Appendix B. Additional description of the methods used to determine gannet tissue and environmental baseline stable isotope ratios.

B.1 Gannet tissue stable isotope ratios

Consumer protein isotope composition reflects dietary protein composition rather than any other components. Lipids in animal tissues are depleted in $\delta^{13}C$ relative to proteins, therefore it is recommended that they be extracted prior to $\delta^{13}C$ analysis. However, extraction techniques may also enrich ^{15}N in an unpredictable manner (Post et al. 2007, Mintenbeck et al. 2008). Hence, we removed two samples of muscle tissue from each prey item obtained by recovering spontaneous regurgitates from breeding gannets. We extracted lipids from one using a Soxhlet apparatus, with a chloroform and methanol solvent. We used this sample to measure $\delta^{13}C$ and the remaining sample to measure $\delta^{15}N$. All samples (prey, plasma and erythrocytes) were dried in an oven for 18 h at 50°C and then homogenised, before a 0.7 mg (± 0.1 mg) aliquot was transferred into a tin capsule. Lipid extraction was impracticable for the small RBC and plasma samples collected from gannets (Votier et al. 2010) so we included tissue type as a fixed effect when estimating isotopic repeatability within gannet blood tissues (see main text).

We expressed stable isotope ratios as δ-values (‰), where

$$\delta X = 1000 \text{ x} \left(\frac{\theta_{\text{sample}}}{\theta_{\text{standard}}} - 1 \right), \qquad \text{(B.1)}$$

X is ^{13}C or ^{15}N, θ_{sample} is the corresponding ratio of $^{13}C/^{12}C$ or $^{15}N/^{14}N$ in blood tissues and θ_{standard} is the corresponding international reference ratio. These were atmospheric N_2 for nitrogen and Pee Dee Belemnite for carbon. Stable isotope ratios were measured by continuous flow mass spectrometry using a Costech (Milan, Italy) ECS 4010 elemental analyser and Thermo Electron (Bremen, Germany) Delta XP mass spectrometer at the NERC Life Sciences Mass Spectrometry Facility, East Kilbride. We used the internal isotope standards Alanine 14, Tryptophan, glycine and gelatine for both $\delta^{13}C$ and $\delta^{15}N$, which were measured with respective precisions of 0.1 and 0.2‰.

B.2 Baseline environmental stable isotope ratios

We obtained baseline estimates of $\delta^{15}N$ and $\delta^{13}C$ from isoscapes predicted by models fitted to tissue isotope ratios measured in phytoplankton-feeding bivalve molluscs (*Aequipecten opercularis*) sampled throughout the North Sea (Jennings and Warr 2003, Barnes et al. 2009). We digitised isoscapes presented in these publications and appended baseline ratios to each tracking location. For each bird, we then calculated the median baseline isotopic ratio across all putative foraging locations (defined below) within each year.

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