A Pilot Wintering Waterbird Indicator for the European Union

A report by Wetlands International European Association

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Executive Summary

Waterbirds represent an important cultural, recreational and economic asset. One third of all bird species in the European Union are waterbirds, but they make up two thirds of the huntable species listed on Annex II of the Birds Directive. For many species, the majority of their populations winter in EU member states even if their breeding ranges are elsewhere. The International Waterbird Census is one of the largest citizen science biodiversity monitoring schemes in Europe, having operated for almost 50 years. This long-term dataset provides a good basis to assess the effectiveness of the EU Birds Directive and other EU policies for the conservation of waterbirds that winter in significant numbers in the European Union.

Composite indices for waterbirds show an overall positive trend for waterbirds, which indicates their generally favourable status. This can be linked to site-based conservation efforts, as Article 4.2 of the Birds Directive requires designation of internationally important wetlands as SPAs and roughly half of all SPAs were designated for waterbirds. The overall trend amongst species listed on Annex I is slightly more positive than the trend of species listed on Annex II of the Birds Directive. However, the effectiveness of the SPA network requires more detailed analyses.

Marine specialist species generally have a less favourable trend than coastal or freshwater specialist species, which probably reflects the delays in protecting marine habitats compared to coastal and freshwater ones.

The report also outlines how this pilot indicator could be further developed by combining indices for breeding and wintering birds, thus increasing the number of species contributing to the composite indices.

Background

Waterbirds represent an important cultural, recreational and economic asset. 142 of the 476 bird species (i.e. almost one-third) recognised in the EU Birds Directive Article 12 reporting process are waterbirds. Waterbirds represent 36% of the species listed on Annex I of the Birds Directive (i.e. the list of endangered species) and 61% of the species listed on Annex II (i.e. the list of huntable species). Such a high proportion on Annex II indicates their special cultural, recreational and economic value. Recognising their special value and the vulnerability of migratory waterbirds to overexploitation and habitat loss, Wetlands International and its predecessors have been developing the International Waterbird Census for almost half a century in Europe. In 2014, the European Commission supported this large-scale biodiversity-monitoring programme through the EU NGO Operational Grant of LIFE+. One of the activities we planned to carry out in the framework of the operational grant was developing a set of waterbird indicators that provides annually updated feedback on the status of waterbirds, considering their special importance in the context of the Birds Directive, and the effectiveness of other policies designed to maintain their habitats in good ecological status such as the Water Framework Directive and the Marine Strategy Framework Directive. This report is especially timely because the European Commission starts an extensive evidence-gathering exercise in January 2015 to provide input into the Fitness Check of the EU Nature Legislation, i.e. the Birds and the Habitats Directive.

Headline indicators based on common farmland and forest breeding birds have already been adopted nationally and at the EU level (Gregory et al., 2005; Gregory et al., 2008). These well-established indicators are also retained amongst the indicators for the 2020 EU biodiversity targets. However, no similar indicator exists for waterbirds and wetlands at the EU level although national breeding and wintering wetland bird indices exist e.g. in the UK (Austin, Banks, & Rehfisch, 2007). The Pan-European Common Bird Monitoring Scheme includes only 24 waterbird species (PECBMS, 2014), i.e. 18% of all species monitored by the PECBMS and 17% of all waterbird species in the EU. This is partly because many waterbird species breed in remote, inaccessible areas that are difficult to monitor and many species are difficult to observe during the breeding period. This is particularly true for arctic and sub-arctic breeders, that winter in large numbers in lower latitudes. Many of these are trigger species for the designation of Special Protection Areas under the Birds Directive and well monitored under the framework of the International Waterbird Census.

Earlier attempts to develop a waterbird index were hampered by the fact that many waterbird species respond to some form of wetland degradation, particularly eutrophication, in a non-linear fashion. At lower levels of eutrophication, waterbird numbers may increase and the reduction of nutrient load may trigger their declines. This is particularly the case when results were presented taxonomically (e.g. waders or Anatidae) regardless of the habitat requirements and sensitivities of the individual species. Therefore, we paid particular attention to the needs of policy makers and

resource managers. In this context we considered particularly important the Birds Directive, the Water Framework Directive and the Marine Strategy Framework Directive.

Methodology

Developing policy relevant indicators

Gregory et al. (2005) have distinguished four types of indicators. Type 1 indicators describe how specific taxa are doing. Type 2 indicators can be more generalised for biodiversity, Type 3 indicators describe how a certain taxa responds to environmental change while Type 4 describes the response of biodiversity to environmental change more generally.

Birds Directive

The Birds Directive aims to maintain all waterbird populations at levels that correspond to scientific, recreational and cultural requirements while taking account of economic and other interests. Species listed on Annex I require special measures, while in case of species listed on Annex II the directive aims to avoid that their exploitation has negative affects on their conservation. To assess the effectiveness of the Birds Directive for waterbirds, we developed Type 1 indicators. First, we classified the waterbird species according to their status in the following categories: Annex I species (69), Annex II species (50) and unlisted species (29).

Other EU policies

Besides of the Birds Directive, waterbird species are affected by a number of other EU policies such as the Common Agricultural Policy, the Water Framework Directive and the Marine Framework Directive. This calls for developing Type 3 indicators to assess the impact of these policies. The Common Agricultural Policy would affect waterbirds in various direct and indirect manners, though the impact on wintering waterbirds is not considered to be representative for breeding waterbirds. However, specialist wintering waterbirds are considered to be sufficiently representative for freshwater, coastal and marine habitats as recognised, for example, under HELCOM (Aunins et al., 2013).

Data sources

The International Waterbird Census (IWC) started in 1967 with the first counts taking place in the UK, Germany, the Netherlands, Sweden and Switzerland. It has gradually expanded its scope across Europe and reached an almost complete coverage in the 1990s. The aim of the IWC is to contribute to the conservation and sustainable use of waterbird populations by estimating the size of their populations, by describing changes in their numbers and to assess the importance of individual sites for waterbirds during the non-breeding season.

The IWC is organised through national schemes. Currently, active IWC schemes cover all EU Member States. National coordinators work with a network of observers either

directly or through regional and site coordinators. The IWC schemes typically cover inland and coastal wetlands. Some countries have complementary schemes covering offshore areas to monitor the status of seaducks and on farmlands for geese and swans. Data of 16,000 sites from the 27 Member States of the European Union from the period of 1990-2012 were used in this analysis (
Figure 1). Complementary data for geese and swans wintering in the UK and Ireland were provided by the Wildfowl and Wetlands Trust.

Figure 1. Distribution of the 16,000 International Waterbird Census sites used for analysing wintering waterbird trends in the 27 EU Member States between 1990-2012

Species selection
We selected 50 waterbird species that regularly winters in significant numbers in Europe (Table 1). We classified the selected species according to their status on the Birds Directive (i.e. Annex I, Annex II and not listed) and according to their habitat requirements (marine, coastal and freshwater) as listed in the relevant habitat tables in Tucker & Evans (1997), selecting only species using 75% of the given habitat in winter or all year around.

Species trends
Species trends were calculated from site level data using TRIM software following the data preparation procedure described in van Roomen et al. (2012). Contrary to the PECBMS, no weighting for national populations were applied because (i) winter distribution of waterbirds can significantly change according to the weather - known as cold weather movements and short stopping, and (ii) usually a high proportion of the birds are counted during the IWC counts. To avoid geographic bias, count data of geese populations from the UK and Ireland were added to the population estimates from mainland Europe. In case of populations with only periodic total counts, interpolation was made using relevant WeBS indices.

4

Calculation of multispecies composite indices
Multispecies composite indices were calculated following the method used by PECBMS (van Strien, Pannekoek, & Gibbons, 2001).
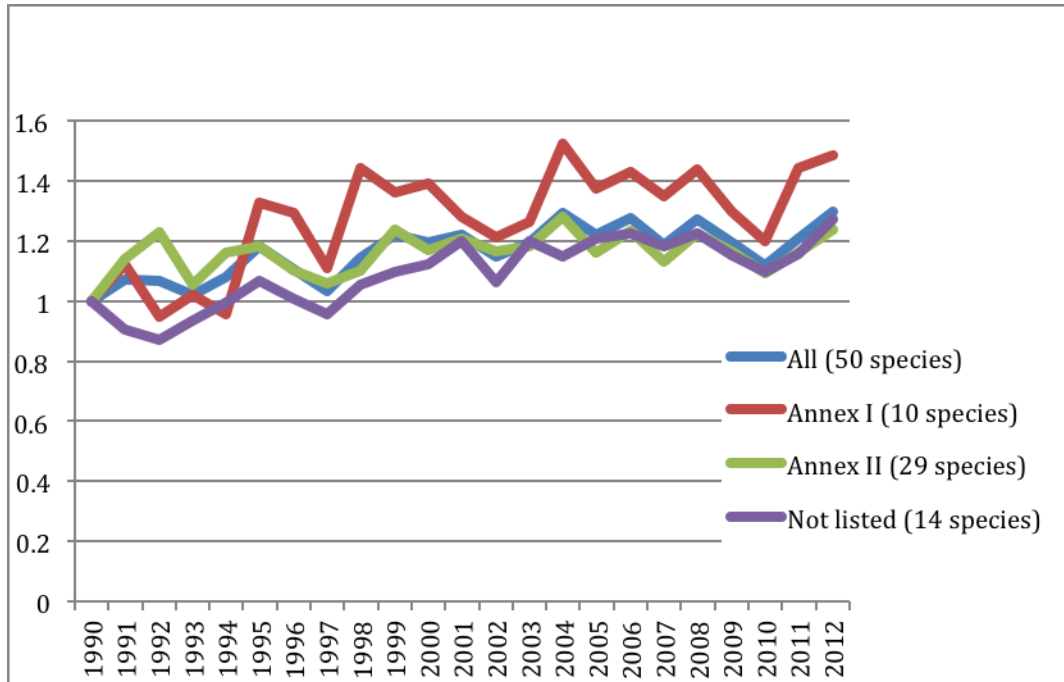
Results

Birds Directive

Figure 2. Trend of wintering populations of 50 waterbird species in the European Union according to their status on the Birds Directive.

Waterbird species in general show an increasing trend in the European Union. There is a suggestion that the trend of species listed on Annex I of the Birds Directive are more positive than the overall trend of all species, though this is not statistically significant. Trend of species listed on Annex II does not differ from the overall trend or from the species not listed on the Birds Directive.
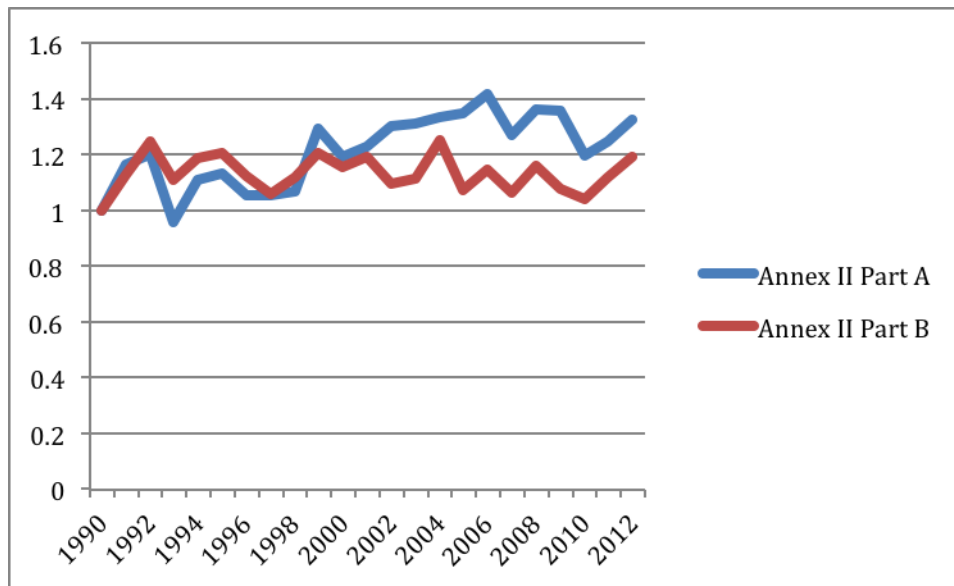
Figure 3. Overall trend of the wintering populations of species listed on Part A (10) and Part B (19) of Annex II of the Birds Directive in the European Union

The long-term trend of species listed on Part A of Annex II, i.e. species that can be hunted across the European Union, is increasing, but decreasing in the short-term.
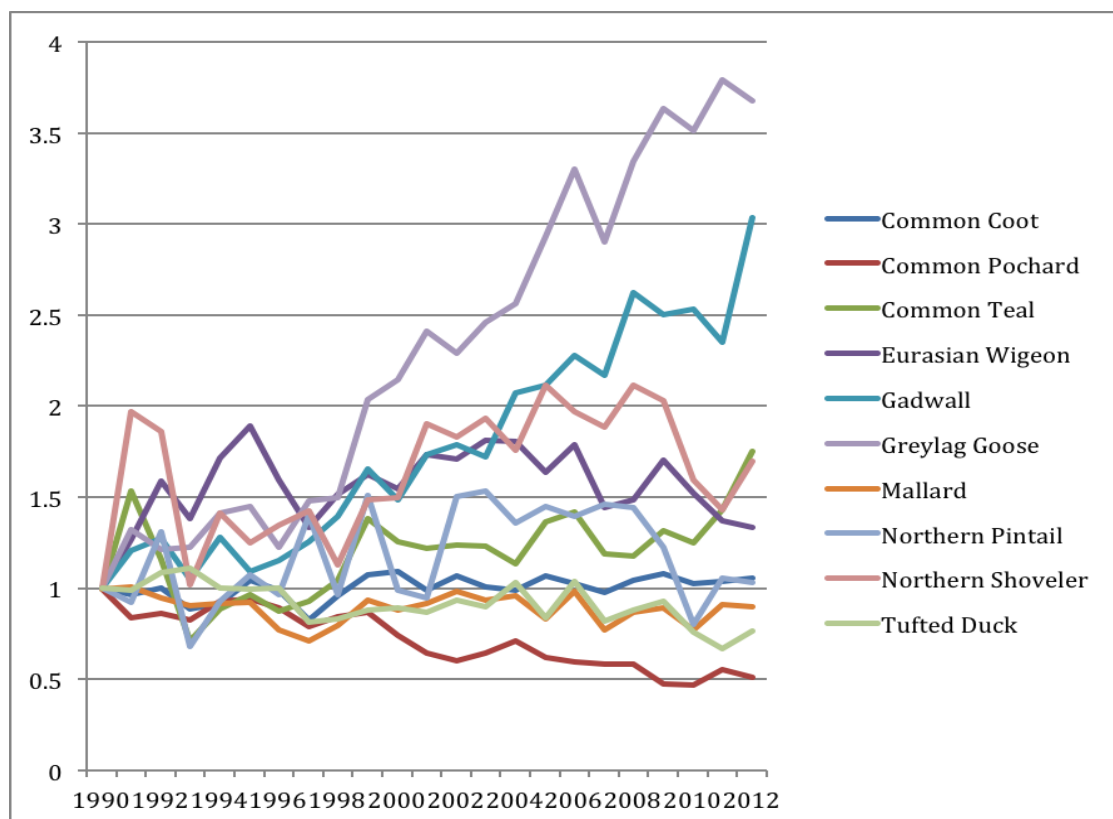
Figure 4. Trend of the wintering populations of species listed on Part A of Annex II of the Birds Directive in the European Union

Only three out of ten species listed on Part A of Annex II, the Greylag Goose *Anser anser*, Gadwall *Anas strepera* and Common Teal *Anas crecca* show a continued long-term increase. The long-term trends of Northern Shoveler *Anas clypeata*, Eurasian Wigeon *Anas penelope*, Northern Pintail *Anas acuta* indicate a long-term increase, but all of these show significant declines in the short-term. The most worrying however is the status of Common Pochard *Aythya ferina* that shows a consistent and very large long-term decline.
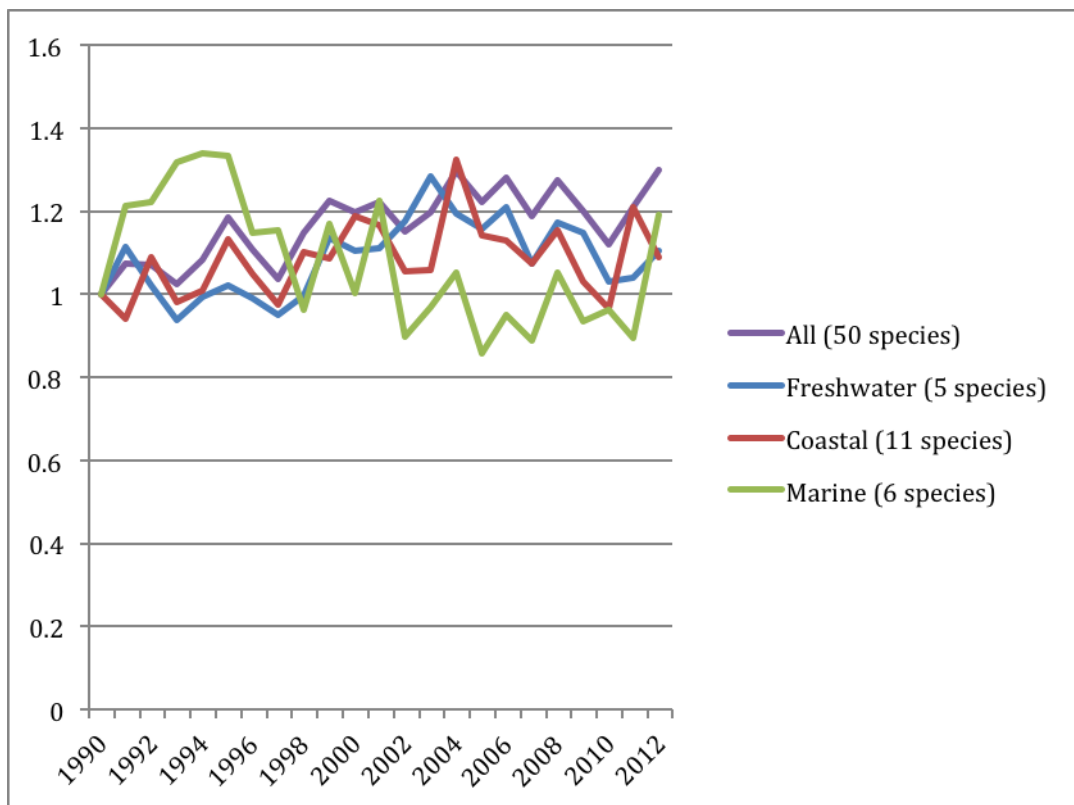
Waterbird trends according to habitat types

Figure 5. Trend of wintering populations of 50 waterbird species in the European Union according to their habitat association.

Less than half of the 50 waterbird species can be considered as habitat specialists and can be used to provide information about the overall ecological status of the habitat. The trends for species associated with freshwater and coastal habitats do not differ significantly from the overall trend of all species, but the trend of marine species seems to be more negative (
Figure 5).

Discussion

Policy relevance of the wintering waterbird indicator

The overall positive trend of the wintering waterbird indicator is consistent with other meta-data analysis that found an overall positive trend in the status of waterbird populations in Europe and also consistent with the finding that indicate a downward trend in the short-term. The overall positive trend of wintering waterbirds is likely to be at least partially associated with the Birds Directive because: (i) all waterbird species benefit from the general protection regime provided by the Directive and (ii) congregatory waterbirds especially benefit from designation of Special Protection Areas (SPAs) under the provision of Art. 4.2. The suggestion of a more positive overall trend of populations listed on Annex I of the Directive is also consistent with the statement above as these populations benefit from stricter protection regime and also benefit from habitat conservation measures under Art. 4.1. However, to confirm the effectiveness of the SPA network would require further analysis.

The overall positive trend of species listed on Annex II indicates that the regulation of hunting as set out in Art. 7 of the Directive is generally effective with a few exceptions, particularly Common Pochard. However, as has been pointed out by Madsen et al. (2015) it is necessary to improve coordination of harvest management across the flyway through applying adaptive management principles.

The small number of species that can be considered as wetland specialist limits the utility of the waterbird index to monitor the state of freshwater, coastal or marine habitats. Developing multispecies indices for monitoring changes in habitat quality would require a combination of trends from the breeding season, when additional species can be comprehensively monitored. The marine species selection is also most relevant for North-west Europe (i.e. the North Sea and the Baltic) because the majority of waterbirds species that can be considered as marine specialists occur there. The indication of a more negative trends amongst waterbirds associated with the marine environment is consistent with the findings of regional studies from the Baltic (Aunins et al., 2013; Skov, 2011).

Future refinements of a wintering waterbird indicator

The new waterbird indicator already covers about one-third of all waterbird species in the European Union, but s biased towards Anatidae and waders that represent the majority of wintering waterbirds in Europe. However, land-based counts are not sufficient to monitor the trend of seaducks (Pehlak, Lõhmus, Kuresoo, & Luigujõe, 2006) and geese and swans also need specific surveys because they spend significant periods on non-wetland habitats (Gilbert et al., 1998).

To more closely link waterbird numbers to policies or environmental change, it might be necessary to calculate first national trends similar to the PECBMS (van Strien et al., 2001), though data availability could be a limitation (van Roomen et al., 2011). Improvements to ensure timely availability of the data for decision-makers are

needed. The current 2-year time lag should be further reduced to maximise the utility of the data for adaptive harvest management.

As the differences between the various composite indices are relatively small, it will be important to calculate standard errors for the index values and to calculate significance of differences between the long-term trends.

Towards indices based on a broader selection of species

In this report, we produced multispecies indices based on 50 waterbird species, which represents one-third of all waterbirds species in the European Union. Only 10 of these are included in the list of 24 species under the Pan-European Common Bird Monitoring Scheme. This is partly because many waterbird species do not breed in the European Union, only winter there. On the other hand, many species breeding in Europe winter mainly in Africa, and are not covered adequately by winter counts. Hence, wintering numbers would not provide an adequate representation of their numbers. A very significant proportion of these species are either colonial or rare breeders that cannot be monitored well by common bird monitoring methods and would require development of special schemes.

Acknowledgments

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Tables

Table 1. Status of waterbird species on the EU Birds Directive and their habitat specialisation according to Tucker & Evans (1997)

	Birds Directive		Habitat specialist		
Species_name	Annex I	Annex II	Coastal	Freshwater	Marine
Mute Swan		B		x	
Whooper Swan	x				
Tundra Swan	x				
Brent Goose		B			
Barnacle Goose	x				
Greylag Goose		A			
Bean Goose					
Pink-footed Goose		B			
Greater White-fronted Goose albifrons		B			
Greater White-fronted Goose flavirostris	x	B			
Common Shelduck			x		
Common Goldeneye		B			
Common Eider		B			x
Smew	x				
Goosander		B			
Red-breasted Merganser		B			x
Black Scoter		B			x
Red-crested Pochard		B		x	
Common Pochard		A		x	
Tufted Duck		A			
Greater Scaup		B			x
Northern Shoveler		A		x	
Gadwall		A		x	
Eurasian Wigeon		A			
Mallard		A		x	
Northern Pintail		A			
Common Teal		A		x	
Little Grebe				x	
Great Crested Grebe					
Black-necked Grebe					
Common Coot		A			
Common Loon					x
Pygmy Cormorant	x			x	
Shag					x
Great Cormorant					
Eurasian Oystercatcher		B	x		
Pied Avocet	x		x		
Grey Plover			x		
Eurasian Golden Plover	x				

Common Ringed Plover			x
Kentish plover	x		x
Northern Lapwing		B	
Curlew		B	x
Bar-tailed Godwit	x	B	x
Black-tailed Godwit		B	
Ruddy Turnstone			x
Red Knot		B	x
Sanderling			x
Dunlin			x
Common Redshank		B	x

Annex

List of national IWC coordinators in the European Union

Austria - Norbert Teufelbauer (BirdLife Austria)
Belgium (Flanders) -Koen Devos Belgium (Instituut voor Natuur-en Bosonderzoek)
Belgium (Wallonia & Brussels) - Jean-Yves Paquet (Aves)
Bulgaria - Valeri Georgiev (Ministry of Environment and Water)
Croatia – Tibor Mikuska (Croatian Society for Bird and Nature Protection)
Cyprus – Martin Hellicar (BirdLife Cyprus)
Czech Republic – Zuzana Musilová (Czech University of Life Sciences)
Denmark – Preben Clausen (Aarhus University, Dept. of Bioscience)
Estonia – Leho Luigujoe (InstituteofZoologyand Botany)
Finland (Åland Islands) – Markku Mikkola-Roos (FinnishEnvironment Institute)
Finland (mainland) – Aleksi Lehikoinen (Finnish Museum of Natural History)
France - Bernard Deceuninck (Ligue pour la Protection des Oiseaux)
Germany – Johannes Wahl (Dachverband Deutscher Avifaunisten)
Greece – Danae Portolou (Hellenic Ornithological Society)
Hungary – Sándor Faragó (University of West-Hungary)
Ireland – Helen Boland (BirdWatchIreland)
Italy – Nicola Baccetti (Istituto Superiore per la Protezione e la Ricerca Ambientale)
Latvia – Antra Stīpniece (UniversityofLatvia,InstituteofBiology)
Lithuania – Laimonas Sniauksta (Lithuanian Ornithological Society)
Luxembourg – Gilles Biver (Ministère du Développement durable et des
        Infrastructures)
Malta – John Bord (BirdLife Malta)
The Netherlands – Menno Hornman (Sovon Vogelonderzoek Nederland)
Poland – Wlodzimierz Meissner (University of Gdansk)
Portugal – Vitor Encarnação (Divisão de Habitats e Ecossistemas)
Romania – Cristian Domsa (Romanian Ornithological Society)
Slovakia – Katarina Slabeyova (Slovak Ornithological Society)
Slovenia – Luka Božič (Društvo Za Opazovanje In Proučevanje Ptic Slovenije)
Spain – Blas Molina (SEO BirdLife)
Sweden – Leif Nilsson (UniversityofLund)
United Kingdom – Chas Holt (British Trust for Ornithology)