Koen Devos & Thierry Onkelinx, INBO

Jean-Yves Paquet & Jean-Paul Jacob, Aves

Research Institute for Nature and Forest

Wintering waterbirds in Belgium

The state of the birds in Belgium, data compilation in a federal country

In Belgium, the breeding bird atlas (1973-1977) has been the last bird counting project organised on a national scale. Since then, in each of the three autonomous regions, quite similar projects have been developed, but often methods and priorities were not the same and, apart from the waterbird counts, no common schemes exist. In the framework of the reporting under Article 12 of the Birds Directive and the Birds in Europe 3 project led by BirdLife, experts from Wallonia, Brussels and Flanders have joined forces to compile the regional information into national data. This approach resulted in the first trend analysis for wintering waterbird species at a national level.

Waterbird counts have a long tradition in the three regions of Belgium and are coordinated by the Research Institute for Nature and Forest (INBO) (Flemish region) and Aves (Walloon and Brussels region). These counts take place from October till March (Flanders) or November till February (Wallonia/Brussels), during one fixed weekend in the middle of the month. This poster presents some results of the first analysis at a national scale. Population estimates and both short and long term trends were calculated. Missing data were imputed based on a generalized linear mixed model (negative binomial family), predicting the counts by a year effect (fixed factor), a month effect (fixed factor) and a location effect (random intercept). The model was fit with INLA (Rue etal., 2009) in R (R Core Team 2013). Not the predicted value but a random value based on a the predicted value and it standard error are used as imputed values. This reflects the uncertainty of the counts due to imputation. After the imputation, the total population is calculated for each year and each month. The procedure is repeat 499 times. All further analyses are done on each imputation set. The resulting parameter estimated are averaged and a combined standard error is calculated, taking into account the uncertainty due to the uncertainty the analysis as the imputation.

Havard Rue, Sara Martino, Finn Lindgren, Daniel Simpson and Andrea Riebler (2009). INLA: Functions which allow to perform full Bayesian analysis of latent Gaussian models using Integrated Nested Laplace Approximaxion.
R Core Team (2013). R: A language and environment for statistical computing. R Foundation for Statistical Computing, Vienna, Austria. URL http://www.R-project.org/.

For a selected number of species, some results of the analysis are given in Table 1 and Figure 1. Most species show positive long term trends. In the short term and for various reasons, increase rates of some species in Belgium have slowed down considerably or even became negative. The reasons for this pattern can differ between species. It can be the result of either a similar trend on flyway level or large scale distribution changes within the flyway. For some species, there is evidence that global warming and mild winter temperatures can lead to a northward shift of distribution area. On the other hand, also major changes in Belgian wetlands can be an important driving factor in the observed trends. Changes in water quality and food availability are believed to be the main factor in a recent and very significant decrease of waterbird numbers in the Schelde estuary, one of the most important wintering areas in Belgium.

Figure 1. Trend of some selected waterbird species in Belgium during the periode 1991/92 - 2011/12, based on average numbers in November-February.

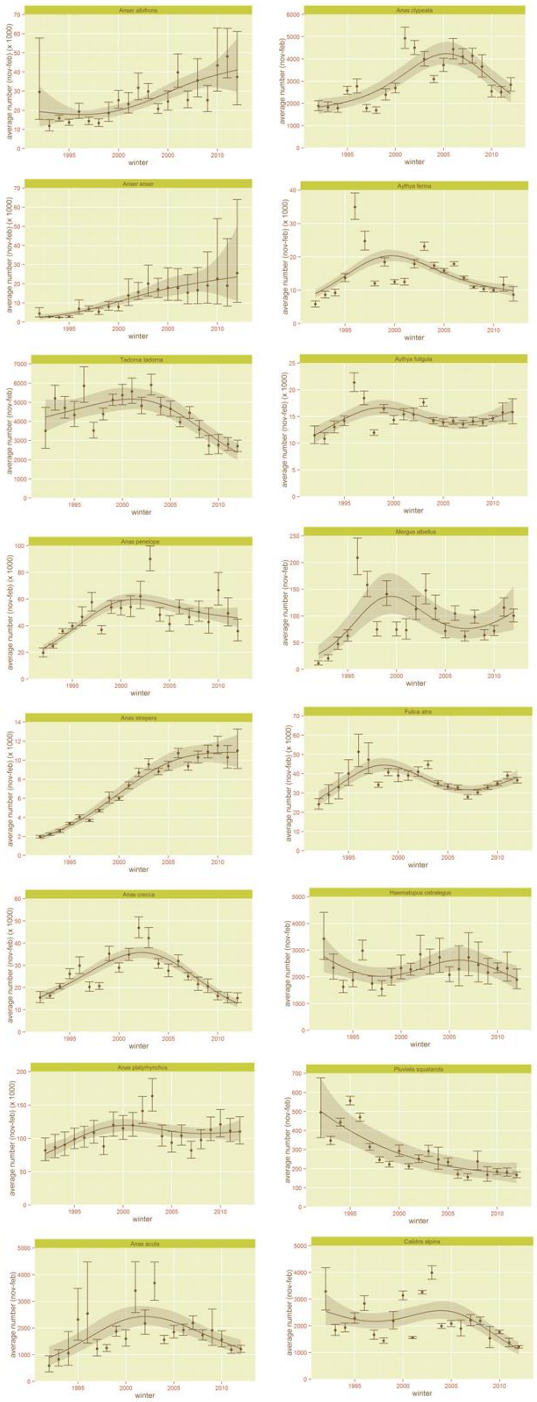

Table 1. Population estimates for the period 2008-2012 (based on month with highest numbers), and trends (range of annual change) of a selection of waterbird species in Belgium. Minimum and maximum values correspond to the confidence intervals. Population estimates for gulls are based on additional roost site counts.

Increasing trend = green, decreasing trend = orange, stable trend = blue, unclear trend = yellow.

	Population size 2008-2012			Long term trend 1992-2012		Short term trend 2001-2012	
	Min	Max	Med	Min	max	Min	Max
Little Grebe	1293	1624	1449	3,3	4,1	-2,3	-0,3
Great Crested Grebe	4273	4436	4354	0,2	0,5	-1,9	-1,1
Great Cormorant	7138	9017	8022	3,8	4,5	1,9	4,1
Great Egret	186	229	206	?	?	16,9	19,7
Mute Swan	1097	1225	1160	2,6	3,3	-0,3	1,2
Tundra Swan	390	954	565	?	?	-34,8	20,6
Bean Goose	1325	9473	3542	-44,1	11	-21,4	31,8
Pink-footed Goose	30783	31092	30937	4,6	4,9	-2,1	0,1
Greater White-fronted Goose	42958	83517	59897	3	7,3	1,6	8,8
Greylag Goose	15373	61944	30859	6	14,1	-3,5	12,8
Common Shelduck	4040	5407	4674	-2,6	-1,6	-8,1	-6,1
Eurasian Wigeon	53971	77065	64492	1,3	2,4	-4,6	-1,6
Gadwall	11178	13825	12431	7,2	8,1	1,9	3,9
Common Teal	19126	24507	21650	-0,7	-0,1	-10,3	-8,6
Mallard	109311	143281	125148	0,2	1,5	-3,5	-0,3
Northern Pintail	1615	2637	2064	-0,4	202	-9,8	-5,6
Northern Shoveler	4033	4878	4435	2,4	3,1	-5,2	-3,6
Common Pochard	11725	13891	12762	-1,5	-0,7	-6,9	-4,9
Tufted Duck	14837	18272	16465	-0,1	-1,7	-1,1	0,5
Common Goldeneye	366	426	395	0,6	1,5	-2,2	-0,5
Smew	164	195	179	0,6	1,8	-3,1	0
Common Merganser	459	753	588	-3,9	-1	-0,3	5,6
Common Coot	37629	40105	38847	-0,7	0,1	-1,8	-0,9
Pied Avocet	182	207	194	-1,6	2,9	-4	-2,6
Eurasian Golden Plover	2000	5000	3400	?	?	-32,1	11,4
Grey Plover	190	257	221	-6,3	-4,8	-4,8	-2,8
Northern Lapwing	36612	85104	55820	?	?	-10,9	-2
Sanderling	239	465	333	-3,6	0,1	-8,6	-0,2
Purple Sandpiper	64	110	84	-8,6	-2,4	-5,2	0,6
Dunlin	1774	2252	1999	-2,5	-2,1	-6,9	-5,5
Ruff	599	9051	2328	?	?	-63,4	6,1
Eurasian Curlew	8872	25925	15166	?	?	-5,6	10,3
Ruddy Turnstone	761	1169	943	?	?	-6,2	-3,7
Black-headed Gull	200000	300000		?	?	?	?
Mew Gull	90000	165000		?	?	?	?
Lesser Black-backed Gull	3500	4500		?	?	?	?
Herring Gull	25000	35000		?	?	?	?
Caspian Gull	120	150		?	?	?	?
Great Black-backed Gull	3500	4000		?	?	?	?