

nationally. Clear grass tracks encourage visitors to remain on the special Nature Trail which is indicated only by small arrows. The first ten-years' management plan is nearing its completion, and a new plan, based upon our experience, is now in preparation. At first our objective was to conserve a typical chalk woodland, but we now realize that we are owners of a very special woodland which is not at all typical.

A study of the weather is beginning in 1980—we are lucky to have a Trust member living on the edge of the Reserve, at the top of the hill, who is a meteorologist and has an official weather station in his garden. A com-

parison with results obtained in the valley where the Warden's house is situated should be very interesting.

Land prices in England in 1980 place the value of this Reserve at more than a quarter of a million pounds sterling. Naturalists' Trusts must, however, continue to try to save these rich pockets of wildlife.

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Uncontrolled Grazing and Vegetation Removal in the Falkland Islands

The Falkland Islands (Latitude 51°S, Longitude 60°W), an isolated archipelago in the South Atlantic ocean, have long been recognized for their relatively untouched wildlife potential (Strange, 1971). The predominant vegetation of the Islands is an oceanic heath that is notable for its uniformity, while there is a total lack of any natural tree-growth. As described by Moore (1968), there are only seven at all obviously different plant associations on the Islands, and, of these, two occupy almost 70% of the land area. Habitat diversity is very limited, and the main concentrations of flora and fauna are to be found in the coastal areas.

The two main plant associations of the coastal areas are:

(i) The *Poa flabellata* (Tussock-grass) fringe, which is not as extensive as it was before the introduction of grazing stock, when uncontrolled grazing of the palatable leaves resulted in its present diminished area status. The problems associated with the decimation of the Tussock-grass area have been fully discussed and described elsewhere (Strange, 1976).

(ii) The *Ammophila/Elymus* association. *Ammophila arenaria* and *Elymus arenarius* were introduced to the Islands in the 19th century, and one of the most extensive areas of cover of this association is on the Cape Pembroke peninsula (Fig. 1), which is approximately 7 km from the only sizeable human settlement on the Islands, Port Stanley (population ca 1,000). The history of the Cape Pembroke area reflects a successful *Ammophila/Elymus* establishment exercise and has been summarized by Hubbard (1937) as follows:

'The Board of Trade lighthouse at Cape Pembroke was situated in dismal surroundings, and sand, drifting from a source 4 or 5 miles [6.4 or 8 km] from the lighthouse, had destroyed practically all the vegetation on the peninsula and laid waste an area of about 1,800 acres [730 ha]. In addition it had almost buried the first floor of the light-keeper's quarters. Marram Grass (*Ammophila arenaria*) and Lyme Grass (*Elymus arenarius*) were imported and planted in 1923. The planting was most successful, and the whole area had [become] covered over by 1937 with sand-binding grasses.'

The area was securely fenced and used as common grazing for the Islanders' cows and horses, being carefully managed so as to provide valuable late summer and winter feed. This stocking pattern, with controlled grazing and removal of stock in the spring, was found to have no detrimental effect on the vegetation cover, and the encouragement of stock to eat poorer vegetation on the rest of the common-land outside the Cape Pembroke area for certain periods, was having a beneficial effect on the feeding quality and quantity of the vegetation in that area. The area was photographed in 1956 (Fig. 2), at which time the Cape area was considered to be well vegetated, with no reported problems from blown sand. The dunes had become stabilized, and breeding colonies of Gentoo Penguins (*Pygoscelis papua*) and Magellanic Penguins (*Spheniscus magellanicus*) had established themselves on parts of the area. A sand-dune-associated flora had also developed.

The Cape Pembroke peninsula supports one of the most extensive areas of sand-dune ecosystem on the entire Falkland Islands, and because of its proximity to Port Stanley it has considerable tourist and recreational potential. However, in 1972 work commenced on the construction of a 1,250-m-long airstrip on the Cape Pembroke peninsula (see Fig. 3), and the vegetation cover was removed over considerable areas. Fences were also removed to allow access for construction vehicles, and the grazing pattern of the area reverted to one of year-round uncontrolled grazing, with stock preferring to remain in the area in spring-time rather than graze the less-attractive pastures outside. As a result, the vegetation in the area at present does not have an opportunity to recover in the spring-time and this, coupled with the damage done to the vegetation by construction equipment in what is essentially a fragile and unstable ecosystem, has led to a reduction in the vegetation cover and a recurrence of the blown-sand problem.

The lighthouse keepers had, in 1978, noticed a considerable increase in the quantity of blown sand in the lighthouse buildings, and the airport contractors

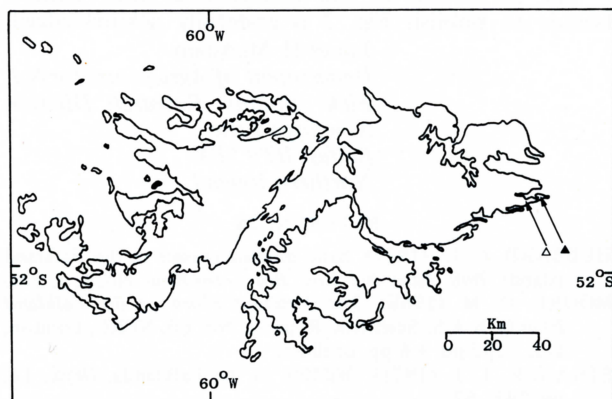


Fig. 1. Sketch-map of the Falkland Islands, with positions of Stanley (△) and Cape Pembroke peninsula (▲) indicated.



Fig. 2. Aerial view of Cape Pembroke peninsula in 1956 (\blacktriangle = Lighthouse position). Scale as Fig. 3. Photos: Hunting Aerosurveys Ltd.

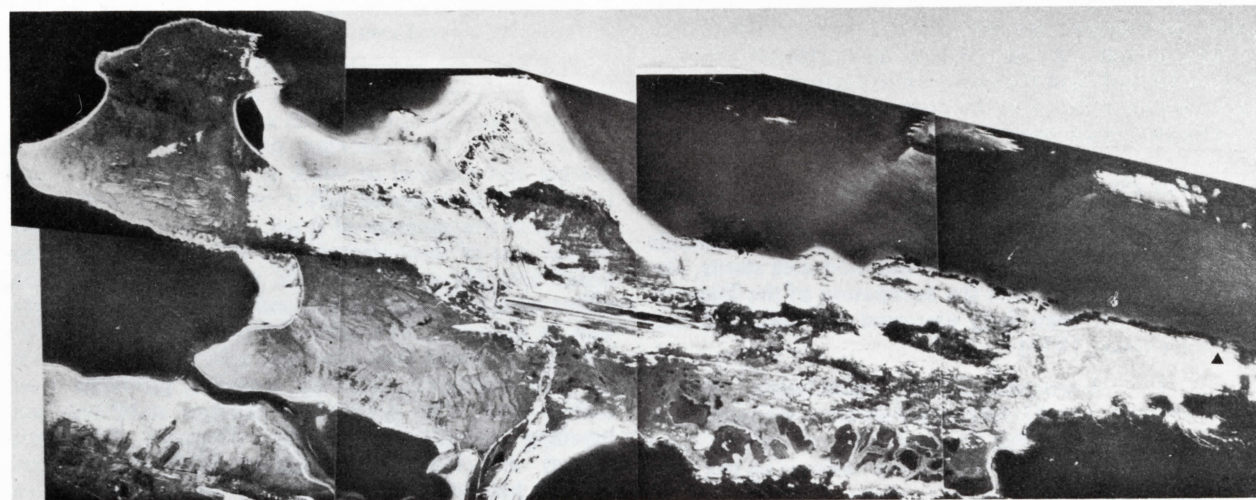


Fig. 3. Aerial view of Cape Pembroke peninsula in 1976 (\blacktriangle = Lighthouse position). Scale indicated by 1,250-metres-long airstrip in centre. Photos: J. H. McAdam.

were experiencing severe problems with blown sand filling drains that served the runway and access roads. The denuded area appears to be expanding rapidly, and a comparison of Fig. 2 (taken in 1956) and Fig. 3 (taken in 1976) will give some idea of the extent of the problem.

The combined effect of vegetation removal and destruction by heavy machinery thus introduced serious problems concerning the stability and future of this potentially valuable area. With the completion of the airfield, the problem of heavy vehicles has been alleviated; however, the restoration of the fencing and exclusion of livestock for a period of years pending the re-introduction of the previous controlled grazing management is thought to be essential if the Cape and its peninsula are to be conserved and developed as a multi-use area serving agriculture, wildlife, tourism, and recreation.

The permission of the Governor of the Falkland Islands to publish Fig. 2 is gratefully acknowledged.

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REFERENCES

- HUBBARD, C. E. (1937). Sand-binding grasses in the Falkland Islands. *Bull. Misc. Inf. Roy. Bot. Gdns Kew*, No. 4, p. 274.
 MOORE, D. M. (1968). *The Vascular Flora of the Falkland Islands*. B.A.S. Scientific Reports, No. 60, NERC, London, U.K.: 202 pp. + 6 pp. of illustr.
 STRANGE, I. J. (1971). Wildlife in the Falklands. *Oryx*, 11, pp. 241–57.
 STRANGE, I. J. (1976). Ravaged Falkland Islands. *Geog. Magazine*, 48, pp. 297–304.