RESERVE MANAGEMENT—WHY AND HOW

Tutanning Wildlife Sanctuary—showing cleared land around perimeter

If you are sufficiently interested in conservation to be reading this journal, you probably have some understanding of why man sets aside reserves for the conservation of fauna and flora. It certainly is not because governments must pander to preservation extremists, vocal though they may be; nor is it solely to provide academic stimulation for white-coated boffins in dusty halls of learning. It is, fortunately for mankind, because that new branch of science known as ecology has brought about an increased awareness of the close relationships that exist between man and his environment; and also because our native animals and wildflowers have an aesthetic appeal.

Most ecologists would be the first to admit that the depth of man's knowledge of the role of each organism in the biosphere, and his understanding of the interaction between these organisms, is still very, very limited. Nevertheless man has blundered along making sometimes irreversible decisions at the expense of future generations. But one thing he has learnt is that if, by destroying its habitat, he causes a species to become extinct, there can be no recall later if he discovers the animal had a vital role to play in the environment.

Once a species is extinct the position is final. No further research can be done, no more learnt from it or from its relationships with other species, including man. For we can learn a lot from other animals, and not just behaviour patterns; it has already been shown that research on the quokka may aid medical science particularly in the study of muscular dystrophy. There are many other links between man and other animals and surely thousands are yet to be discovered.

This reason alone is sufficient justification for creating reserves and conserving wildlife populations and their habitat; but what of the inalienable right of every animal—the right to live? This is the cry of the sentimentalists; it is a plea for preservation rather than conservation, and overlooks the natural high mortality of animals which is a part of nature. It is as amoral to cause the depletion of a species by overprotecting it, as it is to destroy its habitat or shoot it out. What we must do to ensure an animal's "right to live" is establish reserves and manage them so that the habitat does not deteriorate through the introduction of outside influences, e.g. man, weeds, and unnatural predators. The term "unnatural predators" is used because the prey/predator relationship plays an important role in the balance of Nature and introduced predators, e.g. foxes, upset this ecological balance.

Nangeen Hill Wildlife Sanctuary (Rock Wallaby Reserve)

The Reserve Management Branch of the Department of Fisheries and Fauna was created in 1968. Its initial problems were manifold; little work had been done on the problem of reserve management either in Australia or overseas, and the unique nature of Western Australian fauna and flora meant that there was little information available and even fewer established techniques or guidelines. The management of a piece of natural bush is much more complex than farm management, because instead of managing for a few species of plants and animals, one must maintain complexity where there are large numbers of plant and animal species.

At present in Western Australia there are about 400 reserves for the conservation of fauna and flora, comprising 12½ million acres. Of these 235 (comprising about 11 million acres) are vested in the Western Australian Wild Life Authority. The responsibilities of the Authority and the Reserve Management Branch are to establish new reserves, ensure they are in the right place, are of the right size, and are properly managed.

Tutanning Wildlife Sanctuary—example of over-mature vegetation requiring burning. Note dying box poison in foreground at base of tree

Determining the size of a reserve is of paramount importance: a suitable size in one area will not be suitable in another. In the deserts a greater area is necessary than in a high rainfall area because of the lower density of plants and animals in dry country. In Western Australia, it is considered that 50,000 acres is the minimum size for a reserve which will continue to harbour a full range of plants and animals; reserves under this size need careful management if they are not be be altered drastically by external influences.

When the land around a reserve is cleared for farming, the character of a reserve begins to change. What was once a large area of unbroken bushland becomes an island surrounded by country which most of the animals are unable to inhabit. The reserve commences a change in character due to outside pressures such as the introduction of weeds like wild oats and introduced animals like rabbits, foxes, cats, dogs, rats and mice. Fire also tends to become more frequent with consequential effects on the plants. A reserve affected by these external influences, if not managed, slowly and inevitably will change over a period of many years; plant associations will deteriorate and the animals they support will decrease in variety and numbers. Because the unfavourable pressures are exerted from the outside of a reserve, a smaller reserve will be affected more quickly than a larger one because the buffer zone which is created around the perimeter forms a greater percentage of the overall area, and the centre of the reserve is relatively close to the cleared land. This has already occurred in many smaller reserves in the south-west of the State.

Firebreak construction at Tutanning

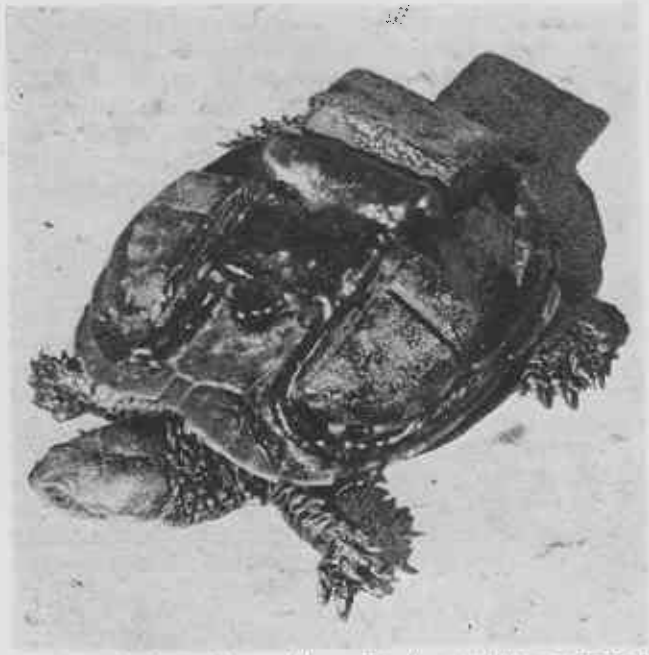
This outside pressure is only one factor affecting the changing character of a reserve. In smaller reserves there is a much greater chance that a fire will burn out a whole area and destroy all the food and cover for a particular species. In larger reserves pockets of land will remain unburned and the animals there will repopulate the areas as they recover. Thus paradoxically, the

Dr. A. A. Burbidge with radio tracking equipment

larger the reserve the less management it requires. These larger reserves are usually in the more remote parts of the state and are known as Primitive Reserves. Examples are the Northern Nullabor Wildlife Sanctuary which consists of over 6 million acres and the Fitzgerald River Reserve of 604,000 acres.

Twin Swamps Wildlife Sanctuary showing pit traps used for catching tortoises

Rare Species Reserves are a different kettle of fish entirely. Almost as if by some diabolic prearranged plan Nature seems to have decreed that the rarer species of wildlife shall inhabit areas which are subjected to human usage or interference. The Short-necked Tortoise Reserves at Ellen Brook and Twin Swamps are typical in this respect. Situated only 20 to 25 miles northeast of Perth, they are surrounded by land which has been developed or is likely to be developed in the near future. They are also relatively small and therefore would be unable to withstand the threat of extensive alterations to the external environment.



Short-necked tortoise with radio transmitter attached

So delicate is the balance, that research officers visit these reserves on average about once a week during the winter, monitoring populations by recording movements, growth, age and numbers. This research has been continuous since 1963. Apart from this biological research, much of the work of Reserve Management Officers is taken up with fire control. Because of the tortoise's habit of burying itself under leaf-litter or fallen branches in summer, a fire through the reserves would be disastrous.

A word here about fire control in relation to the management of reserves. Most of our native flora is not only fire-resistant but actually requires regular burning. Fires have been going through this country for hundreds and thousands of years and the plants and animals have adapted to these. In the management of reserves it is necessary both to prevent fires and start them.

Prescribed burning at Tutanning

Firebreaks not only control fires which start accidentally, but also control those fires started by Reserve Management Officers when they are burning to rejuvenate the flora and to reduce leaf litter. This is known as prescribed burning; it is burning under a certain set of conditions so that the fire becomes a tool of management. The management officer controls the rate of spread of the fire, the height of the flames and the percentage of the area that will be burned.

Many animals can survive relatively "cool" fires; but where leaf litter accumulates the fire becomes hotter, giving us the paradox that if we protect our fauna from fire we may in fact be helping to destroy it. Furthermore, if an area remains unburned for a long time it can change in character and become unsuitable for the animals it supports.

The Short-necked Tortoise Reserves are examples of rare species reserves where the pressures are mainly external and human access and interference very limited. But the Two Peoples Bay Wildlife Sanctuary, the home of the Noisy Scrub Bird, has a history of considerable human usage. The scenery and excellent fishing make this area extremely attractive to tourists.

Management must therefore cater for tourist activity without allowing it to compromise the primary aim of the management plan which is to protect the habitat of the reserve for the Noisy Scrub Bird. In addition to fire control, the management plan involves creating roads through the reserve to permit access to attractive picnic and beach areas, but access is restricted in other areas where the bird is known to exist. This reserve is so important that a full-time ranger is housed actually on the reserve.

Fire out-of-control at the Two Peoples Bay Wildlife Sanctuary February 1970

It can be seen therefore that no two reserves are alike and each requires a different management plan. The most complex management plans are for smaller reserves housing a variety of fauna. Possibly the best example of this is the Tutanning Reserve. This is an area of only 5,000 acres but contains about one dozen varieties of marsupial. One problem for management is to provide varied habitat; not only a diversity of vegetation type but also vegetation of different ages. For example, when the she-oak is small it is a food source for the Tammar; after 5 to 7 years' growth it provides shelter for the Tammar; between 11 and 15 years' growth it shelters the Red-tailed Wambenger and when mature it becomes the habitat of the Ring-tail Possum. Since the area is isolated and the animal community virtually imprisoned by the clearing of the surrounding land, a fire through the reserve would be catastrophic. The vegetation at different stages of growth which provides prepared habitat for some of the fauna would be destroyed and certain species would be eliminated.

Regenerating Casuarina at Tutanning

The diversity of the vegetation is not the only management problem. Population levels are important also, since different animals require varying living space. A single Woylie weighing only 2 lbs requires up to 100 acres, but the Tammar weighing about ten pounds requires only 4-5 acres.

The situation at Tutanning is therefore extremely complex. So complex, in fact, that a Research Station has been established in the reserve to facilitate further research.

Casuarina at Tutanning before regeneration

Our rapidly diminishing wetlands are another type of reserve which require management. The preservation of wetland refuges is the key to maintaining waterfowl populations in Western Australia; but on the Swan Coastal Plain alone over 150,000 acres of wetlands have been drained for industrialisation, urbanisation and agricultural projects. It is unfortunate that the prime agricultural lands are also those areas which have, for thousands of years, provided the habitat for much of our waterfowl.

The loss of coastal wetland refuges has a disastrous effect on our waterfowl populations because the birds are unable to survive our long summer on the limited permanent waters of the inland areas. In addition, many freshwater swamps are deteriorating through the inflow of brackish or saline water. This is borne out by the increasing proportion of Mountain Ducks in the waterfowl population (these birds have a preference for a salt-water habitat), and the decreasing proportions of Black Duck and Grey Teal, which are much more desirable as game birds.

Recommendations for the establishment and management of game reserves and sanctuaries

are based on data collected by the Department's Waterfowl Research Unit. Trapping and banding provides evidence of migration patterns, breeding habits and the type of habitat preferred by the various species; over 20,000 ducks have been banded to date.

Other practical work undertaken by the Waterfowl Research Unit is the establishment of artificial nest-boxes. In Western Australia nearly all ducks nest in the hollow branches of trees. In many wetland areas there are few suitable nesting sites and elsewhere much timber has been cleared for agriculture. In an attempt to remedy this, nearly 2,000 artificial nest boxes have been erected in the South-West.

This research work is not "management" in the strict sense of the word, but on the basis of the data obtained management decisions can be made. There are two types of waterfowl reserve; game reserves where shooting may take place during the annual waterfowl hunting season, and waterfowl sanctuaries and refuges where shooting is not permitted at any time. The sanctuaries are areas where it is necessary to conserve waterfowl, for example, where a rare species like the Freckled Duck is found (e.g. Benger Swamp), or where large populations of ducks congregate (e.g. Mandurah). The refuges are reserves established in areas of considerable shooting pressure, so that birds may retreat to safety during the hunting season (e.g. Lake Muir).

The conservation of waterfowl is a complex problem, but it is not the game shooter who exerts the greatest pressure on our waterfowl populations. The effects of the game shooter can be and are controlled; if research shows that shooting in a particular area and at a particular time is not warranted, then the area is closed to shooting for that season. In 1969 drought conditions were so severe that there was no season proclaimed. Game shooters in general are aware that management measures such as this are vital if their sport is to have a future. It is the reduction of our wetlands that poses an almost insuperable problem. Since we cannot hope to stem the tide of urbanisation and industrialisation we must **create** artificial lakes such as those at Beverley. In this way we can prolong the existence of populations of waterfowl.

It must now be apparent that the work of fauna conservation and the Reserve Management Branch in particular is complex in the extreme. With only a very small staff to manage and police 400 reserves totalling 12½ million acres, the Department places great value on the importance of the role of Honorary Wardens. Quarterly reports detailing unusual sightings of fauna are of special interest to research officers. In addition, and particularly in more remote areas, reports on the unauthorized usage of reserves, fire hazards, increased predation on fauna etc., all help to lessen the burden of the district warden and the Reserve Management Branch.