Supplemental Information

Figure S1. Adult female bears (n = 42) were fitted with a Telonics TAW-4610H satellite radio collar to collect movement data. These movement data were used to differentiate between 'offshore bears' (n = 36; left panel) that used larger areas across the pack ice of Baffin Bay and 'coastal bears' (n = 6; right panel) that remained resident on the fast ice in Melville Bay near glaciers.

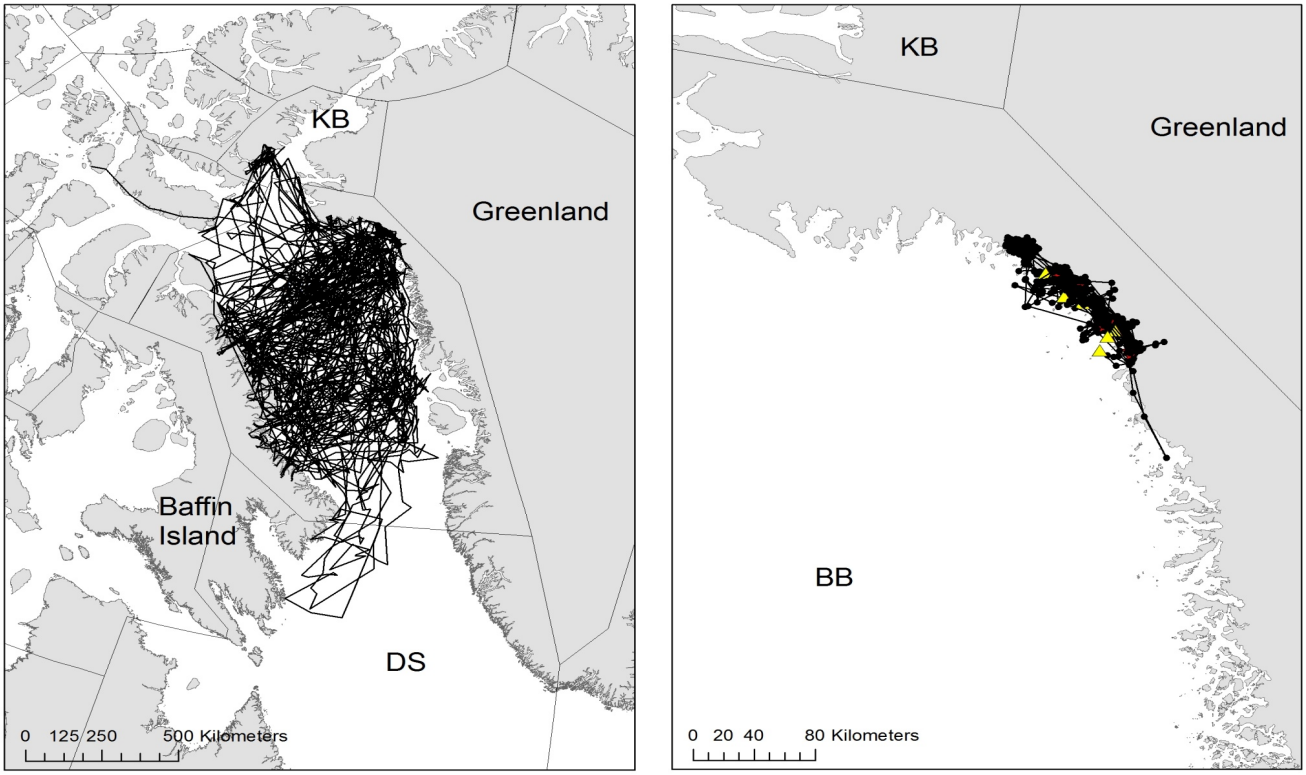
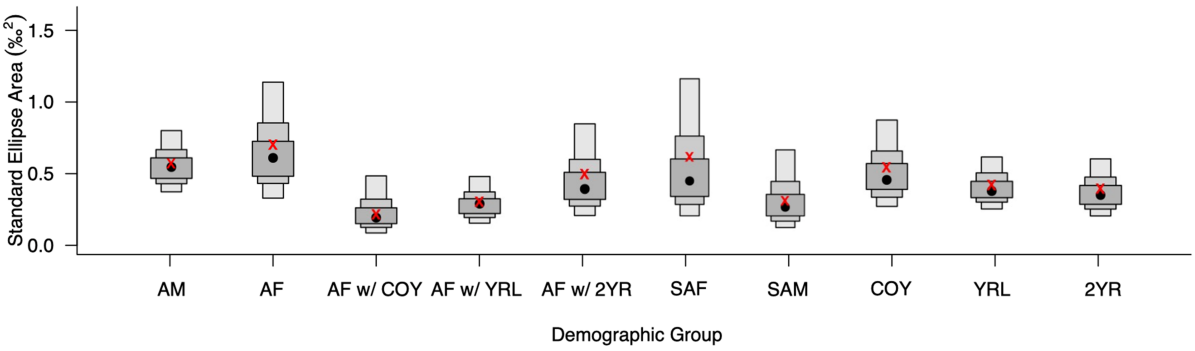


Figure S2. Density plot of the Bayesian estimates of the standard ellipse area [SEA_B] for each group (top panel) or space-use strategy (bottom panel). The mode SEA_B is represented by a black circle, the maximum likelihood estimate of the corrected standard ellipse area [SEA_c] is represented by a red x, and the 50, 75, and 95% credible intervals are represented as different shades of grey. Demographic groups are defined as follows: Adult Female (AF), Adult Male (AM), Subadult Female (SAF), Subadult Male (SAM), Cub-of-the-year (COY), Yearling (YRL), and 2-year-old (2YR).



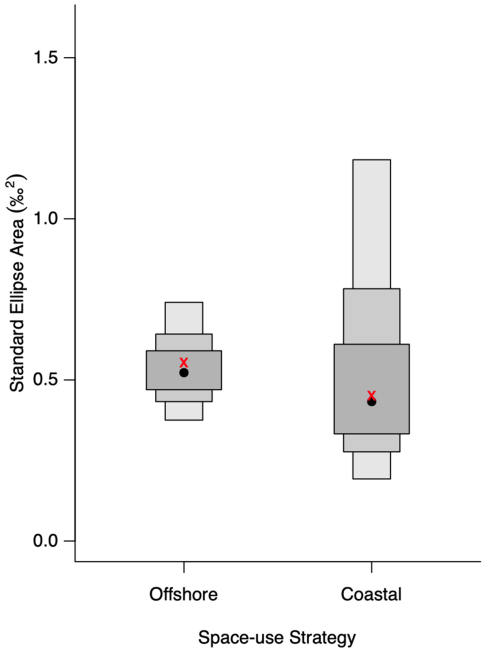


Figure S3. Biplot of guard hair $\delta^{13}C$ and $\delta^{15}N$ stable isotope values (‰) for individual bears that were captured and re-captured in the Baffin Bay (BB) polar bear (*Ursus maritimus*) subpopulation between 2009-2013. The demographic and reproductive status groups are defined as follows: Adult Female (AF), Adult Female with Cub-of-the-year (AF w/ COY), Adult Female with 2-year-old (AF w/ 2YR), Adult Male (AM), Subadult Male (SAM), Yearling (YRL), and 2-year-old (2YR).

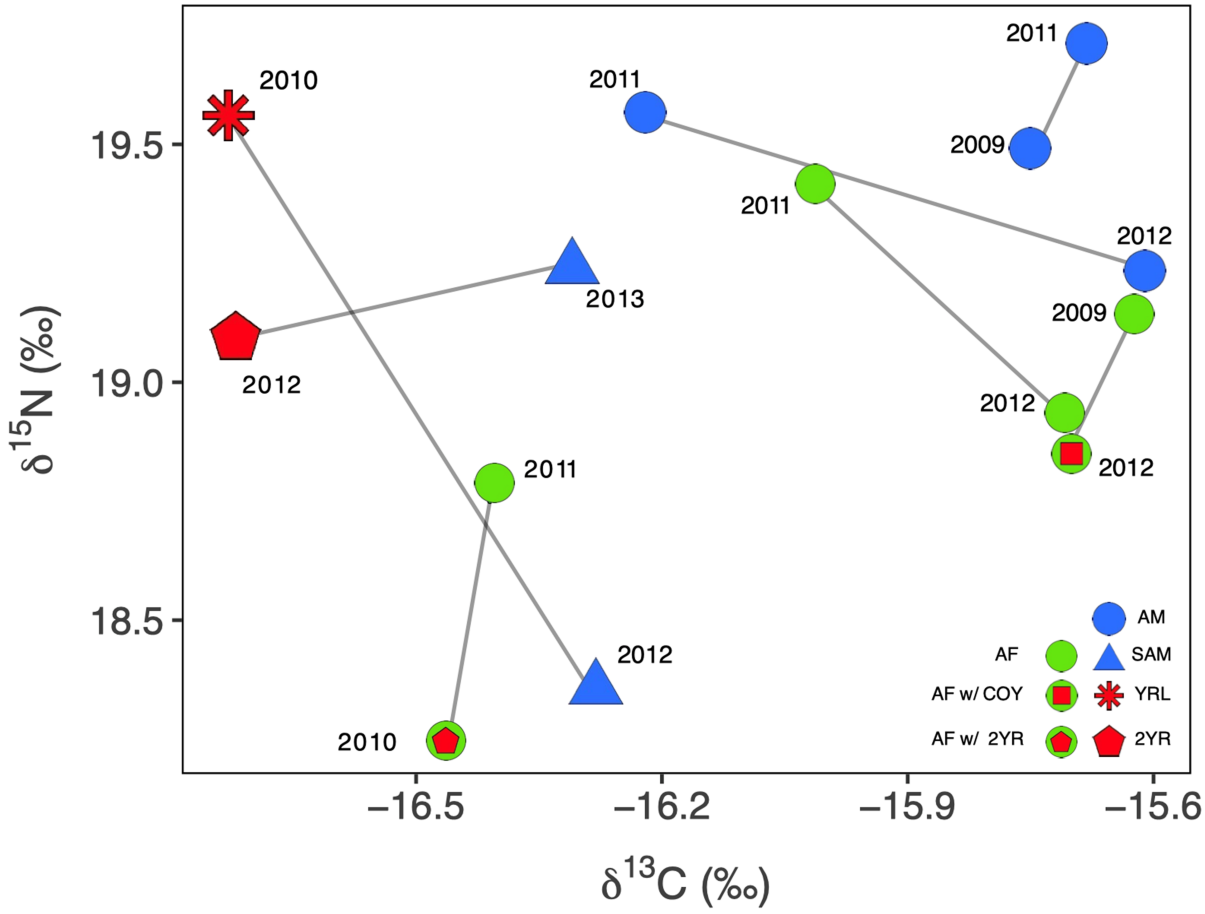


Table S1. The equations used to estimate Total Body Mass (Derocher and Wiig 2002) and Body Condition Index (Cattet et al. 2002). The Body Condition Index was calculated for each bear using the TBM in kg and straight-line body length in cm

	Equation	Variables	Source
Total Body Mass	$W\,(1-e^{-k(a-A)})^3$	a = age (years) W=asymptotic mass (kg) k=mass growth rate constant (years^{-1}) A= fitting constant (years)	(Derocher and Wiig 2002)
Body Condition Index	$\frac{\ln(TBM)-3.07(\ln(SLBL))+10.76}{0.17+0.009(\ln(SLBL))}$	TBM = Total Body Mass (kg) SLBL = Straight-Line Body Length (cm)	(Cattet et al. 2002)

Table S2. The estimate and 95% confidence intervals for coefficients included in the model of best fit for guard hair $\delta^{13}C$, $\delta^{15}N$, and THg concentrations of Baffin Bay polar bears (*Ursus maritimus*), 2009 - 2013. The reference age class included in the intercept is Adult Female. Bold denotes that the confidence interval of the estimate does not overlap zero. The covariate abbreviation *OpenWater.lag* represents the open water period of the previous year (in days)

	$\delta^{13}C$		**$\delta^{15}N$**		**THg**	
	Class + *OpenWater.lag* + (1 | *Capture Year*)		*Class*		*Class*	
Variables	Estimate	Confidence Interval	Estimate	Confidence Interval	Estimate	Confidence Interval
(Intercept)	-14.5	**(-16.7, -12.3)**	18.9	**(18.6, 19.2)**	1.8	**(1.6, 1.9)**
Class (Adult Female with COY)	0.2	(-0.03, 0.5)	0.5	(-0.01, 0.9)	-0.1	(-0.4, 0.2)
Class (Adult Female with YRL)	-0.2	(-0.4, 0.03)	-0.4	(-0.7, 0.07)	0.1	(-0.1, 0.4)
Class (Adult Female with 2YR)	0.04	(-0.2, 0.3)	-0.3	(-0.8, 0.1)	0.2	(-0.1, 0.4)
Class (Adult Male)	0.1	(-0.1, 0.3)	0.5	**(0.1, 0.8)**	-0.01	(-0.2, 0.2)
Class (Subadult Female)	-0.2	(-0.5, 0.1)	-0.1	(-0.6, 0.4)	-0.2	(-0.5, 0.1)
Class (Subadult Male)	-0.2	(-0.5, 0.1)	-0.1	(-0.6, 0.4)	-0.3	**(-0.6, -0.02)**
OpenWater.lag	-0.01	(-0.02, 0.003)				

Table S3. Model selection to assess population and environmental variables affecting $\delta^{13}C$, $\delta^{15}N$ and THg of Baffin Bay polar bears (*Ursus maritimus*). Models are ranked by AIC_c ,with $\Delta AIC_c \leq 2$ bolded. All models with $\Delta AIC_c < 4$ are shown

Response	Rank	Model	df	AIC_c	ΔAIC_c	AIC_c Weight
$\delta^{13}C$	1	***Class + OpenWater.lag + (1 | Capture Year)***	10	54.8	0	0.256
	2	***Class + (1 | Capture Year)***	9	54.9	0.08	0.247
	3	***Class + BreakUp.lag + (1 | Capture Year)***	10	55.5	0.64	0.187
	4	*Class + IceExtent.lag + (1 | Capture Year)*	10	56.9	2.10	0.090
	5	*Class + IceArea.lag + (1 | Capture Year)*	10	57.1	2.27	0.082
	6	*BreakUp.lag + (1 | Capture Year)*	4	57.8	2.95	0.059
	7	*OpenWater.lag + (1 | Capture Year)*	4	58.5	3.65	0.041
	8	1 (null) + (1 | *Capture Year*)	3	58.6	3.81	0.038
$\delta^{15}N$	1	***Class***	8	131.4	0	0.243
	2	***Class + IceArea.lag***	9	131.6	0.26	0.214
	3	***Class + BreakUp.lag***	9	131.8	0.43	0.196
	4	***Class + IceExtent.lag***	9	131.9	0.50	0.189
	5	*Class + OpenWater.lag*	9	133.4	2.07	0.086
	6	*Class + FreezeUp.lag*	9	133.8	2.48	0.071
log(THg)	1	***Class***	8	35.4	0	0.330
	2	***Class + OpenWater.lag***	9	37.4	2.01	0.121
	3	***Class + FreezeUp.lag***	9	37.4	2.03	0.120
	4	*Class + BCI*	9	37.7	2.31	0.104
	5	*Class + BreakUp.lag*	9	37.9	2.50	0.095
	6	*Class + IceExtent.lag*	9	37.9	2.53	0.093
	7	*Class + IceArea.lag*	9	37.9	2.53	0.093
	8	1 (null)	2	39.4	3.98	0.045

Table S4. Mean guard hair $\delta^{13}C$ and $\delta^{15}N$ stable isotope values (‰) and mercury concentrations (μg g^{-1}) with standard errors (SE), 95% confidence interval, and sample size (*n*) for each movement pattern in the adult female Baffin Bay (BB) polar bear (*Ursus maritimus*) sub-population

	Coastal *n* = 6	Offshore *n* = 36	Confidence Interval
$\delta^{13}C$	16.3 ± 0.2	16.2 ± 0.1	(-0.2, 0.7)
$\delta^{15}N$	19.1 ± 0.2	18.8 ± 0.1	(-2.3, 2.0)
THg	6.6 ± 0.8	6.7 ± 0.4	(-0.7,0.5)

Table S5. Mean base and tip guard hair $\delta^{13}C$, $\delta^{15}N$, $\delta^{34}S$ stable isotope values (‰) and mean mercury concentrations (µg g^{-1}) with standard error (SE) and sample size (*n*) for each movement pattern in the adult female BB polar bear subpopulation. An outlier was excluded from the $\delta^{13}C$ and $\delta^{15}N$ stable isotope base and tip analyses. The 95% confidence intervals comparing base to tip segments and coastal base/tip to offshore base/tip are shown in the row and column margins, respectively; bold denotes significance, $\alpha = 0.05$

	Habitat	*n*	Base	Tip	
THg ± SE	*Coastal*	6	6.7 ± 0.8	6.5 ± 0.8	(-1.0, 0.6)
	Offshore	16	6.3 ± 0.6	6.8 ± 0.5	(-0.7,1.4)
			(-1.6, 2.7)	(-2.0, 2.0)	
$\delta^{13}C$ ± SE	*Coastal*	6	-16.4 ± 0.3	-15.9 ± 0.2	**(0.3, 0.8)**
	Offshore	21	-16.5 ± 0.1	-15.9 ± 0.1	**(0.4, 0.7)**
			(-0.6, 0.7)	(-0.6, 0.6)	
$\delta^{15}N$ ± SE	*Coastal*	6	18.9 ± 0.2	18.9 ± 0.2	(-0.3, 0.4)
	Offshore	21	18.8 ± 0.2	18.8 ± 0.1	(-0.3, 0.2)
			(-0.5, 0.6)	(-0.4, 0.7)	
$\delta^{34}S$ ± SE	*Coastal*	5	19.6 ± 0.2	20.6 ± 0.3	**(0.6, 1.5)**
	Offshore	7	19.8 ± 0.2	20.6 ± 0.3	**(0.7, 1.2)**
			(-1.0, 0.2)	(-1.1, 0.5)	

Table S6. Model selection to assess population and environmental variables affecting $\delta^{13}C$, $\delta^{15}N$ and THg of Baffin Bay adult female polar bears (*Ursus maritimus*). Models with a $\Delta AIC_c < 2$ are shown through bolding, but only the top 5 models ranked by AIC_c are shown. An additional covariate (*Habitat)* was included and is derived from the satellite collar data (*i.e.*, coastal or offshore movement patterns)

Response	Rank	Model	df	AIC_c	ΔAIC_c	AIC_c Weight
$\delta^{13}C$	1	***OpenWater.lag***	3	40.0	0	0.366
	2	***BreakUp.lag***	3	41.4	1.44	0.178
	3	***FreezeUp.lag***	3	41.5	1.54	0.170
	4	**1 (null)**	2	41.5	1.56	0.168
	5	*OpenWater.lag + Habitat*	4	42.2	2.27	0.117
$\delta^{15}N$	1	***BreakUp.lag***	3	62.7	0	0.257
	2	***IceArea.lag***	3	62.8	0.09	0.246
	3	***IceExtent.lag***	3	63.5	0.78	0.174
	4	**1 (null)**	2	63.6	0.85	0.168
	5	***BreakUp.lag + Habitat***	4	63.8	1.02	0.154
THg	1	**1 (null)**	2	27.7	0	0.287
	2	***BCI***	3	27.9	0.16	0.266
	3	***IceExtent.lag***	3	28.9	1.25	0.154
	4	***IceArea.lag***	3	29.0	1.29	0.151
	5	***BCI + IceExtent.lag***	4	29.1	1.42	0.142

Table S7. The coefficient and 95% confidence intervals for the Pearson's product-moment correlation between log-transformed total mercury concentrations (THg) and CN stable isotopes ($\delta^{13}C$ and $\delta^{15}N$) separated by adult sex and reproductive status of Baffin Bay polar bears (*Ursus maritimus*), 2009 - 2013. Bold denotes that the 95% confidence interval of the estimate does not overlap zero

		$\delta^{13}C$ and THg		**$\delta^{15}N$ and THg**	
Class	*n*	Coefficient	Confidence Interval	Coefficient	Confidence Interval
Adult Female	10	**0.630**	**(0.088, 0.884)**	0.391	(-0.236, 0.788)
Adult Female with COY	5	**0.766**	**(0.0313, 0.963)**	0.431	(-0.477, 0.894)
Adult Female with YRL	12	0.019	(-0.517, 0.544)	**0.531**	**(0.0004, 0.828)**
Adult Female with 2YR	7	0.524	(-0.215, 0.881)	0.333	(-0.425, 0.817)
Adult Male	26	-0.0002	(-0.373, 0.373)	0.072	(-0.309, 0.434)