

# Combining radio-telemetry and random observations to model the habitat of Near Threatened Caucasian grouse *Tetrao mlokosiewiczi*

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**Appendix 1** Grouse climate model. The variables are described in Table 1.

Climatic variable	Coefficient	Minimum value	Maximum value
bio1	0	-9.4	15.5
bio2	0	6.4	14
bio3	-2.371165	21	38
bio4	-1.698677	5,467	10,528
bio5	0	7.4	43.4
bio6	0	-23.6	4.2
bio7	0	21.7	44.7
bio8	0	-3.2	23.4
bio9	0	-18	27.7
bio10	0	-1.1	27.8
bio11	0	-18	7.6
bio12	2.053346	155	2,382
bio13	0	17	305
bio14	0	2	99
bio15	0	9	71
bio16	0	45	845
bio17	0	8	345
bio18	0.3832688	9	600
bio19	0	27	736
bio1 <sup>2</sup>	-28.10309	0	240.25
bio3 <sup>2</sup>	-1.080928	441	1,444
bio4 <sup>2</sup>	-7.494743	2.99E+07	1.11E+08
bio6 <sup>2</sup>	0.9976312	0	556.96
bio7 <sup>2</sup>	0.0035328	470.89	1,998.09
bio8 <sup>2</sup>	-9.229393	0	547.56
bio9 <sup>2</sup>	-7.550569	0	767.29
bio10 <sup>2</sup>	-0.091929	0.16	772.84
bio11 <sup>2</sup>	-10.15444	0	324
bio14 <sup>2</sup>	-4.204711	4	9,801
bio15 <sup>2</sup>	-2.478196	81	5,041
bio18 <sup>2</sup>	0.2039859	81	360,000
bio19 <sup>2</sup>	0.89912	729	541,696
bio1*bio11	-0.785934	-48	169.2
bio1*bio18	-15.63023	-3,010.8	8,511.5
bio1*bio4	-0.516804	-63,497	148,877.5
bio1*bio5	-1.743632	-69.56	590.24
bio1*bio6	-0.725065	-105.28	221.84
bio1*bio8	-0.696925	-18.72	313.02
bio1*bio9	-0.999699	-44.88	429.35
bio2*bio3	1.013424	140.7	490.0
bio2*bio5	-0.505874	82.88	473.71
bio2*bio6	-2.293452	-264.32	27.72
bio2*bio7	-2.337363	138.88	611.34
bio3*bio4	5.4953812	160,196	314,247
bio3*bio5	-0.093941	266.4	1,159.4
bio3*bio7	0.2970394	613.8	1,389.5
bio3*bio8	0.2192461	-115.2	754.8
bio3*bio9	1.6226202	-648.0	855.6
bio4*bio9	-1.059488	-121,590.0	266,834.1
bio5*bio7	0.254583	229.40	1,939.98

**Appendix 1** (Continued)

Climatic variable	Coefficient	Minimum value	Maximum value
bio6*bio8	-3.591322	-205.36	75.52
bio7*bio8	-0.360744	-112.32	885.40
bio7*bio9	-1.083009	-558.00	1,157.73
bio8*bio9	14.659099	-107.44	497.84
bio10*bio14	-0.913487	-37.4	2,205.0
bio10*bio18	-1.514277	-343.2	13,090.1
bio10*bio3	-0.442299	-39.6	855.6
bio10*bio9	-0.846715	-127.92	770.06
bio11*bio14	2.1009093	-612.0	644.0
bio11*bio5	16.50537	-210.24	199.88
bio11*bio6	-0.901121	-7.68	424.80
bio11*bio7	2.6078605	-558.00	176.40
bio11*bio8	-5.32316	-107.44	134.67
bio11*bio9	6.043413	-133.92	324.00
bio12*bio15	1.9748823	3,097	78,606
bio12*bio3	0.2295824	3,875	83,370
bio12*bio4	4.1067021	1,550,620	1.35E+07
bio13*bio14	0.8412298	102	25,620
bio13*bio2	3.5060277	159.8	2,592.5
bio13*bio4	16.732258	168,572	1,771,198
bio13*bio6	-0.44781	-3,894.0	853.4
bio14*bio15	2.8113838	112	2,772
bio14*bio6	0.3088597	-888.0	272.0
bio14*bio8	-0.043983	-108.8	2,068.0
bio15*bio16	-0.385951	893	36,173
bio15*bio18	-5.97805	620	23,694
bio15*bio19	-46.18949	570	28,743
bio15*bio3	-1.254219	288	2,442
bio15*bio7	1.1791911	240.3	2,807.0
bio15*bio9	15.07305	-954.0	1,966.7
bio16*bio6	-0.869157	-10,738.0	2,383.4
bio17*bio19	0.506748	702	253,920
bio17*bio2	-1.561595	97.6	3,189.9
bio17*bio5	-0.324074	298.4	9,604.0
bio17*bio6	3.4311002	-2,917.2	989.4
bio17*bio8	-0.792814	-371.2	7,570.2
bio17*bio9	1.119775	-2,088.0	6,854.4
bio18*bio6	-4.935356	-8,685.0	1,659.2
bio18*bio7	0.336254	344.7	14,968.5
bio18*bio8	-3.298952	-998.4	11,798.7
bio18*bio9	-5.013918	-6,446.2	7,568.4
Linear predictor normalizer	-3.999929		
Density normalizer	167.43025		
Number of background points	10,000		
Entropy	6.8677558		

**Appendix 2** Grouse disturbance model. Cost distance from urban areas on slope is calculated with the slope cell size excluded.

Disturbance variable	Coefficient	Minimum value	Maximum value
Cost distance	14.4027	0	1,151.16
Cost distance ^2	-11.112488	0	1.33E+06
Linear predictor normalizer	4.66674		
Density normalizer	969.18		
Number of background points	10,000		
Entropy	8.098679		

**Appendix 3** Grouse land cover model. In the variable name the number corresponds to the land cover class described in Table 2. Distances are in metres.

Landcover variable	Coefficient	Minimum value	Maximum value
distance1	10.38134642	0	120,611
distance3	-6.700217129	0	113,450
distance4	-4.80008897	0	213,438
distance5	5.250243262	0	120,467
distance6	4.892895022	0	55,096
distance7	2.514255434	0	172,711
distance8	1.429344562	0	60,697
distance9	-5.720638746	0	142,958
distance10	-68.3555346	0	122,485
distance12	5.671779021	0	41,121
distance14	-3.770226153	0	96,341
distance1^2	-36.57866409	0	1.45E+10
distance4^2	-336.0794878	0	4.56E+10
distance5^2	-15.31489415	0	1.45E+10
distance8^2	-24.40008417	0	3.68E+09
distance9^2	22.17344959	0	2.04E+10
distance12^2	-4.841861438	0	1.69E+09
distance1*distance10	-172.5379474	0	3.29E+09
distance1*distance12	1.439124442	0	3.91E+09
distance1*distance3	-36.72993149	0	1.29E+10
distance1*distance4	-8.708628972	0	2.17E+10
distance1*distance5	34.68644089	0	1.43E+10
distance1*distance6	-17.71668209	0	3.02E+09
distance1*distance7	25.70582715	0	6.87E+09
distance3*distance4	35.06850532	0	2.16E+10
distance3*distance6	4.815642478	0	3.02E+09
distance3*distance7	7.961524588	0	9.52E+09
distance3*distance8	-8.414274369	0	6.89E+09
distance3*distance9	22.35376373	0	1.15E+10
distance4*distance5	-6.329090414	0	2.22E+10
distance4*distance6	25.1923367	0	8.28E+09
distance4*distance8	133.4786835	0	1.10E+10

**Appendix 3** (Continued)

Landcover variable	Coefficient	Minimum value	Maximum value
distance4*distance9	49.9121123	0	2.25E+10
distance5*distance6	36.90081723	0	4.57E+09
distance5*distance7	-93.5966242	0	1.23E+10
distance5*distance8	10.60452861	0	7.08E+09
distance5*distance9	-37.56878304	0	1.18E+10
distance6*distance7	-3.904409418	0	6.30E+09
distance6*distance8	-4.344920963	0	2.37E+09
distance6*distance9	-12.08520791	0	5.73E+09
distance7*distance8	-10.25642008	0	4.93E+09
distance7*distance9	7.734455256	0	1.89E+10
distance8*distance9	14.91953198	0	5.99E+09
distance10*distance12	14.52647728	0	7.27E+08
distance10*distance5	-59.366805	0	3.49E+09
distance10*distance9	-396.2561388	0	1.32E+10
distance12*	1.806571684	0	2.02E+09
distance14			
distance12*distance3	14.32063328	0	3.31E+09
distance12*distance5	12.85323571	0	3.85E+09
distance12*distance6	-8.440680402	0	1.47E+09
distance12*distance7	-5.278823873	0	1.88E+09
distance12*distance8	-5.40199003	0	1.50E+09
distance12*distance9	-13.98220486	0	2.00E+09
distance14*distance3	-45.26081543	0	5.50E+09
distance14*distance4	-181.3113698	0	1.34E+10
distance14*distance5	-101.7710942	0	5.06E+09
distance14*distance7	-48.94455864	0	9.52E+09
distance14*distance8	72.24618017	0	2.37E+09
distance14*distance9	-90.2296218	0	5.28E+09
Linear predictor normalizer	1.868439906		
Density normalizer	184.231453		
Number of background points	10,000		
Entropy	7.076071559		

**Appendix 4** Grouse terrain model. Slope is in degrees.

Land cover variable	Coefficient	Minimum value	Maximum value
slope	21.819118	0	30.20
slope^2	-19.636287	0	912.0400
Linear predictor normalizer	6.0611483		
Density normalizer	1,188.9342		
Number of background points	10,000		
Entropy	8.0048208		