

**S2 Table. Summary of model selection process on dynamic reproduction probabilities ( $R_t^{[m]}$ ) of a Eurasian Eagle-owl population in south-eastern Spain.**

<b>Model</b>	<b>K</b>	<b>AIC</b>	<b><math>\Delta</math>AIC</b>	<b>w</b>
$R(\text{Year} + \text{State} + \text{Ruggedness})$	25	2193.86	0.00	0.8417
$R(\text{Year} + \text{Ruggedness} + \text{Crops})$	24	2199.54	5.68	0.0492
$R(\text{Year} + \text{Ruggedness})$	23	2199.69	5.83	0.0456
$R(\text{Year} + \text{Ruggedness} + \text{Scrub})$	24	2200.75	6.89	0.0269
$R(\text{Year} + \text{Zone} + \text{Ruggedness})$	24	2201.65	7.79	0.0171
$R(\text{Year} + \text{Ruggedness} + \text{Distance})$	24	2201.69	7.83	0.0168
$R(\text{Year} + \text{State} + \text{Scrub})$	25	2206.53	12.67	0.0015
$R(\text{Year} + \text{State} + \text{Crops})$	25	2208.17	14.31	0.0007
$R(\text{State} + \text{Ruggedness})$	20	2210.09	16.23	0.0003
$R(\text{Year} + \text{State} + \text{Distance})$	25	2211.13	17.27	0.0001
$R(\text{Year} + \text{State} + \text{Zone})$	25	2211.60	17.74	0.0001
$R(\text{Year} + \text{State})$	24	2212.49	18.63	0.0001
$R(\text{Ruggedness} + \text{Crops})$	18	2218.92	25.06	0.0000
$R(\text{Year} + \text{Crops} + \text{Scrub})$	24	2219.33	25.47	0.0000
$R(\text{Year} + \text{Crops})$	23	2219.76	25.90	0.0000
$R(\text{State} + \text{Scrub})$	20	2220.18	26.32	0.0000
$R(\text{Year} + \text{Scrub})$	23	2220.54	26.68	0.0000
$R(\text{Year} + \text{Distance} + \text{Crops})$	24	2221.21	27.35	0.0000
$R(\text{Year} + \text{Zone} + \text{Scrub})$	24	2221.28	27.42	0.0000
$R(\text{State} + \text{Crops})$	20	2221.44	27.58	0.0000
$R(\text{Ruggedness} + \text{Distance})$	18	2221.63	27.77	0.0000
$R(\text{Year} + \text{Zone} + \text{Crops})$	24	2221.73	27.87	0.0000
$R(\text{Year} + \text{Distance} + \text{Scrub})$	24	2222.27	28.41	0.0000
$R(\text{State} + \text{Distance})$	20	2222.56	28.70	0.0000
$R(\text{Year} \times \text{State})$	34	2223.28	29.42	0.0000
$R(\text{State})$	19	2223.82	29.96	0.0000
$R(\text{Ruggedness})$	17	2223.87	30.01	0.0000
$R(\text{Zone} + \text{Ruggedness})$	18	2225.23	31.37	0.0000
$R(\text{Year} + \text{Distance})$	23	2225.24	31.38	0.0000

$R(\text{Ruggedness} + \text{Scrub})$	18	2225.37	31.51	0.0000
$R(\text{Year} + \text{Zone} + \text{Distance})$	24	2226.79	32.93	0.0000
$R(\text{Year} + \text{Zone})$	23	2226.82	32.96	0.0000
$R(\text{Year})$	22	2227.53	33.67	0.0000
$R(\text{State} + \text{Zone})$	20	2229.43	35.57	0.0000
$R(\text{Zone} + \text{Scrub})$	18	2239.33	45.47	0.0000
$R(\text{Distance} + \text{Crops})$	18	2239.81	45.95	0.0000
$R(\text{Distance} + \text{Scrub})$	18	2240.22	46.36	0.0000
$R(\text{Scrub})$	17	2241.39	47.53	0.0000
$R(\text{Crops})$	17	2242.25	48.39	0.0000
$R(\text{Distance})$	17	2242.26	48.40	0.0000
$R(\text{Zone} + \text{Distance})$	18	2242.79	48.93	0.0000
$R(\text{Zone} + \text{Crops})$	18	2243.82	49.96	0.0000
$R(\text{Zone})$	17	2245.04	51.18	0.0000
$R(.)$	17	2247.45	53.59	0.0000

Summary of 44 multi-season, multi-state models for successful reproduction

probabilities, including the total number of estimable parameters ( $K$ ), the value of the Akaike Information Criterion (AIC), the relative differences in AIC ( $\Delta\text{AIC}$ ) and the Akaike weights ( $w$ ). Models are ordered in terms of  $\Delta\text{AIC}$ .  $R(.)$  denotes the null (only constant) model. The probabilities of territorial occupancy  $\psi$  were modelled considering only the previous state of the territory  $\psi(\text{State})$ . The probabilities of detecting occupancy given that the territory was occupied without successful breeding ( $p_{1-4}^{[1]}$ ) and detecting occupancy given that the territory was occupied with successful reproduction ( $p_{1-4}^{[2]}$ ) were modelled based on the *survey* covariate but considered constant across years. The probability of detecting a successful reproduction was fixed as zero for the first survey ( $\delta_1 = 0$ ) and allowed to vary independently for the rest of the surveys, but considered constant across years ( $\delta_{2-4}$ ).