

Supplementary Material

What factors affect species richness and distribution dynamics within two Afromontane protected areas?

Eustrate Uzabaho^{A,}, Charles Birasa Kayijamahe^A, Abel Musana^B, Prosper Uwingeli^B, Christopher Masaba^C, Madeleine Nyiratuza^D, and Jennifer Frances Moore^E*

^AInternational Gorilla Conservation Programme, P.O. Box 931, Kigali, Rwanda.

^BVolcanoes National Park, Rwanda Development Board, P.O. Box 6239, Kigali, Rwanda.

^CMgahinga Gorilla National Park, Uganda Wildlife Authority, P.O. Box 3530, Kampala, Uganda.

^DUnited Nations Development Programme, P.O. Box 445, Kigali, Rwanda.

^EMoore Ecological Analysis and Management, LLC, 3142 NW 12th Street, Gainesville, FL 32609, USA.

*Correspondence to: Eustrate Uzabaho International Gorilla Conservation Programme, P.O. Box 931, Kigali, Rwanda Email: uzbheustra@gmail.com

Supplementary Data S1. Details of camera trap surveys

	Objective	To document diversity, occupancy, distribution and habitat use of most detected species
Study Design	Species Targeted	<i>Syncerus caffer</i>
		<i>Loxodonta africana</i>
		<i>Cephalophus nigrifrons</i>
		<i>Tragelaphus scriptus</i>
		<i>Cercopithecus mitis kandti</i>
		<i>Canis lupus familiaris</i>
		<i>Cricetomys gambianus</i>
		<i>Gorilla beringei beringei</i>
		<i>Dendrohyrax arboreus</i>
		<i>Genetta servalina</i>
		<i>Leptailurus serval</i>
		<i>Caracal aurata</i>
		<i>Canis adustus</i>
	Site	Mgahinga Gorilla NP, Uganda
		Volcanoes NP, Rwanda
Habitat	Montane forest	
	elevation range 2500 - 3884 m	
	Distance to edge 144 - 4500 m	
	Human pop. density > 400 hab. km ⁻²	
Trap layout	Systematic TEAM design	
	Navigate to point and set camera within 50 m	
	traps deployed 30-40 days; sampling period considered 5 days samples	
	Total 60 points, minimum 2 km between points.	
	Camera trap setup follows TEAM protocol, using single camera deployment	
Survey design	Traps used	Reconyx HC500 Semi-Covert IR
		Reconyx PC800 Hyperfire Professional IR
	Trap placement	50-60 cm above ground level
		perpendicular to most likely pathway
		3 m to centre of detection zone
		Horizontal orientation
Habitat modification	Minimal	
Lure	None	
Mode of operation	Still	
Trap settings	Flash	none
	Delay period	No delay
	Images per trigger	3
	Trigger speed	High

Supplemental Data S2: Full model selection table for the probability of initial occupancy, colonization, extinction, and detection probability for species richness. We provide the covariates included on each parameter, the number of parameters (Npar), the Akaike Information Criterion (AIC), the change in AIC (Δ AIC) for each model structure, and the model weight.

#	Model	AIC	Npar	Δ AIC	Weight
1	$\psi(\sim\text{Distance})p(\text{Guild})\gamma(\cdot)\epsilon(\cdot)$	8575.323	7	0	0.1135
2	$\psi(\sim\text{Elevation})p(\text{Guild})\gamma(\cdot)\epsilon(\cdot)$	8575.424	7	0.1013	0.1079
3	$\psi(\sim\text{Distance})p(\text{Guild})\gamma(\sim\text{Distance})\epsilon(\cdot)$	8576.728	8	1.4051	0.0562
4	$\psi(\sim\text{Elevation})p(\text{Guild})\gamma(\sim\text{Distance})\epsilon(\cdot)$	8576.785	8	1.4618	0.0547
5	$\psi(\sim\text{Distance})p(\text{Guild})\gamma(\cdot)\epsilon(\sim\text{Distance})$	8577.155	8	1.832	0.0454
6	$\psi(\sim\text{Distance})p(\text{Guild})\gamma(\sim\text{Elevation})\epsilon(\cdot)$	8577.168	8	1.8454	0.0451
7	$\psi(\sim\text{Elevation})p(\text{Guild})\gamma(\cdot)\epsilon(\sim\text{Distance})$	8577.246	8	1.9227	0.0434
8	$\psi(\sim\text{Elevation})p(\text{Guild})\gamma(\sim\text{Elevation})\epsilon(\cdot)$	8577.274	8	1.9506	0.0428
9	$\psi(\sim\text{Distance})p(\text{Guild})\gamma(\cdot)\epsilon(\sim\text{Elevation})$	8577.322	8	1.9993	0.0418
10	$\psi(\sim\text{Elevation})p(\text{Guild})\gamma(\cdot)\epsilon(\sim\text{Elevation})$	8577.424	8	2.101	0.0397
11	$\psi(\sim\text{Distance})p(\text{Guild})\gamma(\cdot)\epsilon(\sim\text{Habitat})$	8578.025	11	2.7023	0.0294
12	$\psi(\sim\text{Habitat})p(\text{Guild})\gamma(\cdot)\epsilon(\cdot)$	8578.077	10	2.7538	0.0286
13	$\psi(\sim\text{Elevation})p(\text{Guild})\gamma(\cdot)\epsilon(\sim\text{Habitat})$	8578.118	11	2.7954	0.0281
14	$\psi(\sim\text{Distance})p(\text{Guild})\gamma(\sim\text{Distance})\epsilon(\sim\text{Distance})$	8578.649	9	3.3265	0.0215
15	$\psi(\sim\text{Elevation})p(\text{Guild})\gamma(\sim\text{Distance})\epsilon(\sim\text{Distance})$	8578.703	9	3.3798	0.0209
16	$\psi(\sim\text{Distance})p(\text{Guild})\gamma(\sim\text{Distance})\epsilon(\sim\text{Elevation})$	8578.723	9	3.4003	0.0207
17	$\psi(\sim\text{Elevation})p(\text{Guild})\gamma(\sim\text{Distance})\epsilon(\sim\text{Elevation})$	8578.779	9	3.4557	0.0202
18	$\psi(\sim\text{Distance})p(\text{Guild})\gamma(\sim\text{Elevation})\epsilon(\sim\text{Distance})$	8579.037	9	3.7138	0.0177
19	$\psi(\sim\text{Elevation})p(\text{Guild})\gamma(\sim\text{Elevation})\epsilon(\sim\text{Distance})$	8579.132	9	3.8089	0.0169
20	$\psi(\sim\text{Distance})p(\text{Guild})\gamma(\sim\text{Elevation})\epsilon(\sim\text{Elevation})$	8579.167	9	3.8437	0.0166
21	$\psi(\sim\text{Elevation})p(\text{Guild})\gamma(\sim\text{Elevation})\epsilon(\sim\text{Elevation})$	8579.271	9	3.9485	0.0158
22	$\psi(\sim\text{Habitat})p(\text{Guild})\gamma(\sim\text{Distance})\epsilon(\cdot)$	8579.422	11	4.099	0.0146
23	$\psi(\sim\text{Distance})p(\text{Guild})\gamma(\sim\text{Distance})\epsilon(\sim\text{Habitat})$	8579.523	12	4.1996	0.0139
24	$\psi(\sim\text{Elevation})p(\text{Guild})\gamma(\sim\text{Distance})\epsilon(\sim\text{Habitat})$	8579.575	12	4.2524	0.0135
25	$\psi(\sim\text{Distance})p(\text{Guild})\gamma(\sim\text{Elevation})\epsilon(\sim\text{Habitat})$	8579.895	12	4.5724	0.0115
26	$\psi(\sim\text{Habitat})p(\text{Guild})\gamma(\cdot)\epsilon(\sim\text{Distance})$	8579.904	11	4.5814	0.0115
27	$\psi(\sim\text{Habitat})p(\text{Guild})\gamma(\sim\text{Elevation})\epsilon(\cdot)$	8579.93	11	4.6069	0.0113
28	$\psi(\sim\text{Elevation})p(\text{Guild})\gamma(\sim\text{Elevation})\epsilon(\sim\text{Habitat})$	8579.992	12	4.6689	0.011
29	$\psi(\sim\text{Habitat})p(\text{Guild})\gamma(\cdot)\epsilon(\sim\text{Elevation})$	8580.077	11	4.7536	0.0105
30	$\psi(\sim\text{Habitat})p(\text{Guild})\gamma(\cdot)\epsilon(\sim\text{Habitat})$	8580.45	14	5.1274	0.0087
31	$\psi(\sim\text{Distance})p(\text{Guild})\gamma(\sim\text{Habitat})\epsilon(\cdot)$	8580.624	11	5.3007	0.008
32	$\psi(\sim\text{Elevation})p(\text{Guild})\gamma(\sim\text{Habitat})\epsilon(\cdot)$	8580.732	11	5.4087	0.0076
33	$\psi(\sim\text{Habitat})p(\text{Guild})\gamma(\sim\text{Distance})\epsilon(\sim\text{Distance})$	8581.346	12	6.0231	0.0056
34	$\psi(\sim\text{Habitat})p(\text{Guild})\gamma(\sim\text{Distance})\epsilon(\sim\text{Elevation})$	8581.409	12	6.0863	0.0054
35	$\psi(\sim\text{Habitat})p(\text{Guild})\gamma(\sim\text{Elevation})\epsilon(\sim\text{Distance})$	8581.794	12	6.4712	0.0045
36	$\psi(\sim\text{Habitat})p(\text{Guild})\gamma(\sim\text{Distance})\epsilon(\sim\text{Habitat})$	8581.881	15	6.5584	0.0043
37	$\psi(\sim\text{Habitat})p(\text{Guild})\gamma(\sim\text{Elevation})\epsilon(\sim\text{Elevation})$	8581.924	12	6.6009	0.0042
38	$\psi(\sim\text{Distance})p(\text{Guild})\gamma(\sim\text{Habitat})\epsilon(\sim\text{Habitat})$	8582.169	15	6.8457	0.0037
39	$\psi(\sim\text{Elevation})p(\text{Guild})\gamma(\sim\text{Habitat})\epsilon(\sim\text{Habitat})$	8582.269	15	6.9465	0.0035

40	$\psi(\sim\text{Habitat})p(\text{Guild})\gamma(\sim\text{Elevation})\epsilon(\sim\text{Habitat})$	8582.319	15	6.9965	0.0034
41	$\psi(\sim\text{Distance})p(\text{Guild})\gamma(\sim\text{Habitat})\epsilon(\sim\text{Distance})$	8582.519	12	7.1964	0.0031
42	$\psi(\sim\text{Distance})p(\text{Guild})\gamma(\sim\text{Habitat})\epsilon(\sim\text{Elevation})$	8582.614	12	7.2911	0.003
43	$\psi(\sim\text{Elevation})p(\text{Guild})\gamma(\sim\text{Habitat})\epsilon(\sim\text{Distance})$	8582.619	12	7.2959	0.003
44	$\psi(\sim\text{Elevation})p(\text{Guild})\gamma(\sim\text{Habitat})\epsilon(\sim\text{Elevation})$	8582.721	12	7.398	0.0028
45	$\psi(\sim\text{Habitat})p(\text{Guild})\gamma(\sim\text{Habitat})\epsilon(.)$	8583.533	14	8.2101	0.0019
46	$\psi(\sim\text{Habitat})p(\text{Guild})\gamma(\sim\text{Habitat})\epsilon(\sim\text{Habitat})$	8584.781	18	9.4581	0.001
47	$\psi(\sim\text{Habitat})p(\text{Guild})\gamma(\sim\text{Habitat})\epsilon(\sim\text{Distance})$	8585.43	15	10.1074	7.00E-04
48	$\psi(\sim\text{Habitat})p(\text{Guild})\gamma(\sim\text{Habitat})\epsilon(\sim\text{Elevation})$	8585.514	15	10.1908	7.00E-04
49	$\psi(\sim\text{Sites})p(\text{Guild})\gamma(.)\epsilon(.)$	8642.639	65	67.3159	0
50	$\psi(\sim\text{Sites})p(\text{Guild})\gamma(\sim\text{Distance})\epsilon(.)$	8644.008	66	68.6846	0
51	$\psi(\sim\text{Sites})p(\text{Guild})\gamma(\sim\text{Elevation})\epsilon(.)$	8644.47	66	69.147	0
52	$\psi(\sim\text{Sites})p(\text{Guild})\gamma(.)\epsilon(\sim\text{Distance})$	8644.493	66	69.1705	0
53	$\psi(\sim\text{Sites})p(\text{Guild})\gamma(.)\epsilon(\sim\text{Elevation})$	8644.639	66	69.3159	0
54	$\psi(\sim\text{Sites})p(\text{Guild})\gamma(.)\epsilon(\sim\text{Habitat})$	8645.007	69	69.6836	0
55	$\psi(\sim\text{Sites})p(\text{Guild})\gamma(\sim\text{Distance})\epsilon(\sim\text{Distance})$	8645.948	67	70.6246	0
56	$\psi(\sim\text{Sites})p(\text{Guild})\gamma(\sim\text{Distance})\epsilon(\sim\text{Elevation})$	8645.996	67	70.6732	0
57	$\psi(\sim\text{Sites})p(\text{Guild})\gamma(\sim\text{Elevation})\epsilon(\sim\text{Distance})$	8646.361	67	71.0377	0
58	$\psi(\sim\text{Sites})p(\text{Guild})\gamma(\sim\text{Distance})\epsilon(\sim\text{Habitat})$	8646.452	70	71.1292	0
59	$\psi(\sim\text{Sites})p(\text{Guild})\gamma(\sim\text{Elevation})\epsilon(\sim\text{Elevation})$	8646.464	67	71.141	0
60	$\psi(\sim\text{Sites})p(\text{Guild})\gamma(\sim\text{Elevation})\epsilon(\sim\text{Habitat})$	8646.848	70	71.525	0
61	$\psi(\sim\text{Sites})p(\text{Guild})\gamma(\sim\text{Habitat})\epsilon(.)$	8648.004	69	72.6809	0
62	$\psi(\sim\text{Sites})p(\text{Guild})\gamma(\sim\text{Habitat})\epsilon(\sim\text{Habitat})$	8649.246	73	73.9232	0
63	$\psi(\sim\text{Sites})p(\text{Guild})\gamma(\sim\text{Habitat})\epsilon(\sim\text{Distance})$	8649.926	70	74.6035	0
64	$\psi(\sim\text{Sites})p(\text{Guild})\gamma(\sim\text{Habitat})\epsilon(\sim\text{Elevation})$	8649.984	70	74.6607	0
65	$\psi(\sim\text{Distance})p(\text{Size})\gamma(.)\epsilon(.)$	8981.152	7	405.8288	0
66	$\psi(\sim\text{Elevation})p(\text{Size})\gamma(.)\epsilon(.)$	8981.26	7	405.9372	0
67	$\psi(\sim\text{Distance})p(\text{Size})\gamma(.)\epsilon(\sim\text{Distance})$	8983.041	8	407.7184	0
68	$\psi(\sim\text{Distance})p(\text{Size})\gamma(\sim\text{Distance})\epsilon(.)$	8983.109	8	407.7863	0
69	$\psi(\sim\text{Distance})p(\text{Size})\gamma(\sim\text{Elevation})\epsilon(.)$	8983.113	8	407.7902	0
70	$\psi(\sim\text{Distance})p(\text{Size})\gamma(.)\epsilon(\sim\text{Elevation})$	8983.126	8	407.8031	0
71	$\psi(\sim\text{Elevation})p(\text{Size})\gamma(.)\epsilon(\sim\text{Distance})$	8983.145	8	407.8225	0
72	$\psi(\sim\text{Elevation})p(\text{Size})\gamma(\sim\text{Distance})\epsilon(.)$	8983.204	8	407.8807	0
73	$\psi(\sim\text{Elevation})p(\text{Size})\gamma(\sim\text{Elevation})\epsilon(.)$	8983.225	8	407.9018	0
74	$\psi(\sim\text{Elevation})p(\text{Size})\gamma(.)\epsilon(\sim\text{Elevation})$	8983.236	8	407.9133	0
75	$\psi(\sim\text{Habitat})p(\text{Size})\gamma(.)\epsilon(.)$	8983.659	10	408.3363	0
76	$\psi(\sim\text{Distance})p(\text{Size})\gamma(\sim\text{Elevation})\epsilon(\sim\text{Distance})$	8985.013	9	409.6904	0
77	$\psi(\sim\text{Distance})p(\text{Size})\gamma(\sim\text{Distance})\epsilon(\sim\text{Distance})$	8985.015	9	409.6918	0
78	$\psi(\sim\text{Distance})p(\text{Size})\gamma(\sim\text{Distance})\epsilon(\sim\text{Elevation})$	8985.089	9	409.766	0
79	$\psi(\sim\text{Distance})p(\text{Size})\gamma(\sim\text{Elevation})\epsilon(\sim\text{Elevation})$	8985.094	9	409.7712	0
80	$\psi(\sim\text{Elevation})p(\text{Size})\gamma(\sim\text{Distance})\epsilon(\sim\text{Distance})$	8985.108	9	409.785	0
81	$\psi(\sim\text{Elevation})p(\text{Size})\gamma(\sim\text{Elevation})\epsilon(\sim\text{Distance})$	8985.12	9	409.7973	0
82	$\psi(\sim\text{Elevation})p(\text{Size})\gamma(\sim\text{Distance})\epsilon(\sim\text{Elevation})$	8985.186	9	409.8627	0

83	$\psi(\sim\text{Elevation})p(\text{Size})\gamma(\sim\text{Elevation})\epsilon(\sim\text{Elevation})$	8985.207	9	409.884	0
84	$\psi(\sim\text{Habitat})p(\text{Size})\gamma(\cdot)\epsilon(\sim\text{Distance})$	8985.555	11	410.2319	0
85	$\psi(\sim\text{Habitat})p(\text{Size})\gamma(\sim\text{Distance})\epsilon(\cdot)$	8985.591	11	410.2678	0
86	$\psi(\sim\text{Habitat})p(\text{Size})\gamma(\sim\text{Elevation})\epsilon(\cdot)$	8985.624	11	410.3007	0
87	$\psi(\sim\text{Habitat})p(\text{Size})\gamma(\cdot)\epsilon(\sim\text{Elevation})$	8985.643	11	410.3198	0
88	$\psi(\sim\text{Habitat})p(\text{Size})\gamma(\sim\text{Distance})\epsilon(\sim\text{Distance})$	8987.507	12	412.1836	0
89	$\psi(\sim\text{Habitat})p(\text{Size})\gamma(\sim\text{Elevation})\epsilon(\sim\text{Distance})$	8987.529	12	412.2063	0
90	$\psi(\sim\text{Habitat})p(\text{Size})\gamma(\sim\text{Distance})\epsilon(\sim\text{Elevation})$	8987.58	12	412.2567	0
91	$\psi(\sim\text{Habitat})p(\text{Size})\gamma(\sim\text{Elevation})\epsilon(\sim\text{Elevation})$	8987.612	12	412.2893	0
92	$\psi(\sim\text{Distance})p(\text{Size})\gamma(\cdot)\epsilon(\sim\text{Habitat})$	8988.419	11	413.0963	0
93	$\psi(\sim\text{Distance})p(\text{Size})\gamma(\sim\text{Habitat})\epsilon(\cdot)$	8988.481	11	413.1581	0
94	$\psi(\sim\text{Elevation})p(\text{Size})\gamma(\cdot)\epsilon(\sim\text{Habitat})$	8988.526	11	413.2032	0
95	$\psi(\sim\text{Elevation})p(\text{Size})\gamma(\sim\text{Habitat})\epsilon(\cdot)$	8988.588	11	413.2648	0
96	$\psi(\sim\text{Distance})p(\text{Size})\gamma(\sim\text{Habitat})\epsilon(\sim\text{Distance})$	8990.392	12	415.0695	0
97	$\psi(\sim\text{Distance})p(\text{Size})\gamma(\sim\text{Distance})\epsilon(\sim\text{Habitat})$	8990.395	12	415.0722	0
98	$\psi(\sim\text{Distance})p(\text{Size})\gamma(\sim\text{Elevation})\epsilon(\sim\text{Habitat})$	8990.397	12	415.0741	0
99	$\psi(\sim\text{Distance})p(\text{Size})\gamma(\sim\text{Habitat})\epsilon(\sim\text{Elevation})$	8990.465	12	415.1425	0
100	$\psi(\sim\text{Elevation})p(\text{Size})\gamma(\sim\text{Distance})\epsilon(\sim\text{Habitat})$	8990.491	12	415.1681	0

Supplemental Data S3: Full model selection table for the probability of initial occupancy, colonization, extinction, and detection probability for species distribution. We provide the covariates included on each parameter, the number of parameters (Npar), the Akaike Information Criterion (AIC), the change in AIC (Δ AIC) for each model structure, and the model weight.

#	Model	AIC	Npar	Δ AIC	Weight
1	$\psi(\sim\text{Species})p(\text{Species})\gamma(.)\epsilon(\sim\text{Elevation})$	7478.663	29	0	0.1513
2	$\psi(\sim\text{Species})p(\text{Species})\gamma(.)\epsilon(\sim\text{Distance})$	7480.085	29	1.4222	0.0743
3	$\psi(\sim\text{Species})p(\text{Species})\gamma(\sim\text{Elevation})\epsilon(\sim\text{Elevation})$	7480.220	30	1.5572	0.0694
4	$\psi(\sim\text{Species})p(\text{Species})\gamma(\sim\text{Distance})\epsilon(\sim\text{Elevation})$	7480.339	30	1.6758	0.0655
5	$\psi(\sim\text{Species}+\text{Elevation})p(\text{Species})\gamma(.)\epsilon(\sim\text{Elevation})$	7480.369	30	1.7057	0.0645
6	$\psi(\sim\text{Species}+\text{Distance})p(\text{Species})\gamma(.)\epsilon(\sim\text{Elevation})$	7480.439	30	1.7757	0.0623
7	$\psi(\sim\text{Species})p(\text{Species})\gamma(.)\epsilon(.)$	7481.196	28	2.5333	0.0426
8	$\psi(\sim\text{Species})p(\text{Species})\gamma(\sim\text{Distance})\epsilon(\sim\text{Distance})$	7481.647	30	2.9841	0.034
9	$\psi(\sim\text{Species})p(\text{Species})\gamma(\sim\text{Elevation})\epsilon(\sim\text{Distance})$	7481.807	30	3.1443	0.0314
10	$\psi(\sim\text{Species}+\text{Elevation})p(\text{Species})\gamma(.)\epsilon(\sim\text{Distance})$	7481.845	30	3.1818	0.0308
11	$\psi(\sim\text{Species}+\text{Distance})p(\text{Species})\gamma(.)\epsilon(\sim\text{Distance})$	7481.862	30	3.1992	0.0306
12	$\psi(\sim\text{Species}+\text{Elevation})p(\text{Species})\gamma(\sim\text{Elevation})\epsilon(\sim\text{Elevation})$	7482.028	31	3.3646	0.0281
13	$\psi(\sim\text{Species}+\text{Distance})p(\text{Species})\gamma(\sim\text{Elevation})\epsilon(\sim\text{Elevation})$	7482.061	31	3.3985	0.0277
14	$\psi(\sim\text{Species}+\text{Elevation})p(\text{Species})\gamma(\sim\text{Distance})\epsilon(\sim\text{Elevation})$	7482.109	31	3.4463	0.027
15	$\psi(\sim\text{Species}+\text{Distance})p(\text{Species})\gamma(\sim\text{Distance})\epsilon(\sim\text{Elevation})$	7482.200	31	3.5372	0.0258
16	$\psi(\sim\text{Species}+\text{Elevation})p(\text{Species})\gamma(.)\epsilon(.)$	7483.001	29	4.3378	0.0173
17	$\psi(\sim\text{Species}+\text{Distance})p(\text{Species})\gamma(.)\epsilon(.)$	7483.031	29	4.3684	0.017
18	$\psi(\sim\text{Species})p(\text{Species})\gamma(\sim\text{Distance})\epsilon(.)$	7483.077	29	4.4143	0.0166
19	$\psi(\sim\text{Species})p(\text{Species})\gamma(\sim\text{Elevation})\epsilon(.)$	7483.077	29	4.4144	0.0166
20	$\psi(\sim\text{Species}+\text{Elevation})p(\text{Species})\gamma(\sim\text{Distance})\epsilon(\sim\text{Distance})$	7483.474	31	4.8106	0.0137
21	$\psi(\sim\text{Species}+\text{Distance})p(\text{Species})\gamma(\sim\text{Distance})\epsilon(\sim\text{Distance})$	7483.521	31	4.8584	0.0133
22	$\psi(\sim\text{Species}+\text{Distance})p(\text{Species})\gamma(\sim\text{Elevation})\epsilon(\sim\text{Distance})$	7483.634	31	4.9714	0.0126
23	$\psi(\sim\text{Species}+\text{Elevation})p(\text{Species})\gamma(\sim\text{Elevation})\epsilon(\sim\text{Distance})$	7483.641	31	4.9776	0.0126
24	$\psi(\sim\text{Species}+\text{Habitat})p(\text{Species})\gamma(.)\epsilon(\sim\text{Elevation})$	7483.947	33	5.2839	0.0108
25	$\psi(\sim\text{Species})p(\text{Species})\gamma(.)\epsilon(\sim\text{Habitat})$	7484.109	32	5.4465	0.0099

		9			
26	$\psi(\sim\text{Species}+\text{Elevation})p(\text{Species})\gamma(\sim\text{Distance})\epsilon(.)$	7484.913	6	30	6.2502 0.0066
27	$\psi(\sim\text{Species}+\text{Elevation})p(\text{Species})\gamma(\sim\text{Elevation})\epsilon(.)$	7484.924	8	30	6.2614 0.0066
28	$\psi(\sim\text{Species}+\text{Distance})p(\text{Species})\gamma(\sim\text{Elevation})\epsilon(.)$	7484.941	1	30	6.2777 0.0066
29	$\psi(\sim\text{Species}+\text{Distance})p(\text{Species})\gamma(\sim\text{Distance})\epsilon(.)$	7484.956	8	30	6.2934 0.0065
30	$\psi(\sim\text{Species})p(\text{Species})\gamma(\sim\text{Habitat})\epsilon(\sim\text{Elevation})$	7485.069	4	33	6.406 0.0061
31	$\psi(\sim\text{Species}+\text{Habitat})p(\text{Species})\gamma(.)\epsilon(\sim\text{Distance})$	7485.473	4	33	6.81 0.005
32	$\psi(\sim\text{Species}+\text{Habitat})p(\text{Species})\gamma(\sim\text{Elevation})\epsilon(\sim\text{Elevation})$	7485.741	4	34	7.078 0.0044
33	$\psi(\sim\text{Species})p(\text{Species})\gamma(\sim\text{Distance})\epsilon(\sim\text{Habitat})$	7485.756		33	7.0926 0.0044
34	$\psi(\sim\text{Species})p(\text{Species})\gamma(\sim\text{Elevation})\epsilon(\sim\text{Habitat})$	7485.765	9	33	7.1025 0.0043
35	$\psi(\sim\text{Species}+\text{Habitat})p(\text{Species})\gamma(\sim\text{Distance})\epsilon(\sim\text{Elevation})$	7485.813	4	34	7.15 0.0042
36	$\psi(\sim\text{Species}+\text{Elevation})p(\text{Species})\gamma(.)\epsilon(\sim\text{Habitat})$	7485.838	5	33	7.1751 0.0042
37	$\psi(\sim\text{Species}+\text{Distance})p(\text{Species})\gamma(.)\epsilon(\sim\text{Habitat})$	7485.900	4	33	7.237 0.0041
38	$\psi(\sim\text{Species})p(\text{Species})\gamma(\sim\text{Habitat})\epsilon(\sim\text{Distance})$	7486.544		33	7.8806 0.0029
39	$\psi(\sim\text{Species}+\text{Habitat})p(\text{Species})\gamma(.)\epsilon(.)$	7486.698	6	32	8.0352 0.0027
40	$\psi(\sim\text{Species}+\text{Elevation})p(\text{Species})\gamma(\sim\text{Habitat})\epsilon(\sim\text{Elevation})$	7486.871	9	34	8.2085 0.0025
41	$\psi(\sim\text{Species}+\text{Distance})p(\text{Species})\gamma(\sim\text{Habitat})\epsilon(\sim\text{Elevation})$	7486.949	4	34	8.286 0.0024
42	$\psi(\sim\text{Species}+\text{Habitat})p(\text{Species})\gamma(\sim\text{Distance})\epsilon(\sim\text{Distance})$	7487.256	5	34	8.5931 0.0021
43	$\psi(\sim\text{Species}+\text{Habitat})p(\text{Species})\gamma(\sim\text{Elevation})\epsilon(\sim\text{Distance})$	7487.371	8	34	8.7084 0.0019
44	$\psi(\sim\text{Species}+\text{Elevation})p(\text{Species})\gamma(\sim\text{Distance})\epsilon(\sim\text{Habitat})$	7487.549	2	34	8.8858 0.0018
45	$\psi(\sim\text{Species}+\text{Elevation})p(\text{Species})\gamma(\sim\text{Elevation})\epsilon(\sim\text{Habitat})$	7487.581	1	34	8.9177 0.0018
46	$\psi(\sim\text{Species}+\text{Distance})p(\text{Species})\gamma(\sim\text{Elevation})\epsilon(\sim\text{Habitat})$	7487.611	5	34	8.9481 0.0017
47	$\psi(\sim\text{Species}+\text{Distance})p(\text{Species})\gamma(\sim\text{Distance})\epsilon(\sim\text{Habitat})$	7487.632	3	34	8.9689 0.0017
48	$\psi(\sim\text{Species})p(\text{Species})\gamma(\sim\text{Habitat})\epsilon(.)$	7488.037	7	32	9.3743 0.0014
49	$\psi(\sim\text{Species}+\text{Elevation})p(\text{Species})\gamma(\sim\text{Habitat})\epsilon(\sim\text{Distance})$	7488.382	5	34	9.7191 0.0012
50	$\psi(\sim\text{Species}+\text{Distance})p(\text{Species})\gamma(\sim\text{Habitat})\epsilon(\sim\text{Distance})$	7488.416	6	34	9.7532 0.0012
51	$\psi(\sim\text{Species}+\text{Habitat})p(\text{Species})\gamma(\sim\text{Distance})\epsilon(.)$	7488.675	3	33	10.0119 0.001
52	$\psi(\sim\text{Species}+\text{Habitat})p(\text{Species})\gamma(\sim\text{Elevation})\epsilon(.)$	7488.678	3	33	10.0149 0.001
53	$\psi(\sim\text{Species}+\text{Habitat})p(\text{Species})\gamma(.)\epsilon(\sim\text{Habitat})$	7489.431	2	36	10.7678 7.00E-04

54	$\psi(\sim\text{Species})p(\text{Species})\gamma(\sim\text{Habitat})\epsilon(\sim\text{Habitat})$	7489.885	36	11.2216	6.00E-04
55	$\psi(\sim\text{Species}+\text{Elevation})p(\text{Species})\gamma(\sim\text{Habitat})\epsilon(.)$	7489.895 3	33	11.2319	6.00E-04
56	$\psi(\sim\text{Species}+\text{Distance})p(\text{Species})\gamma(\sim\text{Habitat})\epsilon(.)$	7489.940 4	33	11.277	5.00E-04
57	$\psi(\sim\text{Species}+\text{Habitat})p(\text{Species})\gamma(\sim\text{Habitat})\epsilon(\sim\text{Elevation})$	7490.856 8	37	12.1934	3.00E-04
58	$\psi(\sim\text{Species}+\text{Habitat})p(\text{Species})\gamma(\sim\text{Distance})\epsilon(\sim\text{Habitat})$	7491.275 4	37	12.612	3.00E-04
59	$\psi(\sim\text{Species}+\text{Habitat})p(\text{Species})\gamma(\sim\text{Elevation})\epsilon(\sim\text{Habitat})$	7491.288 4	37	12.625	3.00E-04
60	$\psi(\sim\text{Species}+\text{Elevation})p(\text{Species})\gamma(\sim\text{Habitat})\epsilon(\sim\text{Habitat})$	7491.701 9	37	13.0385	2.00E-04
61	$\psi(\sim\text{Species}+\text{Distance})p(\text{Species})\gamma(\sim\text{Habitat})\epsilon(\sim\text{Habitat})$	7491.777 4	37	13.114	2.00E-04
62	$\psi(\sim\text{Species}+\text{Habitat})p(\text{Species})\gamma(\sim\text{Habitat})\epsilon(\sim\text{Distance})$	7492.384 2	37	13.7208	2.00E-04
63	$\psi(\sim\text{Species}+\text{Habitat})p(\text{Species})\gamma(\sim\text{Habitat})\epsilon(.)$	7493.866 2	36	15.2028	1.00E-04
64	$\psi(\sim\text{Species}+\text{Habitat})p(\text{Species})\gamma(\sim\text{Habitat})\epsilon(\sim\text{Habitat})$	7495.736 5	40	17.0731	0
65	$\psi(\sim\text{Species})p(\text{Guild})\gamma(.)\epsilon(\sim\text{Elevation})$	8144.003	19	665.339 6	0
66	$\psi(\sim\text{Species})p(\text{Guild})\gamma(.)\epsilon(.)$	8144.449 9	18	665.786 5	0
67	$\psi(\sim\text{Species})p(\text{Guild})\gamma(.)\epsilon(\sim\text{Distance})$	8144.818	19	666.154 6	0
68	$\psi(\sim\text{Species})p(\text{Guild})\gamma(\sim\text{Elevation})\epsilon(\sim\text{Elevation})$	8145.306 5	20	666.643 1	0
69	$\psi(\sim\text{Species})p(\text{Guild})\gamma(\sim\text{Distance})\epsilon(\sim\text{Elevation})$	8145.738 8	20	667.075 4	0
70	$\psi(\sim\text{Species}+\text{Distance})p(\text{Guild})\gamma(.)\epsilon(\sim\text{Elevation})$	8145.872 1	20	667.208 7	0
71	$\psi(\sim\text{Species}+\text{Elevation})p(\text{Guild})\gamma(.)\epsilon(\sim\text{Elevation})$	8145.932 9	20	667.269 5	0
72	$\psi(\sim\text{Species})p(\text{Guild})\gamma(\sim\text{Elevation})\epsilon(.)$	8146.007 7	19	667.344 3	0
73	$\psi(\sim\text{Species})p(\text{Guild})\gamma(\sim\text{Elevation})\epsilon(\sim\text{Distance})$	8146.240 9	20	667.577 5	0
74	$\psi(\sim\text{Species})p(\text{Guild})\gamma(\sim\text{Distance})\epsilon(.)$	8146.292 2	19	667.628 8	0
75	$\psi(\sim\text{Species}+\text{Distance})p(\text{Guild})\gamma(.)\epsilon(.)$	8146.324 1	19	667.660 7	0
76	$\psi(\sim\text{Species}+\text{Elevation})p(\text{Guild})\gamma(.)\epsilon(.)$	8146.387 4	19	667.724	0
77	$\psi(\sim\text{Species})p(\text{Guild})\gamma(\sim\text{Distance})\epsilon(\sim\text{Distance})$	8146.512 4	20	667.849	0
78	$\psi(\sim\text{Species}+\text{Distance})p(\text{Guild})\gamma(.)\epsilon(\sim\text{Distance})$	8146.681 4	20	668.018	0
79	$\psi(\sim\text{Species}+\text{Elevation})p(\text{Guild})\gamma(.)\epsilon(\sim\text{Distance})$	8146.752 7	20	668.089 3	0
80	$\psi(\sim\text{Species}+\text{Distance})p(\text{Guild})\gamma(\sim\text{Elevation})\epsilon(\sim\text{Elevation})$	8147.224 4	21	668.561	0
81	$\psi(\sim\text{Species}+\text{Elevation})p(\text{Guild})\gamma(\sim\text{Elevation})\epsilon(\sim\text{Elevation})$	8147.281 7	21	668.618 3	0

82	$\psi(\sim\text{Species}+\text{Distance})p(\text{Guild})\gamma(\sim\text{Distance})\epsilon(\sim\text{Elevation})$	8147.646	21	6	0
83	$\psi(\sim\text{Species}+\text{Elevation})p(\text{Guild})\gamma(\sim\text{Distance})\epsilon(\sim\text{Elevation})$	8147.690	21	1	0
84	$\psi(\sim\text{Species})p(\text{Guild})\gamma(.)\epsilon(\sim\text{Habitat})$	8147.810	22	5	0
85	$\psi(\sim\text{Species}+\text{Distance})p(\text{Guild})\gamma(\sim\text{Elevation})\epsilon(.)$	8147.918	20	3	0
86	$\psi(\sim\text{Species}+\text{Elevation})p(\text{Guild})\gamma(\sim\text{Elevation})\epsilon(.)$	8147.979	20	9	0
87	$\psi(\sim\text{Species}+\text{Distance})p(\text{Guild})\gamma(\sim\text{Elevation})\epsilon(\sim\text{Distance})$	8148.148	21	9	0
88	$\psi(\sim\text{Species}+\text{Distance})p(\text{Guild})\gamma(\sim\text{Distance})\epsilon(.)$	8148.194	20	5	0
89	$\psi(\sim\text{Species}+\text{Elevation})p(\text{Guild})\gamma(\sim\text{Elevation})\epsilon(\sim\text{Distance})$	8148.215	21	1	0
90	$\psi(\sim\text{Species}+\text{Elevation})p(\text{Guild})\gamma(\sim\text{Distance})\epsilon(.)$	8148.245	20	8	0
91	$\psi(\sim\text{Species}+\text{Distance})p(\text{Guild})\gamma(\sim\text{Distance})\epsilon(\sim\text{Distance})$	8148.417	21	7	0
92	$\psi(\sim\text{Species}+\text{Elevation})p(\text{Guild})\gamma(\sim\text{Distance})\epsilon(\sim\text{Distance})$	8148.469	21	9	0
93	$\psi(\sim\text{Species})p(\text{Guild})\gamma(\sim\text{Elevation})\epsilon(\sim\text{Habitat})$	8149.108	23	1	0
94	$\psi(\sim\text{Species}+\text{Habitat})p(\text{Guild})\gamma(.)\epsilon(\sim\text{Elevation})$	8149.311	23	9	0
95	$\psi(\sim\text{Species})p(\text{Guild})\gamma(\sim\text{Distance})\epsilon(\sim\text{Habitat})$	8149.518	23	5	0
96	$\psi(\sim\text{Species}+\text{Distance})p(\text{Guild})\gamma(.)\epsilon(\sim\text{Habitat})$	8149.675	23	3	0
97	$\psi(\sim\text{Species}+\text{Elevation})p(\text{Guild})\gamma(.)\epsilon(\sim\text{Habitat})$	8149.736	23	3	0
98	$\psi(\sim\text{Species}+\text{Habitat})p(\text{Guild})\gamma(.)\epsilon(.)$	8149.784	22	5	0
99	$\psi(\sim\text{Species}+\text{Habitat})p(\text{Guild})\gamma(.)\epsilon(\sim\text{Distance})$	8150.133	23	7	0
100	$\psi(\sim\text{Species})p(\text{Guild})\gamma(\sim\text{Habitat})\epsilon(\sim\text{Elevation})$	8150.704	23	3	0

Supplementary Data S4: Probability of occupancy at each site location for 13 most detected species.













