Supporting Materials

Status and distribution of the Common Shelduck *Tadorna tadorna* in Iceland, with special reference to the core area in Borgarfjörður

This document includes:

- **a link to the raw survey data on the adult numbers throughout the survey period in Borgarfjörður, and the R code to create and validate the models.**
- **two additional tables and two additional figures related to the statistical approach used to model the abundance of Shelducks in Borgarfjörður.**

The raw data on the adult numbers throughout the survey period and the R code used to create and validate the models are available at: https://github.com/NiallTierney/shelducks-borgarfjordur.

Models of Shelduck counts from the Borgarfjörður survey are shown in Table S1. The minimum adequate model was a zero-inflated Poisson General Additive Model (GAM) of the response variable counts with explanatory variables week (s(week)), tide, subarea, with area as an offset (offset(area)), and an interaction between tide and subarea (tide * subarea). Coefficient estimates and associated statistics of the minimum adequate model are given in Table S2 and deviance residual plots in Fig. S1.

Table S1. Candidate zero-inflated Poisson GAMs assessed to evaluate the effect of date (week), tide and subarea on Shelduck abundance in Borgarfjörður between 12 March–25 October 2017. AIC measures model fit and complexity, with lower AIC values increasing model ranking (Zuur *et al.* 2007). Models are significantly different if their AIC values differ by > 2.

Model	AIC	Rank (AIC)
s(week) + tide * subarea + offset(area)	15,038.23	1
s(week) + tide + subarea + offset(area)	15,929.55	2
s(week) + subarea + offset(area)	15,950.51	3
subarea + offset(area)	22,364.26	4
s(week)	35,546.47	5
s(week) + tide	35,547.04	5
tide	43,832.43	6
null	43,830.92	6

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Table S2. Coefficient estimates for the minimum adequate model of Shelduck counts in the Borgarfjörður study area. *P* values are approximate, as a result of ignoring the smoothing parameter uncertainty.

Model coefficient	**Estimate**	**s.e.**	**z statistic**	***P* value (approx.)**
Intercept	0.15	0.04	3.93	< 0.001
subsite2	1.91	0.04	48.12	< 0.001
subsite3	–1.21	0.05	–22.46	< 0.001
subsite4	2.26	0.04	54.19	< 0.001
subsite5	0.41	0.09	4.44	< 0.001
subsite6	0.22	0.17	1.29	0.197
tiderising	0.52	0.05	10.93	< 0.001
subsite2:tiderising	–0.61	0.05	–12.21	< 0.001
subsite3:tiderising	0.26	0.07	3.98	< 0.001
subsite4:tiderising	–1.12	0.06	–20.15	< 0.001
subsite5:tiderising	–0.24	0.12	–2.00	0.045
subsite6:tiderising	–1.11	0.32	–3.53	< 0.001
Approximate significance of smooth terms:		**edf**	**χ^2**	***P* value (approx.)**
s(week)		8.90	5877	< 0.001

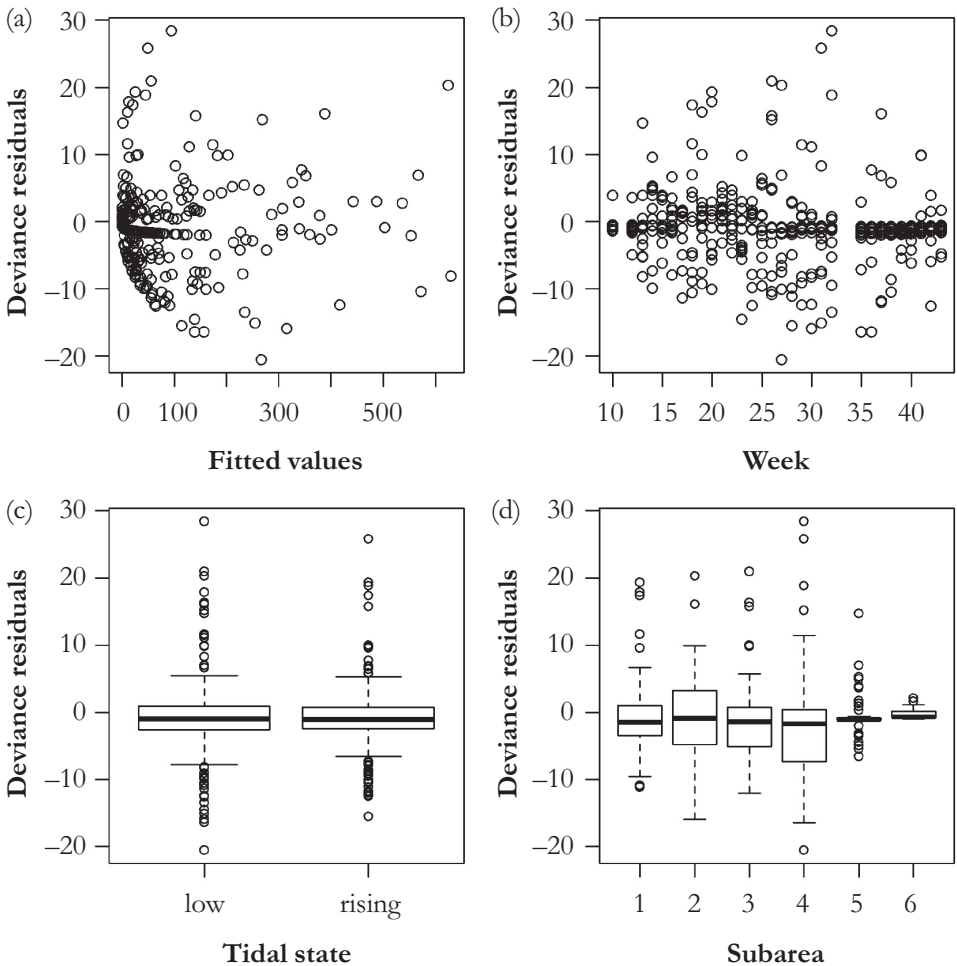

Figure S1. Deviance residuals of the minimum adequate model plotted against the fitted values (a), and each of the explanatory variables: week (b), tide (c) and subarea (d).

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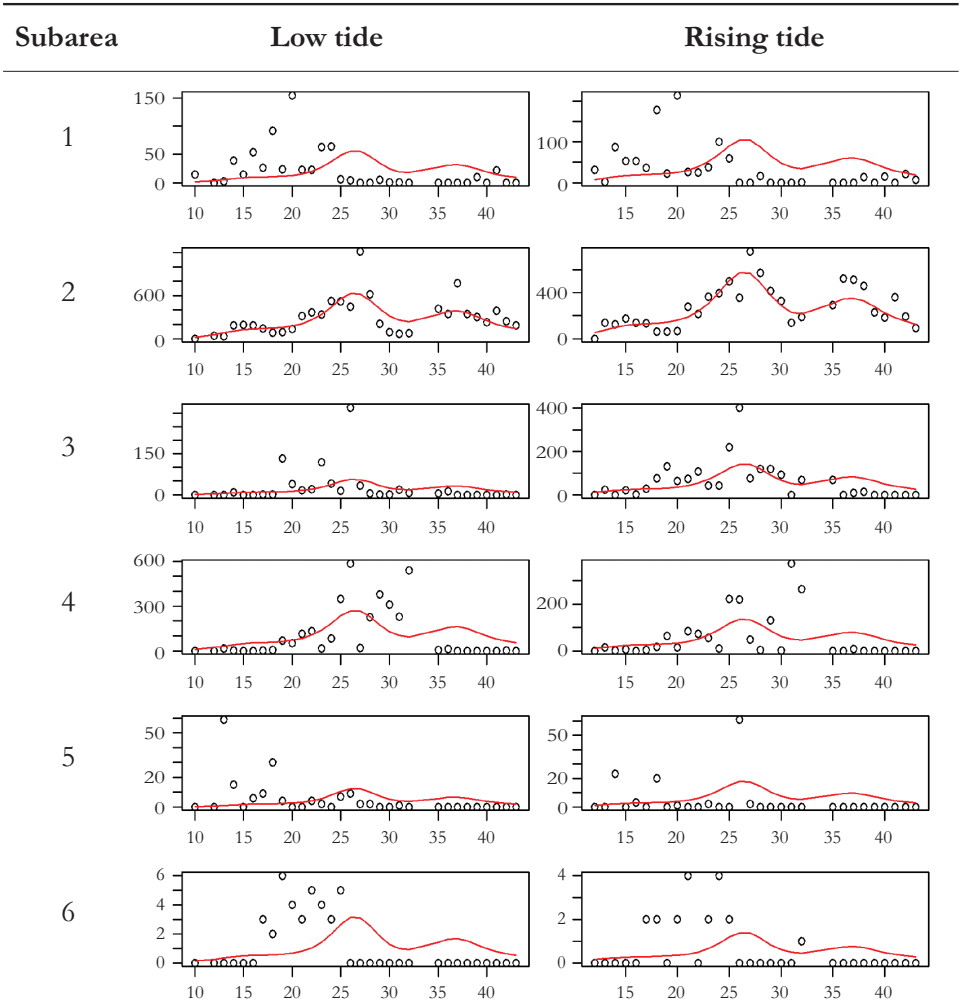

Figure S2. Shelduck counts by week number (points) overlaid with curves generated by the minimum adequate model (lines) from surveys of six subareas in the Borgarfjörður study area between 12 March–23 October 2017.