

# Supplementary Materials For: Capital and income breeding traits differentiate trophic match-mismatch dynamics in large herbivores

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*Phil Trans Roy Soc B* **368** (1624) doi: 10.1098/rstb.2012.0484

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## Appendix A: Trophic Mismatch and Abundance Models

Model	TMM Coefficient ± s.e.	Abundance Coefficient ± s.e.	n	AICc	R <sup>2</sup>
<b>Caribou</b>					
$CP_t = a_0 + tmm_t + \varepsilon$	<b>-0.546 ± 0.149**</b>	--	<b>11</b>	<b>-19.77</b>	<b>0.60</b>
$CP_t = a_0 + tmm_t + \varepsilon$ (sub)	-0.536 ± 0.150**	--	9	-15.39	0.65
$CP_t = a_0 + tmm_{t-1} + \varepsilon$	0.330 ± 0.221	--	9	-8.49	0.24
$CP_t = a_0 + abund_t + \varepsilon$	--	-0.0003 ± 0.0003	11	-11.24	0.12
$CP_t = a_0 + abund_t + \varepsilon$ (sub)	--	-0.0003 ± 0.0003	9	-7.79	0.18
$CP_t = a_0 + abund_{t-1} + \varepsilon$	--	0.0003 ± 0.0003	9	-7.10	0.11
$CP_t = a_0 + tmm_t + abund_t + \varepsilon$	-0.515 ± 0.157**	-0.0002 ± 0.0002	11	-17.58	0.63
$CP_t = a_0 + tmm_{t-1} + abund_t + \varepsilon$	0.392 ± 0.552	-0.0001 ± 0.0008	9	-5.08	0.24
$CP_t = a_0 + tmm_t + abund_{t-1} + \varepsilon$	-0.608 ± 0.191**	-0.0002 ± 0.0003	9	-12.58	0.67
$CP_t = a_0 + tmm_{t-1} + abund_{t-1} + \varepsilon$	0.289 ± 0.241	-0.0002 ± 0.0003	9	-5.60	0.28
<b>Muskoxen</b>					
$MP_t = a_0 + tmm_t + \varepsilon$	-0.00368 ± 0.00367	--	10	-19.68	0.11
$MP_t = a_0 + tmm_t + \varepsilon$ (sub)	-0.00225 ± 0.00379	--	9	-17.65	0.05
$MP_t = a_0 + tmm_{t-1} + \varepsilon$	<b>-0.00636 ± 0.00289*</b>	--	<b>9</b>	<b>-21.93</b>	<b>0.41</b>
$MP_t = a_0 + abund_t + \varepsilon$	--	-0.0001 ± 0.002	10	-18.49	0.00
$MP_t = a_0 + abund_t + \varepsilon$ (sub)	--	-0.0003 ± 0.002	9	-17.33	0.04
$MP_t = a_0 + abund_{t-1} + \varepsilon$	--	0.001 ± 0.002	9	-17.84	0.07
$MP_t = a_0 + tmm_t + abund_t + \varepsilon$	-0.004 ± 0.004	-0.0008 ± 0.002	10	-16.68	0.13
$MP_t = a_0 + tmm_{t-1} + abund_t + \varepsilon$	-0.007 ± 0.003**	-0.002 ± 0.002	9	-20.11	0.49
$MP_t = a_0 + tmm_t + abund_{t-1} + \varepsilon$	-0.001 ± 0.004	0.001 ± 0.002	9	-14.58	0.09
$MP_t = a_0 + tmm_{t-1} + abund_{t-1} + \varepsilon$	-0.006 ± 0.003	0.0001 ± 0.002	9	-18.80	0.41

CP and MP are species-specific calf ratios at time t, tmm is the species-specific index of trophic mismatch at lag t, abund is species-specific abundance at the breeding ground at lag t. The designation (sub) indicates analyses with subset of data (excluding 1993,2002) to allow for goodness of fit comparison with analyses where response years were sacrificed to explore lagged effects. \* p <= 0.1, \*\* p <= 0.05.

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## Appendix B: Temporal Trends in Response and Predictor Variables

Variable of Interest	Year Coefficient $\pm$ s.e.	R <sup>2</sup>
Caribou Calf Production	-0.016 $\pm$ 0.013	0.15
<b>Caribou Trophic Mismatch Index</b>	0.034 $\pm$ 0.017*	<b>0.33</b>
Caribou Abundance	-14.98 $\pm$ 14.13	0.12
<b>Muskox Calf Production</b>	0.019 $\pm$ 0.005**	<b>0.61</b>
<b>Muskox Trophic Mismatch Index</b>	-1.6 $\pm$ 0.5**	<b>0.52</b>
Muskox Abundance	-1.64 $\pm$ 1.38	0.15

Temporal trends in response and predictor variables were assessed by regressing the variable in question against year using data from 2002-2011 and by examining model significance. \*  $p \leq 0.1$ , \*\*  $p \leq 0.05$ . #

## Appendix C: Trophic Mismatch and Abundance Models with Detrended Data

Model	TMM Coefficient $\pm$ s.e.	Abundance Coefficient $\pm$ s.e.	n	AICc	R <sup>2</sup>
<b>Caribou</b>					
$CP_t = a_0 + tmmd_t + \varepsilon$	-0.60 $\pm$ 0.22**	--	10	-13.73	0.47
$CP_t = a_0 + tmmd_t + \varepsilon$ (sub)	-0.72 $\pm$ 0.16**	--	9	-17.99	0.74
$CP_t = a_0 + tmmd_{t-1} + \varepsilon$	0.62 $\pm$ 0.20**	--	9	-13.65	0.57
$CP_t = a_0 + tmmd_t + abund_t + \varepsilon$	-0.54 $\pm$ 0.27*	-0.0001 $\pm$ 0.0003	10	-10.66	0.48
$CP_t = a_0 + tmmd_{t-1} + abund_t + \varepsilon$	0.97 $\pm$ 0.33**	0.0004 $\pm$ 0.0004	9	-12.50	0.67
$CP_t = a_0 + tmmd_t + abund_{t-1} + \varepsilon$	-0.82 $\pm$ 0.19**	-0.0002 $\pm$ 0.0002	9	-15.95	0.77
$CP_t = a_0 + tmmd_{t-1} + abund_{t-1} + \varepsilon$	-0.65 $\pm$ 0.26**	-0.00007 $\pm$ 0.0003	9	-10.30	0.58
$CP_t = a_0 + tmmd_t + tmmd_{t-1} + \varepsilon$	t: -0.59 $\pm$ 0.29*; t-1: 0.15 $\pm$ 0.28	--	9	-15.00	0.75
<b>Muskoxen</b>					
$MPd_t = a_0 + tmmd_t + \varepsilon$	0.005 $\pm$ 0.003	--	10	-31.57	0.30
$MPd_t = a_0 + tmmd_t + \varepsilon$ (sub)	0.005 $\pm$ 0.003	--	9	-26.77	0.05
$MPd_t = a_0 + tmmd_{t-1} + \varepsilon$	-0.002 $\pm$ 0.003	--	9	-24.04	0.05
$MPd_t = a_0 + abund_t + \varepsilon$	--	-0.002 $\pm$ 0.001	10	-31.16	0.27
$MPd_t = a_0 + abund_{t-1} + \varepsilon$	--	-0.0009 $\pm$ 0.001	9	-24.14	0.06
$MPd_t = a_0 + tmmd_t + abund_t + \varepsilon$	0.005 $\pm$ 0.003*	-0.002 $\pm$ 0.0009	9	-32.19	0.54
$MPd_t = a_0 + tmmd_{t-1} + abund_t + \varepsilon$	-0.003 $\pm$ 0.003	-0.002 $\pm$ 0.001	9	-24.15	0.35
$MPd_t = a_0 + tmmd_t + abund_{t-1} + \varepsilon$	0.005 $\pm$ 0.003	-0.0009 $\pm$ 0.001	9	-24.12	0.36
$MPd_t = a_0 + tmmd_{t-1} + abund_{t-1} + \varepsilon$	-0.002 $\pm$ 0.004	-0.0009 $\pm$ 0.001	9	-21.22	0.11

CP and MPd (muskox detrended by year) are species-specific calf ratios at time t, tmmd is the detrended (by year) species-specific index of trophic mismatch at lag t, abund is species-specific abundance at the breeding ground at lag t. The designation (sub) indicates analyses with subset of data (excluding 1993, 2002) to allow for goodness of fit comparison with analyses where response years were sacrificed to explore lagged effects. \*  $p \leq 0.1$ , \*\*  $p \leq 0.05$  #