

## **Appendix 1. AICc tables for detection modeling**

The abundance of Greater Sage-Grouse as a proxy for the abundance of sagebrush-associated songbirds in Wyoming, USA

Tables detailing the AICc model-selection results for the detection-modeling stage of the analysis (stage 1). Distance-sampling models were fit to songbird data collected during 144 surveys in central Wyoming, USA, 2012–2013. The key function fit to the distance data and the covariates on the shape parameter in the detection function varied by model.

**Table A1.1.** Model-selection results comparing candidate distance-sampling models to estimate Brewer’s Sparrow detectability ( $P$ ) in central Wyoming, USA, 2012–2013.

<b>Model</b>	<b>Key<sup>†</sup></b>	<b>K<sup>‡</sup></b>	<b>AICc<sup>§</sup></b>	<b><math>\Delta</math>AICc<sup>  </sup></b>	<b>w<sup>¶</sup></b>
$P \sim$ BareGround + Observer	half-normal	11	6605.88	0.00	0.94
$P \sim$ Observer	half-normal	10	6611.26	5.39	0.06
$P \sim$ BareGround + Observer	hazard rate	12	6620.05	14.17	0.00
$P \sim$ BareGround	half-normal	2	6623.58	17.70	0.00
$P \sim$ Observer	hazard rate	11	6623.68	17.81	0.00
$P \sim 1$	half-normal	1	6626.10	20.22	0.00
$P \sim$ BareGround	hazard rate	3	6627.26	21.38	0.00
$P \sim 1$	hazard rate	2	6628.28	22.40	0.00

<sup>†</sup>Key function describing the form of the distance-detection relationship.

<sup>‡</sup>Number of parameters.

<sup>§</sup>Second-order variant of Akaike’s Information Criterion.

<sup>||</sup>Difference in AICc between the model and the top-ranked model in the set.

<sup>¶</sup>Model weight.

**Table A1.2.** Model-selection results comparing candidate distance-sampling models to estimate Sagebrush Sparrow detectability ( $P$ ) in central Wyoming, USA, 2012–2013.

<b>Model</b>	<b>Key<sup>†</sup></b>	<b>K<sup>‡</sup></b>	<b>AICc<sup>§</sup></b>	<b><math>\Delta</math>AICc<sup>  </sup></b>	<b><math>w^¶</math></b>
$P \sim 1$	half-normal	1	615.64	0.00	0.77
$P \sim 1$	hazard rate	2	618.01	2.37	0.23

<sup>†</sup>Key function describing the form of the distance-detection relationship.

<sup>‡</sup>Number of parameters.

<sup>§</sup>Second-order variant of Akaike’s Information Criterion.

<sup>||</sup>Difference in AICc between the model and the top-ranked model in the set.

<sup>¶</sup>Model weight.

**Table A1.3.** Model-selection results comparing candidate distance-sampling models to estimate Sage Thrasher detectability ( $P$ ) in central Wyoming, USA, 2012–2013.

<b>Model</b>	<b>Key<sup>†</sup></b>	<b>K<sup>‡</sup></b>	<b>AICc<sup>§</sup></b>	<b><math>\Delta</math>AICc<sup>  </sup></b>	<b>w<sup>¶</sup></b>
$P \sim 1$	hazard rate	2	1573.13	0.00	0.39
$P \sim \text{BareGround}$	hazard rate	3	1573.31	0.18	0.36
$P \sim 1$	half-normal	1	1575.04	1.90	0.15
$P \sim \text{BareGround}$	half-normal	2	1575.98	2.85	0.09

<sup>†</sup>Key function describing the form of the distance-detection relationship.

<sup>‡</sup>Number of parameters.

<sup>§</sup>Second-order variant of Akaike’s Information Criterion.

<sup>||</sup>Difference in AICc between the model and the top-ranked model in the set.

<sup>¶</sup>Model weight.

**Table A1.4.** Model-selection results comparing candidate distance-sampling models to estimate Horned Lark detectability ( $P$ ) in central Wyoming, USA, 2012–2013.

<b>Model</b>	<b>Key<sup>†</sup></b>	<b>K<sup>‡</sup></b>	<b>AICc<sup>§</sup></b>	<b><math>\Delta</math>AICc<sup>  </sup></b>	<b>w<sup>¶</sup></b>
$P \sim$ BareGround + Observer	hazard rate	12	8336.00	0.00	0.44
$P \sim$ Observer	hazard rate	11	8336.23	0.24	0.39
$P \sim$ Observer	half-normal	10	8338.61	2.62	0.12
$P \sim$ BareGround + Observer	half-normal	11	8339.95	3.95	0.06
$P \sim$ 1	hazard rate	2	8399.49	63.49	0.00
$P \sim$ BareGround	hazard rate	3	8400.37	64.37	0.00
$P \sim$ 1	half-normal	1	8404.72	68.72	0.00
$P \sim$ BareGround	half-normal	2	8405.96	69.96	0.00

<sup>†</sup>Key function describing the form of the distance-detection relationship.

<sup>‡</sup>Number of parameters.

<sup>§</sup>Second-order variant of Akaike’s Information Criterion.

<sup>||</sup>Difference in AICc between the model and the top-ranked model in the set.

<sup>¶</sup>Model weight.

**Table A1.5.** Model-selection results comparing candidate distance-sampling models to estimate Vesper Sparrow detectability ( $P$ ) in central Wyoming, USA, 2012–2013.

<b>Model</b>	<b>Key<sup>†</sup></b>	<b>K<sup>‡</sup></b>	<b>AICc<sup>§</sup></b>	<b><math>\Delta</math>AICc<sup>  </sup></b>	<b>w<sup>¶</sup></b>
$P \sim$ Observer	half-normal	10	3148.50	0.00	0.42
$P \sim$ BareGround + Observer	half-normal	11	3148.85	0.35	0.35
$P \sim$ Observer	hazard rate	11	3150.39	1.89	0.16
$P \sim$ BareGround + Observer	hazard rate	12	3152.03	3.53	0.07
$P \sim$ BareGround	half-normal	2	3171.79	23.29	0.00
$P \sim$ 1	half-normal	1	3173.54	25.04	0.00
$P \sim$ BareGround	hazard rate	3	3175.74	27.24	0.00
$P \sim$ 1	hazard rate	2	3176.05	27.55	0.00

<sup>†</sup>Key function describing the form of the distance-detection relationship.

<sup>‡</sup>Number of parameters.

<sup>§</sup>Second-order variant of Akaike’s Information Criterion.

<sup>||</sup>Difference in AICc between the model and the top-ranked model in the set.

<sup>¶</sup>Model weight.

**Table A1.6.** Model-selection results comparing candidate distance-sampling models to estimate Western Meadowlark detectability ( $P$ ) in central Wyoming, USA, 2012–2013.

<b>Model</b>	<b>Key<sup>†</sup></b>	<b>K<sup>‡</sup></b>	<b>AICc<sup>§</sup></b>	<b><math>\Delta</math>AICc<sup>  </sup></b>	<b><math>w^¶</math></b>
$P \sim 1$	half-normal	1	534.64	0.00	0.70
$P \sim 1$	hazard rate	2	536.33	1.69	0.30

<sup>†</sup>Key function describing the form of the distance-detection relationship.

<sup>‡</sup>Number of parameters.

<sup>§</sup>Second-order variant of Akaike’s Information Criterion.

<sup>||</sup>Difference in AICc between the model and the top-ranked model in the set.

<sup>¶</sup>Model weight.