The Cape Barren Goose in Victoria, Australia: management related to agriculture

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Introduction

There are four populations of the Cape Barren Goose *Cereopsis novaehollandiae* in the coastal regions of southern Australia (Figure 1). Dorward (1967) estimated the world population at about 5,300, of which 4,000 (Guiler 1965) were on the islands of the Furneaux Group in Bass Strait, Tasmania. Lesser numbers were to be found on islands off Wilson's Promontory, Victoria (about 200); on islands in Spencer Gulf and around the Cape York Peninsula, South Australia (about 1,000); and on the Recherche Archipelago islands, Western Australia (about 100).

Both the Furneaux Group and South Australia now have many more birds in flocks, although we think it unlikely that the breeding pairs on the small islands have increased proportionately. The world total is probably now in excess of ten thousand (Pearse, 1975, suggests 15,000), and perhaps a third of these visit farmlands, mostly on Flinders Island, Furneaux Gp., and in South Australia (where the figure of 10,000 suggested by Kear & Williams (1978) requires closer investigation).

In contrast the number of geese in Victoria is still small. During summer up to 200 regularly appear in the western district. There are still about 100 breeding pairs on the islands off Wilson's Promontory, as there were at the first estimate (Dorward & Pizzey 1965). Year-round observations on the islands show that most breeding adults remain permanently in their territories. This nucleus has given rise to a flock of birds at Yanakie on the nearby mainland (Figure 2) which started as six about 1950 and has gradually increase to about 300. It has included young birds marked on the islands. One marked bird from South Australia was seen in 1974 but we believe the increase is a result not of immigration but because availability of pasture on the mainland has improved the survival of immature birds from the islands. This has given rise to complaints by farmers whose pastures are visited. We have attempted to assess and deal with the situation in Victoria, and to offer an answer to the problem, frequently raised, of how much geese eat in comparison with domestic stock. Scientists have hitherto failed to give a satisfactory and comprehensible answer and farmers, probably as a direct result, have widened their claims of damage to include other alleged problems, such as fouling of grazing and water-holes and the transmission of disease. Similar problems have arisen on Flinders Island (Guiler 1974; Pearse 1975). The short open season declared in February 1977 may temporarily have alleviated the farmers' difficulties but we believe that a different long-term approach is required.

Management

Marriott (1970) and Marriott & Forbes (1970) showed that during the dry season the preferred food (green vegetation) on the islands decreases, and so the mainland pastures become relatively very attractive. The birds regularly congregate to feed in certain small areas where the pasture is of highest nitrogen content and greatest digestibility. Owen (1975a) has shown experimentally that wild White-fronted Geese *Anser a. albifrons* have strong preferences for such areas, which are of course also particularly valuable to farmers.

In 1967 an attempt was made to reduce the alleged damage without at the same time harming the small goose population. Fox-proof pens, approximately 0·5 ha in area with a fence 2 m high, were built, one in a field near Shallow Inlet (Yanakie) which the geese regularly visited and two others about 15 km north-east and south-west. The aim was to use pairs of pinioned captive geese to attract the wild geese away from places where they were a cause for complaint on to the properties of farmers who would welcome them. Land-holders undertook to maintain short pasture around the pens; to allow official access; to keep adequate records; and to advise on problems associated with the pens. The Victorian Fisheries & Wildlife Division were responsible for maintaining the pens, for providing food and water within them, and for scaring geese from some surrounding farms with the object of reinforcing the

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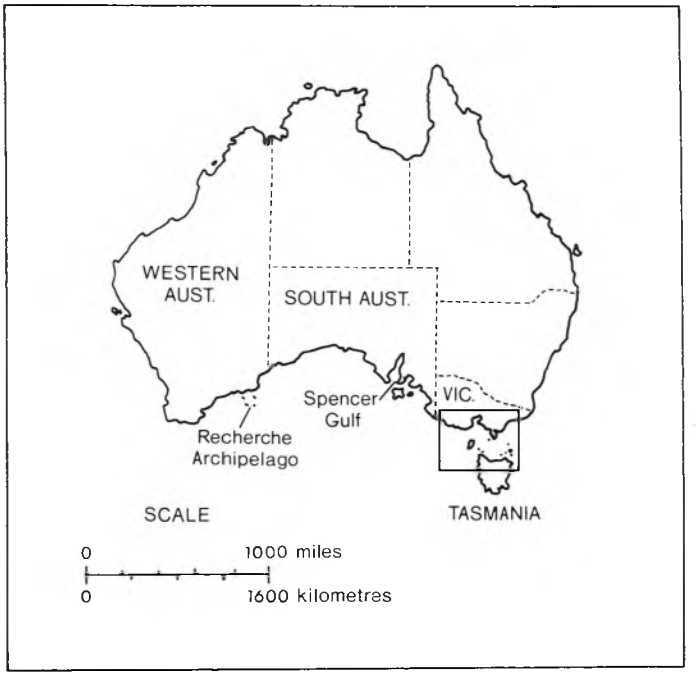

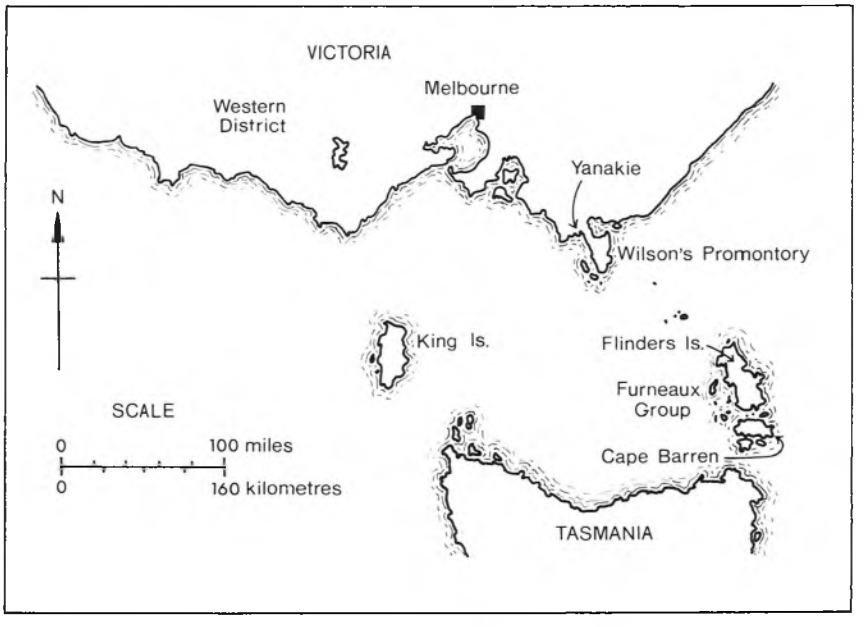

Figure 1. Map showing range of Cape Barren Goose and (lower) coastal regions of south-east Australia.

Figure 2. Cape Barren Geese on a mainland pasture at Yanakie near Wilson's promontory. The distance to the fence and scrub is foreshortened; the geese usually stay well out in open fields.

attractiveness of the feeding zones around the pens. It was intended that young birds bred in the pens would be allowed to fly freely and thus improve the decoying effect.

Few of the desired results were achieved. The pens' fencing was continually damaged by stock. The attraction of the penned geese was not strong. Farmers did not keep the pasture around the pens short, and a rapid deterioration in the price of wool led to more cattle being carried, with consequent changes in the type of grazing.

Breeding in the pens was unexpectedly poor, probably due to disturbance by foxes. Finally a pair with three young goslings were placed in one pen; after they fledged the marked young were seen for several weeks some 10 km away but not with the wild flock. When shot at one returned briefly to its natal area.

Geese responded to gunshot by moving, but only for short distances, and they persistently came back.

Newton & Campbell (1973) had found that certain farms in Scotland were highly attractive to *Anser* spp. and suffered much damage, while others nearby were almost ignored. Cape Barren Geese congregated in areas that, first, had a roost nearby, on low mud islets in an estuary. This offered a protection at night against the numerous foxes in the area. Second, the pasture area was mostly flat, with no hedges and few shelter belts and fields divided by wire fences. Entire farms (varying from about 100 to about 1,000 ha) would appear to the geese as one large pasture differing only in quality from place to place. Third, the pastures were fertilized and green. Marriott (1970) showed that Cape Barren Geese eat the same pasture plants as sheep, but differ in being unable to digest fibre. There was no selection of plant species within these green areas.

Amount of food eaten by geese in comparison with stock

Various methods have been used to estimate the amount of food eaten by geese (e.g. Kear 1970; Owen 1972; Ebbinge *et al.* 1975), but we have found no data on how much geese eat in comparison with their competitors, sheep and cattle. Direct comparisons of weights, or of the metabolic body weight cannot be made because of differences in digestive capabilities. Cape Barren Geese are much greater competitors with livestock than their body weights would suggest (Table 1).

Marriott & Forbes (1970) compared the intakes of sheep and captive Cape Barren Geese fed on a nearly identical diet of lucerne chaff, but concluded only that geese ate relatively large amounts because of the differences in both intake and digestive capabilities of the two species.

The essential basis of our comparison is the average daily intake of dry matter. Marriott & Forbes figures showed that captive Cape Barren Geese ate 322 g/day. For merino sheep on the same diet McIntosh (1966) gave 1,233 g/day and Forbes & Tribe (1970) 1,276 g/day.

Marriott & Forbes (1970) also examined digestibility and rates of passage of food in Cape Barren Geese and sheep. The dry matter intake (grams per day per kilogram of metabolic body weight) for sheep was only about half that for geese, while the digestibility was more than double. As a corollary, the retention and excretion times were about thirty times greater in sheep. The important point, as has been noted in other geese (Mattocks 1971; Ebbinge *et al.* 1975), is that the geese did not digest any cellulose.

The comparisons indicate that about four Cape Barren Geese eat as much as one sheep. Owen (1972) cites four sheep as having an intake equivalent to one cow, so about sixteen geese are needed to eat as much as one cow. A note of caution must be sounded in that gut development in captive geese may only be half that in the wild (Owen 1975b). This must affect their digestive capacity and the true ratio may be 6 to 8 geese per sheep. Farmers, experienced in gauging carrying capacity in terms of their domestic stock, readily appreciate goose/sheep/cow comparisons though they

Table 1. Comparison of feeding of Cape Barren Geese and sheep on a diet of Lucerne chaff. Figures in brackets are standard deviations.

	Cape Barren Goose†	Sheep (i)‡	Sheep (ii)§	Ratio goose:sheep (i)
Mean body weight (kg)	3·56 (0·63)	51·3 (4·91)	51·4 (1·22)	1:14
Mean metabolic body weight* (kg)	2·59	19·17	19·20	1:7·4
Mean dry matter intake/day (g)	322 (73·54)	1,232·5 (101·26)	1,276 (189·5)	1:3·8
Mean daily dry matter intake ($g/d/W^{0·75}$)	123·9 (27·09)	69·75 (5·86)	66·5 (9·94)	1:0·56
% digested‖	25·35 (6·41)	57·03 (1·4)	57·93 (2·14)	1:2·25
Mean retention time (hours)	1·30 (0·33)	38·05 (1·87)	52·2 (8·6)	1:29·3
90% excretion time	2·16 (0·30)	68·5¶ (2·74)	88·7 (15·53)	1:31·7

* Equals $W^{0·75}$ (see Ebbinge *et al.*, 1975).
† Marriott (1970), n = 8.
‡ McIntosh (1966), n = 4.
§ Forbes and Tribe (1970), n = 3.
‖ Coefficient of apparent dry matter digestibility (%) (Marriott 1970) is

$$\frac{\text{dry matter intake} - \text{dry matter in droppings}}{\text{dry matter intake}} \times \frac{100}{1}$$

¶ McIntosh (1966) actually gives figures for 95% excretion time.

have little idea of daily intakes or pasture yields in terms of grams/m^2, wet or dry.

'Fouling' of pastures and drinking places

Another frequent complaint is that Cape Barren Geese droppings make pastures and drinking places unpalatable to stock. Marriott's (1973) experiments indicated that sheep did not obviously avoid areas 'fouled' by goose droppings but he did suggest that avoidance could occur where there was a dense concentration, as for instance round water-holes and troughs. Since the presence of goose droppings in drinking places clearly irritated farmers, 'goose-proof' covers for standard water troughs were designed and built by C. Nancarrow of the Fisheries and Wildlife Division (Figure 3). The devices prevent geese defaecating into the troughs, because they cannot stand on the edges or on the baffles.

In the true geese of the northern hemisphere, Rochard & Kear (1970) demonstrated that the presumed chemical factor was transient because only droppings less than one day old had repellent effect on sheep. The possibility remains that the appearance of fresh droppings each day, even at low density, could have a repellent effect over a longer time. Cape Barren Geese habitually frequent the same pieces of pasture and the same waterholes for weeks on end.

Owen (1972) has shown that White-fronted Geese spend up to 25% of their non-feeding activity drinking. Presumably the problem in respect of the Cape Barren Goose is not that it drinks more than other geese but that water is less widely available to it in the hot dry dummers (Dorward 1977a).

Harbouring of disease

In one case there were four unexplained deaths of calves, with symptoms of 'scouring', in paddocks frequented by geese. The farmer suggested that a coccidial disease originated from or was transmitted by the geese. However, according to Jones (1967) *Eimeria* coccidia are found in nearly all domestic animals (including geese) but are host-specific. Hence, although geese may have acted as passive vectors (as might any other birds, machinery, or farm workers themselves) it seems unlikely that they were a source of the disease.

Protection and refuges

The Cape Barren Geese in the situations described above permit the approach of a farm vehicle to within 50 metres before taking off and flying low and in leisurely fashion to a neighbouring field. Presumably this is because they are shot at infrequently. We think that if legal protection was removed they might quickly become timid. For instance, it was reported that on the first day of the open season on Flinders Islands, 1977, the geese were an easy target but less so by the second week-end.

The Cape Barren Geese are noticeably more timid on their Victorian breeding islands than on mainland pastures. This may be because the former are adults and the latter immatures or because geese have, at least until recently, been shot at on the islands by visiting fishermen.

Owen (1973) found a significant negative correlation between 'goose usage' and an 'avoidance index' which included distance from roads and frequency of shepherding. Australian farmers do not shepherd their stock and the birds are very little disturbed by farming activities. However, it is noticeable that the geese do not favour areas close to roads.

Owen (1977) advocated the creation and management of refuges to safeguard goose populations and lessen conflicts with agricultural interests, a view which we strongly

Figure 3. 'Goose-baffle'. The plates are of 3 mm mild steel, and are too narrow for geese to perch on.

endorse for the situation in Victoria. The problems in respect to the Cape Barren Goose, at least in this part of its range, are thus very similar to those involving other species elsewhere, particularly at Loch Leven (Newton & Campbell 1973) and even more so at Caerlaverock and Slimbridge (Owen 1977).

There are differences in the Australian situation. The number of Cape Barren Geese in our area of study is only about 300, instead of the many thousands of geese wintering in Britain. But it is relevant to note that in the Greylag *Anser anser* and Pinkfoot *A. brachyrhynchus* the flocks feeding on any given area mostly number less than 500 (Newton & Campbell 1973), especially after the initial arrival period. (In the Furneaux Group about 1,000 Cape Barren Geese may be seen on farms of about 500 ha, and the problems are correspondingly greater.)

The Cape Barren Goose flock birds are only about 40 km from their breeding grounds and, as the families break up after fledging, consist largely of non-breeding birds. In contrast the British wintering birds may travel several thousand kilometres and contain birds of all age and social categories. An important correlate is that if Cape Barren Geese are managed in one state, other states are not affected and political problems should not arise. However, although the four Australian states which the Cape Barren Goose encompasses have similar legislation, public attitudes vary. This was reflected in strongly differing views published in newspapers about the 1977 open season.

A third difference is that Cape Barren Geese have very rarely been recorded as eating anything but pasture plants, whereas the true geese in Scotland regularly frequent fields of grain stubble and root crops.

Conclusion

Selected areas must be made a much more superior attraction and this can only be brought about by a strong control over pasture management, size of area and stocking techniques.

In Victoria, the islands around Wilson's Promontory are all now designated as part of a National Park. They have no history of human habitation or pasturing, and are infrequently visited by holiday fishermen or skin divers in small boats. Even these visits usually occur in summer when the breeding season, and the goose's time of susceptibility to disturbance, is nearly over. Crayfish boats have visited or taken shelter amongst the islands in the past, and some fishermen used to take home the full-grown but still flightless goslings for Christmas. The tradition of gosling-hunting has declined if not disappeared in the last decade. So the human impact on the geese of the Victorian breeding islands is now probably fairly small and does not seem likely to change. In the Furneaux Group, however, the situation is different; the number of birds are larger, the breeding islands are often still pastured, and some are freehold (Guiler 1974; Pearse 1975).

The solution to these similar and yet different problems, in Australia as in Europe, undoubtedly lies in the purchase and careful management of appropriate areas of land (Owen 1977), as is now in progress on Flinders Island, Tasmania.

Incidentally, there is as yet no indication that the problems discussed here have arisen in Western Australia, but Dorward (1977b) predicts that they will, if appropriate agricultural changes take place.

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Summary

Cape Barren Geese *Cereopsis novaehollandiae* from breeding grounds on islands off Wilson's Promontory, Victoria, visit mainland pastures some 40 km distant during summer in a flock of up to 300 birds.

Attempts to attract geese to certain areas and to minimize the agricultural problems are described. Their impact on agricultural interests is assessed in terms of amount of pasture consumption, fouling of water places, and possible transmission of disease. These problems are compared with those for Cape Barren Geese elsewhere in Australia and for true geese in Britain. The suggested long-term solution is acquisition of appropriate land and its specific management for geese.

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