Description of primary variables and data sources used to parameterize Niche Mapper.

Table 1. Parameters included in the mechanistic model Niche Mapper, and their associated values and sources.

Parameter	Source	Value
Body mass	Seasonal estimates from Schwartz et al. (2014)	99–135 kg
Percent body fat	Seasonal estimates from Schwartz et al. (2014)	13–27.5 %
Animal density	Weighted average based on body composition (Schwartz et al. 2014) and density of bone, muscle, fat, and viscera (Warren Porter, personal communication)	1033.6 kg/m^3
Basal metabolic rate	See Appendix C	84–107 W
Pelt reflectivity (350 – 2,500 nm) on the dorsal and ventral surfaces of the head, neck, torso, and legs	Measured from captive bears at Washington State University Bear Research, Ecology, and Conservation Center (BRECC) with ASD field spectrophotometer	Example: torso, dorsal 0.430, ventral 0.29
Pelt depth and hair length	Measured from captive bears at BRECC, once in May and once in September. Validated with Brown (1942)	Example: torso, 31.4 mm (Sept) –75.9 mm (May); 52.9 (Sept)– 82.8 mm (May)
BMR multiplier for peak lactation	Jenness et al. (1972), Prentice and Prenctice (1988), Gittleman (1989)	1.52
Thermal conductivity of flesh	Valvano et al. (1985) and Natori and Porter (2007)	0.4–2.8 W/m^{o}C
Oxygen extraction efficiency	Schmidt-Nielsen (1997)	25%
BMR multiplier for activity	Measured from captive bears at BRECC during treadmill trials and doubly labeled water trials. Speed estimates for activity based on Craighead (1974)	1.56
Configuration factors	Warren Porter, personal communications	Between animal and sky = 0.5; between animal and ground = 0.3
Soil thermal conductivity	Estimated from Abu-Hamdeh and Reeder (2000)	0.35 W/^{o}mC

Substrate reflectivity	Averaged across multiple vegetation types (Matthews 1984)	26%
Substrate density	Estimated from common rock data available online[a]	2,650 kg/m3
Substrate specific heat	Estimated from common rock data available online[a]	837 J/kg-K
Substrate longwave infrared emissions	Sellers (1965)	90%
Animal average height	Measured from captive grizzly bears at BRECC	100 cm
Percent shade	Estimated as percent canopy cover from the National Land Cover Database	BRECC and YNP 1–100%
Cloud cover	Historic weather data available at weatherunderground.com	BRECC 0–54.3%; YNP 0–100%
Air Temperature	Recorded at 2 m by a weather station[b] in BRECC and sourced from PRISM Climate Group at Oregon State University	BRECC 1.40–33.92 ºC; YNP -10.14–29.72 ºC

[a]Common rock data obtained from: (1) http://www.engineeringtoolbox.com; and (2) at http://www.edumine.com/xtoolkit/tables/sgtables.htm.
[b]Weather station at BRECC located at 46°43'50"N, 117°8'33"W

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