Appendix S1. Model selection and significance for bird abundance in Kaingaroa Forest and adjacent farmland. R^2 generated by sem.model.fits function in R.

Model	N	Marginal	Conditional	AIC	dAIC
TOTAL~category	195	0.588382214	0.5883822	2699.854	0.000
TOTAL~category+MONTH	195	0.586128041	0.5861280	2703.663	3.808
TOTAL~MONTH	195	0.001314057	0.6913008	2768.263	68.409

TOTAL~category		numDF	denDF	F-value	p-value
(Intercept)		1	169	34.10088	<.0001
category		**10**	**15**	**27.73110**	**<.0001**

TOTAL~category+MONTH		numDF	denDF	F-value	p-value
(Intercept)		1	167	33.76328	<.0001
category		**10**	**15**	**27.45656**	**<.0001**
MONTH		2	167	0.08919	0.9147

Fixed effects: TOTAL ~ category

	Value	Std.Error	DF	t-value	p-value
(Intercept)	44.7714	39.98302	169	1.119761	0.2644
categoryI	-21.3169	81.76325	15	-0.260715	0.7979
CategoryM/I	-26.9857	74.80138	15	-0.360765	0.7233
categoryI/P	-4.9714	84.81679	15	-0.058614	0.9540
categoryI/Y	-26.0361	56.95878	15	-0.457105	0.6541
categoryM	-2.6945	76.82889	15	-0.035072	0.9725
categoryM/P	12.6730	88.40578	15	0.143351	0.8879
categoryM/Y	-14.3660	55.77518	15	-0.257570	0.8002
categorySlge	1333.4508	88.40578	15	15.083298	0.0000
categoryTR/P	52.5363	76.82889	15	0.683809	0.5045
categoryY/P	-12.5714	84.81679	15	-0.148219	0.8841

Appendix S2. Model selection and significance for native bird abundance in Kaingaroa Forest. R^2 generated by sem.model. fits function in R.

Model	N	Marginal	Conditional	AIC	dAIC
native~category+MONTH	173	0.31961487	0.3415989	1425.099	0.000
native~category	173	0.25271511	0.3260302	1437.429	12.329
native~MONTH	173	0.04611528	0.3457874	1442.306	17.206

		numDF	denDF	F-value	p-value
native~category+MONTH	(Intercept)	1	150	133.46840	<.0001
	category	**8**	**12**	**6.68501**	**0.0019**
	MONTH	**2**	**150**	**7.53103**	**0.0008**

Fixed effects: native ~ category + MONTH

	Value	Std.Error	DF	t-value	p-value
(Intercept)	11.419935	3.177955	150	3.593485	0.0004
categoryI	8.687677	5.444218	12	1.595762	0.1365
categoryM/I	6.198794	5.110159	12	1.213033	0.2485
categoryI/P	0.695892	5.639465	12	0.123397	0.9038
categoryI/Y	0.273268	4.014441	12	0.068071	0.9468
categoryM	24.793452	5.169002	12	4.796564	0.0004
categoryM/P	25.724630	5.807768	12	4.429349	0.0008
categoryM/Y	15.297359	3.948784	12	3.873941	0.0022
categoryY/P	2.757858	5.672424	12	0.486187	0.6356
MONTHJULY	-7.539704	2.570404	150	-2.933276	0.0039
MONTHJUNE	-9.825201	2.795097	150	-3.515156	0.0006

Appendix S3. Model selection and significance for introduced bird abundance in Kaingaroa Forest. R^2 generated by sem. model.fits function in R.

Model	N	Marginal	Conditional	AIC	dAIC
exotic~CorE	173	0.04085920	0.3465921	1727.730	0.000
exotic~MONTH+CorE	173	0.04705940	0.3571461	1730.556	2.826
exotic~MONTH	173	0.00506657	0.3167301	1731.011	3.281
exotic~category	173	0.10727533	0.4151764	1737.109	9.370
exotic~category+MONTH	173	0.11007221	0.4244360	1740.070	12.340

		numDF	denDF	F-value	p-value
exotic~CorE	(Intercept)	1	151	12.600961	0.0005
	CorE	1	151	2.343586	0.1279

		numDF	denDF	F-value	p-value
exotic~MONTH+CorE	(Intercept)	1	149	12.286668	0.0006
	MONTH	2	149	0.564338	0.5699
	CorE	1	149	2.414271	0.1224

Fixed effects: exotic ~ CorE

	Value	Std.Error	DF	t-value	p-value
(Intercept)	30.59391	9.155882	151	3.341448	0.0011
CorEE	-16.88837	11.031825	151	-1.530878	0.1279

Appendix S4. Model selection and significance for bird abundance in open habitat and the border to mature aged pine stands in Kaingaroa Forest. R^2 generated by sem.model.fits function in R.

Model	N	Marginal	Conditional	AIC	dAIC
total~CorE+HARVEST	251	0.04122447	0.2084762	2526.965	0.000
total~CorE	251	0.02507417	0.1992758	2527.257	0.291
total~HARVEST	251	0.01641044	0.1948746	2528.428	1.463
total~SIZE+CorE*SIZE+HARVEST*SIZE+SIZE*CorE	251	0.06160925	0.2229442	2529.864	2.898
total~CorE*SIZE+HARVEST*SIZE+SIZE*CorE	251	0.06160925	0.2229442	2529.864	2.898
total~CorE*SIZE+HARVEST*SIZE	251	0.06160925	0.2229442	2529.864	2.898
total~MONTH+SIZE+CorE*HARVEST+CorE*MONTH+ CorE*SIZE+HARVEST*SIZE+HARVEST*CorE+SIZE*CorE	251	0.08613136	0.2468730	2531.518	4.552
total~SIZE+CorE*HARVEST+CorE*MONTH+CorE*SIZE+ HARVEST*SIZE+HARVEST*CorE+SIZE*CorE	251	0.08613136	0.2468730	2531.518	4.552
total~SIZE+CorE*HARVEST+CorE*SIZE+ HARVEST*SIZE+HARVEST*CorE+SIZE*CorE	251	0.06259382	0.2276132	2531.538	4.572
total~SIZE+CorE*SIZE+HARVEST*SIZE+ HARVEST*CorE+SIZE*CorE	251	0.06259382	0.2276132	2531.538	4.572
total~CorE*SIZE	251	0.03201360	0.2114447	2530.371	3.405
total~MONTH+SIZE+CATEGORY+CorE*CATEGORY+ CorE*HARVEST+CorE*MONTH+CorE*SIZE+ HARVEST*SIZE+HARVEST*CorE+SIZE*CorE	251	0.08525980	0.2535486	2539.328	12.363
total~MONTH+SIZE+CATEGORY+CorE*CATEGORY+CorE*HARVEST+ CorE*MONTH+CorE*SIZE+HARVEST*SIZE+HARVEST*CorE+SIZE*CorE	251	0.08525980	0.2535486	2539.328	12.363
total~MONTH+SIZE+CATEGORY+CorE*CATEGORY+ CorE*HARVEST+CorE*MONTH+CorE*SIZE+CATEGORY*SIZE+ HARVEST*SIZE+HARVEST*CorE+SIZE*CorE	251	0.08825569	0.2578231	2542.198	15.233
total~SIZE+HARVEST+CATEGORY+MONTH+ SIZE*HARVEST+MONTH*HARVEST+MONTH*SIZE+CorE	251	0.06034091	0.2195739	2543.016	16.050

total~CorE+HARVEST	numDF	denDF	F-value	p-value
(Intercept)	1	210	47.93657	<.0001
CorE	1	38	3.29834	0.0772
HARVEST	1	38	2.20525	0.1458

Fixed effects: total ~ CorE + HARVEST

	Value	Std.Error	DF	t-value	p-value
(Intercept)	12.80977	5.492544	210	2.332210	0.0206
CorEE	12.22466	6.662125	38	1.834949	0.0744
HARVESTW	10.10864	6.807118	38	1.485010	0.1458

Appendix S5. Model selection and significance for native bird abundance in open habitats and the ecotone between the open habitats and mature aged pine stands in Kaingaroa Forest. R^2 generated by sem.model.fits function in R.

Model	N	Marginal	Conditional	AIC	dAIC
native~MONTH+CorE*MONTH	251	0.2942479	0.2942480	2043.978	0.000
native~MONTH+SIZE+CATEGORY+HARVEST+ CorE*CATEGORY+CorE*HARVEST+CorE*MONTH+ CorE*SIZE+CATEGORY*SIZE+HARVEST*SIZE	251	0.3149522	0.3228153	2054.972	1.099
native~CorE+MONTH	251	0.2741187	0.2741187	2047.705	3.727
native~MONTH+CATEGORY+ CorE*CATEGORY+CorE*MONTH	251	0.3022770	0.3022771	2047.791	3.813
native~MONTH+CorE*CATEGORY+CorE*MONTH	251	0.3022770	0.3022771	2047.791	3.813
native~MONTH+CATEGORY+CorE*CATEGORY+ CorE*HARVEST+CorE*MONTH	251	0.3095419	0.3095419	2048.431	4.453
native~CorE	251	0.2617340	0.2617344	2048.522	4.544
native~MONTH+SIZE+CATEGORY+HARVEST+CorE*CATEGORY+ CorE*HARVEST+CorE*MONTH+CATEGORY*SIZE	251	0.3158908	0.3158925	2051.003	7.025050e+00
native~MONTH+CATEGORY+HARVEST+CorE*CATEGORY+ CorE*HARVEST+CorE*MONTH+CATEGORY*SIZE	251	0.3158908	0.3158925	2051.003	7.025050e+00
native~MONTH+CATEGORY+CorE*CATEGORY+ CorE*HARVEST+CorE*MONTH+CATEGORY*SIZE	251	0.3158908	0.3158925	2051.003	7.025050e+00
native~CorE*MONTH	251	0.2942479	0.2942480	2043.978	8.799361e-10
native~MONTH+SIZE+CATEGORY+HARVEST+CorE*CATEGORY+ CorE*HARVEST+CorE*MONTH+CATEGORY*SIZE+HARVEST*SIZE	251	0.3154220	0.3187448	2052.980	9.002271e+00

native~MONTH+CorE*MONTH

	numDF	denDF	F-value	p-value
(Intercept)	1	206	166.31195	<.0001
CorE	**1**	**39**	**91.67648**	**<.0001**
MONTH	2	206	2.44782	0.0890
CorE:MONTH	**2**	**206**	**3.82990**	**0.0233**

native~MONTH+SIZE+CATEGORY+HARVEST+ CorE*CATEGORY+CorE*HARVEST+CorE*MONTH+ CorE*SIZE+CATEGORY*SIZE+HARVEST*SIZE

	numDF	denDF	F-value	p-value
(Intercept)	1	200	155.76830	<.0001
MONTH	2	200	1.81205	0.1660
SIZE	1	34	0.28016	0.6000
CATEGORY	2	200	0.98507	0.3752
HARVEST	1	34	0.34359	0.5616
CorE	**1**	**34**	**87.48077**	**<.0001**
CATEGORY:CorE	**2**	**200**	**3.12772**	**0.0460**
HARVEST:CorE	1	34	2.52376	0.1214
MONTH:CorE	2	200	1.65932	0.1929
SIZE:CorE	1	34	0.00268	0.9590
SIZE:CATEGORY	2	200	1.52545	0.2200
SIZE:HARVEST	1	34	0.01337	0.9086

Fixed effects: native ~ CorE * MONTH

	Value	Std.Error	DF	t-value	p-value
(Intercept)	1.717948	2.228157	206	0.771018	0.4416

Appendix S5. Continued.

CorEE	22.843028	3.112425	39	7.339303	0.0000
MONTHJULY	1.682051	3.131333	206	0.537168	0.5917
MONTHJUNE	1.350233	3.060261	206	0.441215	0.6595
CorEE:MONTHJULY	-11.868027	4.308312	206	-2.754681	0.0064
CorEE:MONTHJUNE	-5.193262	4.364903	206	-1.189777	0.2355

Appendix S6. Model selection and significance for introduced bird abundance in open habitats and the ecotone between the open habitats and mature aged pine stands in Kaingaroa Forest. R^2 generated by sem.model.fits function in R.

Model	N	Marginal	Conditional	AIC	dAIC
exotic~HARVEST	251	0.01418331	0.2111858	2442.089	0.000
exotic~HARVEST+CorE	251	0.02043294	0.2153312	2443.260	1.171
exotic~HARVEST+SIZE	251	0.01687904	0.2174337	2443.768	1.678
exotic~HARVEST+HARVEST*CorE	251	0.02933115	0.2218662	2444.101	2.011
exotic~HARVEST+CorE*MONTH	251	0.03562297	0.2270874	2446.324	4.234
exotic~HARVEST+CorE*MONTH+HARVEST*SIZE	251	0.06200593	0.2370896	2446.414	4.324
exotic~HARVEST+CorE*HARVEST+ CorE*MONTH+HARVEST*SIZE	251	0.07021303	0.2408639	2446.916	4.827
exotic~HARVEST+CorE*MONTH+ HARVEST*CorE	251	0.04425840	0.2334394	2447.158	5.068
exotic~SIZE+HARVEST+CATEGORY +MONTH+SIZE*HARVEST+MONTH*HARVEST	251	0.04684873	0.2256376	2452.360	10.270
exotic~MONTH+SIZE+CATEGORY+HARVEST+ CorE*CATEGORY+CorE*HARVEST+ CorE*MONTH+CorE*SIZE+HARVEST*SIZE	251	0.07720208	0.2533187	2455.219	13.129
exotic~MONTH+SIZE+HARVEST+CorE*CATEGORY+ CorE*HARVEST+CorE*MONTH+CorE*SIZE+HARVEST*SIZE	251	0.07720208	0.2533187	2455.219	13.129
exotic~MONTH+HARVEST+CorE*CATEGORY+ CorE*HARVEST+CorE*MONTH+CorE*SIZE+HARVEST*SIZE	251	0.07720208	0.2533187	2455.219	13.129
exotic~HARVEST+CorE*CATEGORY+CorE*HARVEST +CorE*MONTH+CorE*SIZE+HARVEST*SIZE	251	0.07720208	0.2533187	2455.219	13.129
exotic~SIZE+HARVEST+CATEGORY+MONTH+ SIZE*HARVEST+MONTH*HARVEST+MONTH*SIZE	251	0.04711090	0.2249094	2456.189	14.099
exotic~MONTH+SIZE+CATEGORY+HARVEST+ CorE*CATEGORY+CorE*HARVEST+CorE*MONTH+ CorE*SIZE+CATEGORY*SIZE+HARVEST*SIZE	251	0.07775569	0.2592203	2458.803	16.713

exotic~HARVEST		numDF	denDF	F-value	p-value
	(Intercept)	1	210	15.36727	0.0001
	HARVEST	1	39	1.70845	0.1988

exotic~HARVEST+SIZE		numDF	denDF	F-value	p-value
	(Intercept)	1	210	15.112767	0.0001
	HARVEST	1	38	1.683225	0.2023
	SIZE	1	38	0.304385	0.5844

exotic~HARVEST+CorE		numDF	denDF	F-value	p-value
	(Intercept)	1	210	15.397979	0.0001
	HARVEST	1	38	1.711197	0.1987
	CorE	1	38	0.769016	0.3860

Fixed effects: exotic ~ HARVEST

	Value	Std.Error	DF	t-value	p-value
(Intercept)	8.397611	3.778077	210	2.222721	0.0273
HARVESTW	7.843580	6.000855	39	1.307077	0.1988

Appendix S7. Model selection and significance for New Zealand falcon activity level (duration per location) in relation to various weather conditions (descriptive) Kaingaroa Forest, in 2012–2014.

Model	N	Marginal	Conditional	AIC	dAIC
MIN~habitat+weather+month*day+factor(year)	5748	0.06499233	0.08783512	51941.51	0.000
MIN~habitat+weather+month*day	5748	0.06052196	0.08759205	51949.51	8.009
MIN~habitat+weather+month+sex+nickname+ factor(year)+day	5748	0.05851465	0.08042564	51967.43	25.925
MIN~habitat+weather+month+nickname+ factor(year)+day	5748	0.05877304	0.07996030	51965.87	24.367
MIN~habitat+weather+month+factor(year)+day	5748	0.05907039	0.07976572	51964.07	22.565
MIN~habitat+weather+month+day	5748	0.05461884	0.08011765	51971.77	30.261
MIN~habitat+weather	5748	0.03974073	0.07252216	52037.63	96.123

MIN~habitat+weather+month*day+factor(year)	numDF	denDF	F-value	p-value
(Intercept)	1	5686	972.7221	<.0001
habitat	**11**	**5686**	**16.3578**	**<.0001**
weather	**7**	**5686**	**7.0575**	**<.0001**
month	**4**	**5686**	**17.0453**	**<.0001**
day	**2**	**5686**	**5.5927**	**0.0037**
factor(year)	**2**	**5686**	**5.6948**	**0.0034**
month:day	**8**	**5686**	**4.8374**	**<.0001**

MIN~habitat+weather+month*day	numDF	denDF	F-value	p-value
(Intercept)	1	5696	889.6151	<.0001
habitat	**11**	**5696**	**16.2407**	**<.0001**
weather	**7**	**5696**	**7.0114**	**<.0001**
month	**4**	**5696**	**16.8141**	**<.0001**
day	**2**	**5696**	**5.5360**	**0.004**

Fixed effects: MIN ~ habitat + weather + month * day + factor(year)

	Value	Std.Error	DF	t-value	p-value
(Intercept)	23.280951	1.742670	5686	13.359355	0.0000
habitatI	5.102134	1.318205	5686	3.870516	0.0001
habitatI/P	12.548138	5.127215	5686	2.447360	0.0144
habitatM	9.054568	1.271201	5686	7.122848	0.0000
habitatM/I	6.994980	1.571258	5686	4.451834	0.0000
habitatM/P	18.392217	3.239622	5686	5.677272	0.0000
habitatP	-1.059042	1.900003	5686	-0.557390	0.5773
habitatSilage	-6.092347	2.228475	5686	-2.733864	0.0063
habitatTR/P	4.845049	1.417232	5686	3.418669	0.0006
habitatY/I	2.951986	1.304186	5686	2.263470	0.0236
habitatY/M	7.544005	0.787789	5686	9.576175	0.0000
habitatY/P	-2.685940	4.230006	5686	-0.634973	0.5255
weathercloudy	0.844908	0.710590	5686	1.189022	0.2345
weatherdrizzling	14.887688	2.714333	5686	5.484843	0.0000
weatherfoggy	2.279240	1.944655	5686	1.172053	0.2412
weatherhail	11.078564	6.786860	5686	1.632355	0.1027
weatherrain	4.927925	1.453570	5686	3.390223	0.0007
weathershower	2.833570	1.770429	5686	1.600499	0.1095

Appendix S7. Continued.

weatherstormy	-4.086240	4.699079	5686	-0.869583	0.3846
monthAPRL	-6.383684	2.605428	5686	-2.450148	0.0143
monthAUG	-7.691070	1.371956	5686	-5.605918	0.0000
monthJULY	-7.837293	1.369246	5686	-5.723800	0.0000
monthMAY	2.934483	2.221862	5686	1.320732	0.1866
dayam	-0.374417	1.434269	5686	-0.261051	0.7941
daypm	-5.902749	1.308466	5686	-4.511197	0.0000
factor(year)2013	2.710175	1.640622	5686	1.651919	0.0986
factor(year)2014	-0.637207	1.633078	5686	-0.390188	0.6964
monthAPRL:dayam	-5.398226	3.499557	5686	-1.542546	0.1230
monthAUG:dayam	-0.796091	1.907987	5686	-0.417241	0.6765
monthJULY:dayam	0.239618	1.971804	5686	0.121522	0.9033
monthMAY:dayam	-5.469321	3.097194	5686	-1.765896	0.0775
monthAPRL:daypm	10.018588	3.415124	5686	2.933595	0.0034
monthAUG:daypm	6.984586	1.884177	5686	3.706969	0.0002
monthJULY:daypm	5.700663	1.840198	5686	3.097853	0.0020
monthMAY:daypm	-1.454049	2.750077	5686	-0.528730	0.5970

Appendix S8. Model selection and significance for New Zealand falcon activity level (duration per location) in relation to wind speed in Kaingaroa Forest, in 2012–2014.

Model	df	AIC	BIC	dAIC
MIN~habitat_windrank+YEAR+SEX+ month+Day+CorE+temprank+rainrank	89	51755.73	52346.92	0.00
MIN~habitat_windrank+YEAR+ month+Day+CorE+temprank+rainrank	88	51756.77	52341.34	1.04
MIN~habitat_windrank+YEAR+ month+Day+CorE+rainrank	84	51764.32	52322.37	8.59
MIN~habitat_windrank+YEAR+month+CorE+rainrank	82	51768.57	52313.36	12.84
MIN~habitat_windrank+YEAR+month+rainrank	81	51774.01	52312.18	18.25
MIN~habitat_windrank+YEAR+month	77	51791.81	52303.45	36.08

MIN~habitat_windrank+YEAR+SEX+month+ Day+CorE+temprank+rainrank	numDF	denDF	F-value	p-value
(Intercept)	1	5641	984.5894	<.0001
habitat_windrank	**69**	**5641**	**3.7236**	**<.0001**
YEAR	**1**	**5641**	**23.0422**	**<.0001**
SEX	1	27	0.2520	0.6198
month	**4**	**5641**	**19.4489**	**<.0001**
Day	**2**	**5641**	**2.9948**	**0.0501**
CorE	**1**	**5641**	**3.9694**	**0.0464**
temprank	4	5641	0.7640	0.5486
rainrank	4	5641	3.0922	0.0149

MIN~habitat_windrank+YEAR+month+CorE+rainrank	numDF	denDF	F-value	p-value
(Intercept)	1	5646	1031.4630	<.0001
habitat_windrank	**69**	**5646**	**3.7218**	**<.0001**

Appendix S8. Continued.

factor(YEAR)	2	5646	12.2165	<.0001
month	4	5646	19.8659	<.0001
CorE	1	5646	4.2727	0.0388
rainrank	4	5646	2.9728	0.0183

Fixed effects: MIN ~ habitat_windrank+factor(YEAR)+SEX+month+Day+CorE+temprank+rainrank

	Value	Std.Error	DF	t-value	p-value
(Intercept)	27.004257	3.532811	5646	7.643844	0.0000
habitat_windrankI.0	1.413238	7.730475	5646	0.182814	0.8550
habitat_windrankI/P.0	-20.431746	22.357351	5646	-0.913871	0.3608
habitat_windrankM.0	-0.641562	7.737505	5646	-0.082916	0.9339
habitat_windrankM/I.0	-10.369073	8.394537	5646	-1.235217	0.2168
habitat_windrankM/P.0	-18.933892	11.569157	5646	-1.636584	0.1018
habitat_windrankP.0	3.644068	6.589216	5646	0.553035	0.5803
habitat_windrankTR/P.0	-5.990136	7.127467	5646	-0.840430	0.4007
habitat_windrankY.0	-7.042676	2.883925	5646	-2.442045	0.0146
habitat_windrankY/I.0	-6.663829	5.338253	5646	-1.248317	0.2120
habitat_windrankY/M.0	-2.869597	4.060165	5646	-0.706768	0.4797
habitat_windrankY/P.0	-20.723495	11.496123	5646	-1.802651	0.0715
habitat_windrankI.1	-1.015963	3.773363	5646	-0.269246	0.7878
habitat_windrankI/P.1	19.179107	15.920539	5646	1.204677	0.2284
habitat_windrankM.1	-0.738421	3.605713	5646	-0.204792	0.8377
habitat_windrankM/I.1	-10.329240	4.277799	5646	-2.414616	0.0158
habitat_windrankM/P.1	-0.335328	13.123661	5646	-0.025551	0.9796
habitat_windrankP.1	-16.405345	3.675890	5646	-4.462959	0.0000
habitat_windrankSilage.1	-10.693828	6.988838	5646	-1.530130	0.1260
habitat_windrankTR/P.1	-4.068223	3.879010	5646	-1.048779	0.2943
habitat_windrankY.1	-7.542429	2.405583	5646	-3.135385	0.0017
habitat_windrankY/I.1	-5.461808	4.137029	5646	-1.320225	0.1868
habitat_windrankY/M.1	-5.542997	3.058534	5646	-1.812305	0.0700
habitat_windrankY/P.1	-11.292097	7.018623	5646	-1.608876	0.1077
habitat_windrankI.2	-1.198405	3.043711	5646	-0.393732	0.6938
habitat_windrankI/P.2	-9.100700	11.450795	5646	-0.794766	0.4268
habitat_windrankM.2	1.115732	3.118050	5646	0.357830	0.7205
habitat_windrankM/I.2	-5.613877	3.887141	5646	-1.444217	0.1487
habitat_windrankM/P.2	-0.489498	6.589817	5646	-0.074281	0.9408
habitat_windrankP.2	-10.600371	4.386460	5646	-2.416612	0.0157
habitat_windrankSilage.2	-23.502825	4.535783	5646	-5.181646	0.0000
habitat_windrankTR/P.2	-10.415207	3.440866	5646	-3.026915	0.0025
habitat_windrankY.2	-8.167243	2.356844	5646	-3.465331	0.0005
habitat_windrankY/I.2	-8.488659	3.621508	5646	-2.343957	0.0191
habitat_windrankY/M.2	-3.713340	2.992460	5646	-1.240899	0.2147
habitat_windrankY/P.2	-12.233243	8.359631	5646	-1.463371	0.1434
habitat_windrankI.3	-5.106674	2.951229	5646	-1.730355	0.0836
habitat_windrankI/P.3	8.737059	7.895369	5646	1.106606	0.2685
habitat_windrankM.3	-0.591756	3.003224	5646	-0.197040	0.8438

Appendix S8. Continued.

habitat_windrankM/I.3	-5.486269	4.260590	5646	-1.287678	0.1979
habitat_windrankM/P.3	17.007974	6.117935	5646	2.780019	0.0055
habitat_windrankP.3	-2.296699	4.723799	5646	-0.486197	0.6268
habitat_windrankSilage.3	-15.474818	4.320184	5646	-3.581982	0.0003
habitat_windrankTR/P.3	-7.617175	3.539217	5646	-2.152221	0.0314
habitat_windrankY.3	-8.758353	2.326083	5646	-3.765280	0.0002
habitat_windrankY/I.3	-9.116649	3.331503	5646	-2.736498	0.0062
habitat_windrankY/M.3	-3.342071	2.986824	5646	-1.118938	0.2632
habitat_windrankY/P.3	-11.448296	10.350042	5646	-1.106111	0.2687
habitat_windrankI.4	-4.743841	3.456752	5646	-1.372341	0.1700
habitat_windrankI/P.4	-8.137987	15.929615	5646	-0.510872	0.6095
habitat_windrankM.4	-1.241024	3.115770	5646	-0.398304	0.6904
habitat_windrankM/I.4	-0.008301	4.209765	5646	-0.001972	0.9984
habitat_windrankM/P.4	-5.677607	10.299187	5646	-0.551267	0.5815
habitat_windrankP.4	-5.873781	4.556175	5646	-1.289191	0.1974
habitat_windrankSilage.4	-20.822842	4.781263	5646	-4.355093	0.0000
habitat_windrankTR/P.4	-4.378433	4.502861	5646	-0.972367	0.3309
habitat_windrankY.4	-9.294709	2.447373	5646	-3.797831	0.0001
habitat_windrankY/I.4	-8.522849	3.866967	5646	-2.204014	0.0276
habitat_windrankY/M.4	-4.758128	3.017151	5646	-1.577027	0.1148
habitat_windrankY/P.4	-19.268601	22.376876	5646	-0.861094	0.3892
habitat_windrankI.5	0.020013	7.700316	5646	0.002599	0.9979
habitat_windrankI/P.5	-25.181510	22.366787	5646	-1.125844	0.2603
habitat_windrankM.5	14.214484	4.996829	5646	2.844701	0.0045
habitat_windrankM/I.5	4.708956	5.666232	5646	0.831056	0.4060
habitat_windrankM/P.5	-8.592162	15.948537	5646	-0.538743	0.5901
habitat_windrankP.5	-14.221418	22.299630	5646	-0.637742	0.5237
habitat_windrankSilage.5	-14.909521	10.308749	5646	-1.446298	0.1481
habitat_windrankTR/P.5	-10.697282	7.258330	5646	-1.473794	0.1406
habitat_windrankY/I.5	-14.916583	5.334475	5646	-2.796261	0.0052
habitat_windrankY/M.5	-0.345222	3.554501	5646	-0.097122	0.9226
factor(YEAR)2013	-0.018961	1.106370	5646	-0.017138	0.9863
factor(YEAR)2014	-2.954178	0.992002	5646	-2.977997	0.0029
SEXM	-1.058204	1.450103	27	-0.729744	0.4718
monthAUG	0.585185	1.802559	5646	0.324641	0.7455
monthJULY	-0.596915	1.844366	5646	-0.323642	0.7462
monthJUNE	5.890593	1.706274	5646	3.452314	0.0006
monthMAY	4.975363	1.788868	5646	2.781291	0.0054
Daymid-day	1.086121	0.853257	5646	1.272912	0.2031
Daypm	-0.632817	0.879161	5646	-0.719796	0.4717
CorEE	4.043680	1.913936	5646	2.112757	0.0347
temprank	-0.230398	0.583526	5646	-0.394838	0.6930
rainrank	1.565367	0.500930	5646	3.124920	0.0018

Appendix S9. Model selection and significance for New Zealand falcon activity level (duration per location) in relation to precipitation in Kaingaroa Forest, in 2012–2014.

Model	df	AIC	BIC	dAIC
MIN~habitat_rainrank+YEAR+SEX+month+Day+CorE+temprank+windrank	68	51827.94	52279.89	0.00
MIN~habitat_rainrank+YEAR+month+Day+CorE+temprank+windrank	67	51828.98	52274.29	1.04
MIN~habitat_rainrank+YEAR+month+Day+CorE+windrank	63	51836.86	52255.63	8.92
MIN~habitat_rainrank+YEAR+month+CorE+windran	61	51841.17	52246.67	13.23
MIN~habitat_rainrank+YEAR+month+windrank	60	51847.69	52246.55	19.75
MIN~habitat_rainrank+YEAR+month	55	51862.77	52228.44	34.83
MIN~month_rainrank+YEAR+SEX+habitat+Day+CorE+temprank+windrank	49	51912.33	52238.17	84.39
(MIN~month_rainrank+YEAR+SEX+habitat+Day+CorE+windrank	45	51920.03	52219.30	92.09
MIN~month_rainrank+YEAR+habitat+Day+CorE+windrank	44	51920.99	52213.61	93.05
MIN~month_rainrank+YEAR+habitat+Day+windrank	43	51927.07	52213.05	99.13
MIN~month_rainrank+YEAR+habitat+windrank	41	51932.62	52205.31	104.68
MIN~month_rainrank+YEAR+habitat	36	51947.69	52187.16	119.75
MIN~habitat+rainrank+YEAR+SEX+month+Day+CorE+temprank+windrank	36	52010.48	52249.95	182.54
MIN~habitat+rainrank+YEAR+month+Day+CorE+temprank+windrank	35	52011.50	52244.32	183.56
MIN~habitat+rainrank+YEAR+month+Day+CorE+windrank	31	52019.14	52225.38	191.20
MIN~habitat+rainrank+YEAR+month+Day+windrank	30	52025.38	52224.97	197.44
MIN~habitat+rainrank+YEAR+month+windrank	28	52030.36	52216.65	202.42

MIN~habitat_rainrank+YEAR+SEX+month+Day+CorE+temprank+windrank

	numDF	denDF	F-value	p-value
(Intercept)	1	5662	1068.4825	<.0001
habitat_rainrank	47	5662	4.9344	**<.0001**
YEAR	1	5662	20.2893	**<.0001**
SEX	1	27	0.3692	0.5485
month	4	5662	17.8628	**<.0001**
Day	2	5662	3.4430	**0.0320**
CorE	1	5662	5.3883	**0.0203**
temprank	4	5662	1.0153	0.3979
windrank	5	5662	2.9149	**0.0124**

MIN~habitat_rainrank+YEAR+month+Day+CorE+windrank

	numDF	denDF	F-value	p-value
(Intercept)	1	5666	1085.2803	<.0001
habitat_rainrank	47	5666	4.9353	**<.0001**
YEAR	1	5666	20.4348	**<.0001**

Appendix S9. Continued.

month	4	5666	17.8337	<.0001
Day	2	5666	3.3992	0.0335
CorE	1	5666	5.5124	0.0189
windrank	5	5666	2.9723	0.0110

Fixed effects: MIN ~ habitat_rainrank+factor(YEAR +SEX+month+Day+CorE+temprank+windrank

	Value	Std.Error	DF	t-value	p-value
(Intercept)	48.20980	10.556949	5664	4.566641	0.0000
habitat_rainrankY/M.0	-24.45035	9.963531	5664	-2.453984	0.0142
habitat_rainrankY.0	-27.89294	10.130381	5664	-2.753395	0.0059
habitat_rainrankI.0	-22.60648	10.179199	5664	-2.220851	0.0264
habitat_rainrankI/P.0	-23.99923	11.411388	5664	-2.103095	0.0355
habitat_rainrankM.0	-18.94175	10.202660	5664	-1.856550	0.0634
habitat_rainrankM/I.0	-24.95174	10.066621	5664	-2.478661	0.0132
habitat_rainrankM/P.0	-16.48281	10.531142	5664	-1.565150	0.1176
habitat_rainrankP.0	-28.42328	10.268738	5664	-2.767942	0.0057
habitat_rainrankSilage.0	-37.67935	10.203059	5664	-3.692946	0.0002
habitat_rainrankTR/P.0	-27.04901	10.041116	5664	-2.693825	0.0071
habitat_rainrankY/I.0	-27.84502	10.037513	5664	-2.774096	0.0056
habitat_rainrankY/P.0	-32.98058	10.834653	5664	-3.043990	0.0023
habitat_rainrankY.1	-25.89742	10.337989	5664	-2.505073	0.0123
habitat_rainrankI.1	-19.27021	11.350418	5664	-1.697754	0.0896
habitat_rainrankI/P.1	5.95391	16.229121	5664	0.366866	0.7137
habitat_rainrankM.1	-14.16600	11.994105	5664	-1.181080	0.2376
habitat_rainrankM/I.1	-27.19621	12.713128	5664	-2.139223	0.0325
habitat_rainrankM/P.1	-26.08137	18.622989	5664	-1.400493	0.1614
habitat_rainrankP.1	-31.49762	14.242801	5664	-2.211477	0.0270
habitat_rainrankSilage.1	-42.39998	13.035338	5664	-3.252695	0.0011
habitat_rainrankTR/P.1	-30.03773	13.063095	5664	-2.299434	0.0215
habitat_rainrankY/I.1	-37.38985	10.920557	5664	-3.423804	0.0006
habitat_rainrankY/M.1	-19.34630	10.269182	5664	-1.883918	0.0596
habitat_rainrankY/P.1	-36.92544	18.651901	5664	-1.979715	0.0478
habitat_rainrankY.2	-21.21836	10.525584	5664	-2.015884	0.0439
habitat_rainrankI.2	-24.03153	14.263482	5664	-1.684829	0.0921
habitat_rainrankM.2	-13.95019	11.199867	5664	-1.245568	0.2130
habitat_rainrankM/I.2	-24.72330	13.578904	5664	-1.820714	0.0687
habitat_rainrankP.2	-43.12067	24.444804	5664	-1.764002	0.0778
habitat_rainrankSilage.2	-27.44304	18.590963	5664	-1.476150	0.1400
habitat_rainrankTR/P.2	-32.72983	11.716725	5664	-2.793428	0.0052
habitat_rainrankY/I.2	-28.44218	12.029174	5664	-2.364433	0.0181
habitat_rainrankY/M.2	-21.11073	10.521031	5664	-2.006527	0.0448
habitat_rainrankY.3	-15.27263	10.985684	5664	-1.390231	0.1645
habitat_rainrankI.3	-16.65739	12.835532	5664	-1.297756	0.1944
habitat_rainrankM.3	-26.98318	11.854143	5664	-2.276266	0.0229
habitat_rainrankM/I.3	-14.20094	14.100666	5664	-1.007111	0.3139
habitat_rainrankP.3	-45.82679	24.453504	5664	-1.874038	0.0610
habitat_rainrankSilage.3	-51.37690	13.516746	5664	-3.800981	0.0001

Appendix S9. Continued.

habitat_rainrankTR/P.3	-29.39634	11.863555	5664	-2.477869	0.0132
habitat_rainrankY/I.3	-27.63053	12.182709	5664	-2.268012	0.0234
habitat_rainrankY/M.3	-21.34045	10.584739	5664	-2.016153	0.0438
habitat_rainrankY.4	13.56608	16.354636	5664	0.829494	0.4069
habitat_rainrankI.4	-24.71759	18.692155	5664	-1.322351	0.1861
habitat_rainrankM.4	-22.32519	16.336103	5664	-1.366617	0.1718
habitat_rainrankTR/P.4	-37.66689	18.636728	5664	-2.021111	0.0433
habitat_rainrankY/I.4	-28.17831	18.636750	5664	-1.511976	0.1306
factor(YEAR)2013	0.09530	1.100539	5664	0.086590	0.9310
factor(YEAR)2014	-2.83619	0.988293	5664	-2.869788	0.0041
SEXM	-1.08316	1.404201	27	-0.771372	0.4472
monthAUG	0.14925	1.801436	5664	0.082849	0.9340
monthJULY	-0.70428	1.844052	5664	-0.381918	0.7025
monthJUNE	5.79154	1.707979	5664	3.390877	0.0007
monthMAY	4.92574	1.793491	5664	2.746453	0.0060
Daymid-day	1.30844	0.851409	5664	1.536791	0.1244
Daypm	-0.38232	0.878630	5664	-0.435133	0.6635
CorEE	4.46626	1.888991	5664	2.364361	0.0181
temprank	-0.40085	0.579069	5664	-0.692234	0.4888
windrank1	-1.50913	1.506399	5664	-1.001814	0.3165
windrank2	-1.26802	1.545719	5664	-0.820344	0.4121
windrank3	-0.98114	1.582530	5664	-0.619985	0.5353
windrank4	-1.63068	1.680087	5664	-0.970594	0.3318
windrank5	3.97234	2.047494	5664	1.940101	0.0524

Appendix S10. Model selection and significance for New Zealand falcon activity level (duration per location) in relation to temperature in Kaingaroa Forest, in 2012–2014.

Model	df	AIC	BIC	dAIC
MIN~habitat_temprank+factor(YEAR)+SEX+month+Day+rainrank+windrank	67	51860.98	52306.30	0.00
MIN~habitat_temprank+factor(YEAR)+month+Day+rainrank+windrank	66	51862.11	52300.79	1.13
MIN~habitat_temprank+factor(YEAR)+month+rainrank+windrank	64	51867.86	52293.27	6.88
MIN~habitat_temprank+factor(YEAR)+month+windrank	60	51885.17	52284.03	24.19
MIN~habitat_temprank+factor(YEAR)+month	55	51905.04	52270.71	44.06
MIN~month_temprank+factor(YEAR)+SEX+habitat+Day+rainrank+windrank	46	51967.18	52273.08	106.20
MIN~month_temprank+factor(YEAR)+habitat+Day+rainrank+windrank	45	51968.20	52267.46	107.22
MIN~month_temprank+factor(YEAR)+habitat+rainrank+windrank	43	51973.42	52259.40	112.44

MIN~habitat_temprank+factor(YEAR)+SEX+month+Day+rainrank+windrank	numDF	denDF	F-value	p-value
(Intercept)	1	5663	1106.3292	<.0001
habitat_temprank	46	5663	4.5956	<.0001
factor(YEAR)	2	5663	10.7812	<.0001
SEX	1	27	0.2775	0.6026
month	4	5663	18.9732	<.0001
Day	2	5663	4.0260	0.0179
rainrank	4	5663	3.7276	0.0049
windrank	5	5663	3.1782	0.0072

MIN~habitat_temprank+factor(YEAR)+month+Day+rainrank+windrank	numDF	denDF	F-value	p-value
(Intercept)	1	5663	1109.1782	<.0001
habitat_temprank	46	5663	4.5960	<.0001
factor(YEAR)	2	5663	10.7941	<.0001
month	4	5663	18.9419	<.0001
Day	2	5663	3.9904	0.0185
rainrank	4	5663	3.7066	0.0051
windrank	5	5663	3.1699	0.0073

Fixed effects: MIN ~ habitat_temprank+factor(YEAR)+SEX month+Day+rainrank+windrank

	Value	Std.Error	DF	t-value	p-value
(Intercept)	50.56042	7.767484	5663	6.509240	0.0000
habitat_temprankM.5	23.36083	17.504081	5663	1.334594	0.1821
habitat_temprankY.1	-28.18505	8.624667	5663	-3.267958	0.0011
habitat_temprankM.1	-16.81406	17.505214	5663	-0.960517	0.3368
habitat_temprankM/I.1	-30.56931	15.013851	5663	-2.036074	0.0418
habitat_temprankTR/P.1	-34.64577	23.531912	5663	-1.472289	0.1410
habitat_temprankY/I.1	-19.32858	12.031085	5663	-1.606553	0.1082
habitat_temprankY/M.1	-27.98775	9.268074	5663	-3.019802	0.0025
habitat_temprankY.2	-32.19966	7.815334	5663	-4.120061	0.0000

Appendix S10. Continued.

habitat_temprankI.2	-26.66688	8.665861	5663	-3.077234	0.0021
habitat_temprankM.2	-27.63919	8.237176	5663	-3.355420	0.0008
habitat_temprankM/I.2	-25.48434	8.568159	5663	-2.974308	0.0029
habitat_temprankM/P.2	-16.14499	10.245541	5663	-1.575806	0.1151
habitat_temprankP.2	-22.85663	9.656447	5663	-2.366981	0.0180
habitat_temprankSilage.2	-29.18796	11.060001	5663	-2.639056	0.0083
habitat_temprankTR/P.2	-24.44455	8.597600	5663	-2.843183	0.0045
habitat_temprankY/I.2	-27.90844	8.748405	5663	-3.190118	0.0014
habitat_temprankY/M.2	-23.98178	7.902730	5663	-3.034619	0.0024
habitat_temprankY/P.2	-46.41933	23.572682	5663	-1.969200	0.0490
habitat_temprankY.3	-32.61110	7.694392	5663	-4.238295	0.0000
habitat_temprankI.3	-26.75037	7.784748	5663	-3.436254	0.0006
habitat_temprankI/P.3	-16.99723	9.484958	5663	-1.792019	0.0732
habitat_temprankM.3	-23.04045	7.805086	5663	-2.951979	0.0032
habitat_temprankM/I.3	-24.65758	7.892681	5663	-3.124107	0.0018
habitat_temprankM/P.3	-18.54719	8.929295	5663	-2.077117	0.0378
habitat_temprankP.3	-33.26811	7.999623	5663	-4.158709	0.0000
habitat_temprankSilage.3	-39.51728	8.036107	5663	-4.917466	0.0000
habitat_temprankTR/P.3	-27.32275	7.834364	5663	-3.487552	0.0005
habitat_temprankY/I.3	-28.63178	7.779998	5663	-3.680179	0.0002
habitat_temprankY/M.3	-24.86497	7.701649	5663	-3.228525	0.0013
habitat_temprankY/P.3	-34.72092	9.070706	5663	-3.827808	0.0001
habitat_temprankY.4	-31.59057	7.694291	5663	-4.105715	0.0000
habitat_temprankI.4	-26.58460	7.868102	5663	-3.378782	0.0007
habitat_temprankI/P.4	-34.89723	14.978446	5663	-2.329830	0.0199
habitat_temprankM.4	-25.42760	7.944059	5663	-3.200833	0.0014
habitat_temprankM/I.4	-27.66054	8.289139	5663	-3.336961	0.0009
habitat_temprankM/P.4	-15.42832	10.419033	5663	-1.480782	0.1387
habitat_temprankP.4	-36.40664	8.352776	5663	-4.358627	0.0000
habitat_temprankSilage.4	-40.76930	8.758643	5663	-4.654750	0.0000
habitat_temprankTR/P.4	-31.07136	7.970102	5663	-3.898490	0.0001
habitat_temprankY/I.4	-32.54108	8.056053	5663	-4.039333	0.0001
habitat_temprankY/M.4	-24.68930	7.697977	5663	-3.207246	0.0013
habitat_temprankY/P.4	-28.27056	11.425232	5663	-2.474397	0.0134
habitat_temprankY.5	-35.82248	10.265531	5663	-3.489589	0.0005
habitat_temprankI.5	-40.80853	12.424715	5663	-3.284464	0.0010
habitat_temprankM/I.5	-29.07227	23.500654	5663	-1.237084	0.2161
habitat_temprankY/I.5	-33.65910	23.491240	5663	-1.432836	0.1520
factor(YEAR)2013	-0.11129	1.100905	5663	-0.101086	0.9195
factor(YEAR)2014	-2.95337	0.988755	5663	-2.986963	0.0028
SEXM	-1.09701	1.405358	27	-0.780595	0.4418
monthAUG	1.14831	1.865699	5663	0.615485	0.5383
monthJULY	0.00165	1.899287	5663	0.000869	0.9993
monthJUNE	6.45066	1.772398	5663	3.639509	0.0003
monthMAY	5.82075	1.848069	5663	3.149636	0.0016
Daymid-day	1.43028	0.875905	5663	1.632912	0.1025
Daypm	-0.47247	0.897436	5663	-0.526470	0.5986

Appendix S10. Continued.

rainrank1	1.45459	1.400313	5663	1.038764	0.2990
rainrank2	3.54676	1.834713	5663	1.933141	0.0533
rainrank3	2.87266	2.093521	5663	1.372168	0.1701
rainrank4	12.87896	5.444246	5663	2.365609	0.0180
windrank1	-0.63399	1.553295	5663	-0.408157	0.6832
windrank2	-0.72650	1.575206	5663	-0.461207	0.6447
windrank3	-0.54485	1.621120	5663	-0.336093	0.7368
windrank4	-1.01615	1.714775	5663	-0.592586	0.5535
windrank5	4.71025	2.075760	5663	2.269168	0.0233