Supplementary material

Methods

Bon Portage Island is a small island (3 × 0.5 km) situated 3 km from the mainland. Habitat is dominated by coniferous forest (*Abies balsamica; Picea sp.*) with small patches of deciduous canopy and understory (mostly *Alnus sp*. and *Amelanchier sp.*). The island supports a breeding population of ~ 50 Blackpolls, that are primarily situated in its southern half (Cormier, D., unpublished data).

At the time of tagging, hatch-year birds had fledged from the nests and were moving independently of adults. Most hatch-year birds had completed their first prebasic molt (some were still undergoing body molt) and their gape was reduced. All but two adults had completed prebasic molt. The mean (± SD) mass of tagged birds was 12.3 ± 0.7 g, similar to mass during the breeding season, and birds showed little to no evidence of fat stores (Table S1).

For analysis, tag detections on Bon Portage Island prior to the commencement of dispersal were removed and only data from a single 9-element Yagi tower was used in order to better equalize detection probabilities throughout the array and to improve overall model fit. Time was recoded in hourly units by rounding times to the nearest hour.

We used package mgcv to fit generalized additive mixed models to test how latitudinal and longitudinal displacement varied with time and age. We used mixed models (function gamm; individual as a random effect) with temporally autocorrelated errors (function corCAR1 in package nlme). Temporally autocorellated errors were fit

separately for individual (e.g. individual was considered a grouping factor within the corCAR1 error function).

Three models were tested to measure each of longitudinal and latitudinal displacement: the base model was position versus a smoothed function of time, the second included age as a factor and the third modeled a smoothed function of time with an age interaction. We examined log-likelihood ratios for the 'lme' component of the models to test for evidence of time, age and interactive effects of time and age on the response.

Results

There was no evidence that the relationship between longitudinal displacement and time was non-linear (single df in resulting model, see Fig S1a) but there was support for a non-linear relationship between time and latitudinal displacement (Fig. S1b).

Table s1. Distribution of fat scores (Kaiser 1993) of tagged Blackpoll Warblers on breeding grounds during the post-fledging period

Fat Score	Adult	Hatch-year
0	8	9
1	1	2
2	1	1
3	0	2
4, 5, 6, 7	0	0

Figure s1. Plot showing the smoothed function of longitudinal movements (a) and latitudinal (b) movements (on the scale of the linear predictor) versus time for gamm models of dispersing Blackpoll Warblers around the Gulf of Maine. Estimated degrees of

freedom are 1 for longitudinal models (no evidence for a non-linear relationship between longitude and the time by age interaction) and 6.5 for latitudinal models (evidence for a non-linear relationship between latitude and time). Dotted lines are 2 SE above and below the estimated smooth (solid line). In Figure 1a Adults are represented by blue and hatch-years by red.