Electronic Supplementary Material

Richard A. J. Williams, Xiang-Ming Xiao, A. Townsend Peterson

16 variables were selected for the development of remotely sensed models. Jackknife valuation of the percent contribution of each variable (Supporting Information Table 1) in explaining the observed distribution revealed that the minimum for land surface water index (LSWI) was the most important variable for Falconiformes, non-swan Anseriformes, and swan models, but was of limited importance to other models. The range of LSWI was the most important variable for two models (wild birds and Anseriformes), and somewhat important for two models (Falconiformes and non-swan Anseriformes), but the contribution to the swan model and poultry models was slight. Normalized difference vegetation index (NDVI) range was the most important variable for poultry, but was unimportant in developing all other models. Enhanced vegetation index (EVI) mean, GTOPO 30, LSWI mean, NDVI maximum, also made important contributions to at least 2 models. Jackknife tables based on 7 climatic layers were more consistent (Supporting Information Table 2). Minimum temperature was the environmental variable responsible for greatest proportion of variation in four models (wild birds, Anseriformes, swans, and non-swans), the second most important variable for the Falconiformes model, and the third most important for poultry. The most important variable for the Falconiformes model was mean diurnal range, though this was responsible for less than 10% of all other models. Annual mean temperature was the most important variable for the poultry model, the second most important variable for wild birds and Anseriformes, but unimportant in the construction of other models.

Electronic Supplementary Material Table 1: heuristic estimates of relative contributions of remotely-sensed variables to each Maxent model; to determine these values, in each iteration of the training algorithm, the increase in regularized gain is added to the contribution of the corresponding variable, or subtracted from it if the change to the absolute value of lambda is negative.

Variable	Poultry	Wild	Anseriformes	Variable	Non-*Cygnus*	*Cygnus*
EVI maximum	1.6	0.7	1.5	0.7	0.1	1.7
EVI mean	10.9	0.7	1.4	14.5	0.3	1.2
EVI minimum	4.8	9.8	2.3	1.3	1.2	5.8
EVI range	0.9	1.5	1.7	0	0.9	0
LSWI maximum	6.0	2.0	3.7	0.2	11.8	19.1
LSWI mean	11.5	25.3	11.9	6.1	0.4	7.2
LSWI minimum	4.4	3.5	5.3	23.7	29.2	21.2
LSWI range	1.0	26.0	25.4	8.0	11.6	1.2
NDVI maximum	5.4	10.4	10.8	3.5	15.6	10.7
NDVI mean	0.4	3.7	3.4	3.3	1.1	12.1
NDVI minimum	1.2	3.3	4.8	3.1	15.0	4.0
NDVI range	35.9	1.8	1.5	0	2.1	0
Aspect	3.0	1.4	0.6	2.6	0	0
Elevation	7.1	5.9	17.9	16.5	1.1	10.2
Slope	3.6	2.6	4.7	14.1	5.3	4.1
Compound topographic index	2.4	1.7	2.9	2.3	4.2	1.5

Electronic Supplementary Material Table 2: heuristic estimates of relative contributions of remotely-sensed variables to each Maxent model; to determine these values, in each iteration of the training algorithm, the increase in regularized gain is added to the contribution of the corresponding variable, or subtracted from it if the change to the absolute value of lambda is negative.

Variable	Poultry	Wild	Anseriformes	Variable	Non-*Cygnus*	*Cygnus*
Annual mean temperature	44.7	20.1	13.3	3.4	6.3	1.8
Mean diurnal range	0.3	3.4	6.9	47	8	3.4
Maximum temperature for warmest month	0.9	10.4	4.2	1.2	11.4	0.9
Minimum temperature for coolest month	10.5	50.6	51.2	24.8	47.9	70.5
Annual precipitation	34.9	8.7	8.2	0	1.6	5.5
Precipitation of wettest month	1.6	1.0	3.1	12.3	4.3	0.5
Precipitation of driest month	7	5.8	13	11.4	20.5	17.5