Table S1. List of co-variates and their sources. Note, not all co-variates were used in the final models.

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| Predictor | Description/levels | Source |
| ***Continuous variables*** |  |
| 1) Distribution | % 10km squares occupied in England, Scotland and Wales (1960-2013) | 224/225 species: Data obtained from Bird Atlas 2007-11 (Balmer *et al.*. 2013). Total distribution (possible, probable and confirmed breeding areas combined). Where distribution was recorded as “<1%” a value of 0.5 was used. Monk parakeet: data obtained from AHVLA (pers. comm. P. Robertson). |
| 2) Population | Estimated number of individuals | 223/225 species: BTO Birdfacts (http://www.bto.org/about-birds/birdfacts). Eagle owl: estimate from Elkins, 2010; Monk parakeet: data obtained from AHVLA (pers. comm. P. Robertson). |
| 3) Body weight | Mean body weight (kg) | Majority of species: BTO Birdfacts (http://www.bto.org/about-birds/birdfacts). Additional species: TraitBank (EOL, 2014).  |
| 4) 20 year index, 20 year change and 40 year change  | 20 year index: distribution change (number of 10km squares occupied) between 1988-1991 and 2008-2011 atlases, allowing for biases in recording effort. 20 year change: percentage change in distribution between 1988-1991 and 2008-2011.40 year change: percentage change in distribution between 1968-1972 and 2008-2011.Positive and negative values indicate range expansion and contraction respectively (Balmer *et al.*. 2013 p. 154) | 20-year index: available for 195 spp 20-and 40 year change: available for 221 spp. All Balmer *et al.*, 2013 |
| ***Categorical factors*** |  |
| Introduced? | Yes/no | 224 spp: BTO BirdFacts and/or Balmer *et al.* 2013. Monk parakeet: Non-Native Species Secretariat factsheet (NNSS, 2014).  |
| Functional group | Ducks & geese (22 spp), herons/bitterns/egrets (10 spp), game birds (10 spp), corvids & small passerines (6 & 80 spp), birds of prey (21 spp), seabirds (23 spp), doves & pigeons (6 spp), grebes/divers/rails (14 spp), waders (24 spp) and other (9 spp). | All species: IUCN Red List (IUCN, 2014), with further groupings carried out subjectively. |
| Breeding status | Resident or migrant  | 223 spp: Harrop *et al.* 2013. Eagle owl: Balmer *et al*. 2013, Monk parakeet: NNSS, 2014. |
| Conservation status |  |
|  UK | BAP Yes/no | JNCC, 2014 |
|  Elsewhere | Red List: Not Assessed, Least Concern, Near Threatened. | IUCN, 2014 |