

Appendix 1. Supplementary tables from “The role of ambient temperature and microclimate refuges in the survival of grassland birds overwintering in the Chihuahuan Desert”.

Table A1.1. Candidate model set for winter survival analysis of Baird’s and Grasshopper sparrows in the Marfa grassland of Texas, 2016-2019. Temperature is ambient average weekly minimum temperature (°C).

Model	Model Structure
(Null) 1	Survive/trials ~ 1
2	Survive/trials ~ Temperature
3	Survive/trials ~ Grass cover
4	Survive/trials ~ Grass height
5	Survive/trials ~ Shrub height
6	Survive/trials ~ Grass height + Grass cover
7	Survive/trials ~ Temperature + Grass height
8	Survive/trials ~ Grass height + Grass cover + Shrub height
9	Survive/trials ~ Temperature * Grass height
10	Survive/trials ~ Temperature* Grass height + Grass cover+Shrub height
11	Survive/trials ~ Grass cover + Forb cover + Salsola + Other
12	Survive/trials ~ Grass height + Forb height + Shrub height Survive/trials ~ Temperature + Forb cover + Forb height + Shrub height
(Global) 13	+ Grass cover + Grass height + Russian thistle + Other + Grass height*Temperature

Table A1.2. Vegetation structure measured in 5 m radius circles at telemetry locations of Baird’s Sparrow (n = 1,678) and Grasshopper Sparrow (n = 1,462), and grid locations (n = 1,557) in the Marfa grasslands, Texas, during the winters of 2016-17, 2017-18, and 2018-19.

	Baird’s Sparrow		Grasshopper Sparrow		Grid	
	Mean	SD	Mean	SD	Mean	SD
Grass cover (%)	38.2	19.7	34.2	18.5	33.0	20.7
Grass height (mm)	18.7	5.3	20.7	6.3	17.9	5.7
Shrub cover (%)	0.2	0.6	0.3	1.0	0.3	1.2
Shrub height (mm)	6.2	17.5	11.3	25.6	9.7	22.5
Forb cover (%)	0.5	1.7	0.7	2.8	0.8	2.2
Forb height (mm)	5.1	10.2	5.4	11.4	6.1	11.0
Bare ground (%)	51.4	24.5	55.7	23.3	56.6	24.6
Salsola (%)	0.3	1.1	0.7	2.3	0.6	2.7
Other cover (%)	9.5	11.9	8.3	10.8	8.7	12.8

Table A1.3. Average minimum, mean, and maximum daily temperature ($^{\circ}\text{C} \pm \text{SD}$) from February 10 to March 3, 2018 and 2019, for broad scale (ambient) data and microclimate measurements in bird ($n = 40$) and random ($n = 40$) locations in the Marfa grasslands, Texas.

	Minimum		Mean		Maximum	
	2018	2019	2018	2019	2018	2019
Ambient (broad scale)	-0.05 (4.47)	-0.60 (4.18)	10.05 (3.47)	8.82 (3.91)	20.50 (3.99)	19.05 (4.82)
Bird (microclimate)	-3.48 (4.86)	-3.97 (4.56)	11.88 (3.58)	9.64 (4.06)	34.00 (5.58)	28.10 (7.13)
Random (microclimate)	-2.84 (7.48)	-4.19 (4.40)	12.07 (3.45)	9.50 (3.98)	32.84 (5.70)	27.07 (6.70)