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Wildlife Research

Supplementary Material

Habitat suitability correlates with mean population fitness of a threatened marsupial predator

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Supplementary material

Table S1 - Northern quoll (*Dasyurus hallucatus*) trapping data recorded as part of the Pilbara northern quoll monitoring program.

Site	Y	X	2014	2015	2016	2017	2018	2019
Broken Boulder	-21.18	117.95	6	14	-	-	-	-
Cane River Gorge	-22.18	116.27	2	-	5	-	-	-
Coppin's Gap	-20.89	120.12	7	6	3	-	-	-
Dales Gorge	-22.48	118.56	-	-	4	-	3	1
Degrey Station	-20.32	119.17	-	-	-	-	4	-
Euro Springs	-21.77	117.91	3	5	3	-	-	-
Poondano Central	-20.46	118.83	-	5	-	-	-	-
Poondano South	-20.50	118.83	-	-	3	-	-	-
Python Pool	-21.33	117.24	8	1	1	3	-	1
Quoll Knoll	-22.10	119.24	-	-	-	2	-	1
Red Rock	-20.87	118.58	21	23	13	21	27	8

Table S2- Environmental variables used to predict northern quoll habitat suitability and habitat suitability. Table adapted from Moore *et al.* (2019)

Variable	Justification	Source
Topographical Ruggedness	Studies suggest suitability of northern quoll habitat is often associated with rocky rugged areas (Braithwaite & Griffiths, 1994; Burnett, 1997; Hernandez-Santin et al., 2016; Schmitt et al., 1989)	Elevation data sourced from (GeoScienceAustralia, 2008). Ruggedness calculated following Riley *et al.* 1999)
Annual Precipitation	Increased productivity as a result of high annual precipitation may boost the capacity of northern quolls to tolerate threats (Burnett, 1997; Hohnen et al., 2016; Start et al., 2007)	(BOM, 2022)
Precipitation Seasonality	Northern quoll records in Queensland associated with higher levels of rainfall seasonality (Woinarski et al., 2008).	(BOM, 2022)
Elevation	Pollock (1999) found northern quolls in central Queensland were typically found at lower elevation. Molloy *et al.* (2017) found elevation was a strong contributor to MAXENT modelling for northern quolls in the Pilbara	(GeoScienceAustralia, 2008)
Distance to water	Studies suggest areas proximate to permanent water are more likely to provide high suitability for northern quolls (Begg, 1981; Braithwaite & Griffiths, 1994; Burnett, 1997; Molloy et al., 2017)	(GeoScienceAustralia, 2022)

Table S3 – Response of Pilbara northern quolls (*Dasyurus hallucatus*) to habitat suitability and sex.

Intercept	Month	Habitat suitability	Previous wet	Sex	df	AICc	delta
Body condition							
5.58		+		+	5	171.9	0.0
		+	+	+	6	175.0	3.1
5.59				+	4	176.0	4.1
Tail circumference							
47.65	+	+	+	+	12	328.1	0.0
48.29	+	+		+	11	328.8	0.7
Mass							
364.00	+	+	+	+	12	570.2	0.0

Table S4 – Response of Pilbara northern quolls (*Dasyurus hallucatus*) to environmental factors and sex.

Intercept	Month	Annual rainfall	Elevation	Distance to water	Rainfall variation	Topographical ruggedness	Sex	df	AICc	delta
Body condition										
5.6						+	+	5.0	174.7	0.0
5.6							+	4.0	176.0	1.2
5.6					+	+	+	6.0	176.2	1.5
Tail circumference										
45.3	+	1.8	-1.3			3.5	+	13.0	324.1	0.0
44.6	+	1.3				3.0	+	12.0	324.2	0.2
44.9	+					2.7	+	11.0	324.5	0.4
45.5	+		-0.8			3.0	+	12.0	325.4	1.4
Mass										
361.5	+	+	+	+	+	+	+	15	547.5	0.0
361.9	+	+	+		+	+	+	14	551.2	3.7