

Population dynamics of Mute Swans *Cygnus olor* in the Outer Hebrides, Scotland

C. J. SPRAY

A five year population study of Mute Swans was carried out in the Outer Hebrides between 1978-82. This isolated, resident population stems from a deliberate introduction of several pairs one hundred years ago, but has since become wild, and lives with little interference from man. Total population size varied from 948 adults (June 1978) to 688, +263 recently fledged cygnets, in October 1982. During this time the islands experienced two unusually severe winters causing high mortality.

The area holds the highest density of breeding swans in Britain, with 99-140 pairs nesting each year. Breeding adults only comprise 30% of the total spring population, less than that recorded elsewhere in Britain. Little emigration or immigration occurs and large flocks of non-breeding adults occur on two shallow saline lochs. The mean number of cygnets fledged/nesting pair is low (1.77) and varied widely between years. Production of young is closely related to habitat type with pairs nesting on eutrophic lochs fledging an average of 2.86 cygnets, compared to only 1.56 and 1.47 cygnets for pairs nesting on mesotrophic and saline lochs. The difference is largely due to differential cygnet survival between hatching and fledging.

The main cause of mortality is collisions with overhead wires, which accounts for 46% of all deaths (88% where cause of death positively determined). Mortality is heavily concentrated in the winter months. The survival rate of cygnets in their first year post fledging is low (42%) and very variable between years. Second and third year survival rates are much higher, and the survival rate of adult breeding pairs is over 90%. These survival rates are minimums and probably much lower than normal, due to the incidence of two severe winters in the five year computation period for these figures.

Mean age of first breeding is unknown, but is delayed later than populations studied elsewhere in Britain: no three year birds and only 4% of four year birds were observed breeding in the Hebrides study. It is suggested that physical isolation, the presence of large areas of suitable habitat for non-breeders and a limited number of prime (eutrophic) breeding sites have favoured the development of a stable population, characterised by a high percentage of non-breeders, delayed age of first breeding, a relatively high breeding density but overall a low mean productivity, and high adult survival rates.

C. J. Spray, Skipport, Main Street, Bamack, Stamford, Lincs PE9 3DN, UK.