

**Appendix 1.** Detailed outputs of statistical analysis of long-term, seed year population trends and seedfall effect for each bird species with AIC best supported models.

**Table A1** Description of models used for each bird species to predict the mean number of birds per 5-minute count. The best combination of explanatory variables: study period (Period) or seed year (one seed year: March to February), season, site or elevation; random factors: observer (Obs), Station (Stn), Subsite (Sbt) or date; and error distribution with either generalized linear mixed model Poisson (Poisson GLMM), negative binomial (nb.GLMM) or zero-inflated mixed model Poisson (ZIP), negative binomial (ZINB), was selected for each bird species using AIC values.

Bird species	Fixed effects	Random effects	Distribution	AIC
Bellbird	Period + Season + Site + Elevation	Obs, Stn, Date	Poisson GLMM	34949.2
	Seed year + Season + Site + Elevation	Obs, Stn, Date	Poisson GLMM	34929.8
	Seed fall + Season + Site	Obs, Sbt/Stn, Date	Poisson GLMM	34956.3
Rifleman	Period + Season + Site	Obs, Sbt/Stn, Date	ZIP	24827.1
	Seed year + Season + Site	Obs, Stn, Date	Poisson GLMM	24859
	Seed fall + Season + Site	Obs, Stn, Date	Poisson GLMM	24931.7
Brown Creeper	Period + Season + Site + Elevation	Obs, Stn, Date	ZINB	12859.2
	Seed year + Season + Site + Elevation	Obs, Stn, Date	ZINB	12744.1
	Seed fall + Season + Site + Elevation	Obs, Stn, Date	ZINB	12886.4
Tomtit	Period + Season + Site	Obs, Stn, Date	Poisson GLMM	16433.8
	Seed year + Season + Site	Obs, Stn, Date	Poisson GLMM	16427.8
	Seed fall + Season + Site	Obs, Stn, Date	Poisson GLMM	16437.7
Grey Warbler	Period + Season + Site + Elevation	Obs, Stn, Date	Poisson GLMM	12826.6
	Seed year + Season + Site + Elevation	Obs, Stn, Date	Poisson GLMM	12812.9
	Seed fall + Season + Site + Elevation	Obs, Stn, Date	Poisson GLMM	12853.1
Silvereye	Period + Season + Site + Elevation	Obs, Stn, Date	ZINB	30963.1
	Seed year + Season + Site + Elevation	Obs, Stn, Date	ZINB	31097.8
	Seed fall + Season + Site + Elevation	Obs, Stn, Date	ZINB	31025.7
Fantail	Period + Season + Site + Elevation	Obs, Sbt/Stn, Date	nb.GLMM	4623.1
	Seed year + Season + Elevation	Obs, Sbt/Stn, Date	nb.GLMM	4701.8
	Seed fall + Season + Elevation	Obs, Sbt/Stn, Date	nb.GLMM	4620.7
Blackbird	Period + Season + Site + Elevation	Obs, Stn, Date	Poisson GLMM	8327.9
	Seed year + Season + Site + Elevation	Obs, Stn, Date	Poisson GLMM	8310.9
	Seed fall + Season + Site + Elevation	Obs, Sbt/Stn, Date	Poisson GLMM	8313.8
Chaffinch	Period + Season + Site + Elevation	Obs, Stn, Date	nb.GLMM	26393.8
	Seed year + Season + Site + Elevation	Obs, Stn, Date	nb.GLMM	26316.3
	Seed fall + Season + Site + Elevation	Obs, Stn, Date	nb.GLMM	26334.1

Redpoll	Period + Season + Site	Obs, Stn, Date	ZINB	25678.9
	Seed year + Season + Site	Obs, Stn, Date	nb.GLMM	25724.2
	Seed fall + Season + Site	Obs, Stn, Date	ZINB	25682.6
Dunnock	Period + Elevation	Obs, Stn, Date	nb. GLMM	6343.9
	Seed year + Season + Elevation	Obs, Stn, Date	nb. GLMM	6268.1
	Seed fall + Elevation	Obs, Stn, Date	nb. GLMM	6319.8
Greenfinch	Period + Season + Site + Elevation	Obs, Sbt/Stn, Date	ZINB	4930.9
	Seed year + Season + Site	Obs, Stn, Date	Poisson GLMM	5203.2
	Seed fall + Season + Site + Elevation	Obs, Stn, Date	ZINB	4880.6
Goldfinch	Period + Season + Elevation	Obs, Stn, Date	ZINB	2964.4
	Seed year + Season + Elevation	Obs, Stn, Date	Poisson GLMM	3287.5
	Seed fall + Season + Elevation	Obs, Stn, Date	ZINB	2914.9
Kea	Period + Season + Elevation	Obs, Sbt/Stn, Date	nb.GLMM	3626
	Seed year + Elevation	Obs, Sbt/Stn, Date	nb.GLMM	3612.9
	Seed fall+ Season + Elevation	Obs, Sbt/Stn, Date	nb.GLMM	3642.2
Long-tailed Cuckoo	Period + Site + Elevation	Obs, Sbt /Stn, Date	Poisson GLMM	953.9
	Seed year + Elevation	Obs, Sbt/Stn, Date	Poisson GLMM	956.5
	Seed fall + Site + Elevation	Obs, Sbt/Stn, Date	Poisson GLMM	955.7

**Table A2** Summary of statistical model outputs (estimate, standard error, Z value and p-value) for long-term trends for each bird species with study period (1978-79, 1999-2004, 2019-2020), season (summer, autumn, spring), site (Broken river: “BR”, Cheeseman: “CH”, Craigieburn: “CR”) and elevation. For birds marked with a superscript z, only the conditional part of zero-inflated mixed models is shown. The intercept corresponds to study period: 1999-2004, season: summer and site: BR. \* Brown Creeper: 2019-20 significantly different from 1978-82 (z value = -2.022, P = 0.043); Grey Warbler: 2019-20 significantly different from 1978-82 (z value = -3.028, P = 0.002).

Bird species	Fixed effects	Estimate	Std.Error	z value	P
Bellbird	<i>Intercept</i>	1.348622	0.389255	3.465	<0.001
	1978-82	-0.359634	0.150785	-2.385	0.017
	2019-20	0.466073	0.176575	2.64	0.008
	Autumn	0.587537	0.072197	8.138	<0.001
	Spring	0.007182	0.075501	0.095	0.924
	CH	0.086471	0.087842	0.984	0.325
	CR	-0.162796	0.098481	-1.653	0.098
	Elevation	-0.602446	0.379804	-1.586	0.112
Rifleman <sup>z</sup>	<i>Intercept</i>	-0.7187	0.20773	-3.46	0.001
	1978-82	0.99467	0.24063	4.134	<0.001
	2019-20	0.81832	0.31083	2.633	0.008
	Autumn	-0.21245	0.07824	-2.716	0.007
	Spring	-0.39817	0.08164	-4.877	<0.001
	CH	-0.06631	0.13664	-0.485	0.627

Brown Creeper <sup>Z</sup>	CR	0.54412	0.23545	2.311	0.021
	<i>Intercept</i>	-4.92158	0.83523	-5.892	<0.001
	1978-82	0.0414	0.27906	0.148	0.882
	2019-20	-1.03949	0.56251	-1.848	0.065*
	Autumn	1.15552	0.16252	7.11	<0.001
	Spring	0.03772	0.15514	0.243	0.808
	CH	-0.32183	0.27416	-1.174	0.240
Tomtit	CR	0.64227	0.45215	1.42	0.156
	Elevation	4.76274	0.83153	5.728	<0.001
	<i>Intercept</i>	-1.3221	0.1723	-7.675	<0.001
	1978-82	0.4998	0.2008	2.489	0.013
	2019-20	0.5232	0.2623	1.995	0.046
	Autumn	-0.318	0.1181	-2.693	0.007
	Spring	-0.382	0.1227	-3.112	0.002
Grey Warbler	CH	0.1374	0.1016	1.352	0.176
	CR	0.4017	0.1396	2.878	0.004
	<i>Intercept</i>	-3.7608	0.6516	-5.772	<0.001
	1978-82	1.6018	0.2734	5.859	<0.001
	2019-20	0.6005	0.3676	1.634	0.102*
	Autumn	-1.2997	0.1632	-7.962	<0.001
	Spring	-0.4482	0.1643	-2.728	0.006
Silvereye <sup>Z</sup>	CH	0.7017	0.1697	4.135	<0.001
	CR	0.9315	0.2143	4.347	<0.001
	Elevation	1.3417	0.6284	2.135	0.033
	<i>Intercept</i>	0.4891	0.49373	0.991	0.322
	1978-82	0.37884	0.31139	1.217	0.224
	2019-20	0.55939	0.39218	1.426	0.154
	Autumn	0.46735	0.13893	3.364	0.001
Fantail	Spring	-0.06663	0.14523	-0.459	0.646
	CH	-0.25361	0.1213	-2.091	0.037
	CR	0.25504	0.15947	1.599	0.110
	Elevation	-0.99953	0.43561	-2.295	0.022
	<i>Intercept</i>	1.7931	1.1198	1.601	0.109
	1978-82	-0.1082	0.5267	-0.205	0.837
	2019-20	-0.2618	0.7237	-0.362	0.718
Blackbird	Autumn	-0.1951	0.3291	-0.593	0.553
	Spring	-1.4925	0.3687	-4.048	<0.001
	Elevation	-1.4925	0.3687	-4.048	<0.001
	<i>Intercept</i>	-0.63387	0.83996	-0.755	0.450
	1978-82	0.22961	0.38648	0.594	0.552
	2019-20	0.51333	0.50425	1.018	0.309
	Autumn	-0.70498	0.21337	-3.304	0.001
Chaffinch	Spring	0.07099	0.21688	0.327	0.743
	CH	-0.54261	0.22117	-2.453	0.014
	CR	-0.85662	0.33178	-2.582	0.010
	Elevation	-1.97332	0.81651	-2.417	0.016
	<i>Intercept</i>	-0.56424	0.67697	-0.833	0.405

	1978-82	1.67456	0.67415	2.484	0.013
	2019-20	2.71258	0.84601	3.206	0.001
	Autumn	-0.62815	0.2745	-2.288	0.022
	Spring	-0.39746	0.29066	-1.367	0.171
	CH	0.18799	0.08997	2.089	0.037
	CR	-0.11162	0.11844	-0.942	0.346
	Elevation	-1.49802	0.36397	-4.116	<0.001
Redpoll <sup>Z</sup>	<i>Intercept</i>	-1.4262	0.6194	-2.303	0.021
	1978-82	0.4208	0.7282	0.578	0.563
	2019-20	0.2088	0.9415	0.222	0.825
	Autumn	0.0997	0.389	0.256	0.798
	Spring	-0.3598	0.4132	-0.871	0.384
	CH	-0.1325	0.1949	-0.68	0.497
	CR	0.2239	0.2768	0.809	0.419
Dunnock	<i>Intercept</i>	-3.4759	1.1659	-2.981	0.003
	1978-82	2.559	0.5678	4.507	<0.001
	2019-20	1.8915	0.7209	2.624	0.009
	Elevation	-2.1652	1.0609	-2.041	0.041
Greenfinch <sup>Z</sup>	<i>Intercept</i>	1.613	1.324	1.218	0.223
	1978-82	0.295	0.780	0.379	0.705
	2019-20	0.411	1.083	0.380	0.704
	Autumn	1.335	0.534	2.500	0.012
	Spring	-0.036	0.542	-0.067	0.946
	CH	0.152	0.535	0.284	0.777
	CR	-1.304	0.570	-2.287	0.022
	Elevation	-6.191	1.193	-5.191	<0.001
Goldfinch <sup>Z</sup>	<i>Intercept</i>	-3.9532	2.0005	-1.976	0.048
	1978-82	1.7759	1.2541	1.416	0.157
	2019-20	3.0037	1.4921	2.013	0.044
	Autumn	2.4109	1.4019	1.72	0.085
	Spring	0.8533	1.3727	0.622	0.534
	Elevation	-3.7041	1.1088	-3.341	0.001
Kea	<i>Intercept</i>	-5.9504	1.3382	-4.446	<0.001
	1978-82	-0.57957	0.4049	-1.431	0.152
	2019-20	-19.23333	2453.841	-0.008	0.994
	Autumn	0.02038	0.22808	0.089	0.929
	Spring	0.36562	0.21769	1.68	0.093
	Elevation	3.56034	1.33787	2.661	0.008
Long-tailed Cuckoo	<i>Intercept</i>	-9.649	2.254	-4.281	<0.001
	1978-82	1.309	0.712	1.838	0.066
	2019-20	-0.113	1.163	-0.097	0.923
	CH	-1.858	0.934	-1.988	0.047
	CR	-16.766	4590.526	-0.004	0.997
	Elevation	4.604	2.235	2.060	0.039

**Table A3** Summary of statistical model outputs (estimate, standard error: “SE”, Z value and p-value) for seed year trends for each bird species with season (summer, autumn, spring), site (Broken river: “BR”, Cheeseman: “CH”, Craigieburn: “CR”) and elevation. For birds marked with a superscript z, only the conditional part of zero-inflated mixed models is shown. The intercept corresponds to seed year: 1978, season: summer, site: BR.

<b>Bird species</b>	<b>Fixed effects</b>	<b>Estimate</b>	<b>SE</b>	<b>z value</b>	<b>P</b>
Bellbird	<i>Intercept</i>	0.74741	0.39255	1.904	0.057
	1979	0.51178	0.13867	3.691	<0.001
	1980	0.06305	0.14601	0.432	0.666
	1981	0.19309	0.14967	1.29	0.197
	1982	0.2334	0.15047	1.551	0.121
	1999	0.51259	0.2077	2.468	0.014
	2000	0.74155	0.23453	3.162	0.002
	2001	0.67787	0.21028	3.224	0.001
	2002	0.40331	0.24394	1.653	0.098
	2003	0.64303	0.24393	2.636	0.008
	2019	1.09083	0.1938	5.629	<0.001
	Autumn	0.55278	0.06757	8.181	<0.001
	Spring	0.01948	0.07089	0.275	0.783
	CH	0.08698	0.08772	0.992	0.321
	CR	-0.15469	0.09815	-1.576	0.115
	Elevation	-0.60034	0.37982	-1.581	0.114
Rifleman	<i>Intercept</i>	0.26922	0.2205	1.221	0.222
	1979	0.2594	0.15185	1.708	0.088
	1980	0.04994	0.16136	0.309	0.757
	1981	-0.14703	0.16925	-0.869	0.385
	1982	-0.19929	0.16948	-1.176	0.240
	1999	-2.09401	0.36393	-5.754	<0.001
	2000	-0.80479	0.3812	-2.111	0.035
	2001	-0.75301	0.35937	-2.095	0.036
	2002	-0.94524	0.38665	-2.445	0.014
	2003	-0.35003	0.39287	-0.891	0.373
	2019	-1.28786	0.35038	-3.676	<0.001
	Autumn	-0.24958	0.07203	-3.465	0.001
	Spring	-0.37493	0.07491	-5.005	<0.001
	CH	-0.28751	0.14379	-1.999	0.046
	CR	0.03746	0.2138	0.175	0.861
	Brown Creeper <sup>z</sup>	<i>Intercept</i>	-4.5827	0.81745	-5.606
1979		0.69516	0.26382	2.635	0.008
1980		0.41347	0.27197	1.52	0.128
1981		-0.09386	0.27537	-0.341	0.733

	1982	0.15257	0.26481	0.576	0.565
	1999	0.35977	0.39665	0.907	0.364
	2000	0.48752	0.51989	0.938	0.348
	2001	0.21029	0.35715	0.589	0.556
	2002	0.37193	0.50265	0.74	0.459
	2003	-0.06192	0.43534	-0.142	0.887
	2019	-0.62532	0.53612	-1.166	0.243
	Autumn	1.06768	0.1492	7.156	<0.001
	Spring	0.11281	0.14803	0.762	0.446
	CH	-0.19506	0.26088	-0.748	0.455
	CR	0.43058	0.46439	0.927	0.354
	Elevation	4.26691	0.80206	5.32	<0.001
Tomtit	<i>Intercept</i>	-0.4661	0.2432	-1.917	0.055
	1979	-0.4919	0.2413	-2.038	0.042
	1980	-0.1808	0.2516	-0.718	0.473
	1981	-0.3066	0.2546	-1.204	0.229
	1982	-0.5006	0.2565	-1.952	0.051
	1999	-0.6014	0.3108	-1.935	0.053
	2000	-0.3929	0.3608	-1.089	0.276
	2001	-0.9628	0.3196	-3.012	0.003
	2002	-1.0579	0.3846	-2.75	0.006
	2003	-1.6663	0.4135	-4.03	<0.001
	2019	-0.3214	0.2942	-1.093	0.275
	Autumn	-0.3289	0.1159	-2.838	0.005
	Spring	-0.4146	0.1212	-3.422	0.001
	CH	0.1363	0.1012	1.347	0.178
	CR	0.3615	0.1398	2.587	0.010
Grey Warbler	<i>Intercept</i>	-1.95863	0.67923	-2.884	0.004
	1979	-0.66348	0.32138	-2.064	0.039
	1980	0.05434	0.33028	0.165	0.869
	1981	0.08369	0.33267	0.252	0.801
	1982	0.18962	0.333	0.569	0.569
	1999	-1.15184	0.42364	-2.719	0.007
	2000	-1.94695	0.5133	-3.793	<0.001
	2001	-1.85401	0.44004	-4.213	<0.001
	2002	-2.4617	0.5505	-4.472	<0.001
	2003	-2.1656	0.53302	-4.063	<0.001
	2019	-1.13736	0.41869	-2.716	0.007
	Autumn	-1.35125	0.15751	-8.579	<0.001
	Spring	-0.5821	0.15996	-3.639	<0.001
	CH	0.70435	0.16908	4.166	<0.001
	CR	0.86068	0.21334	4.034	<0.001
	Elevation	1.3308	0.62733	2.121	0.034
Silvereye <sup>z</sup>	<i>Intercept</i>	1.53544	0.50976	3.012	0.003
	1979	-0.54708	0.25771	-2.123	0.034
	1980	-0.59832	0.26878	-2.226	0.026
	1981	-0.54826	0.27628	-1.984	0.047

	1982	-0.09408	0.27715	-0.34	0.734
	1999	-0.79693	0.40897	-1.949	0.051
	2000	-1.15875	0.49606	-2.336	0.019
	2001	-0.63226	0.41177	-1.536	0.125
	2002	-1.05595	0.50682	-2.083	0.037
	2003	-0.59246	0.47381	-1.25	0.211
	2019	-0.17537	0.39024	-0.449	0.653
	Autumn	0.39729	0.12942	3.07	0.002
	Spring	-0.07162	0.13673	-0.524	0.600
	CH	-0.2895	0.12913	-2.242	0.025
	CR	0.12105	0.16221	0.746	0.456
	Elevation	-1.14976	0.44039	-2.611	0.009
Fantail	<i>Intercept</i>	1.96406	1.13639	1.728	0.084
	1979	-0.78721	0.60104	-1.31	0.190
	1980	0.52995	0.60834	0.871	0.384
	1981	1.07647	0.60627	1.776	0.076
	1982	0.16016	0.61383	0.261	0.794
	1999	2.13788	0.68506	3.121	0.002
	2000	1.21612	0.7846	1.55	0.121
	2001	-18.94707	2551.016	-0.007	0.994
	2002	-3.19732	1.30104	-2.458	0.014
	2003	-18.91442	3648.033	-0.005	0.996
	2019	0.09774	0.71362	0.137	0.891
	Autumn	-0.46575	0.24486	-1.902	0.057
	Spring	-1.7428	0.29207	-5.967	<0.001
	Elevation	-5.63398	1.03375	-5.45	<0.001
Blackbird	<i>Intercept</i>	-0.52428	0.90881	-0.577	0.564
	1979	0.41596	0.47904	0.868	0.385
	1980	-0.19549	0.49389	-0.396	0.692
	1981	0.11418	0.49648	0.23	0.818
	1982	1.1963	0.49124	2.435	0.015
	1999	0.3827	0.60001	0.638	0.524
	2000	-0.55013	0.70534	-0.78	0.435
	2001	0.0782	0.61248	0.128	0.898
	2002	-0.79077	0.73714	-1.073	0.283
	2003	0.03848	0.70492	0.055	0.956
	2019	0.60591	0.5856	1.035	0.301
	Autumn	-0.96874	0.20457	-4.735	<0.001
	Spring	-0.16424	0.20712	-0.793	0.428
	CH	-0.54395	0.22024	-2.47	0.014
	CR	-0.8983	0.33316	-2.696	0.007
	Elevation	-1.9941	0.81686	-2.441	0.015
Chaffinch	<i>Intercept</i>	1.20947	0.61889	1.954	0.051
	1979	0.59898	0.40433	1.481	0.139
	1980	-0.91335	0.42362	-2.156	0.031
	1981	-0.65475	0.42838	-1.528	0.126
	1982	1.35022	0.42525	3.175	0.002

	1999	-0.72391	0.76852	-0.942	0.346
	2000	-1.24866	0.83636	-1.493	0.135
	2001	-3.45696	0.78686	-4.393	<0.001
	2002	-1.37316	0.86056	-1.596	0.111
	2003	-1.23203	0.86032	-1.432	0.152
	2019	1.20571	0.73053	1.65	0.099
	Autumn	-0.97062	0.20877	-4.649	<0.001
	Spring	-0.4005	0.22049	-1.816	0.069
	CH	0.18856	0.08981	2.099	0.036
	CR	-0.11895	0.11791	-1.009	0.313
	Elevation	-1.50713	0.3641	-4.139	<0.001
Redpoll	<i>Intercept</i>	-20.1881	762.0213	-0.026	0.979
	1979	20.5693	762.0213	0.027	0.978
	1980	18.531	762.0214	0.024	0.981
	1981	18.8497	762.0214	0.025	0.980
	1982	21.661	762.0214	0.028	0.977
	1999	19.4408	762.0215	0.026	0.980
	2000	19.3168	762.0216	0.025	0.980
	2001	16.2484	762.0216	0.021	0.983
	2002	18.4377	762.0217	0.024	0.981
	2003	17.8885	762.0217	0.024	0.981
	2019	19.3962	762.0215	0.026	0.980
	Autumn	-0.4774	0.2402	-1.988	0.047
	Spring	-0.1512	0.2563	-0.59	0.555
	CH	-0.2405	0.1887	-1.275	0.202
	CR	-0.6048	0.2253	-2.685	0.007
Dunnock	<i>Intercept</i>	-2.6873	1.2139	-2.214	0.027
	1979	2.6614	0.7	3.802	<0.001
	1980	2.136	0.7067	3.023	0.003
	1981	1.6286	0.7156	2.276	0.023
	1982	3.7353	0.7063	5.289	<0.001
	1999	0.4352	0.8343	0.522	0.602
	2000	-0.9022	1.1168	-0.808	0.419
	2001	-0.3402	0.9314	-0.365	0.715
	2002	-0.4892	1.0467	-0.467	0.640
	2003	-1.1553	1.1207	-1.031	0.303
	2019	1.6965	0.8016	2.117	0.034
	Autumn	-0.3366	0.173	-1.946	0.052
	Spring	-0.5222	0.188	-2.778	0.005
	Elevation	-2.3188	1.0508	-2.207	0.027
Greenfinch	<i>Intercept</i>	-23.030	1783.0	-0.013	0.990
	1979	19.300	1783.0	0.011	0.991
	1980	17.700	1783.0	0.01	0.992
	1981	17.030	1783.0	0.01	0.992
	1982	20.120	1783.0	0.011	0.991
	1999	17.880	1783.0	0.01	0.992
	2000	18.790	1783.0	0.01	0.992



	2001	15.690	1783.0	0.009	0.993
	2002	18.560	1783.0	0.01	0.992
	2003	-11.510	417600.0	0	1.000
	2019	18.150	1783.0	0.01	0.992
	Autumn	0.490	0.388	1.262	0.207
	Spring	0.969	0.413	2.344	0.019
	CH	0.577	0.357	1.617	0.106
	CR	0.336	0.405	0.83	0.407
Goldfinch	<i>Intercept</i>	-25.080	2199	-0.011	0.991
	1979	18.400	2199	0.008	0.993
	1980	17.140	2199	0.008	0.994
	1981	16.420	2199	0.007	0.994
	1982	19.370	2199	0.009	0.993
	1999	16.680	2199	0.008	0.994
	2000	-5.027	1.57E+05	0	1
	2001	-15.470	3.98E+06	0	1
	2002	18.920	2199	0.009	0.993
	2003	-7.508	3.58E+05	0.000	1.000
	2019	19.88	2199	0.009	0.993
	Autumn	2.630	0.496	5.298	<0.001
	Spring	2.935	0.518	5.662	<0.001
Kea	<i>Intercept</i>	-7.4136	1.36454	-5.433	<0.001
	1979	-0.07132	0.49604	-0.144	0.886
	1980	-0.02125	0.51295	-0.041	0.967
	1981	0.33892	0.51792	0.654	0.513
	1982	0.82645	0.50363	1.641	0.101
	1999	1.32268	0.57088	2.317	0.021
	2000	-0.20802	0.71325	-0.292	0.771
	2001	1.06314	0.58738	1.81	0.070
	2002	0.0797	0.69873	0.114	0.909
	2003	-0.78241	0.85217	-0.918	0.359
	2019	-18.63122	2610.844	-0.007	0.994
	Elevation	3.49519	1.33193	2.624	0.009
Long-tailed Cuckoo	<i>Intercept</i>	-7.888	2.238	-3.524	<0.001
	1980	0.038	0.798	0.048	0.962
	1981	0.532	0.874	0.609	0.543
	1982	0.976	0.991	0.985	0.325
	1999	-19.305	5047.256	-0.004	0.997
	2000	-0.527	1.105	-0.477	0.633
	2001	-2.159	1.428	-1.512	0.131
	2002	-20.248	8847.276	-0.002	0.998
	2003	0.251	1.041	0.241	0.810
	2019	-1.066	1.147	-0.929	0.353
	Elevation	3.628	2.163	1.677	0.094

**Table A4** Fitted mean number of each bird species per 5-min count per study period (1978-82, 1999-2004, 2019-20) in summer at Broken River (see Tables A1 and A2 for full models).

<b>Bird species</b>	<b>1978-82</b>	<b>1999-2004</b>	<b>2019-20</b>
<i>Native</i>			
Bellbird	1.517	2.173	3.464
Rifleman	1.308	0.411	0.690
Brown Creeper	0.214	0.271	0.028
Tomtit	0.439	0.267	0.450
Grey Warbler	0.413	0.083	0.152
Silvereye	0.876	0.586	1.098
Fantail	0.027	0.031	0.024
Kea	0.016	0.038	0.000
Long-tailed Cuckoo	0.021	0.006	0.005
<i>Exotic</i>			
Blackbird	0.102	0.081	0.136
Chaffinch	0.731	0.137	2.065
Redpoll	0.365	0.170	0.285
Dunnock	0.051	0.004	0.026
Greenfinch	0.006	0.003	0.005
Goldfinch	0.0004	0.0001	0.005