

Supporting Information for:

LOCAL CLIMATE DETERMINES VULNERABILITY TO CAMOUFLAGE MISMATCH IN
SNOWSHOE HARES

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Figures S1-S4

Tables S1-S3

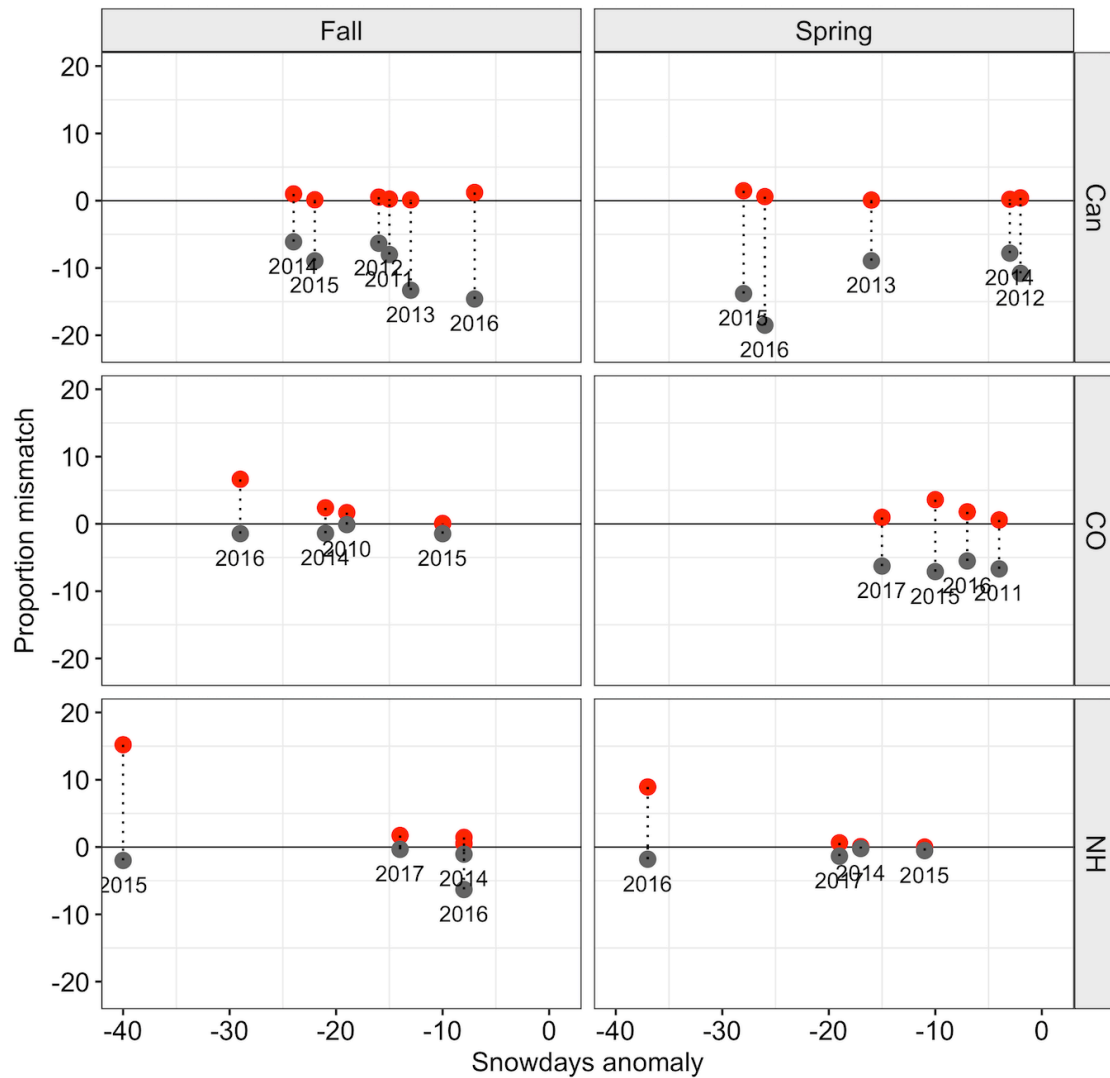


Figure S1. Annual proportions of camera days with white (red) and brown (gray) mismatch occurrences (in %) plotted against anomalies in the number of snowdays each season in Canada, Colorado and New England. Study area-specific anomaly in the number of snow days was calculated for each year as the difference between the mean number of snow days during each season and the mean number of snow days during 1980-2009 at all camera sites.

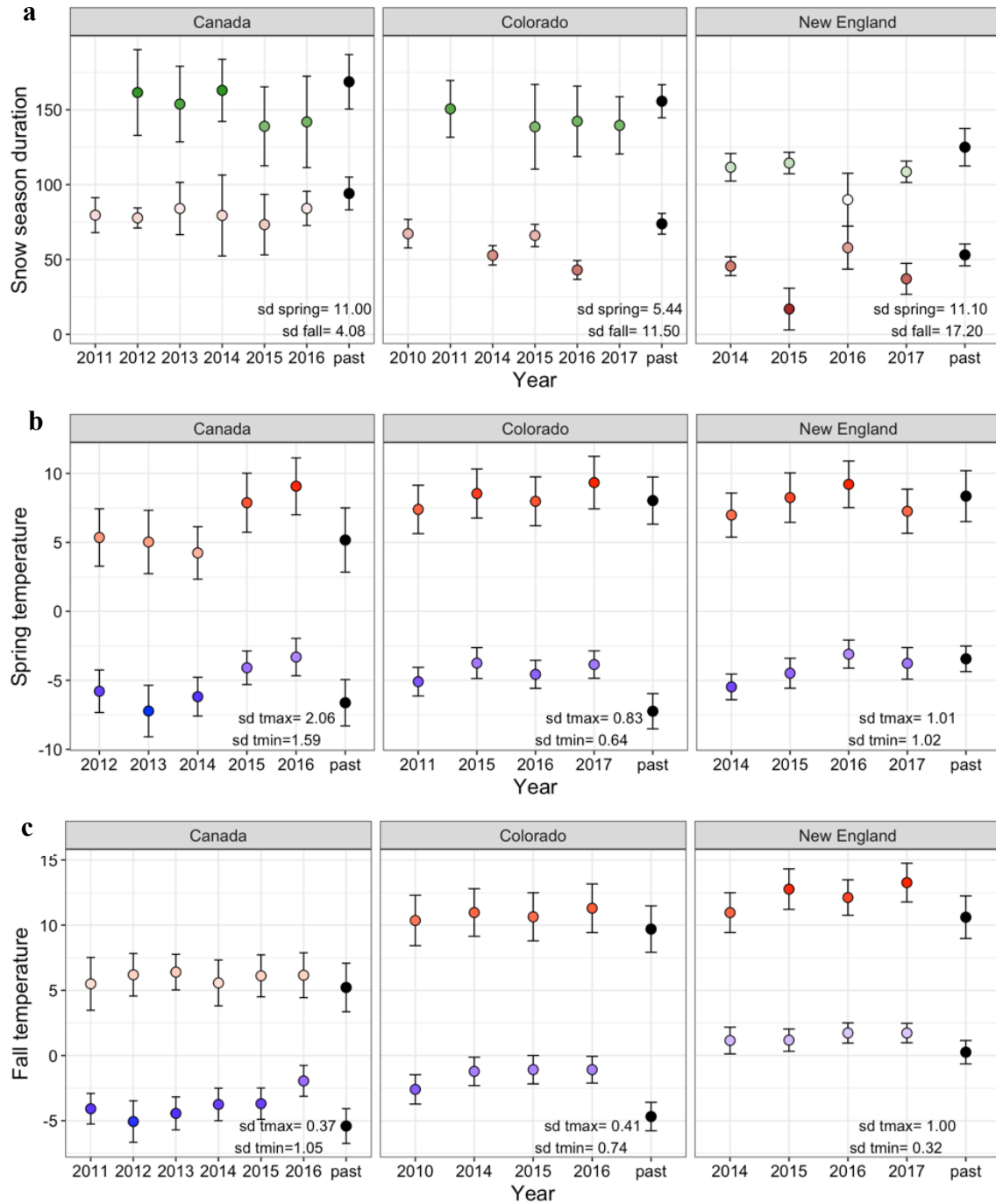


Figure S2. Annual mean and standard deviation in snow and temperature variables at the three study areas during the years of monitoring and for the 30-year mean (black points; 1980-2009). (a) duration of snow season (days; falls = bottom; spring = top). (b) seasonal minimum (bottom) and maximum (top) temperatures in spring. (c) seasonal minimum (bottom) and maximum (top) temperature in fall. Annotations at the bottom right corner of each facet give standard deviation in the depicted climate variable across the years of monitoring.

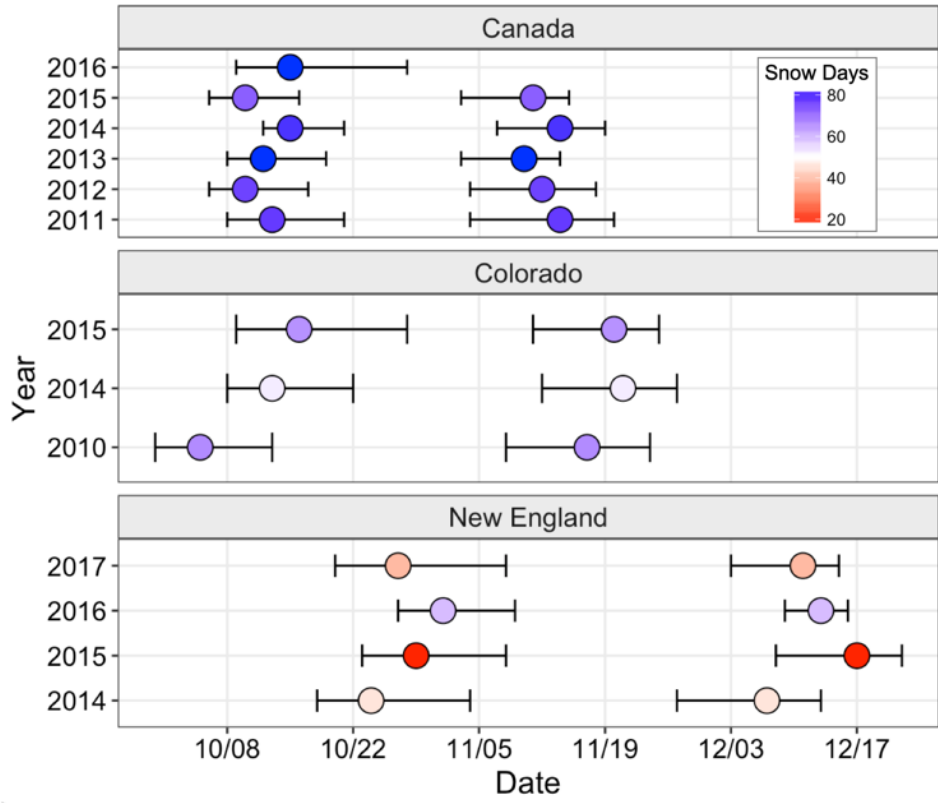


Figure S3. Estimated annual fall molt initiation (left) and completion (right) dates in the hare populations in Canada, Colorado and New England. Points show mean date estimates and are colored by the annual duration of fall snow season (in days). Horizontal lines show 95% credible intervals (overlapping CRIs identify same dates).

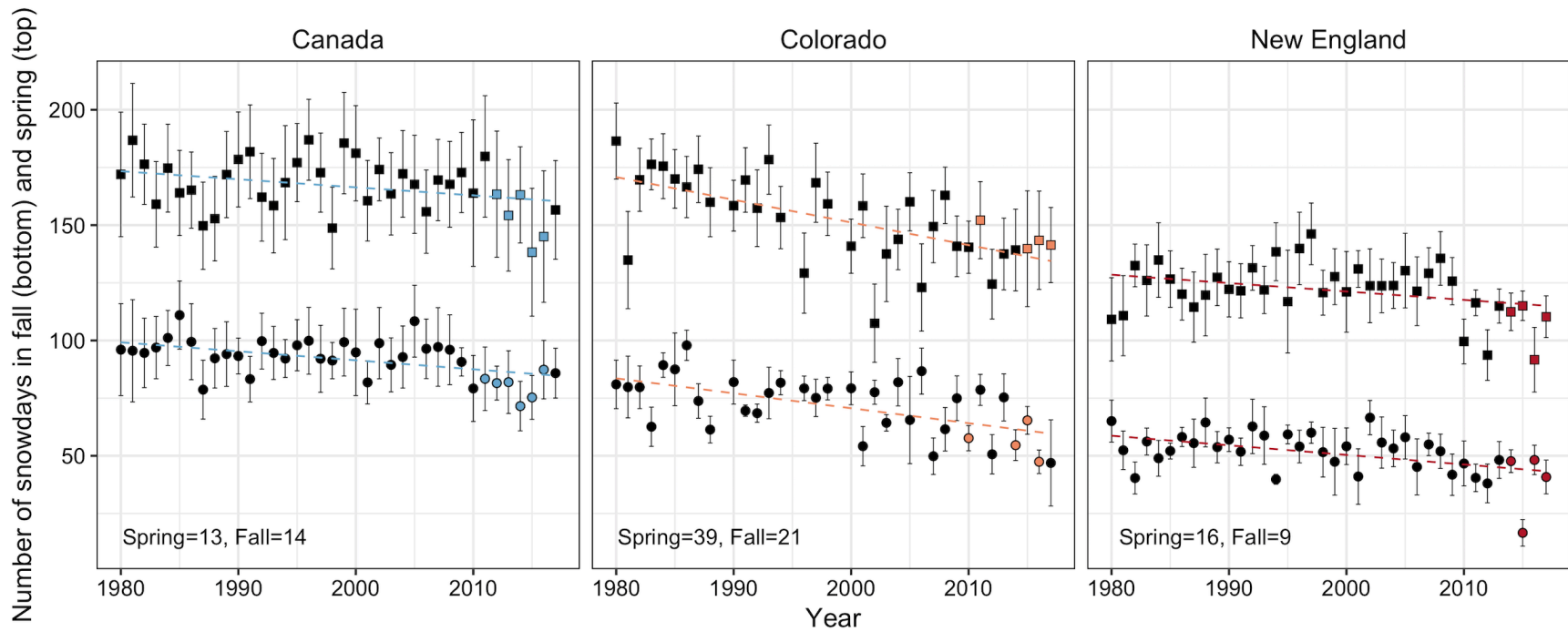


Figure S4. Mean annual number of days with snow at camera trap sites in the fall (bottom series) and spring (top series) 1980-2017. The colored points highlight years of molt phenology monitoring. Vertical lines show standard deviations. Dashed lines show linear regression slopes for each study area. Numbers in the bottom show estimated reductions in number of snow days between 1980-2017.

Table S1. Pearson’s correlation coefficients between annual minimum (tmin) or maximum (tmax) temperature and seasonal snow duration during the course of the study (2010-2017) and the 30-year period (1980-2009). The correlation coefficients are calculated across all camera sites.

Time Period	Fall			Spring		
	tmin x tmax	tmin x snow	tmax x snow	tmin x tmax	tmin x snow	tmax x snow
2010-2017	0.77	-0.68	-0.73	0.78	-0.62	-0.66
1980-2009	0.66	-0.85	-0.83	0.61	-0.74	-0.64

Table S2. Effects of geospatial and long-term climate covariates on snowshoe hare molt phenology. Mean effect sizes and 95% credible intervals (CRI) estimates for slopes for univariate models including data from all years and populations combined. Betas indicate effect of latitude, elevation, duration of snow season, mean seasonal minimum (tmin) and maximum (tmax) temperature during 1980-2009 on the probability of brown (β_{brown}) and white (β_{white}) coat color. Asterisks indicate CRIs not overlapping 0. Values reflect standardized data.

Covariate	Fall β_{brown}	Fall β_{white}	Spring β_{brown}	Spring β_{white}
Latitude	-0.624 (-1.474, 0.165)	0.566 (-0.136, 1.293)	0.689* (0.376, 1.012)	-1.127* (-1.500, -0.764)
Elevation	-1.952* (-2.739, -1.224)	2.165* (1.450, 3.033)	-1.325* (-1.631, -1.039)	1.812* (1.513, 2.140)
Snow	-0.752* (-1.494, -0.077)	0.446 (-0.214, 1.123)	-0.809* (-1.143, -0.492)	0.382* (0.015, 0.746)
tmax	1.693* (1.046, 2.409)	-1.855* (-2.479, -1.288)	0.776* (0.440, 1.123)	-0.546* (-0.938, -0.165)
tmin	2.182* (1.542, 2.976)	-2.370* (-2.894, -1.909)	1.280* (0.998, 1.579)	-1.665* (-2.029, -1.325)

Table S3. Effects of annually varying covariates on snowshoe hare molt phenology. Betas are the slopes of reaction norms β_2 (=mean effect size of annually varying climate covariate) and their 95% credible intervals (CRI) on probability of being in brown ($\beta_{2\text{brown}}$) and white coat color ($\beta_{2\text{white}}$). Results are based on univariate models using standardized data. Asterisks indicate CRIs not overlapping zero.

Covariate	Fall $\beta_{2\text{brown}}$	Fall $\beta_{2\text{white}}$	Spring $\beta_{2\text{brown}}$	Spring $\beta_{2\text{white}}$
Snow annual	-1.036* (-1.618, -0.475)	1.466* (1.009, 1.929)	-1.627* (-1.969, -1.303)	1.965* (1.637, 2.320)
tmax annual	1.718* (1.063, 2.489)	-2.070* (-2.850, -1.432)	1.587* (1.208, 2.003)	-0.831* (-1.239, -0.434)
tmin annual	2.122* (1.427, 2.944)	-2.344* (-2.943 -1.845)	1.273* (0.921, 1.655)	-1.090* (-1.480, -0.718)