

Additional File 3 Model rankings exploring factors affecting detection probability (p) and prevalence (ψ) of *Haemoproteus* parasites in Lincoln's Sparrows.

Model	K	$\Delta AICc$	w_i	Deviance
$\sigma(.) + p(\text{PCR run}) + \psi(.)$	4	0.00	0.27	102.29
$\sigma(.) + p(\text{PCR run}) + \psi(\text{sex})$	5	1.56	0.12	101.51
$\sigma(.) + p(\text{PCR run}) + \psi(\text{year})$	5	2.04	0.10	101.99
$\sigma(.) + p(\text{PCR run}) + \psi(\text{BCI})$	5	2.10	0.10	102.06
$\sigma(.) + p(\text{PCR run}) + \psi(\text{age})$	7	2.29	0.09	97.33
$\sigma(.) + p(\text{PCR run}) + \psi(\text{age+year})$	8	3.65	0.04	96.10
$\sigma(.) + p(\text{PCR run}) + \psi(\text{sex+year})$	6	3.67	0.04	101.21
$\sigma(.) + p(\text{PCR run}) + \psi(\text{age+BCI})$	8	3.68	0.04	96.14
$\sigma(.) + p(\text{PCR run}) + \psi(\text{sex+BCI})$	6	3.72	0.04	101.26
$\sigma(.) + p(\text{PCR run}) + \psi(\text{year+BCI})$	6	4.45	0.03	101.98
$\sigma(.) + p(\text{PCR run}) + \psi(\text{sex+age})$	8	4.61	0.03	97.07
$\sigma(.) + p(\text{PCR run}) + \psi(\text{sex+age+year})$	9	6.11	0.01	95.89
$\sigma(.) + p(\text{PCR run}) + \psi(\text{sex+age+BCI})$	9	6.13	0.01	95.91
$\sigma(.) + p(\text{PCR run}) + \psi(\text{sex+year+BCI})$	7	6.17	0.01	101.21
$\sigma(.) + p(\text{PCR run}) + \psi(\text{age+year+BCI})$	9	6.31	0.01	96.09
$\sigma(.) + p(.) + \psi(.)$	2	6.57	0.01	113.32
$\sigma(.) + p(.) + \psi(\text{sex})$	3	7.98	0.01	112.54
$\sigma(.) + p(.) + \psi(\text{age})$	5	8.40	0.00	108.36
$\sigma(.) + p(.) + \psi(\text{year})$	3	8.46	0.00	113.02
$\sigma(.) + p(.) + \psi(\text{BCI})$	3	8.53	0.00	113.08
$\sigma(.) + p(\text{PCR run}) + \psi(\text{sex+age+year+BCI})$	10	8.86	0.00	95.87
$\sigma(.) + p(.) + \psi(\text{age+year})$	6	9.67	0.00	107.21
$\sigma(.) + p(.) + \psi(\text{age+BCI})$	6	9.74	0.00	107.27
$\sigma(.) + p(.) + \psi(\text{sex+year})$	4	9.94	0.00	112.24

$\sigma(.) + p(.) + \psi(\text{sex}+\text{BCI})$	4	9.99	0.00	112.28
$\sigma(.) + p(.) + \psi(\text{sex}+\text{age})$	6	10.62	0.00	108.16
$\sigma(.) + p(.) + \psi(\text{year}+\text{BCI})$	4	10.72	0.00	113.01
$\sigma(.) + p(.) + \psi(\text{sex}+\text{age}+\text{year})$	7	11.99	0.00	107.03
$\sigma(.) + p(.) + \psi(\text{sex}+\text{age}+\text{BCI})$	7	12.05	0.00	107.09
$\sigma(.) + p(.) + \psi(\text{age}+\text{year}+\text{BCI})$	7	12.16	0.00	107.21
$\sigma(.) + p(.) + \psi(\text{sex}+\text{year}+\text{BCI})$	5	12.28	0.00	112.23
<u>$\sigma(.) + p(.) + \psi(\text{sex}+\text{age}+\text{year}+\text{BCI})$</u>	<u>8</u>	<u>14.58</u>	<u>0.00</u>	<u>107.03</u>

Model set and rankings exploring the importance of factors affecting the detection probability (p) and prevalence (ψ) of

Haemoproteus blood parasites in Lincoln Sparrows captured and sampled at a high-elevation valley in northern Colorado

during 2017-2018. ‘PCR run’ indicates the 3 PCR replicates carried out for each sample. The number of parameters (K), model

weights (w_i), and deviance are shown for each model and the models are ranked by their AICc differences relative to the best

model in the set (ΔAICc_i). Sigma (σ) was a random effect included in every model to account for unmodeled heterogeneity.