Supplementary material

Jochen Bellebaum, Jan Kube, Axel Schulz, Henrik Skov & Helmut Wendeln: Decline of Long-tailed Duck *Clangula hyemalis* numbers in the Pomeranian Bay revealed by two different survey methods. — Ornis Fennica 91: 129–137.

Table S1. Overview of surveys used for analysis.

Ship-based surveys (*n* = 27)		Aerial surveys (*n* = 18)	
Start date	End date	Start date	End date
03.02.1988	07.03.1988	12.02.2003	12.02.2003
19.04.1988	20.04.1988	18.03.2003	18.03.2003
19.03.1990	19.03.1990	23.04.2003	23.04.2003
01.02.1992	18.02.1992	22.01.2004	22.01.2004
29.01.1993	29.01.1993	27.02.2004	27.02.2004
04.03.1993	09.03.1993	18.03.2004	18.03.2004
07.02.2003	08.02.2003	16.04.2004	16.04.2004
14.03.2003	15.03.2003	18.03.2006	18.03.2006
22.04.2003	22.04.2003	11.04.2006	11.04.2006
15.01.2004	16.01.2004	20.02.2007	20.02.2007
28.01.2004	29.01.2004	20.03.2007	20.03.2007
10.02.2004	11.02.2004	09.03.2010	09.03.2010
23.03.2004	24.03.2004	19.04.2010	19.04.2010
12.04.2004	14.04.2004	31.10.2010	31.10.2010
25.04.2004	25.04.2004	07.11.2010	07.11.2010
08.03.2006	10.03.2006	20.01.2011	20.01.2011
19.04.2006	21.04.2006	15.10.2011	15.10.2011
03.05.2006	05.05.2006	23.03.2012	23.03.2012
01.02.2007	07.02.2007	–	–
01.03.2007	04.03.2007	–	–
11.02.2008	16.02.2008	–	–
19.03.2008	19.03.2008	–	–
12.03.2011	14.03.2011	–	–
14.04.2011	16.04.2011	–	–
14.03.2012	16.03.2012	–	–
09.02.2013	12.02.2013	–	–
19.02.2014	23.02.2014	–	–

Table S2. Effective strip width (ESW) for aerial surveys by sea state, observer and flock size.

Flock size	Sea state 1	Sea state 2	Sea state 3	Total
Observer 1				
1–2 ind.	152 (326)	135 (295)	134 (58)	143 (679)
3–5 ind.	154 (211)	155 (195)	196 (22)	157 (428)
6–30 ind.	170 (192)	150 (147)	158 (9)	161 (348)
Total	157 (729)	145 (637)	152 (89)	152 (1,457)
Observer 2				
1–2 ind.	139 (32)	138 (171)	–	138 (203)
3–5 ind.	149 (10)	128 (79)	–	130 (89)
6–30 ind.	144 (16)	141 (68)	–	142 (84)
Total	142 (58)	136 (318)	–	137 (376)
Observer 3				
1–2 ind.	118 (22)	138 (62)	–	133 (84)
3–5 ind.	134 (16)	115 (33)	–	122 (49)
6–30 ind.	136 (28)	89 (33)	–	113 (61)
Total	130 (66)	121 (128)	–	124 (194)
All observers				
1–2 ind.	135 (380)	137 (528)	134 (58)	138 (966)
3–5 ind.	145 (237)	131 (307)	196 (22)	135 (566)
6–30 ind.	149 (236)	120 (248)	158 (9)	136 (493)
Total	142 (853)	133 (1,083)	152 (89)	137 (2,027)

Table S3. Correction factor for observer efficiency during aerial surveys by sea state, observer and flock size. Sample size (number of flocks) in brackets. Correction factors used in further analyses are bolded.

Flock size	Sea state 1	Sea state 2	Sea state 3	Total
Observer 1				
1–2 ind.	**1.7** (208)	**1.9** (239)	**1.8** (56)	1.8 (503)
3–5 ind.	**1.3** (136)	**1.4** (151)	**1.5** (31)	1.4 (318)
6–30 ind.	**1.5** (108)	**1.5** (118)	**1.4** (23)	1.5 (249)
Total	1.5 (452)	1.6 (508)	1.5 (110)	1.6 (1,070)
Observer 2				
1–2 ind.	–	**2.8** (34)	–	2.8 (34)
3–5 ind.	–	**1.3** (20)	–	1.3 (20)
6–30 ind.	–	**1.3** (9)	–	1.3 (9)
Total	–	1.9 (63)	–	1.9 (63)
Observer 3				
1–2 ind.	2.7 (26)	**2.1** (66)	–	2.3 (92)
3–5 ind.	1.2 (15)	**1.2** (32)	–	1.2 (47)
6–30 ind.	**1.2** (21)	**1.1** (31)	–	1.1 (52)
Total	**1.5** (62)	**1.4** (129)	–	1.5 (191)
All observers				
1–2 ind.	2.2 (234)	2.3 (339)	1.8 (56)	2.3 (629)
3–5 ind.	1.3 (151)	1.3 (203)	1.5 (31)	1.3 (385)
6–30 ind.	1.4 (129)	1.3 (158)	1.4 (41)	1.3 (310)
Total	1.5 (514)	1.6 (700)	1.7 (110)	1.6 (1,324)

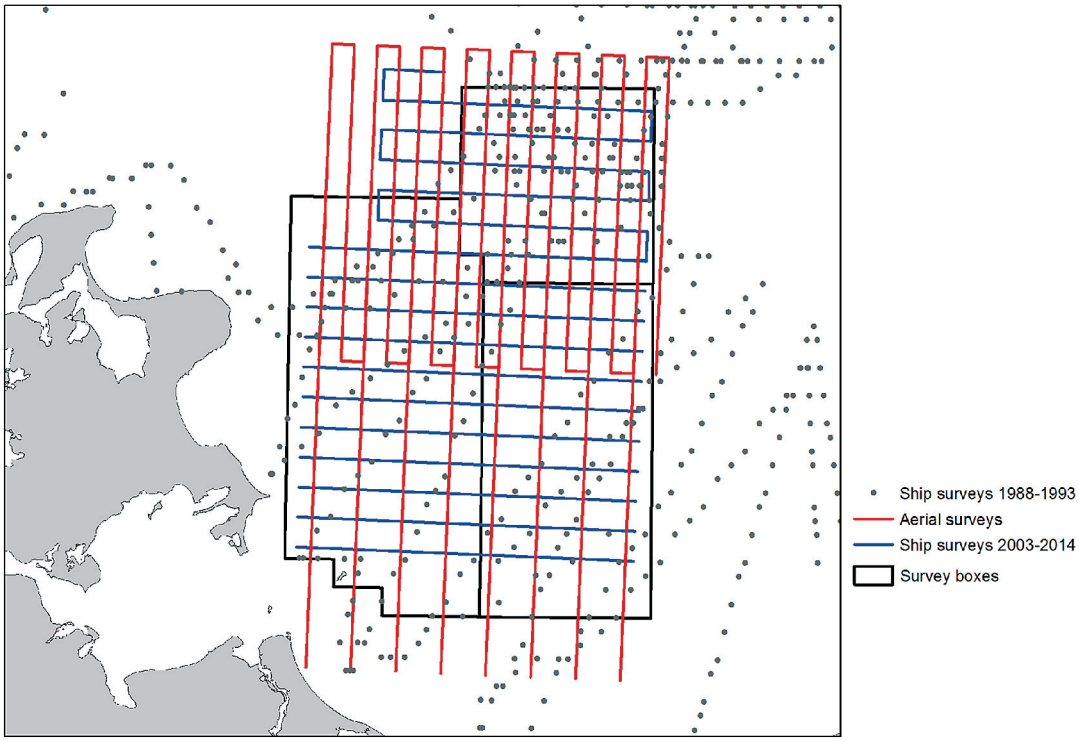

Fig. S1. Maximum coverage of ship-based and aerial surveys.

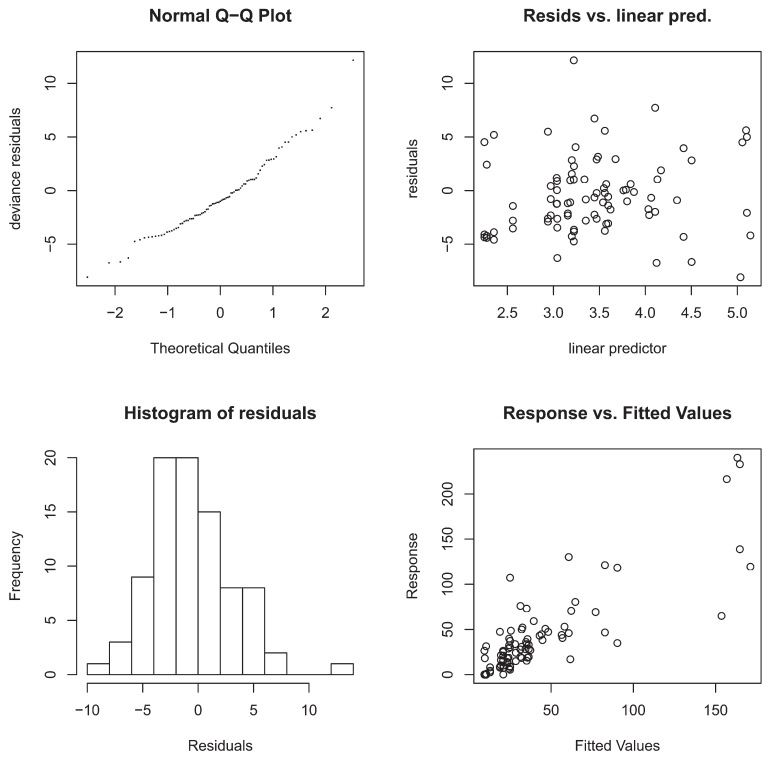

Fig. S2. Validation plots for the GAMM.

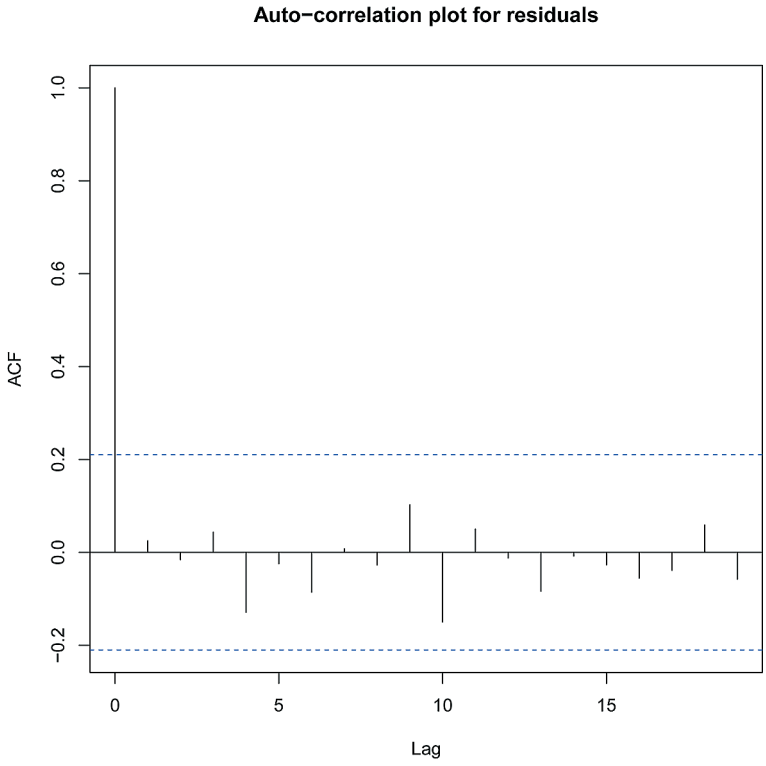

Fig. S3. Autocorrelation plot for GAMM residuals.