

a. Wintering grounds of greater white-fronted geese *Anser a. albifrons* in the with sites (circles, $n = 64$) where 51,037 successful families in 1,884 flocks were recorded. Triangles mark 21 splits observed in 13 GPS tracked families. Shaded area bounds 10,635 observations of marked geese. Data were collected from 2000 - 2017. *b.* Breeding grounds (ellipse) with Kolguyev Island (dot) and rough migration route (arrow) to wintering area (rectangle).

Fig.2 Distance ~ family size

GLMM partial fit (lines) and mean distance of wintering site from Kolguyev Island (symbols) per number of family juveniles. First 60 days after arrival indicated in red, the remainder in blue. Triangles & dotted lines represent data from marked geese (dataset *C*), circles and solid lines family counts (dataset *B*).

Fig.3 Family ~ time

GLMM partial fit (lines) and mean number of juveniles in families on each day since goose autumn arrival (dots), for successful families in flocks (dataset *B*, red), and families of marked geese (dataset *C*, blue). Arrows show development of size of GPS tracked families.

Fig.4 Family size ~ predation

GLMM partial fit (lines) and mean number of juveniles per family at each unique level of pooled summer predation index (symbols) using two datasets: blue, all families of marked geese (dataset *C*); red, successful families counted in flocks (dataset *B*); black, successful families only of marked geese (subset of *C*).

Fig.5 N fams ~ flock size

GAMM partial fit (line) and mean number of successful families in white-fronted goose flocks of each unique size (circles). 95% confidence interval is shaded grey.

Fig.6 N fams ~ time

GAMM partial fit (line) and mean number of successful families in white-fronted goose flocks on each winter day, pooled across all winters (circles). 95% confidence interval is shaded grey.

Fig.7 N fams ~ dist

GAMM partial fit (line) and mean number of successful families in white-fronted goose flocks at each site (circles, $n = 49$) as a function of its distance from the Kolguyev Island. 95% confidence interval is shaded grey.

Fig.8 Flocksize ~ distance

GLMM partial fit (line) and mean size of flocks at each site (circles, $n = 111$) as a function of its distance from Kolguyev Island.

Fig.9 J% ~ time

GAMM partial fit (line) and mean proportion of first-winter juveniles in white-fronted goose flocks on each winter day, pooled across all years (circles). Note that days since arrival was modelled as a smoothed covariate using thin plate splines.

Fig.10 p(split) ~ days, total flights, total distance, family size

GAMM partial fits (lines) for (a) days since arrival, (b) cumulative number of flights over winter, (c) number of juveniles, and (d) cumulative number of displacements of more than 1000 km.