

The following supplement accompanies the article

Variability in polar bear *Ursus maritimus* stable isotopes in relation to environmental change in the Canadian Beaufort Sea

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Table S1. Julian day for break-up (first day that sea ice concentration dropped below 50%) and freeze-up (first day that sea ice concentration remained above 50%), as well as open water duration (number of days between break-up and freeze-up) for the study area within the Canadian Beaufort Sea, 2003-2011. Sea ice metrics were calculated from Special Sensor Microwave Imager daily satellite images (25 km resolution; National Snow and Ice Data Center, Boulder, Colorado) by averaging the sea ice concentration value for all pixels within the study area.

Year	Break-up date	Freeze-up date	Open water duration (days)
2003	178	300	122
2004	169	291	122
2005	149	302	153
2006	194	305	111
2007	159	301	142
2008	136	302	166
2009	173	303	130
2010	153	315	162
2011	166	303	137

Table S2. Model selection to assess biological and environmental variables affecting $\delta^{13}\text{C}$ and $\delta^{15}\text{N}$ of Canadian Beaufort Sea polar bears *Ursus maritimus*. Top ten models are shown, ranked by AIC_c . CLASS = female with cubs, female or adult male, MASS = weight (kg), AGE = subadult or adult, LAT = latitude, LONG = longitude, YEAR = year of hair growth, AO = Arctic oscillation index, PDO = Pacific decadal oscillation index, AOO = Arctic ocean oscillation index, TEMP = mean air temperature from May to November, RS = ringed seal ovulation, BREAK = 50% sea ice break-up, FREEZE = 50% sea ice freeze-up.

Response	Rank	Model	df	AIC_c	ΔAIC_c	AIC_c Weight
$\delta^{13}\text{C}$	1	CLASS + MASS + LAT + LONG + FREEZE + AOO	9	265.28	0	0.35
	2	CLASS + MASS + LAT + LONG + FREEZE	8	266.39	1.11	0.20
	3	CLASS + MASS + LAT + LONG + AOO + PDO + FREEZE	10	267.42	2.13	0.12
	4	CLASS + MASS + LAT + LONG + TEMP	8	267.42	2.14	0.12
	5	CLASS + MASS + LAT + LONG + AO + FREEZE	9	268.06	2.78	0.099
	6	CLASS + MASS + LAT + LONG + FREEZE + RS	9	268.46	3.18	0.072
	7	CLASS + MASS + LAT + LONG + YEAR + AOO + FREEZE	14	270.53	5.24	0.026
	8	CLASS + MASS + LAT + LONG + YEAR	15	272.71	7.43	0.0086
	9	CLASS + LAT + LONG + AOO + FREEZE	8	275.97	10.69	0.0017
	10	CLASS + AGE + LAT + LONG + FREEZE	9	276.89	11.61	0.0011
$\delta^{15}\text{N}$	1	CLASS + LAT + PDO + RS	7	565.52	0.00	0.35
	2	CLASS + LAT + RS	6	565.78	0.26	0.29
	3	CLASS + MASS + LAT + PDO + RS	8	566.75	1.23	0.20
	4	CLASS + MASS + LAT + PDO + RS + AO	9	568.82	3.30	0.075
	5	CLASS + MASS + LAT + PDO + RS + AO + TEMP	10	570.44	4.92	0.036
	6	CLASS + MASS + AGE + LAT + PDO + RS + AO + TEMP	11	572.55	7.03	0.013
	7	CLASS + MASS + AGE + LAT + PDO + RS + AO + FREEZE	11	572.64	7.12	0.013
	8	CLASS + MASS + AGE + LAT + PDO + RS + AOO + FREEZE	11	572.98	7.46	0.011
	9	CLASS + MASS + AGE + LAT + PDO + AOO + FREEZE + BREAK	11	575.42	9.90	0.0032
	10	CLASS + MASS + AGE + LAT + PDO + AOO + FREEZE + OW	11	575.42	9.90	0.0032

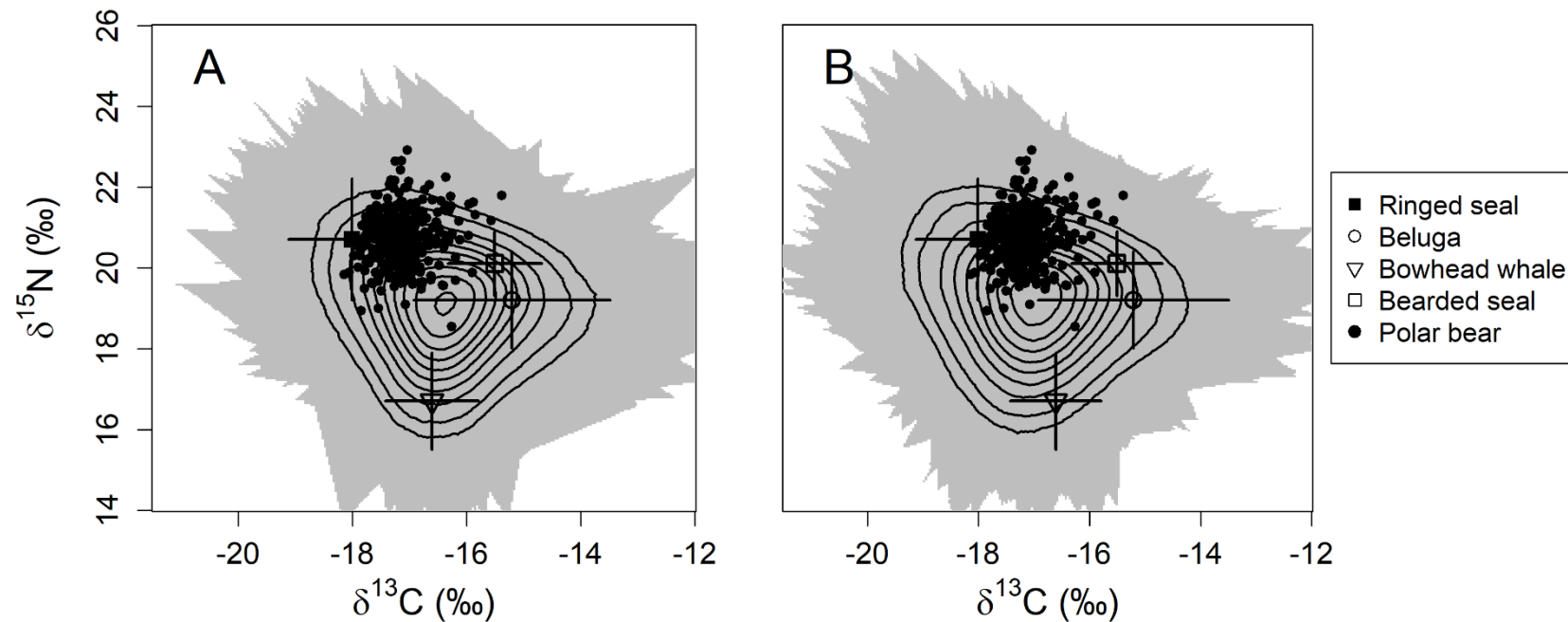


Figure S1. Biplots of $\delta^{13}\text{C}$ and $\delta^{15}\text{N}$, with simulated mixing region, for polar bears *Ursus maritimus* (filled circle, $n = 315$) and their prey sources. Prey included ringed seal *Pusa hispida* (filled square), bearded seal *Erignathus barbatus* (hollow square), bowhead whale *Balaena mysticetus* (hollow triangle), and beluga whale *Delphinapterus leucas* (hollow circle), with $\delta^{13}\text{C}$ and $\delta^{15}\text{N}$ from Cherry et al. (2011). Prey isotopic values were corrected with the polar bear discrimination factors from: A) L'Hérault et al. (2018) ($\Delta\delta^{15}\text{N} = 2.41 \pm 0.20\text{‰}$, $\Delta\delta^{13}\text{C} = 2.59 \pm 0.42\text{‰}$, $n = 3$), and B) Rode et al. (2016) ($\Delta\delta^{15}\text{N} = 2.5 \pm 0.2\text{‰}$, $\Delta\delta^{13}\text{C} = 2.0 \pm 0.6\text{‰}$, $n = 4$). Error bars show 95% confidence intervals. The grey area shows the mixing region, with contours for every 10% interval beginning at the outermost contour (5%).

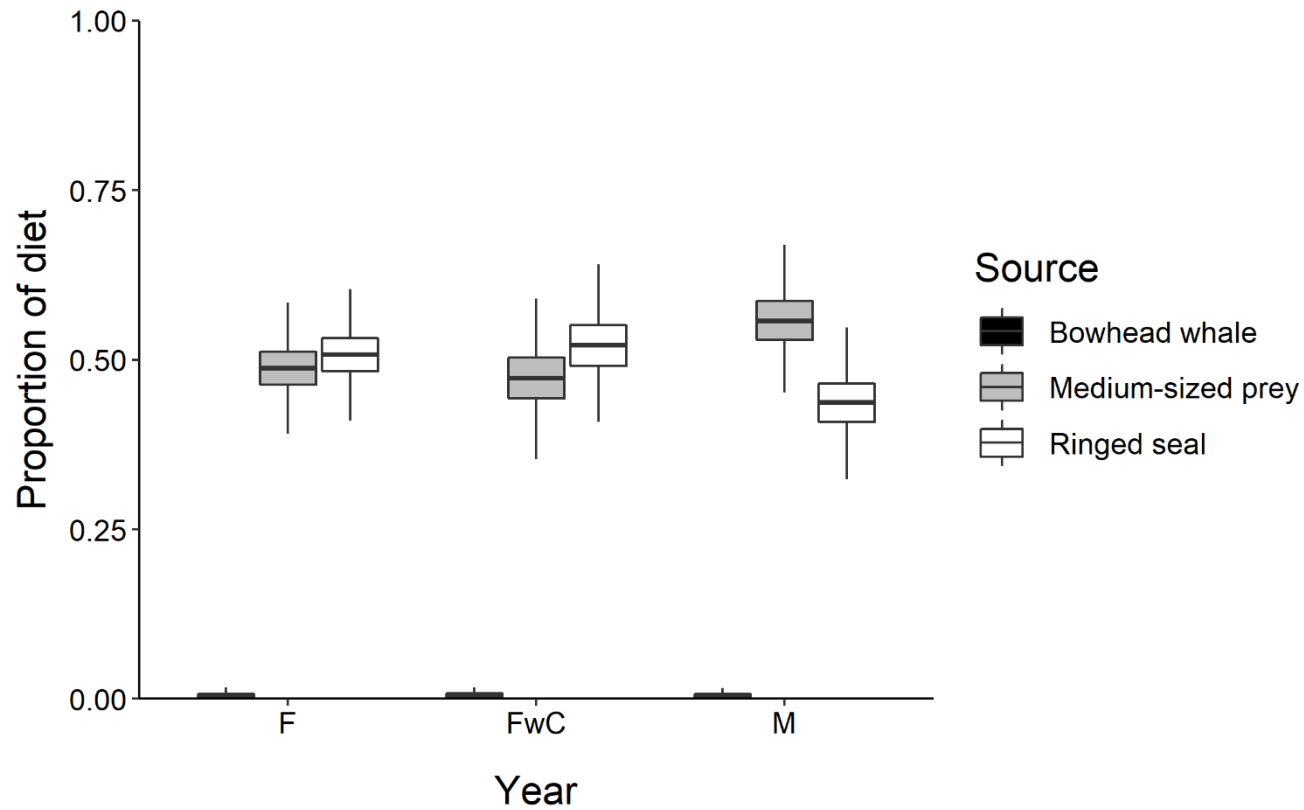


Figure S2. Prey contributions to diets of females (F), females with cubs (FwC), and males (M) of polar bears *Ursus maritimus* (n = 285) of the Canadian Beaufort Sea, 2003-2011. Prey contributions and 95% credible intervals were generated from MixSIAR, using the discrimination factor from Rode et al. (2016). Bearded seal *Erignathus barbatus* and beluga *Delphinapterus leucas* were aggregated as medium-sized prey, *a priori*.

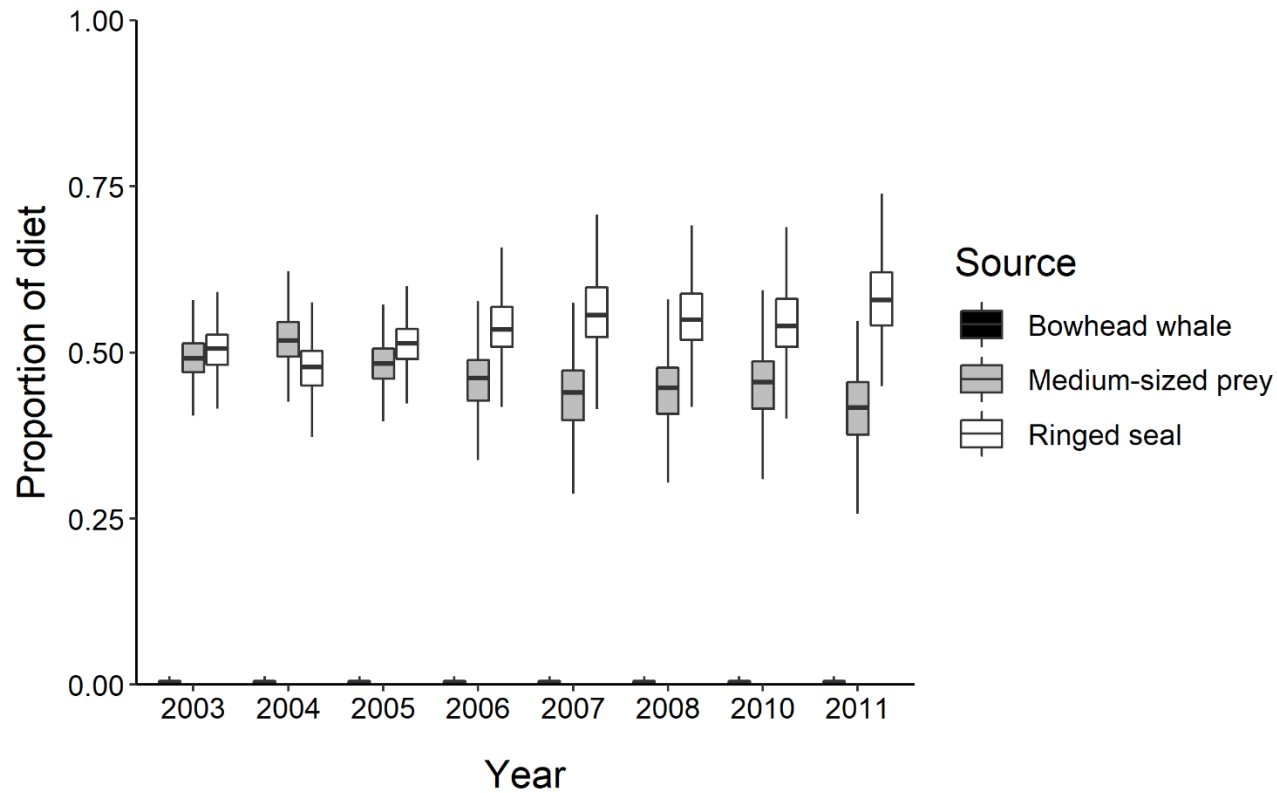


Figure S3. Temporal change in prey contributions, with 95% credible interval bands generated by MixSIAR, for polar bears *Ursus maritimus* (n = 285) from the Canadian Beaufort Sea, 2003-2011. Prey contributions and 95% credible intervals were generated from MixSIAR, using the discrimination factor from Rode et al. (2016). Bearded seal *Erignathus barbatus* and beluga *Delphinapterus leucas* were aggregated as medium-sized prey, *a priori*.

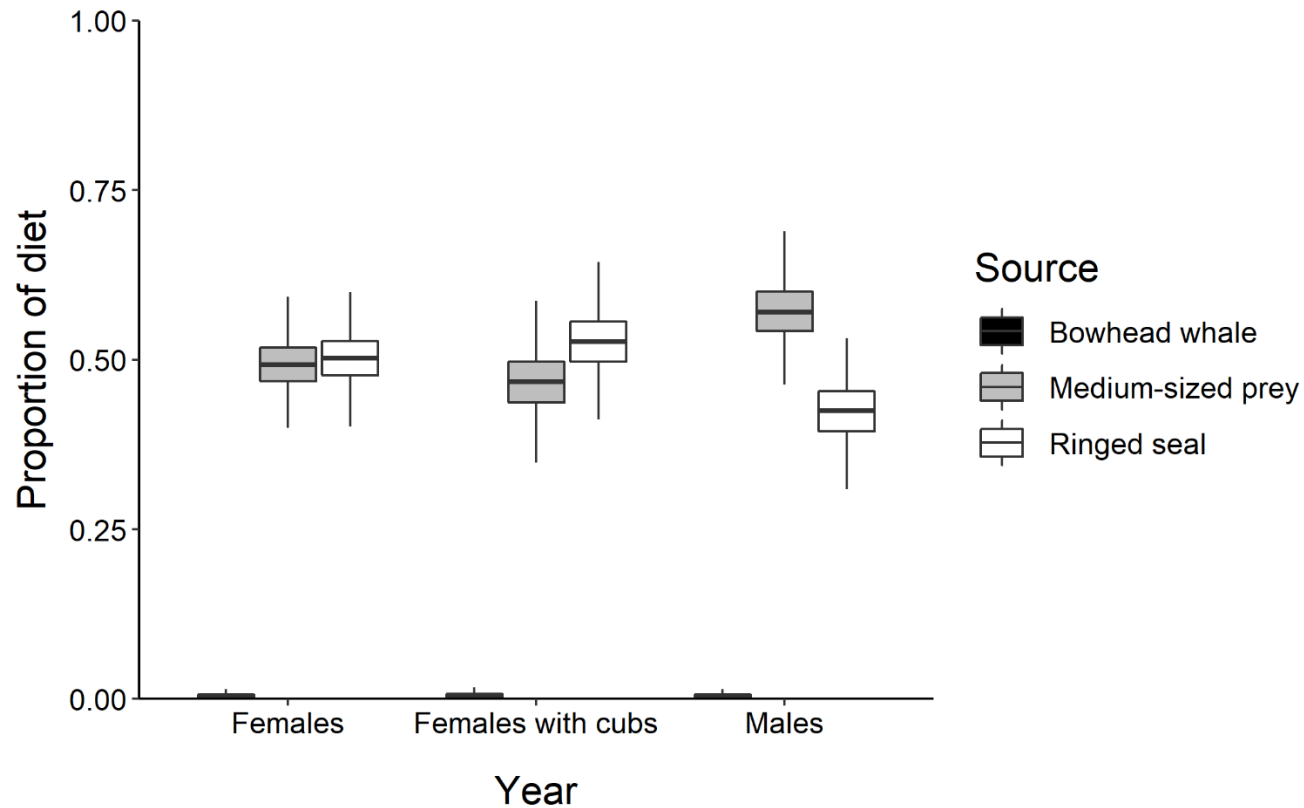


Figure S4. Prey contributions to diets of females, females with cubs, and males of polar bears *Ursus maritimus* (n = 315) of the Canadian Beaufort Sea, 2003-2011. Prey contributions and 95% credible intervals were generated from MixSIAR, using the discrimination factor from L'Hérault et al. (2018). Outliers, based on the 95% mixing region, were included within this model. Bearded seal *Erignathus barbatus* and beluga *Delphinapterus leucas* were aggregated as medium-sized prey, *a priori*.

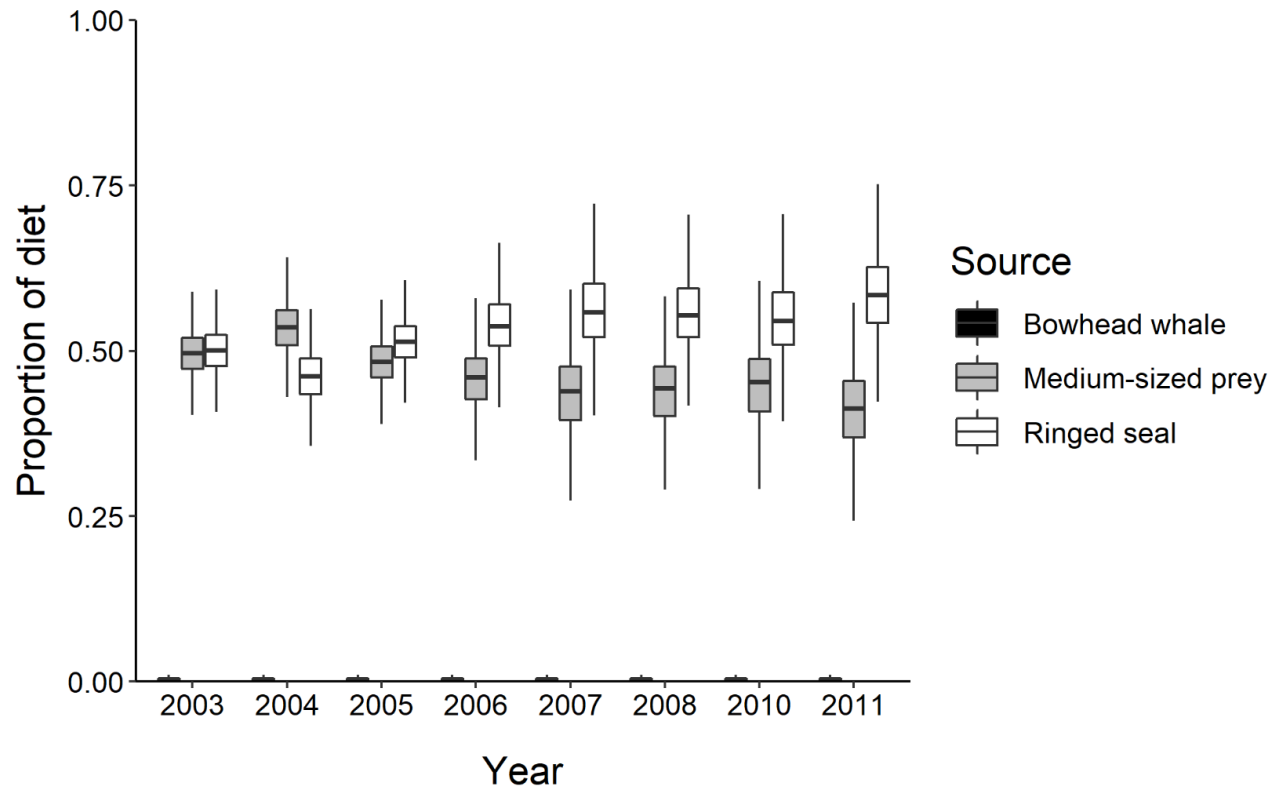


Figure S5. Temporal change in prey contributions, with 95% credible interval bands generated by MixSIAR, for polar bears *Ursus maritimus* (n = 315) from the Canadian Beaufort Sea, 2003-2011. Prey contributions and 95% credible intervals were generated from MixSIAR, using the discrimination factor from L'Hérault et al. (2018). Outliers, based on the 95% mixing region, were included within this model. Bearded seal *Erignathus barbatus* and beluga *Delphinapterus leucas* were aggregated as medium-sized prey, a priori.

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