EUROPEAN MONITORING NEWS

Ten years of the BirdLife Cyprus Common Bird Monitoring Scheme, 2006–2015

Martin Hellicar & Christina Ieronymidou

BirdLife Cyprus, P.O. Box 12026 2340 Nicosia, Cyprus
martin.hellicar@birdlifecyprus.org.cy; christina.ieronymidou@birdlifecyprus.org.cy

Abstract. We present here the first findings of the BirdLife Cyprus Common Birds Monitoring Scheme (CBMS), set up in 2006 and expanded in 2013 thanks to state funding. The aim of the CBMS is to capture a representative sample of common breeding birds in all major habitats in Cyprus, in order to reliably track the trends in numbers of these birds and also in order to gather data on population densities. We report here on trends in the populations of common birds, and on indexes derived as indicators for common, farmland and forest bird groupings, but not on density estimates. Tracking wild bird populations in this way allows conservationists to monitor the state of our countryside. Understanding whether these populations are stable, increasing or decreasing is fundamental to bird conservation efforts. Indexes derived from the CBMS provide the best currently available indicators of the state of the environment in Cyprus. The first results for the Common Bird Indicator suggest that numbers of common birds in Cyprus were relatively stable and recovering after a decline during the period 2006–2009. The pattern is similar for the Farmland Bird Indicator, though the decline during 2006–2009 is more marked and subsequent recovery weak, compared to common birds as a whole. The Forest Bird Indicator shows a pattern similar to that for common birds, but without the clear 2006–2009 decline in numbers.

Introduction

Prior to 2006, there existed no reliable picture of the national population sizes, densities or trends for the common and widespread birds of Cyprus. Monitoring programmes run by the Cyprus Game and Fauna Service and by BirdLife Cyprus existed for many rarer or habitat or site restricted species, such as birds of prey like the Griffon Vulture *Gyps fulvus*, Bonelli's Eagle *Aquila fasciata*, Eleonora's Falcon *Falco eleonorae* and wetland birds, such as Kentish Plover *Charadrius alexandrinus* and Spur-winged Lapwing *Vanellus spinosus*. However, reliable population estimates for more widespread and common species such as European Goldfinch *Carduelis carduelis*, House Sparrow *Passer domesticus* and Crested Lark *Galerida cristata*, were not available. Without such information, gathered in a scientifically rigorous manner and updated on an annual or near-annual basis, it was not possible to know what the conservation status of the common species of Cyprus was.

An important suite of species among these common birds, from both a conservation and policy point-of-view, is that of farmland birds. Systematic monitoring of farmland birds is an obligation of European Union Member States for the delivery of wild bird indicators, used as a proxy for the conservation status of farmland and as indicators of sustainable development (Gregory et al. 2008). Information on population trends of farmland birds provides much of the necessary evidence base for appropriate planning of farmland management actions and the conservation of farmland biodiversity.

In 2010, a workshop was organised by BirdLife Cyprus and the Cyprus National Rural Network (EAD) entitled 'Development of a single methodology for a Cyprus Farmland Bird Indicator', involving all stakeholders as well as invited experts from the European Bird Census Council (EBCC). The workshop concluded in a proposal for establishment of a volunteer-based common bird monitoring scheme for Cyprus. Following on from this workshop, the Cyprus Department of Agriculture awarded a two-year (September 2012 — September 2014) service contract to BirdLife Cyprus for the establishment of volunteer-based common bird monitoring scheme and delivery of a Farmland Birds Index for Cyprus.

Methods

In the early years of the scheme (2006–2012), two separate, smaller monitoring programmes were in operation, one west Cyprus scheme ran by Professor Derek Pomeroy of Makerere University, Uganda (Pomeroy & Walsh, 2015), and the other a pilot volunteer-based, BirdLife Cyprus scheme. These two schemes were merged and expanded in 2012 to form a comprehensive all-island CBMS, with 156 sampling locations (Figure 1). This represented a near-doubling of the 84 sites covered during the period 2006–2012, under the older schemes. At the time of writing, and due to the division of the island, the coverage of the scheme effectively only extends to Cyprus south of the dividing line, with only four CBMS sites north of the dividing line. In the long term, the scheme aims to achieve representative coverage over the entire island.

The sampling unit for the CBMS is a 1×1 km square. The 156 sampling locations are selected randomly with stratification by habitat. When expanding the CBMS scheme in 2012, eight broad habitat categories were mapped for Cyprus on the basis of the 2006 CORINE land cover classification system (MANRE 2009). Within each broad habitat category, and after incorporating the 84 sites from the two pre-existing schemes, new 1×1 km squares were randomly added, until a target number of sites had been reached for each habitat category, proportional to the actual relative extent of each habitat type and evenly spread across all administrative districts, to achieve a balanced geographical coverage of Cyprus.

The eight habitat categories used include all natural and man-made habitats, including built-up areas, but not wetlands as these are covered under a separate monitoring scheme. The habitat categories are: Forest (mostly pines), Scrub (maquis and garrigue), Phrygana (low, open scrub with grasses), Groves (Olives, Citrus, Carob, etc), Mosaic (small farm plots with permanent and annual crops, mixed with patches of natural vegetation), Vines, Cereals (mostly barley and wheat fields) and Towns (and villages).

The CBMS concentrates on the 40 species identified as common breeding birds of Cyprus (Table 1). Of these species, a sub-set of 25 are largely dependent on farmland habitats, including cultivation, permanent crops and grazed scrub and prhygana, and 17 are largely dependent on forest habitats (16 common birds, plus the Cyprus Short-toed Treecreeper *Certhia brachydactyla dorothea*, which is not strictly speaking a common breeding bird in Cyprus, but is recorded during surveys).

Within each 1×1 km sampling plot, a track is chosen for a walked line transect bird survey. Surveys are carried out during the breeding season (March to June) each year, with one early survey in March or April and one late survey in May or June. Surveys are carried out by a team of volunteers, who receive specific training on the survey methodology. All species seen or heard are recorded in distance bands either side of the transect line (0–25 m, 25–100 m, >100 m), while walking at a very slow pace. Transects are around 1 km long, but can be longer or shorter, depending on the availability of suitable tracks. Recording in distance bands allows the data collected to be analysed to derive estimates of density for individual species. We report here on trends in the populations of common birds, but not on density estimates. Prior to this paper, trend data had been presented only in reports to the Cyprus government relating to the service contract to produce the Farmland Bird Index for the island.

To overcome between-year variations in sampling, analysis of the data is carried out using the purpose-designed software package TRIM (TRends and Indices for Monitoring data, Pannekoek & van Strien 2001), developed by Statistics Netherlands and used widely across Europe for analysis of trend data for bird populations. Following Pan-European Common Bird Monitoring Scheme (PECBMS) guidance, the trends for single species generated using TRIM (Table 2) are aggregated in a standardised manner to produce trend indexes for groups of bird species, such as the Common Birds Index, Farmland Bird Index and Forest Bird Index. CBMS data on all 40 common breeding bird species from all survey sites are used to derive the

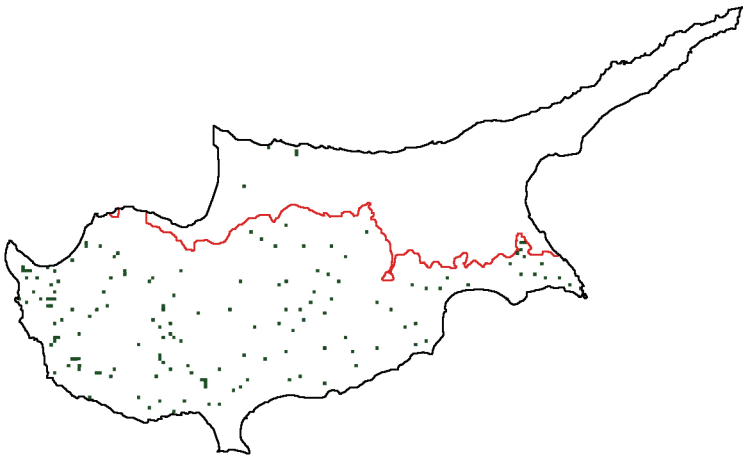

Figure 1. The 156 BirdLife Cyprus Common Birds Monitoring Scheme survey sites (1×1 km squares in black) were selected randomly, with stratification by habitat and ensuring an even coverage of Cyprus. The island's dividing line is shown in red.

Table 1. The CBMS programme focuses on 40 common breeding species, of which 25 are classified as predominantly farmland birds in Cyprus and included in the Farmland Bird Index, and 17 are classified as predominantly forest birds. Note that some species are classified as both farmland and forest birds.

Species included in the Cyprus Farmland Birds Index — 25 species				
Falco tinnunculus *Alectoris chukar* *Francolinus francolinus* *Coturnix coturnix* *Columba palumbus*	*Streptopelia turtur* *Clamator glandarius* *Athene noctua* *Coracias garrulus* *Galerida cristata*	*Hirundo rustica* *Oenanthe cypriaca* *Cisticola juncidis* *Iduna pallida* *Sylvia conspicillata*	*Sylvia melanocephala* *Parus major* *Pica pica* *Corvus corone cornix* *Passer hispaniolensis*	*Chloris chloris* *Carduelis carduelis* *Linaria cannabina* *Emberiza melanocephala* *Emberiza calandra*
Species included in the Cyprus Forest Birds Index — 17 species				
Columba palumbus *Streptopelia turtur* *Troglodytes troglodytes* *Oenanthe cypriaca*	*Cettia cetti* *Hippolais pallida* *Sylvia melanothorax* *Periparus ater cypriotes*	*Parus major* *Certhia brachydactyla dorothea* *Lanius nubicus* *Garrulus glandarius glaszneri*		*Fringilla coelebs* *Serinus serinus* *Chloris chloris* *Carduelis carduelis* *Emberiza caesia*
Species included in the Cyprus Common Birds Index — 40 species				
Falco tinnunculus *Alectoris chukar* *Francolinus francolinus* *Coturnix coturnix* *Columba palumbus* *Streptopelia decaocto* *Streptopelia turtur* *Clamator glandarius*	*Athene noctua* *Apus apus* *Coracias garrulus* *Galerida cristata* *Hirundo rustica* *Cecropis daurica* *Delichon urbicum* *Troglodytes troglodytes*	*Oenanthe cypriaca* *Cettia cetti* *Cisticola juncidis* *Iduna pallida* *Sylvia conspicillata* *Sylvia melanocephala* *Sylvia melanothorax* *Periparus ater cypriotes*	*Parus major* *Lanius nubicus* *Garrulus glandarius glaszneri* *Pica pica* *Corvus monedula* *Corvus corone cornix* *Passer domesticus* *Passer hispaniolensis*	*Fringilla coelebs* *Serinus serinus* *Chloris chloris* *Carduelis carduelis* *Linaria cannabina* *Emberiza caesia* *Emberiza melanocephala* *Emberizacalandra*

Common Birds Index for Cyprus, while data on the 25 farmland dependent species from surveys sites located in farmland habitat are used to derive the Farmland Bird Index for Cyprus, and data on the 17 forest dependent species from forest habitat sites are used to derive the Forest Bird Index for Cyprus (Figure 3).

Results and discussion

In total, over 1,300 CBMS surveys were carried out across Cyprus over the period 2006–2015, by a team of trained volunteer field recorders. The number of sites each year varied considerably (Figure 2). This inter-annual variation in coverage was partly down to availability of volunteers and funding. The large increase in coverage from 2013 was achieved through direct funding for the BirdLife Cyprus CBMS provided by the Cyprus Agriculture Department during the period 2012–2014, under a service contract for the production of the Farmland Bird Index for Cyprus.

Both the Common Birds Index and the Farmland Bird Index appear to show a decline during the

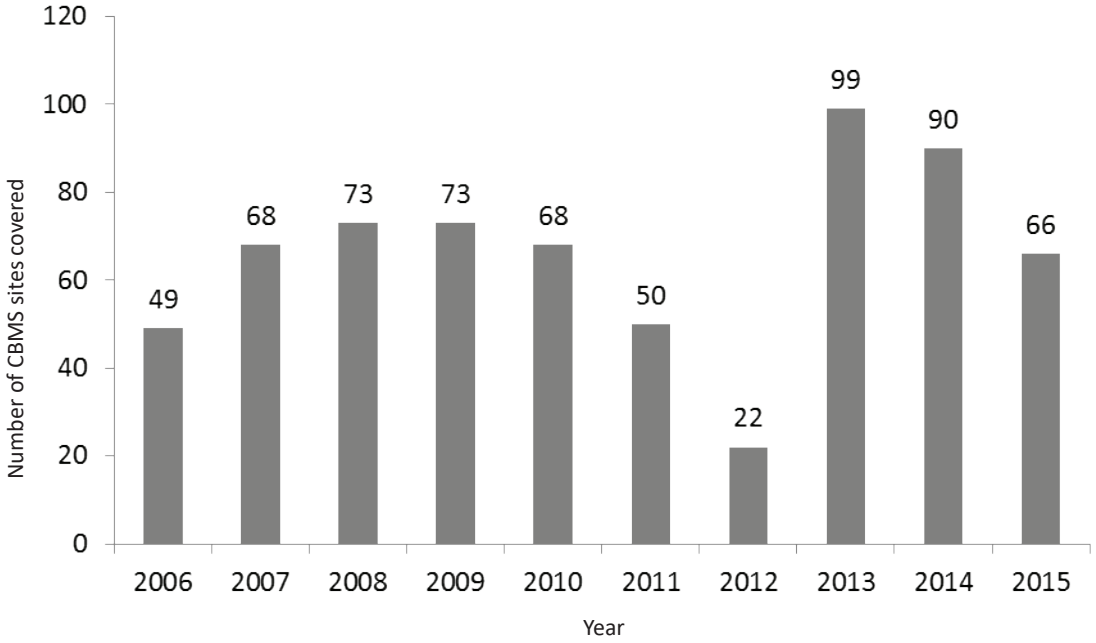

Figure 2. Inter-annual variation in BirdLife Cyprus Common Bird Monitoring Scheme survey site coverage over the period 2006–2015. The total number of sites was 84 up to 2012, and 156 from 2013 onwards.

period 2006–2009, with this decline being more pronounced for the sub-set of 25 bird species largely dependent on farmland. The year 2009 represents a 'low point' for common birds as a whole, for farmland birds in particular and also for forest birds, probably related to the below average (500mm) rainfall levels in Cyprus over the period 2005–2008 and the drought of 2007/08. The 'peak' seen for all three indicators in 2013 could be related to the preceding winter being the wettest over the survey period ((Meteorological Service undated)).

From 2010 onwards, there appears to be a recovery evident for both common birds and for farmland birds, though farmland birds only return to the baseline level in 2013 and decline again thereafter. Common bird numbers therefore appear to be more stable overall than those for farmland birds over the ten year period. This suggests birds that are more dependent on farmland habitats fared worse during this period than common birds as a whole in all habitats taken together. But note the patterns apparent in Figure 3 were not tested statistically.

At a European scale, the intensification of farming practices on the one hand and the abandonment of traditional farming on the other, have led to marked declines in farmland birds and other wildlife across the continent in recent decades (Farina 1997, Donald et al. 2001, Benton et al. 2002, Donald et al. 2006). While the reasons behind the negative trend for farmland bird numbers in Cyprus over the period 2006–2015 are not clear, both intensification and abandonment patterns have been evident in Cyprus farmland in recent decades (Ieronymidou 2012). These changes are likely to have had a degrading effect on the quality of farmland as a habitat for birds and wildlife in general, as has been shown to be the case for Europe as a whole.

The Forest Birds Index shows that the sub-set of forest birds fare better in general than common birds and better than farmland birds. Notably, the decline over the period 2006–2009 is not evident for forest birds, though 2009 is again a 'low point'. Overall, the Forest Bird Index can be said to be stable over the period 2006–2015.

BirdLife Cyprus contributes CBMS data from Cyprus to PECBMS, which produces indexes for common, farmland and forest birds at a European level, pulling together data from 28 different countries (Van Strien et al. 2001, Gregory et al. 2008). While these European indexes are much longer-term than the Cyprus indexes (since 1980 compared to since 2006 for Cyprus), it is evident that there is a broad similarity in the patterns shown for common breeding birds at the pan-European and Cyprus scales. At both scales, farmland birds have fared worse. The major difference is the catastrophic and continuing decline in farmland bird populations seen across Europe since 1980. This dramatic decline has not been

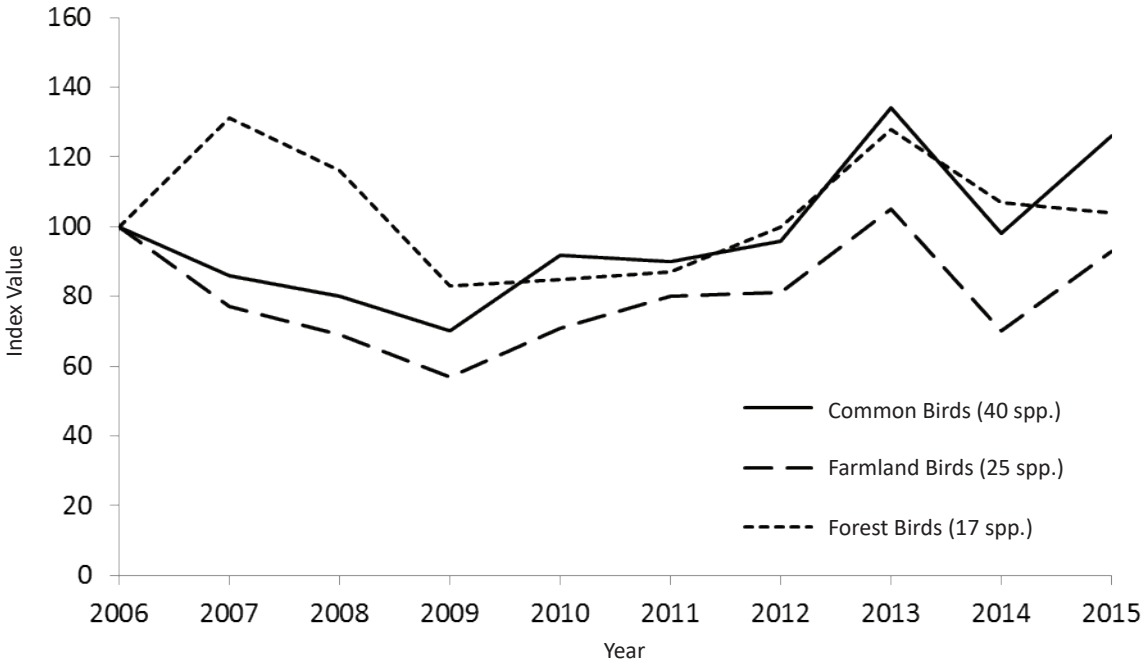

Figure 3. Wild bird indicators for Cyprus 2006–2015. The Common Bird Indicator (solid line) shows that numbers of common birds in Cyprus were relatively stable and recovering after a decline during the period 2006–2009. The pattern is similar for the Farmland Bird Indicator (long dash) though the decline during 2006–2009 is more marked and subsequent recovery weak, compared to common birds as a whole. The Forest Bird Indicator (short dash) shows a very similar trend to that for common birds, but without the clear 2006–2009 decrease in numbers. The 'peak' seen for all three indicators in 2013 could be due to the preceding winter being the wettest over the survey period.

recorded in Cyprus, at least not in the recent short term over the period 2006–2015. Sadly, there is no systematic data available on longer term population trends for common breeding birds in Cyprus.

Acknowledgements

The data presented and analysed in this report was collected by a team of volunteer bird recorders, both local and visiting, coordinated under the BirdLife Cyprus Common Birds Monitoring Scheme (CBMS). A special thank-you is due to these dedicated volunteers, who are: Aaron Howe, Adam Millington, Alan Crabtree, Alan & Sue Colquhoon, Alan Turtle, Alan Tye, Alison McArthur, Anders Gray, Anna Pitzi, Bill Barker, Bob Peel, Bob Johnston, Brian & Marny Willis, Chris Stavrou, Clairie Papazoglou, Colin Richardson, Dave & Jan Walker, David & Judy Dawes, Dindy Drury, Hugo Sampaio, Ioanna Ioannidou, Jane Stylianou, Jim Muncey, Johannes Honold, John & Ann Stapley, June Neal, Kostas Kailis, Larry Dyke, Martin Hellicar, Melis Charalambides, Nick Pollard, Nigel Cottle, Panicos Panayides, Paul Watson, Paul & Melanie Curry, Peter Evans, Peter Beckenham, Peter Moore, Ray Atkinson, Stavros Christodoulides, Sue Todd and Thjis Valkenburg. A particular mention and many thanks are also due to Prof. Derek Pomeroy, of Makerere University, Uganda, who set up the first common birds monitoring scheme in Cyprus, in the West of the island, and contributed all his field data (and expert advice besides) to the CBMS.

References

Benton, T.G., Bryant, D.M., Cole, L. & Crick, H.Q. 2002. Linking agricultural practice to insect and bird populations: a historical study over three decades. Journal of Applied Ecology 39: 673–687.

Donald, P.F., Green, R.E. & Heath, M.F. 2001. Agricultural intensification and the collapse of Europe's farmland bird populations. Proceedings of the Royal Society B: Biological Sciences 268: 25–29.

Table 2. Overview of individual trends for common breeding birds in Cyprus 2006–2015. The population index trends for the 40 common breeding bird species across all (non-wetland) habitats ('Overall') and also, where the species occurs in these habitats to a significant extend in Cyprus, in farmland habitats ('Farmland') and in forests ('Forest'). 'Strong Increase' signifies an increase significantly more than 5% per year. 'Moderate Increase' signifies a significant increase, but not significantly more than 5% per year. 'Stable' signifies no significant increase or decline, and most probable trends less than 5% per year. 'Uncertain' signifies no significant increase or decline, and unlikely trends are less than 5% per year. 'Moderate Decline' signifies a significant decline, but not significantly more than 5% per year. 'Steep Decline' signifies decline significantly more than 5% per year (5% would mean a halving in abundance within 15 years).

Species	Overall (for 156 sites across all habitats)	Farmland (for 114 farmland sites)	Forests (for 26 forest sites)
Common Kestrel *Falco tinnunculus*	Uncertain	Uncertain	
Chukar *Alectoris chukar*	Uncertain	Uncertain	
Black Francolin *Francolinus francolinus*	Moderate Increase	Moderate Increase	
Common Quail *Coturnix coturnix*	Uncertain	Uncertain	
Common Woodpigeon *Columba palumbus*	Uncertain	Uncertain	Uncertain
Eurasian Collared-dove *Streptopelia decaocto*	Uncertain		
European Turtle-dove *Streptopelia turtur*	Uncertain	Uncertain	Uncertain
Great Spotted Cuckoo *Clamator glandarius*	Uncertain	Uncertain	
Little Owl *Athene noctua*	Uncertain	Uncertain	
Common Swift *Apus apus*	Uncertain		
European Roller *Coracias garrulus*	Moderate Decline	Moderate Decline	
Crested Lark *Galerida cristata*	Uncertain	Uncertain	
Barn Swallow *Hirundo rustica*	Moderate Decline	Moderate Decline	
Red-rumped Swallow *Cecropis daurica*	Uncertain		
Northern House Martin *Delichon urbicum*	Moderate Increase		
Northern Wren *Troglodytes troglodytes*	Strong Increase		Moderate Increase
Cyprus Wheatear *Oenanthe cypriaca*	Stable	Uncertain	Uncertain
Cetti's Warbler *Cettia cetti*	Moderate Increase		Uncertain
Zitting Cisticola *Cisticola juncidis*	Moderate Increase	Moderate Increase	
Olivaceous Warbler *Iduna pallida*	Stable	Uncertain	Uncertain
Spectacled Warbler *Sylvia conspicillata*	Uncertain	Uncertain	
Sardinian Warbler *Sylvia melanocephala*	Strong Increase	Strong Increase	
Cyprus Warbler *Sylvia melanothorax*	Stable		Uncertain
Cyprus Coal Tit *Periparus ater cypriotes*	Moderate Increase		Moderate Increase
Great Tit *Parus major*	Strong Increase	Strong Increase	Uncertain
Masked Shrike *Lanius nubicus*	Uncertain		Uncertain
Cyprus Jay *Garrulus glandarius glaszneri*	Moderate Increase		Moderate Increase
Eurasian Magpie *Pica pica*	Stable	Stable	
Eurasian Jackdaw *Corvus monedula*	Moderate Increase		
Hooded Crow *Corvus corone cornix*	Stable	Uncertain	
House Sparrow *Passer domesticus*	Strong Increase		
Spanish Sparrow *Passer hispaniolensis*	Uncertain	Uncertain	
Common Chaffinch *Fringilla coelebs*	Strong Increase		Strong Increase
European Serin *Serinus serinus*	Strong Increase		Uncertain
European Greenfinch *Chloris chloris*	Uncertain	Moderate Increase	Steep Decline
European Goldfinch *Carduelis carduelis*	Stable	Stable	Moderate Decline
Common Linnet *Linaria cannabina*	Uncertain	Uncertain	
Cretzschmar's Bunting *Emberiza caesia*	Moderate Increase		Uncertain
Black-headed Bunting *Emberiza melanocephala*	Moderate Decline	Moderate Decline	
Corn Bunting *Emberiza calandra*	Strong Increase	Strong Increase	
Short-toed Treecreeper *Certhia brachydactyla dorothea*			Moderate Increase

Donald, P.F., Sanderson, F.J., Burfield, I.J. & van Bommel, F.P.J. 2006. Further evidence of continent-wide impacts of agricultural intensification on European farmland birds, 1990–2000. Agriculture, Ecosystems & Environment 116: 189–196.

Farina, A. 1997. Landscape structure and breeding bird distribution in a sub-Mediterranean agro-ecosystem. Landscape Ecology 12: 365–378.

Gregory, R.D., Vořišek, P., Noble, D.G., Van Strien, A., Klvaňová, A., Eaton, M., Gmelig Meyling, A.W., Joys, A., Foppen, R.P.B. & Burfield, I.J. 2008. The generation and use of bird population indicators in Europe. Bird Conservation International 18: S223–S244.

Ieronymidou, C. 2012. Avian Land-Use Associations in the Eastern Mediterranean (Doctoral dissertation). Norwich, U.K.: University of East Anglia.

MANRE, Ministry of Agriculture, Natural Resources and the Environment. (2009). Co-ordination of Information on the Environment (CORINE) Land Cover 2006 1: 250,000. Nicosia: Ministry of Agriculture, Natural Resources and Environment, Republic of Cyprus.

Meteorological Service. Undated. Cyprus: Average Annual Precipitation (mm). Nicosia: Ministry of Agriculture, Natural Resources and Environment, Republic of Cyprus. Available at: http://www.moa.gov.cy/moa/MS/MS.nsf/All/DAAAF48177B21A88C22579AE00245199/$file/Kipros_Mesi_Etisia_Vroxoptosi_1901_2014_Data_Chart_UK.pdf?Openelement (accessed on 26 June 2017).

Pannekoek, J. & van Strien, A.J. (2001). TRIM 3 Manual. TRends and Indices for Monitoring Data. Research paper No. 0102. Statistics Netherlands, Voorburg, The Netherlands.

Pomeroy, D. & Walsh, F. (2015). Monitoring landbird populations in western Cyprus with particular reference to Paphos District. Sandgrouse 37: 137–159.

Van Strien, A.J., Pannekoek, J. & Gibbons, D.W. (2001). Indexing European bird population trends using results of national monitoring schemes: a trial of a new method. Bird Study 48: 200–213.

Received: 4 April 2017
Accepted: 26 June 2017