

The prevalence of non-breeders in raptor populations: evidence from ringing, radio-tagging and transect surveys of the common buzzard.

Kenward, R.E., Walls, S.S., Hodder, K.H., Pakkala, M., Freeman, S.N. and Simpson, V.R. 2000.
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Age-specific survival and breeding (ASSAB) models were developed with data from 146 common buzzards (*Buteo buteo* L.) radio-tagged in southern Britain during 1990-98, in a 120 km² study area that had on average 25 egg-laying pairs. Survival checks were aided by philopatric behaviour and a maximum annual tag failure rate of 7%: minimum survival rates estimated assuming death of buzzards with lost tags were close to maximum rates estimated using only the recorded deaths. First-year survival rate estimates for 35 buzzards fitted in 1990-1 with 25-30g backpack radios were 69-74% (minimum-maximum), close to the 61-71% for 16 buzzards with 12g tail-mount radios; the backpacks transmitted for 2-4 years. Overall survival rates were 66-73% in the first year, 91-97% in the second and 88-91% thereafter. Survival estimates from 288 recent British ring recoveries were lower in the first and second years, at 55% and 75%, but similar (88%) thereafter. Most deaths were from natural causes (40%) or interaction with artefacts (36%). ASSAB models, from radio-tracking and the observed 1.71 young/clutch, predicted breeding by 16-21% of all the buzzards present in spring, or up to 25% with the minimum likely productivity of 1.4 young/clutch or 10% net emigration. Ringing data predicted breeding rates of 33-38%. The models were tested with density data from nest surveys and new radio-corrected-transect and truncation-mark-resighting estimates of buzzard numbers. Surveys in autumn and late winter estimated breeding rates of 21-25%. The high non-breeder density in spring, of three other buzzards for each paired bird with eggs, has important implications for understanding evolutionary fitness, predation and population ecology.