Wildlife Biology

WLB-00534

Lonsinger, R. C., Lukacs, P. M., Gese, E. M. and Waits, L. P. 2019. Empirical comparisons of abundance estimators for two sympatric carnivores using noninvasive genetic sampling. – Wildlife Biology 2019: wlb.00534

Appendix 1. Description of individual covariates used in Huggins capture-recapture models for kit foxes *Vulpes macrotis* and coyotes *Canis latrans* in Utah, USA, 2013–2014.

Appendix 2. List of robust design models evaluating kit fox *Vulpes macrotis* and coyote *Canis latrans* survival (*S*), capture (*p*) and recapture (*c*) probabilities, and movement (temporary immigration = 1 – γ"; temporary emigration = γ') in western Utah, USA, 2013–2014.

Appendix 3. Ranking of robust design models fit for kit fox *Vulpes macrotis* survival (*S*), capture (*p*) and recapture (*c*) probabilities, and movement (temporary immigration = 1 – γ"; temporary emigration = γ') in western Utah, USA, 2013–2014, with the program MARK based on Akaike's information criterion with small sample size correction (AIC_c).

Appendix 4. Ranking of robust design models fit for coyote *Canis latrans* survival (*S*), capture (*p*) and recapture (*c*) probabilities, and movement (temporary immigration = 1 – γ"; temporary emigration = γ') in western Utah, USA, 2013–2014, with the program MARK based on Akaike's information criterion with small sample size correction (AIC_c).

Appendix 1

Description of individual covariates included in Huggins capture-recapture models for kit foxes *Vulpes macrotis* and coyotes *Canis latrans* in Utah, USA, 2013–2014

In Huggins capture-recapture models, we included distance to water and individual heterozygosity as individual covariates on survival (*S*). Water had been proposed as an important driver of canid space use in this system (Arjo et al. 2007). We identified water sources through a combination of GIS layers, aerial imagery, and field surveys (i.e. ground-truthing; Lonsinger et al. 2018). Distance to nearest water was calculated as the mean distance to nearest water across samples for each individual. Reduced heterozygosity can reflect inbreeding and thus a correlation between individual heterozygosity and fitness is often predicted (Reed and Frankham 2003). We calculated five measures of individual heterozygosity – proportion of heterozygous loci, standardized observed and expected heterozygosity, internal relatedness, and homozygosity by locus – with GENHET (Coulon 2010). All individual heterozygosity metrics were highly correlated (Spearman's rank correlations for all comparisons: $r > |0.91|$, $p < 0.001$) and we therefore used only the standardized observed heterozygosity. Coyote activity can influence spatial dynamics of kit foxes at Dugway (Lonsinger et al. 2017). Thus, an index of coyote activity was used as an individual covariate in the kit fox models, where we calculated the mean number of coyote scats detected (standardized by the length of surveys) within 500 m of each kit fox sample location.

References

Arjo, W. M. et al. 2007. Changes in kit fox–coyote–prey relationships in the Great Basin Desert, Utah. – W. N. Am. Nat. 67: 389–401.

Coulon, A. 2010. Genhet: An easy-to-use R function to estimate individual heterozygosity. – Mol. Ecol. Resour. 10: 167–169.

Reed, D. H. and Frankham, R. 2003. Correlation between fitness and genetic diversity. – Conserv. Biol. 17: 230–237.

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Appendix 2

List of robust design models evaluating kit fox *Vulpes macrotis* and coyote *Canis latrans* survival (*S*), capture (*p*) and recapture (*c*) probabilities, and movement (temporary immigration = 1 – γ"; temporary emigration = γ') in Utah, USA, 2013–2014.

Parameters	Models considered		
Survival			
	S(.)	*S* (sex+ExWinter)	*S* (sex*DistW)
	S (t)	*S* (sex+DistW)	*S* (sex*IndHet)
	S (T)	*S* (sex+IndHet)	*S* (DistW*t)
	S (sex)	*S* (DistW+t)	*S* (DistW+Season)
	S (Season)	*S* (DistW+Season)	*S* (DistW*ExWinter)
	S (ExWinter)	*S* (DistW+ExWinter)	*S* (DistW+IndHet)
	S (DistW)	*S* (DistW+IndHet)	*S* (DistW*t+sex)
	S (DistW2)	*S* (DistW*t+IndHet)	*S*(C.idx)[d]
	S (IndHet)	*S* (sex*t)	*S*(C.idx*t)[d]
	S (sex+t)	*S* (sex*T)	*S*(C.idx*sex)[d]
	S (sex+T)	*S* (sex*Season)	*S*(C.idx*DistW)[d]
	S (sex+Season)	*S* (sex*ExWinter)	*S*(C.idx*DistW2)[d]
Capture probability[a,b]			
	p(.)	*p*(t)	*p*(T)
	p(sex)	*p*(t+sex)	*p*(T+sex)
Movement[c]			
	γ '(.),γ"(.)	γ '(t)=γ"(t)	γ '=γ"=0

Abbreviations are as follows: "." = constant, "t" = time-varying, "T" = trend, "Season" = variation between seasons, "ExWinter" = difference following an extreme winter season, "DistW" = Euclidean distance to nearest water, "DistW2" = Quadratic distance to nearest water, "IndHet" = individual heterozygosity, "C.idx" = index of coyote activity.

[a]In all capture models, $p = c$ and the mean p across occasions (secondary sampling periods) was applied to individuals captured only at single-occasion sites.

[b]All capture models considered variation in p among sessions (primary sampling periods).

[c]For movement models, γ '(t) = γ"(t) represents random movement and γ ' = γ" = 0 represents no movement.

[d]Model was only considered for kit foxes.

Appendix 3

Ranking of robust design models fit for kit fox *Vulpes macrotis* survival (*S*), capture (*p*) and recapture (*c*) probabilities, and movement (temporary immigration = 1 – γ"; temporary emigration = γ') in Utah, USA, 2013–2014, with the program MARK based on Akaike's information criterion with small sample size correction (AIC_c). Each model is ranked based on ΔAIC_c, where K = number of parameters and w_i = Akaike weight. Only models with $w_i > 0.001$ are presented.

Survival	Capture[a,b]	Movement[c]	K	AIC_c	ΔAIC_c	w_i	Deviance
S(sex+T)	*p*=*c*(T)	γ'=γ"=0	11	905.447	0.000	0.0497	882.4241
S(DistW2)	*p*=*c*(T)	γ'(.), γ"(.)	12	905.789	0.342	0.0419	880.5750
S(C.idx*t)	*p*=*c*(T)	γ'=γ"=0	14	905.854	0.407	0.0405	876.2073
S(DistW)	*p*=*c*(T)	γ'(.), γ"(.)	12	906.150	0.702	0.0350	880.9355
S(DistW+ExWinter)	*p*=*c*(T)	γ'(.), γ"(.)	13	906.314	0.867	0.0322	878.8920
S(sex+t)	*p*=*c*(T)	γ'=γ"=0	12	906.321	0.874	0.0321	881.1072
S(sex+T)	*p*=*c*(T)	γ'(.), γ"(.)	13	906.932	1.484	0.0237	879.5099
S(sex+T)	*p*=*c*(T)	γ'(t)=γ"(t)	13	907.084	1.636	0.0219	879.6618
S(sex+T)	*p*=*c*(t)	γ'=γ"=0	19	907.283	1.835	0.0199	866.2427
S(C.idx*DistW)	*p*=*c*(T)	γ'(.), γ"(.)	14	907.341	1.894	0.0193	877.6939
S(C.idx*t)	*p*=*c*(T)	γ'(.), γ"(.)	16	907.386	1.938	0.0189	873.2355
S(DistW+t)	*p*=*c*(T)	γ'(.), γ"(.)	14	907.436	1.989	0.0184	877.7893
S(T)	*p*=*c*(T)	γ'=γ"=0	10	907.507	2.059	0.0178	886.6574
S(sex*T)	*p*=*c*(T)	γ'=γ"=0	12	907.638	2.190	0.0166	882.4235
Cont'd							
S(C.idx*t)	*p*=*c*(T)	γ'(t)=γ"(t)	16	907.679	2.232	0.0163	873.5290
S(t)	*p*=*c*(T)	γ'(.), γ"(.)	12	907.690	2.243	0.0162	882.4763
S(DistW2)	*p*=*c*(t)	γ'(.), γ"(.)	20	908.086	2.638	0.0133	864.7120
S(C.idx*t)	*p*=*c*(t)	γ'=γ"=0	22	908.088	2.641	0.0133	859.9908
S(t)	*p*=*c*(T)	γ'=γ"=0	11	908.149	2.702	0.0129	885.1261
S(DistW2)	*p*=*c*(T)	γ'(t)=γ"(t)	12	908.175	2.727	0.0127	882.9605
S(sex+t)	*p*=*c*(t)	γ'=γ"=0	20	908.266	2.819	0.0121	864.8928
S(DistW*t)	*p*=*c*(T)	γ'(.), γ"(.)	16	908.323	2.876	0.0118	874.1730
S(DistW+IndHet)	*p*=*c*(T)	γ'(.), γ"(.)	13	908.331	2.883	0.0118	880.9087
S(C.idx*DistW)	*p*=*c*(T)	γ'(t)=γ"(t)	14	908.337	2.890	0.0117	878.6900
S(DistW+Season)	*p*=*c*(T)	γ'(.), γ"(.)	13	908.34	2.892	0.0117	880.9178

S(DistW+sex)	*p*=*c*(T)	γ'(.), γ''(.)	13	908.356	2.908	0.0116	880.9338
S(sex+t)	*p*=*c*(T)	γ'(.), γ''(.)	14	908.358	2.911	0.0116	878.7111
S(DistW)	*p*=*c*(t)	γ'(.), γ''(.)	20	908.438	2.991	0.0111	865.0647
S(DistW)	*p*=*c*(T)	γ'(t)=γ''(t)	12	908.458	3.011	0.011	883.2439
S(DistW+t)	*p*=*c*(T)	γ'=γ''=0	12	908.475	3.028	0.0109	883.2611
S(sex+t)	*p*=*c*(T)	γ'(t)=γ''(t)	14	908.62	3.173	0.0102	878.9732
S(DistW+ExWinter)	*p*=*c*(t)	γ'(.), γ''(.)	21	908.675	3.228	0.0099	862.9493
S(sex+T)	*p*=*c*(t)	γ'(.), γ''(.)	21	908.925	3.478	0.0087	863.1992
S(DistW*t+sex)	*p*=*c*(T)	γ'(.), γ''(.)	17	909.000	3.553	0.0084	872.5718
S(T)	*p*=*c*(T)	γ'(t)=γ''(t)	12	909.054	3.607	0.0082	883.8404
S(sex+T)	*p*=*c*(t)	γ'(t)=γ''(t)	21	909.107	3.659	0.008	863.3809
S(DistW*t+sex)	*p*=*c*(T)	γ'(t)=γ''(t)	17	909.158	3.711	0.0078	872.7298
S(T)	*p*=*c*(t)	γ'=γ''=0	18	909.206	3.759	0.0076	870.4812
S(sex*T)	*p*=*c*(T)	γ'(t)=γ''(t)	14	909.308	3.861	0.0072	879.6608
S(C.idx)	*p*=*c*(T)	γ'(t)=γ''(t)	12	909.429	3.982	0.0068	884.2149
S(DistW*t)	*p*=*c*(T)	γ'(t)=γ''(t)	16	909.456	4.009	0.0067	875.3057

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S(C.idx)	*p*=*c*(T)	γ'=γ''=0	10	909.538	4.091	0.0064	888.6890
S(C.idx)	*p*=*c*(T)	γ'(.), γ''(.)	12	909.592	4.144	0.0063	884.3776
S(sex*T)	*p*=*c*(t)	γ'=γ''=0	20	909.616	4.169	0.0062	866.2425
S(C.idx*DistW2)	*p*=*c*(t)	γ'(.), γ''(.)	22	909.798	4.351	0.0056	861.7008
S(DistW*t+IndHet)	*p*=*c*(T)	γ'(.), γ''(.)	17	909.837	4.39	0.0055	873.4087
S(DistW*t+IndHet)	*p*=*c*(T)	γ'(t)=γ''(t)	17	909.842	4.395	0.0055	873.4135
S(DistW+t)	*p*=*c*(t)	γ'(.), γ''(.)	22	909.870	4.422	0.0055	861.7725
S(DistW+ExWinter)	*p*=*c*(T)	γ'(t)=γ''(t)	13	909.893	4.446	0.0054	882.4713
S(C.idx*DistW)	*p*=*c*(t)	γ'(.), γ''(.)	22	909.945	4.497	0.0053	861.8473
S(t)	*p*=*c*(t)	γ'=γ''=0	19	909.956	4.509	0.0052	868.9161
S(DistW*t)	*p*=*c*(T)	γ'=γ''=0	14	909.998	4.551	0.0051	880.3513
S(DistW*Season)	*p*=*c*(T)	γ'(t)=γ''(t)	14	910.071	4.623	0.0049	880.4234
S(C.idx*t)	*p*=*c*(t)	γ'(t)=γ''(t)	24	910.130	4.682	0.0048	857.2316
S(DistW*Season)	*p*=*c*(T)	γ'(.), γ''(.)	14	910.192	4.744	0.0046	880.5446
S(C.idx*DistW2)	*p*=*c*(T)	γ'(.), γ''(.)	14	910.220	4.773	0.0046	880.5733
S(DistW*t+IndHet)	*p*=*c*(T)	γ'=γ''=0	15	910.230	4.782	0.0046	878.3399

S(t)	*p*=*c*(T)	γ'(t)=γ"(t)	13	910.314	4.867	0.0044	882.8923
S(DistW2)	*p*=*c*(t)	γ'(t)=γ"(t)	20	910.350	4.902	0.0043	866.9760
S(DistW+t)	*p*=*c*(T)	γ'(t)=γ"(t)	14	910.442	4.994	0.0041	880.7945
S(DistW+t)	*p*=*c*(t)	γ'=γ"=0	20	910.453	5.006	0.0041	867.0797
S(sex+t)	*p*=*c*(t)	γ'(.), γ"(.)	22	910.489	5.042	0.004	862.3921
S(DistW+Season)	*p*=*c*(T)	γ'(t)=γ"(t)	13	910.508	5.061	0.004	883.0863
S(DistW+IndHet)	*p*=*c*(T)	γ'(t)=γ"(t)	13	910.523	5.075	0.0039	883.1007
S(C.idx*sex)	*p*=*c*(T)	γ'=γ"=0	12	910.537	5.089	0.0039	885.3226
S(DistW*IndHet)	*p*=*c*(T)	γ'(.), γ"(.)	14	910.543	5.096	0.0039	880.8963
S(C.idx*sex)	*p*=*c*(T)	γ'(t)=γ"(t)	14	910.568	5.120	0.0038	880.9205
S(DistW)	*p*=*c*(t)	γ'(t)=γ"(t)	20	910.629	5.182	0.0037	867.2554
Cont'd							
S(DistW*t+sex)	*p*=*c*(T)	γ'=γ"=0	15	910.630	5.183	0.0037	878.7403
S(sex*t)	*p*=*c*(T)	γ'=γ"=0	14	910.633	5.186	0.0037	880.9863
S(C.idx*sex)	*p*=*c*(T)	γ'(.), γ"(.)	14	910.704	5.256	0.0036	881.0567
S(DistW*t)	*p*=*c*(t)	γ'(.), γ"(.)	24	910.749	5.301	0.0035	857.8507
S(sex+t)	*p*=*c*(t)	γ'(t)=γ"(t)	22	910.763	5.316	0.0035	862.6662
S(DistW+IndHet)	*p*=*c*(t)	γ'(.), γ"(.)	21	910.763	5.316	0.0035	865.0376
S(DistW+Season)	*p*=*c*(t)	γ'(.), γ"(.)	21	910.767	5.319	0.0035	865.0408
S(DistW+sex)	*p*=*c*(t)	γ'(.), γ"(.)	21	910.789	5.341	0.0034	865.0630
S(sex+T)	*p*=*c*(T+g)	γ'=γ"=0	15	910.812	5.364	0.0034	878.9218
S(C.idx*DistW)	*p*=*c*(t)	γ'(t)=γ"(t)	22	910.826	5.379	0.0034	862.7287
S(DistW+sex)	*p*=*c*(T)	γ'(t)=γ"(t)	13	910.890	5.443	0.0033	883.4685
S(T)	*p*=*c*(t)	γ'(t)=γ"(t)	20	910.935	5.488	0.0032	867.5616
S(sex+ExWinter)	*p*=*c*(T)	γ'=γ"=0	11	910.950	5.502	0.0032	887.9265
S(ExWinter*DistW)	*p*=*c*(T)	γ'(t)=γ"(t)	14	910.962	5.514	0.0032	881.3145
S(C.idx*DistW2)	*p*=*c*(T)	γ'(t)=γ"(t)	14	911.028	5.581	0.0031	881.3810
S(sex)	*p*=*c*(T)	γ'(t)=γ"(t)	12	911.170	5.722	0.0028	885.9555
S(sex+ExWinter)	*p*=*c*(T)	γ'(t)=γ"(t)	13	911.446	5.999	0.0025	884.0244
S(sex*T)	*p*=*c*(t)	γ'(t)=γ"(t)	22	911.478	6.030	0.0024	863.3804
S(sex)	*p*=*c*(T)	γ'(.), γ"(.)	12	911.519	6.071	0.0024	886.3046
S(sex+Season)	*p*=*c*(T)	γ'(t)=γ"(t)	13	911.536	6.088	0.0024	884.1137
S(sex+ExWinter)	*p*=*c*(T)	γ'(.), γ"(.)	13	911.555	6.107	0.0023	884.1329

S(DistW*t+sex)	*p*=*c*(t)	γ'(.), γ"(.)	25	911.562	6.115	0.0023	856.2344
S(C.idx)	*p*=*c*(t)	γ'(t)=γ"(t)	20	911.574	6.127	0.0023	868.2008
S(DistW*t+sex)	*p*=*c*(t)	γ'(t)=γ"(t)	25	911.746	6.299	0.0021	856.4182
S(C.idx)	*p*=*c*(t)	γ'=γ"=0	18	911.761	6.313	0.0021	873.0356
S(C.idx)	*p*=*c*(t)	γ'(.), γ"(.)	20	911.776	6.329	0.0021	868.4024
S(sex+t)	*p*=*c*(T+g)	γ'=γ"=0	16	911.893	6.445	0.0020	877.7426

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S(DistW*t)	*p*=*c*(t)	γ'(t)=γ"(t)	24	911.897	6.450	0.0020	858.9989
S(sex)	*p*=*c*(T)	γ'=γ"=0	10	912.170	6.723	0.0017	891.3208
S(IndHet)	*p*=*c*(T)	γ'(t)=γ"(t)	12	912.174	6.727	0.0017	886.9599
S(DistW+ExWinter)	*p*=*c*(t)	γ'(t)=γ"(t)	21	912.196	6.749	0.0017	866.4705
S(Season)	*p*=*c*(T)	γ'(t)=γ"(t)	12	912.200	6.753	0.0017	886.9859
S(sex+Season)	*p*=*c*(T)	γ'(.), γ"(.)	13	912.290	6.842	0.0016	884.8677
S(t)	*p*=*c*(t)	γ'(t)=γ"(t)	21	912.310	6.862	0.0016	866.5840
S(sex+Season)	*p*=*c*(T)	γ'=γ"=0	11	912.314	6.866	0.0016	889.2902
S(.)	*p*=*c*(T)	γ'(t)=γ"(t)	11	912.356	6.909	0.0016	889.3329
S(DistW*t)	*p*=*c*(t)	γ'=γ"=0	22	912.386	6.938	0.0016	864.2885
S(sex+IndHet)	*p*=*c*(T)	γ'(t)=γ"(t)	13	912.410	6.962	0.0015	884.9877
S(DistW*t+IndHet)	*p*=*c*(t)	γ'(.), γ"(.)	25	912.410	6.963	0.0015	857.0821
S(C.idx*DistW2)	*p*=*c*(T)	γ'=γ"=0	12	912.424	6.977	0.0015	887.2103
S(DistW*t+IndHet)	*p*=*c*(t)	γ'(t)=γ"(t)	25	912.427	6.980	0.0015	857.0993
S(DistW*Season)	*p*=*c*(t)	γ'(t)=γ"(t)	22	912.428	6.981	0.0015	864.3311
S(IndHet)	*p*=*c*(T)	γ'(.), γ"(.)	12	912.603	7.155	0.0014	887.3886
S(DistW*IndHet)	*p*=*c*(T)	γ'(t)=γ"(t)	14	912.612	7.164	0.0014	882.9645
S(DistW+t)	*p*=*c*(t)	γ'(t)=γ"(t)	22	912.620	7.173	0.0014	864.5228
S(sex+T)	*p*=*c*(T+g)	γ'(.), γ"(.)	17	912.671	7.224	0.0013	876.2423
S(sex+T)	*p*=*c*(t+g)	γ'=γ"=0	23	912.677	7.230	0.0013	862.1891
S(.)	*p*=*c*(T)	γ'(.), γ"(.)	11	912.703	7.256	0.0013	889.6800
S(DistW*Season)	*p*=*c*(t)	γ'(.), γ"(.)	22	912.754	7.306	0.0013	864.6563
S(DistW*t+IndHet)	*p*=*c*(t)	γ'=γ"=0	23	912.758	7.311	0.0013	862.2701
S(DistW+Season)	*p*=*c*(t)	γ'(t)=γ"(t)	21	912.805	7.358	0.0013	867.0791
S(sex+IndHet)	*p*=*c*(T)	γ'(.), γ"(.)	13	912.806	7.359	0.0013	885.3841
S(ExWinter)	*p*=*c*(T)	γ'=γ"=0	10	912.821	7.374	0.0012	891.9716

S(DistW+IndHet)	*p*=*c*(t)	γ'(t)=γ"(t)	21	912.838	7.390	0.0012	867.1118
Cont'd							
S(sex*t)	*p*=*c*(t)	γ'=γ"=0	22	912.872	7.425	0.0012	864.7748
S(C.idx*DistW)	*p*=*c*(T)	γ'=γ"=0	12	912.896	7.449	0.0012	887.6820
S(sex+T)	*p*=*c*(T+g)	γ'(t)=γ"(t)	17	912.928	7.481	0.0012	876.4998
S(sex*t)	*p*=*c*(T)	γ'(t)=γ"(t)	16	912.950	7.503	0.0012	878.8002
S(Season)	*p*=*c*(T)	γ'(.), γ"(.)	12	913.006	7.559	0.0011	887.7920
S(C.idx*sex)	*p*=*c*(t)	γ'(t)=γ"(t)	22	913.015	7.568	0.0011	864.9178
S(sex*T)	*p*=*c*(T+g)	γ'=γ"=0	16	913.038	7.591	0.0011	878.8879
S(DistW*t+sex)	*p*=*c*(t)	γ'=γ"=0	23	913.039	7.591	0.0011	862.5510
S(sex*ExWinter)	*p*=*c*(T)	γ'=γ"=0	12	913.084	7.637	0.0011	887.8702
S(sex+ExWinter)	*p*=*c*(t)	γ'=γ"=0	19	913.089	7.642	0.0011	872.0494
S(C.idx*t)	*p*=*c*(T+g)	γ'=γ"=0	18	913.090	7.643	0.0011	874.3650
S(C.idx*sex)	*p*=*c*(t)	γ'=γ"=0	20	913.095	7.647	0.0011	869.7213
S(DistW*IndHet)	*p*=*c*(t)	γ'(.), γ"(.)	22	913.123	7.676	0.0011	865.0261
S(DistW+sex)	*p*=*c*(T)	γ'=γ"=0	11	913.182	7.735	0.0010	890.1588
S(C.idx*sex)	*p*=*c*(t)	γ'(.), γ"(.)	22	913.189	7.742	0.0010	865.0918
S(DistW+sex)	*p*=*c*(t)	γ'(t)=γ"(t)	21	913.226	7.778	0.0010	867.4997
S(DistW+ExWinter)	*p*=*c*(T)	γ'=γ"=0	11	913.241	7.794	0.0010	890.2180
S(ExWinter)	*p*=*c*(T)	γ'(t)=γ"(t)	12	913.267	7.820	0.0010	888.0533

Abbreviations are as follows: "." = constant, "t" = time-varying, "T" = trend, "Season" = variation between Seasons, "ExWinter" = difference following an extreme winter Season, "DistW" = Euclidean distance to nearest water, "DistW2" = Quadratic distance to nearest water, "IndHet" = individual heterozygosity, "C.idx" = index of coyote activity.

[a]In all capture models, $p = c$ and the mean p across sessions was applied to individuals captured only at single-session sites.

[b]All capture models considered variation in p among sessions (primary sampling periods).

[c]For movement models, γ '(t) = γ"(t) represents random movement and γ ' = γ" = 0 represents no movement.

Appendix 4

Ranking of robust design models fit for coyote *Canis latrans* survival (*S*), capture (*p*) and recapture (*c*) probabilities, and movement (temporary immigration = 1 – γ"; temporary emigration = γ') in Utah, USA, 2013–2014, with the program MARK based on Akaike's information criterion with small sample size correction (AIC_c). Each model is ranked based on ΔAIC_c, where K = number of parameters and w_i = Akaike weight. Only models with $w_i > 0.001$ are presented.

Survival	Capture[a,b]	Movement[c]	K	AIC_c	ΔAIC_c	w_i	Deviance
S(DistW*t+IndHet)	*p*=*c*(t)	γ'(t)=γ"(t)	24	2854.661	0	0.0747	2805.2578
S(DistW+IndHet)	*p*=*c*(T)	γ'(.),γ"(.)	13	2855.037	0.375	0.0619	2828.6163
S(DistW+IndHet)	*p*=*c*(t)	γ'(.),γ"(.)	20	2855.376	0.715	0.0523	2814.3984
S(DistW*t+IndHet)	*p*=*c*(T)	γ'=γ"=0	15	2855.402	0.741	0.0516	2824.8467
S(DistW*IndHet)	*p*=*c*(T)	γ'(.),γ"(.)	14	2855.569	0.908	0.0475	2827.0834
S(DistW*Season)	*p*=*c*(T)	γ'(.),γ"(.)	14	2855.647	0.986	0.0457	2827.1616
S(DistW*t+IndHet)	*p*=*c*(t)	γ'=γ"=0	22	2855.921	1.260	0.0398	2810.7400
S(DistW*IndHet)	*p*=*c*(t)	γ'(.),γ"(.)	21	2855.940	1.278	0.0394	2812.8626
S(DistW*Season)	*p*=*c*(t)	γ'(.),γ"(.)	21	2856.007	1.346	0.0381	2812.9305
S(DistW*t)	*p*=*c*(T)	γ'(.),γ"(.)	16	2856.593	1.932	0.0284	2823.9629
S(DistW*Season)	*p*=*c*(T)	γ'=γ"=0	12	2856.921	2.260	0.0241	2832.5612
S(DistW*t)	*p*=*c*(t)	γ'(.),γ"(.)	23	2856.966	2.305	0.0236	2809.6766
S(DistW*Season)	*p*=*c*(t)	γ'=γ"=0	19	2857.377	2.716	0.0192	2818.4933
S(DistW*Season)	*p*=*c*(T)	γ'(t)=γ"(t)	14	2857.381	2.720	0.0192	2828.8958
Cont'd							
S(DistW*t)	*p*=*c*(T)	γ'(t)=γ"(t)	16	2857.493	2.832	0.0181	2824.8626
S(DistW*Season)	*p*=*c*(t)	γ'(t)=γ"(t)	21	2857.828	3.166	0.0153	2814.7506
S(DistW+IndHet)	*p*=*c*(T+sex)	γ'(.),γ"(.)	17	2858.008	3.347	0.0140	2823.2984
S(DistW*t)	*p*=*c*(t)	γ'(t)=γ"(t)	23	2858.010	3.349	0.0140	2810.7206
S(DistW*t+sex)	*p*=*c*(T)	γ'(.),γ"(.)	17	2858.029	3.368	0.0139	2823.3194
S(DistW)	*p*=*c*(T)	γ'(.),γ"(.)	12	2858.030	3.369	0.0139	2833.6701
S(DistW+ExWinter)	*p*=*c*(T)	γ'(.),γ"(.)	13	2858.174	3.513	0.0129	2831.7539
S(DistW*t+IndHet)	*p*=*c*(T+sex)	γ'=γ"=0	19	2858.179	3.518	0.0129	2819.2953
S(DistW)	*p*=*c*(t)	γ'(.),γ"(.)	19	2858.340	3.679	0.0119	2819.4564
S(DistW*ExWinter)	*p*=*c*(T)	γ'(.),γ"(.)	14	2858.421	3.760	0.0114	2829.9359
S(DistW*t+sex)	*p*=*c*(t)	γ'(.),γ"(.)	24	2858.435	3.774	0.0113	2809.0313

S(DistW+ExWinter)	*p*=*c*(t)	γ'(.),γ"(.)	20	2858.447	3.786	0.0113	2817.4692
S(sex+DistW)	*p*=*c*(T)	γ'(.),γ"(.)	13	2858.555	3.894	0.0107	2832.1347
S(DistW*IndHet)	*p*=*c*(T+sex)	γ'(.),γ"(.)	18	2858.556	3.895	0.0107	2821.7619
S(DistW*ExWinter)	*p*=*c*(t)	γ'(.),γ"(.)	21	2858.725	4.064	0.0098	2815.6480
S(DistW*Season)	*p*=*c*(T+sex)	γ'(.),γ"(.)	18	2858.775	4.114	0.0096	2821.9805
S(sex+DistW)	*p*=*c*(t)	γ'(.),γ"(.)	20	2858.899	4.238	0.0090	2817.9215
S(DistW*t)	*p*=*c*(T)	γ'=γ"=0	14	2858.933	4.271	0.0088	2830.4470
S(DistW*t+sex)	*p*=*c*(T)	γ'(t)=γ"(t)	17	2859.179	4.518	0.0078	2824.4689
S(DistW*Season)	*p*=*c*(T+sex)	γ'=γ"=0	16	2859.222	4.561	0.0076	2826.5916
S(DistW+IndHet)	*p*=*c*(T)	γ'=γ"=0	11	2859.406	4.745	0.0070	2837.1021
S(DistW+IndHet)	*p*=*c*(T)	γ'(t)=γ"(t)	13	2859.418	4.757	0.0069	2832.9975
S(DistW*t)	*p*=*c*(t)	γ'=γ"=0	21	2859.421	4.760	0.0069	2816.3439
S(DistW*t+sex)	*p*=*c*(t)	γ'(t)=γ"(t)	24	2859.730	5.069	0.0059	2810.3264
S(DistW*Season)	*p*=*c*(T+sex)	γ'(t)=γ"(t)	18	2859.771	5.110	0.0058	2822.9765
S(DistW+IndHet)	*p*=*c*(t)	γ'(t)=γ"(t)	20	2859.830	5.168	0.0056	2818.8518
S(DistW+IndHet)	*p*=*c*(t)	γ'=γ"=0	18	2859.836	5.174	0.0056	2823.0412

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S(DistW*IndHet)	*p*=*c*(T)	γ'=γ"=0	12	2859.836	5.175	0.0056	2835.4762
S(DistW*t+IndHet)	*p*=*c*(t+sex)	γ'(t)=γ"(t)	28	2859.843	5.181	0.0056	2801.9342
S(sex*DistW)	*p*=*c*(T)	γ'(.),γ"(.)	14	2860.002	5.340	0.0052	2831.5160
S(DistW*IndHet)	*p*=*c*(T)	γ'(t)=γ"(t)	14	2860.106	5.445	0.0049	2831.6209
S(DistW*t)	*p*=*c*(T+sex)	γ'(.),γ"(.)	20	2860.136	5.475	0.0048	2819.1581
S(DistW*IndHet)	*p*=*c*(t)	γ'=γ"=0	19	2860.299	5.638	0.0045	2821.4152
S(sex*DistW)	*p*=*c*(t)	γ'(.),γ"(.)	21	2860.378	5.717	0.0043	2817.3010
S(DistW+IndHet)	*p*=*c*(t+sex)	γ'(.),γ"(.)	24	2860.396	5.735	0.0043	2810.9924
S(DistW*t+sex)	*p*=*c*(T)	γ'=γ"=0	15	2860.474	5.812	0.0041	2829.9180
S(DistW*IndHet)	*p*=*c*(t)	γ'(t)=γ"(t)	21	2860.554	5.892	0.0039	2817.4766
S(T)	*p*=*c*(T)	γ'(.),γ"(.)	12	2860.701	6.040	0.0037	2836.3412
S(T)	*p*=*c*(t)	γ'(.),γ"(.)	19	2860.923	6.261	0.0033	2822.0388
S(DistW*IndHet)	*p*=*c*(t+sex)	γ'(.),γ"(.)	25	2860.976	6.315	0.0032	2809.4536
S(DistW*t+sex)	*p*=*c*(t)	γ'=γ"=0	22	2860.997	6.335	0.0032	2815.8156
S(DistW)	*p*=*c*(T+sex)	γ'(.),γ"(.)	16	2861.047	6.385	0.0031	2828.4161
S(DistW*t+IndHet)	*p*=*c*(t+sex)	γ'=γ"=0	26	2861.078	6.417	0.0030	2807.4319

S(DistW*Season)	*p*=*c*(t+sex)	γ'(.),γ"(.)	25	2861.092	6.431	0.0030	2809.5699
S(DistW*t+sex)	*p*=*c*(T+sex)	γ'(.),γ"(.)	21	2861.451	6.790	0.0025	2818.3743
S(sex+DistW)	*p*=*c*(T+sex)	γ'(.),γ"(.)	17	2861.463	6.802	0.0025	2826.7532
S(DistW*t)	*p*=*c*(T+sex)	γ'=γ"=0	18	2861.659	6.998	0.0023	2824.8648
S(DistW+ExWinter)	*p*=*c*(T+sex)	γ'(.),γ"(.)	17	2861.665	7.003	0.0023	2826.9545
S(DistW+IndHet)	*p*=*c*(T+sex)	γ'=γ"=0	15	2861.718	7.057	0.0022	2831.1623
S(DistW+IndHet)	*p*=*c*(T+sex)	γ'(t)=γ"(t)	17	2861.810	7.149	0.0021	2827.1002
S(DistW*t)	*p*=*c*(t+sex)	γ'(.),γ"(.)	27	2861.995	7.333	0.0019	2806.2199
S(DistW*ExWinter)	*p*=*c*(T+sex)	γ'(.),γ"(.)	18	2862.043	7.382	0.0019	2825.2490
S(DistW*IndHet)	*p*=*c*(T+sex)	γ'=γ"=0	16	2862.195	7.533	0.0017	2829.5643
S(T)	*p*=*c*(t)	γ'(t)=γ"(t)	19	2862.336	7.674	0.0016	2823.4520

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S(DistW*Season)	*p*=*c*(t+sex)	γ'=γ"=0	23	2862.490	7.828	0.0015	2815.1996
S(DistW+ExWinter)	*p*=*c*(T)	γ'=γ"=0	11	2862.506	7.844	0.0015	2840.2015
S(DistW*IndHet)	*p*=*c*(T+sex)	γ'(t)=γ"(t)	18	2862.549	7.888	0.0015	2825.7546
S(sex+T)	*p*=*c*(T)	γ'(.),γ"(.)	13	2862.726	8.065	0.0013	2836.3057
S(sex+ExWinter)	*p*=*c*(T)	γ'(.),γ"(.)	13	2862.730	8.069	0.0013	2836.3096
S(IndHet)	*p*=*c*(T)	γ'(.),γ"(.)	12	2862.745	8.084	0.0013	2838.3853
S(T)	*p*=*c*(T+sex)	γ'(t)=γ"(t)	15	2862.788	8.127	0.0013	2832.2328
S(DistW*ExWinter)	*p*=*c*(t)	γ'(t)=γ"(t)	21	2862.850	8.189	0.0013	2819.7731
S(DistW+ExWinter)	*p*=*c*(t)	γ'=γ"=0	18	2862.890	8.228	0.0012	2826.0958
S(DistW*Season)	*p*=*c*(t+sex)	γ'(t)=γ"(t)	25	2862.900	8.238	0.0012	2811.3773
S(sex*IndHet)	*p*=*c*(T)	γ'(.),γ"(.)	14	2862.917	8.255	0.0012	2834.4311
S(sex*DistW)	*p*=*c*(T+sex)	γ'(.),γ"(.)	18	2862.971	8.309	0.0012	2826.1762
S(sex+T)	*p*=*c*(t)	γ'(.),γ"(.)	20	2862.9812	8.320	0.0012	2822.0033
S(DistW)	*p*=*c*(T)	γ'=γ"=0	10	2862.985	8.323	0.0012	2842.7315
S(sex+ExWinter)	*p*=*c*(t)	γ'(.),γ"(.)	20	2862.987	8.326	0.0012	2822.0090
S(IndHet)	*p*=*c*(t)	γ'(.),γ"(.)	19	2863.062	8.401	0.0011	2824.1786
S(DistW)	*p*=*c*(T)	γ'(t)=γ"(t)	12	2863.114	8.453	0.0011	2838.7543
S(DistW*t+sex)	*p*=*c*(T+sex)	γ'=γ"=0	19	2863.161	8.500	0.0011	2824.2774
S(DistW*t)	*p*=*c*(t+sex)	γ'(t)=γ"(t)	27	2863.172	8.510	0.0011	2807.3969
S(sex*IndHet)	*p*=*c*(t)	γ'(.),γ"(.)	21	2863.297	8.635	0.0010	2820.2197

Abbreviations are as follows: "." = constant, "t" = time-varying, "T" = trend, "Season" = variation between seasons, "ExWinter" = difference following an extreme winter season, "DistW" =

Euclidean distance to nearest water, “DistW2” = distance to nearest water squared, “IndHet” = individual heterozygosity.
[a]In all capture models, $p = c$ and the mean p across sessions was applied to individuals captured only at single-session sites.
[b]All capture models considered variation in p among sessions (primary sampling periods).
[c]For movement models, $\gamma'(t) = \gamma''(t)$ represents random movement and $\gamma' = \gamma'' = 0$ represents no movement.