

HABITAT DESTRUCTION AND FAUNA PROTECTION IN SOUTH AUSTRALIA

By H. T. CONDON, *South Australian Museum.*

HABITAT DESTRUCTION

The elimination of the natural environment commenced when the first white settlers arrived in South Australia in December, 1836. The close of the first hundred years of settlement was marked by the occupation of all usable parts of the State, sometimes under difficult climatic conditions. At this time great areas of the natural flora remained untouched. Since the war, housing projects, new industries, and increased rural settlement have reduced and wiped out natural habitats with increasing efficiency in all directions on an unprecedented scale. Everywhere the natural environment has been despoiled to meet the demands of an expanding population. The extent of the widespread ravages and encroachment of modern economic development can be judged in the light of comparisons between the vegetation maps produced by botanists to show the original floral communities and land utilisation maps (e.g. Hambidge, loc. cit).

Vast tracts of woodland forests have disappeared or are marked for destruction, swamplands subject to periodical flooding have been drained and more are threatened, and, in the wetter parts of the State, extensive plantations of the California pine (*Pinus radiata*) have been set up under the Government afforestation programme.

Loss of natural habitats has been a tremendous catastrophe for much of the endemic fauna. Although the extent and trend of the effects brought about by these losses are complex, there is a widespread feeling that unless a progressive scheme for wild-life management is introduced soon, any attempts to preserve the remnants of our vanishing fauna and flora will be impossible and much that is unique will be irretrievably lost. Mr. A. Strom, Chief Fauna Guardian in New South Wales, has discussed this problem in the light of similar changes in his own State. He says (*Austr. Mus. Mag.*, 13 (1), p. 10): "Animals may react in two ways to the

changes wrought by man. The majority die with the vegetation because their association with it is a tight bond forged over countless years of adaptation. Some may escape to untouched areas, but even in these areas population pressures eventually become excessive, resulting in death to the animals . . . Provided action comes quickly a well-distributed system of faunal reserves could ensure the retention of samples of most of the naturally occurring environments in this State. But two factors are essential: Speed in locating available areas and sympathetic understanding from the authorities responsible for making the reserves things of reality. Such steps require vision and conviction."

At the Conference of Interstate Fauna Authorities held in Sydney in November, 1958, the following resolution was passed: "In view of the fact that the conservation and management of wild-life is basically dependent on the retention of sufficient natural habitat, and further that many of our wild-life problems are largely due to the reduction of habitat, this conference recommends to the respective Governments that they review the provision of funds made available to the fauna authorities for the protection and management of habitat."

Increasing interest is being shown in agricultural development on Eyre Peninsula. It is pleasing to note, therefore, that it has recently been reported that the Flora and Fauna Advisory Committee has directed its attention to the need for further reserves in this part of South Australia. However, it is doubtful whether the retention of small portions of the original vegetation in wild-life reserves can be regarded as habitat conservation, or whether it will mitigate the permanent threat to many forms of wild-life. As I have remarked elsewhere (1958, ANZAAS Handbook, Introducing South Australia, p. 120), there is no evidence that European settlement has been the sole cause of extinction of any species in South Australia in the past, but cultivation, drainage,

and the destruction of the native flora must be blamed for the disappearance of many species in certain districts. Commercial exploitation of the avifauna by the bird trade has increased the threat of extinction for some birds in recent years.

In the higher rainfall areas there is hardly a portion which can be regarded as virgin land and the ease with which alien plants may be established in denuded areas must have far-reaching effects in many directions in the long run. Birds of all kinds will vanish in spite of protection and irruptions of other creatures will occur in the face of controls. In other parts of the world, it has been found that new, artificial environments created by man are very unstable and it is often impossible to foretell what ills may befall them. Almost invariably traditional methods of husbandry are unable to cope with the fall-off in productivity caused by a decline in soil fertility. This decline can be traced to a disturbance of the natural balance in which every indigenous animal once played a part.

It should never be forgotten that the effects of man-made changes may be more extensive than is intended or foreseen. The use of pesticides may exact a much heavier toll on the natural enemies (including birds) of the pests than on the organisms for which they were intended (see also Review, p. 24). The late Prof. Aldo Leopold, an American, says, in his book, *A Sand County Almanac*, that practices adopted under the name of conservation are often only local alleviation of "land sickness." Disturbance of natural habitats may not be apparent at first sight owing to the use of DDT, "1080," and other toxic substances which might be picked up by birds. This matter appears to have received little attention from Australian authorities.

Habitat destruction deprives many species of opportunities to breed without human interference. The Mallee Fowl (*Leipoa ocellata*), which has withstood the depredations of the introduced fox in some districts for more than half a century, is completely eliminated by clearing and settlement. Commercial interests and their sympathisers use this to justify the trapping of live birds with the promise that in captivity they will be "perpetuated in better than natural conditions," which, to say the least, is questionable.

Burning and chopping down of trees,

which interferes with the undergrowth, has had a serious effect on birds. It is true, of course, that some of the smaller native species have adapted themselves to the introduced flora. Others have grasped opportunities for breeding afforded by older-type dwellings and buildings; competition with the more aggressive introduced species is great.

At present, the national parks and reserves do not adequately compensate for the destruction of natural habitats. The allocation of reserves has been haphazard and privately-owned sanctuaries are not always satisfactory.

There are many who consider that much unnecessary destruction of the native vegetation has taken place. The abandonment from time to time of great areas which have been defaced in this way confirms the view held by some authorities, after detailed land utilisation surveys, that less than 20 per cent. of the whole State can be occupied economically (see Hambidge, 1946, *Proc. Roy. Geogr. Soc.*, S.A. Branch, 47, p. 9 et seq.). At the present time, I am told, huge areas of mallee scrubs—officially known as "marginal lands"—are being cleared and burned, with the aid of modern mechanisation, at the rate of 400 acres per day. Possibly some of this clearing, which is difficult to police, is being done illegally. On the other hand, it is lawful to destroy plant growth as a measure towards rabbit control.

In South Australia there is no responsible authority for the many aspects of nature conservation and wild-life management which are recognised in other parts of the world. This cannot be construed as a criticism of Government policy. As Leopold remarks in his book (*loc. cit.*), philosophy and religion have not yet heard of conservation, so why should we expect governments to base their conduct on it?

Those who say "Are we justified in asking for areas of land (for nature reserves) that have some value for primary production?" may be reminded that no true conservation programme can be based on wholly economic considerations. Nowadays it is an acknowledged principle that *all* birds should have some protection on moral and aesthetic grounds as well as economic ones. C. A. Kelly (Chief Secretary, New South Wales) has said ". . . the next decade may well be the deciding period when the survival or

elimination of our native fauna will be determined. But elimination is not necessary if we plan ahead to see that the use of the land leaves suitable cover and breeding grounds for the animals; animals unknown elsewhere in the world, an attraction for visitors from this land or overseas and, truly, a symbol of our Australian nation." (Wild Life Service, March, 1959.)

EXPLOITATION OF BIRDS

A post-war activity which in recent years has claimed the attention of members of the South Australian Ornithological Association and kindred bodies all over Australia is the large-scale commercial exploitation of our avifauna which is now in full swing. The facts are such that any pleas which are made for our birds should not be dismissed as mere misguided sentiment.

The keeping of native birds as pets or aviary subjects is a popular pastime amongst all sections of the community. It is flourishing because of the ease with which all kinds of tame and wild birds can be obtained from bird shops and dealers. The bird trade is a lucrative business and has attracted backyard breeders who dispose of their surplus stock to the big companies. Trafficking in birds to those States where trapping is not permitted is being intensified to offset the dwindling overseas demand. Smuggling of birds taken without permit is also common between the various States.

The unremitting destruction and taking of birds which by common consent are regarded as "numerous" (although nobody has ever attempted to count them) must have its limits. Species which are in demand in the bird trade (and also for sport) are endangered by the inability of anybody to say which are "common" and which are not.

It was the eminent British ornithologist, Col. Meinertzhagen, who pointed out recently that since man became 'civilised' his relationships with birds have followed the paths of violence, cruelty and murder. Particularly grievous in the modern picture is the widespread and foolish persecution of the birds of prey and the part some of the newspapers play, as the mouthpiece of the people, in helping to encourage it. Equally upsetting to many is the "annual stampede" of the duck-shooting fraternity. One of our members, Mr. Erhard Boehm, has this to say about the cruelties involved in trapping native birds

for the bird trade: "Black sticky bird lime is used to secure call-birds to act as decoys . . . or a bird may be lightly wounded with dust shot and tethered beside a trough or pan to attract others. Overcrowding of freshly trapped birds is often serious . . . Supporters of the racket blandly deny any such knowledge and profess to be horrified at the mention of it." The trappers themselves admit that the mortality rate in their business is high and that they work on the basis of 75 per cent. loss. This means that *for every 100 birds taken not more than 25 survive.* Strict supervision of trappers by the authorities in Western Australia is believed to have reduced the mortality rate in that State considerably; the figure estimated is now less than 5 per cent.

FAUNA AND FLORA LEGISLATION

Protective legislation for the fauna and flora is not uniform throughout the Commonwealth; it differs from State to State. Also, there is no law covering fauna in Commonwealth territories. There are nature reserves in all parts of Australia and national parks have been proclaimed everywhere except the Northern Territory.

Fauna and flora protection in South Australia is dealt with at some length by McGilp (*S. Austr. Nat.*, May, 1950, p. 2). The article contains a lot of information and some constructive suggestions regarding sanctuaries and reserves; explanations of certain clauses in the protection Acts are given. Since its publication, there have been several amendments to the Acts dealt with, the most far-reaching being the changing of the "*National Park Act*" to *National Park and Wild-Life Reserves Act* in December, 1955.

South Australian legislation can be divided into two headings: (1) Acts which are designed to protect or conserve the endemic flora and/or fauna; (2) Acts which provide some protection but are not primarily concerned with fauna conservation or protection.

(1) PROTECTION ACTS

The Flora and Fauna Reserve Act, 1919-1940, deals with the establishment of a reserve of some 160 square miles, to be known as Flinders Chase, on the western end of Kangaroo Island.

This reserve, which was enlarged slightly in 1940, conforms in some ways to the idea of a "primitive area" as recognised in North

America (Wing, *Practice of Wildlife Conservation*, 1951: p. 137) and a "Nature Reserve" of the type set up in recent years by the Nature Conservancy in Great Britain. Under Section 16 of the Act, the controlling body of Flinders Chase is charged with the maintenance of the reserve for "the protection, preservation and propagation of fauna and flora." However, the area has been spoiled somewhat by the introduction of alien forms, which is permitted by the Act; it is also officially described as a "pleasure and health resort." For further details see McGillp (loc. cit.).

The *Animals and Birds Protection Act*, 1919-1958, which is referred to below, is designed to protect all animals and birds, except those listed by name, and to regulate hunting, trapping and the use of firearms; honorary game inspectors may be appointed. An Act with similar provisions is the *Native Plants Protection Act*, 1939. This controls the sale and picking of wild flowers and the destruction of shrubs and other vegetation on Crown lands, forest reserves, public places and private property during proclaimed protected periods.

The *National Trust of South Australia Act* became law in 1955. Its purpose, among other things, is for the preservation of lands and buildings of historic and scientific interest and "so far as practicable" of "the natural aspect features of lands and their animal and plant life." The Trust is empowered to deal with anybody injuring, destroying, damaging or interfering with those things in its charge. The Trust has a Nature Conservation Committee, consisting of eight members, with Mr. C. Warren Bonython as chairman.

The *National Park and Wild-Life Reserves Act*, 1891-1955, has amongst its objectives the protection of native and *imported* animals and birds at the National Park at Belair and on any wild-life reserve under the jurisdiction of the Commissioners. Further wild-life reserves may now be proclaimed on the recommendation of the Commissioners. Certain reserves for the protection of fauna and flora which have been declared under the Crown Lands Act have recently been placed under the control of the National Park authorities; several others are controlled by the Fauna and Flora Advisory Committee which was appointed by the Government in

1939 (see *S. Austr. Orn.*, Jan., 1940). A large number of local sanctuaries, mainly for birds but in some instances native mammals also, have been proclaimed under the *Animals and Birds Protection Act*. These areas are from one-half to 12,000 acres and may be islands, lakes, shores and river frontages, golf links, water reserves, irrigation areas, or patches of scrub; further, they may be Crown Lands or private property.

However, the *Act* does not mention the word "conservation" and in no way interferes with the "Abrahamic concept," which a section of the community, even in these enlightened times, seems to regard as a 'proper' attitude. (See also Newland, page 20.) Some may see the beginnings of conservation in the clauses which deal with close seasons and bag limits, but other sections are concerned with the rights of property owners, the regulation of hunting, trapping, selling and buying, the keeping of birds in confinement, and the issuing of licences and the payment of royalties. There is no mention of conservation of habitats which are so necessary for the protection of many species and characteristic communities.

Some of the aims of the *National Park and Wild-Life Reserves Act* appear incompatible as it now stands. The National Park, of some 2,000 acres at Belair, serves two purposes. It is a fauna reserve. On the other hand the trustees must provide facilities necessary for visitors—golf and tennis courts, roads and kiosks. They are also encouraged to "beautify" the area—often with the aid of foreign trees and shrubs—with the result that some parts have become semi-natural habitats which support remnants of the original fauna and flora, together with an assemblage of exotic types. Public recreation is the primary purpose of this reserve. The sections of the original National Park Act dealing with amenities apply to "wild-life reserves" also, and now there is some danger that these may be spoiled as 'virgin areas.'

(2) OTHER ACTS

Section 263 of the *Crown Lands Act*, 1929-1939, provides that at least five of every 250 acres of forested land shall be set aside for the growth of timber and that no trees growing thereon shall be destroyed. This clause, for which exemptions may be granted when

it is deemed advisable, does not apply to areas of less than 250 acres. As mentioned by McGilp (loc. cit.) a further clause, 263a, was introduced which stipulates that a lessee or purchaser of Crown Land shall set apart, for the control of soil erosion, areas covered with "natural scrub growth"—10 per cent. of the total area or more if required by the Government—in addition to the timber area required under Section 263.

The *Sand Drift Act*, 1923-1935, and the *Soil Conservation Act*, 1947, both include sections requiring the preservation of natural vegetation at the discretion of the Agricultural Department. Here, of course, the primary purpose is for the provision of breakwind reserves for abating or preventing sand and soil drift. Three months notice is required by the Government Soil Conservator before any vegetation can be destroyed on scrubland, but this does not apply to the cutting of trees for firewood, posts and timber, the making of firebreaks, afforestation or public works and roads. 'Soil conservation districts' may be declared; they consist of one or more special tracts of lands.

The provision of forestry reserves under the Crown Lands Act may or may not preserve certain natural habitats. Mention must also be made of a number of National Pleasure Resorts which are under the control of the Immigration, Publicity and Tourist Bureau Department.

Some of these, such as Wilpena Pound (20,000 acres) in the Flinders Ranges, are large, whilst others, closer to or about Adelaide, may not comprise more than a few acres. In most the native vegetation is rarely disturbed, which is in the interests of the avifauna. McGilp (loc. cit.) says: "Although primarily tourist and pleasure resorts, well patronised by the public, these Reserves are very valuable for the protection and preservation of Fauna and Flora . . . These Reserves, moreover, create an interest in our Fauna and Flora, and interest inevitably leads to a desire for protection of animals and plants we learn to love and admire. . . . The By-laws of the National Pleasure Resorts Act, 1914, contain provision making it illegal to take, molest or destroy any native flower, plant, or tree or any animal or bird within the areas . . ."

BIRD HABITATS

A bird's habitat is the environment in which it lives. This may change daily, at varying times of the year, or according to season. Habitat is not the same thing as geographical range, although on occasions writers attempt to combine the two. Species differ greatly in their habitat tolerances, and geographical range is dependent on this ability for adjustment. The consistent environmental factors which are required throughout a species' range can only be determined by ecological studies; little or nothing has been done in this direction in South Australia. Most introduced birds have wide habitat tolerances, e.g. House Sparrow (*Passer domesticus*) and Indian Dove (*Streptopelia chinensis*). The endemic Ground or Swamp Parrot (*Pezoporus wallicus*), which is on the verge of extinction in this State, has an extremely narrow habitat tolerance, being tied to the coastal samphire swamplands, which have been drained in many places.

Islands: Natural conditions on most of our islands along the coastline have been seriously disturbed, even where there is no permanent settlement. Goats, rabbits, feral cats, pigs, and even rats can be a serious menace to many birds, including nest-burrowers, e.g. mutton birds and storm petrels. The nesting sites and burrows are destroyed by the elimination of the native herbage by herbivorous creatures. Island habitats of birds should not be neglected in any conservation scheme. The question of the introduction of any alien forms of any kind should be carefully considered in every case, and an endeavor should be made to improve conditions on those already adversely affected.

Mangroves. On many of the mud flats of our South Australian coastline, the mangrove, *Avicennia marina* var. *resinifera*, grows in dense masses within the daily tidal limits of the adjacent sea. At Port Gawler and elsewhere, breeding colonies of the Pied Cormorant (*Phalacrocorax varius*) utilise this habitat regularly but not exclusively. Cormorants may nest on islands and have learned to use breakwaters and buoys for this purpose. The numbers of birds found in the mangroves are unimportant and the variety of species is limited.

Salt Marshes, Lakes and Swamps. These are frequented by migratory waders and other water birds. The serious effects of drainage

on water-birds is rarely considered. Different species of waders customarily visit the same spot year in and year out, and with the disappearance of the natural setting these species must vanish from the area. It is a well-established fact that districts which appear to offer similar conditions to those normally frequented by waders are, for some unknown reason, unacceptable to them. Wherever possible areas frequented by migratory waders should be left undisturbed as feeding grounds in order that further opportunities may remain for scientific study of these little-known birds.

So far as native species are concerned, there is only one small passerine, the thornbill, *Acanthiza iredalei*, which breeds exclusively on the saltwater samphire flats at several places along the shores of St. Vincent Gulf—notably at Outer Harbour and Port Gawler. Elimination of the habitat at these places would result in the disappearance of this highly-specialised bird.

In the South-east of South Australia, the Swamp or Ground Parrot (*Pezoporus wallicus*) has already disappeared from many areas which have been drained for settlement, and it is doubtful whether the species now occurs in South Australia at all, except perhaps in very small numbers in the vicinity of the Glenelg River. Nothing can be done to bring back this parrot to the areas from which it has disappeared.

Pelicans, ibises, and, to a lesser extent, ducks breed on inland waters and islands which may be of limited extent. Pelicans disappeared from their Kangaroo Island breeding grounds long ago, and the main nesting site in the south at present is on some small islands in the Coorong. These pelicaneries, which are subject to annual depredations by fishermen, are a sanctuary leased by the South Australian Ornithological Association in an endeavor to prevent grazing rights from being granted. Many consider that much stricter supervision of the area by the authorities is required.

Ibises nest in colonies at Bool Lagoon, Lake Bonney and other waters. Any move to drain these areas would result in a reduction of the breeding activities of these insect-destroying birds in South Australia.

Ducks breed on most of the inland waters of South Australia, small or large. However, the numbers and requirements of many species are, as yet, practically unknown. Irriga-

tion schemes, drainage, and changes in water-levels have adverse effects on some breeding grounds, which may be restricted also by flooding caused by dam building. Bool Lagoon, near Naracoorte, is one of the biggest breeding grounds for ducks within the State. This fact should be seriously considered before any further drainage schemes are implemented in the area.

Regarding certain uneconomic species, there appear to be enough natural freshwaters to ensure their present rate of survival. More breeding sanctuaries for pelicans and ibises, as well as ducks, are needed.

Woodlands and Sclerophyll Forests. In South Australia these were regions of higher rainfall, mainly in the Mount Lofty Ranges and the South-east. At the present time they are the most productive portions of the State, being used for dairying, "intensive grazing," cattle studs, pine forests, and some horticulture. As might be imagined, there has been great destruction of the native vegetation in many places. There are no wild-life reserves. The National Park is the largest area which has been set aside partly for the fauna and flora; there are numerous National Pleasure Resorts (see above), and a few privately-owned sanctuaries. An excellent opportunity for the establishment of a wild-life reserve has been lost by the opening up of a lot of the country on Fleurieu Peninsula, and the same may be said of the South-East. The birds now living in the National Park are not a representative sample of the birds of the Mount Lofty Ranges, and every endeavor should be made to preserve the few remaining "untouched areas."

Heath Vegetation and Mallee. These vegetation types occur over wide areas which receive an annual rainfall of between 10 and 20 inches. In post-war years many thousands of acres of heathlands, especially in the South-East of the State, have been taken over for sheep and cattle grazing. The spectacular development of these areas, which were formerly regarded as wastelands, has been mainly due to the use of trace elements and improved farming implements. Further clearing of scrub for the expansion of pastures is to continue. On Eyre Peninsula sclerophyllous mallee areas have been cleared for grazing and agriculture. The bird life in the two regions mentioned differs, and it is desirable that suitable areas of the denser

undergrowth, on which a number of species are dependent, should be preserved.

The Mallee areas of South Australia, which provide a haven for an avifauna quite distinct from that found in other parts, are open eucalypt scrublands with annuals, ephemeral plants, and grasses. In the "Murray" mallee much of the scrub has been removed for firewood and farming, although extensive tracts remain near the Victorian border. In this region a large fauna reserve has been set aside and there is another on the western side of the River Murray near Wellington (1,600 acres). North of the river, pastoral pursuits (sheep) have necessitated the clearing of mallee scrubs.

One of the hardest-hit species by agricultural development in the mallee is the Mallee Fowl (*Leipoa ocellata*), although wherever sufficient cover remains its mounds may still be observed in use. Mallee Fowl are popular aviary subjects and are good to eat. Undoubtedly much illegal shooting and trapping of the species is taking place in all parts. There is a great need for the establishment of inviolable reserves solely for the greater protection of these birds.

Other species of mallee birds, which are of great scientific interest, face extinction with the loss of their natural habitat and are likely to be further threatened by the depredations of those connected with the live bird trade, as many have been found to be desirable aviary subjects, for which there is always a ready market. The need for preserving mallee habitats and mallee birds in South Australia is urgent. Some of the birds are peculiar to this State, and others provide the only and easily accessible source of cagebirds offered for sale on the local and interstate markets.

Arid Interior. North of the Mallee, in regions of 10 inches and less, are wooded regions with such trees as mulga, myall, black

oak and false sandalwood, and shrub steppes with bluebush, saltbush and bindyi. Some of the most desirable aviary birds come from these remote parts, e.g. Scarlet-chested Parrot (*Neophema splendida*). It is here also that the Night Parrot (*Geopsittacus occidentalis*), of whose continued existence rumors persist, may one day be found. Many of the smaller finches and other species handled by the bird trade are obtained from the arid interior and illegal trapping is rarely detected. As in other parts of the State, the danger is that traders may concentrate on certain species until the supply is exhausted. It is also likely that trappers travelling overland from Western Australia replenish their diminishing stocks in out of the way places before proceeding to rural and urban districts.

CONCLUSION

Although I have confined my remarks to birds, it is generally agreed that the present is a crucial period for the native fauna. Birds, like other forms of Australian animal life, are facing the most serious threats to their continued existence, in many cases, since the advent of European settlement. First and foremost is the threat of habitat loss. Second in magnitude is the threat of commercial exploitation. A number of species may be eliminated before the community realises what has happened. Lack of public interest in fauna preservation, which, in the main, is a moral question, is an additional threat. Some people are oblivious of their obligations to guard against the destruction of our unique birds and animals, others are apathetic in their attitude towards nature conservation. Meanwhile the exploitation of our natural resources goes on apace in spite of the State protection laws. It has been left to local natural history bodies to examine and present the problem; its solution, which is full of difficulties, rests with the people of South Australia.