearfells. Only one species, the Linnet, had a simple negative population trend across the country and across habitats. In contrast, several species, e.g. the Skylark and the Starling, had negative trends in parts of the country, but less so in others. Notably, some species, particularly Meadow Pipit and Yellow Wagtail, had more negative trends in farmland than in non-farmland habitats.

COMPARING LAND SPARING AND LAND SHARING STRATEGIES FOR THE CONSERVATION OF FARMLAND AND FOREST BIRDS IN EXPLOITED LANDSCAPES

Yves Bas* & Frédéric Jiguet
Muséum National d'Histoire Naturelle, UMR 7204 MNHN-CNRS-UPMC, Conservation des Espèces, Restauration et Suivi des Populations, CP 51, 55 Rue Buffon, 75005 Paris, France
* Corresponding author: ybas@mnhn.fr

Conciliating wood and food production and bird conservation is a highly challenging issue as both wood and food demand are expected to drastically increase in the near future. Two general strategies have been put forward regarding production constraints in farmlands and forests, either (1) 'land sparing' where production is achieved by the most intensive practices, allowing to maximize the land area spared from intensive exploitation, or (2) 'land sharing' where practice intensity is averaged out on a maximal land area.
There is indeed evidence of such competing strategies in many different contexts (e.g. forest certification vs. unmanaged forest reserves and spatial distribution of Agri-Environment Schemes), and the conservation outcome of these two strategies could be compared by analysing the shape of the relationship between yields and species relative density (a convex response argues for land sparing and a concave response argues for land sharing, cf. Green *et al*., 2005 in *Science*).
Here, we applied this model to the abundance of 25 species of farmland specialist and 25 species of forest specialist. We analysed farmland bird abundance variations thanks to the French Breeding Bird Survey (BBS) dataset and an index of agricultural production intensity calculated from fine-scale statistics of yields and livestock densities. Similar analysis was conducted on forest birds thanks to a specific dataset of 117 lowland forest sites in western France where silvicultural rotation length, conifer introduction and forest breeding birds abundance were quantified.
Our results showed that most forest birds responses to wood yield were concave and that a majority of farmland birds had a convex response to agricultural yield. These differing responses pleaded for opposing strategies: a widely applied compromise in forest exploitation (especially in rotation length) and for a sparing of extensive farm-

lands. This last result points out the importance of maintaining a substantial proportion of extensive farmland at the cost of higher production intensity on the remaining part. On the contrary, a mix of old forest reserves and short rotation forests does not seem favourable for forest birds. The reasons of the efficiency of average forestry practices may be the possibility to maintain relatively intense wood production with a high density of high value microhabitats and with a low level of disturbance compared to average agricultural practices.

Session 11. MODELLING I: GENERAL ISSUES

MODELLING BIRD DISTRIBUTION AND ABUNDANCE WITH DIFFERENT SUBSET OF PREDICTIVE VARIABLES

Luis M. Carrascal[1]*, Jorge M. Lobo[1] & David Palomino[2]
[1] Dept. Biodiversity and Evolutionary Biology, Museo Nacional de Ciencias Naturales, CSIC, Madrid, Spain
[2] Área de Estudio y Seguimiento de Aves, SEO/BirdLife, Madrid, Spain
* Corresponding author: lmcarrascal@mncn.csic.es

Mapping bird distribution is a first step in biodiversity inventories in order to foster good environmental decisions or conservation plans. This is a formidable endeavour in large areas with a limited number of qualified observers. Several modelling methodologies to analyze distribution and abundance are available and have been tested during the last decade. Nevertheless, a considerably lower effort has been made in order to test the accuracy of predictions derived from different subsets of predictive variables used in modelling bird distribution. This is an important concern, because local abundance and occurrence is governed by proximal effects related to habitat preferences and physiological boundaries of performance defining the ecological niche of species, especially under limiting environmental conditions (e.g., thermal or hydric stress).

We present a comparative analysis of three different subsets of predictive variables, from coarse to fine grained predictors, to model bird abundance in an environmentally diverse area (La Palma island, Canary archipelago). Bird surveys were carried out during the breeding season using line transects of fixed length (0.5 km). A total number of 437 line transects were made covering a very broad range of habitats or geographical areas in an island of 706 km^2. Data modelling is carried out using a powerful predictive tool (boosting regression trees) working with geographical predictors (GEO; longitude, latitude, altitude, slope, cardinal orientation), landscape characteristics obtained from GIS databases (GIS; e.g., major habitat types surrounding the census location, distance to the nearest habitat patch, NDVI), and habitat structure variables obtained in the census location while sampling (HAB; e.g., cover and average height of the herbaceous, shrub and tree layers). Twenty two species are modelled, including a wide array of birds differing greatly in stenotopy, habitat preferences, abundance, geographical range, mobility and detectability.

First, we model spatial variation in bird density using five subsets of predictive variables (GEO, GIS, HAB, GEO+GIS and GEO+HAB). Second, the explanatory and predictive power of boosting tree models are compared, trying to identify the best subset of variables for mapping bird distribution-abundance. These models are used to test their suitability predicting population density in eleven major habitats, and habitat breadth. Finally, the effect of species' autoecological traits on predictability of habitat suitability models is also analyzed.

USING THE NDVI FOR MODELLING BIRD DISTRIBUTIONS IN CHANGING FARMLAND LANDSCAPES: PREDICTING THE DYNAMIC DISTRIBUTION OF THE COMMON QUAIL (*COTURNIX COTURNIX*)

Francesc Sardà-Palomera[1]*, Manel Puigcerver[2], Lluís Brotons[3] & José Domingo Rodríguez-Teijeiro[1]
[1] Departament de Biologia Animal, Facultat de Biologia, Universitat de Barcelona, Avinguda Diagonal 645, 08028 Barcelona, Spain
[2] Departament de Didàctica de les Ciències Experimentals i la Matemàtica, Facultat de Formació del Professorat, Universitat de Barcelona, Passeig Vall d'Hebron 171, 08035 Barcelona, Spain
[3] Centre Tecnològic Forestal de Catalunya, Area de Biodiversitat, Ctra. Sant Llorenç de Morunys, km. 2 (Ctra. vella), 25280 Solsona, Spain
* Corresponding author: fsarda@ub.edu

The interest on predictive modelling techniques has increased during the last decade. These methods are useful tools to study animal distributions, and are broadly used for biodiversity management and conservation. Although predictive models can be very accurate, they can show a too general view of the species requirements, capturing it in a single distribution map. This problem can be still stressed in birds. Birds are the animal group with higher capacity of movement; they are able to cover long distances in short periods of time, but not only during migrations, they can also show fast dispersion and nomadic movements, and their population dynamics and ecological requirements can vary during a single season.
A good example of it is the Common Quail (*Coturnix coturnix*). This species mainly inhabits cereal and herbaceous crops, which are ephemeral agricultural habitats in constant change, directly affected by human activities. It is known that quails show latitudinal and altitudinal movements during breeding season, mainly induced by habitat changes and mowing. Thus, a predictive model that would not include information about habitat dynamics could have serious errors.
During three years (2006-2008) we collected continuous quail presence-absence data in thirteen study areas distributed in four countries (Morocco, Portugal, Spain and France). Using Generalized Linear Mixed Models (GLMM) we related the species presence with the Normalized Difference Vegetation Index (NDVI) of each area every 16 days, and the monthly mean temperature.
The resultant predictive model explained the 66% of the deviance. The NDVI in cereal and grassland landscapes is constantly changing, from green plant in spring, to yellow dry plant and finally short stubbles after mowing in summer. Thus, we can predict the constant habitat suitability and the dynamic distribution of the species within each breeding season. The results explain the quail nomadic movements from northern Africa to Europe due to an important habitat suitability lost after mowing. It also indicates that this species distribution during breeding season act as a 'wave' and that a non-dynamic model could induce consequently to important errors from a conservation point of view.

CHECKLIST PROGRAMS AS A SOURCE OF DATA FOR BIRD MONITORING: DESIGNING ANALYSES AND MODEL VALIDATIONS TO ACCOUNT FOR UNEQUAL SPATIAL AND TEMPORAL SAMPLING EFFORT

Wesley M. Hochachka*, Daniel Fink & Steve Kelling
Lab of Ornithology, Cornell University, 159 Sapsucker Woods Rd, Ithaca, NY 14850, USA
* Corresponding author: wmh6@cornell.edu

Country- and continent-wide monitoring of birds effectively necessitates the use of volunteers for the collection of data, and checklists of all observed bird species are often the form data that volunteers produce. For these data to be useful for monitoring and other conservation-related activities, the data need to be turned into some form of species distribution model. Our experience is that standard analysis techniques are not adequate. We conclude this from work with the largest

checklist-based bird-monitoring program in North America, eBird, an online data collection scheme that currently gathers data from over 74,000 new checklists each month. While impressive volumes of data are accumulated, the data are not uniformly collected across North America with some areas and some times of year better represented than others. Species-distribution models created from these data using standard analysis techniques are unrealistic, even when standard model diagnostics suggest that the models are adequate representations of reality. Models are unrealistic because patterns found in regions of high data density overwhelm information from regions of lower data density, and the resultant errors are not detected during model validation because conventional methods for validating models are also weighted in favour of areas of higher data density.

We present analyses to illustrate the problems with generic species distribution models, and suggest a framework for analysis that reduces the potential biases caused by unequal data densities. We also introduce a model-validation scheme that describes the suitability of models across continent-spanning areas in spite of unequal data densities. These approaches are able to produce accurate species-distribution models throughout the year even for migratory species.

Checklist programs without rigorous protocols should not be viewed as replacements for monitoring using more strictly-controlled protocols, as there is likely a trade-off between quantity (checklist) and per-datum quality (stricter protocols). However, we believe that checklist-based schemes to have important roles in bird monitoring. Such data can serve as initial, exploratory data useful for suggesting biological questions to be studied more intensively. Another possible use for checklist data would be to provide a common, albeit coarse-resolution set of data that could be used to 'knit together' information from disparate and non-overlapping bird monitoring schemes.

PHENOLOGICAL AND RESOURCE USE TRAITS EXPLAIN LONG TERM POPULATION TRENDS IN UK PASSERINE BIRDS

Lara Salido[1, 2]*, Bethan Purse[1], Rob Marrs[2], Dan Chamberlain[3] & Susanne Shultz[2]

[1] Centre for Ecology and Hydrology, Bush Estate, Penicuik, Midlothian, EH26 0QB, UK
[2] University of Liverpool, Biological Sciences, Liverpool, L69 3BX, UK
[3] British Trusts for Ornithology, The Nunnery, Thetford, Norfolk, IP24 2PU, UK
* Corresponding author: larlad@ceh.ac.uk

Ecological responses to recent climate change and habitat loss and modification are wide ranging, including alterations in the timing of life-history events, range and population changes, and biodiversity loss. Despite the increasing evidence supporting phenological responses to climate change in a range of bird species, few studies have looked at the relationship between observed population trends and phenological traits within a modelling framework that also includes other specific traits such as life-history and/or resource use. We modelled population trends for 50 passerine species in the UK over the period 1994-2007. We used a range of modelling methods (GLMs, PGLS) to relate population trends to species specific traits, amongst which were mean laying dates and clutch laying periods, whose timing have been postulated to alter in response to climate change with significant impacts on species population dynamics. Amongst all the predictors used to develop the final model, only migration status, species with farmland as breeding habitat and the interaction between migration and first clutch laying period were retained (final model $D2 \sim 0.4$). Amongst these predictors, farmland as breeding habitat appeared as the most important factor ($\Delta AICc = 14.2$). Our results indicated that species dependent on farmland as their main breeding habitat had lower population trends than species using other habitats. While it is known that species with specialized habitat requirements are declining at a much higher rate than habitat generalist, this

may also be a sign that habitat quality may be decreasing which may lead to functional biotic homogenization. We also uncovered a significant interaction between first clutch laying period and migration status which indicated that migrant species with longer laying periods had significant larger population trends than those with shorter (slope = 0.16, p = 0.047). This is the first study to indicate that for species already constricted in the timing of certain phenological events, small changes in their timing may be of crucial importance for their population stability. Thus, as there appears to be a considerable inter-specific variation in the degree and direction of species responses to both of short-term habitat loss/degradation and long term threat of climate change, identifying the mechanisms driving these responses would be essential for developing adequate conservation strategies for the most vulnerable species.

REPORT OF THE EBCC SPATIAL MODELLING GROUP: UPDATE ON SPATIAL MODELLING OF BIRD MONITORING DATA IN EUROPE

Henk Sierdsema[1]*, Lluís Brotons, Stuart Newson, Frédéric Jiguet, Marc Kéry & Richard Gregory
[1] SOVON Vogelonderzoek Nederland/SOVON Dutch Centre for Field Ornithology Rijksstraatweg 178, NL-6573 DG Beek-Ubbergen, The Netherlands
* Corresponding author:
henk.sierdsema@sovon.nl

Since 2005 the EBCC Spatial Modelling Group of the EBCC has worked to promote and support the use of bird monitoring data in the production of distribution and trend maps of breeding birds in Europe. During the past few years a pilot project has been set up to illustrate the use of monitoring data for mapping purposes across multiple countries and monitoring schemes. The results have been reported at a large number of conferences and at meetings of the EBCC, including PECBMS-workshops. There is now considerable interest within the EBCC for work of this type and an interest to collaborate in such studies at a Pan-European scale. As a consequence there is a need for tools that facilitate the production of such maps from bird monitoring data and it is envisaged that training to create such maps perhaps in combination with the development of a program like 'TRIMMAPS' could facilitate this process. In this presentation we will provide an update on the work of workgroup and interesting new developments as part of this project, and present some applied results on the use spatial modelling of monitoring data for the conservation of farmland birds in Europe.

Session 12. STEPPE BIRDS

MEADOW BIRD MONITORING IN FRANCE AND RUSSIA: FIRST RESULTS OF COMPARATIVE RESEARCHES

Joël Broyer[1]*, Alexander Mischenko[2], Olga Sukhanova[2] & Laurence Curtet[1]
[1] Office National de la Chasse et de la Faune Sauvage, Montfort, 01330 Birieux, France
[2] Russian Bird Conservation Union, Shosse Entuziastov, 60, 111123 Moscow, Russia
* Corresponding author:
joel.broyer@oncfs.gouv.fr

In western Europe, farmland birds, meadow birds in particular, have undergone a severe decline in the last decades after long term changes in farming practices. In north-eastern Europe (Russia), a long-lasting crisis in agriculture leads to the abandonment of huge grassland areas, then gradually overgrown by bushes. Agri-environmental schemes only involve western countries, with few successful results reported so far for meadow birds.
A national haymeadow ecosystem monitoring has been implemented in France since 2001, with the objectives to: (1) describe annual trends with standardized indicators; (2) ex-

plain observed changes with the help of environmental descriptors; (3) model the effects of grassland management on meadow bird abundance. This observatory also aimed at controlling the efficiency in corresponding public policies. Standardized data are now collected annually in 1,000 12-hectare sampling plots selected in 120 study regions most important for meadow bird breeding in France.

Since 2006, a partnership between ONCFS and RBCU has enabled to launch a similar observatory in European Russia. The same methodology was used so that the results from the two countries could be easily compared, but the size of the country could not allow an exhaustive annual survey in Russia. Standardized data have been collected in 2006-2009 in 187 sampling plots selected in 36 study regions located in different parts of European Russia. Annual bird counts in 2007-2009 have been done in 64 of the sampling plots selected in 12 study regions.

Yet a similar Meadow Passerine Index (MPI), i.e. the number of individuals censused by a static observer within two 15-minute periods (in the first half, then in the second half of bird nesting time), enables to compare the French and Russian meadow ecosystems. Only hay meadows still provide favourable breeding conditions for birds in France, while in Russia extensively grazed or recently abandoned grasslands can be very attractive for some species. While few differences were observed across the respective lists of observed passerine species, bird abundances, as described by the MPI, strongly differ between the two countries. The MPI was lower in France (< 10 in two-thirds of the study regions) and correlated with the hay cutting schedule in preceding years. The MPI in Russia was < 10 only in about one-third of the sampling plots; the highest MPIs (> 27) were recorded in flood plain meadows mown in late terms (after 1 July), mown incompletely or non mown in previous year.

We can thus assume that the schedule of mowing could be at the origin of generally low population density in western Europe.

THE IMPACT OF POST-SOVIET LAND USE CHANGE ON STEPPE BIRD POPULATIONS IN KAZAKHSTAN

Johannes Kamp[1, 2]*, Paul F Donald[1] & Norbert Hölzel[2]

[1] Conservation Science Department, Royal Society for the Protection of Birds, The Lodge, Sandy, Bedfordshire SG19 2DL, UK

[2] Ecosystem Research Group, Institute of Landscape Ecology, University of Muenster, Robert-Koch-Str. 28, 48149 Muenster, Germany

* Corresponding author: johannes.kamp@rspb.org.uk

The Eurasian steppe belt has been cultivated for centuries, with large expanses of pristine steppe landscapes remaining only in Kazakhstan. Declines of steppe birds have been attributed to cultivation since the 19th century. However, the collapse of the Soviet Union in 1991 has lead to large-scale abandonment of agriculture and major changes in grazing patterns of both wild and domestic ungulates. We studied abundance (using distance sampling) and habitat preferences of steppe breeding birds in Central Kazakhstan in 2009. We also collated agricultural data for the period 1990 to 2009 from state and regional statistical agencies, in order to evaluate possible future population trends in relation to trends in land use. Grazing patterns were examined by attaching GPS loggers to domestic cattle and horses.

On abandoned arable fields several species such as Black Lark (*Melanocorypha yeltoniensis*), Booted Warbler (*Hippolais caligata*) and Siberian Stonechat (*Saxicola maurus*) reached up to ten times higher densities than in pristine steppe. Overgrazed steppe swards were species-poor, but hosted the highest numbers of Sociable Lapwing (*Vanellus gregarius*) and White-winged Lark (*Melanocorypha leucoptera*). GPS tracking data suggested a strong relationship between the breeding density of these species and densities of grazing livestock.

Overall avian species richness and diversity were highest in moderately to ungrazed steppe, but bird densities were rather low,

with several species clearly preferring this habitat and avoiding (former) cultivation.
Analysis of land use trends showed a strong decrease of area under cultivation 1990-1999, but a subsequent recovery with large-scale reclamation of abandoned areas. Average yields are increasing, suggesting intensification of farming practices. Domestic livestock numbers collapsed in the early 1990s, but are recovering quickly since then. Livestock is now much less mobile than in Soviet times leading to imbalanced grazing pressure across the steppe.
We conclude that populations of many biome-restricted and threatened steppe species could recover during the period 1990-2005 due to increased habitat availability. Current trends in arable farming suggest an end of this favourable situation. A basic monitoring scheme is much needed for steppe birds.

ASSESSING THE CONSERVATION STATUS OF THE STEPPE HABITAT IN ANDALUSIA (S SPAIN) THROUGH THE LONG-TERM MONITORING OF STEPPE BIRDS

José R. Garrido[1]*, Marcos Moleón[1], Matías de las Heras[1] & Francisco Romero[2]
[1] Programa de Emergencias, Control Epidemiológico y Seguimiento de Fauna Silvestre de Andalucía, Egmasa-Consejería de Medio Ambiente, Junta de Andalucía, Spain
[2] Servicio de Geodiversidad y Biodiversidad, Consejería de Medio Ambiente, Junta de Andalucía, Spain
* Corresponding author: jrgarrido@egmasa.es

The steppe birds are one of the most endangered groups of birds nowadays. This unfortunate situation is greatly caused by the rapid, widespread transformation and degradation of the steppe environment mainly due to agricultural purposes. However, the relatively low plasticity in the ecological requirements of these birds also contributes. Thus, the status of the steppe bird community may be a reliable indicator of the status of the whole steppe habitat. The government of Andalusia (S Spain) have improved a well-established, long-term monitoring program of several steppe birds (starting from at least 2004, depending on the species), including the more threatened ones in the region (*Chersophilus duponti*, *Otis tarda*, *Pterocles orientalis*) and several other species showing a lower level of threat (*P. alchata*, *Tetrax tetrax*, *Circus pygargus*, *Falco naumanni*). Using the birds census data (number of individuals by age and sex) both from the breeding and the non-breeding seasons, we defined indicators on the population trends of each the abovementioned species. We also registered the management actions, changes in habitat use and some other human impacts implemented/observed in the steppe lands. The resulting conservation indicators are mainly related (a) to the population trend and (b) to the population vs. distribution area trends ratio. The former is put against the 'optimal' population level in the region (defined from historical and current carrying capacity data) and the population levels needed to enter in the upper and the downer threaten regional category (following IUCN criteria).
This shows what is and what is not desirable to reach, so being a valuable point of reference for managers. *C. duponti* and *O. tarda* showed the more critical trends (e.g., in the last decade disappeared the 80% of the population of the former); however, in the last few years appears to take place some stability. A similar situation was also observed for *C. pygargus*. The other species showed positive (mainly *F. naumanni*) or stabilized (the other ones) population trends.
The continuous increasing of the olive-tree groves is the main cause of habitat loss in *O. tarda*, although also affects other species. Indeed, while the *O. tarda* numbers are currently stabilized, the distribution range of this species is still diminishing, so birds concentrate in more and more small areas. The management actions implemented over the last years by the local government (e.g., different habitat management techniques, the correction of power lines, or feral dog/cat control) might partially explain the recent favourable general trends.

USING MULTI-SOURCE REMOTE SENSING DATA FOR DESCRIBING STEPPE BIRD LANDSCAPE REQUIREMENTS IN THE CASTRO VERDE SPA, PORTUGAL

Pedro J. Leitão[1, 2]*, Francisco Moreira[2] & Patrick E. Osborne[3]
[1] Geomatics Lab, Institute of Geography, Humboldt-Universität zu Berlin, Germany
[2] Centre for Applied Ecology 'Prof. Baeta Neves', Institute of Agronomy, Technical University of Lisbon, Portugal
[3] Centre for Environmental Sciences, School of Civil Engineering and the Environment, University of Southampton, UK
* Corresponding author: p.leitao@geo.hu-berlin.de

The Castro Verde SPA is the main pseudo-steppe area in Portugal, holding populations of several threatened steppe bird species with national and international importance. The implementation of a specific agri-environmental programme for farmers in the area has been successful in supporting these populations. However, a lack of knowledge of the landscape requirements by steppe bird species can hinder the efficiency of the respective management measures. In this study, we used remote sensing data from several different sources (SPOT VGT, LandSat, LiDAR) data for characterising landscape features at different spatial scales, while agricultural crop dynamics were captured by multi-date imagery. Steppe bird species occurrences were estimated through a combined stratified random field sampling design. In order to quantify the species-landscape associations we used a non-linear regression approach (MARS models). Remote sensing data, collected at different spatial scales and times allowed a good description of the steppe bird community in terms of their habitat requirements, as well as the quantification of specific species-landscape associations which can be translated into appropriate management prescriptions.

Session 13. GLOBAL CHANGE I: HABITAT APPROACHES

CLIMATE CHANGE AND BIRDS: FROM PHENOLOGY TO POPULATION TRENDS

Christiaan Both
Animal Ecology Group, Centre for Ecological and Evolutionary Studies, University of Groningen, The Netherlands
c.both@rug.nl

One of the best observed effects of climate change is that birds progressively migrate and breed earlier in spring. This response is expected, because other parts of the ecosystem also advance their phenology. However, in several cases the food peak for the birds advanced more than the birds' breeding dates, and this mismatch could cause reduced reproductive rates and consequently population declines. Here I show that the migratory Pied Flycatcher indeed responded insufficiently to the advance of their food peak, and as a result Pied Flycatcher populations have declined. The reason why they did not advance their breeding more is most likely because of their migratory behaviour. At their wintering grounds they cannot properly anticipate to the advanced conditions at their breeding site, and also constraints during migration have hampered an advance in their arrival times. This consequence of climate change is expected to be present in more long-distance migratory bird species, especially those that breed in habitats with a narrow food peak in spring. Using data from the common bird census collected by many volunteer birders, we show that in the Netherlands all long-distance migrant species have declined in the highly seasonal forest habitat, but not in the less seasonal marsh habitat. For residents and short-distance migrants, population trends were not different between forest and marsh. Climate change is most likely involved, because for the forest breeding migrants the effect was not observed in areas where spring temperatures have increased less (Western Europe compared with Fenno-Scandian populations). Limited adaptation to climate

change could thus be an important reason why especially migratory birds have declined.

PREDICTING THE POTENTIAL IMPACTS OF FUTURE LAND COVER CHANGES ON BREEDING BIRD COMMUNITES IN THE ITALIAN ALPS

Marco Girardello[1, 2]*, Simone Tenan[2] & Paolo Pedrini[2]
[1] Centre for Ecology and Hydrology, Cromarsh Gifford, Wallingford, Oxfordshire, OX10 8BB, UK
[2] Trento Museum of Natural Sciences, 38100 Trento, Italy
* Corresponding author: mara@ceh.ac.uk

Predicting the impacts of environmental changes on biodiversity is central to the development of adequate conservation strategies. Whilst most studies have focussed on the predicting impacts of changes in climate on breeding birds, fewer have considered the impacts of future land cover changes. We studied the potential impact of land cover driven change on the distribution and conservation of over 60 bird species in the Italian Alps. We modelled the distribution of each species using seven niche modelling techniques. Species distributions were projected into the future using two different land cover scenarios. To reach a consensus scenario we used an ensemble-forecasting approach to obtain the distribution of each species at each time interval. We estimated distributional extent and shift in each species. Our results show a complex response of species distributions, emphasizing the potential severity of land cover changes on the distribution of breeding birds in the Italian Alps. Changes in range size varied across species and future predicted range extent was negatively correlated with current predicted range extent in all scenarios. Our findings highlight the need to maintain these breeding bird communities in an optimal condition in which they can be most resilient to land cover changes, to monitor them for signals of change and to develop more flexible conservation policies which account for future changes land cover changes in the Alps.

HOW MUCH HAVE RECENT CHANGES IN FOREST AGE STRUCTURE INFLUENCED HABITAT QUALITY OF COMMON BIRD SPECIES IN LATVIA?

Elmārs Pēterhofs
Institute of Systematic Biology, Daugavpils University, Vienibas 13-229, LV-5401 Daugavpils, Latvia
elmars.peterhofs@dundaga.lv

Over the past two decades forestry in Latvia has intensified causing essential changes in forest age structure. The background of the present study is the dominance of 50-80 year-old pine, 30-40 year-old spruce, 50-70 year-old birch and 50-80 year-old broadleaved forest stands, the increasing ratio of young forest stands and the decreasing ratio of forests in harvesting age. The main object of the study is a habitat selection of forest bird species and how the changes in forest age structure influence the breeding habitat quality. The occurrence of breeding birds was studied by using the point-count method combined with bird mapping by GPS. The spatial analysis of the forest age structure was performed by GIS in two relevant circles with registered birds: (1) within 25 m radius circle and (2) within 300 m radius circle from each registered bird. The relation between areas of similar age forest stands in two relevant circles show which forest age classes are preferred by each bird species. Overall 36,400 bird territories of 66 bird species and over 1 million ha of forest were examined, obtaining the distribution models of spatial age structure for pine, spruce, birch and broadleaved forest stands. Follow-up the forest stands preferred by different bird species were analyzed in context of forest age structure changes at national level. The results of the present study show the decrease of the habitat quality for many bird species during last 8 years: 13 species in pine forests, 28 in spruce forests, 16 in birch forests and 32 in broadleaved forests. At the same time forest man-

agement has created liveable circumstances for bird species preferring younger, more open forest stands with recently performed forest harvesting. Consequently, we can forecast a declining number of birds mostly found in older and dense forest stands and an increasing population trends for bird species living in more open forest landscapes. The decline of habitat quality was also found for most common bird species like Chaffinch (*Fringilla coelebs*), Robin (*Erithacus rubecula*) and Wood Warbler (*Phylloscopus sibilatrix*), hence a decrease of the total number of forest birds could be expected in Latvia.

ABUNDANCE AND IMMUNOCOMPETENCE OF ALPINE PASSERINES IN THE CANTABRIAN MOUNTAINS: POTENTIAL IMPACT OF CLIMATE CHANGE

Leandro Meléndez[1], Jesús Ángel Lemus[2], Guillermo Blanco[2], Mónica García[1], María José Bañuelos[1] & Paola Laiolo[1]*
[1] Instituto Cantábrico de Biodiversidad (CSIC, Universidad de Oviedo, Principado de Asturias), Oviedo, Spain
[2] Museo Nacional de Ciencias Naturales (CSIC), Madrid, Spain
* Corresponding author: paola@ebd.csic.es

Climate is a key determinant of bird ecology, and its variation can have important consequences for species phenology, abundance and distribution. Less known are the effects of climate on bird immunocompetence, and how the immune system may respond to climate change. In this study we address altitudinal variation in abundance and immunocompetence of two representative passerines of Cantabrian Mountains, the Wheatear (*Oenanthe oenanthe*) and the Water Pipit (*Anthus spinoletta*). Because of their southern location and the limited range of altitudes they cover, Cantabrian Mountains are expected to experience a major impact of climate warming, posing a considerable threat to cold-adapted organisms.
This study was carried out in the Picos de Europa National Park, at the eastern fringe of Cantabrian Mountains, during the breeding season 2009. Bird abundance was estimated by carrying out 105 circular-plot bird counts in 21 different areas distributed throughout the open habitats of the National Park, in the altitudinal range of 600-2,200 m a.s.l. Birds were captured in 12 sample areas, along the whole study gradient, and a drop of blood was extracted from each captured bird. We used flow citometry techniques to evaluate cell immunity from extracted samples, by direct account of the three most representative T-cell subset (CD4+, CD5+, CD8+). In both species we found a nonlinear relationship of increasing abundance and immune condition with elevation up until 1,400-1,500 m a.s.l. and then these parameters stabilized.
As altitude by itself has a poor effect on organisms, we analyzed the climatic, biogeographic, topographic and environmental determinants that may condition the observed elevation patterns of abundance and immune condition. The Water Pipit was more common in plots characterized by low mean annual temperatures, and its abundance was positively associated with mean annual rainfall. Greater abundances were also found in moderately rocky and steep habitats with scarce tree cover. Wheatear density increased in flat, rocky plots with low annual temperatures and scarce shrub cover at the local scale. The immune condition of both passerines was enhanced by cold temperatures and moderate-high rainfall levels. In addition, the health condition of the Water Pipit improved in areas with scarce shrub and tree cover, and far from the geographical edges of the Cantabrian Mountains. These findings suggest that the two species may be especially vulnerable to global warming and should be considered as good indicators of climate change in alpine environments.

THE EFFECTS OF N.A.O. AND LAND USE CHANGE ON DISTRIBUTION AN ABUNDANCE OF (*FALCO NAUMANNI*) IN SICILY

Maurizio Sarà
Dipartimento di Biologia Animale, Università di Palermo, Italy
mausar@unipa.it

The Negative Binomial Distribution (NBD; He & Gaston, 2000) can be used for predicting abundance of species from occurrence maps at two different scales of resolution. A first application to Raptors in Sicily, provided a good approximation of the breeding abundance of Lesser Kestrel (*Falco naumanni*) for the years 2003-2007, by using sample areas located in 67 UTM 10 x 10 km cells (coarse-scale) and 268 UTM 5 x 5 km cells (fine-scale; Sarà, 2008). During 2009, I repeated the census and the NBD modelling to outline the trend of this threatened small raptor. *F. naumanni* showed a decline in the colonies ($\tilde{N}$ = 62 ± 11 in 2003-2007 vs. 51 ± 13 in 2009), with a 20.4% (1,075 vs. 1,350 km^2) range contraction at the fine-scale area of occupancy. Yet, the decline was not homogeneous, with colonies in NNW Sicily decreasing of 13%, respect to the 1.8% in the SE. When considering the N of pairs (corrected for the N unchecked active colonies), the population trend of *F. naumanni* emerging from 6 years of counts shows a continue increase in the SE (from 170 to 557 pairs), respect to fluctuations around 70-120 pairs in NNW. To understand this figure, I used a GLZ design (normal distribution of error and identity link function) where the N of pairs counted during 6 years in 35 colonies was analysed by categorical (the median De Martonne's aridity index of the UTM) and continuous predictor variables (the NAO of the previous year, the monthly-NAOs from January through April, the relative frequency of change of land uses 1 km around the colony). Predictors selected as the best subset (AIC = 1,512.9, p = 0.000) proved how habitat change around the colonies (decrease of crop fields and increase of intensive cultivations) and climatic oscillations (NAO of February, of April and that of the previous year) affect the yearly pair abundance mainly depending from the location of the colony itself in a NNW (temperate De Martonne) or in a SE (semiarid) UTM (figure 1).

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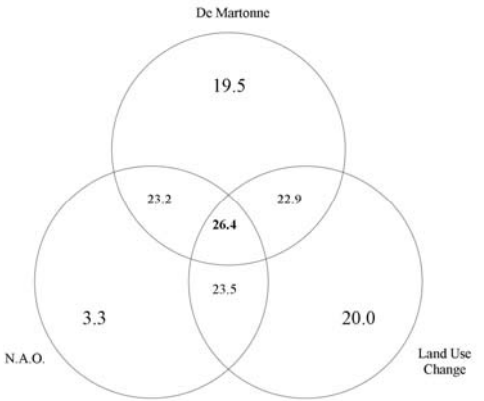

Figure 1. *Variation partitioning of significant predictors (grouped in classes) emerging from GLZ model.*

Session 15. GLOBAL CHANGE II: INDICATORS

CLIMATE CHANGE INDICATORS: NEW GENERATION INDICATORS

Richard D. Gregory
European Bird Census Council & The Royal Society for the Protection of Birds, The Lodge, Sandy, Bedfordshire, SG19 2DL, UK
richard.gregory@rspb.org.uk

Global and regional targets to reduce the rate of biodiversity loss bring with them a need to measure how nature is changing. Groundbreaking work by the EBCC, in initiating a Pan-European Common Bird Monitoring Scheme through the cooperation of expert ornithologists across Europe, has led to the creation of a biodiversity indicator based on annual bird trend data. It is the first of its kind. Designed as a state indicator and sensitive to direct pressures in the environment, it integrates the balance of trends in a basket of species. Its purpose is to act as a barometer of change in nature. EU and national govern-

ments have adopted wild bird indicators (WBIs) within strategies to assess sustainability and environmental health. The WBI has the qualities of an effective indicator and acts as a bridge between science and policy. The farmland bird indicator, for example, shows how changes in farming practice across Europe have impacted on specialist birds and by inference on nature. It tells us how populations are changing now and we can predict how they might change in the future. The depth of information contained in the population trends, however, goes much further than the direct pressures that were our first concern, and we are learning more about indirect signals of environmental change, especially of the impact of climatic warming on birds.
Rapid climatic change poses a threat to global biodiversity. Evidence is accumulating that it has altered many biological phenomena. Scientists and policy makers have called for indicators that summarise impacts over many species. An EBCC-led team has developed a biological indicator of impacts. First, it tested the performance of projections of change in the extent of species' geographical range (from climatic envelope models) in predicting species' trends. Finding trends were highly correlated with change in potential range between the late 20th and 21st centuries. Second, it constructed a Climatic Impact Indicator (CII) based on the divergence in population trends between species expected to be positively and negatively affected by climatic change. The CII is a pressure indicator and has increased strongly in the past 20 years, coinciding with a period of rapid climatic warming. This demonstrates that climatic change is having a detectable effect on bird populations across Europe, including evidence of negative and positive effects. The number of birds negatively impacted was three times larger than those positively affected in this study. Parallel work on birds and butterflies using different methods shows similar effects. Taken together, this suggests there might be wide-scale change in bird communities across Europe, with 'a few winners and many losers' as climatic impacts unfold.

THE ROLE OF EBCC MONITORING DATA IN CLIMATE CHANGE RESEARCH

Ruud P. B. Foppen[1, 2]*, Chris van Turnhout[1], Richard G. Gregory[2, 3], Arco van Strien[4] & Vincent Devictor[5]
[1] SOVON Dutch Centre for Field Ornithology, Nijmegen, The Netherlands
[2] European Bird Census Council, Beek-Ubbergen, The Netherlands
[3] The Royal Society for the Protection of Birds, The Lodge, Sandy, UK
[4] Statistics Netherlands, Voorburg, The Netherlands
[5] Institut de Sciences de l'Evolution, Université Montpellier, France
* Corresponding author: ruud.foppen@sovon.nl

Climate change is one of the prime threats to avian biodiversity worldwide. To understand its real impact we need to study large scale patterns in changes in distribution and abundance of species as well as demographic rates in local ecological conditions. In this research there is a complementary role for professional ornithologists and volunteer bird counters. Professionals study in detail the mechanistic processes of adaptation to climate change in interaction with ecological changes, e.g. how does it affect local demographic rates. However, their local, detailed studies cannot easily be translated to larger spatial scales. The importance of data from volunteer networks is that they allow us to describe large-scale patterns on multiple species, with less detail. We show examples of collaborations between professional and volunteer networks in Europe in describing and unravelling the effects of climate change on bird populations. The approach enables to scale up and down the various data sources. We believe it to be essential in order to understand the processes explaining impacts of global change. The results could also prove valuable in public awareness campaigns, examples are climate change indicators. Ultimately this combination of knowledge and data can contribute to the design of strategies for mitigating and compensating the negative impacts of climate change.

A VULNERABILITY INDEX FOR BREEDING BIRDS IN CHANGING CLIMATE AND LAND USE

Ramona Maggini[1, 2]*, Boris Schröder[3], Niklaus E. Zimmermann[4], Janine Bolliger[4], Anthony Lehmann[2], Ruud P. B. Foppen[5], Hans Schmid[1] & Niklaus Zbinden[1]

[1] Swiss Ornithological Institute, Sempach, Switzerland
[2] Climatic Change and Climate Impacts Research Group, Institute for Environmental Sciences, University of Geneva, Carouge, Switzerland
[3] Institute of Geoecology, University of Potsdam, Potsdam, Germany
[4] Swiss Federal Research Institute WSL, Birmensdorf, Switzerland
[5] European Bird Census Council, Beek-Ubbergen, The Netherlands
* Corresponding author: ramona.maggini@vogelwarte.ch

In recent years, evidence has accumulated about the impacts of climate change on different aspects of birds' life. In the spatial dimension, climate change has been shown to induce pole- and upward shifts of the distributional ranges. The main question addressed by the ClimBird project at the Swiss Ornithological Institute is therefore to know how the forecasted changes in climate and land use will modify the distribution of breeding birds in Switzerland and which will be the most vulnerable species.

The project relies on a considerable amount of quality data made available through monitoring programs, atlases and ornithological databases in order to accurately model the current distribution of birds across Switzerland. However, the new challenge set by climate change in species distribution modeling is to reduce uncertainty while predicting future ranges. Since predictions can vary greatly according to the input data set, the employed modeling technique and the applied scenario, it is now recommended to work within an 'ensemble forecasting' framework. The current distribution of Swiss breeding birds was therefore modelled by an ensemble of techniques (GAMs, BRT, MARS) using different bioclimatic, topographic and land use-related predictors at a resolution of 1 km^2. The distribution in the late 21st century was then projected according to combined scenarios of climate (temperature, precipitation) and land use change developed specifically for Switzerland. Average species distributions were calculated from the ensemble forecasts.

Finally, a Swiss Bird Vulnerability Index (SBVI) was defined for each species by integrating elements such as the extent and the overlap of the projected distribution relative to the current distribution, the recruitment possibilities for Swiss populations from the surrounding European countries and the current population trends in Switzerland. Ranking of the species according to their vulnerability clearly shows that climate warming represents a major threat especially for alpine species, for which Switzerland has a key responsibility in the European alpine landscape.

A CLIMATE CHANGE INDICATOR FOR SWEDISH BIRDS

Åke Lindström[1]*, Vincent Devictor[2], Martin Green[1], Richard Ottvall[1] & Henrik Smith[1]

[1] Department of Ecology, Lund University, Ecology Building, S-223 62 Lund, Sweden
[2] Station Biologique de la Tour du Valat, Le Sambuc, F-13200 Arles, France
* Corresponding author: ake.lindstrom@zooekol.lu.se

We developed an indicator for tracking climate-change induced changes in biodiversity in Sweden, using bird monitoring data from the Swedish Bird Survey. The indicator is based on the Fixed Routes, a scheme with 716 routes systematically spread over Sweden. Sweden has a large latitudinal range, from 55°N to 69°N, and the habitats vary from intensively farmed areas of a continental type in the south, via typical taiga forest, to tundra in the north. It is therefore well suited for analyses of climatic effects on biodiversity. We followed the procedures of Devictor *et al*. (2008), calculating a community temperature index (CTI) for each route

and year, based on species-specific temperatures representing the average summer temperature within each species' range. The average CTI increased over the period 1996-2008 showing that the Swedish bird community is steadily changing towards more warmth-loving species. We also present data on how these trends differ between different parts of Sweden and for different groups of habitat specialists. The Swedish parliament has decided on a set of Environmental Objectives, and the present indicator is aimed for following biodiversity changes under objective no. 1 'Reduced Climate Impact' (www.miljomal.nu).

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CLIMATE CHANGE AND BIRD POPULATION TRENDS: EVIDENCE FROM 40 YEARS OF MONITORING IN THE UK

Sarah Eglington*, Stuart Newson & Dan Chamberlain
British Trust for Ornithology, The Nunnery, Thetford, Norfolk, IP24 2PU, UK
* Corresponding author: sarah.eglington@bto.org

Climate change is projected to have substantial impacts on wildlife and their habitats.

A range of taxonomic groups are systematically monitored across the UK, enabling cross-taxa assessments of the importance of climatic factors on population dynamics. However, only recently has a rigorous systematic analysis been carried out to assess such impacts, under the BICCO-Net (Biological Impacts of Climate Change Observation Network) project. This aims to identify those species, communities and habitats that are most likely to be impacted by climate change in the UK.

This talk will present the first key findings from this major ongoing project, which fully assesses the evidence for climate impacts on UK bird populations over the past four decades. The impacts of a range of climatic variables referenced at fine scales (5 x 5 km) on inter-annual changes in bird populations are assessed using data from the Breeding Bird Survey (BBS)/Common Birds Census (CBC), which together provide a data-set running from the 1960s. We apply an approach to model changes in abundance between consecutive counts at a site in relation to spatio-temporally referenced local conditions (Freeman & Newson, 2008), thus providing a powerful technique to analyse population trends which has not been applied before in a climate change context. In addition, the BICCO-Net partnership holds annual data on other taxa including moths, aphids and plants. Therefore, this project provides an opportunity to study the impacts of climate change at different trophic levels by undertaking the same modelling approach. We undertake the same modelling approach to assess changes in abundance of potential prey species, as this may provide further insight into the likely impacts on their bird predators.

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Session 16. WEB TOOLS

INTEGRATING WEB-TECHNOLOGY AND ORNITHOLOGICAL ATLASING: EXPERIENCES FROM BIRD ATLAS 2007-11 IN BRITAIN AND IRELAND

Simon Gillings*, Dawn Balmer, Iain Downie & Karen Wright
British Trust for Ornithology, The Nunnery, Thetford, Norfolk, IP24 2PU, UK
* Corresponding author: simon.gillings@bto.org

The internet can provide invaluable opportunities for the organisers of atlas projects but it is not without its pitfalls. From the outset, "Bird Atlas 2007-11" aimed to map distribution and abundance of birds in the breeding season and winter throughout Britain and Ireland, collating records over four years, and ambitiously attempted to involve 30,000 voluntary observers. From initial square request systems and regional organisers' management suites, through online data submission utilising mapping technologies, to live presentation of results and validation of records, web technology is the back bone of Bird Atlas 2007-11. The result is that to date, c90% of the 90 million birds reported have been submitted online and the application is used by 15,000 volunteer observers. On the costs side, application development has been a significant investment and necessitated tackling thorny issues such as confidentiality of rare breeding birds, data quality and ownership. This paper will discuss these pros and cons and present possible solutions and directions for the future. We conclude that to be used effectively, web technologies must be incorporated at the earliest stage and be well resourced

EMERGING ISSUES IN WEB-BASED COLLECTION OF ORNITHOLOGICAL DATA: THE UK PERSPECTIVE

Andy Musgrove
British Trust for Ornithology, The Nunnery, Thetford, Norfolk, IP24 2PU, UK
andy.musgrove@bto.org

Across Europe and beyond, simple observations of birds have been transformed into useful data for many years. Until recently, the main route of information flow from observer to recipient has been on paper, either as annotated lists of observations or on bespoke paper recording forms. This has produced valuable information and increasingly rigorous datasets. However, the recording of observations on paper, transport of forms and analysis of paper-based records is time-consuming. Indeed, a large proportion of more 'casual' records have traditionally never been submitted for further use. Moreover, there are many opportunities for errors to be introduced to the dataset.

The advent of the internet has enabled a rapid transformation in our ability to collect and mobilise large numbers of ornithological observations. This has been hugely beneficial but has led to some issues gaining new prominence, such as: data ownership; verification of records; geographical definition of records; deciding which variables to record; supporting for local recording 'communities'; maintaining organisation expertise in system design and database support; and the sheer volume of data. Moreover, whilst technical methods for linking web-based forms to databases are now well-established, and simple systems can be set up relatively cheaply, it is easy to underestimate the human element; understanding how and why observers use web-based systems is vitally important to their success. Using examples from the British experience, including both annual monitoring schemes and the collation of casual records, the talk will examine these issues and consider opportunities for the future.

DO WE NEED A EUROPEAN DATABASE FOR BIRD SIGHTINGS AND IF YES, WHAT IS THE ROLE OF THE EBCC?

Hans Schmid
Schweizerische Vogelwarte, Luzernerstrasse 6, CH-6204 Sempach, Switzerland

hans.schmid@vogelwarte.ch

Over the last few years many regional, national and international Internet platforms for recording bird sightings have been set up. Internet platforms such as the British Birdtrack (www.bto.org/birdtrack), the Danish DOFbasen (www.dofbasen.dk), the Swedish Artportalen (www.artportalen.se) or the Swiss www.ornitho.ch sites, nowadays also installed in France, Catalonia and Italy, are very popular among field ornithologists. In addition, with www.migraction.net there already exists a scientific platform in France which collects counts of migrating birds at bottlenecks as well as results from constant effort sites. There are ideas to use this platform for the whole of Europe.

Design and functionality may differ enormously, but aims and purposes of these web platforms are largely identical. They hold an immense data with a great potential on the European level. For instance, we see possibilities to gain insights into large-scale trends for rather scarce species which are not yet monitored by PECBMS or to show European-wide bird movements more or less in real time. Our vision is to allow analyses concerning, e.g., distributions, changes in distribution, phenology or conservation. Last but not least, it might be an important source for a new European Breeding Bird Atlas or even for a product with year-round distribution maps.

In this workshop, we would like to discuss whether there are chances to use extracts of these databases on the continental level. In addition, we would like to launch a discussion whether the EBCC should take the leadership in such a process, e.g. by establishing a working group, by setting standards and/or by creating a European database.

POTENTIAL USES OF AD HOC DATA FROM BIRDWATCHERS FOR MONITORING AND CONSERVATION: THE WORLDBIRDS FAMILY OF WEB TOOLS

Johannes Kamp[1]*, Stephen R. Baillie[2], Paul F. Donald[1], Mark A. Eaton[1], Ian Fisher[1] & Richard D. Gregory[1]
[1] Royal Society for the Protection of Birds, The Lodge, Sandy, Bedfordshire SG19 2DL, UK
[2] British Trust for Ornithology, The Nunnery, Thetford, Norfolk, IP24 2PU, UK
* Corresponding author: johannes.kamp@rspb.org.uk

Worldbirds is a global 'family' of online databases, providing a platform for schemes set up to collect, store and analyze bird observation data. The system accepts both compiled species lists and *ad hoc* data gathered by recreational birdwatchers and professional ornithologists. Established schemes such as BirdTrack in the UK or eBird in the United States are linked into the platform, and a newly developed web application is provided for 135 countries now. Particularly in resource-poor countries, Worldbirds might serve as a cheaper alternative to standardised monitoring schemes.

We evaluated the potential uses of Worldbirds type data for conservation and identified three main areas, namely (1) monitoring range change (classical comparison of changes in distribution), (2) predicting species' distributions with predictive modelling techniques in sparsely populated areas to prioritize areas for surveys and reserve selection and (3) evaluating population trends by assessing changes in list reporting rates.

We will present the results of a comparison of two large Worldbirds type datasets (collected in the UK and Denmark) with nationwide standardized monitoring schemes to assess the general usefulness of Worldbirds for the derivation of population trends.

Session 17. MONITORING METHODS

HIERARCHICAL MODELING OF DISTRIBUTION AND ABUNDANCE IN METAPOPULATION DESIGNS

Marc Kéry
Swiss Ornithological Institute, Switzerland
marc.kery@vogelwarte.ch

Distribution and abundance of organisms are central to both the science of Ecology as well as to monitoring studies. Alas, almost universally, neither distribution nor abundance is observed directly, since individuals may be overlooked. This fact is very well-known to every field-ornithologist, and yet, we all tend to forget or ignore it once we design field studies and analyse their data. Treating observed detection-nondetection data (misleadingly also called 'presence-absence' data) or observed counts as if they were the true occurrence or abundance is tantamount to making the assumption that detection probability $p = 1$. Since this can be true only in exceptional cases, a number of biases are likely to be widespread in distribution and abundance studies. These range from the underestimation of range size or total abundance to the biased perception of trends or spatial patterns in occurrence or abundance.
Recently, hierarchical models (HMs) for data from metapopulation designs have been developed (e.g., Royle & Dorazio, 2006, 2008). The virtue of these models is that they make a formal distinction between the ecological process, in which we are usually interested and which generates a certain occurrence or abundance state, and the observation process, which typically is a mere nuisance that may have to be included in a model to avoid inappropriate conclusions about distribution and abundance. Such HMs consist simply of two or more coupled GLMs; thus, they offer tremendous flexibility in terms of covariate or random effects that may be included. However, they also incur costs; foremost, they require at least some degree of replication of the observations within a short time period so that the true system state can be assumed constant. Second, they are more challenging since few software is available to fit them and relatively brainfree modeling, such as automated variable selection, is underdeveloped compared to conventional approaches.
An informed choice between simpler conventional modeling approaches, which confound the ecological and the observation process, and HMs, which keep them apart, requires a knowledge of the strengths and weaknesses of HMs. Therefore, I will give an overview of current HMs available for distribution and abundance modeling along with some examples of application.

DETECTION PROBABILITY ANALYSIS OFFERS NEW OPPORTUNITIES FOR BIRD CENSUS WORK

Arco van Strien[1]*, Chris van Turnhout[2], Henk Sierdsema[2], Ruud Foppen[2] & Leo Soldaat[1]
[1] Statistics Netherlands, PO Box 24500, 2490 HA The Hague, The Netherlands
[2] SOVON Vogelonderzoek Nederland, Beek-Ubbergen
* Corresponding author: asin@cbs.nl

Detection probability analyses are focussing on delivering improved estimates of abundance and of population trends. Here we give some examples of new types of application related to research in climate change effects.
Climate change has led to warmer springs over large parts of Europe and to an accelerated development of insects. For some species it has been demonstrated that, as a consequence, insectivorous long-distance migratory birds suffer from a mismatch between food requirements and food availability. As a reaction, some species have advanced the timing of their breeding in an attempt to minimize the mismatch. This may lead to a shortened period of vocal activity and consequently to a decrease of the length of the effective observation period. A decrease in detection probability of breeding pairs may result in an overestimation of population

decline, if not corrected for. We tested if the recently developed methods to estimate detection probabilities are helpful to clarify this. Climate change is also causing changes in the distribution of bird species. Building on the ideas of collecting simple species lists, the need for an updated European Atlas for breeding birds, the potential of spatial analysis and detection probability analysis, we envision how this could combine to the creation of a frequently updated European Atlas on the web, showing colonisation and extinction probabilities per grid cell. This may show how bird species distribution ranges are changing and if species are tracking climate change.

HIERARCHICAL MODELS FOR SMOOTHED POPULATION INDICES: THE IMPORTANCE OF CONSIDERING AMONG-SITE VARIATIONS IN POPULATION TRENDS

Tatsuya Amano[1, 2]*, Hiroshi Okamura[3] & William J. Sutherland[2]
[1] Biodiversity Division, National Institute for Agro-Environmental Sciences, 3-1-3, Kannondai, Tsukuba-shi, Ibaraki 305-8604, Japan
[2] Conservation Science Group, Department of Zoology, University of Cambridge, Cambridge CB2 3EJ, UK
[3] National Research Institute of Far Seas Fisheries, Fisheries Research Agency, 2-12-4 Fukuura, Kanazawa, Yokohama-shi, Kanagawa 236-8648, Japan
* Corresponding author: amatatsu@affrc.go.jp

Population indices quantify changes in population sizes, which underpin much of basic ecology and conservation science. But population trends may vary between sites, and confound existing population indices estimated without accounting for such variations. Thus, we created a smoothed hierarchical model, and compared its performance against the conventional approaches using generalized linear and additive models (GLMs and GAMs) and a non-smoothed hierarchical model by applying all the models to simulation data with a known trend.

The smoothed hierarchical model always achieved the best estimation of the population index; the performance of other models deteriorated with increasing variation in trends among sites. The disadvantage of the conventional approaches using GAMs and GLMs in estimating accurate population indices has led to the wrong conclusions about population growth rates. The estimated variations in population trends among sites of 41 wader species in Japan were within the range of values actually applied in the simulation. In a comparison using data on Long-toed stints, the estimates from the smoothed hierarchical model were robust to the effects of outliers, unlike the indices estimated using other models.
Even the conventional approaches that do not allow for spatial interaction might derive the right conclusions from data with small variations in population trends among sites. However, since such variations usually increase with spatial and temporal scale, the smoothed hierarchical model developed in this study should play an important role in accurately assessing population trends for many species, particularly at large spatial and/or long temporal scales.

TIME MEANS… SPECIES! ON THE PERFORMANCE OF SPECIES RICHNESS ESTIMATORS AND DIFFERENT SAMPLING SCHEMES

Pedro A. Salgueiro[1, 2]*, Hugo Costa[3] & João E. Rabaça[1, 2]
[1] LabOr-Laboratory of Ornithology, Department of Biology, University of Évora, 7002-554 Évora, Portugal
[2] Mediterranean Landscapes & Ecosystems Research Group, ICAAM, University of Évora, 7002-554 Évora, Portugal
[3] Bio3-Estudos e Projectos em Biologia e Valorização de Recursos Naturais, Lda. Rua D. Francisco Xavier de Noronha, 37B, 2800-092 Almada, Portugal
* Corresponding author: pas@uevora.pt

Species richness is accounted as the oldest and the simplest concept of species diversity, being widely used in scientific grounds for

monitoring and assessment purposes. However, the challenge is to correctly estimate the number of species. Not only estimates should be accurate, but also should be precise for correct assessment of a system's state and trend. This study aims to determine differences between estimates derived from different sampling schemes and to evaluate the performance of observed richness and three non-parametric estimators frequently used (first-order Jackknife, second-order Jackknife and second-order Chao) by means of bias, inaccuracy and imprecision. In overall, our final goal is to establish recommendations for bird monitoring surveys and assessments.

Data was obtained through a resampling procedure of real data gathered from 30 points of 15 min in Candeeiros Mountain wind farm (central Portugal). Points were sampled from sunrise to sunset in three different days in both months of April and June. The employed methodology intended to provide a large spectrum of sampled area at different times, thus obtaining a truthful number of species. For resampling purposes, only data from morning points was included. Sampling schemes involving different point durations (3, 5, 8, 10, 12 and 15 min) and number of points (5, 10, 15, 20, 25 and 30) were established. For each one, 696 random combinations of different points were calculated, making a total of 25,056 combinations for each estimator.

Obtained results show that accuracy tends to be higher when time spent (number of points x point duration) in a given area is higher, whereas precision increases with sampling coverage. Observed richness values tend to be more biased and inaccurate, while both Jackknife estimators are more accurate. Both second order estimators revealed less biased values, although precision was smaller. On the other hand, observed richness estimator is more precise within samples. In our opinion, second-order Chao performed poorly, while first-order Jackknife was more consistent.

The selection of a sampling scheme or an estimator should take into account the purpose of the survey. For instance, monitoring programmes may require more precise estimates in order to detect real trends, even though biased. In contrast, environmental assessment studies should account for a higher number of species, since it is very unlikely that all species are detected.

SWIFT COUNTS: A NEW METHODOLOGICAL APPROACH

Pedro Pereira*, Pedro Salgueiro & Carlos Godinho
LabOr-Laboratory of Ornithology, ICAM-Institute of Mediterranean Agricultural Sciences, University of Évora, 7002-554 Évora, Portugal
* Corresponding author: ppereira@uevora.pt

Swifts are migratory birds that use urban areas as a replacement of their natural breeding sites. Their feeding habits play an important ecological role, even to human populations, due to their strict insect consumption. However, recent studies in England revealed that swifts are decreasing mainly by modern building restoration. For this reason, an urban monitoring scheme based on a systematic methodology is needed in order to assess their local population trends. Swifts are difficult to monitor because they spend almost all time on wing, sometimes away from breeding places. Our study aims to identify the most relevant factors that influence swift activity and may act as a source of bias on their counts and therefore propose a field methodology to be applied in swift census and monitoring programs.

This study was carried out in Évora, a historic city on southern Portugal, where Common Swift (*Apus apus*) and Pallid Swift (*A. pallidus*) breeds regularly. A new methodological approach was conducted during spring 2009. The city was divided in 56 squares (250 x 250 m) including both historical center and two new urban areas. During May and June a 200 m transect within each square was surveyed weekly by seven observers in a rotational system. Transects were carried out by walking at dusk when birds return to breeding places, allowing to locate more easily their colonies.

In order to establish a methodological scheme to swifts, field data obtained by transects of two species was analyzed together. Tested

variables were observer, date, census area visibility, time before sunset, and hourly and daily weather conditions (temperature, humidity, sun radiation and wind speed). Data was analyzed using Generalized Estimating Equations. Best fitted model verified observer, visibility area, time before sunset, hourly humidity and daily average temperature as the most significant variables. Dusk transects revealed to be a good option since it eases counting and bird location. Preliminary results showed that at least four visits to each transect are essential to sampling swifts, allowing a lower observer bias. Swift abundances increase with average temperature and hourly humidity. Closer to sunset census provide a better estimate, otherwise street wideness has a negative influence on swift counts. These relations might be related to their forage and breeding preferences and must be taken into account on the development of a methodological scheme.

Session 18. GLOBAL CHANGE III: PHENOLOGY AND DISTRIBUTION

COULD CLIMATE CHANGE HAVE SOMETHING TO DO WITH CHANGES IN BIRD DISTRIBUTION IN LATVIA?

Viesturs Ķerus*, Ainārs Auniņš, Māris Strazds & Jānis Priednieks
University of Latvia, Faculty of Biology, Kronvalda bulvaris 4, Riga, LV-1010, Latvia
* Corresponding author: viesturs@lob.lv

In 2007 "A Climatic Atlas of European Breeding Birds" (Huntley *et al*., 2007) was published. Bird distribution data were taken from the "EBCC Atlas of European Breeding Birds" (Hagemeijer & Blair, 1997) and climate change simulations were used to predict the potential distribution of breeding birds in late 21st century.

As data of simulated present distribution in the Climatic Atlas were actually based on bird distribution in late 1980s, some changes in the predicted direction might already be seen. We aimed to look at how the actual recorded changes in bird distribution in Latvia from 1985-1989 until 2000-2004 match the predictions of the Climatic Atlas.

34 squares in the maps of Climatic Atlas were considered representing Latvia. Two-way contingency tables were used to evaluate the differences between simulated present and potential distribution. The same method was used to compare the actual distribution data (in 10 x 10 km squares) from Latvia, while controlling for differences in survey coverage between the two periods.

We selected 239 species from the Climatic Atlas that have been breeding or were predicted to be breeding in Latvia with the 'best' models (good, very good and excellent). In 21 cases the model was not applicable as species that have been breeding in Latvia do not appear in the simulated present distribution map. Thus these species were not used in further analysis. 112 species showed significant differences in their present and future distribution - 27 disappearing, 49 decreasing, 18 increasing and 18 appearing.

Of the 76 species predicted to disappear or decrease in distribution in Latvia 50 have actually increased (e.g., Corncrake *Crex crex* and River Warbler *Locustella fluviatilis*) and only 5 have decreased (e.g., Roller *Coracias garrulus* and Sand Martin *Riparia riparia*), others do not show significant differences. However, all species distribution of which was shrinking between the compared atlases were predicted to do so. Of the 18 species predicted to increase in distribution 8 have actually increased (e.g., Middle Spotted Woodpecker *Dendrocopus medius* and Penduline Tit *Remiz pendulinus*) and none show significant decrease in distribution.

We will further discuss the cases of consistency and discrepancy between the predictions and actual changes and see if count data can help clear the picture.

CHANGES IN BIRD DISTRIBUTION DUE TO GLOBAL WARMING - A FIRST HIGH RESOLUTION

MODELLING APPROACH FOR GERMANY

Thomas K. Gottschalk[1]*, Christoph Sudfeldt[2], Alexander Mitschke[2] & Rainer Dröschmeister[3]
[1] Justus Liebig University, Department of Animal Ecology, Heinrich-Buff-Ring 26-32, D-35392 Giessen, Germany, thomas.gottschalk@allzool.bio.uni-giessen.de
[2] Federation of German Avifaunists (Dachverband Deutscher Avifaunisten e.V.), Zerbster Str. 7, D-39264 Steckby, Germany, sudfeldt@dda-web.de, mitschke@dda-web.de
[3] Bundesamt für Naturschutz, Konstantinstr. 110, D-53179 Bonn, Germany, droeschr@bfn.de
* Corresponding author: thomas.gottschalk@allzool.bio.uni-giessen.de

Modelling of bird distribution change due to climate warming has in the past been conducted on a national as well as on a continental level. Most of these approaches have been carried out at a relatively coarse resolution, often using a 50 km grid and ignoring small regional differences in habitat use and topography. The aim of our study was to predict species distribution change in Germany at a fine resolution, in order to overcome low model fit and to improve prediction accuracy. To do so we used (a) data from the German Common Breeding Bird Survey (DDA Monitoring Programme), (b) a high resolution land-use map derived from ATKIS data, (c) several topographical parameters obtained from the German digital terrain model and (d) data on climate change based on regional climate simulations of the IPCC scenario A1B, A2 und B2. ATKIS stands for Authoritative Topographic Cartographic Information System and is a joint project of all German mapping agencies comprising an object-orientated vector database at the scale of 1:25,000. Data from the German Common Bird Census included more than 150,000 breeding bird records registered within 1,000 study areas by DDA members. These breeding records were used to estimate regional densities. Climate variables included temperature and precipitation rates (mean values for the breeding season as well as the annual mean). Resource selection functions based on a Generalized Linear Model (GLM) were used to predict the current occurrence probability and population size of six selected bird species. We used the resource selection functions for prediction of changes in population size, applying these to the scenario values of climate predictors for the years 2050 and 2080.

This ongoing study is the first estimate of changes occurring in the ranges of bird species in Germany based on a high spatial resolution. Although land-use was the main factor affecting species distribution climate variables, especially spring temperatures, significantly influenced distribution patterns. Projected changes suggested large scale effects over the coming decades, with concomitant consequences for the German avifauna. Models projected strong spatially varying impacts on the six bird species used in the study. The greatest changes in species distribution due to climate change were predicted for Pied Flycatcher, Crested Tit, Icterine Warbler and Whinchat, whereby the lowest, or no change at all, were for Blackcap and Common Redstart. Despite these climate-driven changes, our results suggest that the effects of climate effects are most likely to be subordinate to future changes in land use.

BIRDS AND BUTTERFLIES TRACKING CLIMATE CHANGE: WHICH ARE FASTER?

Vincent Devictor[1]*, Chris van Swaay[2], Tom Brereton[3], Lluís Brotons[4, 5], Dan Chamberlain[6], Janne Heliölä[7], Sergi Herrando[4], Romain Julliard[8], Mikko Kuussaari[7], Åke Lindström[9], Jiří Reif[10], David Roy[11], Oliver Schweiger[12], Josef Settele[12], Constantí Stefanescu[13], Arco Van Strien[14], Chris Van Turnhout[15, 16], Zdeněk Vermouzek[17], Michiel Wallis De Vries[2, 18], Irma Wynhoff[2] & Frédéric Jiguet[8]
[1] CNRS, Institut des Sciences de l'Evolution, France. [2] Dutch Butterfly Conservation, Wageningen, The Netherlands. [3] Butterfly Conservation, UK. [4] Catalan Ornithological Institute, Spain. [5] Centre Tecnològic Forestal de Catalunya, Spain. [6] British Trust for Ornithology, UK. [7] Finnish Environment Institute, Finland. [8]

Conservation Restauration et Suivi des Populations MNHN, France. [9] Department of Biology Lund University, Lund, Sweden. [10] Institute for Environmental Studies, Charles University in Prague, Czech Republic. [11] Centre for Ecology and Hydrology, UK. [12] UFZ, Helmholtz, Centre for Environmental Research, Dept.of Community Ecology, Halle, Germany. [13] Museu de Granollers Ciències Naturals, Barcelona, Spain. [14] Statistics Netherlands, The Netherlands. [15] SOVON Dutch Centre for Field Ornithology, The Netherlands. [16] Dept. of Environmental Science and Dept. of Animal Ecology, Institute for Water and Wetland Research, Radboud University Nijmegen, the Netherlands. [17] Czech Society for Ornithology, Czech Republic. [18] Lab of Entomology, Wageningen University, The Netherlands
* Corresponding author: vincent.devictor@univ-montp2.fr

It is now acknowledged that current climate changes have profound effects on the distribution of numerous plant and animal species. However, whether and how different taxonomic groups are able to track climate changes is still unclear. Here, we measure and compare the northward shift of bird and butterfly communities at a European scale. We quantified the trend in the Community Temperature Index (CTI) of several European countries respectively in 9,490 and 2,130 bird and butterfly communities distributed across Europe and monitored each year over two decades (1990-2008). We found a rapid, but different northward shift in bird and butterfly communities: European birds and butterflies have shifted approximately 35 km and 104 km northward respectively. But we also show that during the same period, the northward shift in temperature in Europe was even faster: birds and butterflies have both accumulated a climatic debt and are respectively lagging 224 km and 155 km behind climate change. These results suggest both that birds and butterflies cannot keep up with temperature increase and that climate change is creating rapid and important desynchronizations between different groups. This study proposes a robust and powerful mean to measure the mismatch between the responses of different taxonomic groups to climate changes.

POPULATION DECLINE OF LONG-DISTANCE MIGRATORY SPECIES IN HUNGARY

Tibor Szép[1], Károly Nagy[2], Zsolt Nagy[2] & Gergő Halmos[2]
[1] College of Nyíregyháza, Nyíregyháza, Sóstói út 31/b, H-4400, Hungary
[2] MME/BirdLife Hungary, Budapest, Költő út 21, H-1121, Hungary
* Corresponding author: partifecske@freemail.hu

The climate change has serious impact on the breeding populations of long-distance migrant species by the change of the timing and the abundance of the food in the breeding areas and by the increase of adverse weather conditions in the breeding, migration and wintering areas as well. The most investigations and results in this field exist in Western part of Europe, mainly because of the lack of relevant dataset in the Central and Eastern part of Europe. The Hungarian Common Bird Monitoring program (MMM), organised by the MME/BirdLife Hungary since 1999 with contribution of near one thousand observers, let us to study population trend of 100 common birds species in Central Europe, in the main part of the Carpathian Basin, in Hungary. In the frame of the MMM program, the observers carry out survey on randomly selected areas, using standard double point counts. The annually surveyed areas cover ~2% of the area of the country and representative for the main habitats. On the base of the data of intense ringing work in Hungary, we classified the 100 common Hungarian breeding bird species to four migration groups as: resident (26 species), partial migrant (16 species), short-distance migrant (22 species) and long-distance migrant (36 species). The population indices and trends were measured by the TRIM software for each studied species. Geometric means of the indices were calculated for each migration groups for the period of 1999-2008. Twenty species showed significant decline during 1999-2008 in Hungary and half of these species were long-distance migrants. Among the studied four migration groups, only the long-distance migrant group showed significant

decline, whereas the other three groups showed similar population level as in 1999. On the base of the survey data, using Corine Land Cover database and GIS, we classified the studied long-distance migrant species to four habitat groups: farmland (18 species), forest (4 species), mixed (9 species), wetland (5 species), based on the habitat where dominant percentage of the breeding population observed in Hungary. We found that the decline were significant for long-distance migrants mainly common in farmland and mixed habitats. Our results indicate the serious decline of long-distance migrants in Central East Europe where general condition of the habitats and breeding bird population regarded better than in Western Europe. The results showed that populations of long-distance migrants mainly related to the farmland breeding habitat, decline more than others which use mainly their natural habitats for breeding. The MMM program was supported by the RSPB, KvVm and OTKA 69068 grant donated the analysis of the data.

Session 19. INVASIVE BIRDS AND HUMAN EFFECTS

THE PARADOX OF INVASIONS IN BIRDS

Daniel Sol[1, 2]
[1] Centre for Ecological Research and Forestry Applications (CREAF), Autonomous University of Barcelona, 08193 Bellaterra, Catalonia, Spain
[2] Center for Advanced Studies of Blanes (CEAB)-Spanish National Research Council (CSIC), Spain
d.sol@creaf.uab.es

Why can alien species succeed in environments to which they have had no opportunity to adapt and even become more abundant than many native species? Here I will analyse this paradox in birds, a group that has become a model in studies of biological invasions. The paradox is classically resolved by invoking pre-adaptations of the species and environmental conditions that increase region invasibility, but current evidence indicate that the main factor influencing establishment success is luck. Most avian introductions involve a few individuals and hence many populations die out as a result of stochasticity and Alle effects. Beyond a certain number of individuals released, however, the success is no longer determined by propagule size and the properties of the species and locality gain greater importance. The key adaptations during the establishment are those that facilitate that individuals find an appropriate niche in the novel environment, notably ecological generalism and behavioural flexibility. While these latter traits may aid establishment in regions to which the species have had no opportunity to adapt to, the question remains as to why some avian exotics may become more abundant than many native species. The success of these alien birds does not seem to be primarily associated with a competitive superiority over native species. Rather, the success is facilitated if the environment has been altered by human actions, highlighting the importance of species-by-habitat interaction to resolve the invasion paradox.

POPULATION CHANGE OF AVIAN PREDATORS AND GREY SQUIRRELS IN ENGLAND: IS THERE EVIDENCE FOR AN IMPACT ON AVIAN PREY POPULATIONS?

Stuart E. Newson[1]*, Eric. A. Rexstad[2], Stephen R. Baillie[1], Stephen T. Buckland[2] & Nicholas J. Aebischer[3]
[1] British Trust for Ornithology, The Nunnery, Thetford, Norfolk, IP24 2PU, UK
[2] Research Unit for Wildlife Population Assessment, Centre for Research into Ecological and Environmental Modelling, University of St. Andrews, KY16 9LZ, UK
[3] Game & Wildlife Conservation Trust, Burgate Manor, Fordingbridge, Hampshire, SP6 1EF, UK
* Corresponding author: stuart.newson@bto.org

Over the past forty years many wild bird species have declined in abundance in the UK. Whilst many of these declines are associated with changes in agricultural practices, increases in the abundance of common and widespread avian and mammalian predators may be depressing population levels of some

species. These predators can be grouped into two broad categories: predators of juvenile and adult birds (Eurasian Sparrowhawk *Accipiter nisus*, Common Kestrel *Falco tinnunculus* and Common Buzzard *Buteo buteo*), and nest predators (Carrion Crow *Corvus corone*, Black-billed Magpie *Pica pica*, Eurasian Jay *Garrulus glandarius*, Great Spotted Woodpecker *Dendrocopos major* and Grey Squirrel *Sciurus carolinensis*). Sparrowhawks feed on avian prey and their abundance in England increased by 170% between 1975 and the early 1990s, remaining relatively stable thereafter. This is perhaps the predator that is most likely to affect wild bird populations, because for many, abundance is more strongly influenced by juvenile and adult mortality than by nesting success. However, breeding bird populations can be buffered against increasing predation pressure through density-dependent mechanisms, including compensatory reduction in mortality rates through reduced competition for resources and recruitment of surplus, non-breeding individuals. There is no doubt that the eight predators considered here prey on the nests, fledglings or adults of a wide range of bird species. There is also some evidence for population depression of passerines and ground-nesting waders and gamebirds at a local scale. However, previous analyses of UK garden bird data and national bird monitoring data, focussing in each case on a single predator species, have failed to detect any marked effects. Here we use the larger national data set that has accumulated across a wider suite of predators and apply novel analytical methods to reassess this question.

SITE-BASED MONITORING AND ASSESSMENT BREEDING BIRD COMMUNITIES OF THE PROTECTED MIRES IN ESTONIA: THE EFFECT OF RECREATIONAL DISTURBANCE ON HABITAT USE OF BIRDS

Agu Leivits[1]*, Aivar Leito[2], Ivar Ojaste[1, 2], Meelis Leivits[1,3] & Murel Merivee[1, 4]

[1] Environmental Board, Pärnu-Viljandi Region, Nigula Center, Vana-Järve 86107, Estonia

[2] Institute of Agriculture and Environmental Sciences, Estonian University of Life Sciences, 1 Kreutzwaldi St., Tartu 51014, Estonia

[3] Institute of Ecology and Earth Sciences, Tartu University, 46 Vanemuise St., Tartu 51014, Estonia

[4] Faculty of Economics and Business Administration, Tallinn University of Technology, Akadeemia tee 3, Tallinn 12618, Estonia

* Corresponding author: agu.leivits@nigula.ee

A considerable part of Estonia is covered by peatlands (21%). Around 1/3 of Estonian mires covering 310,000 ha have been preserved in nearly natural condition, in the present moment 31% of these are protected areas. These mires are crucial for the regional survival of several endangered species - many northern and boreal bird species breed only or preferably on the mires in the Baltic region. Also more than 20 species breeding on the mires in Estonia are EU Bird's Directive Annex I species. Estonian mires, especially bogs, possess quite important recreational potential, being the place to get the wilderness experience. During the last decades in numerous protected large mires special wooden boardwalks (>70 km in Estonia) have been constructed to create access to the bog landscapes. Also tourism entrepreneurs have started to offer special packets for walking with snowshoes in bogs. Although the most important local factor affecting the bird community composition has been found to be the change in vegetation structure due to influence of direct or indirect drainage, it is needed to assess the impacts of recreational disturbance on the habitats used by birds in mires.

In the present study we analyze effects of the visitor disturbance to the mire bird communities in four study areas with boardwalks during different periods: Nigula Bog (2,300 ha, 1981-2007), Männikjärve Bog (170 ha, 1987-2008), Marimetsa Bog (7,000 ha, 2006-2008) and Kuresoo Bog (11,000 ha, 1986-1988 and 2007-2008). The breeding bird monitoring is done with same method in late May - early June, using single visit mapping census.

In Nigula Bog, special attention has been turned to studying the disturbance effects caused by visitors to Golden Plover (*Pluvialis*

apricaria) population near a wooden pathway (7 km). Using territories in the vicinity (500 m) of the boardwalk and comparing undisturbed (1981-1993) and disturbed periods (1995-2007), a significant increase of the average territory distance from the pathway was found. The total number of the breeding bird territories significantly decreased in relatively small sized Männikjärve Bog. The total number of the breeding bird species and territories (especially for waders) was significantly decreased in the surroundings of boardwalk after a sharp increase of visitors in Marimetsa Bog. Habitat suitability models for management planning are therefore used for avoiding similar disturbance effects caused by recreation and tourism activities in Kuresoo Bog of Soomaa National Park.

HABITAT AND LANDSCAPE ASSESSMENT OF THE IMPACT OF SKI-RUNS ON ALPINE GRASSLAND BIRD COMMUNITIES

Enrico Caprio*, Marco Isaia & Antonio Rolando
DBAU-Università degli Studi di Torino, Via Accademia Albertina 13, 10123 Torino, Italy
* Corresponding author: enrico.caprio@unito.it

Treeless mountainous areas at high altitudes have increased in value as wildlife habitat, but they are affected and increasingly threatened by ski-resort developments, in particular by the construction and enlargement of ski-pistes.
To assess the extent of this threat, we compared bird diversity and community composition in circular plots centred on ski-runs of recent construction, grassland habitats adjacent to ski-runs and natural grassland habitats far from the ski-runs. We modeled bird community indices with Generalized Linear Models both at habitat and landscape level. Habitat metrics included diversity of habitats, mean height of grass and shrubs, cover percentage of habitats, rocks and bare ground. Landscape metrics included in models were class and landscape metrics according to Fragstats terminology. Topographic variables were also included as covariates (i.e. altitude, exposition and slope). Plots located in natural grasslands supported the greatest bird species richness and diversity and the greatest grassland species density, whereas those set in ski-pistes presented the lowest values. Plots located beside ski-runs did not support smaller numbers of bird species and diversity than plots of natural areas, but they supported a significantly lower bird density. This suggests that ski-pistes, besides exerting a negative direct effect on the structure of local bird communities, may also exert an indirect, detrimental effect on bird density in nearby patches.
Generalized linear models at habitat level showed that communities indices (i.e. bird diversity, species richness and abundance of individuals) were best modeled by combinations of factors, including habitat type (the three categories defined above) and altitude.
Generalized linear models at landscape level showed that community indices were best modeled by combinations of factors including altitude, exposition and a few landscape metrics. The edge of ski-pistes, in particular, seems to negatively affect bird communities.
Retaining the avifauna around ski-resorts is likely to involve developing new, environmentally friendly ways of constructing pistes, such as only removing rocks and/or levelling the roughest ground surfaces, to preserve as much soil and natural vegetation as possible. Restoration of ski-pistes should promote the recovery and maintenance of local vegetation to enhance invertebrate and bird assemblages. In order to not compromise the safety of the ski-runs, it may be necessary to control encroaching shrubs through pruning and/or cattle grazing.

FOLLOWING RAPTORS AND SOARING BIRDS POPULATIONS IN WIND FARMS: A METHODOLOGICAL PROTOCOL

Ana Teresa Marques*, Joana Bernardino, Hugo Costa & Miguel Mascaranhas
Bio3-Estudos e Projectos em Biologia e Recursos Naturais, Rua D. Francisco Xavier de Noronha 37B, 2800-092 Almada, Portugal
* Corresponding author: teresa.marques@bio3.pt

The increasing number of wind farms in natural landscapes is highlighting the concerns about the interaction of birds with these infrastructures, mainly birds of prey and other soaring birds. Besides direct mortality, the presence of a wind farm can be responsible for impacts on the community of raptors and soaring birds, like disturbance and habitat displacement.

In order to assess changes in space use due to the operation of a wind farm, we developed a methodological protocol, which aims to fully understand how soaring birds use a specific area. The methodological protocol is based on a spatial analysis and is conducted on a 3D basis. Field data collection is obtained through observation points that cover the wind farm and the surrounding area. During the surveys, birds' movements are mapped and described with as much detailed as possible, namely their height of flight and behaviour.

The information collected during field work is inserted in a GIS and analysed by means of a regular grid. The grid is the basis to the creation of maps that reflect the horizontal and the vertical use of the area and the behaviours observed across that area (figure 1). This analysis can also be conducted with data collected by telemetry or radar.

Apart from assessing differences in space use throughout the years, the results of this analysis allow us to identify areas and specific turbines with high collision risk and can be related with the mortality of each turbine on the operation stage.

Although this methodological protocol was established with the aim of monitoring the impacts of an operational wind farm, this approach is also useful in a pre-construction study, where areas with potential higher risk of collision can be identified. This can provide important information that can be used not only to select the location of a new wind farm, but also to adjust the final layout of the turbines, minimizing future impacts.

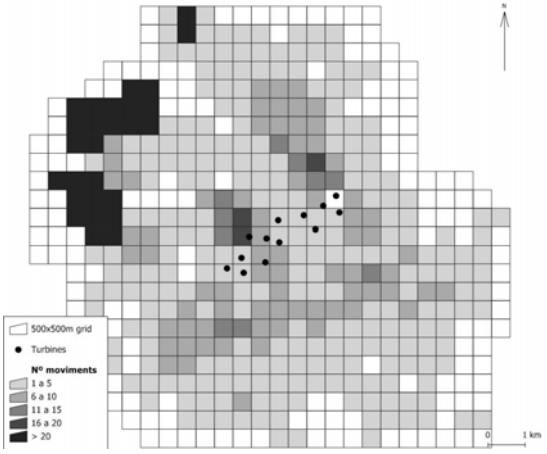

Figure 1. *Number of movements from raptors and soaring birds on a wind farm and surrounding area.*

Session 22. MODELLING II: APPLICATIONS

HOW FAR DO WE STAND FROM THE TRUTH: FEATURING FOUR TYPES OF PHENOLOGICAL MODELING METHODS USING SIMULATED DATA

Jean-Pierre Moussus*, Romain Julliard & Frédéric Jiguet
CRBPO, UMR 7204 MNHN-CNRS-UPMC 'Conservation des Espèces, Restauration et Suivi des Populations', 55 rue Buffon, CP 51, 75005 Paris, France
* Corresponding author: moussus@mnhn.fr

As phenological responses to current climate change rise increasing interest, little is known about how phenological modeling techniques behave in relation to the quality of the phenological data. Thus, we hardly know how far estimates computed using classical or recently developed modeling techniques stand from the true biological response. Indeed this quantity reflecting actual biological changes remains unknown. In order to assess the efficiency of the most frequently applied phenological modeling techniques, we generated simulated phenological distributions

where the biological change is known in advance. We compare the efficiency of four different types of phenological measures namely first appearance dates, mean dates, various percentile dates (10th, 25th, 50th, 75th and 90th percentile dates) and a recently developed method based on Generalized Additive Models. Based on the criteria of Mean Quadratic Errors (trade-off between Bias and estimation variance) and Bias, we assess the estimation efficiency of these methods in relation to various types of distributions (symmetrical, skewed, bimodal), various types of dataset alterations (Differences in sample sizes, Gaps in the dataset) and different parameters within each distribution (Variance, actual phenological shift, sample size, and truncation).

Our results show that most techniques are negatively biased meaning that true phenological variation might have previously often been underestimated. Moreover, smoothing methods (GAM) appear to be almost unbiased and accurate method when sample sizes between the compared phenological distributions do not differ much. However, when the dataset is altered, phenological measures such as mean dates or high percentile dates (75th percentile dates) perform best. Lastly, results show that first appearance dates, and low percentile dates (10th and 25th), although they continue to be used in phenological modeling, are the less accurate and the most biased phenological estimators available and should be excluded from phenological studies or at least be considered with extreme cautiousness.

These results might constitute useful guidelines for the analysis of phenological data gathered by Breeding Bird Surveys, standardized migratory observatories or standardized bird ringing protocols.

USING ATLAS AND CENSUS DATA OF MONTAGU'S AND HEN HARRIERS IN SPAIN TO OBTAIN FAVOURABILITY AREAS AND FORECAST THE IMPLICATIONS OF CLIMATE CHANGE ON BOTH SPECIES

Alba Estrada[1]*, Beatriz Arroyo[1] & Ana Luz Márquez[2]

[1] Instituto de Investigación en Recursos Cinegéticos (IREC), CSIC-UCLM-JCCM, Ronda de Toledo s/n, 13071 Ciudad Real, Spain

[2] Biogeography, Diversity, and Conservation Research Team, Dept. of Animal Biology, Faculty of Sciences, University of Malaga, 29071 Málaga, Spain

* Corresponding author: alba.estrada@uclm.es

In 2001 it was published the most recent atlas for breeding birds in Spain. Additionally, in 2006 the Spanish Society of Ornithology (SEO/BirdLife) coordinated a national census of Montagu's Harrier (*Circus pygargus*) and Hen Harrier (*Circus cyaneus*) in Spain, sampling random 10 km x 10 km UTM cells within the area of presence according to the atlas and estimating the minimum and maximum number of pairs of both species in each UTM cell.

Using presence/absence data from the atlas, we performed a favourability function and we obtained the most favourable areas of each species and the current environmental variables that affect their distributions. Both species favourability models are dependent on environmental energy and water availability, so a change on these environmental factors could affect species distribution. We also modelled the maximum number of pairs with a Poisson distribution and with the same set of variables, to identify factors affecting species density within their favourable areas.

With the intention of knowing the effect of climate change on these species, we obtained their environmental favourability in mainland Spain using, as climatic variables, the daily maximum temperature and precipitation data of the periods 1961-1990, 2011-2040, 2041-2070 and 2071-2100, produced by the Meteorological National Institute according to the atmosphere-ocean global circulation model

CGCM2 and the greenhouse gases emission scenarios A2 and B2. Both emission scenarios forecast a reduction on the favourable areas for both species during future periods.
In particular, if climate change scenarios are achieved, the model for the Montagu's Harrier forecasted that high favourability areas for this species will be concentrated and relegated to Castilla y León. However, it is noteworthy that monitoring and conservation programmes of Montagu's Harrier in Spain exist in many regions except in Castilla y León, although this region constitutes an important favourability area for the species.
The case of the Hen Harrier is also interesting, as this species markedly increased its distribution in recent decades, with current most favourable areas distributed throughout the whole of the half-northern part of Spain. However, future favourability will be relegated to the past distribution of the species.
We present maps of current and future favourability for the two species considered and discuss the conservation implication of our results.

MULTISPECIES SYNCHRONY WITH CLIMATIC VARIABLES IN THE STUDY OF SEABIRD ADULT SURVIVAL AT THE ISLE OF MAY (SCOTLAND)

José J. Lahoz-Monfort[1]*, Byron J. T. Morgan[1], Michael P. Harris[2], Sarah Wanless[2] & Stephen Freeman[3]
[1] National Centre for Statistical Ecology, SMSAS, University of Kent, UK
[2] Centre for Ecology and Hydrology, Edinburgh, UK
[3] Centre for Ecology and Hydrology, Wallingford, UK
* Corresponding author: jjl9@kent.ac.uk

We present a method for studying the effect of environmental covariates in generating synchrony and asynchrony in demographic parameters for sympatric species. The method can provide insight into how species that share one area respond similarly or differently to changes in their environment, and help disentangle the sources of these differences.
We studied three colonial-nesting auk species that share resources during the breeding season at the Isle of May (Scotland). Mark-resight information has been collected from 1985 to 2007 for Atlantic puffins (*Fratercula arctica*), common guillemots (*Uria aalge*) and razorbills (*Alca torda*) marked as breeding adults. The three species were modelled together, with winter North Atlantic Oscillation index (wNAO) and Sea Surface Temperature (SST) as environmental covariates. Using random effect terms, we were able to separate the contribution of these climatic factors between the synchronous and asynchronous components of the between-year variance in adult survival. We show that to a large extent, these factors are acting as a synchronising agent in the survival of puffins, common guillemots and razorbills at the Isle of May, although there is a significant percentage of synchronous variation that remains unexplained. Interestingly, the same climatic factors act simultaneously as asynchronising agents. There is evidence that both wNAO and SST act indirectly on survival and it is therefore possible that they can have different indirect causation paths, some of them affecting the three species in synchrony, others affecting them differently.

SPATIAL DISTRIBUTION MODELS FOR THE LESSER KESTREL (*FALCO NAUMANNI*) IN CENTRAL GREECE

Antonia Galanaki* & Alan Fielding
Division of Biology, School of Biology, Chemistry & Health Science, Manchester Metropolitan University, Manchester, M1 5GD, UK
* Corresponding author: antonia_galanaki@yahoo.com

Integration of statistical models with powerful tools such as Geographical Information Systems (GIS) and Remote Sensing (RS) allows researchers to investigate the relationships between environmental attributes and species over extensive temporal and spatial scales, using data that could not be collected

only by field work and monitoring The Lesser Kestrel (*Falco naumanni*) is a globally threatened bird species that, in Europe, is mainly restricted to the Mediterranean Basin. The aim of the present study is to identify environmental attributes related with Lesser Kestrel occurrence and to build spatial distribution models for the species.
The study area is located in Central Greece. It consists of agricultural land dominated by cotton and cereal fields, open hilly areas with grasslands and is surrounded by mountains. During the breeding seasons of 2005 and 2006 the distribution of Lesser Kestrel colonies was mapped. Habitat data were derived by satellite image processing. Predictive models were developed using Generalized Additive Model (GAM) and Random Forest (RF) classifiers with the species presence/absence data and environmental information derived by RF and GIS. All statistical analyses were performed using the R-statistical environment.
There are 86 Lesser Kestrel colonies within the study area. Seven land use classes were extracted from the image analysis; including irrigated and non-irrigated fields, scrubland, grassland, forest, water cover and urban areas. Both GAM and RF showed that lesser kestrels mainly selected areas with non-irrigated fields. Prediction performance of the models was high. Dry cereal cultivations are the main habitat of lesser kestrels in Central Greece. Such agricultural areas, which support rare species, are considered as 'high-nature-value farming systems' and are of great importance for the preservation of biodiversity in Europe.
The present study is part of a PhD funded by the Greek State Scholarships Foundation.

A PROTOCOL FOR SETTING QUANTITATIVE TARGETS FOR SPECIES RECOVERY

Mark A. Eaton[1]*, Andy Evans[1], David G. Noble[2], Nicholas A. Aebischer[3], Andy F. Brown[4], Richard D. Gregory[1], Andy J. Musgrove[2], Peter Cranswick[5], David W. Gibbons[1], Phil V. Grice[4], Leigh Lock[1, 5] & Robin Wynde[1]
[1] Royal Society for the Protection of Birds, The Lodge, Sandy, Bedfordshire, SG19 2DL, UK
[2] British Trust for Ornithology, The Nunnery, Thetford, Norfolk, IP24 2PU, UK
[3] Game & Wildlife Conservation Trust, Fordingbridge, Hampshire, SP6 1EF, UK
[4] Natural England, Northminster House, Peterborough, PE1 1UA, UK
[5] The Wetland & Wildfowl Trust, Slimbridge, Gloucestershire, GL2 7BT, UK
* Corresponding author: mark.eaton@rspb.org.uk

The delivery of conservation action is increasingly regulated by complex planning allied to robust monitoring to allow progress to be measured, often against stated quantitative targets. In some cases, such as the UK's wild bird indicators, such targets are bound into government policy. However, the setting of quantitative targets is often based on guesswork, and so can lead to the adoption of goals that either insufficiently ambitious, it which case apparent 'success' does not result in genuine conservation achievement, or over ambitious, in which case targets are unattainable and can actually act as a deterrent to action.
Here we present a simple modelling approach that allows sensible and standardised quantitative targets to be calculated for the recovery of individual species. The model allows aspirational population trajectories to be plotted, from which targets can be derived for any given year. These targets can be absolute (e.g. number of breeding pairs) or, for species covered by common bird monitoring schemes, relative index of abundance values. The trajectories are calculated using recent species trends, estimates for the time needed to identify the correct conservation action and deploy this action at a sufficient scale to produce a recovery, the geographical scale of action required and the likely population response based on species ecology. The rates of increase, once a species enters the recovery phase, predicted by this modelling approach have been compared with known rates of population increase from recent successful recovery projects in the UK and show good concordance.

We present the trajectories calculated using this approach, and the targets derive from them, for the priority bird species on the UK's Biodiversity Action Plan, and discuss the implications of governmental adoption of such targets. We hope that the adoption of such quantitative targets will provide impetus to speedy conservation action, and a robust way of measuring the success of the combined actions of the UK government and non-governmental organisations in tackling biodiversity loss.

ABSTRACTS OF WORKSHOPS AND TRAINING SESSIONS

Session 14. TRAINING SESSION: BirdSTATs

THE USE OF BirdSTATs

Tom van der Meij, Arco van Strien & Mark A. Eaton

The Species Trends Analysis Tool for birds (BirdSTATs) that has been developed by Bioland Informatie is an open source Microsoft Access database for the preparation and statistical analysis of bird counts data in a standardised way. The BirdSTATs tool is programmed to use and automatically run the program TRIM (TRends and Indices for Monitoring data) in batch mode to perform the statistical analysis for series of bird counts in the dataset and produce standardised species indices and trends as the main results.

In this way it is particularly suitable for use in all European countries participating in the Pan European Common Bird Monitoring Scheme (PECBMS) because these species indices are used as subsets by the PECBMS for the calculation of overarching European wild bird indices and indicators.

The fact that this tool is an open source database allows users to adapt or expand the tool to their own demands. The tool is also usable for other species groups.

Characteristics of the tool:

- It is capable of importing different kinds of counts data
- It enables stratification of count sites and selection of subsets of counts data
- It produces standardised TRIM input and command files and runs TRIM in batch mode for all or a selection of strata
- It collects the output of the batched TRIM runs in a convenient and standardised format to fit the requirements of PECBMS.

This training should provide you the basic knowledge you need to start using the BirdSTATs tool so it is intended mainly for beginners but more advanced users of the BirdSTATs are also very welcome.

During this training you will work on your own computer. Therefore, bring your own laptop with BirdSTATs already installed, please (download BirdSTATs BEFORE the training from http://www.ebcc.info/trim.html). For practical exercise, you will use sample data that are already included in the downloaded BirdSTATs tool.

ABSTRACTS OF POSTER COMMUNICATIONS

BIODIVERSITY CONSERVATION: Patterns, Changes and Indicators

DEVELOPING A NATIONAL FARMLAND BIRD INDEX FOR AUSTRIA

Norbert Teufelbauer* & Johannes Frühauf
BirdLife Austria, Museumsplatz 1/10/8, A-1070 Wien, Austria
* Corresponding author:
norbert.teufelbauer@birdlife.at

The 'Wild Bird Indicator for Europe', the combined population trends of common and widespread breeding bird species published through a joint effort of EBCC, RSPB, BirdLife International and Statistics Netherlands, has had great influence on the use of biodiversity indicators in policy in the past years. The sub-indicator dealing with the fate of Europe's farmland birds has received most attention and has subsequently been adopted by the EU for different purposes. This talk concentrates on the 'Farmland Bird Index' used to evaluate measures implemented under the EU's Rural Development Programme 2007-2013. Each member state of the EU needs to deliver a national indicator. The Austrian index is based on the data of the common bird monitoring scheme run by BirdLife Austria since 1998.
For the Austrian Farmland Bird Index, we chose a species composition differing from the European one, because (1) some species of the European selection do not occur in Austria at all (or only in insufficient numbers), (2) some species which are typical for Austria's farmland were not chosen at the European level (e.g. for alpine pastures), and (3) in a few cases the classification of certain species as farmland bird species is not correct for Austria.
The selection procedure started with a long-list of 55 species and used information from a variety of sources, including quantitative data on habitat selection obtained from the monitoring scheme, results of studies focusing on the sensitivity of birds to agricultural land-use, spatial modelling of Austrian farmland birds, published information on biology, and expert experience. The following criteria were defined, by which to select species for the index: strong linkage to farmland habitat, clear indicator function with respect to agricultural land-use, reliable recording using the count method of the common bird monitoring, frequency of occurrence, geographical distribution, biology, and lacking persecution by humans. Species that failed to meet the criteria were discarded by a group of experts.
The selection process finally lead to 24 indicator species: Kestrel, Grey Partridge, Northern Lapwing, Turtle Dove, Wryneck, Woodlark, Skylark, Tree Pipit, Water Pipit, Whinchat, Stonechat, Northern Wheatear, Fieldfare, Marsh Warbler, Common Whitethroat, Red-backed Shrike, Starling, Tree Sparrow, European Serin, Citril Finch, European Goldfinch, Linnet, Yellowhammer, and Corn Bunting. In this talk I will present details on the selection procedure of the Austrian indicator species, compare the Austrian species set with the European one, and show the resulting trend differences of the Farmland Bird Index.

INCREASED FREQUENCY OF IRRUPTIONS OF 'NORTHERN FOREST BIRDS' RELATED TO CLIMATE WARMING

Marc Herremans* & Gerald Driessens
Natuurpunt Studie, Coxiestraat 11, 2800 Mechelen, Belgium
* Corresponding author:
marc.herremans@natuurpunt.be

There are several birds from northern forests that undertake irruptive flights into Western

Europe at irregular intervals. We compiled data on the major irruptions that reached the low countries (The Netherlands and Belgium) during the last 50 years for Bohemian Waxwing (*Bombycilla garrulus*) (8), Blue Tit (*Cyanistes caeruleus*) (14), Coal Tit (*Periparus ater*) (14), Great Tit (*Parus major*) (15), Siberian Nutcracker (*Nucifraga caryocatactes macrorhynchos*) (4), Mealy Redpoll (*Carduelis* (*f.*) *flammea*) (7), Northern Bullfinch (*Phyrrhula p. phyrrhula*) (5) and Crossbills (*Loxia curvirostra* species complex) (14) - numbers in brackets are the total number of major flight years for each species. During the last 50 years, the above 8 species undertook in total 81 major irruptions into the low countries. These were, however, not equally spread over time: after a remarkable dip from 1973-1982, when only 5 invasions occurred during 10 years, there was a steady increase in the number of major irruptions, with an unprecedented 19 incidences between 2004-2008 (figure 1).

Folk wisdom allocates a predictive value to invasions of northern birds, claiming that arrival of large numbers of irruptive species indicates that a severe winter can be expected. However, no such relationship was present in the data. To the contrary, multiple flight years involving invasions of more species occurred more frequently following one or more above average mild winters, and irruptions were more seldom after severe winters (= higher Hellmann index; figure 2).

The mechanisms behind the increasing frequency of irruptions are probably multiple: (1) mild winters enhance survival, (2) mild springs improve breeding, (3) above average warm summers induce mast years in several trees (e.g. Beech) resulting in better food supply for larger populations, again contributing to better survival. (4) Greater population pressure especially when food then might start failing results more frequently in large irruptions, involving more birds and longer flights. Because several of the mechanisms refer to climate warming, it is no coincidence that the long series of exceptionally mild winters from the mid 1980s onwards was paralleled by an increase in large irruptions, involving record numbers of birds for six of the species since 2005.

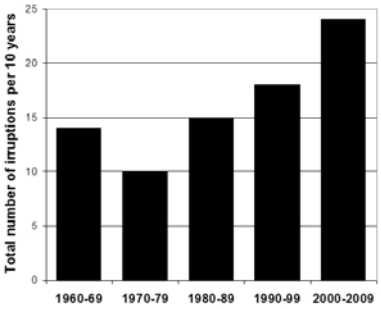

Figure 1. *Total number of irruptions per 10 years.*

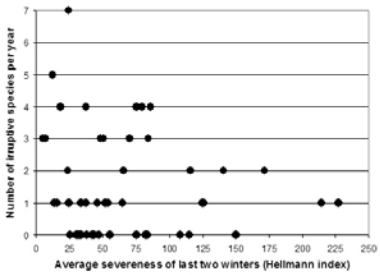

Figure 2. *Correlation between the average severeness of last two winters and the number of irruptive species per year.*

INCREASE IN BIRD SPECIES RICHNESS AT NATIONAL, REGIONAL AND LOCAL SCALE IN WALLONIA (SOUTHERN BELGIUM): ARTEFACT OR GENUINE PHENOMENON?

Jean-Yves Paquet[1]*, Christophe Dehem, Nicolas Titeux & Jean-Paul Jacob
[1] Aves-Natagora, Rue du Wisconsin 3, 5000 Namur, Belgium
* Corresponding author: jean-yves.paquet@aves.be

Comparison of two successive breeding bird atlases in Wallonia (Southern Belgium) offers a unique opportunity to assess changes in composition and abundance of bird assemblages across a range of spatial scales between both sampling periods (1973-1977 and 2001-2007). Unexpectedly in the present context of biodiversity crisis, the number of

breeding species (even excluding introduced exotics) is increasing at all three spatial scale examined. First, the number of breeding birds in Wallonia now amounts to 166 species, compared to only 147 in 1973-1977. Second, the species richness increased in all but one of the five Walloon geographical sub-regions. Third, the species richness in the 80 km^2 grid units increased by 13.8 species on average.

However, direct comparison of successive atlases can be subject to strong biases. In particular, it is generally believed that recent developments in field ornithology has led to an increase in the sampling effort over time, resulting in negative evolutions to be underestimated and positive ones to be overestimated. To what extent this increase of sampling effort influxes on the observed variations in species richness needs to be fully understood. To address this issue, sampling effort in both atlases was indirectly estimated for each grid unit, using the residual of a multiple regression of within-unit species richness against three parameters representing within-unit habitat diversity, and explaining respectively 41 and 68% of the species richness variability in the two successive atlases.

At the grid unit scale, increase in species richness is strongly negatively correlated with first Atlas sampling effort, suggesting an effect of increase sampling effort in explaining increase of species richness. However, even for grid cells where sampling effort seems to have decreased, species richness is in most cases increasing.

Accordingly, the observed increase in species richness relates to an increase in the sampling effort but must be regarded as a genuine phenomenon. Populations of many waterbirds, raptors and forest species have soared and this is often associated with an expansion of their range. Contrastingly, a lot of common bird species (e.g. species associated with agriculture habitats) have decreased in numbers, but their geographical range has not been restricted in most cases. As most of the range-expanding species are not numerous birds, and some formerly very abundant bird species are less widespread now, there is an estimated decrease of -7% in abundance (all species together) at the national scale. Possible evidence for a biotic homogenisation (tendency for grid units to be less distinct from one another than before) will also be discussed.

REGIONAL CONSERVATION OBJECTIVES FOR NON BREEDING BIRDS IN FLANDERS (BELGIUM)

Koen Devos*, Anny Anselin, Glenn Vermeersch, Peter Adriaens & Gerald Louette
Research Institute for Nature and Forest, INBO, Kliniekstraat 25, B-1070 Brussels, Belgium
* Corresponding author: koen.devos@inbo.be

The sustainable conservation of biodiversity is the ultimate goal of the European Habitat and Bird Directive. EU member states need to achieve a favourable conservation for all habitats and species that are listed in the annexes. Therefore conservation objectives have to be formulated, at least on the level of protected sites. In Flanders (Belgium), the first step was to determine conservation status and objectives at a regional level, creating a framework for future objectives at site level.

The conservation status was not only assessed for 31 regularly breeding bird species but also for 26 non breeding species. These are mainly wintering/migrating waterbird species that occur in internationally important numbers (based on 1% criterion), next to a small selection of Annex I species. For this assessment, changes in range and population size since the 1970s were determined. Also habitat factors and future prospects were taken into account. This allows an evaluation of how the current situation relates to the favourable conservation status.

In contrast to breeding birds, a high proportion of the non breeding species (17) showed a favourable conservation status. The majority of this group concerns waterbird species showing positive trends at population level. Nine species were considered to have a bad or very bad conservation status, mainly as a result of decreasing numbers in Flanders (or at population level) or bad habitat quality.

Based on the evaluation of the conservation status, regional conservation objectives were extracted. General objectives include for instance a stand still or an increase in range, habitat area, an improvement in quantity and quality of habitat, or the safeguard of their future prospects. For some of these general objectives a quantification was made, leading to specific quantified objectives (e.g. minimal population size). The methods used will be presented. Only for a few species, an increase in population size and/or available sites is targeted. Most of the proposed measures are aiming at an increase in habitat quality within (protected) sites that are currently available.
For all species, relevant Special Protection Areas (or Important Bird Areas) are listed and ranked according to their importance for the conservation of the species (essential site, very important site, important site). Sites are defined as essential site when the numbers equal or exceed the 1% norm of the total biogeographical population on a regular (at least half of the winters) basis, or if irregularly, are listed as Annex I bird species. Furthermore, SPAs harboring 15% or more of the total population of Annex I bird species in Flanders are categorized as essential site.

HABITAT CHANGES ON THE MOST IMPORTANT AREAS FOR BIRDS IN CROATIA DURING 1990-2000 PERIOD

Andreja Radović[1]*, Dragan Bukovec[2] & Nikola Tvrtković[2]
[1] Croatian Academy of Sciences and Arts, Institute for Ornithology, Gundulićeva 24, HR-10000 Zagreb, Croatia
[2] Croatian Natural History Museum, Demetrova 1, HR-10000 Zagreb, Croatia
* Corresponding author: anradovic@hazu.hr

Authors researched the habitat changes on specific habitat types on area previously assessed as the most important areas in Croatia for the protection of endangered bird fauna during 1990-2000 year period. The areas used in the analysis were four areas in continental part of the Croatia (Danube and Drava River alluvium, Pokupsko depression, Sava River basin, Upper Drava River basin) and four areas in the Mediterranean part (Neretva River estuary, NW part of the North Dalmatia, Paško field, Lake Vrana). For the analysis of changes in classified habitat types Corine Land Cover Databases for 1990 and 2000 years were used.
We used to assessment of the ornithological of the whole territory of Croatia according known distributions of endangered birds (Radović *et al*., 2003). Using software package ArcView (Version 9.1, Copyright © 2006 ESRI) we abstracted the polygons with detected change in habitat class from period 1990-2000, further analysis was performed with SAS [JMP] software (Version 7) of the SAS system (SAS Institute Inc.).
Almost no changes in habitat were detected on the Mediterranean part of the country, for example the greatest change was detected on Vrana lake (less than 2% of total area as degradation of forest) while on other areas even less than 1%. The four areas are in the Pannonian part of Croatia are Pokupsko depression, Sava River basin, upper part of the Drava River basin and Danube and Drava River floodplains. Both, total area and percent change detected was much greater on areas in Pannonian part and that is the reason why all other results and discussion will be focused on them. At Danube and Drava River floodplains habitat changes were detected on more than 8% of total area and more than 5% was changed in Sava River basin but with greatest absolute amount. We are totally aware that this kind of analysis is not optimal for the assessment of changes in habitat quality for small area extents.
Altogether 57 possible groups (directions) have been identified. In total, the greatest change during 1990-2000 year was identified on forest habitats. Almost all changes were detected on broad-leaved forests with extremely small portion of mixed forests. All the changes were those between forest stands transforming to transitional woodland and scrub and vice-versa with notably greater extent of forest degradation compared with maturation of forest stands. This process is detected on two areas: Sava River basin and Pokupsko depression with total amount of change more evident along Sava River basin.

Authors discussed the possible impact on several bird species listed in Red Data Book of Birds of Croatia for what the detected changes should have the greatest impact on populations.
Because of inadequate country-wide monitoring schemes for the most of the bird species listed in Red Data Book of endangered birds in Croatia the discussion presented below should be seen only as rough indicator of assumed impact on regarded bird species according species-specific research and monitoring programs conducted elsewhere.

ECOLOGICAL PREFERENCES OF THE FOREST BIRD COMMUNITIES IN ŽUMBERAK AND MEDVEDNICA MOUNTAINS

Tamara Kirin[1]*, Jelena Kralj[2], Davor Ćiković[2] & Zdravko Dolenec[3]
[1] Pavla Hatza 20, Zagreb, Croatia
[2] Institute of Ornithology, Croatian Academy of Sciences and Arts, Gundulićeva 24, Zagreb, Croatia
[3] Department of Zoology, Faculty of Science, University of Zagreb, Rooseveltov trg 6, Zagreb, Croatia
* Corresponding author: tamarakirin@gmail.com

We studied the effect of floristic and structural characteristics of vegetation to the breeding ornithofauna. Study area comprised two Nature Parks, Medvednica and Žumberak-Samoborsko gorge, situated in continental part of Croatia only 15 km apart. Forests, which cover over 60% of area in both Parks, are continuous on Medvednica and fragmented on Žumberak. The point-count method was used for analyzing bird communities and circular plot method for habitat mapping, on 101 points at both sites. Non-parametric test were used (Kruskal-Wallis and Kendal Tau). The tree basal area was used to classify studied points into five forest types (beech, oak, coniferous, mixed deciduous and conifer/deciduous mixed forests) and as measure of the forest age.
The number of bird species recorded in Medvednica was 39 and in Žumberak 49. Biodiversity was higher in Žumberak due to greater habitat fragmentation, while population density of songbirds was greater in Medvednica. The total bird density was positively correlated with the average tree basal area and negatively with the density of the youngest trees, confirming the preference for older forest stands. Among structural characteristics, those related to forest age (total basal area and number of the oldest trees) had the most pronounced effect to the densities of different ecological groups of birds. Population densities of canopy-feeders showed positive and those of ground-feeders negative correlation with scrub layer density.
Seven species showed the preference for the particular forest type (with more then 50% of pairs in one forest type). Sørensen index showed that in spite of the differences in floristic composition between particular forest types in two studied areas (0.475 ± 0.120), bird communities show greater similarity (0.806 ± 0.116). The highest similarity of bird communities between parks was recorded in oak forests. Those forests showed the least similarity in tree species composition and no significant difference in structural characteristics. The greatest difference of bird densities in the particular forest type between two parks was found in conifer/deciduous mixed forests. Structural differences between these two forests were the result of the forest age, with denser population in oldest forest stands.
It can be concluded that for habitat selection on the larger spatial scale both floristic and structural composition are important, while on smaller scale, structural characteristics of vegetation play much greater role.

BIRD SPECIES THAT HAVE SIGNIFICANTLY CHANGED BREEDING RANGE ON CROATIAN COASTAL AREA: COMPARISON OF 30 YEARS OLD DATA AND RECENT KNOWLEDGE

Ivan Budinski*, Antica Čulina, Krešimir Mikulić & Luka Jurinović
Association for Biological Research 'BIOM', Šestinski dol 12, 10 000 Zagreb, Croatia
* Corresponding author: ivan.budinski@biom.hr

In Croatia there are tenths of bird species that are known to have changed breeding range and/or abundance in the last decades. Comprehensive research had been undertaken from 1946 to 1975 on the Croatian coast. In that research representative data for 106 breeding bird species were collected. We compared those distribution data to data we collected in the recent years and tried to evaluate potential reasons for changes.

For a number of species we noticed the difference in breeding range and/or abundance and for 16 species a significant change was recognized. For other species the change was not clear giving the possible difference in methodology or research effort.

Thirteen species have shown positive trend increasing breeding abundance in research area (two species) or increasing breeding range (eleven species). Of the second group of species four species expanded their breeding range into colder habitats and seven species into warmer habitats. Three species have shown negative trend with decreasing abundance or becoming locally extinct.

Potential driving forces for positive trend are as followed: reforestation alone, reforestation together with less disturbance, agricultural changes and climate change. Reforestation is due to abandoning rural settlements (this also means less disturbance), decreasing extensive livestock keeping and extensive afforestation. Another possible reason is constant decrease in pressure of illegal hunting and trapping on Croatian coast.

For at least one species one of the reasons for increase is change in species behaviour and breeding biology.

The reasons for decline of three species are habitat loss due to reforestation (Short-toed Lark) and reforestation combined with increased hunting pressure (Rock Partridge) and agricultural changes (Little Owl and Rock Partridge). These species are also decreasing in other parts of Europe.

Approach that we have applied is a good indicator for trends of species we had enough available data, and could be a starting point for future monitoring. This is especially important for species declining globally but also for the species that are increasing their numbers as they could be a potential competitors with endangered species.

PATTERNS AND TRENDS IN AVIAN BIODIVERSITY IN DENMARK 1971-74 TO 1993-96

Hans Meltofte*, Timme Nyegaard & Michael Borch Grell
Dansk Ornitologisk Forening (DOF)/BirdLife Denmark, Vesterbrogade 140, DK-1620 Copenhagen V, Denmark
* Corresponding author: hans.meltofte@dof.dk

Due to Denmark's location close to the border between the temperate and boreal zones and in-between Europe's Atlantic and continental climates the country contains high levels of biodiversity considering to its small size of only 43,000 km^2. The breeding bird species were mapped by members of the Danish Ornithological Society during atlas surveys in 1971-74 (Dybbro, 1976) and 1993-96 (Grell, 1998) using 5 x 5 km squares.

This study presents a simple analysis of patterns and changes in the distribution of different taxonomic and biological groupings of bird species (e.g. passerines and water birds) as well as conservation groupings (e.g. farmland birds, the red list and annex 1 of the EC bird directive). Furthermore, point counts made in all quadrants during the second atlas were analysed using Simpson's Diversity Index.

The main findings were that the 'young' landscapes glaciated during the last glaciation (i.e. until about 12,000 years ago) held significantly more species than the elder landscapes of West Jutland. This is because the 'recently' glaciated landscapes are much more heterogeneous and have more fertile soils. Rare species were to a high extent found in 'marginal' coastal habitats, partly because inland meadows, commons and heath land, which formerly held many of these species, have been lost, and partly because of coastal dynamic processes creating new 'marginal' habitats.

Between the two atlas studies, the number of breeding bird species in Denmark increased from 186 in 1971-74 to 200 in 1993-96.

Three species had disappeared, while 17 had immigrated. 41% of the Danish breeding bird species increased significantly (>20%) between the two studies, while 28% decreased significantly (Grell, 1998). Increases are thought mainly to be due to overgrowing and euthrophication of the landscape together with better protection of raptors, while decreases mainly are due to intensification of farming.

THE DANISH IBA CARETAKER PROJECT'S STATUS OF THE DANISH IBAs 1980-2008

Anne Eskildsen, Mathias Vogdrup-Schmidt & Thomas Vikstrøm*
Dansk Ornitologisk Forening (DOF)/BirdLife Denmark, Vesterbrogade 140, DK-1620 Copenhagen V, Denmark
* Corresponding author:
thomas.vikstroem@dof.dk

The DOF IBA Caretaker Project's monitoring of the Danish Important Bird Areas (IBAs) from 2003-2013 will be reported at length when the project is officially finished. However, as an appetizer the table below shows a brief overview of the development for the trigger species in the Danish IBAs since DOF's site surveys during the period of 1978-81 to 2008. The list of trigger species includes all species of breeding and staging birds, which according to BirdLife International's criteria qualify a site as being of international importance. Furthermore it includes all species, which are listed in the bases of designation set by the EU for the 113 Danish sites, which have been designated as EU bird protection areas, i.e. those species that are protected by EU legislation.

In the table seen below the current status of each IBA is compared with its status about 1980. Comparison is made with this particular period because it was during this time that the EF Bird Protection Directive came into force. It is therefore also this period, which is used by the Danish nature authorities when assessing whether important bird areas are fulfilling the EU's demands for a favourable conservation status. In order to assess the status of important bird areas, many of DOF's sister organisations in other European countries have made detailed descriptions of what is to be understood by the term favourable conservation status for both individual species and sites in general. They are often based on detailed analyses of the habitat requirements of each species, its former distribution and present threats etc. However, such assessments have not yet been carried out in Denmark.

The columns of the table should be interpreted as follows:

1. The number of the IBA according to BirdLife International.
2. The name of the IBA according to BirdLife International (however some names have been changed by the caretakers).
3. The status score of the IBA. The score is calculated as an average of all trigger species scores found on the location. The status score of each species is calculated by using BirdLife's 0-3 point score system:
   - A score of 3 indicates that the present population size is >90% of the population size in 1978-81.
   - A score of 2 indicates that the present population size is 70-90% of the population size in 1978-81.
   - A score of 1 indicates that the present population size is 40-70% of the population size in 1987-81.
   - A score of 0 indicates that the present population size is <40% of the population size in 1978-81.
4. Brief comment on the development of the IBA.

Please note that the status score has not been assessed using the 'weakest link principle', which is usually used by BirdLife, where the status of the single trigger species, which is doing most poorly, is used as the overall score for the site. Instead we have found it more appropriate to score each site using an overall average calculated using all trigger species. In this case, the status is measured by using the highest number of breeding or stag-

ing birds, which have been registered within each period.

As the table shows, only 23 IBAs (18%) have a favourable conservation status (i.e. a score of 3), while the largest group of 60 IBAs (47%) score 2 on the status scale, meaning that the present population size of the trigger species is 70-90% of the population size in 1978-81. 21 IBAs (16%) are in a rather bad state and 13 (10%) in a really bad state, scoring 1 or 0, respectively, on the scale, while it has not been possible to assess the conservation status of 10 IBAs (8%).

Generally, the main reasons for the unfavourable conservation status of many IBAs are decreases of breeding trigger species of open habitats as meadows, heaths and coasts threatened by overgrowing and disturbance. This counts especially for waders as Dunlin (*Calidris alpina* ssp. *schintzii*), Ruff (*Philomachus pugnax*), Black-tailed Godwit (*Limosa limosa*), Green Sandpiper (*Tringa glareola*), Golden Plover (*Pluvialis apricaria*), and for some terns. As to staging birds decreases are found particularly among diving ducks as Tufted Duck (*Aythya fuligula*) and may be due to water pollution. Breeding trigger species doing well and thereby contributing to a favourable conservation status of IBAs are most birds of forests and more closed marshes as Bittern (*Botaurus stellaris*), Greylag Goose (*Anser anser*), White-tailed Eagle (*Haliaetus albicilla*), Red Kite (*Milvus milvus*) and Common Crane (*Grus grus*). As well, some of these species are contributing to a favourable IBA conservation status as staging birds; other staging birds contributing are especially geese, of which Barnacle Goose (*Branta leucopsis*) has shown a remarkable increase.

A majority of the material underlying the table, of which a large part has been entered into the DOF database, has been gathered by participants of the IBA Caretaker Project. A comprehensive reference list can be acquired by contacting the DOF IBA Caretaker Project on thomas.vikstroem@dof.dk.

COMMON BIRD MONITORING SCHEME, A USEFUL CONSERVATION TOOL

Virginia Escandell* & Blas Molina
Área de Estudio y Seguimiento de Aves, SEO/BirdLife, C/ Melquiades Biencinto 34, 28053 Madrid, Spain
* Corresponding author: vescandell@seo.org

Common Bird Monitoring in Spain (SACRE) is firstly aimed at knowing the evolution of the population of the most common birds in the country: 'A' criterion, on decreasing of the population. This criterion is basic for knowing the conservation bird status, according to the International Union for Conservation of Nature (IUCN), although is not the only one. However, data gathered from this monitoring scheme provide enough information to obtain the required parameters to evaluate the inclusion of not of a species in a threatened category.

Through data obtained in SACRE Scheme during the years 2004, 2005 and 2006, the quantification of 95 common bird species in Spain was calculated (Carrascal y Palomino, 2008, 2010). That can allow the evaluation of these species by the criterion C, on the population size.

Moreover, during the years 1998-2002 it was carried out the last Breeding Bird Atlas in Spain (Martí y Del Moral, 2003) that provides information of the criterion B, on distribution range.

According to the available information and applying the IUCN criteria described above, none of the 95 species evaluated should be classified in some threatened category of IUCN taking into account the distribution range and the size of the population. However, some species have been declining in population over the last years, for example the Dartford Warbler (*Sylvia undata*), and it could be included in the next List of National Threatened Species.

RELATIONSHIP BETWEEN BIRD FAUNA DIVERSITY AND LANDSCAPE METRICS IN AGRICULTURAL LANDSCAPE AT DIFFERENT LEVELS

Riho Marja*, Evelyn Uuemaa & Ülo Mander
Department of Geography, Institute of Ecology and Earth Sciences, University of Tartu, 46 Vanemuise St., 51014 Tartu, Estonia
* Corresponding author: rmarja@ut.ee

The main objectives of this study were to find relationship between the heterogeneity of the agricultural landscape and farmland bird species diversity. Research areas were located in three counties of Estonia: Valga, Jõgeva and Lääne-Viru. For each research area, 10 research squares of a size 1 km^2 were randomly chosen. In 2002 and in 2004 two point counts were carried out in each test square. For gathering landscape data vector-shaped Estonian Basic Map (1:10,000) was used. Vectoral data were rastered and three landscape indexes of Fragstats (Patch Density, Edge Density and Shannon's Landscape Diversity Index, SHDI) were calculated at three levels: 100 and 200 metres buffer zones around the count points and 1 km^2 research square. For the characterization of bird fauna the number of species and Shannon's Diversity Index were calculated. In terms of breeding bird species all the indexes used were significantly correlated with bird fauna diversity and landscape structure. In most cases the following trend was found: the Spearman rank correlation values between the number of bird and landscape indexes increased when expanding the research area (table 1). The correlation coefficients were lowest in 100-meters buffer cases and highest in 1 km^2 research square cases. Therefore relations improved with the increase size of research area. This indicates that a 100-metres buffer around the count point does not give adequate information about landscape pattern for birds. Analysis of this research work confirms the earlier results that fragmentation may increase the local species diversity. In that case different niches for various species and also the number of different habitats and micro-habitats may increase. For instance, fragmentations increase edge habitats, which are very important for many farmland bird species. The results of this research supported hypotheses on strong relationship between the landscape metrics and bird fauna diversity. Thus, the landscape structure is a significant predictor of bird fauna structure in agricultural landscapes.

	No. of species		Shannon's H	
Year	**2002**	**2004**	**2002**	**2004**
100 m buffer zones (n = 120)	0.27	0.30	0.28	0.33
200 m buffer zones (n = 120)	0.41	0.48	0.42	0.51
1 km^2/buffer zones (n = 30)	0.59	0.57	0.58	0.64

Table 1. *Correlations between SHDI and bird indexes (number of species and Shannon's H). Statistically significant correlations are marked in bold ($p \leq 0.05$).*

WILD BIRD INDICES: BIRD POPULATION MONITORING FOR BIODIVERSITY

Danaë K. Sheehan*, Richard D. Gregory & Mark A. Eaton
Royal Society for the Protection of Birds, Sandy, Bedfordshire, SG19 2DL, UK
* Corresponding author:
danae.sheehan@rspb.org.uk

The global 'Wild Bird Index' project began in 2007, coordinated and funded by the RSPB and BirdLife International, with additional support from the 2010 Biodiversity Indicators Partnership, with the ultimate aim to develop a global Wild Bird Index to monitor and report on the impact of environmental change on bird populations worldwide.
The project will build upon existing terrestrial bird monitoring schemes (e.g. the Pan-European Common Bird Monitoring Scheme), support the establishing of new monitoring programmes in a representative sample of countries worldwide, and investigate the novel use of existing datasets, and new monitoring approaches, for the purpose of measuring population trends in widespread bird species.

The project will work with local partner organisations in a number of countries, firstly through BirdLife International's network of partners, with the intention of building local and regional capacity for Bird Population Monitoring, and engagement with local/regional policy forums. The scheme will aim for long-term sustainability by engaging volunteer observers in simple and rewarding bird monitoring with clear objectives and conservation value, and with high quality support for participants.

A detailed global review of existing bird monitoring activities, and capacity assessment of potential participating countries is currently being carried out. Counts of particular species or groups are well established, popular and extend back some time. Some of these existing schemes could be expanded, whilst others could be harmonized, enhanced and joined up to maximise their effectiveness and usefulness.

The project will also coordinate the development of systematic, widespread Bird Population Monitoring within representative habitats across countries. The project supports the implementation of appropriate survey designs at an appropriate number of sites per country, using local observers. This will cover abundant and widespread species both inside and outside of protected areas. The project will also implement online data collection through bespoke new development of the 'Worldbirds' system.

MONITORING THE EFFECTIVENESS OF MANAGEMENT CHANGES ON MOORLAND BREEDING BIRDS: A CASE STUDY OF SPECIES SELECTION AND THE NEED FOR APPROPRIATE REFERENCE DATA

John Calladine[1]* & Andre Thiel[2]
[1] BTO Scotland, University of Stirling, FK9 4LA, UK
[2] Scottish Resources Group, Gartlove, FK10 3PZ, UK
* Corresponding author: john.calladine@bto.org

Opencast coal extraction from moorland in south-west Scotland that is designated under the EU Birds Directive has necessitated mitigation management of neighbouring moorland to compensate against potential losses associated with that development. This included changes in grazing regimes, restoration of mire hydrology and the control of predation. The aim is to enhance conditions for, and therefore population densities of the Annex 1 species for which the area is designated: Hen Harrier, Merlin, Peregrine, Short-eared Owl and Golden Plover.

Within the 9 km^2 'mitigation area', it was considered that any response to management changes by the three raptor species might be difficult to detect because of small population sizes and the potential impacts of extrinsic (off-site) factors. Further detailed studies, that have included the same study area, have demonstrated difficulties in reliable monitoring of Short-eared Owls. Therefore it was decided to monitor their key prey species (Skylark, Meadow Pipit, Red Grouse and also Field Voles) to assess any changes in conditions for those breeding raptors and owls. Golden Plover was the only species included on the citation list that were directly included in the site's monitoring programme. Other species that have been incidentally monitored and proven to be sufficiently abundant to reliably detect population trends during 2002-09 are Snipe, Curlew, Wren and Stonechat.

Reproductive success of moorland birds can be particularly sensitive to weather and therefore changes in populations may not necessarily be a result of management measures alone. Comparisons with reference data would provide the best measure for the effectiveness of mitigation management, in that relative changes in bird numbers can be assessed. Data collected from a single proximate reference area during the first four years of monitoring (2002-05) was shown to be unrepresentative of population changes for relevant species in comparable habitats assessed by the national monitoring scheme (the BTO/JNCC/RSPB Breeding Bird Survey; BBS). Issues associated with management changes at that single reference site, and also the potential lack of independence from the managed area for mitigation are likely to have made it unsuitable as a source of refer-

ence data. Ongoing monitoring of the managed mitigation area (which is planned to continue to at least 2017) will be assessed against data selected from the BBS supplemented with additional data collected specifically for this purpose from a range of random selected sites on moorland across south-west Scotland. The latter has enhanced comparability in terms of weather and geographical variability in trends to the managed mitigation area and increase the statistical power to detect a divergence in trends in bird populations between the mitigation area and comparable habitats in the region.
This study demonstrates the value of independent reference data and for site monitoring programmes to be sufficiently resourced to permit the collection of that data in cases where it is not already available.

AN ORNITHOLOGICAL ZONATION OF ITALY

Guglielmo Londi[1], Guido Tellini Florenzano[1, 2]*, Tommaso Campedelli[1], Lorenzo Fornasari[2, 3]
[1] DREAM Italia, via dei Guazzi 31, I-52013 Poppi (AR), Italy
[2] Mito2000, Scientific Committee, Italy
[3] Associazione FaunaViva, viale Sarca 78, 20125 Milano, Italy
* Corresponding author: tellini@dream-italia.it

Ecoregions are widely used in conservation studies both at continental and global scale, but they are useful also at a lower scale, e.g. national scale. An objective identification of ecoregions, based on data collected in the field is may be a useful tool for several purposes. In this sense, purely climatic or phytoclimatic approaches appear to be insufficient to identify ecoregions since climate is not the only factor that determines the environmental conditions, in particular in the Mediterranean that has been highly modified by man for thousands of years. In this work we tried to identify Italian ecoregions using bird species data, as it has been already done in Switzerland and Spain.
Unlike previous studies that used distribution data from Atlases, we have used the semi-quantitative data of the 103 most common species identified by the Italian monitoring program (MITO 2000) collected between 2000 and 2003. The spatial units used are 10 x 10 km squares based on the UTM grid, grouped by cluster analysis using Sorensen's relative distance on logarithm of every species' abundance in the unit (grouping method: beta flexible, beta = 0.25). Using the 'IV' method (Indicator Values) we have chosen the best grouping level, corresponding to the threshold where the number of the species that have significant IV and IV mean significance show a peak; consequently identifying the indicator species within each group. The six identified groups, or 'ornithological zones' with the respective indicator species are:

- Alpine zone (*Anthus spinoletta*, *Sylvia curruca*, *Carduelis flammea*, *Turdus torquatus*, *Prunella collaris*, *P. modularis*, *Parus montanus*, *Nucifraga caryocatactes*).
- Pre-alpine and Apennine reliefs (*Parus palustris*).
- Hills (*Hippolais polyglotta*, *Sylvia cantillans*/*S. subalpina*, *Lullula arborea*).
- Floodplains (*Motacilla flava*, *Acrocephalus arundinaceus*).
- Mediterranean reliefs (*Sylvia undata*, *Monticola solitarius*).
- Mediterranean steppe (*Calandrella brachydactyla*, *Melanocorypha calandra*, *Galerida cristata*).

These results show either good spatial coherence, clearly identifying well marked geographic areas, and ecological coherence, according to the known ecology of species. Moreover, this method shows a good level of resolution, e.g. being able to identify isolated mountains or alpine conditions within the Apennines or xerothermic conditions within the Alpine area.
These ecoregions can be used either as a study (e.g. in stratifying ornithological or ecological monitoring programmes), or as a management and conservation tool (e.g. to evaluate at the ecoregion level the effectiveness of the Protected Areas network).

19 YEARS OF LANDSCAPE CHANGES IN A MEDITERRANEAN NATIONAL PARK (FORESTE CASENTINESI, ITALY) SHOWN BY A LONG-TERM BREEDING BIRD CENSUS PROGRAMME

Guido Tellini Florenzano*, Guglielmo Londi, Tommaso Campedelli & Simonetta Cutini
DREAM Italia, via dei Guazzi 31, I-52014 Poppi (AR), Italy
* Corresponding author: tellini@dream-italia.it

Historical data series resulting from long-period monitoring projects are very important and useful tools to understand dynamic processes affecting those landscape that, like Mediterranean ones, are hugely and rapidly changing.
Since 1992, with the exception of only two years, in the Foreste Casentinesi National Park (14,000 ha covered for the 85% by forests) a breeding bird monitoring project has been carried out. The project, that involves only a part of the National Park area, and precisely that comprised in the Arezzo Province, adopts the BBS methodology, with a total of 175 points, visited twice each breeding season.
Results obtained from the species population trends, calculated with TRIM software, and from the altitudinal variations along the study period, seem to stress and summarize very well the changes occurred, and still occurring, in the landscape.
Analysing the species trends, two are the most important features we can appreciate: first, with the only exception of *Lullula arborea*, all the species linked with open habitats, particularly with cultural landscape, have experienced a sharp decline and some of them are now to be considered irregular breeders within the study area (*Alauda arvensis*). On the other hand, the increases in species preferring ancient and well structured forests (*Phylloscopus sibilatrix*, *Sitta europaea*, *Certhia familiaris*, *C. brachydactyla*, *Regulus regulus*) are clear as well. These results clearly indicate that the forest management policy have improved the biodiversity status of managed forests, as well as the disappearing of traditional agricultural practices, sometimes favoured by National Park, is determining an important biodiversity loss.
Considering the altitudinal shifts, the situation appears more complex, with both forest and open-habitat species showing movement to higher and lower elevations. Among open-habitat species, *Anthus trivialis* and *Emberiza cirlus* show a clear tendency to move upwards, while *Passer domesticus italiae* and *Carduelis carduelis* move downwards. Similarly, among forest species, *Turdus viscivorus*, *Phylloscopus sibilatrix* and *P. collybita*, move upwards, contrasting with *Buteo buteo* and *Certhia brachydactyla* that move downwards. These results therefore do not indicate unique tendencies, even if these shifts could be connected with the evolution of the landscape, whereas there is little evidence of climate-change effects. Considering both population trends and altitudinal shifts, almost all the changes registered could be easily linked with the transformations occurred, and still occurring, in the landscape (natural afforestation, general reduction of open habitats, ageing of forests).

DOES HISTORICAL FOREST MANAGEMENT SHAPE BIRD BIODIVERSITY IN LATVIA?

Oskars Keišs*, Ainārs Auniņš & Guntis Brūmelis
Dept. of Botany and Ecology, University of Latvia, Kronvalda blvd. 4, LV-1586 Riga, Latvia
* Corresponding author: oskars.keiss@lu.lv

Latvia, located in southern boreal forest region, has had intensive agriculture of its times in 1920s and 1930s - forests covered only 23% of Latvia in 1923. During 50 years of Soviet occupation many agricultural lands were abandoned and today about 50% of the country is covered by forests.
We surveyed biodiversity in 5 sample plots in forests with different management history in Northern Latvia in 2009. Surveys included bird survey and survey of vegetation (including bryophytes and lichens) in 4 km transects in each plot. We compared forests formed

since 1930s (by overgrowing of agricultural lands) with old forests (formed before 1930s). Standard bird transect (0-25 m and 25-100 m) surveys were conducted consisting of 4 full counts (beginning and end of April, mid May and early June). Obtained results were also compared to forest bird monitoring plots in Latvia. Management history has had more impact on vegetation than on bird biodiversity. In upcoming years research in these plots will be continued, including entomological survey.

THE DISTRIBUTION OF THE BREEDING BIRDS OF SWITZERLAND IN THE 1950s COMPARED TO THE PRESENT SITUATION

Peter Knaus
Swiss Ornithological Institute, CH-6204 Sempach, Switzerland
peter.knaus@vogelwarte.ch

A good knowledge of the historical distribution and abundance is an important basis for assessing the current status of bird communities in a region. In Switzerland, many species had suffered massive declines before the first comprehensive overview, the first breeding bird atlas (1972-1976), was compiled, as intensification of land use increased in the 1950s or even earlier.
With this project the distribution of the breeding birds for the period 1950-1959 is mapped. The project also aims of raising awareness among politicians, government agencies and the public.
Ornithologists of the older generation still have a good knowledge of the situation of breeding birds in the 1950s. With their notebooks and standardised interviews, this knowledge is used as far as possible. Further sources were the archives of the Swiss Ornithological Institute as well as regional overviews and publications.
Switzerland was divided in 468 100-km^2 squares, allowing comparisons with the two atlases 1972-1976 and 1993-1996. The species were classified as follows: (1) 45 well documented, rare breeding birds, of which the data were already completely available; (2) 109 semi-rare or formerly widespread species, for which data were collected as completely as possible; (3) 59 rather common breeding birds with no indications of massive changes, for which the data were not systematically recorded.
There are enough data for about 130 out of 213 species to produce representative distribution maps for the 1950s. Because of the non-homogeneous distribution of observers in Switzerland, caused mainly by the topographic characteristics of the country, convincing comparisons with the two atlases 1972-1976 and 1993-1996 are only possible in the Plateau, the lowland region between the Jura and the Alps, which covers about a third of the total surface area of Switzerland. In the Plateau the biggest changes in land use occurred. The data document that in the 1950s several farmland and wetland species were widespread across the whole Plateau: Grey Partridge, Common Snipe, Eurasian Curlew, Little Owl, Eurasian Hoopoe, Lesser Grey Shrike, Great Grey Shrike and Woodchat Shrike. These species showed marked declines already in 1972-1976 and a part of them disappeared completely until 1993-1996. Other breeding birds such as the Corn Crake were distributed only fragmentarily already in the 1950s. On the opposite, increases are documented, e.g. for White Stork, Black Kite, Red Kite, Peregrine Falcon, Eurasian Collared Dove, Fieldfare and Northern Raven. These results help to better understand today's distribution of the breeding birds of Switzerland.

CBMSs & ATLASES: Studies at the Regional/national Scales

BIRD MONITORING AT URBAN SCALE: THE CASE OF BRUSSELS

Anne Weiserbs
Aves-Natagora, Département Etudes, 3 rue Fusch, B-4000 Liège, Belgium
anne.weiserbs@aves.be

The city of Brussels (169 km^2) is an autonomous region on its own in the federal state of Belgium and, as such, is organising specific environment monitoring schemes. One of these schemes concerns avifauna and is in action since 1992 thanks to volunteers support.
Several approaches are conducted on an annual basis:

- The common breeding bird monitoring scheme, involving 99 point counts, sampled twice a year. The plots are mostly located in the green spaces of the town. Analysis of the 1992-2008 period delivered trends for 38 species: 14 species are in expansion, 15 show decline and 9 are judged stable. This apparently well-balanced outcome only concerns a part of the Brussels avifauna constituted of the most widespread species. General trends can be detected, for example the globally good health of cavity nesters and a general adverse evolution of seed eaters.
- The breeding waterbird scheme, in the form of a yearly spring census in the 20 major wetlands and pounds. During the 1995-2009 period, 3 indigenous species remained stable (*Fulica atra*, *Gallinula chloropus* and *Anas platyrhynchos*), 2 showed a steady increase (*Aythya fuligula* 12%/year and *Cygnus olor* 7%/year) and one decreased (*Podiceps cristatus* 6%/year). In the same period, 2 exotic species increased sharply: *Branta canadensis* (50%/year) and *Alopochen aegyptiacus* (8%/year) and one seemed stable (*Aix galericulata*). Finally, results for *Anas platyrhynchos* forma *domestica* indicate a sharp decrease (-15%/year).
- Specific monitoring schemes deal with the remaining *Delichon urbicum* colonies and annual census of the Parrots roosts (*Psittacula krameri* and *P. eupatria*).

Moreover, a part of the survey is devoted to complementary schemes possibly lead over several years. One the most important recent outcome of the breeding bird monitoring schemes in Brussels has been the publication of an new atlas of Brussels breeding birds, published in 2007 (Weiserbs, A. & Jacob, J.-P. 2007. *Breeding birds of Brussels 2000-2004: distribution, abundance, evolution*. Aves, Liège; in French with English summaries).

MONITORING THROUGH RINGING: DISTRIBUTION AND IMPORTANCE OF THE RINGING ACTIVITY IN BELGIUM AND INTEREST OF THE GATHERED DATA

Michèle Loneux* & Didier Vangeluwe
IRSNB-KBIN-RBINS, Belgian Ringing Scheme, rue Vautier 29, B-1000 Brussels, Belgium
* Corresponding author:
michele.loneux@naturalsciences.be

Belgium is a country where volunteer ringers do not see their ringing activity limited or restricted to frame-specific programmes only. As a result, this so small country is to-day in Europe second, after the United Kingdom, amongst those with the biggest number of birds ringed per year (655,434 ringed birds of 250 species and subspecies in 2007). This contribution aims to present the distribution and density of the ringing places over the country as known from the ringing and recovery data computerized so far, and to locate them in a GIS system in relation to major Belgian regions from geographic and environmental points of view. The evolution of the ringing activity between sites and over time periods will be described and analyzed to assess the regularity and geographical homogeneity of this kind of monitoring for some stations and instance species regularly caught, using the annual ringing bags avail-

able since 1960. The results will illustrate the interest of the data collected by such kind of monitoring in our country.

OVERVIEW OF THE BREEDING BIRD ATLAS OF WALLONIA (SOUTHERN BELGIUM) 2001-2007

Jean-Paul Jacob* & Jean-Yves Paquet
Aves, 3 rue du Wisconsin, B-5000 Namur, Belgium
* Corresponding author: jp-jacob@aves.be

Fieldworks for the first regional breeding bird Atlas for Wallonia were conducted between 2001 and 2007, in a general framework of biodiversity monitoring schemes. The goal of this atlas was first to describe and contribute to a better understanding of the evolution in breeding avifauna since the Belgian Breeding Bird Atlas, dating back from 1973-1977. Furthermore, detailed data on breeding bird distribution and abundance were also much needed for the optimalization of conservation programs, such as the development of Natura 2000 network.
Wallonia covers 16,844 km^2 (55% of Belgium). A regular grid of 8 x 5 km rectangular cells was used as inventory unit. In each of these 500 units, all the free living breeding bird species, including exotic, were to be searched for. For a definite list of common species, only an estimate of the abundance was to be given; for all other species, both breeding evidence according to EOAC criteria and abundance estimate were gathered. This coarse-grain fieldwork was complemented by a fine-grain sampling scheme, using standardized 1-hour counts in 1-km squares (8 squares were to be sampled in each 8 x 5 km cell). Three maps form the main atlas result for each breeding species: a distribution map, a map showing the changes in abundance between the two compared period and, for the commoner species, a high-resolution relative density map derived from fine-grain sampling data.
Between 2001 and 2007, 176 species have bred in Wallonia, among which 15 introduced exotic species (on average, 80.1 species per 8 x 5 km unit). Of this total, 84% have been breeding regularly; the other 16% are species reproducing only occasionally, or bird recently added to the breeding avifauna. This group also includes several species on the verge of extinction. Half of the breeding species present low density (average of less than 1 pair/10 km^2) or occupy limited range. However, comparison with 1973-1977 period show a clear increase in average within-cell species richness, even accounting for better coverage in the present-day atlas. This increase is mostly linked to progressions in waterbirds, raptors and some forest birds, while the decline of many open-habitat species is not yet reflected by a significant range decrease. The new Red List, applying IUCN criteria on data from this atlas, amounts to 46 endangered species (28% of indigenous breeding birds), and its composition suggests that large-scale habitat modification is still a major explanation factor for recent avifauna evolution in Wallonia.

USING BELGIAN RINGING DATA TO ESTIMATE BIRD POPULATION TRENDS: A COMPARATIVE ANALYSIS

Michèle Loneux* & Didier Vangeluwe
IRSNB-KBIN-RBINS, Belgian Ringing Scheme, rue Vautier 29, B-1000 Brussels, Belgium
* Corresponding author: michele.loneux@naturalsciences.be

The ringing data bring a lot of information even if there are biases in the way they are sampled. The Constant Effort Site (CES) initiative aims to reduce part of those biases. Among the species, some are nevertheless ringed more regularly and constantly than others, providing high numbers in the annual balance of ringed birds. Even for species with few ringed individuals, the information on age, sex, and weight, date and place of capture provides useful data in a demographic perspective. In this contribution, we analyse the computerized data gathered by the Belgian ringing scheme for several decades and extract those concerning some of the most commonly and abundantly ringed species over time. We then compare the yearly ring-

ing numbers of these species and the related information on their population dynamics with the available population dynamics information as known by bird watching or bird census. The aim is to illustrate the interest of the Belgian ringing activity.

EMERGENCY, EPIDEMIOLOGIC CONTROL AND WILDLIFE MONITORING PROGRAM OF ANDALUSIA

Francisco Romero
Dirección General del Medio Natural, Consejería de Medio Ambiente, Junta de Andalucía, Spain
francisco.romero.ext@juntadeandalucia.es

Emergency, Epidemiology Control and Wildlife Monitoring Program conducts the early detection of mortalities in the different wetlands managed by the Andalusian government, performs the preventions of disease transmission in wildlife such as avian flu, and surveys wildlife species, especially the threatened ones.
Temperature increase and cessation of rainfall during the summer, plus occasional episodes of pollution or disease, result in different changes into wetlands that affect directly or indirectly fishes and aquatic birds. There is a specialized technical team in order to recover ill's birds or withdrawn dying animals (birds and fish).
Promptness in this type of action is essential to avoid generating processes of bacterial contamination and the spread of disease.
Game and threatened wildlife (raptors, steppe birds, black storks, bats, aquatic birds) monitoring is conducted by a team of skilled technicians and aims to provide adequate information for proper management of habitats and their populations, and periodically evaluate the conservation status of endangered species, game and fishing, and mapping their current distribution.
The information obtained is very important to detect early decline of a species or their chances of sustainable use, and identify and give priority conservation measures to be developed. It also allows evaluating the effectiveness of conservation programs for endangered species.
This monitoring is complemented by the analysis of dispersal and wintering populations.
The spatial dispersion makes possible the genetic flow and therefore plays a key role in the structure, size and genetic variability of populations. The survey of the autumn and winter concentration areas of protected species is therefore a fundamental tool in the effective development of actions for their conservation. The potential nature of such individuals sink or areas of refuge for young and adult individuals makes them a key objective of environmental management.
In many cases these areas not only maintain local or regional population, but are also critical for foreign populations and may allow colonization or recolonization of breeding areas through the rescue effect.

THE MONITORING OF BIRDS OF PREY IN ANDALUSIA: TOWARDS A LONG-TERM ASSESSMENT OF THE CONSERVATION STATUS OF MEDITERRANEAN ECOSYSTEMS IN S SPAIN

Marcos Moleón[1], Matías de las Heras[1], José R. Garrido[1]* & Francisco Romero[2]
[1] Programa de Emergencias, Control Epidemiológico y Seguimiento de Fauna Silvestre de Andalucía, Egmasa-Consejería de Medio Ambiente, Junta de Andalucía, Spain
[2] Servicio de Geodiversidad y Biodiversidad. Consejería de Medio Ambiente, Junta de Andalucía, Spain
* Corresponding author: jrgarrido@egmasa.es

Because of their relatively high ecological requirements, raptors may serve as good indicators of the functioning of a wide number of ecological processes. The government of Andalusia (S Spain) has improved a well-established monitoring program of the birds of prey in this region which is, in terms of biodiversity, one of the richest in the Mediterranean basin. The program, designed to be maintained in the long-term, includes the monitoring of a wide variety (from the eco-

logical point of view) of species, from the more threatened ones in the region (*Aquila adalberti*, *Milvus milvus*, *Neophron percnopterus*) to several other species showing a lower level of threat (*Hieraaetus fasciatus*, *A. chrysaetos*, *Falco peregrinus*, *F. naumanni*, *Circus pygargus*, *Elanus caeruleus*, *Gyps fulvus*, *Pernis apivorus*). Through an intensive, continuous field work we have monitored (since at least 2004) the basic biological parameters for each species: census of breeding pairs, breeding parameters, number of non-adult/adult territorial birds, and census of wintering birds. We simultaneously registered changes in the environmental conditions, either 'negative' or 'positive' ones due to, respectively, human pressure and management actions. One of the main resulting conservation indicators drawn from this information is the population trend, which is put against the 'optimal' population level in the region (defined from historical and current carrying capacity data) and the population levels needed to enter in the upper and the downer threaten regional category (following IUCN criteria). This shows what is and what is not desirable to reach, so being a valuable point of reference for managers. Other specific indicators were also defined, e.g., the standardized population trend of Lesser Kestrels living in urban vs. rural areas or of Lesser Kestrel colonies in restored buildings ('good' vs. 'bad' restorations). As the main preliminary results, we highlight the positive trends of the populations of some species (*Aquila adalberti*, *Falco naumanni*, *Elanus caeruleus*, *Gyps fulvus*); the population trend of the rest of species showed certain stability. These findings are of special relevance in the case of the more endangered species. Lesser kestrels were highly dependent on the conservation status of the buildings supporting the colonies and on the kind of restoration of old such as buildings. The correction of power lines, the creation of feeding stations for scavengers, and the implementation of a strong strategy against the poisoning by the local government could partially explain the observed trends. The threaten category (and, subsequently, the required conservation efforts) of some raptor species in the region have to be re-assessed in the light of our results. New artificial colonies are yet planned to be built for lesser kestrels where their populations declined in great extent.

COMMON BIRD MONITORING SCHEMES AS A TOOL TO ESTIMATE ABSOLUTE ABUNDANCES OF BIRDS

David Palomino[1]* & Luis M. Carrascal[2]
[1] Área de Estudio y Seguimiento de Aves, SEO/BirdLife, C/ Melquiades Biencinto 34, 28053 Madrid, Spain
[2] Dept. Biodiversidad y Biología Evolutiva, Museo Nacional de Ciencias Naturales, CSIC, C/ José Gutiérrez Abascal 2, 28006 Madrid, Spain, mcnc152@mncn.csic.es
* Corresponding author: dpalomino@seo.org

Common bird monitoring schemes (CBMSs) performed at the national scale provide us with objective indicators on population trends of many species. However, although the primary objectives of these programs are relative, long-term indices on bird abundances, the huge amount of data gathered by CBMSs allows to calculate additional bird parameters of conservation concern. Here we show an example on the use of the Spanish CBMS to estimate total population figures for almost one hundred species nationwide. These values constitute a basic starting point for deepening in the objective knowledge of the threat status of widespread, but scarcely studied common species.

However, the reliability and usefulness of these estimates depend upon three basic assumptions that must be implemented in the sampling protocols and the analytical designs of CBMS:

1. It is almost inevitable to fail in detecting all of the individuals present at the sampling locations; hence, it is necessary to correct field data of each species by its detectability rate to obtain precise measures of density
2. The total area effectively sampled constitutes a tiny fraction out of the national area where the bird densities will be extrapolated; so, it is necessary to apply

weighting procedures on coverages of the main ornithological environments available
3. Calculations at the macroscales entail to admit margins of error in the estimates indicatives of their objective precision; as a consequence, rigorous and repeatable procedures on confidence intervals must be clearly stated.

Sample size in the Spanish CBMS was 12,030 point-counts, gathered along three consecutive years by volunteer-based field work. After calculating specific detectability of 95 common species, their mean abundance during the three years in 23 main environments was parameterized by means of bootstrapping methods at the 90% confidence interval. The most abundant species in Spain were: House Sparrow (163,450,000 birds), Spotless Starling (52,700,000), European Serin (35,730,000), Goldfinch (34,380,000), Common Swift (32,750,000), Crested Lark (31,450,000), Barn Swallow (29,410,000), Corn Bunting (21,800,000), Linnet (21,390,000) and Common Chaffinch (19,270,000). On the contrary, the ten more scarce species were: Wryneck (126,000 birds), Whinchat (154,000), Stock Dove (183,000), Common Redstart (188,000), Grey Wagtail (233,000), Raven (240,000), Great Spotted Cuckoo (278,000), Orphean Warbler (317,000), Common Bullfinch (339,000) and Hawfinch (340,000).

THE HELLENIC COMMON BIRD MONITORING (HCBM) SCHEME

T. Kominos*, D. Portolou, D. Markopoulou & A. Dimalexis
Hellenic Ornithological Society, BirdLife Greece, Vas. Herakleiou 24, Athens 10682, Greece
* Corresponding author:
kithironiscus@yahoo.com

The 'Hellenic Common Bird Monitoring (HCBM)' scheme that has been conducted by the Hellenic Ornithological Society, on a pilot basis, for the last 4 years (2006-2009) is a project for the monitoring of common birds' populations of Greece. Main aims of the project are to collect data of common species breeding populations and report any potential changes in them and their habitats from all over Greece and to joint the Pan-European Common Bird Monitoring (PECBMS) scheme for the development of bird indices.

The project is based entirely on volunteers, who collect data from areas of their choice, twice a year, during the breeding season of birds. The first visit should be carried out between mid April and mid May and the second between mid May and mid June. In these areas, initially, volunteers select a 10 x 10 km grid. Then, the project coordinators, randomly, select a 2 x 2 km grid, within which 15 basic and 10 alternative points are randomly selected, from were data would be collected. The habitat protocol was based on the Corine 2000 land cover types that have been also employed by many other European schemes.

In total, during the 4 years of the HCBM, 130 people applied and 99 took part in the project. Volunteers, mainly, come from the urban areas and mainland and some from islands. Most of the observers are bird-watchers, but some scientists also participate in the project. There are also participants from some Management Bodies of protected areas. The major habitat types recorded were 'farmland' and 'agroforestry' biotopes, based on the Corine land cover. The final list of birds recorded and the 3-year population trends, that are still being developed, will be available and presented soon.

TWO NEW MONITORING SCHEMES FOR BREEDING BIRDS IN THE NETHERLANDS

Maja Roodbergen*, Chris van Turnhout & Wolf Teunissen
SOVON Dutch Centre for Field Ornithology, Rijksstraatweg 178, NL-6573 DG Beek-Ubbergen, The Netherlands
* Corresponding author:
maja.roodbergen@sovon.nl

In the Netherlands, the national monitoring program for common breeding birds has been running since 1984. It is based on territory

mapping, and compromises 5-10 visits per year in fixed study plots. This method is reliable, but also time consuming and not very popular among volunteers in species poor areas, such as urban areas and large-scale, intensively managed farmland. These habitats are therefore underrepresented in the national scheme, as observers can choose their own study sites. In a densely populated country with a large area of intensive farmland and urban habitats this is a major shortcoming when calculating species trends. To tackle this problem, two new monitoring schemes have been developed, based on point counts. Point counts are less time consuming than territory mapping and therefore more attractive to observers. In the new monitoring scheme for agricultural areas, individual observations are mapped, which enables distance sampling and a more direct link with habitat. The aims and methodology of the two new monitoring schemes are discussed, and some preliminary results presented.

MINIMIZING THE THREAT TO BIRDS FROM COLLISION AND ELECTROCUTION ON MEDIUM VOLTAGE POWER LINES IN HORTOBÁGY NATIONAL PARK WITH LAYING THE MOST CRITICAL OVERHEAD CABLES UNDERGROUND, INSTALLING FIREFLIES AND INSULATING PYLONS ON THE KEY HABITATS

Szilvia Gőri*, Miklós Dudás, Gábor Tihanyi & István Kapocsi
Hortobágy National Park Directorate, 4024 Debrecen, Sumen u. 2, Hungary
* Corresponding author: gori@hnp.hu

Hortobágy is dominated by alkaline steppes representing the largest coherent grassland in Europe of natural origin, interspersed by temporary wetlands, permanent marshes, fishponds. It is one of the most important bird habitats in Europe (table 1), important stop-over site supporting masses of migrating waterfowl and waders. On autumn passage it holds the largest European concentration of Common Cranes up to 100,000 individuals. Until now 345 bird species had been recorded, and almost one third of birds of Annex I of the Birds Directive occurs in the SPA as breeder or regular visitor.

Medium voltage overhead power lines and transmission poles, however, are responsible for collisions and electrocuting masses of birds. Crossing the treeless, open landscape, the adverse effects of power lines occur in an increased degree.

After conducting a 15 years long survey, in 2003 Hortobágy National Park Directorate (HNPD) completed a study to identify the most dangerous medium voltage power line sections, and prioritized those ones which has to be laid underground to effectively minimize the threat of bird collision and electrocution. Underground cables provide 100% bird protection, but very expensive, therefore the most critical habitats had to be identified. Based on the results of the long term survey, the target habitats and species were selected, which served as a basis for project planning and conservation actions.

The EU integration opened new funding opportunities like the Environment and Energy Operational Program, and decades of collaboration with E.ON East-Hungarian Electricity Supply provided a very good basis to start large projects. In 2006-2008 with EU co-finance and financial and technical support from the electricity provider HNPD replaced 72.5 km dangerous medium voltage overhead power lines crossing the national park by underground cables. In 2010-2015 further 43 km power line will be laid underground in the Hortobágy SPA. 2,238 fireflies (rotating, fluorescent diverter) will be installed to reduce the threat of collision, this marker already proven to be successful. Dangerous pylons will be insulated along 630 km power line.

The projects serve for the protection of about 40 bird species and stop the mass loss of birds caused by collisions and electrocutions on the key habitats, hereby ensure more effective preservation of birds protected by the EU Birds Directive and contribute to the 2010 target of halting biodiversity decline.

Hortobágy National Park	Surface
Territory	82,000 ha, UNESCO World Heritage Site
SPA	110,000 ha
Biosphere Reserve	52,000 ha
Ramsar Site	32,000 ha

Table 1. *Protection of the Hortobágy National Park.*

MONITORING BIRDS WITHIN AN ARID-ZONE WETLAND AND MIGRATION BOTTLENECK, HULA VALLEY, ISRAEL: CONSERVATION AND MANAGEMENT

Zev Labinger*, Itai Shanni & Dan Alon
Society for the Protection of Nature in Israel, Tel Aviv, Israel
* Corresponding author: labinger@inter.net.il

The Hula Valley is a critical migratory stopover and wintering site in this central region of the Eastern Eurasian-African Flyway. Situated within the Great Rift Valley the area supports more than 300 species of birds, including 21 Globally Threatened species as defined by BirdLife International (IUCN, 2007) and 16 State Threatened species (Israeli Red Book 2002). In addition to over 100 resident bird species, the valley is host to a continual flux of migrating birds. An estimated 500 million birds of over 200 species pass through the Rift Valley in autumn and spring. Many of these species breed in Central and Eastern Europe and a significant portion of their entire population pass through the region. Given this amazing diversity and concentration, the conservation of birds is a high priority for regional ecosystem management. In cooperation with Keren Kayemet L'Israel (KKL), Migal Technology Center, the Nature and National Parks Authority, and the U.S. Forest Service (USFS), we have conducted full-scale avian diversity monitoring and research since 2005 within the Hula Valley with special emphasis on the newly restored Agmon Lake within. Methods include breeding bird point-counts, monthly water-bird counts, constant-effort mist-netting and species-specific censusing (e.g. Common Cranes *Grus grus*, White Pelican *Pelicanus onocrotalus*, Imperial Eagle *Aquila heliaca* and Greater Spotted Eagle *A. clanga*). The results of the past five-year monitoring effort point to the significance of conserving rare wetlands in the arid zone of the Middle East to resident, migratory, wintering and breeding birds. Of the 284 total numbers of species found during this monitoring scheme, 67 are listed as nationally or globally threatened. This is a very high proportion of rare and sensitive species. No overall trends in populations were found; however, certain migratory species show decreasing populations; whereas most resident species appear to be stable. The results are discussed in terms of a model of how bird monitoring can provide a powerful and efficient tool for determining and conserving such important habitats for biodiversity.

IMPLEMENTATION OF THE COMMON BIRD MONITORING SCHEME IN LUXEMBOURG

Gilles Biver[1]*, Lucien Hoffmann[2], Patric Lorgé[1] & Nicolas Titeux[2]
[1] Centrale Ornithologique, Lëtzebuerger Natur- a Vulleschutzliga (LNVL-BirdLife Luxembourg), 5 route de Luxembourg, L-1899 Kockelscheuer, Luxembourg
[2] Public Research Centre-Gabriel Lippmann, Department Environment and Agro-biotechnologies, 41 rue du Brill, L-4422 Belvaux, Luxembourg
* Corresponding author: col@luxnatur.lu

The Pan European Common Bird Monitoring Scheme (PECBMS) is based on the data contribution from a range of European countries and informs on the state and trends of common bird species breeding in Europe. The report from the PECBMS in 2009 demonstrates a lack of data contribution from Luxembourg to the calculation of headline bird indicators in Europe.
The government of Luxembourg decided in 2007 to consider the implementation of a national biodiversity monitoring scheme as a priority mid-term objective in order to document the changing state of biodiversity across

the wider countryside. As part of this scheme and with a financial support from the Ministry of the Environment, a common bird monitoring programme in Luxembourg (COBIMOLUX) has been developed and implemented in 2008-2009 through a close collaboration between the Public Research Centre-Gabriel Lippmann and the LNVL-BirdLife Luxembourg.

A series of 1 km-resolution sampling squares were located in Luxembourg according to a grid-based stratified random sampling strategy to ensure an appropriate coverage of the country. The stratification system was based on environmental data related to topography, soil, climate and land cover. Transects of approximately 2.5 km in length were delineated within the sampling squares and serve as a basis for data collection along walked-itineraries. A 3-year cycle of data acquisition was retained as a trade-off between the amount of available volunteer fieldworkers and an acceptable geographical coverage of Luxembourg. A small number of sampling squares were, however, randomly selected for yearly sampling in order to account for inter-annual variations in the field measurements.

In order that early and late breeders can be recorded, the sampling squares are to be visited twice a year, in early and late spring. The field method of the programme is based on a review of existing monitoring schemes in Europe and can be viewed as a simplified territory mapping procedure focusing on the visual or acoustic detection of individuals along fixed itineraries. The survey is to be conducted under predefined meteorological conditions and within 5 hours after sunrise.

The implementation of the programme in 2009 is considered as a pilot phase, which will provide the necessary information on volunteer availability to evaluate the feasibility of the programme in the long term. An online data encoding system is being developed by the National Museum of Natural History of Luxembourg and will be tested in 2010 to increase the speed of encoding and reporting.

BREEDING BIRDS POPULATION IN BYERS PENINSULA (LIVINGSTON IS, SOUTH SHETLANDS ISLANDS)

José Antonio Gil-Delgado[1]*, Jacob González-Solís[2] & Andrés Barbosa[3]

[1] Instituto Cavanilles de Biodiversidad y Biología Evolutiva, Universidad de Valencia, Spain

[2] Departamento de Biología animal, Universidad de Barcelona, Spain

[3] Departamento de Ecología Evolutiva, Museo Nacional de Ciencias Naturales, CSIC, Madrid, Spain

* Corresponding author: gild@uv.es

Data about breeding population birds in Antarctic are rare and fragmented. Further, the information is very old. For instance, the population on Antarctic Tern was estimated in 7,000 pairs on Livingston Island. To solvent the lack of data about the bird populations in Antarctic will be a challenge to carry out regular census by researchers that visit these areas. In the last expedition, 2008-2009, we tried to estimate some of the species breeding in Byers Peninsula. We applied a mixture of both the line transect and nest searching methods. Transect line were used to estimate the Antarctic Tern (*Sterna vittata*) and Kelp Gull (*Larus dominicanus*) populations. Other species as the Southern Giant Petrel (*Macronectes giganteus*) were monitorized by nest searching. Transect lines were divided in two groups. Transects along the beaches (14.42 km) and transects across the inland (17.05 km). The wide of the band was 100 m. Antarctic Tern showed similar abundances between beaches and inland. Thus, we estimated the population pooling both samples. The estimated density was 62.44 ind./km^2. Considering the Peninsula area we roughly estimate a maximum of 3,746 individuals. Kelp Gulls were found close to the beaches and we estimated a density of 269.1 ind./km^2. We estimated a population about 1,884 individuals considering the 100 m band of the beaches. Between Ocoa Point and Cerro Negro we found 238 nests of Southern Giant Petrels.

COMMON BIRD MONITORING IN UGANDA - DEVELOPING A NEW PARTICIPATORY SCHEME FOR THE FUTURE

Danaë K. Sheehan*[1], Dianah Nalwanga[2], Derek Pomeroy[3], Achilles Byaruhanga[2], Mark A. Eaton[1] & Richard D. Gregory[1]
[1] Royal Society for the Protection of Birds, Sandy, Bedfordshire, SG19 2DL, UK
[2] Nature Uganda, Plot 83 Tufnel Drive, Kamwokya, PO Box 27034, Kampala, Uganda
[3] Makerere University Institute of Environment and Natural Resources, PO Box 7298, Kampala, Uganda
* Corresponding author: danae.sheehan@rspb.org.uk

In Africa, as elsewhere in the world, many species of birds are declining and in need of more effective conservation. In Uganda, the rate of loss of biodiversity as a whole has been estimated at about 1% per year (Pomeroy *et al*., 2006): similar to the global rate (Loh *et al*., 2005). A recent review of former and current monitoring activities in Africa (RSPB, unpublished) listed 85 schemes in 13 countries, of which 69 are ongoing. Some 20 African countries are currently monitoring waterbirds, but as yet there are far fewer schemes for landbirds. Of those that are in place, the longest running is that organised from Makerere University in Uganda, with records from 1983 onwards, and by 2007, the programme had made than 950 counts, recording nearly 500 non-forest species at 39 sites. As well as being geographically dispersed, the sites were stratified in two ways - by land use (natural, pastoral and agricultural) and by original natural vegetation (forest, moist savannah, dry savannah and impeded drainage). Although counts began in 1983, regular twice-yearly counts at all sites only began in 2004.
Since 2007, and with the support of the RSPB/BirdLife International Global Wild Bird Indicator project, many of the original monitoring sites have now been incorporated into a new Common Bird Monitoring (CBM) scheme for Uganda, with increased observer participation enabling new sites to be added. Although previous counts were made using Timed Species Count methods (originally developed to cope with species-rich habitats), the new CBM scheme uses standardised line transects. Integration of the new scheme with the existing monitoring has been relatively straightforward and has presented few problems. At a sample of sites that were monitored previously using TSCs, a period of overlap has been built in whereby both old and new count methods have been used side-by-side, thus providing comparative data. Additionally, by developing the new scheme in partnership and collaboration with several conservation organisations and by engaging volunteer observers, the new CBM scheme has real prospects of long-term sustainability.
The new Ugandan CBM scheme has now been running for 2 years and is growing steadily; the scheme now conducts twice-yearly counts at around 60 sites involving many different volunteer observers. Here we report on the development of the scheme, progress so far and some preliminary results. Experience in Uganda leads us to encourage other countries to develop national CBM programmes, either by adapting or enhancing ongoing monitoring or by developing new schemes to work in collaboration with other existing monitoring programmes.

COMMON BIRD MONITORING PROJECTS IN PORTUGAL

Domingos Leitão, Ricardo Martins, Henk Feith, Joana Andrade, Ana Meirinho*, Geoff Hilton, Ricardo Ceia, Ana Isabel Fagundes, Ana Isabel Leal, Ana Teresa Marques, Carlos P. Santos, Luís Reino, Joana Santana, Alexandre Leitão, Gonçalo Elias & Iván Ramirez
Sociedade Portuguesa para o Estudo das Aves, Avenida da Liberdade 105, 2º esq, 1250-140 Lisboa, Portugal
* Corresponding author: ana.meirinho@spea.pt

SPEA runs four common bird monitoring programs in Portugal: Common Bird Census, Christmas and New Year Bird Count, Chegadas-Monitoring Spring Arrival dates

for Migratory Birds and Dias RAM-Seabird Monitoring from the Coast.

The Common Bird Census (CAC) started in 2004 by SPEA with the main goal of calculating trends of breeding bird species and to use them as an indicator of the general state of the environment. Volunteer fieldworkers are responsible for the data collection that takes place in Portuguese mainland, and Madeira and Azores archipelagos. The sample unit is the square of 10 x 10 km in which 20 point counts are monitored twice every spring. After the first years of project, the statistical procedure to calculate species trends were determined as well as the way to combine them into composite indices (only for mainland). Hence, the general Portuguese Common Bird Index, the Farmland Bird Index and Forest Bird Index were created. The data analyses showed quite stable trends in these indicators, respectively with variations of +1,7%, +2,5% and -1,3% between 2004 and 2008. Portuguese government has included the Common Bird Index in the National Strategy for the Sustainable Development 2005-2015 and the Ministry of Agriculture accepted the Farmland Bird Index as an Indicator of the National Rural Development Program 2007-2013.

The Christmas and New Year Bird Counts (CANAN) started in 2001. It is a program for monitoring wintering farmland birds in Mainland Portugal, by producing abundance indexes, updating the national estimates and improving the knowledge of wintering birds in IBAs. Voluntaries were asked to perform road transects in farmland or grassland areas, recording all birds of the following groups: herons and egrets, storks, ducks, geese, birds of prey, partridges and quails, moorhens, cranes, bustards, plovers and other waders, gulls, sandgrouses, pigeons and doves, owls, hoopoes, kingfishers, corvidae and shrikes. We are able to produce abundance indexes for eight species since 2001 and for more than 20 species since 2004.

The Spring Arrival Monitoring Project (Chegadas) started in 2003 with the compilation of arrival dates of 5 migratory breeding species, with the objective to characterize arrival dates for different districts in Portuguese mainland territory. During the following years, the number of species included in the project grew considerably, up to 70 in 2009. The project uses arrival dates sent by voluntary birdwatchers from all over the territory. Average arrival dates for 7 regions are calculated for the 18 species on yearly bases. At the moment the project team starts analysing arrival trends for eleven species with data sets sufficiently large. Preliminary results indicate a slight tendency for earlier arrival dates within the studied period (2003-2009).

Since September 2008, and through RAM (Iberian Seabird and Marine Mammal Monitoring Network) methodology, SPEA regularly surveys 4 sites at the Portuguese mainland coast. Every first Saturday of each month, during a 3-hour period in the morning, counts are performed at the same time in each point in Portugal and through the rest of the Iberian Peninsula. The data collected include number of birds per species, flight direction, other behaviour and age (for some species). These simultaneous observations using a standard methodology can provide a long term data set and can be used to provide an index of the abundance and distribution of species near the coast.

CENSUSING AT DARKNESS: THE LAUNCH OF A MONITORING SCHEME OF OWLS AND NIGHTJARS IN PORTUGAL

João E. Rabaça[1, 2]*, Rui F. Lourenço[1, 2], Ricardo Tomé[3] & Inês Roque[1, 2]

[1] LabOr-Laboratory of Ornithology, Department of Biology, University of Évora, 7002-554 Évora, Portugal

[2] Mediterranean Landscapes & Ecosystems Research Group, ICAAM, University of Évora, 7002-554 Évora, Portugal.

[3] SPEA-Portuguese Society for the Study of Birds, Av. da Liberdade 105, 2. esq, 1250-140 Lisbon, Portugal

* Corresponding author: * jrabaca@uevora.pt

Population data and trends for owls (7 species) and nightjars (2 species) in Portugal are scant and limited to a few local initiatives

and/or to a very few species (e.g. Little Owl and Eagle Owl). The lack of reliable information about these species is a critical handicap considering their importance in conservation grounds and land management plans. In order to cope with this drawback, the Working Group on Nocturnal Birds (GTAN) of SPEA in partnership with the LabOr-Laboratory of Ornithology, University of Évora, proposed a monitoring scheme of owls and nightjars in Portugal to be experimentally launched in 2010 (the kickoff year). The sampling design is expected to be as follows: using GIS methodology 20 UMT squares 10 x 10 km (we intend to increase to 40-50 in the following year) will be selected combining criteria derived from habitat representativity, species distributions and logistic constrains; in each square 5 sampling stations no less than 1.5 km apart will be established and in each station a 10 min census will be conducted in order to record all birds with a spontaneous aural (or even visual) detection. Surveys will be carried out during the 2 hours immediately after sunset and each station will be visited 3 times/year according to the following periods: 1 December-15 February, 1 March-15 May, 16 May-30 June. Although noticeably large, we must keep in mind that this time span is crucial in order to answer to phenological disparities in different species' activities. This sampling procedure is expected to be efficient for species like Little Owl, Tawny Owl, Scops Owl and also for nightjars.

Considering that for Barn Owls and Eagle Owls this general scheme will probably be ineffective, a special team will be focused in monitoring a given number of known nests of the first species and territories of the later. For Long-eared Owls, the detection of juveniles through general surveys might give some evidence on species occurrence and breeding data. Nevertheless nest monitoring seems to be an option. For Short-eared Owl, a winter visitor in Portugal, surveys for recording the number of birds in known winter refugees will be conducted.

The organization of the monitoring scheme will count with volunteers for survey work and coordination and scientific assistance will be provided by a group of expertise persons with a consistent knowledge on monitoring and biology of nocturnal species. Finally, we think that the implementation of this program will allow a direct assessment of Portuguese data with results of the Spanish NOCTUA program.

RESULTS OF A LARGE-SCALE MONITORING OF COMMON FOREST BIRD IN EUROPEAN RUSSIA

Irina M. Marova* & Ksenia V. Avilova
Subdepartment of Vertebrate Zoology, Department of Biology, Lomonosov Moscow State University, 119992 Moscow, Russia
* Corresponding author: collybita@yandex.ru

Monitoring of forest bird species appears to be a very important part of protection strategy of forest communities. About 30 million ha of boreal forests are concentrated in the European Russia. Therefore the fate of the last large areas of the forests in Europe depends on a scientific support of their protection. A long-term project "Census of common forest breeding bird species of the European Russia" started in 2006 as a development of the project "Birds of Europe 1-2 - Russia" (Mischenko, 2004). In the new project a uniform technique (line transects method) are used in bird surveying in all regions. The main aims of the project are to carry out an objective estimation of forest bird number and to estimate tendencies and reasons of the bird species changes. The project will allow to compare the species-trends with those in the other European countries. In Russia census of birds have no such old tradition, as in the Western Europe and there are no data about dynamics of even common bird species in many regions of Russia. Nevertheless, in the last some years some progress in the monitoring was achieved. The network of observers gradually extends. Representative results on the same registration units for 5-8 and more years are received for Moscow, Kaliningrad, Leningrad, Voronezh, Novgorod, Arkhangelsk and some other areas. For some species of birds it is possible to speak about trends of dynamics. So, in the

Moscow area the number of Chiffchaff is reduced during the last 10 years while the number of Robin, Song Thrush, and Greenish Warbler continues to increase. In a lot of areas the number of Wood Warbler increases during the last 10 years.

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COMMON BIRD MONITORING IN TURKEY - FIRST STEPS

Özge Balkız[1], Ferdi Akarsu[1] & José Tavares[2]*

[1] Doğa Derneği, Hürriyet Cad. 43/12 Dikmen, Ankara, Turkey, ozge.balkiz@dogadernegi.org

[2] Royal Society for the Protection of Birds, The Lodge, Sandy, Bedfordshire, SG19 2DL, UK

* Corresponding author: jose.tavares@rspb.org.uk

A pilot project to monitor common birds in Turkey was started in 2007 by Doğa Derneği (BirdLife in Turkey) and the Royal Society for the Protection of Birds (BirdLife in the UK), with the main goal of developing common bird monitoring capacity in this country. The medium term goal of the project is to establish a fully-fledged and widespread common bird monitoring scheme that will allow to calculate trends of common breeding bird species and use them as an indicator of the general state of nature in Turkey.

In the pilot project up to 15 volunteer field-workers surveyed max. 15 squares per year in a total of 6 regions in Turkey, across the country, since 2007. Sampling units are squares of 1 x 1 km, monitored twice during spring/summer - volunteers record birds while walking a transect through it.

A total of 111 species were detected in the survey during these last 3 years - but most visits average only 16-20 species. House Sparrow (*Passer domesticus*) was the most abundant species recorded in all years, while Swallow (*Hirundo rustica*) was the species seen most frequently.

Training workshops were held for volunteers. The project will continue in the future, aiming to increase significantly the geographical extent of the surveys and the number of squares covered.

METHODS: Tools and Strategies for Monitoring and Modelling

APPLICATION OF NICHE-BASED MODELLING TECHNIQUES TO LONG-TERM COMMON BIRD MONITORING DATA

Olatz Aizpurua[1, 3]*, Lucien Hoffmann[1], Lluís Brotons[2], Jean-Yves Paquet[4] & Nicolas Titeux[1]

[1] Centre de Recherche Public-Gabriel Lippmann, Département Environnement et Agro-biotechnologies, 41 rue du Brill, L-4422 Belvaux, Luxembourg

[2] Centre Tecnològic Forestal de Catalunya, Àrea de Biodiversitat, Crta. de Sant Llorenç de Morunys, km 2 (dir. Port del Comte), 25280 Solsona, Spain

[3] Universitat de Lleida, 1 Plaça de Víctor Siurana, 25003 Lleida, Spain

[4] Aves-Natagora, Département Études, Rue du Wisconsin 3, B-5000 Namur, Belgium

* Corresponding author: aizpurua@lippmann.lu

The implementation of common bird monitoring schemes in an increasing number of European countries provides us with a great deal of spatial data that could be used for mapping species distributions. Those schemes are repeated on a regular basis over time and could therefore constitute an appropriate source of data to periodically update species distributions at large spatial scales. However, the information gathered in small and geographically scattered sampling locations is not readily usable to map the distribution of species in a continuous way across the regions of interest. In addition, the collection of data can be spatially biased because the monitoring schemes rely on volunteer participation to a large extent. Coupling those programs with niche-based modelling of species distributions offers the opportunity of

building those continuous maps. In a PhD project using datasets from Catalonia (Spain), Wallonia (Belgium) and Luxembourg, we address the relevance of coupling bird monitoring data with GIS-layers representing environmental conditions through niche-based modelling of species distribution in order to derive habitat suitability maps for farmland birds. In those countries, bird species occurrence and abundance data have been collected according to a variety of survey methodologies applied simultaneously or successively over time, i.e. walked itineraries, point counts or territory mapping. Depending on the country, these schemes have been running for a long time or have been implemented only recently. We propose a methodology to evaluate the relevance of coupling monitoring and modelling approaches through the use of parameters related to the reproductive performance of the species, because these parameters are the ultimate indicators of habitat suitability. The evaluation procedures will be performed either on the basis of direct measures of reproductive performance collected in the field for a conservation-interest species (*Lanius collurio* in Wallonia and Luxembourg) or with indirect measures of reproductive performance from a Constant Effort Site (CES) programme (Catalonia). CES-programmes have proven to yield valuable data on reproduction rates of several small passerine species. Those measures will be confronted to the patterns of habitat suitability revealed by the niche-based models to ultimately evaluate their relevance.

MODELLING ABUNDANCE OF SEABIRD BY-CATCH IN THE SPANISH MEDITERRANEAN LONGLINE FISHERY

Salvador García-Barcelona[1], David Macías[1], Enrique Alot[1], Alba Estrada[2]*, Raimundo Real[3] & José C. Báez[1]

[1] Instituto Español de Oceanografia, Centro Oceanográfico de Málaga, Puerto Pesquero Fuengirola, Málaga, Spain

[2] Instituto de Investigación en Recursos Cinegéticos (IREC), CSIC-UCLM-JCCM, Ronda de Toledo s/n, 13071 Ciudad Real, Spain

[3] Universidad de Málaga, Departamento de Biología Animal, 29071 Málaga, Spain

* Corresponding author: alba.estrada@uclm.es

Longline fisheries are the most critical global threat to seabird, mainly Procellariiformes. The Western Mediterranean Sea is an important fishing area where the Spanish drifting longline fisheries targeting swordfish, bluefin tuna and albacore operates. By-catch of these fisheries includes several seabird species: *Larus michahellis* (37.4% of seabird by-catches), *Calonectris diomedea* (36.8%), *Puffinus* sp. (1.1%), *Morus bassanus* (15.4%), *Phalacrocorax* sp. (2.7%), *Larus audouinii* (0.5%), and *Catharacta skua* (0.5%).

Understanding factors that determine seabird by-catch, and how they could be managed, is a major goal in seabird conservation biology. In this context, the main aim of our study was to model the abundance and distribution data of seabird by-catch recorded by an onboard observer program of the Spanish Institute of Oceanography (IEO) monitoring commercial Spanish Mediterranean longline fisheries.

In this paper we model the effects of the interaction with others fisheries on seabird by-catch. These interactions were estimated using non-working days as predictor variable, because Spanish normative forbids any vessel but longliners to operate in non-working days. Only those metiers with seabird by-catch were used in the study. Binary logistic regression was performed to assess the probability of catching a seabird during a fishing operation in function of the predictor variable. Model goodness-of-fit was assessed by means of an omnibus test for model coefficients. In addition, the discrimination capacity of the model (trade-off between sensitivity and specificity) was evaluated with the area under the receiving operating characteristic (ROC) curve. The relative importance of the variable within the model was quantified using the Wald parameter.

A total of 2,277 fishing operations were observed from January to December, during the years 2000 to 2008, which represent 4,786,466 hooks controlled directly, with 182 seabirds by-caught in 74 fishing operations.

We obtained a statistically significant logistic model with the probability of catching a bird increasing in non-working days (Wald = 17.921, d.f. = 1, p = 0.001). The model's goodness-of fit-was significant (Omnibus test = 17.571, d.f. = 1, p = 0.001), and its discrimination capacity was moderate (AUC = 0.619).

PREDICTIVE MODELLING INDICATES EXTREME NATIONWIDE FRAGMENTATION OF SUITABLE NESTING HABITATS OF ENDANGERED RAPTORS

Suvi Ponnikas[1]*, Riikka Hannila[1], Markku Orell[1] & Miska Luoto[2]
[1] University of Oulu, Finland
[2] University of Helsinki, Finland
* Corresponding author: suvi.ponnikas@oulu.fi

Habitat suitability modelling (HSM) provides an invaluable approach in conservation biology by helping to determine species' habitat requirements and the amount and structure of the suitable habitat. This knowledge can form basis for protection planning and management of endangered species. Instead of traditional bird atlas approach, we used the explicit observed nestings from nationwide monitoring data together with 14 explanatory variables from 5 environmental factor groups (climate, topography, land cover, human impact and connectivity) to model the distribution of two endangered raptors Golden Eagle (*Aquila chrysaetos*) and Peregrine Falcon (*Falco peregrinus*) in Finland. The modelling was done in hierarchical manner with Maxent-algorithm in 2 x 2 km resolution. The predictive maps revealed strongly fragmented structure in the potential suitable nesting habitat for both raptors. Examining the study species' habitat requirements, we found that the Golden Eagle avoids strongly human altered landscape and favours topographically variable coniferous forests. The distribution of the Peregrine Falcon is most correlated with open peatlands and their connectivity. Our results highlight the importance to protect the remaining unprotected habitats for both study raptors to ensure the long-term survival of the populations in the area. From methodological point of view, inclusion of land cover variables revealed the extreme fragmentation in suitable nesting habitat for both species. Thus, ignoring land cover information would have had resulted in less accurate predictions of the amount and structure of the suitable nesting habitat. Our results also emphasize the importance of long-term monitoring of endangered species as it can result in confident results in HSM and thus give insights to factors affecting populations' survival in the long-term.

USING GIS AND MODELLING TOOLS HELPS MEETING POLICY AIMS: SPAs IN THE BASQUE COUNTRY, SPAIN

José María Fernández* & Mikel Gurrutxaga
IKT SA, Granja Modelo s/n, 01192 Arkaute, Álava, Spain
* Corresponding author: jfernandez@ikt.es

Special Protection Areas (SPAs) are classified by EU member states to implement habitat conservation in relation to bird species listed in Annex I of Birds Directive 79/409/EEC. In the Basque Country (Northern Spain), the SPA network was established in year 2000, and individual SPAs were selected and delimited based on expert judgement and, sometimes, incomplete data on species distribution and abundance.
To know the degree of coverage provided by this SPA network in relation to potential breeding habitats for several target species, ecological niche models were performed using MaxEnt. Results showed better coverage for species with restricted range at regional level (Golden Eagle and Eagle Owl) than for those dispersed (Egyptian Vulture and Peregrine Falcon).
Then, particular focus was set on SPA ES0000246. Niche models identified three areas proposed for inclusion in this SPA, having spatial connectivity and high probability of species' occurrence. As for home ranges coverage, we used average distance among centres of territories and G analysis to test for regular spacing. Peregrine Falcon

home ranges were mainly inside SPA ES000246; on the contrary, Golden Eagle's were insufficiently covered. We also quantified length of borders among shrub, pasture and agriculture lands inside and outside SPA ES0000246 limits, in order to test if current design of this SPA was protecting the most suitable feeding areas for target species. We used this variable as a surrogate for Red-legged Partridge and Rabbit abundance, the most important prey species in the study area. We concluded that a small extension of SPA boundaries would result in a higher increase of prey-rich ecotones and improved meeting of conservation objectives. Finally, quality of habitats for Turtle Dove was assessed by means of simple and logistic regression between abundance in the study area and structural variables. In this case, an extension of boundaries would not increase the amount of preferred, suitable habitats for this species.
Overall, GIS supported data and modelling techniques, applied in a practical and politically meaningful context, were useful to detect and propose spatial adjustments in SPAs, so that conservation mandatory from Birds Directive is better achieved. In the absence of precise data on spatial ecology of target species, these procedures allow less biased designs.

IDENTIFICATION OF FAVOURABLE AREAS FOR THE POTENTIAL EXPANSION OF THE LONG-LEGGED BUZZARD (*BUTEO RUFINUS CIRTENSIS*) IN ANDALUSIA

Antonio Román Muñoz*, Javier Elorriaga & Alejandro Onrubia
Fundación Migres, Huerta Grande, Pelayo, Algeciras, 11390 Cádiz, Spain
* Corresponding author: roman@fundacionmigres.org

Knowledge of the spatial organization and distribution of species is essential to manage their populations. In the case of the Long-legged Buzzard (*Buteo rufinus cirtensis*), an African taxon that has first bred in Europe in 2009, the interest lies in knowing whether this is an isolated breeding event or the starting of a future colonization process and dispersal in Europe, like other African species such as the Black-shouldered Kite (*Elanus caeruleus*), the White-rumped Swift (*Apus caffer*) or the Little Swift (*Apus affinis*), which already have well established breeding populations.
In this study we determine favourable areas for the species in Andalusia to account for its current distribution and predict its future course according to its potential range. We have applied a favourability function (which is independent of the initial proportion of presences and absences), based on Generalized Linear Models (GLM), on the current distribution of the species and on a set of 34 variables related to climate, topography, human activity, vegetation and spatial situation. Based on the predictive model we have built an explanatory model that includes 4 variables related to spatial situation, climate, and vegetation. It correctly classified 100% of the UTM grids. We calculated the factor of expected change in the distribution of presences and it predicts an increase of available grids for the species not yet occupied.
Monitoring the progress of these new populations becomes an excellent tool to study the effects of the global warming process on species distribution ranges, being the Strait of Gibraltar an area of great interest given its strategic geographical location.

TELEMETRY OF THE BOREAL OWL (*AEGOLIUS FUNEREUS*) IN FORESTS SEVERELY DAMAGED BY AIR POLLUTION IN THE ORE MOUNTAINS, CZECH REPUBLIC

Marek Kouba, Václav Tomášek, Karel Šťastný*, Markéta Zárybnická & Michael Griesser
Department of Ecology, Faculty of Environmental Sciences, Czech University of Life Sciences Prague, Kamýcká 129, CZ-165 21 Praha 6 - Suchdol, Czech Republic
* Corresponding author: stastny@fzp.czu.cz

During the breeding seasons 2006-2008 totally 14 Boreal Owl (*Aegolius funereus*) males were caught, equipped with tail-

mounted transmitters and tracked by VHF telemetry. Individuals were tracked around the water reservoir Fláje in the Ore Mountains in order to determine the home range size of males during the nesting period (May-July). This mountain range was deeply damaged by air-pollution calamity at the end of the 1970s when most of coniferous stands above the altitude of 500 m died and, therefore, most of natural nesting holes were lost. To compensate for the lack of natural tree cavities, 159 Boreal Owl nestboxes were installed successively since 1999.

The data collection was made by using radio receivers AOR 8000 and Yupiter connected with three-element Yagi antennas. Locations of nocturnal hunting were gained by triangulation. Consequently, a normal distribution of all gained data files of hunting was tested in the Biotas 1.03 programme using the Poisson Chi-squared test. In all cases, a non-random pattern of space distribution of the data-sets was indicated (Poisson χ^2 test = 10.8-108.9, n = 10, $p < 0.005$). Individual hunting home ranges (n = 10) were based on 128 ± 26 (± standard deviation) locations on average. Average size of hunting home range within nesting season was counted as follows: 187 ± 49 ha (median = 171 ha) according to 90% Kernel density estimator (KDE), 231 ± 61 ha (= 216 ha) in case of 95% KDE and 226 ± 66 ha (= 226 ha) according to minimum convex polygon (MCP). Fixed KDE with smoothing parameter LSCV was used. The area used by males each night (n = 50) estimated with MCP was 85 ± 51 ha (= 76 ha) on average and the ranges of those nights were based on 26 ± 6 locations on average. Hunting individuals were found out in distance of 627 ± 303 m (= 588 m) from their nestboxes on average and the average of maximum distances was 1,218 ± 393 m (= 1,186 m). The monitoring took place each night 5.7 ± 1.4 hours on average. The evaluation of the forest stands structure of individual home ranges showed that males hunted especially in open canopy of Blue Spruce stands (*Picea pungens*), the tree species used for the economic restoration of forests.

Locations of diurnal roosts were gained directly by finding roosting males or by triangulation. The individual daytime resting ranges (n = 13) were based on 16 ± 7 locations on average. The average size of a daytime resting range within the nesting season was counted according to MCP on 53 ± 59 ha (= 27 ha). The roosting individuals were found out in a distance of 626 ± 231 m (= 583 m) from their nestboxes on average, the average of minimum distances was 277 ± 354 m (= 128 m) and the maximum was 1,014 ± 391 m (= 1,141 m). The overlap of the foraging and resting MCP ranges was 29 ± 25% (= 20%) on average. By homing in roosting males it was found out that they nearly always (88% of all cases) chose the oldest Norway Spruce stands (*Picea abies*), rests of which are available in the study area. Mean roosting height was 3.9 ± 1.7 m.

THE DEVELOPMENT AND USE OF A METHOD TO FILL TIME GAPS IN MIGRATION COUNTS

María Mateos[1]*, Gonzalo M. Arroyo[1, 2] & Len Thomas[3]

[1] Biology Department, Faculty of Marine and Environmental Sciences, University of Cádiz, Av. República Saharaui s/n, 11510 Puerto Real, Cádiz, Spain

[2] Fundación Migres, Complejo Huerta Grande, 11390 Pelayo, Algeciras, Cádiz, Spain

[3] Centre for Research into Ecological and Environmental Modelling, University of St Andrews, The Observatory, Buchanan Gardens, Fife KY169LZ, UK

* Corresponding author: maria.mateos@uca.es

In some conservation situations, there is a need to obtain accurate estimates of numbers of migrants passing a specific site, such as sites for proposed off-shore wind farms. Migration counts from strategically located coast-based points can potentially be a reliable and effective method to reach this goal. A consistent and statistically robust method is proposed for estimating migratory passage, by estimating numbers of birds passing during count gaps (periods were counts are interrupted), using GAM modelling. This procedure has the advantage of considering covariates, such as date and wind, into the model.

Additionally, reliable measures of estimating precision are provided, based on a nonparametric bootstrap.
The results of the application of this method to the data set of three species of seabirds during autumn migration across the Strait of Gibraltar (mid-October to mid-November) have revealed net migratory passage that equal or even surpass the total population estimates of these species in the Mediterranean, particularly in both Cory's and Balearic shearwaters. These results have important implications in conservation and highlight the necessity of urgently recalculate the global population estimates of these two threatened species.
Potential sources of biases are discussed, mainly concerning the constraint of detection due to distance. We also recommend adjusting monitoring period to the main migratory time of the different species, in order to avoid the possibility of double counting due to local movements. Finally, conservative strategies are suggested when imputing values to the count gaps, in order to avoid overestimates of the migratory passage.

MONITORING HOUSE MARTIN DELICHON URBICUM NESTS IN CATALONIA

Anna Dalmau[1]*, Sergi Herrando[1] & Miquel Rafa[2]
[1] Catalan Ornithological Institute, Museu de Ciències Naturals de la Ciutadella, Passeig Picasso s/n, 08003, Barcelona, Catalonia, Spain
[2] Caixa Catalunya's Social Work, Environmental Area, Provença 261-265, 08008 Barcelona, Catalonia, Spain
* Corresponding author: ico@orenetes.cat

The House Martin Project ('Projecte Orenetes') is a monitoring scheme of the House Martin (*Delichon urbicum*) nests of the villages and cities of Catalonia based on the participation of hundreds of enthusiastic citizens, schools and local organizations. This project was launched in 2007 by Caixa Catalunya's Social Work and it is coordinated by the Catalan Ornithological Institute. From the very beginning it has two distinct objectives: (1) to aware the citizenship of the value of their urban environment, and (2) to improve the knowledge of the species population in Catalonia, and in particular those aspects related to its spatial and temporal dynamics and its association with environmental changes. The project ultimately attempts to describe conservation measures for more suitable management and protection for the species.
The field methodology is based on an easy survey of nests along the streets of villages and cities. The minimum sampling unit consists in a 100 x 100 m UTM square, although each participant includes as many of these squares as he or she wishes. The standardised census of the entire sampling units independently of the presence or absence of the species' nests represents an essential requirement of this project in order to minimise temporal biases in nest detection. Within each detected colony, observers collect data on the address where it is placed (street and number), type and characteristics of the building (house, industrial plant, etc.), situation of the colony, and nest features (total number of nests, proportion of occupied, under construction, etc.). Surveys are managed by means of a data base through the website www.orenetes.cat, where the observers enter directly their data.
This information has proved to be a powerful tool to generate an accurate cartography of House Martin colonies in Catalonia. Fieldwork started 3 years ago and we are just starting to analyze yearly population changes. One of the applications of the project is related with the urban planning. For instance, the cartography elaborated by the project is a source of data to be taken into account when giving licenses of building restoration. Finally, it should be stressed the importance of a project based on an easily studied bird species for environmental educational purposes, as shown by the number of primary and secondary schools that have incorporated it in their current activities.

NEST COUNTS OF BARN SWALLOWS (*HIRUNDO RUSTICA*) AND HOUSE MARTINS (*DELICHON URBICA*) IN CENTRAL GERMANY (METROPOLITAN AREA HANNOVER-BRAUNSCHWEIG-SALZGITTER) AS A TOOL OF MONITORING THEIR ACTUAL POPULATION AND FRAGILE CONSERVATION STATUS

Hans Oelke
Friedrich-Blumenbach-Institut of Zoology and Anthropology, Göttingen University, Berliner Str. 28, D-378073 Göttingen, Germany
Hans.oelke@htp-tel.de

In a 5 year interval starting in 1961, nest counts of swallows have been used for surveying the swallow population of a then normal country-side (approx. 800 square km) between the cities of Hannover and Braunschweig. The last session (2006, survey no. 10) was favoured by strong site tenacity in the nesting sites. So nest and breeding success counts were a helpful tool for the author to control approx. 100 settlements (human population approx. 80,000). Two major long-term developments of swallow populations came up: the end of the long-time decrease of Barn Swallows and the now impressing decrease of House Martins. Just the opposite of the former results, i.e. decrease in *Hirundo rustica* and increase in *Delichon urbicum*. Some main reasons, behavioural changes (fashions) to keep horses and the end of dynamic, peripheral housing constructions due to economic depression and even nest destructions in many varieties are presented and discussed.

A SIMPLE METHOD TO ASSESS DISTANCE-RELATED BIASES ON COUNTS FOR BIRD SURVEYS

Yves Bas*, Romain Julliard & Frédéric Jiguet
Muséum National d'Histoire Naturelle, UMR 7204 MNHN-CNRS-UPMC, Conservation des Espèces, Restauration et Suivi des Populations, CP 51, 55 Rue Buffon, 75005 Paris, France
* Corresponding author: ybas@mnhn.fr

Methods for estimating probability of detection have recently proliferated. However, they entail disproportionate sampling intensity and force ecologists to study only a few species or to sample only a few sites. Moreover, most of these methods seem unable to correct widespread distance-related biases. In this context, the present study proposes a simple and widely applicable method to measure and correct such biases. The principle is to analyse variations of the ratio between close detections and distant detections against the ecological factor of interest. We tested this method on auditory counts of song birds in forests of western France. We then assessed on these counts the possible bias produced by spatial variations in vegetation density. Understorey cover had a strong effect on birds song detectability, reducing the probability of a contact to be distant (beyond 50 m from the observer) from 0.7 for sparse understorey to less than 0.5 for dense understorey.
This analysis shows good evidence of distance-related biases in counts and we give further indications about how to correct the revealed biases in an ecological study. More generally, this article provides a widely applicable method to deal with heterogeneity in detectability in bird visual and auditory counts, whereas previous approaches seem to fail to correct distance-related biases. We emphasize that the method proposed here does not need any within-site replication, and thus allows ornithologists to reallocate their sampling effort to more sites.

BIAS IN LARGE SCALE BIRD MONITORING SCHEMES: OBSERVER ERROR ASSOCIATED TO BAND ALLOCATION IN STRIP LINE TRANSECTS

Natàlia J. Pérez, Javier Quesada*, Santi Guallar, Joan Estrada & Sergi Herrando
Catalan Ornithological Institute, Museu de Ciències Naturals de la Ciutadella, Passeig Picasso s/n, 08003 Barcelona, Catalonia, Spain
* Corresponding author: analisi@ornitologia.org

Distance sampling constitutes one of the most widely used methods for analysing bird detectability in large scale monitoring schemes. In order to apply distance sampling procedures to transect censuses, it is required to estimate the distance from detected birds to the line transect or to the observer. As exact distances are not measured with range-finders in large scale monitoring schemes but are left to the observer estimation, distance sampling depends directly on the observer skills to spatially allocate detections. However, the possible bias associated to the observer has been rarely assessed in monitoring schemes. This is a very important issue, as monitoring schemes are employed to ascertain the trends in the abundance of common birds and are crucial in the framework of atlases for estimating species densities and population sizes. Thus, our aim was to assess the error made by the observers when estimating distances in bird censuses.

We used data from the Catalan Common Bird Survey (SOCC), a monitoring scheme where the observer has to record and count all the species detected and allocate them into one of three distance categories (0-25 m, 25-100 m, >100 m). To assess the observer error in band allocation in the SOCC, we evaluated a randomly selected sample of 30 participants of the programme. We did this evaluation in 30 different sites so that the places represent the spatial and habitat heterogeneity of the SOCC. The evaluation consisted in a test of precision of distance estimation in which every observer had to identify and allocate to a band five static objects plus fifteen birds (aurally or visually) along the transect that he or she regularly censuses. From the point from which the observer detected those, the evaluator measured the real distance with a laser range-finder.

The results indicate that the error increases as the distance from the bands to the axis of the line transect increases. The observer tends to move both the 25-meter band a few centimetres away and to move the 100-band a few meters closer for both visual object and hearing detections (less than 1 m and 3 m, respectively). Nevertheless, we found significant differences between observers and a great variability in error estimates with a maximum error of 63 m.

Bias in band allocation may help improving density estimation in monitoring schemes. Although the observer error was quite small at large scale, this effect may be more relevant as monitoring objectives require smaller scales ought to the great amount of variability found between observers. We propose that future monitoring schemes based on the line transect method implement observer bias in order to improve their outputs.

A SHORTCUT TO OBTAIN RELIABLE ESTIMATIONS OF DETECTABILITY IN EXTENSIVE MULTISPECIFIC CENSUS PROGRAMS

Luis M. Carrascal[1]*, Javier Seoane[2] & Vicente Polo[3]

[1] Dept. Biodiversity and Evolutionary Biology, Museo Nacional de Ciencias Naturales, CSIC, Madrid, Spain

[2] Dep. Ecología, Univ. Autónoma, Madrid, Spain

3 Univ. Rey Juan Carlos, Getafe, Madrid

* Corresponding author: lmcarrascal@mncn.csic.es

Obtaining reliable estimates of animal abundance and density in field studies is a main concern for ecologists and conservation biologists, who often use distance-based sampling methods that rely on measuring distances to contacts accurately. These methods calculate the effective strip width (ESW), which is the distance within one can assume is doing a complete census (vs. a sampling). However, when the study is aimed at an assemblage of numerous species and the field work is collaborative - thus involving a lot of people with different degree of expertise - measuring exact distances to each contact is unfeasible.

Here we propose a new method for the estimation of ESW to estimate absolute densities, based upon geometric properties of distributions describing distances to bird contacts in line transects: the threshold method with a fixed belt *d*. We compare the results provided by this method with those obtained by con-

ventional distance sampling, estimated with Distance software.

There exists a strong linear relationship between the ratio *d/p(d)* and the ESW, being *d* the threshold distance and *p(d)* the proportion of contacts detected within that threshold (ESW = d/p(d); $R^2 > 0.99$ for *d* = 5, 10, 25, 50 and 100 m, and given that *p(d)* < 0.975). The addition of a term *t* obtained after the integration of distribution functions provide perfect predictions of the ESW (ESW = d/p(d) + *t*), especially when using large threshold distances *d* and large *p(d)* proportions >0.5. The equations for two common thresholds distances are:

$$d = 25 \text{ m}, ESW = [25/p(25)] + 1 / (0.549 - 0.0802 \cdot [25/p(25)]^{0.639})$$

$$d = 50 \text{ m}, ESW = [50/p(50)] + 1 / (0.158 - 0.0110 \cdot [50/p(50)]^{0.758})$$

Using six virtual species whose distance distributions were generated using known theoretic distributions (detection distances ranging from 50 to 251 m), both the threshold method with a fixed belt, and the Distance approach, produce very accurate ESW estimations. However, Distance figures have narrower confidence intervals for more detectable species.

The relationship between the estimates of ESW using the approach implemented by Distance and the threshold method with a fixed belt of 25 m was further analyzed with 46 bird species censused in different environments (arid habitats and pinewoods in three sites; sample sizes ranging from 30 to 3,000 contacts, and maximum detection distances of 45 to 400 m). Both estimations of ESW distances were highly correlated (R^2 = 94.4%) and very similar (non-significant differences, p = 0.911), although confidence intervals of estimates are wider with the threshold method at sample sizes under 75 contacts.

WINTER CENSUS OF GREAT CORMORANT IN SLOVAKIA IN 2005-2007 (*PHALACROCORAX CARBO*) - COMPARISON OF EFFECTIVENESS OF CENSUS AT ROOSTING SITES AND CENSUS DURING DAY IN THE FRAMEWORK OF THE INTERNATIONAL WATERBIRD CENSUS

Jozef Ridzoň
Katedra Zoologie, PřF UK, Viničná 7, Praha 2, CZ-128 44, Check Republic
ridzon@vtaky.sk

Winter waterbird census is realized in mid-January since 1991. Practical use of this census increased since the mid of 1990s, when numbers of Great Cormorant started to increase. Numbers from census were used for estimates of real impact of cormorants on ecosystems and fish industry.

Different numbers of wintering cormorants were published by angler organizations. Therefore Slovak Ornithological Society/BirdLife Slovakia, Slovak Angling Association and State Nature Conservancy of Slovak Republic started to organize common census of Great Cormorant at roosting sites. Common census at all Slovak roosting sites should prevent double registrations and unite different numbers published by particular organizations.

Nevertheless SOS/BirdLife Slovakia continued in independent waterbird census, which did not include results from roosting sites. Only numbers gathered in framework of the International Waterbird Census during the day were included into this census. More than 300 volunteers counted in the framework of this census together 2,634 km of rivers and streams in January 2005. The largest rivers like Dunaj, Morava, Váh, Hron and others, were counted in their whole length and in this way were monitored almost all localities with occurrence of Great Cormorant. Length of counted section in the years 2006 and 2007 was similar.

Census of Great Cormorant at roosting sites covered almost whole population too and this allows us comparison of effectiveness of

particular methods and that census at evening at roosting sites with census during the day at rivers and lakes.
In January 2005 we counted 7,521-8,436 ind. at roosting sites, in January 2006 7,669-9,224 ind. and in January 2007 5,991-6,493 ind. Together 106 roosting sites were monitored.
During the International Waterbird Census in January 2005 were counted 9,378 ind. of cormorants, in January 2006 7,424 ind. and in January 2007 5,523 ind.
In this way we counted 11% of cormorants more during the census in framework of the International Waterbird Census in January 2005 than during the census at roosting sites. In January 2006 we counted 3% less at rivers during the daily census than at roosting sites and in January 2007 we counted 8% less during the daily census than at roosting sites.
Such comparison shows that census at roosting sites is not necessary in the following years. If coverage of the main rivers has not significant gaps, than the International Waterbird Census is sufficient for gathering of reliable data.

BRINGING LIGHT TO REMNANTS OF RIPARIAN AREAS IN RICE FIELD CHANNELS: A COMBINED APPLICATION OF LINEAR TRANSECTS AND THE MAPPING METHOD

Carlos Godinho [1, 2]*, Pedro Pereira[1, 2] & João E. Rabaça[1, 2]
[1] LabOr-Laboratory of Ornithology, Department of Biology, University of Évora, 7002-554 Évora, Portugal
[2] Mediterranean Landscapes & Ecosystems Research Group, ICAAM, University of Évora, 7002-554 Évora, Portugal
* Corresponding author: capg@uevora.pt

The importance of rice fields for bird conservation has been subject of several studies, mainly focused in core areas as habitat for waterbirds. However, significant parts of the rice field structure, like the irrigation channels that control the water level, are often neglected. These corridor-like areas are frequently characterized by the presence of riparian vegetation like willows and ashes or wetland vegetation like reedmace or common reedbeds. In order to assess the importance of these landscape features, two rice fields in the western part of Portugal were surveyed during the 2009 breeding season. The main goal was to assess the breeding bird community of these areas. We used a combination of linear transects and mapping method, recording only the singing males. Between middle April and the end of July, 4 transects in each rice field (A and B) were surveyed by two observers with similar skills in bird identification. Transects must have been surveyed at least three times to be included in the analysis. Average length of transects was 1,627 ± 173 m in plot A and 2,145 ± 125 m in plot B, and the time spent in each transect was in average 35 ± 4.43 min. Three species usually associated to different features in these habitats were selected: *Acrocephalus arundinaceus* (reedbeds), *Cettia cetti* (riparian galleries) and *Luscinia megarhynchos* (shrubby patches). Results were as follows (territories/km): plot A: *Cettia cetti* 3.0, *Acrocephalus arundinaceus* 1.7, *Luscinia megarhynchos* 1.7; plot B: *Cettia cetti* 4.0, *Acrocephalus arundinaceus* 1.4, *Luscinia megarhynchos* 2.1. Other recorded species were *Sylvia atricapilla*, *Phylloscopus ibericus* and *Hippolais polyglotta*. The channels are also used as refuge, feeding or breeding grounds by *Ardea purpurea*, *Ixobrychus minutus*, *Egretta garzetta*, *Gallinula chloropus* and *Rallus aquaticus*. When available, the heterogeneity of vegetation in the channels allows the occurrence of a rich bird community. This must be taken into account when establishing sustainable management actions for these corridors, since that may act as surrogate habitat for the loss of riparian galleries. The combined methodology reveals to be practical and expedite in recording the bird community associated to rice field channels, provided that they are linear structures, often parallel to roads. The rice plots revealed to be excellent reference points to map the species. This is a methodology that can be implemented through time, allowing the assessment of changes in bird communities along the breeding season and between years, and also corre-

lated to inter-annual rice agricultural practices.

IDENTIFICATION METHODS FOR EUROPEAN REED WARBLERS (*ACROCEPHALUS SCIRPACEUS*) IN EASTERN ROMANIA

Emanuel Baltag* & Constantin Ion
Faculty of Biology, 'Alexandru Ioan Cuza' University of Iasi, Carol I Avenue no. 11, 700506, Romania
* Corresponding author:
baltag.emanuel@gmail.com

It is frequently difficult to separate Reed Warbler (*Acrocephalus scirpaceus*) from Marsh Warbler (*A. palustris*), especially for Eastern Europe populations, where we can find more overlaps between plumage and bare part coloration and between measurement criteria (Wilson *et al*., 2001). In published literature we can find more biometric methods to separate these two species, but not all of them can be applied on Eastern Romanian migratory and breeding population, because these methods were conceived for the Western Europe population.
We analyze the biometric measurements of 189 individuals of Reed Warbler, which were collected in 2009 from 3 locations from Eastern Romania: Larga Jijia (47.36 N, 27.35 E), Cârja (46.19 N, 28.11 E) and Fortuna Lake, Danube Delta (45.20 N, 29.11 E).
Using the Leisler's method (Leisler, 1972) we obtained the best results, the percentage of identification of adult and juvenile individuals being 100%. With the Walinder method (Svensson, 1992), the percentage of identification was 34.38%, while the notch length measurement (notch on 2nd primary; Svensson, 1992) had as result a percentage of identification of 53.72%; using the notch/wing ratio calculation (Walinder *et al*., 1988), the percentage of identification was 88.89%.
Working with the biometric index (Wilson *et al*., 2001) we obtained the 100% rate of identification, but only after we invalidated the individuals with worn or recently changed feathers. The biometric index is: (hind claw length x notch length x bill-to-skull) / (wing length x wing-tip to first secondary x bill width).
Given the results obtained through Leisler's method, together with its suitability in any period of the year because of the invariable trait it uses (the inner foot span), we recommend the application of this method for the identification of Eastern Reed Warbler populations.
Comparing the biometric measurements of Eastern Europe population (in which we also included our data) with those from Western Europe, we obtained higher values (1-2 mm) for the first one in some biometrics: total length, wing length, tail length and tarsus length. The Eastern Europe individuals of Reed Warbler have bigger values of total length, wing length and tail length, because they cover longer distances in migration.
Also, comparing the biometric measurements of male individuals with female individuals, we found higher values (1-2 mm) for total length, wing length, length of 3rd primary and tail length, but this method is not effective in separating male from female individuals. For the other biometric measurements (tarsus length, tarsus width, bill-to-skull, bill-to-feathers, bill width, bill depth and notch length), the results are almost the same for both genders.

PARTICULAR SPECIES: Case Studies on Population Trends

DEMOGRAPHICS OF THE BONELLI'S EAGLE POPULATION IN CYPRUS

Nicolaos Kassinis
lemesos.thira@cytanet.com.cy

The Bonelli's Eagle (*Hieraaetus fasciatus*) is the only eagle species that breeds in Cyprus since the extinction of the Imperial Eagle (*Aquila heliaca*) as a breeding bird in the 1980s. It resides in mountainous terrain, nests mostly at forest edge but usually hunts in

more open areas. Immature eagles during dispersal tend to hunt in lowland maquis and agricultural areas where prey is more abundant and more easily obtainable there. Also, a few, mostly immature migratory birds appear annually in coastal areas during fall migration.

The current Bonelli's Eagle population in Cyprus is estimated at 31-39 breeding pairs. During the late 1950s it was considered common with a population estimate of >50 pairs. In the 1980s to early 1990s the population declined to less than 20 pairs. Its stronghold is the Pafos Forest, a state-owned area of 62,000 ha with a high eagle density of 2-2.5 breeding pairs per 100 km^2 with a total nesting population estimated at 12-5 breeding pairs. Nearest neighbour distance (NND) for 27 monitored nesting sites was 7.4 ± 1.1 km (range = 4.1-11.5 km) whereas in Pafos Forest the average distance between neighbouring pairs was smaller (6.2 km).

The majority of nests are built on large Calabrian Pine Trees (*Pinus brutia*) with about 15% of all nests on cliffs (6 cliff nests), whereas 2 pairs had both a tree and a cliff nest. Nesting cliffs are usually on remote and extensive cliff formations, or deep, high-walled ravines. Nest site altitude ranged from 55 m up to 1,200 m a.s.l. (average nest altitude = 625 m a.s.l., n = 22).

Egg laying starts at the end of January-beginning of February. Clutch size is usually 2 and rarely 3 eggs. Young start hatching the last week of February to mid-March and the first eaglets fledge at late April-beginning of May. From 1999 to 2009, 89 chicks fledged from 62 nests (1.4 fledglings/nest). From these, 36 nests (58%) produced 1 young, 25 nests (40%) produced 2 young, and 1 nest produced 3 fledged young.

From 2002 to 2009, we radio-tagged 14 eagles: 4 adults, 7 immature and 3 juveniles. Three of the 4 adults caught, tagged and released were part of breeding pairs and were caught 23 km (in January), 4 km (in September) and 1.5 km (in October) from their respective nesting sites. One eagle caught and tagged as a juvenile in 2005, paired and bred successfully in 2008 and fledged 1 eagle.

Four radio tagged eagles (28%) died due to direct human persecution: 2 were shot, 1 was poisoned whereas only the tag was found from the fourth bird. The cause of death was also probably human-related.

Shooting and poisoning are the most significant problems of direct persecution even though such incidents have declined since the 1980s. Poisoning is a problem locally in areas with dense livestock where shepherds poison carcasses to decrease damage by foxes to kids and lambs. In addition, unlimited access even to the most remote areas through an extensive network of secondary dirt road and forest tracks, cause disturbance to breeding pairs. Housing development in the countryside also increases encroachment and disturbance. Moreover, the current building of wind farms in wilderness areas poses a new threat to the species along with other resident raptors such as the Eurasian Griffon Vulture (*Gyps fulvus*) and also migratory raptors.

INVENTORY OF THE REPRODUCTIVE POPULATION AND MONITORING OF THE REPRODUCTION OF BEARDED VULTURE IN ARAGÓN, SEASON 2007-2008

Juan Antonio Gil*, Juan Carlos Ascaso, Gonzalo Chéliz, Óscar Díez & Álvaro González
Fundación para la Conservación del Quebrantahuesos (FCQ), Place San Pedro Nolasco 1, 4-F, 50001 Zaragoza, Spain, www.quebrantahuesos.org
* Corresponding author: fcq@quebrantahuesos.org

The Bearded Vulture (*Gypaetus barbatus*) is considered one of the most threatened birds of Europe. During the past few years it has been the object of various conservation plans in the different European countries. The inventory of the reproductive population and the monitoring of its reproduction comprise part of the objectives of the 'Recovery Plan of the Bearded Vulture in Aragón' (D. 45/2003). This action is the one which has been worked on longest (since the end of the 1980s) and which generated most informa-

tion. To make up an inventory of the reproductive population and monitor the reproduction in Aragon (Central Pyrenees, Southern part), the method used for other great rupicolous predatory birds has been followed since 1984, consisting in a series of consecutive controls carried out in the nest building area of the reproductive units (RU) in the periods of time considered crucial and providing most information for obtaining reproductive parameters (Canut *et al*., 1987; Margalida *et al*., 2003). This period embraces basically the nest construction, incubation and the development of the chick until it carries out its first flights. A minimum of three visits to each RU is calculated (RU are the units - being pairs or polyandric trios - that run a territory in which indications of reproduction have been confirmed). In some RU an elevated prospecting effort is required due to diverse questions like a difficult verification of the location of the occupied nest or the necessity to affirm early reproduction failure. In the season 2007-2008, 77 well-known territories existed in Aragon (in which the unit that runs the territory is reproductive or not), with 67 RU (43 pairs and 24 trios) and 10 territorial units (TU) (seven pairs and three trios). Aragon owns 53,6% of all the RU of the Pyrenees (covering Spain, France and Andorra) and 42.4-43.7% of all the RU of Europe. Five RU are shared: one with France, one with Navarra and three with Catalonia. Of the 58 controlled RU, 45 realise egg laying and 13 do not. Of these 45, eight RU failed during the incubation and in 35 the chicks were born. Of these, seven chicks die and 28 fly. In Aragon flew 57.1% of the chicks of the Pyrenees and 46.6% of the chicks of Europe. The productivity (no. of controlled flown chicks/no. of RU) was 0.48 chicks. The reproductive success (no. of flown chicks/no. of egg laying RU) was 0.62 chicks. This number is above the average obtained during the previous five years (from 2001 to 2007). Nevertheless, it is lower compared with the past decade, when between 1994 and 2001 the productivity was 0.51 chicks.

POPULATION TREND AND COLONIZATION PATTERN OF THE GRIFFON VULTURE IN THE CANTABRIAN MOUNTAINS OVER THE LAST FOUR DECADES

Patricia Mateo-Tomás[1] & Pedro P. Olea[2]
[1] Department of Biodiversity and Environmental Management, Faculty of Biological and Environmental Sciences, University of León, Campus de Vegazana, 24071 León, Spain, pmatt@unileon.es
[2] School of Biology, IE University, Campus Santa Cruz la Real, 40003 Segovia, Spain, pedro.perez@ie.edu
* Corresponding author: pmatt@unileon.es

We examined the population trend and colonization pattern of the Griffon vulture (*Gyps fulvus*) over the last four decades in the Cantabrian Mountains, NW Spain. During this period, the population of the study area experienced a sharp increase from 15 breeding pairs located in 3 colonies in the 1970s to 586 breeding pairs in 120 colonies in 2008. The population has slowly changed the direction of expansion from southeast to southwest, increasing its range from 90 km^2 in the 1970s to 6,403 km^2 in 2008. During this expansion, the Griffon Vulture tended to select first the longer cliffs placed in open areas with abundant livestock. The increasing population trend reported during the 1980s and 1990s highly coincided with those detected for the species in other European regions and seemed to be related to the implementation of protection laws and the ban of poison use. The population increase reported between 1999 and 2008 (i.e. 184%) contrasts heavily with the decrease reported in other regions where large vulture populations are artificially maintained through feeding stations or dumps. Additionally, the breeding parameters of the studied population are according to those considered normal for the species, even being slightly higher (i.e., productivity = 0.75; breeding success = 0.81). This relatively good current conservation status of this Griffon Vulture population could be due to the presence in the study area of an important extensive farming activity of both local and

transhumant livestock. Therefore, the extensive farming activity should be considered by wildlife managers when designing the management and conservation of the species.

MONITORING AND CONSERVATION OF BLACK VULTURE IN A SPB IN SPAIN. THE IMPORTANCE OF LOCAL MONITORING FOR THE CONSERVATION AT LARGE SCALE

Javier de la Puente
Área de Estudio y Seguimiento de Aves, SEO/BirdLife, C/ Melquiades Biencinto 34, 28053 Madrid, Spain
jdelapuente@seo.org

Annually, long term and intensive census, monitoring and conservation efforts in national or large areas, in bird populations are very expensive in terms of human and economy sources. In fact, usually this works only are possible with very endangered species, and even in this case only is possible approach periodic census every five or ten years. This situation involves that many different aspects related with the biology of a certain species, very useful in conservation projects, are poorly known. Local and intensive monitoring with a small portion of the population may be very useful for the knowledge and conservation form one species at a global scale.

Since 1997 SEO/BirdLife develops, for the Peñalara Natural Park (Madrid, Spain), an intensive monitoring of the Black Vulture colony located in 'Alto Lozoya' Special Bird Protected Area. This colony is close to 100 pairs, which comprise approximately 5% of the European population of the species. Every year location of each pair, evolution of population and breeding parameters are established. This information allows the management and conservation of this population according to its knowledge. The population has increased form 42 pairs in 1997 to 92 in 2009, and 503 fledglings had been produced in this colony.

Furthermore, all this work has been very useful to develop studies applicable in management and conservation of Black Vulture in a global scale. Studies about forest management and vulture conservation, habitat selection, breeding biology, breeding failure, adult home range, juvenile dispersive movements, philopatry, breeding site and pair fidelity, mortality causes, haematology and biochemistry and its relation to health condition, detectability of pairs and pulli in the nest and correction index in census, moult and biometry and its application in ageing and sexing, etc.

All this information is being used in local and global conservation actions with the species. These results indicate that is adequate to invest sources in long and intensive monitoring in the monitoring in at least a small part of an animal population in endangered species. Of fact, sources are limited and to determine priorities is necessary a design of a census every five or ten years with and intensive monitoring of some small end representative populations may be an interesting strategy for monitoring of endangered species.

DE ROUDE SCHÉIERSCHWANZ - THE RED KITE (*MILVUS MILVUS*) IN LUXEMBOURG. MONITORING OF THE TERRITORIAL POPULATION DURING THE BREEDING SEASON IN 1997, 2003 AND 2009. DEFINING THE RANGE OF THE RED KITE IN LUXEMBOURG

Gilles Biver
Centrale Ornithologique Luxembourg-Lëtzebuerger Natur- a Vulleschutzliga (LNVL-BirdLife Luxembourg), Luxembourg
col@luxnatur.lu

The ornithological fieldworkers group of the LNVL (BirdLife Luxembourg) monitored the Red Kite (*Milvus milvus*) in Luxembourg (2,586 km^2) - and at the same occasion the Black Kite (*Milvus migrans*) - for the third time since 1997. The same methodology (Norgall, 1995), coupled with a similar effort, has been used at six-year intervals, allowing comparisons of population size and distribution between 1997, 2003 and 2009.

The population of Red Kites during the breeding season does not only consist of

breeding birds: as for other large-sized bird species, the population also comprises immature birds and solitary adults. Even territorial pairs are not necessarily breeding birds. Consequently, the territorial population consists of breeding pairs, territorial pairs and territorial solitary birds. The main aim of the monitoring of the Red Kite in Luxembourg in 1997, 2003 and 2009 has not been the mapping of breeding pairs or the assessment of breeding success, but the mapping of territories!

Compulsory criteria to be applied in monitoring the Red Kite in Luxembourg (Conzemius, 1998):

- Breeding pair: minimum condition is the observation of a breeding adult on the nest-site or a recently fledged juvenile next to the breeding location during the breeding period (beginning of May till mid July).
- Territorial pair: pair observed at least twice while displaying territorial or mating behaviour during the mating period (beginning of March till end of April) and/or with breeding behaviour during the breeding period, in relation to a potential breeding location.
- Territorial solitary: adult observed at least twice during mating and/or breeding season in a formerly known breeding territory.

Results of the monitoring, with specific respect to the evolution of the territorial population size during the breeding season, reveal an additional 20 territories, which represents an increase of 43% over the last 12 years. Certainly, the better knowledge of the species as a by-product of past censuses of the Red Kite may have had a positive effect on the findings, but all fieldworkers agreed that the Red Kite has become more common over the last few years in Luxembourg. Current figures indicate that the population density has risen from 1.8 territories/100 km^2 in 1997 to 2.6 territories/100 km^2 in 2009. At the same time, the distribution of the Red Kite's territories has changed little since the first census. Yet, it is noticeable that the density has continued to increase mainly in national Red Kite hotspot regions, as defined by Conzemius (1998), i.e. in the North and the East, but also in the (South)-West of Luxembourg. Grassland, cropland and small forests are characteristic features of the landscapes. On the other hand, a few regions, such as the urbanized Center and South, the woodlands of the North and the Center, as well as the vineyards and the forests of the South-East are not inhabited by Red Kites at all.

By joining the data of the 3 censuses of the Red Kite (mainly data of breeding habitats) on one map and by adding recent data relating to chance observations of foraging Red Kites from the LNVL data base, it has been possible to use spatial modelling with MaxEnt to identify the main distribution of the Red Kite's habitats in Luxembourg, which roughly total an area of about 1,500 km^2 (~60% of Luxembourg).

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MALLARD AS A COMMON URBAN SPECIES: TWELVE YEARS OF SUMMER WATERFOWL CENSUS IN MOSCOW

Ksenia V. Avilova
Subdepartment of Vertebrate Zoology, Department of Biology, Moscow State Lomonosov University, 119992 Moscow, Russia
wildlife@inbox.ru

Number dynamics and reproductive success of the urban population of Mallard in Moscow were estimated for the period of 1998-2009. Wintering population has been moni-

tored since the 1980s, with annual mid-winter counts. Summer surveys of urban area of about 1,000 km^2 have been made with the aid of a few dozens of volunteers since 1998. The birds were counted at the fixed routs running along 80% of urban ponds and rivers. Age of ducklings was determined in accordance with the scale developed by Marchall and Gallop (1954) in Isakov's modification (1963). Mallard is the most numerous waterfowl species in Moscow. In 1998-2004, the abundance of Mallard broods ranged between 250 and 540; it has been increasing rapidly since 2005 and reached 900 broods ($N = 12$, $r_s = 0.90$, $p < 0.001$).

The greatest part of the Mallard population in Moscow is non-migratory, since the correlation between the numbers of breeding and wintering ducks is highly significant ($N = 12$, $r_s = 0.88$, $p < 0.001$). The number of ducklings per female has decreased over the 12-year period from 5.5 to 4.1 ($N = 12$, $r_s = -0.66$, $p < 0.01$) along with the growth in the number of females ($N = 12$, $r_s = -0.54$, $p = 0.06$). It is the essential mechanism of number regulation in the large and dense urban population of mallards.

The date of nest initiation is the key parameter for the timing of the nesting period. In Moscow, the first eggs were laid by Mallards between 27.03 and 25.04 in 1998-2009. Over the study period, nest initiation has shifted to the earlier dates ($N = 12$, $r_s = -0.58$, $p = 0.05$); it correlates also with the number of breeding females ($N = 12$, $r_s = -0.58$, $p = 0.05$).

The role of the weather in the reproduction of the urban population is not very important, whereas it is great for the natural populations. In Moscow, the nest initiation date did not correlate with the sum of mean daily air temperatures in 30-40 preceding days. The size of the group of Mallards wintering in the city also did not depend on the weather (Avilova, 2008). Meanwhile, the date of laying of the 1st egg depended on the raise of the mean daily air temperature above the freezing point in spring (02.03-01.04) both in the period of fluctuations of the duck number (1998-2004) and its rapid increase (2005-2009; $N = 7$, $r_s = 0.88$; $N = 5$, $r_s = 0.90$, $p < 0.01$).

The egg-laying period in Mallards lasts for 61-83 days in Moscow. Its length correlates with the nest initiation date ($N = 12$, $r_s = -0.87$, $p < 0.01$). The laying period tends to be longer in the earlier springs. It extends also following the population increase ($N = 5$, $r_s = 0.87$, $p = 0.05$).

The number of breeding birds and the timing of reproduction in urban Mallards depend mostly on the population density and, to some extent, on the weather conditions.

DYNAMICS OF THE NUMBERS AND DISTRIBUTION OF RUDDY SHELDUCK (*TADORNA FERRUGINEA*) IN THE MIDDLE AND LOWER VOLGA REGIONS

Anastasia B. Popovkina[1]*, Eugeny V. Zavialov[2] & Oleg V. Borodin[3]

[1] Moscow State University, Biological Faculty, 119991 Moscow, Russia

[2] Saratov State University, Saratov, Russia

[3] Federal Youth Environmental Centre, Moscow, Russia

* Corresponding author: tadorna@mail.ru

Ruddy Shelducks inhabiting the Middle and Upper Volga regions belong to the West-central Asia/Caspian population of the species (Rose, Scott, 1996). Over the past century, considerable long-term fluctuations in the species' numbers occurred in the region. In the Samara and Ulianovsk regions (the Middle Volga), the species was common in the 19th and the first half of the 20th century, nesting up to 53° 50' N. In the 1940-1960s, Ruddy Shelducks dramatically decreased in numbers there; a few isolated breeding areas were preserved. Gradual restoration of the population began in the 1970-1990s, and at the turn of the century not only noticeable increase in numbers, but also northward dispersal was recorded. Data collected in the Saratov Region (the north of the Lower Volga region) allowed to distinguish more distinct periods of depressions (1900s-1930s, 1950s-1960s, and the mid-1980s to the early 1990s) and stabilization (1930s-1950s, mid-1970s-mid-1980s, and from the early 1990s till present). The state of population in the

region has been stable for the last decades; 520 -560 pairs breed there compared to a few dozens of them in the periods of depression. Ruddy Shelducks are even slightly increasing in numbers and their range expands northwards. The northernmost encounter of the breeding pair has been recently recorded at 54º 37' N, 48º 58' E (Borodin *et al*., 2001). Population depressions could be caused by construction of water reservoirs and consequent flooding of the Volga River floodplain; cultivation of virgin lands; pest control; extensive elimination of Red Foxes (*Vulpes vulpes*) and Marmots (*Marmota bobak*), which resulted in dramatic decrease in abundance of suitable nesting holes; and spring, autumn, and illegal summer hunting. Restoration of the population is likely to be favoured by construction of numerous steppe water reservoirs both for the needs of cattle farming and in the course of implementation of large-scale projects of land reclamation. Marmots rapidly increased in numbers after protection measures had been taken in the region in the last decades of the 20th century, and breeding habitats of hole-nesting Ruddy Shelducks were improved. Depressions, particularly noticeable in the mid-20th century, did not result in complete abandonment of the breeding grounds in the northern parts of the species' range. Even in the most unfavourable years, a certain number of breeding pairs was preserved in some areas along the Volga River and in the steppe marmot refuges. It provided for relatively rapid restoration of the Ruddy Shelduck population in the Middle and Lower Volga regions after the periods of depressions.

UNDERSTANDING DISTRIBUTION AND POPULATION TRENDS OF EUROPEAN NIGHTJAR (*CAPRIMULGUS EUROPAEU*S) IN THE NETHERLANDS

André van Kleunen*, Henk Sierdsema & Popko Wiersma
SOVON Dutch Centre for Field Ornithology, Rijksstraatweg 178, NL-6573 DG Beek-Ubbergen, The Netherlands
* Corresponding author:
andre.vankleunen@sovon.nl

In the Netherlands European Nightjar (*Caprimulgus europaeus*) is a breeding bird of heath land and open pine forests. Population size strongly declined in the 1970s of the past century and the species was classified as 'vulnerable' on the national Red list of threatened species. Since 1990 the species has recovered remarkably. During a national census carried out in 2007 at least 1,600 breeding pairs were counted, considerably more than the estimate of 1,000 based on surveys for the breeding bird atlas 1973-77. However the species is not thriving in all areas. Despite the higher numbers the current distribution is still more restricted than in 1973-77.
What factors affect the abundance and distribution of this species? We analysed the impact of climate, acidification, eutrophication and habitat composition on long term population trends using generalized estimating equations (GEE) and Generalized Linear Models (GLM). Besides the impact of heath and forest management measures and disturbance on local distribution and abundance of nightjars was investigated.
The analysis shows that climate in the Netherlands and Africa, N-deposition levels and habitat composition correlate with population trends. Local distribution and abundance of nightjars were positively correlated with presence of clear cuts and cattle grazing, but negatively correlated with grazing intensity. In order to get more insight in the processes behind these correlations we started an ecological field study involving breeding ecology, land use of radio-tagged nightjars, food abundance and collecting detailed information on grazing intensities.

STATUS AND DISTRIBUTION OF THE SPUR-WINGED LAPWING (*VANELLUS SPINOSUS*) IN CYPRUS

Iris Charalambidou*, Nicolaos Kassinis, Salih Gücel & Wayne Fuller
* Corresponding author:
iris.chara@cytanet.com.cy

The European population of the Spur-winged Lapwing is confined to Cyprus, Greece and Turkey. Although it is one of the most abundant plovers recorded in Cyprus, knowledge of its status is incomplete and island-wide population estimates do not exist. The migratory, wintering and breeding populations of the Spur-winged Lapwing were monitored at 27 wetlands in Cyprus from 2007 to 2009. More than 200 birds were recorded at ten wetlands during autumn passage from late August to November while at least 50 birds over-wintered at five wetlands in December and January. The breeding season extended from March to late June, with 35-50 pairs observed at the same areas. The birds were concentrated at wetlands in central and eastern Cyprus, and used the same group of wetlands throughout the year. Larnaca Salt Lake and the smaller wetlands at Oroklini, Paralimni and Achna Dam were known to support significant breeding populations and partly for this reason have been, or are scheduled to be, designated as SPAs in the Natura 2000 network. Comparative data from two other wetlands, Mia Milia Sewage Treatment Plant and Famagusta Lake, were collected for the first time and revealed important wintering and breeding populations of this species. These findings have implications for the conservation of the Spur-winged Lapwing in Cyprus.

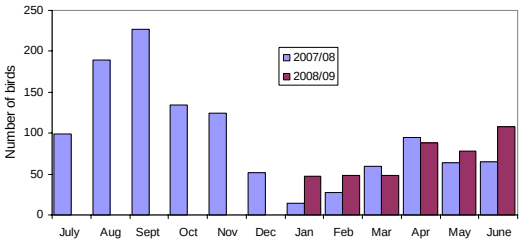

Figure 1. *Numbers of Spur-winged Lapwing recorded from July 2007 to June 2009 during a monitoring programme of 27 wetlands in Cyprus.*

BREEDING KENTISH PLOVER (*CHARADRIUS ALEXANDRINUS*) POPULATION TREND IN NORTH-WESTERN SPAIN, 1974-2009: A BASIS FOR CONSERVATION MEASURES

María Vidal* & Jesús Domínguez
Departamento de Zoología y Antropología Física, Facultad de Biología, Universidad de Santiago de Compostela, 15782 Santiago de Compostela, Spain
* Corresponding author: mariajose.vidal@usc.es

The Kentish Plover (*Charadrius alexandrinus*) is, next to the Eurasian Oystercatcher (*Haematopus ostralegus*), the only breeding wader in the Galician coast (NW Spain). In the stretch of the Spanish coastline between Portugal and France, nesting population, actually of 100 couples, is located exclusively in Galicia. Their European coastal populations, including the Spanish one, have declined in the last decades. It is considered as 'Vulnerable' in the Galician Catalogue of Threatened Species and it is included in the Annex 1 of the Birds Directive (EU). On November 2002 the *Prestige* wreck produced one of the worst oil spill events in Europe, affecting most of the Kentish Plover breeding beaches.

The Conservation Plan of the Galician Kentish Plover population laid down the need for knowledge of basic information such as the trend and current status of population. In this study we analyse long-term (1974-2009) count data to identify quantitatively for the first time Kentish Plover population trends in Galicia to provide baseline information necessary for conservation planning and management in this region. We employed TRIM v3.52, a program developed for the analysis of count data derived from wildlife monitoring schemes. In this program missing values are replaced by predicted counts from a model based on the existing ones. We fitted a linear trend model to the observed counts, where each one was expressed as a function of a site factor and a year factor. We used the Pannekoek trend classification. 1974-2009 time series and 31 beaches were employed. The base year was 2003, because of being the

first nesting period after the *Prestige* oil spill. Three covariates related with beach characteristics were used.
Trend analysis of Galician Kentish Plover population was classified 'stable' according to Pannekoek criterion. We discuss the importance of beach characteristics on Kentish Plover presence along this period and the possible influence of the *Prestige* catastrophe on the overall population trend.

POPULATION MONITORING OF GREAT SNIPE IN LATVIA: SUCCESS STORY OF HABITAT RESTORATION AND MANAGEMENT

Ainārs Auniņš
Dept. of Zoology and Animal Ecology, Faculty of Biology, University of Latvia, Kronvalda bulv. 4, Riga, LV-1010, Latvia
* Corresponding author: ainars.aunins@lu.lv

The first inventory of Great Snipe leks in Latvia was carried out in 1999 that allowed estimating a population of 200-300 breeding pairs (lekking males) for the country. Distribution of the species was strictly determined by presence of large floodplain meadow areas being more frequent in northern and eastern parts of the country while almost lacking in western and southern parts. This strict habitat affinity allowed identifying the existing potentially suitable places for the species.
A monitoring scheme based on counting males in leks was established to follow the changes in the Great Snipe population after the inventory. To avoid bias towards extinction, monitoring plots were established also in a sample of potential sites in addition to the known leks. Areas where suitable habitat has been restored for the species were added to the pool of monitoring plots.
Monitoring data (1999-2009) show that there was a steep tendency for the species to decline until 2004. Nearly 40% of the population was lost during this period. Overgrowing of the breeding habitat due to abandonment and lack of management was identified as a main cause. Two LIFE-Nature projects with an aim to restore and maintain floodplain meadows as a habitat for Great Snipes were started, carrying out the main habitat restoration activities from 2004 to 2007. The projects affected more than 40% of the habitat suitable for the species. As a result there was a rapid tendency for the species to recover in the areas where habitat restoration activities took place and this allowed reversing also the national trend of the Great Snipe.

DETECTING HABITAT CHANGES IN CROSS-BORDER AREAS USING MODIS EVI (MOD13Q1) IMAGES: A CASE STUDY OF SPOONBILL (*PLATALEA LAEUCORODIA*)

Andreja Radović[1]*, Tomislav Hengl[2] & Karmela Fontana-Pudić[3]
[1] Croatian Academy of Sciences and Arts, Institute for Ornithology, Gundulićeva 24, HR-10000 Zagreb, Croatia
[2] Institute for Biodiversity and Ecosystem Dynamics, University of Amsterdam, Nieuwe Achtergracht 166, 1018 WV Amsterdam, The Netherlands
[3] Ivana Filipovića 26, HR-35000 Slavonski Brod, Croatia
* Corresponding author: anradovic@hazu.hr

The breeding population of Spoonbill (*Platalea leucorodia*) in Croatia, currently estimated at 111-220 breeding pairs, is classified as 'endangered' (listed in Red Data Book of Croatian Birds and it's breeding population). Most important reason for the endangered status is changes in breeding and feeding habitats. The purpose of the study was to detect changes in the habitat types previously assessed as important for spoonbills feeding. The area of interest is the central part of the Sava River (Croatia-Bosnia and Herzegovina). The research area was chosen for three reasons: (1) the alluvial wetlands of the Sava River holds the biggest colony of spoonbills in Croatia (until 1989 it was the only one); (2) there are research on feeding ecology of spoonbills along alluvial wetlands of Sava River and (3) we wanted to test usefulness of the method since the specific shape of the Croatia, having important breeding grounds for numerous species placed just along country borders. We used the MODIS Enhanced

Vegetation Index (EVI) as the main indicator for the changes in habitat structure. 20 16-days composites for years 2000 and 2008 with the spatial resolution of 250 m were obtained from the NASA server. Downloading, re-projection and analysis of images was implemented using the open-source software MRTool, R, SAGA. This software combo enables data processing automation and thus can be used to process large volume of data. MODIS images are especially attractive for analysing habitat in cross-border areas where the availability of GIS layers is limited or the layers are not harmonized. The results of the analysis revealed places with significant changes in EVI index along important habitat types for feeding of the spoonbills. The probability value of for t-test (difference in EVI distributions for two periods per pixel) has been produced. The resulting grid was further exported to 'kml' format for visualization in Google Earth i.e. free exchange of results. For the Croatian part of the research area, the resulting grid was overlaid with layers presenting important habitats for spoonbills (pastures, rivers, river edges, fishponds and pastures along highest wetness potential) and analyzed to detect which land cover types are most viable to habitat changes.

THE WINTER MIGRATION OF STORKS AND CRANES FORM NORTHERN HEMISPHERE TO SOUTH-EAST OF INDIA

Abdar Mohan
Department of Zoology, Krantisinh Nana Patil College, Walwe 416313, India
mohanabdar@yahoo.in

A very least known about distant migration and their mechanism. The birds are indicators of different habitats: for example Ibis indicator of marshy wetland, Cormorant indicator of freshwater cat fishes, Little Cormorant indicator of freshwater confined aquatic reservoir.
The ashy purple Demoiselle Crane (*Anthropoides virgo*) indicator of rainfall, therefore people from western Rajasthan eagerly await the first arrival of Demoiselle Crane. The Demoiselle Cranes radiates in Indian continent for foraging on oil seed and nut plants.
The fascinating seasonal migration in the storks has been observed for last two-three decades along the western coast of India and hill ranges of the Western Ghats. The recently built several freshwater systems in hill range of Western Ghat have attracted the Painted Storks (*Mycteria leucocephala*), White Necked Storks (*Ciconia episcopus*), White Storks (*Ciconia ciconia*), Demoiselle Crane (*Anthropoids virgo*), Siberian Crane (*Grus leucogeranus*), etc. The birds from subtropical temperate region after snowfall migrate in thousands up to northwest corner of India and then they radiating in local aquatic network of reservoirs according to foraging sustainability of habitat. The seasonal migration of storks and cranes had not observed in Western Ghat, which is reach spot of biodiversity, therefore the present work has been extensively undertaken.

MONITORING OF THE WHITE STORK (*CICONIA CICONIA*) NUMBER DYNAMICS IN UKRAINE IN 1994-2009

Vitaly Grishchenko
Kaniv Nature Reserve, Kaniv 19000, Ukraine
vgrishchenko@mail.ru

Ukraine has one of the largest populations of the White Stork (*Ciconia ciconia*) in the world. The actual number makes about 30,000-35,000 breeding pairs. Control of the population by means of yearly full censuses is impossible in our conditions because of its large size. We went by the other way: obtaining of monitoring data on the net of constant study plots. This work has started in 1992. Ornithologists and voluntary helpers take part in observations. The net of study plots lets control breeding success and number dynamics in the country. In total, till the autumn of 2009 the information from 256 plots in 24 from 25 regions of Ukraine has obtained. On 95 of them observations were carried out during 3 and more years, on 16 ones during 10-15 years, and on 13 ones during 16-18 years. The net of plots covers the main breeding grounds of the stork in Ukraine. Since

1994 the obtained data are sufficient for the analysis of number dynamics. For this aim we used the average increment of numbers on study plots in percents (figure 1). The diagram shows that since 1994 the increase of number permanently rose. Maximum of increasing was registered in 1996 and 1998. In 1997 number of the White Stork has sharply decreased. It was so called catastrophic year for the species almost in whole Europe caused by bad conditions during wintering and spring migration. Already the next year population was completely restored and number increasing continued. Later the rate of growth began to decrease and population was stabilized. In 2001-2003 the average percentage fluctuated around zero. Since 2004 the number of storks began to increase again. Several years the increasing rate remained stable in about 6-8%, but this period of number increasing was also interrupted by the new catastrophic years in 2005 and 2009. The drastic decline of population was attended by late arrival and low breeding success. At the graph we can see two variants of number increasing: wave-like (1994-2001) and linear (since 2004). There are regional differences in number dynamics of the White Stork. The largest fluctuations take place in eastern part of the country (eastwards from the Dnieper river). This area is located not far from the east border of the breeding range. The population in western and central Ukraine is more stable.

Figure 1. *Evolution of White Stork numbers in Ukraine.*

CHANGES OF WHITE STORK NUMBERS IN UKRAINE IN 1931, 1987 & 2004

Valentin Serebryakov* & Ludmila Lonina
Biol. Dept., Shevchenko National University, Volodymyrska Str. 64, Kiev-01601, Ukraine
* Corresponding author: bcssu2@gmail.com

White Stork censuses in 1931, 1987 and 2004 in Ukraine give a good data for comparison of their numbers. So in general it was recorded the decreasing of bird numbers between 1931 and 1987 years and increasing between 1987 and 2004. However, in different administrative districts there were different trends in both periods (increasing, decreasing and permanent numbers). So in compared censuses in 1931 and 1987 the decreasing was recorded in 64% of districts, increasing - in 32% and permanent numbers - in 4%. But in compared censuses in 1987 and 2004 the increasing of bird numbers was recorded in 75% of districts, decreasing - in 49% and permanent numbers - in 4% of total districts. Distribution of these districts where increasing, decreasing and permanent bird numbers were recorded is different in both periods. The positive attitude of the local people to White Stork is the same everywhere in Ukraine. Climate changes are characterized with uneven distribution of heat and moisture on large territories. So it could be the reason of such uneven trends of bird numbers changes.

FACTORS, WHICH MAKE IMPACT ON THE NUMBER OF BLACK STORK IN UKRAINE

Alexandr Panchuk* & Valentin Serebryakov
Biol. Dept., Shevchenko National University, Volodymyrska Str. 64, Kiev-01601, Ukraine
* Corresponding author: bcssu2@gmail.com

Black Stork is a rare species breeding in dense forests of the Forest zone and Carpathian region in Ukraine. Bird Conservation and Study Society of Ukraine organized the census of this species in 2008-2009. As a result, it was recorded that the number of *Ciconia nigra* is increasing. The factors that have impact on their numbers are positive and negative. Among the first there are establishing of new nature conservation territories, species and wetland conservation activities, human population decreasing in countryside and their activities. The negative factors are as following deforestation and number decreasing of old trees.

DIFFERENTIAL AGE-RELATED ABUNDANCE AND ASSOCIATION IN *LARUS FUSCUS* FROM MALAGA WINTERING AREA

Salvador García-Barcelona[1], Ana Luz Márquez[2], José C. Báez[1], Alba Estrada[3]*, Raimundo Real[2] & David Macías[1]
[1] Instituto Español de Oceanografía, Puerto Pesquero Fuengirola, Málaga, Spain
[2] Departamento de Biología Animal, Universidad de Málaga, 29071 Málaga, Spain
[3] Instituto de Investigación en Recursos Cinegéticos (IREC), CSIC-UCLM-JCCM, Ronda de Toledo s/n, 13071 Ciudad Real, Spain
* Corresponding author: alba.estrada@uclm.es

An interesting question in avian migration phenology is to understand how individuals meet per age groups in the same wintering areas. Many authors consider the Lesser Black-backed Gull (*Larus fuscus*) such as common migratory species with a wide geographical distribution, occurring in N and W Europe from the White Sea to Iceland and S to the Iberian Peninsula, and for this reason it is considered a suitable model for the study of migration. In Malaga province (South of Andalusia, Spain), which represents an important wintering area for this species, we observed wintering exemplars belonging to the three subspecies described for the species; and coming from 51 different breeding colonies distributed throughout 10 different countries.

The aim of the present paper is to identify the possible existence of age class groups with significantly similar time distribution patterns. Baroni-Urbani *et al*. (1978) propose the term 'chorotype' to define the pool of species that share a similar geographic distribution, but whose ranges are significantly different from those of other species. Similarly, 'chronotypes' have been defined as the pool of individuals whose migration phenology shares a similar temporal distribution. We defined 'harbour chronotypes' as the significant groups of age classes that are present in the harbour of Malaga in wintering season.

Sightings were made in the harbour of Malaga during non-working days, in the last three winter season (2006/07 to 2008/09). Only gulls ringed while nestling and present in the harbour between November and February were used in the analysis (n = 321 rings).

We obtained 11 different chronotypes from 19 age classes. The chronotypes most abundant (54% sightings) was those of immature gulls (age classes 1 to 3) while 6 chronotypes were represented for only one age class (age classes 6, 7, 12, 15, 16 and 18). Younger chronotypes (chronotypes 1 to 7) showed diverse geographical origin (at least 3 different countries), moreover they were present during all wintering season. On the other hand, those chorotypes made of gulls older than 13 winters (chronotypes 8 to 11) are formed by individuals coming from only two specific colonies: Rotterdan (Netherlands), and Flat Holm Island (United Kingdom). In the case of Rotterdan's colony the high number of sightings could be explained for a major effort of ringing.

POPULATION TREND OF GREAT CORMORANTS (*PHALACROCORAX CARBO*) WINTERING IN GALICIA (NW SPAIN)

Jesús Domínguez*, Yaiza Iglesias & María Vidal
Departamento de Zoología y Antropología Física, Facultad de Biología, Universidad de Santiago de Compostela, 15782 Santiago de Compostela, Spain.
* Corresponding author: jesus.dominguez@usc.es

Great Cormorant (*Phalacrocorax carbo*) population in Europe has experienced dramatic growth in the last 30 years, with an especially marked upsurge in the continental subspecies *sinensis*. The Great Cormorant was first discovered wintering in Spanish continental environment in the 1950s, although numbers must have remained low into the next decade. The census coverage in Spain did not acquire significant magnitude until the 1970s, showing a continuous increase in the number of effectives wintering in Spain since 1980s.

TRIM (v. 3.52) was used to analyze the trend of the wintering population in Galicia (NW Spain). Populations' trends were classified in according to Pannekoek *et al*. (2005). An analysis of Spanish and Galician population tendency as a whole was carried out for the 1990-2001 period, for which there was a similar census series for both territories.

A significant model was obtained (LR = 0, d.f. = 0, $p > 0.05$; AIC = 0.0) from the analysis of trends in wintering populations in Galicia and Spain as a whole during 1900-2001, with significant tendency change for each year (Wald, $p < 0.05$) except for 1992 (Wald, = 5.5, $p > 0.05$). The average annual increase of the wintering population is 3.87%, signalling out the tendency as a moderate increase. Analyzing the wintering population trend in Galicia a significant model is obtained (LR = 0.41, d.f. = 2, $p > 0.05$; AIC = -3.59), for every year, except 1993, showing significant tendency change (Wald, $p < 0.05$). The average annual increase of the wintering population is 5.30%, signalling out the tendency as a strong increase. Wintering population in coastal wetlands shows a lesser increase (annual average 4.45%) than population from inland reservoirs (annual average 20.0%).

The most fitting model for the census series in Galician reservoirs was an S-curve ($r = 0.984$, $p < 0.001$) defined by the equation:

$$Ni = e^{6.869 - \frac{5.916}{t}}$$

in which $t = 1$ for $i = 1987$ and Ni = number of cormorants. This model predicts a limited increase of individuals for the next years in the Galician localities covered in the census.

EXTINCTION RISK OF THE RECENTLY DESCRIBED MONTEIRO'S STORM PETREL FROM THE AZORES

Alexandre Robert[1]*, Joël Bried[2], Mark Bolton[3] & Frédéric Jiguet[1]
[1] UMR 7204 MNHN-CNRS-UPMC 'Conservation des Espèces, Restauration et Suivi des Populations', 55 rue Buffon, CP 51, 75005 Paris, France
[2] Department of Oceanography and Fisheries, University of the Azores, 9901-862 Horta, Portugal
[3] Royal Society for the Protection of Birds, UK Headquarters, The Lodge, Sandy, Beds, SG19 2DL, UK
* Corresponding author: arobert@mnhn.fr

Understanding how anthropically induced interacting factors may compromise the viability of a particular species or population necessitates expressing them in terms of quantitative effects on population dynamics. The use of mechanistic models to assess these effects is especially helpful to management plans when the causes of species decline are multi-factorial and potentially interacting. The Monteiro's Storm Petrel (*Oceanodroma monteiroi*) is a European rare and recently described species, with a world breeding population of c. 300 pairs confined to two islets of Graciosa Island in the Azores. We developed a stochastic population model to evaluate the viability of the species in the presence of multiple interacting extinction factors such as nesting sites limitation, epi-

sodic predation (documented predation by a vagrant owl) and climatic perturbations. The positive effects of an implemented conservation program for the species, namely the provision of artificial nest boxes, will be evaluated. Finally, the potential benefits of creating a new colony away from Graciosa (by delocating near-fledged juveniles into artificial burrows, as done for the Cahow on Bermuda) will be tested according to potential relationships between distance between colonies and the natal dispersal and/or co-occurrence of negative environmental events (episodic predation and punctual climatic perturbations).

POPULATION NUMBERS AND BREEDING SUCCESS OF SOUTHERN ROCKHOPPER AND GENTOO PENGUINS AT THE FALKLAND ISLANDS

Pierre A. Pistorius[1]*, Alastair Baylis[2], Sarah Crofts[2], Nic Huin[2] & Craig Dockrill[2]
[1] Department of Zoology, Nelson Mandella Metropolitan University, PO Box 77000, Port Elizabeth 6031, South Africa
[2] Falklands Conservation, PO Box 26, Stanley, Falkland Islands FIQQ 1ZZ, UK
* Corresponding author:
pierre.pistorius@nmmu.ac.za

The Falkland Islands hold a significant proportion (between 30 and 50%) of the world populations of Southern Rockhopper (*Eudyptes chrysocome chrysocome*) and Gentoo (*Pygoscelis papua*) Penguins and changes in population numbers in the islands are crucial for the overall trends of these species. Consequently, Falklands Conservation initiated a long-term monitoring program on these species in the late 1980s. In the current study we report on results of the third whole island census of Rockhopper and Gentoo Penguins at the Falkland Islands, which was conducted during the austral summer of 2005/2006. We furthermore present monitoring results from selected colonies for the two species for the period 1990-2008. The Rockhopper Penguin population declined by nearly 100,000 pairs between 2000 and 2005 (at a rate of 5.9% per annum), partly due to a Harmful Algal Bloom (HAB) event of 2002/03, negating the small recovery between 1995 and 2000. Currently the population is estimated at 210,000 breeding pairs. Although numbers at selected colonies have marginally increased between 2005 and 2008, breeding success for this period has remained below average. The number of Gentoo Penguin breeding pairs in 2005 was estimated at 65,857. This represents a decline of 42% since 2000, which was also in part related to the HAB. Based on a selected number of colonies that were monitored annually, the population increased remarkably by over 95% since 2000, and numbered a record high of some 128,500 individuals in 2008. On average, breeding success was 1.01 chicks per breeding pair and this was above average since 2004. Although the Gentoo Penguin population has demonstrated incredible resilience to large scale population perturbations, the situation for the globally threatened Rockhopper Penguin continues to deteriorate. Urgent action is required to improve our understanding of the causal mechanism/s associated with the long-term decline of this species.

LINKS BETWEEN NEST POSITIONS AND INTRAANUAL DYNAMICS OF BLACKCAPS' TERRITORIES

Eva Vojtechovska[1]*, Jana Skorpilova[2] & Arnost L. Sizling[3]
[1] Agency for Nature Conservation and Landscape Protection of the Czech Republic, Nuselská 34, 140 00 Prague 4, Czech Republic
[2] Pan-European Common Bird Monitoring Scheme, Czech Society for Ornithology, Na Bělidle 252/34, 150 00 Prague 5, Czech Republic
[3] Center for Theoretical Study, Jilská 1, 110 00 Prague 1, Czech Republic
* Corresponding author:
eva.vojtechovska@nature.cz

The aim of this study was to explore territory dynamics and its relation to parameters of territory, position of nest and reproductive success in Blackcaps (*Sylvia atricapilla*). We assumed that territory parameters (e.g. size and shape) depend on breeding phase and on

intraspecific interactions between neighbouring territory owners and that position of nest within the territory depends on the territory parameters. The research was performed in a small nature reserve (14.6 ha) located in central Bohemia (Czech Republic) during the breeding season of Blackcap in 2006 and 2007. The field methods were the intensive territory mapping and finding the nests. The Blackcap males were caught immediately after they arrived at the locality, they were colour-marked and their fitness was assessed. In all found nests, we recorded their position on the locality, brood size, breeding success and nest concealment.

During two breeding seasons we caught and marked 58 males and females. In 2006, 25 breeding territories were mapped and 30 nests were found, of which 13 were successful (breeding success 27%, calculated by Mayfield method), while in 2007, 22 breeding territories were mapped and 33 nests found, of which 14 were successful (breeding success 41%).

Our results show that the territory parameters were influenced by the breeding phase. In general, the territories were largest before the nest was built (pre-laying phase) and after the fledglings left the nest, moreover, the size significantly decreases from breeding phase of egg-laying and incubation to nestling phase. Territory size was influenced also by age of male but it differs in the breeding phases. Against expectations, we have not proved significantly the relationship between breeding success and the territory parameters. We also found that the position of nest within territory is non-random and that there is a close relation between size and shape of territory and intraspecific interactions between neighbours.

ESTIMATING BREEDING BLUETHROAT (*LUSCINIA SVECICA AZURICOLLIS*) POPULATION BY TERRITORY MAPPING

Salvador J. Peris* & Solange Mendes
Department of Zoology, Faculty of Biology, Salamanca University, 37071 Salamanca, Spain
* Corresponding author: peris@usal.es

The Bluethroat, an endemic subspecies in the Iberian Peninsula (*Luscinia svecica azuricollis*), breeds above tree line in montane areas of north-western and central Spain, on gentle slopes (>1,300-2,300 m a.s.l.) in a landscape of mosaic-like vegetation, built by broom-scrub of *Cytisus oromediterraneus*, *Erica arborea*/*E. australis* (60-110 cm high), near to wet *Nardus*-grasslands with rivulets and streams.

Records of breeding estimation of the species - combining strip surveys and line transects - range from 0.25 to 1.16 birds/10 ha in Guadarrama, 0.5-1.3 in Gredos and 3 birds/10 ha in Candelario, localities belonging to the Sistema Central range. In northern Spain, the bird reaches up to 2.7-5 birds/10 ha.

A new method of breeding survey was carried out in Spring 2009 at Sanabria (NW Spain) and Candelario-Peña Negra-Gredos (Central Spain). The assessment is based on song recording of active males during May. Records are carried out following belt transects on mountain paths ranging from 2 to 8 km long. In order to contact and record possible birds, a male Bluethroat song was playback - during two minutes - from a tape recorder each 200 m along the transect. If after this time, there was no an answering call from a live bird, we assumed that the species was no present at the point. Best time for answer and recording goes from 1-2 hours after dawn and 1-2 hours before sunset, avoiding midday (about 12.00 to 19.00 local time) and windy days, which - although with occasional bird answer - produce distorted recordings.

Song records were combined with captures in a baited clap-net and colour-ringed individually. A total of 10 good recordings and 5 ringed birds were used. As it was tested that each bird has a distinct individual song (figure 1), each recorded or ringed bird was watched through binoculars on any opportunity from May to mid June (about 5 minutes at a time), till at least 3 observations were registered by each bird. Positions of the observed individuals were marked with a GPS, in order to drawn the minimum area patrolled by each bird.

According to this combination of song-recording and marked birds, male Bluethroats defend territories ranging from 620 to 2,800 m^2, with an average of 1,573 m^2 (n = 15). Territory overlapping amount to about 25% of the surface, mostly within the grassland areas. The species was only registered at 8-12% of the total playback points, and its population range from 5.0 to 7.6 birds/10 ha in Sistema Central and Sanabria, respectively. These data could increases up to 1/3 the estimated breeding Spanish population in 1997 (9,000-12,800 breeding pairs).

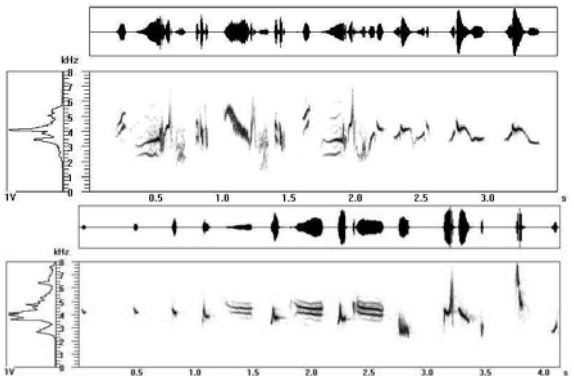

Figure 1. *Individual distinctiveness in successive calls from two neighbouring territorial males at Sanabria (NW Spain).*

BREEDING MONITORING OF GREENFINCH CARDUELIS CHLORIS AND BREEDING POPULATION TREND IN AGRICULTURAL AREAS OF EASTERN SPAIN

Carmen Vives-Ferrándiz, Nuria Banyuls, Jessica Gómez, Eva Marco, Iván Sánchez & Jose A. Gil-Delgado*
Institute Cavanilles of Biodiversity and Evolutionary Biology, University of Valencia, PO Box 2085, 46071 Valencia, Spain
* Corresponding author: gild@uv.es

The agricultural practices have affected farmland bird population's trends in Western Europe since the last century. Nevertheless, reports about bird trends in agricultural areas of the Mediterranean region highlighting the agricultural intensification as likely cause are scarce. We present the status of the breeding Greenfinch (*Carduelis chloris*) populations in agricultural areas of eastern Spain. During the breeding seasons of 2006 and 2007 we surveyed the species by point count on transects in eight agricultural areas with different management of eastern Spain. The areas are mainly characterized by orange, almond, carob and olive trees, pine forest and scrub, and are located from the north of the province of Castellón to the north of Alicante. Moreover, the breeding Greenfinch population of an orange groves plot near the locality of Sagunto (Valencia, Spain) has been monitored applying mapping methods and nest searching techniques since 1975. Since 1995 the traditional practices of management in this plot have changed towards those related to the agricultural intensification, mainly for substitution of flooding per watering techniques. The estimated average density ranged between 22.3 ind/10 ha in 2006 in the area of Vinaròs-Sant Jordi (area characterized mainly by olive trees and pine forest with scrub) and 1.7 ind/10 ha in 2006 in the area of Betxí (area characterized by orange trees). In the orange groves plot the density was 0.6 ind/10 ha in 2006 and 1.18 ind/10 ha in 2007. In this plot 32 years ago the breeding population was 39 ind/10 ha. Thus, a strong decline occurs of breeding population in the plot has occurred. Changes in the management of the agricultural areas could lead these differences.

While the northern agricultural areas did not have changed the management, in the orange groves plot of Sagunto the change of the irrigation system and the use of herbicides have affected the presence of seed-bearing plants whose seeds constitute the main food during the breeding season to rear the nestlings. Indeed, we have reported both the recent absence of the main food of Greenfinches in the plot, *Erodium cicatarium*, and a decrease trend of the population since 1975.

ESTIMATING EXTINCTION RATES OF THE ENDANGERED EASTERN IBERIAN REED BUNTING (*EMBERIZA SCHOENICLUS WITHERBYI*) IN SPAIN

Eduardo Jorge Belda[1]*, Marcial Marín[1], Pablo Vera[2] & Juan Salvador Monrós[3]
[1] IGIC, Universidad Politécnica de Valencia, C/ Paranimf 1, 46730, Gandía, Valencia, Spain
[2] DIHMA, Departamento de Hidráulica, Ingeniería y Medio Ambiente, Universidad Politécnica de Valencia, Camí de Vera s/n, 46022 Valencia, Spain
[3] Instituto 'Cavanilles' de Biodiversidad y Biología Evolutiva, Universidad de Valencia, Apartado de Correos 22085, 46071 Valencia, Spain
* Corresponding author: ebelda@dca.upv.es

Traditionally, abundance has been the parameter used in conservation programs of endangered species. Nonetheless, abundance is a parameter that it is both difficult and costly to estimate. In addition abundance estimation has serious problems when wide ranges are covered for relative scarce and fragmented species. Alternatively estimates of occupancy (proportion of an area occupied by a species or fraction of landscape units where the species is present) based on presence-absence data may be used to monitor population trends. The Eastern Iberian Reed Bunting (*Emberiza schoeniclus witherbyi*) breeds only in Spain, Southern France and Morocco. Estimated population in 2005 in Spain was 254-360 pairs. The main population breeds in Tablas de Daimiel National Park, which holds almost 50% of the Spanish breeding population. In 2006 we sampled 33 wetlands to detect presence of the Reed Bunting during the breeding season. In the Tablas de Daimiel National Park we monitored 30 plots randomly selected to estimate occupancy area and population dynamics for 2007-2009. Presence absence data was analysed using software Mark 5.1 and Presence 2.3. We first evaluated the risk of extinction of the subspecies in Spain using presence data from 1995, 2005 and 2006. This type of data is analogous to data used to estimate survival form capture-recapture studies. Estimated extinction risk in 20 years was 0.20 (95% CI = 0.17-0.23) and 0.66 for a 50 year projection (95% CI = 0.63-0.69). Estimated occupancy rate in Daimiel was 68% in 2007 but it has declined since then. Extinction rate and population dynamics in the National Park are discussed in view of the results. The results suggest a very high probability of extinction in the areas if present conditions continue.

CLIMATIC, TOPOGRAPHIC, LOCAL HABITAT AND LANDSCAPE DETERMINANTS OF THE SNOWFINCH AND THE ALPINE ACCENTOR OCCURRENCE IN THE PICOS DE EUROPA NATIONAL PARK, CANTABRIAN MOUNTAINS

Mónica García, Leandro Melendez & Paola Laiolo*
Instituto Cantábrico de Biodiversidad (CSIC, Universidad de Oviedo, Principado de Asturias), Oviedo, Spain
* Corresponding author: paola@ebd.csic.es

Cantabrian Mountains host the westernmost limit of the Alpine Accentor (*Prunella collaris*) and the Snowfinch (*Montifringilla nivalis*) range. We focus here on climatic and environmental factors that determine the occurrence of these two alpine bird species in the Picos de Europa National Park, at the eastern fringe of Cantabrian Mountains. During spring-summer 2009, 105 circular plot surveys (3.14 ha) were repeated twice, and bird species occurrence and local habitat structure were recorded. Information on climatic (mean annual temperature and rainfall),

topographic (orientation of slopes) and vegetation type cover in 70 ha areas around the study plots was extracted from geographic information system data layers and related to the species' occurrence in plot surveys. The two species positively selected plots with cold temperatures and a great proportion of bare rocks at the local scale. The Snowfinch appeared to avoid dwarf shrub areas both at the plot (local) and landscape level. Conversely, the Alpine Accentor was more common in alpine meadows with a greater proportion of shrubs at the landscape scale. The occurrence of the latter species was also positively associated with the northernmost slopes and the steepest areas. In spite of sharing a strict preference for typical alpine habitats and responding similarly to climatic variation, the two species were differently affected by landscape and topographic features, and co-existed only in half of the occurrence plots.

CAN DATA SCHEME'S IN FLANDERS ASSESS WINTER IMPACT ON GREY WAGTAIL (*MOTACILLA CINEREA*) NUMBERS?

Marc Herremans
Natuurpunt Studie, Coxiestraat 11, 2800 Mechelen, Belgium
marc.herremans@natuurpunt.be

Grey Wagtail is a winter sensitive species in Europe, with numbers much reduced by severe winters. After a long series of (record) mild winters since 1987, the winter 2008-2009 was back to 'normal', with a period of three weeks of heavy frost over western and south-western Europe. In this presentation I will address whether the various data scheme's can asses the impact of this colder winter on Grey Wagtail numbers.

Grey Wagtail is a regular migrant with peak migration September-October; many birds winter in western Europe. There are scheme's online in both Belgium and The Netherlands (www.waarnemingen.be and www.waarneming.nl), capturing about half a million and two million 'occasional' bird records per annum, respectively. In these scheme's, the reporting rates of Grey Wagtail dropped by 56.5% in Belgium and 57.4% in The Netherlands between the month before the frost (15/11-15/12/2008) and the month after (15/1-14/2/2009), suggesting severe impact. Mortality could have been a major cause, but birds might as well still have emigrated. Reporting rates of Grey Wagtail were down by 18 and 22% during September-October 2009 compared to 2008, for Belgium and The Netherlands respectively.

Counts of migrants took place at some 80 locations throughout Flanders in recent years, recording 1.5-2.5 million migrants annually during September-October. Grey Wagtails are sparsely recorded in migration counts, about 2 birds in 10 hours. In 2009, passage dropped by 33%; however, due to particular weather conditions (prolonged periods with back-wind), the overall number of all migrants recorded dropped by exactly the same 33%. Despite c. 8,000 hours of counts annually, it is impossible to assess whether passage of Grey Wagtails declined in 2009.

In a local ringing scheme, I used continuous sound luring for 5 hours in the morning and 2 hours in the evening (almost) daily during September and October 2006-2009. Grey Wagtails on passage invariably responded and landed near a garden pond: all birds were counted, and 71% (815) were caught. Sound luring resulted in 5x more birds than migration counts, and numbers only dropped by 6% in 2009. However, adults increased from 3.5% in 2008 to 9.4% in 2009, indicating that after the more severe winter a larger proportion of the population undertook migration next autumn. When different fractions of the population migrate in different years in partial migrants, comparison of numbers between years becomes complex, if not impossible.

Detailed breeding bird surveys are the only option to assess population trends in such partial migrants, but Grey Wagtail is too sparse and localised in Flanders for common breeding bird techniques, and with c. 550 pairs too frequent to achieve sufficient accuracy in a country-wide breeding bird survey (BBV scheme by INBO).

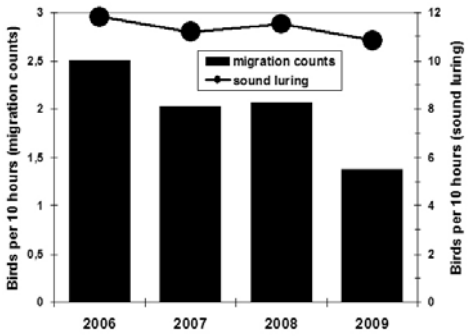

Figure 1. *Number of birds per year according migration counts and sound luring.*

ECOLOGY AND POSSIBLE EVOLUTION OF CRESTED TIT (*LOPHOPHANES CRISTATUS*) AND BLACK WOODPECKER (*DRYOCOPUS MARTIUS*) POPULATIONS IN THE APENNINES, ITALY

Guido Tellini Florenzano, Simonetta Cutini, Tommaso Campedelli* & Guglielmo Londi
DREAM Italia, Via dei Guazzi 31, I-52014 Poppi (AR), Italy
* Corresponding author: tcampe1@hotmail.it

Crested Tit and Black Woodpecker are widespread in North Italy, above all in the Alps, where they are mainly linked with conifer woods. Recently, both species have shown a clear tendency to move southwards, colonizing some areas in the Northern Apennines. If for the Crested Tit this phenomenon seems to proceed regularly along the Apennines from North to South, for the Black Woodpecker the situation seems very different, with the recent discovery of only two separate populations (Valle Aveto, Liguria and Foreste Casentinesi, Tuscany and Emilia-Romagna). It seems, therefore, that, in spite of similar ecological requirements, there are different factors driving these expansions. To investigate these factors, we have built ecological models for both species starting, for the Crested Tit, from all the available presence data in the Northern Apennines, and for the Black Woodpecker, from the observation-sites collected in the Foreste Casentinesi area, where a specific monitoring project has been carried out by the National Park. Ecological models were built using MaxEnt, a presence-only modelling method which, following the maximum entropy approach, gives back, for a certain territory, habitat suitable values. We have considered both environmental and climatic variables, retaining only those that were validated with a sub-sampling approach. The results seem to stress well which are the factors leading the two phenomena. Crested Tit, as it is well known, is not particularly linked with climate, in fact the model explicitation at peninsular Italy define, as areas with high suitability values, large part of the Apennines, as well as other sites, often along the sea coast, all characterised by the presence of conifer woods. On the other hand, the Black Woodpecker model shows a high relative importance of climatic variables, with positive effects of rainy and fresh conditions; consequently the areas with high suitability values are concentrated in the Northern Apennines. Both models show also variable levels of connectivity between suitable areas, showing, in South Italy, a large unsuitable belt along the mountain chain. Also the Crested Tit highly-suitable coastal pinewoods seem much more isolated than the mountain woodlands. Both species, following the expansion of conifer woods, seem therefore able to expand their ranges, at least till the Central Apennines (Abruzzo).

RINGING OF THE AQUATIC WARBLER IN EUROPE - DOES THE HISTORICAL RINGING DATA PROVIDE ESTIMATE FOR POPULATION DYNAMICS?

Mārtiņš Briedis & Oskars Keišs*
Laboratory of Ornithology, Institute of Biology, University of Latvia, Miera iela 3, LV-2169 Salaspils, Latvia
* Corresponding author: oskars.keiss@lu.lv

Quantitative analyses of historical declines in endangered species are usually impossible. We used published reports of European Bird Ringing Schemes to access the numbers of

ringed Aquatic Warblers in Europe since beginning of bird ringing in 20th century. Number of ringed Aquatic Warblers were analysed in comparison with numbers of other *Acrocephalus* species, ringed by respective ringing scheme in a respective year. Numbers of ringed pulli were separated from adults, if possible. Since first reports do not separate these age categories, separate analyses were done on all birds together. Two processes might be observed: decline of the Aquatic Warbler numbers and increased research focus on *Acrocephalus* species in second half of the 20th century (targeted research project - 'Acroproject' by EURING). We also produced population index of Aquatic Warbler and other *Acrocephalus* species by TRIM, treating each ringing scheme as an observation point. The outcome of this calculation should, however, be used with caution, because it is difficult to separate population decline from other factors impacting the number of ringed birds.

WHY HAVE THE NUMBERS OF BREEDING PAIRS OF THE RED-BREASTED FLYCATCHER (*FICEDULA PARVA*) DECREASED IN BIAŁOWIEŻA FOREST?

Cezary Mitrus*, Marzanna Gołoś & Magdalena Sikora
Department of Zoology, University of Podlasie, Prusa 12, 08-100 Siedlce, Poland
* Corresponding author: cmitrus@ap.siedlce.pl

The Red-breasted Flycatcher (*Ficedula parva*) is an uncommon species of bird in Poland and even more rare in western Europe. In the Białowieża National Park it breeds solitarily in natural tree cavities, half-holes or niches, suffers high predation pressure and occurs at low densities of up to 2.0 pairs/10 ha. In recent years (2000-2008), a significant decrease in the numbers of breeding pairs in old-growth lime-oak-hornbeam *Tilio (Querco)-Carpinetum* stands has been observed. This pattern was supported both by mapping and active searching for nests, both methods being used on the same study plots. In the nine years of study no significant changes in habitat structure were detected. In order to investigate the causes of these observed trends of in the numbers of Red-breasted Flycatchers we analysed the influence of breeding success, numbers of fledglings, numbers of potential competitors and predators and the return rates and arrival times of males to their breeding areas. Statistical analysis indicated that the most likely reason for the observed changes was a change in return rate. It seems that factors operating during post-breeding periods (during migration and/or on wintering areas) can play an important role in the regulation of the numbers of breeding pairs of the Red-breasted Flycatcher.

CORNCRAKE (*CREX CREX*) MONITORING IN FRIULI VENEZIA GIULIA (NORTH-EASTERN ITALY)

Fabrizio Florit[1]* & Gianluca Rassati[2]
[1] Autonomous Region of Friuli Venezia Giulia, Head Office of Agricultural, Natural and Forestal Resources, Office for Fauna Studies, via Sabbadini 31, I-33100 Udine, Italy
[2] Autonomous Region of Friuli Venezia Giulia, Head Office of Agricultural, Natural and Forestal Resources, Forest Office, via San Giovanni Bosco 8, I-33028 Tolmezzo, Italy
* Corresponding author: fabrizio.florit@regione.fvg.it

Autonomous Region of Friuli Venezia Giulia has been organizing annual surveys of Corncrake singing males in its regional breeding range since 2000. Results of censuses carried out by Regional Forest Service rangers in 2000-2009 decade are presented and the importance of regional Corncrake population at national level is illustrated. A geo-database of singing sites and a web-GIS application for data entry were developed for monitoring data management. These tools are essential to provide basic geo-coded information for conservation actions and habitat management within the frame of 'Birds' and 'Habitat' (79/409/EEC and 92/43/EEC) Directives.

LATVIAN CORNCRAKES IN EU: DOES HABITAT MANAGEMENT OF NATURA 2000 SITES PROVIDE SUFFICIENT CONSERVATION FOR THE SPECIES?

Ainārs Auniņš[1, 3], Oskars Keišs[1, 2]*, Jānis Reihmanis[2, 3] & Otars Opermanis[4]
[1] Faculty of Biology, University of Latvia, Kronvalda bulvaris 4, LV-1010 Riga, Latvia
[2] Laboratory of Ornithology, Institute of Biology, University of Latvia, Miera iela 3, LV-2169 Salaspils, Latvia
[3] Latvian Fund for Nature, Dzirnavu iela 73-2, LV-1011 Riga, Latvia
[4] Centre Thématique Européen sur la Diversité Biologique, Museum National d'Histoire Naturelle, 57 rue Cuvier, Case Postale 41, 75231 Paris cedex 05, France
* Corresponding author: oskars.keiss@lu.lv

The latest estimate of the Corncrake population in Latvia (2004) has been reported as 48,000 to 58,000 breeding pairs, placing Latvia among the most important countries for the conservation of this species on Pan-European scale. As the species is a strict farmland specialist, the state of the Latvian farmland plays key role in conservation status of the species. It has been estimated that nearly half of the country's Corncrake population (48-50%) inhabited abandoned agricultural lands. Since the beginning of the 21st century and especially after Latvia joined the EU in 2004 large funds have been allocated to its agricultural sector. Due to this, large parts of agricultural areas that were previously abandoned not only returned into agricultural practice but were managed more intensively than before their abandonment. At the same time the areas less accessible for intensive farming continued to overgrow and this polarization of farmland is characteristic not only to Latvia but also for other countries in the region. During this period a LIFE Nature project targeted at restoration of floodplain meadows as a priority habitat for Corncrake was carried out in 15 specially protected areas (SPA) of floodplain grasslands in the country from 2004 to 2008. Circa 2,400 ha of the habitat were restored.

We analysed countrywide Corncrake monitoring data collected annually since 1989 to investigate how population of the species and available farmland habitats have changed during this period. We identified habitat categories that are most important for maintaining the Corncrake population both in terms of having highest densities of calling males and holding largest absolute numbers of calling males. We used yearly Corncrake distribution and habitat management data collected for the floodplain restoration LIFE Nature project (2005-2009) to assess changes in Corncrake densities after habitat restoration. We compare these changes to those recorded in other habitats countrywide and assess the role of local and global factors in these changes. We evaluate the potential and protection level of semi-natural wet grasslands as the priority habitat in providing favourable conservation status of Corncrake in Latvia.

FINNISH EAGLE OWLS ARE IN DANGER - OR ARE THEY?

Jari Valkama* & Pertti Saurola
Finnish Museum of Natural History, FI-00014 University of Helsinki, Finland
* Corresponding author: jari.valkama@helsinki.fi

In the 1960s, the size of the Finnish Eagle Owl (*Bubo bubo*) population was 500-1,000 pairs. Since then, the number of Eagle Owls gradually increased, and in the 1980s the population size was estimated at 2,500 pairs. The increase coincided with several factors: (1) the protection status of the Eagle Owl improved as a result of the breeding season protection in 1966 and full protection since 1982; (2) the species learned to utilise dense Norway Rat (*Rattus norvegicus*) populations at improperly managed refuse dumps; and (3) modern forestry drastically increased the number of suitable nest sites, especially clearcuts. In the past, the Eagle Owls were timid and occupied only the most remote forest areas, but together with reduced persecution and increased food availability close to the human settlements, they showed rapidly an excellent ability to adapt to dumps, villages

and cities. However, since early 1990s the population size has declined and was estimated at 2,000 pairs in 1998, and only 1,200 pairs in 2008. The results of the long-term monitoring program of Finnish birds of prey shows that the annual population change of the Eagle Owl for the period 1994-2008 has been 4.7%, which suggests that the population size will halve during only less than 20 years. This reduction is most probably due to the fact that as much as 90% of old refuse dumps have been closed during the last 20 years, which in turn means that Eagle Owls have lost access to easy food. These changes may have been critical for reproductive success and survival of young and breeding adults. The long-term monitoring will show whether the Finnish population will return back to its original level prior to the era of refuse dumps or whether the decline is even more severe. In this worst scenario, serious and immediate conservation actions are needed.

BARN OWL (*TYTO ALBA*) AT THE SOUTH-WESTERN COAST OF THE CASPIAN SEA: OCCASIONAL RECORDS OR EXPANSION OF THE RANGE?

Nikolay D. Poyarkov[1]*, Anastasia B. Popovkina[1] & Sergey A. Bkreev[2]
[1] Moscow State University, 119991 Moscow, Russia
[2] Institute of Ecology and Evolution, Russia Academy of Sciences, Leninskiy Prosp. 33, 119071 Moscow, Russia
* Corresponding author: cygnopsis@yandex.ru

Wintering Barn Owl was recorded at the south-west coast of the Caspian Sea (Kyzyl-Agach State Nature Reserve, Azerbaijan, 38º 59' N, 48º 56' E) in late January 2005. The bird roosted in an empty metal can 2 m high and 1.5 m in diameter on the top of brick tower 10 m high amidst the ruins partly flooded after the raise of the water level of the Caspian Sea. In January and February 2007-2009 we observed a pair of Barn Owls in the same can; it was littered inside with a thick layer of food waste and pellets, indicating that the birds have used the shelter for a long time. In mid-January 2008 a dead owl was picked 25 km north of the tower. In January 2009 we collected about 1.5 kg of pellets, including fresh ones, in the abandoned buildings in the village 5 km south-west of the tower; in addition, three dead birds were found there. Wintering records (2007, 2008) and breeding records (2006) of the species were reported from the Shirvan National Park, Azerbaijan (40º 06' N, 47º 19' E; Poyarkov *et al*., 2009). Barn Owl is not listed in the recent bird record lists of Azerbaijan; however, the breeding birds of this species have been recently found in the western Caucasus (Bukreev, 2003; Farafontov & Bakhtadze, 2003). According to the experts from Zoological Museum, Moscow State University, the Barn Owls from Azerbaijan belong to the Mediterranean subspecies group (*Tyto alba alba*, *T. a. ernesti*, and *T. a. erlangeri*) and most likely to be *T. a. erlangeri*. Since the birds were recorded at the south-western coast of the Caspian Sea in five consecutive years and their number in the surveyed locality evidently exceeded one pair, the northward or north-eastward expansion of the species' range could be assumed.

WATERBIRD COMMUNITIES

25-YEAR MONITORING OF GEESE AND DUCKS IN VINOGRADOVO FLOODPLAIN (MOSCOW REGION) DURING THE SPRING MIGRATION

Alexander Mischenko[1]*, Olga Sukhanova[1] & Sergey Kharitonov[2]
[1] Russian Bird Conservation Union, Shosse Entuziastov, 60, 111123 Moscow, Russia
[2] Institute of Ecology and Evolution, Leninsky pr., 33, 117071 Moscow, Russia
* Corresponding author: almovs@mail.ru

Vinogradovo floodplain (area about 50 km^2) is suggested for the second set of Ramsar

Sites in Russia. The area is particularly valuable as a spring stop over for the large goose and duck flocks (one of the most important in the Central Russia). Monitoring of migrating geese and ducks numbers is conducted there since the early 1980s.

The maximal numbers of simultaneously staging geese during the period of monitoring were 10,000-16,000 in 1983-1990, 6,000-10,000 in 1995-2000 and 5,000- 22,000 in 2002-2009.

The basic share of migrating geese in Vinogradovo in all years except 2002 makes *Anser albifrons*. Completely other picture was observed in 2002, the year with very early and extremely dry spring. In the peak of migration in 2002 the numbers of *Anser fabalis* exceeded 8,700 individuals - about 80% of all geese. *Anser anser* is rare, no more than 0.5% of all geese. Staging *Anser erythropus* and *Branta leucopsis* are sporadic, no more than 4 individuals simultaneously.

Feeding areas of geese are changeable and depend of quality of the last year's harvesting, crop rotation and terms of sowing.

Spring hunting plays a negative role for staging geese mainly not as a result of their direct shooting, but because of constant disturbance of birds on all periphery of the local nature reserve and inadvertent fires of dry grass, that results in infringement of the diurnal activity, rest and feeding flights.

The maximum numbers of staging ducks were 7,000 in 1984-1990 and 4,900-12,200 in 2002-2009. The ratio of number of different duck species varies in years and different phases of migration. Absolute dominant (as a whole for the period of spring migration) as 20 years ago so now is *Anas penelope*. The changes of share of various duck species during different phases of spring migration is discussing.

Fluctuations of numbers of geese and ducks take place, mainly because of level and duration of spring floods and feeding conditions. The highest amount of staging geese (22,000 individuals) and ducks (12,200) was observed in April 2008, when the high and prolonged flood was made artificially (by closing a canal lock) on against a background of dryness of surrounding areas. It is not possible to estimate a long-term tendency on the background of strong annual fluctuations. Probably numbers are stable as a whole.

Staging geese and ducks suffer from the negative influence of the ceasing of traditional agricultural activity, overgrowing of fields by weeds, large areas of spring fires and disturbance.

The value of this important wetland can be lost forever in the nearest years without special actions on protection and management.

ABUNDANCE AND COMMUNITY COMPOSITION OF WATERBIRDS DURING A YEARLY CYCLE IN COASTAL WETLANDS OF FRIULI VENEZIA GIULIA AND EMILIA-ROMAGNA (NE ITALY), SOUTHERN CROATIA AND ALBANIA

Gabriele Facchin[1]*, Fabrizio Florit[1], Lino Casini[2], Lorenzo Serra[3], Gvido Piasevoli[4] & Taulant Bino[5]

[1] Autonomous Region of Friuli Venezia Giulia, Head Office of Agricultural, Natural and Forestal Resources, Office for Fauna Studies, via Sabbadini 31, I-33100 Udine, Italy

[2] Studi Ecologici Ricerca Natura Ambiente (ST.E.R.N.A), c/o Museo Ornitologico, via Pedriali 12, I-47100 Forlì, Italy

[3] National Institute for Environmental Protection and Research, via Ca' Fornacetta 9, I-40064 Ozzano nell'Emilia (BO), Italy

[4] Public Institution for the Protected Natural Values Management in the County of Split and Dalmatia, Prilaz braće Kaliterna 10, HR-21000 Split, Croatia

[5] Ministry of Environment, Forestry and Water Administration, c/o Natural History Museum Rr. E Kavajes 134, Tirana, Albania

* Corresponding author: gabriele.facchin@regione.fvg.it

A waterbird coordinated monitoring scheme has been implemented within the frame of the Interreg ANSER project ("Ecological role of the coastal wetlands in northern Adriatic, for the stop over and the wintering of water birds: guidelines for the preservation and the management of the coastal natural marine heritage"). Surveys have been carried out throughout two years (June 2006-May 2008)

in several coastal wetlands of Friuli Venezia Giulia and Emilia-Romagna (NE Italy), Split-Dalmatia and Dubrovnik-Neretva Counties (S Croatia) and Albania.
Waterbirds and some wetland-related raptor species were censused twice per month (during high tide in tidal areas) through Daylight Counts.
The community structure of each study area was analysed for the first yearly cycle, taking the highest of the two monthly counts available for each species into consideration. For richness, the overall number of species observed in a month was used. The communities in the three areas were described by the following parameters: monthly richness, average monthly richness, annual total richness, abundance, relative abundance, number of dominant species, number of subdominant species, dominance index, diversity, evenness and evenness index, used as an index of utilization of the wetland over time.
The monthly numerical fluctuations and the species composition of the taxonomic groups most represented (Podicipedidae, Phalacrocoracidae, Ardeidae, Anatidae, Waders, Rallidae, Laridae, Sternidae) are described.

STATE OF THE BREEDING BIRDS IN GEDIZ DELTA: DISTRIBUTION, ABUNDANCE, AND CHANGES IN BIRD POPULATIONS

Ortaç Onmuş* & Mehmet Siki
Ege University, Natural History Museum, Faculty of Sciences, Department of Biology, Izmir, Turkey
* Corresponding author: ortac.onmus@ege.edu.tr

Gediz Delta, located on the west coast of Turkey is a wetland of international importance. It satisfies IBA criteria for 28 bird species including important populations of some globally threatened species like Dalmatian Pelican (*Pelecanus crispus*), Lesser Kestrel (*Falco naumanni*), and Red-breasted Goose (*Branta ruficollis*). The delta is flat and consists of fresh, salty and brackish water ecosystems. Most of the sea-delta boundary is covered with small islets, mud flats, sand flats and sand beaches with Salicornia vegetation and seashells. There are lagoons, salinas, extensive salt marshes, salt pastures behind these habitats. Urban, farmland and industrial zones are also present in the innermost part of the delta.
The state of the breeding birds was identified by the application of breeding birds surveys (BBSs) during May to June in 2002 and 2006. A total of 30,500 ha comprising of wetland and surrounding completing ecosystems were chosen for the study. The study area was divided into 305 1 x 1 km UTM grids. To represent each UTM square, 3 random points separated by at least 300 m distance were sampled and surveyed once. Counts were conducted with duration of 10 minutes each. Standard EBCC breeding codes were used for quantification. Distribution and relative abundance maps for each bird species were prepared. Threat and habitat analyses were compared with the results of bird distributions and abundances.
Out of 305 UTM squares, 291 and 242 UTM squares corresponding to 747 and 667 observation points were surveyed in 2002 and 2006, respectively. In 2002, a total of 129 bird species were identified and 93 species (72.1%) were given breeding codes: 47 (36.4%) were classified as confirmed, 23 (17.8%) as probable, and 23 (17.8%) as possible breeding. In 2006, a total of 142 bird species were identified and 104 species (73.2%) were given breeding codes: 61 (43.0%) were classified as confirmed, 24 (16.9%) as probable, and 19 (13.4%) as possible breeding. A total of 116 different species were given breeding codes during the BBS studies. Among them 81 species were found in both surveys, while 12 species were only found in 2002, and 23 species were only found in 2006. Among the identified breeding species, 3 and 4 species were SPEC1, 10 and 11 SPEC2, 34 and 40 SPEC3 in 2002 and 2006, respectively. Among their threat statuses 6 species were Vulnerable, 18 and 23 species Declining, 4 species Rare, 2 Species Localised, and 18 species were Depleted.
173 (28.8%) and 91 (13.4%) UTM squares were found to be under various threats in 2002 and 2006, respectively. Among the identified threats pollution was found to be the most commonly observed threat and tem-

porary wet grassland and salt marsh and pastures were the most threatened habitats.

WINTERING WATERFOWL AS INDICATORS OF CHANGE OF EFFICIENCY OF BAYS OF BLACK SEA

Antonina G. Rudenko
Black Sea Biosphere Reserve, Ukraine
antonia-luis@yandex.ru

Waterfowl which concentrated during all seasons of year on the bays of Black Sea are used as indicators of large-scale changes and pollution in Tendrovsky and Jagorlytsky bays (the territory of the Black Sea Biosphere Reserve). Cause and effect mutual relations between dynamics of populations and an environment are found out. species indicators are for this purpose allocated: a Mute Swan (*Cygnus olor*) and Coot (*Fulica atra*) - as objects for definition of deterioration of a forage basis, in particular change Phytobenthos -, seaduck *Aythyinae* and river ducks *Anatinae* (ichthyophagous and benthophagus), Pontic Gull (accumulation of poisonous substances in Bays).

Though all listed species promote reception of ambiguous characteristics of a bay, nevertheless their reaction to change of these characteristics always unequivocal - reduction of a total number of population. Therefore in a basis of methodical receptions these indicators also are put.

It is necessary to notice, that the total numbers of wintering birds on a boundary of 1990 and 2000s has got the tendency of sharp decrease, especially in comparison with the period of 1970-80s (figure 1). It, certainly, is connected with deterioration of an ecological condition of the reservoirs connected with human economic activities (Ardamatskaya, 1993; Majatsky & Chervaykov, 1999; Rudenko *et al*., 2000). In Tendrovsky and Jagorlytsky bays of Black Sea there was an essential reduction of the areas to thickets of water plants making a basis of efficiency of bays. The forage babis of ducks, swans and a coots has grown poor. As a result of it number wintering and moulted swans, coots has sharply decreased. There is also an accumulation of chemical poisons in the water and organisms. Among swans the share of physiologically abnormal, probably weakened individuals increases.

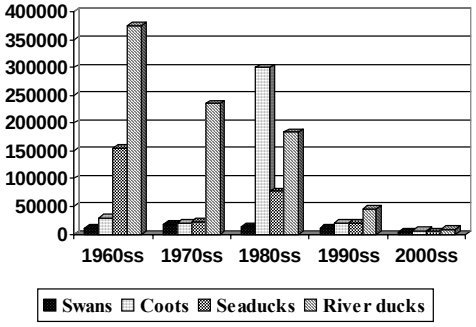

Figure 1. *Number of a wintering waterfowl during the periods of different stages of anthropogenous transformation of reserved bays of Black Sea.*

SOME RESULTS OF WATERBIRDS MONITORING IN WETLANDS OF FOREST AND FOREST-STEPPE ZONES OF UKRAINE

Igor Davydenko
Kyiv Shevchenko University, Volodymyrs'ka Str., 64, 01601 Kyiv, Ukraine
i_davidenko@ukr.net

According to our investigations, in the wetlands of Forest and Forest-Steppe zones 97 species of wetlands birds, which belong to 11 groups, 26 families and 56 genuses are recorded. The most numerous and widely distributed in the wetlands of researched region are: Mallard (*Anas platyrhynchos*; 59,74%), Black-headed Gull (*Larus ridibundus*; 10,65%), Yellow-legged Gull (*Larus cachinnans*; 4,80%), Common Tern (*Sterna hirundo*; 3,10%), Coot (*Fulica atra*; 2,42%), Great Crested Grebe (*Podiceps cristatus*; 2,01%), White-winged Black Tern (*Chlidonias leucopterus*; 1,79%), Grey Heron (*Ardea cinerea*; 1,20%), Lapwing (*Vanellus vanellus*; 1,19%) and Garganey (*Anas querquedula*; 1,03%).

The parameters of bird's species and taxonomical diversity in the wetlands have the general tendency to increase with the level of wetland ecosystems development; however at the last stages of successions they are reduced a little bit. Therefore, we can determine the species, which can be indicators of the basic stages of wetlands complexes succession in the researched region.
Among the birds of Forest and Forest-Steppe zones wetlands in the Red Data Book of Ukraine - 11 species, 5 species are in the Red List of IUCN, 53 species are in the AEWA, and 61 bird species are in the Appendix II of Bern Convention.

TREND IN WATERBIRD POPULATION IN ANDALUSIA (SPAIN) AND ITS VALUE AS AN INDICATOR FOR WETLANDS CONSERVATION

Claudine de le Court[1]*, José R. Garrido[1] & Francisco Romero[2]
[1] Programa de Emergencias, Control Epidemiológico y Seguimiento de Fauna Silvestre de Andalucía, Egmasa-Consejería de Medio Ambiente, Junta de Andalucía, Spain
[2] Servicio de Geodiversidad y Biodiversidad, Consejería de Medio Ambiente (CMA), Junta de Andalucía, Spain
* Corresponding author: cdelecourt@egmasa.es

The analysis of waterbird population changes is useful for assessing the health of wetlands and monitoring environmental changes, even though there are limitations in the use of some bird species as indicators.
Andalusia is an important area for wintering, nesting and migrating waterbird populations. It includes many wetlands of international importance such as the Marshes of the Guadalquivir, the Odiel Marshes, the Cádiz Bay and the Laguna of Fuentedepiedra.
Monitoring of waterbirds has been carried out in the last two decades in Andalusia, although a standardized methodology and a coordinated effort in the surveys exist at a regional scale since 2003 when the Andalusian Government started the "Program of Emergencies, Epidemic Control and Monitoring of Animal Wild Life". From 2003 onwards a professional team carried out monthly monitoring of more than 110 species, following an established protocol, on near 300 wetlands in Andalusia covering more than 140,000 ha. So, CMA gets actualized information about waterbird populations in the main migratory, breeding and stop-over wetlands. The results allow estimating the trends and the status of wintering and breeding populations as well as the use of wetlands as stop-over, wintering and breeding grounds.
Population trends were estimated for the main endangered waterbird species using all available data. Population decline was observed for Marbled Duck (*Marmaronetta angustirostris*), Red-knobbed Coot (*Fulica cristata*) and Ferruginous Duck (*Aythya nyroca*), while a positive trends was registered for White-headed Duck (*Oxyura leucocephala*), Glossy Ibis (*Plegadis falcinellus*) and Eurasian Spoonbill (*Platalea leucorodia*). For others species like Squacco Heron (*Ardeola ralloides*) or Kentish Plover (*Charadrius alexandrinus*), trends remains unclear. Results are discussed in relation to environmental changes.
We propose indicators based on diversity and changes in breeding populations of endangered species, with the aim to assess the health of wetlands and to evaluate the results of management and restoration of Andalusian wetlands.

EFFECT OF HABITAT VARIABLES ON THE LONG-TERM CHANGES IN NUMBERS OF WINTERING WATERFOWL ON PARTICULAR WETLAND SITES THE CZECH REPUBLIC

Polakova Simona*, Musil Petr & Musilova Zuzana
Faculty of Science, Charles University, Vinicna 7, 12843 Prague, Czech Republic
* Corresponding author: simpolak@seznam.cz

The long-term changes in numbers of waterbird species were analysed using data of International Waterbird Census (IWC), which were carried out in mid-January each winter from 1966-2008 inclusive. The IWC counts

covered annually 48-639 wetlands. We analysed data from 175 localities, which were investigated in at least ten seasons from the beginning of monitoring programme (1960s) till nowadays.
We calculate annual mean numbers and species counts of wintering waterbirds in these localities in particular decades for analysis of changes in total numbers and species representation of wintering waterbirds. GLM was used for repeated measurement analysis of relationship among number of wintering waterbirds and time (decades) and habitat variables, i.e. wetland type (river, fishpond, reservoir, 'industrial' water), geographical position, site protection and proportion of surrounding habitats (wetlands, open landscape, forest, urban habitats).
The remarkable increase in numbers of wintering waterbirds, individuals as well as species, was recorded especially on fishponds, which represent the most frequent type of standing waters in the studied area. Data from the 1960s differs significantly from the other decades. There were no changes during decades in other wetland types. In running waters, wintering water birds tend to prefer urban habitats and they are in the wane in open areas. Total number of individuals as well as species grows up in higher elevations. Numbers of individuals decrease from the west to the east in the Czech Republic, whereas species richness increases. Both monitored variables increase from the south to the north because more and more species are wintering northwards. Birds prefer more areas with large proportion of wetlands in surrounding landscape during last five decades. In protected areas, e.g. Ramsar Site, IBA or Natura 2000, number of species but not total numbers increase during the time.
The analysis of local climatic variables on long-term changes in waterbird numbers and species on both the total numbers and the species diversity of wintering waterbirds will be included in the poster. We expect shift of wintering waterbirds numbers to higher altitude and to the regions with colder climatic conditions. On the other hand, increase in numbers of wintering waterbird species is expected in milder climatic areas, where some southern species winter.

THE WOW CRITICAL SITE NETWORK PORTAL: A NEW TOOL FOR WATERBIRD CONSERVATION AND MANAGEMENT AT MULTIPLE SCALES

Szabolcs Nagy*, Nicky Petkov & Vicky Jones
Wetlands International, PO Box 471, 6700 AL Wageningen, The Netherlands
* Corresponding author:
szabolcs.nagy@wetlands.org

The Wings over Wetlands (WOW) UNEP GEF Project coordinated by Wetlands International, BirdLife International and other partners in the African/West Eurasian region will end in 2010. One of the achievements of the project has been the development of an innovative and powerful web portal known as the Critical Site Network (CSN) Tool. The web Portal combines data from Wetlands International's International Waterbird Census (IWC) Database, BirdLife International's World Bird Database (WBDB), the Ramsar Sites Information Service and the World Database of Protected Areas maintained by the World Conservation Monitoring Centre (UNEP-WCMC). It will make these currently dispersed data relating to 300 waterbird species available in a central, open and searchable Web-based interface.
The CSN Tool will be a central information portal, integrating current knowledge on migratory waterbirds along the African-Eurasian Flyways. It will support the identification and conservation of the network of sites used by waterbirds to complete their annual migrations across Africa and Eurasia. The CSN Tool will foster international cooperation among a wide range of governmental and non-governmental organizations towards flyway level conservation of migratory waterbirds.
The CSN Tool is aimed at conservation practitioners, decision-makers and planners at local, national and international level. It will help national authorities across the African-

Eurasian region identify what critical sites fall into their national jurisdiction and highlight the importance of individual sites in a flyways context. The tool will assist international waterbird conservation efforts by providing the information needed to better protect waterbird species across their entire migratory range. It will help all stakeholders involved in the transboundary conservation of waterbirds to target their efforts to fulfil their obligations under relevant international treaties including i.e. the Ramsar Convention on Wetlands, the Convention on Migratory Species and the African-Eurasian Migratory Waterbird Agreement and the EU Birds Directive.

WEB TOOLS

ORNITHO.IT A NEW ORNITHOLOGICAL PLATFORM AND DATABASE ABOUT BIRDS IN ITALY: A GREAT OPPORTUNITY FOR KNOWLEDGE AND CONSERVATION

Roberto Lardelli
Swiss Ornithological Institute, CP 158, CH-6573 Magadino, Switzerland
roberto.lardelli@bluewin.ch

During the spring 2009 a new platform for ornithologist and birders of the ornitho's European family started in Italy as in Cataluña and France.
The tree national ornithological and birding associations of Italy (CISO, LIPU, EBN), the most of regional groups as As. Fa. Ve., ASOIM, ASOER, COT, GOL, GPSO, the Italian ornithological Institute ISPRA, the University of Pavia and the Museum on Natural History of Trento form the Steering Group to ensure the management of Ornitho.it, that guides its decisions, nominates the Data Verification Group, and evaluates, approves, or rejects requests to use the data present in the archives.
Ornitho.it has the following institutive goals:

- Building and maintaining a homogenous ornithological database for the entire territory of Italy, San Marino, Vatican, and northern Tunisia.
- Creating a useful knowledge base for the conservation of Italy's ornithological heritage.
- Monitoring Italy's avian wealth, with particular regards to protected areas and Natura 2000 network sites.
- Sharing basic ornithological information.

During the winter 2009/2010 using Ornitho.it started the new Wintering Birds Atlas of Italy and spring 2010 is also going to begin the new Breeding Birds Atlas of Italy.

NEW INTERNET-GIS-BASED METHODS COLLECT BIRD MONITORING DATA FASTER, EASIER, BETTER AND IN MORE DETAIL

Gerard Troost
SOVON Dutch Centre for Field Ornithology, The Netherlands
gerard.troost@sovon.nl

Processing bird monitoring data is often time consuming. Methods like territory mapping require e.g. interpreting field observations from (paper) field maps. Besides time consuming and slow, in the usual process not all information is transferred to data collectors. Transferring the exact locations of these bird observations is difficult and until recently virtually impossible. The same holds for monitoring non breeding birds, e.g. by mid-winter waterbird counts. Locations of the bird concentrations usually are not digitized by volunteers themselves. The result is that often only the counted totals in an area are stored in databases of the main data collectors.
In this internet era much more is and becomes possible. Communication with the observers has become more easy, e.g. by visualization of survey areas via internet GIS and the distribution of field and distribution maps.
Particularly data collection possibilities are greatly improving. We show examples of

improved geodata collection facilities in the Netherlands. Online GIS software is able to directly store and process the monitoring data collected by breeding bird territory mapping surveys.
The poster shows examples of autovalidation and automated territory clustering tools. Part of these functionalities will be demonstrated 'on the spot'.

WORLDBIRDS - THE POWER OF CITIZEN SCIENCE

Ian Fisher
Royal Society for the Protection of Birds, Sandy, Bedfordshire, SG19 2DL, UK
ian.fisher@rspb.org.uk

Much information on bird numbers and distribution is published in the form of bird atlases, technical reports, site guides and scientific papers. However, large quantities of information are 'lost' - for example in birdwatchers' personal notebooks, in unpublished trip reports or on data sheets that have not been computerised. There are probably millions of bird records that fall into this category, many of them for countries that have very high bird diversity but no common system of monitoring their numbers. WorldBirds is an Internet-based initiative consisting of a global 'family' of data collection portals and provision systems to facilitate the collection, analysis and presentation of data at relatively little cost, thus capturing the vast quantity of data collected by amateur birdwatchers.
Whether you are an amateur or a professional birdwatcher, whether you are a local observer or visiting a country to watch birds, log on to worldbirds.org and help us gather data across the globe. As well as providing valuable information for science (population trends, abundances, distributions, range expansions and changes, assessment of hotspots), it gives you reports, checklists, and maps (to view, print, or download) so you can locate the best birding sites and view the observations of others.

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