Appendix 4. Early stopping

Occupancy models

All occupancy models converged (or nearly so in the case of Common Eider) to the maximum likelihood estimates (i.e., did not stop early; Figure 4.1). Failure to stop early sometimes happens in data sets with many observations and strong but complex effects (**Benjamin: citation for this, or pers. obs?**). This suggests that the effects of the environmental variables on sea duck occupancy are rather complex.

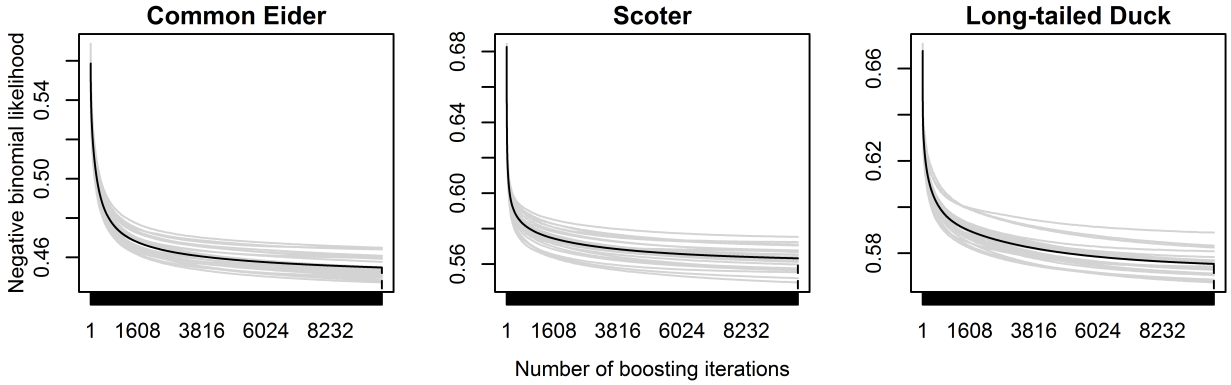

Figure 4.1 Bootstrapped out-of-bag empirical risk in sea duck occupancy models based on 25-fold subsampling. Gray lines indicate the out-of-bag risk on each subsample and the black line indicates the average out-of-bag risk; the optimal iteration is indicated by the dashed vertical line.

Count models

In contrast to occupancy model, bootstrapping prescribed early stopping for both parameters in all count models (Figure 4.2). **Elaborate on *why we need more iterations for the scoter model is simply a result from the fact that the scoter model is more complex or at least takes longer to "converge"***

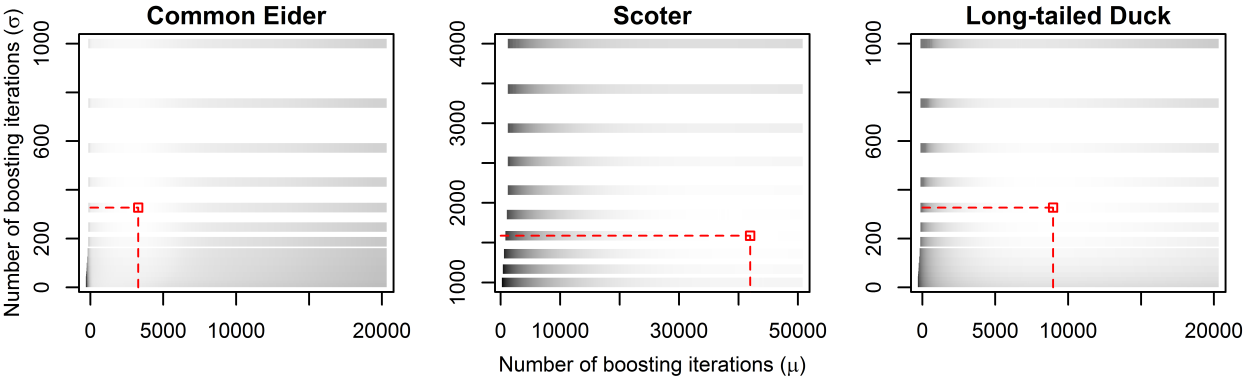

Figure 4.2 Bootstrapped out-of-bag empirical risk in sea duck conditional count models

based on 25-fold subsampling. Lighter colors indicate lower average out-of-bag risk (over the 25 samples) for a given combination of m_{stop}-values for μ and σ; the optimal combination is indicated by the red square.