S.W.A.N.S.

WESTERN AUSTRALIA

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DEPARTMENT OF FISHERIES AND WILDLIFE, PERTH

S.W.A.N.S.

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Director of Fisheries and Wildlife: B. K. Bowen, B.Sc.

The support of the public is an essential component in any conservation or reserve management programme—but an informed, educated public is needed to ensure its continuing success.

This publication is designed as a medium by which the various organisations, individuals, and wildlife management personnel may be kept informed of the work being carried out by this department; of departmental policies and directions; and for promoting a better understanding and appreciation of Western Australian wildlife and the role it plays in maintaining a suitable environment in which man can live.

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Something to think about

A recent television documentary on dolphins highlighted their capabilities of learning and revealed the perfect harmony in which they live with their environment.

It was stated that humans and dolphins probably evolved from a common source of prehistoric ancestory, but millions of years ago the two species separated, one staying on the land and one taking to the sea.

Time and environment changed the physical appearance of both mammals but the dolphin adapted to its aquatic surroundings in a relatively short time. Since that time the superbly efficient and streamlined body of this mammal has changed little.

In the documentary, scientific experiments showed that dolphins have super-perfected senses including communications between one another that are possibly out of the range of human understanding.

They were also shown to have two enemies: human beings and sharks. Sharks, super predators of the sea, occasionally take dolphins for food. Human beings on the other hand, prey on dolphins for sport or kill them with indiscriminate fishing procedures.

The thought is then pondered: if the earth was visited by outsiders who came to record which animal had the superior and successful existence on the planet, which would they choose? Would it be the dolphin which has evolved and learned to fit in with his environment causing no change to upset the balance of nature? Or would it be the human being, who changes his environment to suit his whims and needs, in turn destroying, polluting and affecting himself and other creatures?

IN THIS ISSUE . . . .

THE DESTRUCTION OF WESTERN AUSTRALIA'S HERITAGE AND HABITAT

Western Australia is definitely a state on the move, a state of excitement, a good place to live . . . but there is a cost. In this state the cost appears to be our natural heritage.

The last edition of S.W.A.N.S., Volume 8 Number 1 featured an article called "People . . . They Just Slay You"; this story could be read in conjunction with that article.

In the past years of so called "progress" one can look at most of our worldly achievements with some sort of pride. On the other hand it is sad but inevitable that evolution in the 20th century has forsaken some of the natural qualities of life on Earth.

To have to explain or account for this statement could lead to the usual emotional fog of words that always succeeds in camouflaging the real issues. If one does not understand, then it is probable that one is already lost to the "system".

The famous American Indian Chief Seattle once wrote in a letter to the United States' President Franklin Pierce, "We know that the white man does not understand our ways. One portion of the land is the same to him as the next, for he is a stranger who comes in the night and takes from the land what he needs. The earth is not his brother, but his enemy, and when he has conquered it, he moves on. He leaves his father's grave behind and he does not care . . . His father's grave and his children's birthright are forgotten.

He treats his mother, the earth, and his brother, the sky, as things to be bought, plundered, sold like sheep or bright beads. His appetite will devour the earth and leave behind only a desert."

A Bulldozer and Grubbing chain when indiscriminately used, successfully converts bushland into an organized desert.

The Coblinine River near its efflux with Lake Dumbleyung. Salt intrusion has gradually killed all nearby vegetation. Stock grazing and wind erosion have denuded the beaches and the water is now many times more salty than sea water. If it weren't for nearby farm dams and some aquatic vegetation the Coblinine would have no birdlife whatsoever.

Most of the Western third of Australia is natural desert or semi arid bushland. In Western Australia's one hundred and fifty years of settlement, the clearing of land for agriculture, mining and other industries has been done on an extensive front, using modern machinery and techniques. The bulldozer, the tractor and the chainsaw in the hands of men, have made alterations to our countryside easier, faster and therefore more ruthless. In the past, stands of large trees have been easily disposed of and wetlands energetically reclaimed. This extreme and sudden depredation of vegetation and landscape has now left us with 1·2 per cent of the state's farm-lands affected by salt intrusion. Not only are there large tracts of land barren of natural vegetation but the soil itself is continuing to deteriorate in its ability to successfully grow agricultural crops.

Salt tolerant vegetation can be planted to stop erosion etc. but what may have taken 50 years to destroy, will take hundreds of years, if ever, to achieve original status. We will try to rehabilitate the land by employing experts and scientists, but can they really give nature the hurry on?

It's time for us all to wake up. The over exploitation of property, resources and people is old fashioned. Western Australia will continue to develop and its population will continue to grow, demanding more produce and employment. But let's cultivate for tomorrow while we harvest today. It's up to every individual to put back a little quality into our environment. Develop but develop with thought and compassion.

As it stands, in 200 years time none of us will be here; but in looking past the banners, headlines and ego trips, does anybody really care?

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Vale Samuel William Bowler

Samuel William Bowler first commenced duties as a temporary Inspector of Fisheries, with the Department of the North West in March 1946. Over the following two years Sam carried out regular inspection duties in and between Perth, Moore River, Rottnest, Mandurah and Fremantle. During this time, two terms were also spent relieving officers in Geraldton and Mandurah.

In 1949 Sam was appointed Inspector-in-Charge Fisheries Office Geraldton and was consequently reclassified to Assistant Inspector on the permanent staff.

Sam's capability and zeal in the job led to his promotion again in June 1950. While still residing in Geraldton he was reclassified to Inspector of Fisheries in, as it was then known, the Fisheries Branch of the Chief Secretary's Department, Sam continued to give the Department his utmost in conduct, efficiency and attention for the next five years in Geraldton until taking over the Mandurah office in 1955. In the ensuing years Sam carried out the duties of both Fisheries Inspector and Fauna Warden in many parts of the State. His presence in the most desolate and rugged areas of both land and sea, when he was needed, saved the exploitation of many of our frontiers fish and wildlife.

In May 1957 Sam was appointed to the position of Senior Fauna Warden and continued in this position until being promoted to Supervising Fauna Warden in 1971.

Supervising Wildlife Officer Samuel William Bowler of the now Department of Fisheries and Wildlife retired in May 1978, having completed 32 years unbroken service with the Department.

He is best described as one of the pioneers of field and surveillance work within the Department.

The people of Western Australia who know Sam and Mrs Bowler wish them many years of good health in which to enjoy their well earned leisure. As a tribute, some of Sam's closest colleagues have seen fit to express their feelings and thoughts in their own words.

H. B. Shugg,
Conservator of Wildlife,
Department of Fisheries and Wildlife.

Sam Bowler—a Character—a real, lively, decent, loyal character. Honestly hardworking, he is rightly respected throughout the State as a man and an officer who did his duty but bore no malice. A "gun inspector", he always gave the taxpayer (the "Customer") every courtesy—no matter what.

Though he specializes in "polishing yarns" and "spinning dits", his honesty and integrity were never questioned in the courts or anywhere else when the whips were out.

"Well done thou good and faithful servant" of the State. Enjoy your rest, you *have* earned it.

B. Carmichael,
Chief Wildlife Officer,
Department of Fisheries and Wildlife.

I find it hard to believe that 27 years have passed so quickly since first meeting Sam Bowler in 1951. He was Officer-in-Charge Geraldton, I was a first year Cadet Inspector.

Many Geraldton fishermen will still say "Sammy Bowler stopped the Kakka business here, because he got in and cleaned the place up showing favouritism to no-one".

I can confirm that too, because as a Cadet I was also involved and trained by Sam in those years.

His dedication, and belief in his job has since been followed by many young inspectors and Wildlife Officers, some of whom now hold senior positions within the Department, largely as a result of the early training and association with Sam.

Sam was and still is, a friend and adviser to all who know him. Among his many other talents, he is "Walking travel agency", an "off the cuff" quip expert and he could have closely rivalled John O'Grady the author, (of Nino Cullota fame) had he pursued a natural ability as a story writer.

There are many people still in the department who are indebted to the help and guidance given by Sam Bowler. I am certainly one of them. May he and his wife be well rewarded with a long, happy, satisfying and well deserved retirement.

Bob Marshall,
Supervising Wildlife Officer,
Department of Fisheries and Wildlife.

I cannot recall where or when I first met Sammy Bowler—could have been in the after-hours back bar of the Sandringham Pub, or when he was legging his famous Dad onto the back of a long shot at Goodwood, Belmont, or Canning Vale, or even at "The Demons" old footy ground, the W.A.C.A.

However, we were to meet infrequently from time to time from the immediate post-war years onwards.

One of such meetings that readily comes to mind was during the early 60s. At the time I was Officer in Charge the "Cop Shop" in Kununurra. Contact with the outside world in those days was by mail service ex Wyndham by P.W.D. truck, the service being as irregular as the gravel road that connected both towns.

Visitors were as scarce as a cold can on the Nullarbor, and invariably arrived unannounced.

Imagine my surprise on a day that Kipling would describe as "The 'eat would make your bleeding eyebrows crawl".

I was seated topless, in the "cop shop" endeavouring to disturb the humidity by waving a dry frond of a Pandannus palm, when in walked Samuel William Bowler and a travelling companion, John Schinzig from Moodiarrup, who was riding "Shot Gun" in the old Landrover, both looking like Bourke and Wills a few miles short of Cooper's Creek.

Before I could say "Gooday Sammy" he said "For C----- sake mate, who did you upset to get sent to this b----- hole?".

After they had showered in the ablution block of Her Majesty's Lockup, and an up-date on things happening in the civilised south, associated with the despatch of several cold "Stubbies", Samuel William Bowler outlined his mission in the area.

In a very short time stuffed crocodiles (*Crocodylus johnstoni*), from very small to whoppers, were seized from the canvas tented population of the area, summons' prepared and issued and a Court convened, immediately.

P.G.s (Plea's of Guilty) were the order of the day, and when the Court was adjourned Samuel William Bowler was possessed of as many Crocs as anyone is ever likely to see in one haul.

Samuel William Bowler and John departed from Wyndham a day or so later, the Landrover protesting under the added weight of the Crocs, some of which had an aroma comparable with the Shenton Park treatment plant on a hot summers night.

The day following their departure a transport driver on the Wyndham-Halls Creek run called on me and related that on the previous day, some ten miles from Kununurra he had stopped and investigated a column of smoke emanating from a dry creek bed, some distance from the roadway. He there found two B----- crack pots burning some ancient stuffed Crocs. He admitted that he had been resident in the "top end" long enough for his own brains to be addled but these blokes would have to be refugees from an asylum.

Years passed, neither Samuel William Bowler or I ever imagining that we would one day end up serving the same master. But fact, often stranger than fiction, we did, and he, as my supervisor.

There had been times in the ensuing period that we have clashed on both official and social issues, depending on the prevailing moods, but time will never dim the humour, and pleasantries shared and valued.

Samuel William Bowler was born a "Gum sucker" (Victorian) but he is as parochial a "Sand Groper" as any born west of the 129th.

He denies being a seccessionist but his parochialism is such that he maintains that Australia would even be a better place, if entirely populated and managed by "Sand Gropers".

I sincerely hope that he is blessed with longevity to enjoy the retirement so well deserved, and in the twilight of his time, wend his way to the two pieces of "Terra firma" which he believes hallowed ground, Lathlain Park, and the W.A.C.A., and there enjoy watching the contestants, only if W.A. or "The Demons" are belting the stuffing out of the opposition.

Editor, S.W.A.N.S.

Among eight former W.A. Public Servants who were awarded the Imperial Service Medal in the New Year's Honours List was Mr. S. W. Bowler, of Mt. Pleasant, the former supervising wildlife officer in the Department of Fisheries and Wildlife.

Congratulations—a well earned recognition.

DOLPHIN KILLED AT LEDGE POINT

If you thought that the killing of dolphins doesn't happen anymore then you are probably just a normal Western Australia.

A report to hand from our inspector at Lancelin tells a story which is rather depressing.

On the morning of Tuesday 3rd October 1978, Fisheries Inspectors proceeded to Ledge Point to investigate a report received that a professional fisherman had taken four dolphins, for use as lobster bait, the heads and remains of which were said to be at the Ledge Point rubbish dump.

The rubbish tip was inspected but the remains of only one dolphin were found. An interview revealed that a fisherman admitted catching a dolphin in a set shark net and after it was found (dead), had cut it up to use for bait. This in itself left the fisherman open to a charge of taking protected fauna. The witness who reported the incident was interviewed and remained adamant that the previous morning (2-10-1978) the heads of four individual animals were at the tip. On return to the tip site with inspectors the witness could only insist that three heads had been removed.

On return to the suspect's property, drums of putrid brine revealed dolphin meat and skin together with shark and bream flesh. It was physically impossible for the inspectors to empty the casks or determine the exact amount of dolphin flesh within the vats.

In the opinion of the inspectors it was more than the drums that smelled fishy, and because of no further physical evidence, the whole exercise had reached a standoff.

In frustration the inspectors realized that without further evidence to support the report that four dolphins were taken, the fisherman's explanation about the accidental taking of one animal could be seen by a court as being acceptable.

The story obnoxious as it is, raises the following doubt. Apparently some people are either ignorant of the law or just plain defiant. The latter seems probable. "Grapevine" reports indicate that this offence is not a completely isolated one and the department therefore will promise to come down hard on any offender and impose the maximum penalty under the Wildlife Conservation Act for any breaches.

WHITE COCKATOO MOVEMENTS

Have you noticed that white cockatoos have moved into new areas throughout southern Western Australia during the past two years? If so, they could be one or a mixture of three species of birds; Long-billed Corellas, Little Corellas or a few aviary bred Sulphur-crested Cockatoos. While there are unfortunately always a few aviary escapees, it appears that the Corella species in the wild in W.A. is on the move. These together with the Sulphur-crested Cockatoos have brought a white cloud of uncertainty to our doorstep.

Whilst it is pleasant at times to observe new events or strange happenings in the world of nature, such changes can lead to complications for man.

In a stable environment, the numbers of the component species do not usually show large fluctuations, however when man changes the environment, large scale changes in numbers and distribution may occur, e.g. agricultural clearing to the north of Perth has allowed the Little Corella to extend its range to the south in the last 30–40 years, the Long Billed has also extended its distribution to the east.

Little Corellas (*Cacatua sanguinea*) are generally thought of as loud and gregarious birds, their raucous calls have at times driven people to the edge of despair. They have also been known to damage power lines and television aerials by their prolific numbers and chewing habits. These birds are found generally distributed from Carnamah to throughout the Kimberley, feeding mainly on seeds of grasses and legumes. They prefer native grass seeds to grain crop when the former are available.

Long-billed Corella—(*Cacatua tenuirostris*) (Eastern States sub species with red collar)

Photo by G. Chapman

Long-billed Corella—(*Cacatua tenuirostris*) (Local Western Australian bird with no collar colour)

Photo by L. Moore

Long-billed Corellas (*Cacatua tenuirostris*), also a noisy bird, are uncommon but may be locally abundant in their small range. They are found in a narrow band from the open woodland and farmlands north of Perth to just south of the Murchison district of W.A. There is also a small area in the mid-south-west of the State which supports its own colony.

Long-billed Corellas are different to Little Corellas in that the aforementioned spend most of the day feeding on the ground. They leave their roosting trees, moving out into open country where they scratch about for seeds and use their extended upper bill, digging for roots and bulbs.

Wildlife officers on a recent field trip from Perth to Perenjori, reported numerous sightings of Little Corellas in the Moora/Miling area.

Whilst ornithological references of recent times have indicated a possible southwards progression of range, doubts have been expressed as to the severity of the invasion.

From photographs taken, there is no doubt that Corellas, either Little or Long-billed were sighted on the trip but positive identification is extremely difficult at even a moderate distance.

To date C.S.I.R.O. have not sighted Little Corellas south of Coorow.

It has been determined that the two species are flying together in the Carnamah/Three Springs area, but whether there has been mixed breeding is not known.

C.S.I.R.O. think that Little Corellas could become an increasing minor nuisance if their southern range is further extended and becomes permanent. Dealing with them in the correct manner will need careful planning. The example at present is Long-billed Corellas. In the Hill River District at Jurien they are a nuisance, however a short distance north, none can be found.

At present there are two flocks (maybe more) of either Long-billed or Little Corellas (or mixed) in the Perth metropolitan area. One flock of approximately 30 birds, seen regularly in the mornings at Lake Monger, is thought to be travelling around the western suburbs.

At Midland there is a mixed flock of Little Corella and Sulphur-crested Cockatoos, the numbers seen at Midland varies from a few to 80–90, also the number of each species in the flock varies. These changes are undoubtedly due to each species being nomadic.

Four birds travelling together have been noticed making regular fortnightly visits to the Wembley Downs area. Whether they are a separate group or a fragment of the Lake Monger flock is unknown. From the distance observed they could be any one of the three white species.

With the situation as it stands, regarding numbers and identifications in the State, it would be advantageous for this Department and C.S.I.R.O. to be advised by anyone having positive information on species, places, numbers and dates. There is particular interest in sightings in all areas south of Carnamah. Exact identification of species must be determined remembering that the antics and general appearance of all species of Corellas are very similar. It is preferable to observe at close range with a telescope or even closer with binoculars.

Little Corella—(*Cacatua sanguinea*)
Photo by G. Chapman

LITTLE CORELLA—*Cacatua sanguinea*

The Little Corella, also known as the bare-eyed cockatoo has a repertoire of more than 10 calls. The most common used are:— the alarm call, (an unforgettable raucous screech); a two syllable, wavering contact call in flight; a range of raucous calls associated with breeding pairs. Adult birds are approximately 380 mm in length including 160 mm of tail. The sexes are alike with general plumage being white with sulphur yellow under wings and tail. These birds have no distinct crest but when alarmed, the feathers on top of the head can be raised. There are small reddish coloured feathers between the bill and the eye. This varies in shape with age and possibly sex. The bill is horn coloured, short and typical cockatoo shape. The legs are dark grey.

LONG-BILLED CORELLA—*Cacatua tenuirostris*

The Long-billed or Slender-billed Corella has a contact call frequent in flight, sounding like a three syllable chuckle. The bird shrieks when alarmed.

Adult birds are approximately 375 mm in length including 130 mm of tail.

The colour and general appearance of this bird is exactly like the Little Corella, however the upper mandible is extended for digging roots and bulbs. It is thought that the length of the upper bill increases with the bird's age. Hence immature Long-billed Corellas could be mistaken for Little Corellas. Ornithologists or bird fanciers who have handled the two species could possibly distinguish the difference.

The Trainee Wildlife Officer

After receiving his basic training at Head Office, the trainee obtains further experience by working with other Wildlife Officers in the field.

The Wildlife Officer's main duty is to enforce the Wildlife Conservation Act and Regulations. His duties in enforcing the Act and Regulations are many and varied, some of which are listed below:

(i) Inspections are made frequently of fauna and flora reserves and it is the duty of the officer to ensure that no illegal shooting takes place or the habitat is being destroyed by the dumping of rubbish, removal of soil, vegetation, etc.

(ii) Patrols are carried out in the areas where illegal shooting is suspected.

(iii) Licenced bird trappers are checked in their area of trapping to ensure that the strict regulations placed upon them are adhered to.

(iv) Inspections of all bird dealers and some aviculturists are made to ensure that they comply with the regulations.

(v) Inspections of all kangaroo skin dealers and processors are carried out on a regular basis, as are inspections of the licensed kangaroo shooter and his equipment.

Regular patrols are made by metropolitan wildlife officers and those stationed in country districts, and it is the duty of the officer to apprehend any person who is committing a breach of the Act or Regulations. He then must compile a detailed prosecution report and give evidence in Court as required by the Department.

The Wildlife Officer is required to do a certain amount of manual work, such as erecting nature Reserve signs, washing and cleaning the Department's vehicles and the care and maintenance of other Departmental property.

Qualifications and Requirements

Education: An Achievement Certificate or the equivalent is required. Higher qualifications would give the applicant preference.

Physique: A minimum of 172 cm (5ft 8ins.) in height and 59 kg (130lbs.) in weight and sound physical health.

Age: 18–25 years.

Knowledge: Preference is given to those applicants who have some knowledge of the fauna and flora of this State. Preference is also given to those applicants who are not afraid of manual work, who can use a four wheel drive vehicle or outboard motor, read maps, use a compass, have camping experience and are able to cook and take care of themselves in the bush.

Character: The applicant must be of excellent character; no person with a criminal record would be considered. The applicant must display above average initiative and be reliable. Past service with the school cadets or scouts is an advantage.

After a satisfactory qualifying period, the trainee will be premoted to a Wildlife Officer when a vacancy occurs. Salary rates range from $5 803 to $9 104 as a trainee, graduating in yearly increments. Wildlife Officer's salary ranges from $5 803 to $12 767. An additional commuted overtime allowance of 15 per cent is payable on the gross annual salary. A ten day fortnight is worked, with four days off. Days off in lieu for public holidays worked are also allowed.

Departmental Report on South-West Wetlands

In August 1977 a seminar at Busselton involving residents, landowners, shire officers, Government officers and wildlife experts, discussed the problems and possibilities of protecting the districts wetlands and waterfowl. From this seminar came the full understanding of the districts valuable wetlands in respect of wildlife and town planning alike.

After further observations and consultants' reports on the State's waterfowl and wetlands, a special report has now been prepared by the Western Australian Department of Fisheries and Wildlife. It is to provide general information on the wetlands (swamps, rivers, estuaries, etc.) of the South West of Western Australia, their ecology and some of the problems of their management.

Particular attention is directed towards the wetlands of the Busselton area, namely the Broadwater and the Wonnerup and Vasse Estuaries. A brief account of their value to wildlife and their need for management is given, and an outline of the Department's intentions in relation to future management of these areas is also provided.

The document discusses the broad principles of wetland conservation and management mainly in relation to waterbirds as these are a relatively familiar and well-studied group. It should be noted, however, that wetlands provide essential habitats for a whole range of plants and animals other than waterbirds, each species with its own specialised requirements.

The report is well illustrated with diagrams of habitat layouts and black and white and colour photos of a representative selection of Western Australian waterbirds. Also listed are seventy-three regularly recorded species of waterbirds and their food and nesting habitat information. Thirty-four occasionally recorded species are also listed.

Copies of the report are available to persons cr companies owning land incorporating wetland habitat or people involved in wetland conservation.

A WIN FOR THE SMOKER PARROT

Last July letters were sent by the Western Australian Aviculturists Society to the Shires of Broomehill, Gingin, Narrogin, Victoria Plains and Wickepin pointing out that the Smoker Parrot, while protected throughout the State by the Department of Fisheries and Wildlife, was an agriculture protection board "declared species" (vermin) in those shires. This once prolific but now rare bird could therefore be reduced in numbers or kept under control (shot in other words) but not taken for aviculture.

It was pointed out to the Shires concerned that it was possibly only an oversight on their part that this situation persisted, as it was felt that the numbers were not now so great that the bird presented any threat to Agriculture. It is to the Shires' credit that each one agreed with the Society and consequently wrote to the Agriculture Protection Board asking that the position be rectified.

The Smoker has now been re-classified by the Agriculture Protection Board and if the numbers ever build up again, so much that it becomes a pest, it can be controlled. It is gratifying that the Shires have acceded to such a request from the aviculturists Society.

Regent or Smoker Parrot—(*Polytelis anthopeplis*)
Photo K. & B. Richards

Fire Control and Nature Reserves

By H. B. Shugg

The following address was given by Mr H. B. Shugg, Conservator of Wildlife, Department of Fisheries and Wildlife to a Bush Fires Board training course held at Wanneroo in 1978.

"The Wildlife Conservation Act, 1950–1977, was enacted 'to provide for the Conservation and Protection of Wildlife'. It declares all fauna to be protected and makes it an offence to take (i.e. to kill, capture, or to molest or disturb by any means, etc.) any of the indigenous Australian fauna, except under the authority of a license issued pursuant to the Act and Regulations.

"That is the broad charter and responsibility which devolves on the Department of Fisheries and Wildlife and the Western Australian Wildlife Authority—to protect and conserve wildlife. Parliament, however, has given other Departments and Statutory Authorities responsibility to do other things which, at times, conflict with the requirements of the Wildlife Conservation Act.

"Without exploring the tortuous channels of legal paramountcy between Acts, administrators have to accept that Parliament rightly expects them to find ways by which the intent and purposes of its laws may best be given effect.

"We cannot do this unless we are prepared to accept that our legislation, rights and powers are not meant to over-ride other Acts. Instead they must be applied so as to achieve as much or as many of their aims as is possible at any given time or place.

"So what I am asking you to do is to understand what we are doing and why we want to do it.

"Habitat Reserves

"All wild animals depend on natural habitat to survive. Generally speaking, wildlife is pretty secure from extinction as long as sufficient habitat suitable for each species remains. When European man first came to Australia, Aborigines and the then surviving wildlife co-existed because the Aboriginal people left all the habitat relatively undisturbed. They cleared no land for agriculture, nor for housing or for industry. They didn't fill in swamps or dam or pollute the lakes, rivers and streams to any real effect. European man changed all that with his 'busyness', agriculture and industry. With Europeans came the first need for a wildlife conservation programme and the present system of nature reserves slowly evolved. It is not a complete system—we are still adding to it as scientific and general knowledge show it to be necessary and opportunity and finance permit. My own view is that we need to reserve at least 10 per cent of each habitat type and we are a long way from that goal.

"What our reserve system now amounts to is a patchwork of remnant habitats. Actually, the nature reserves look more like a rash on the face of the State than a patchwork. The greater part of our reserves, particularly in the South-West, are small isolated pockets when viewed against the State as a whole. But without them we could not hope to keep more than a handful of the once vast array of species. How many of which species we can keep depends on how we look after and treat the reserves.

"HABITAT, FOOD AND FIRE

"Every species of wild animal requires a particular sort of natural habitat. If we alter its habitat sufficiently the species will become extinct. It won't cry, it won't go on strike, it won't make headlines. Like an old soldier, it will simply fade away.

"Life has been well described as an improbable state. It is not a state that will persist 'no matter what'. Its various forms have evolved in incredible complexity—the so-called web of life. Destroy any part of that web and its peculiar plant, animal and soil relationships will be affected.

"To do their job, nature reserves must be allowed to provide the life support systems on which our wildlife depends. This calls for a wide array of plant associations of all ages and various structures. Fire, where it doesn't alter plant associations, certainly modifies them. For example, look at what it does to ground litter. Depending on the characteristics of the fire, it will either convert the total ground litter, or part of it, to ashes. 'So what?' you might ask.

"Perhaps the importance of ground litter—the 'fuel bed' as you know it—is best appreciated by considering a research finding of Professor J. B. Cragg, that even in a simple agriculture ecosystem, the weight of animals below the surface—in the soil—may be as much as 10 to 50 times the weight of sheep grazing on the surface.

"Litter provides the basic food source for all the little beasties—bacteria, millipedes, slaters, beetles, spiders, ants and termites, and so on—that the larger animals in turn, rely on for food. The soil bacteria, little beasties, and their predators through their droppings, etc., convert the litter into nutrients which the plants in turn can take up again. The plants can then keep on shedding leaves and sticks and bark and so on for further processing in a continual cycling of nutrients to sustain the whole variety of life in the bush or forest.

"Litter is more than food. It also provides shelter and cover. It is a blanket to protect the soils, reptiles and small mammals from the elements—heat and cold, rain and wind. It supplies nesting material—for birds and other animals.

"Fire reduces or destroys the litter. It destroys the food of animals and breaks or bends the nutrient cycles. The fuel bed that is your concern is the food store of wildlife. Take away any part of it and you starve or expose a whole section of the wildlife web and so destroy it.

"Some very persuasive arguments have been adduced to try to show that fire has little lasting effect on Western Australian plants and animals. Anthropologists and others have postulated from very little evidence that Aborigines were continually burning to facilitate food gathering. Whatever use Aborigines did make of fire, there can be little argument that well-meaning experts have greatly exaggerated it. There can also be no doubt that many well-meaning people have been persuaded to ravage natural habitats with fire regimes that were designed with a lack of understanding of or care for their effects on plants, animals and soils.

"To put in perspective the claims that Aborigines used fire widely and continually, one needs to look at a few indicator species that depend directly on ample litter in their territories. Take two—the numbat and the mallee fowl. Both were once widely distributed through the woodlands and mallee. Numbats deliberately eat only termites. The termites which form the bulk of their food move along sub-surface channels and feed on fallen branches, logs and stumps. Remove these and their food goes and they die.

"You simply can't continually burn territories and keep numbats. In the case of mallee fowl, a similar story unrolls. These birds incubate their eggs in mounds of litter. As you know they dig a depression then fill it up with litter and soil, scrape over an area of 50–100 square metres. Various experienced people have estimated that after a fire in the arid mallee country it would take 30 or 50 years to accumulate enough litter to meet the needs of a successful mallee fowl's nest.

"As numbats and mallee fowl were widely distributed when European man came, the lower rainfall areas particularly must have been rarely burned deliberately by Aborigines. No doubt lightning strikes occurred as much then as now, and in all probability some camp fires occasionally got away.

"A further indication that fire must have occurred infrequently and/or irregularly before European man came can be deduced from the flora itself. Many plants that are easily killed by fire regenerate only from seed and some take longer than others to reach maturity and produce seed. Even when seed has been shed, the right conditions are needed for germination. We wouldn't have found plants like sheoaks for example, to have been widely distributed if the Aborigines had traditionally burned at periods less than 7 years. Animal populations dependent on particular plants, and vice versa, could not have been maintained if the Aborigines had imposed a fire regime different from that which allowed those associations to persist.

"FIRE POLICY AND NATURE RESERVE MANAGEMENT

"If it weren't for pressures brought about by neighbours, perhaps the best fire policy (for large reserves at least) might be—

(a) for fires that God lights—let 'em burn!

(b) for fires that Man lights—put 'em out fast.

"However, at least at present, that policy is not politically sustainable in most instances.

"Accordingly, the Wildlife Authority has adopted a general policy of trying to make fires more easily suppressible at least on those reserves most likely to suffer as a result of fires sweeping in from adjoining private land.

"Like other responsible organizations, we do this by installing firebreaks around perimeters and through reserves so as to divide them into compartments that can be deliberately burned when appropriate and, hopefully, in accordance with the requirements of wildlife and the law.

"There are approximately 1 000 nature reserves in the State approximating eight million hectares or about three per cent of the State. Every year, new firebreaks are installed which results in continual growth in the total that have to be maintained. In the 12 months ending June 30, 1977, for example, 665 kilometres were constructed on 44 reserves while a total of 1 018 kilometres were ploughed.

"Cabinet approval has been obtained to appoint three reserve management teams on a regional basis. We are in the process of recruiting the first of these to be stationed at Pingelly and the other two will be stationed at Wongan Hills and Katanning respectively. Each will consist of a professional officer, a technical officer and wages hands and will have appropriate fire fighting equipment. These, with our existing unit at the Wildlife Research Centre will bring a much greater effort and a high degree of professional skills to the better care and management of nature reserves.

"However, the rising cost of fire control on land reserved for conservation is a matter for concern to Government.

"In addition, some of us who are responsible for conserving wild plant associations and animal populations are becoming increasingly concerned that we should not fail in our task through falling in too easily with current thinking about the so-called necessity to burn.

"Departmental research and compilation of accurate historical data on fires in certain reserves is leading us to question previously accepted hypotheses. We now have 10 years of data and research experience for reserves like Tutanning and Boyagin. In that time there have been no fires started through natural causes on either reserve. We have carried out some preventative burning, and some fires have got away. Other fires have come in from adjoining farms, but none have been started by lightning strikes or other natural means—not in them, nor in our other wheatbelt reserves that we know of.

"Research into the ecology of our flora, and into fire ecology, is suggesting that the role of fire in maintaining species may have been seriously misinterpreted. Evidence is coming forward from the study of flora on islands for example, that have not been burned for very long periods, that the number of species is not necessarily diminished by the absence of fire.

"We need to keep an open mind at this stage on the relationships of fire regimes and flora associations. This is not to say that fire doesn't have a major influence on the wildlife. I don't mean to suggest that. Nor do I mean to avoid the importance of maintaining the greatest possible diversity of plants in our reserve system. In fact, I wish to emphasize that need because it is so important. But we cannot possibly maintain an acceptable diversity in any reserve that is subjected to a simple regularized burning programme.

"So, taking these things together, I see a real need to question whether the management of nature reserves should be approached primarily from a farm or property protection angle. I believe we should be questioning whether we should burn any part of a conservation reserve to protect a farm.

"I am not saying that farms should be left without a fire protection policy. On the contrary—reserves have to be protected from the fires which all too frequently get into them from stubble and clover burns and so on. So there must be, from our needs too, an effective farm fire control system.

"We need firebreaks on either side of boundaries between farms and reserves—and it might be cheaper to the taxpayer to ensure that the breaks between crops and the reserves' flora are sufficiently wide to make burning of the reserve unnecessary from either a farm protection or a reserve point of view. While the payment of compensation for loss of productivity is ever a frightening prospect to the Treasury, it might sometimes at least be cheaper than maintaining expensive fire fighting organizations. I think this approach needs to be given much more thought by all concerned.

"Whatever the future holds, we need to keep talking to each other and co-operating. We will not overcome the problems arising from the conflicting aims of Government unless we try to understand each others points of view.

"I hope this paper achieves something towards that end."

INTRODUCED TROUT STOCKS

Every year, providing the weather permits, the Department's Pemberton Fish Hatchery supplies trout fry for release into streams, rivers and dams of the south-west of Western Australia.

Waterways that have proved over the past to be suitable habitat for the introduced trout, provide the public and organised fishing clubs with a sport fishery and food resource.

At the hatchery, ova from the brood stock are hatched in troughs and held for a period as fry. When the fry have grown into fingerlings (approximately 5 cms long) they are transferred to holding ponds. Some of this new stock is held and reared for up to three years as brood fish. The remainder is sold or used for the re-stocking of public waters.

Many requests are received by the Pemberton Hatchery and the Department regarding the stocking of private agricultural dams. Requests are also received from metropolitan homes and clubs to stock private ponds with marron and trout. Whilst trout will not breed in a pond habitat, artificial feeding will enable the fish to grow quickly. The large fish can be then culled for the table and replaced seasonally with bought stock.

At times when there is a shortage of local bred Brown and Rainbow Trout, shipments are purchased from the Eastern States.

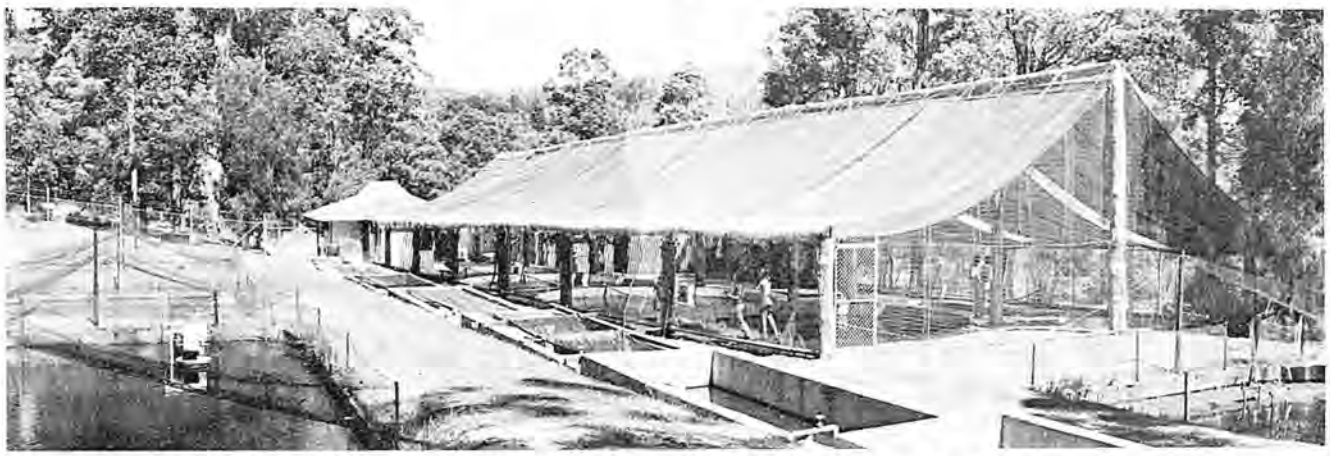
About May-June every year the ova hatch into trout fry.

In the following September-October the small fish are then released into public fishing waters. The stocking of those waters and the numbers involved for 1978 were as follows.

Place	Number of Trout fry	
	Rainbows	Browns
Waroona Dam	40 000	....
Drakesbrook (Dam)	20 000	....
Samson Dam	15 000	....
Stirling Dam	20 000	....
Logue Brook Dam	20 000	....
Harvey (Weir)	20 000	....
Oakley, etc.	5 000	....
Glen Mervyn Dam	20 000	....
Murray River	60 000	....
Collie Gorge	20 000	5 000
Harvey River (upper)	5 000	20 000
Brunswick River	10 000	10 000
Blackwood River—		
Bridgetown	20 000	....
Nannup	20 000	....
Lower	20 000	....
Warren River	20 000	5 000
Lefroy Brook	17 000	....
East Brook	10 000	....
Donnelly River	40 000	....
Jane Brook	....	4 000
Albany Area	20 000	....
Farm dams	13 000	....

Stocking travelling—8 554 km.

	Bred at Pemberton	Purchased from Victoria
Stocked in public fishing waters	435 000	44 000
Sold for private farm dams	74 900	....
Sold interstate	87 000	....
	596 900	44 000
Held in hatchery for brood Stock and further autumn stocking	12 000	
	608 900	



Department of Fisheries and Wildlife Trout and Marron Hatchery at Pemberton.

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MULGARAS ON DISPLAY

In response to a request from the Department of Fisheries and Wildlife, Mr. Pat Green, Warburton Project Manager, obtained a pair of unusual carnivorous marsupials and sent them to the Department's Wildlife Research Centre.

After various data were recorded and photographs taken, the Mulgaras (an Aboriginal name) were sent to the Perth Zoological Gardens for housing in the new nocturnal house.

The Mulgaras (*Dasycercus cristicauda*) were caught near the Laverton Road in sand dunes, eight kilometres west of Warburton. Local Aboriginal women covered the holes and dug out the burrows, finding a male and female with four young. Two, a pair about two-thirds grown (the female weighing 29.3 grams and the male 34.0 grams) were sent to Perth and the others were kept for food. They are considered by the locals to be a delicacy.

This rat-sized animal is one of about 120 species of marsupial found in Australia and like other desert animals, its numbers, which fluctuate greatly, are dependant upon good and bad seasons. It is a nocturnal animal and escapes the intense heat of the day by staying in its burrows, or sheltering under tussocks of grass. The animal is also active by day and has been seen to briefly bask in the sun, as well as search for prey.

The beast has a thick-set body and a broad head. The fur is reddish or sandy-brown and the tail is short and thick with a crest of black hairs at the tip. It is found from the Pilbara in Western Australia to south-western Queensland, usually in spinifex country among sand ridges and stoney deserts.

The Mulgara was once given the name of "Canning's Little Dog" by men of the expedition led by Canning to open up and survey the Great Stock Route from Wiluna to Halls Creek across the Great Sandy Desert in Western Australia.

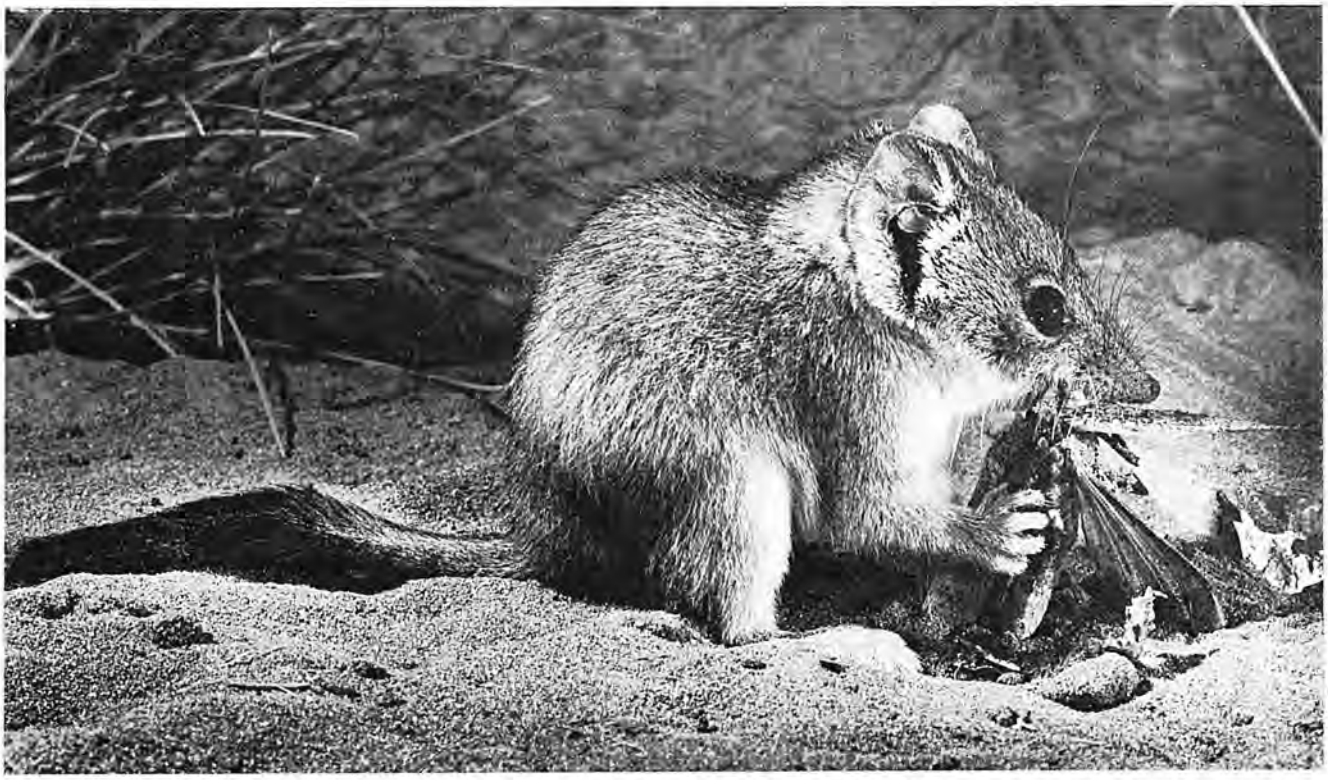
It lives basically on insects, small lizards and mice. A number of studies carried out by officers of the C.S.I.R.O. have disclosed interesting facts about the Mulgaras' ability to survive in the desert without ever drinking water or eating succulent plants. By eating 25 per cent of its body weight each day (in particular, mice), the Mulgara obtains enough fluid from the lean flesh to activate its specially developed kidneys. Urea can be excreted in a highly concentrated dry form.

Professor Wood Jones, an eminent zoologist, reported that the Mulgaras' ability to multiply, in the event of a mouse plague, was astonishing.

Digging burrows is done with the forepaws and the movements are so fast that sand flies out between the hind legs in an almost continual spray. At the early stage of digging its burrow, when its head and part of the body is underground, the Mulgara is vulnerable to predation. At this stage of excavating, it digs for a few seconds, leaps backwards and spins around to face away from the hole. Digging is resumed after a brief survey for danger. At the end of a burrow, a nest of dead grass and bark or similar material is made.

While kept in captivity, it has been found that young were born thirty days after mating. From birth, six or seven young bury into the fur and cling to the female's nipples. The female Mulgara does not have a proper pouch. Tufts of longer hairs on a shallow ridge are found along each side of the mammary area. The mother drags and bumps the babies around until after six weeks, when they are left in the nest. At approximately twelve weeks, the young begin their own short excursions.

The carnivorous marsupials represent one of the most persistent and oldest order of mammals in Australia. They are found in all habitats including the desert and are no less fierce than their relatives, the Tasmanian Tiger, the Tasmanian Devil and the native cats.



The Mulgara—(*Dasycercus cristicauda*)

Photo by A. G. Wells

Rock Wallaby Populations

Populations of Black-flanked Rock Wallabies (*Petrogale penicillata lateralis*) persist on nature reserves in the wheatbelt area south of Kellerberrin. The situation regarding the persistence of populations in these reserves seems grave however.

A rock Wallaby outside a cave at "the Granites" near Shackleton.

The Department's Wildlife Research Branch initiated a project in April 1978 for the purpose of obtaining sufficient information to formulate a management plan.

The study area consists of five large granite outcrops. Each outcrop has been surveyed and mapped for wallaby populations. To date wallabies have been recorded at 10 sites, but many of the sites carry, at most, only 2-3 animals. Moreover, there are numerous sites that seem to be suitable habitat for wallabies, but no sightings have been made nor have fresh scats been found.

Only one juvenile rock wallaby has been observed.

Information on Departmental files indicates that rock wallabies were once frequently observed, but repeated surveys have failed to sight an animal.

At this stage, it is too early to explain the causes of the population decline. Foxes and feral cats are abundant on the reserves and both are known to predate rock wallabies (particularly the juveniles at heel: W. Langdon, pers. comm.). Rock wallaby skeletal remains have been recovered from fox dens and material consisting of *Petrogale* hair and teeth have been found on the firebreak of one reserve. Such evidence is circumstantial and may represent carrion feeding, but the evidence seems sufficiently strong to warrant further investigation on the possible predatory role of foxes (and feral cats) and the need for control. With regard to this point, a baiting programme has been implemented by Vermin Control Officers of the Agriculture Protection Board.

Additional studies are under way to determine the dietary preferences of rock wallabies and their nutritional status. Rabbits are moderately abundant and their dietary habits are being examined to determine whether there is competition for food. Radio-telemetry equipment is on order.

Salt-water Crocodile Status

A July 1978 survey of Salt-water Crocodiles in the Kimberley has confirmed that the species remain greatly depleted following the hunting for skins which took place in the 50's and 60's.

Officers of the Western Australian Wildlife Research Centre spent two weeks in the Kimberley working with the University of Sydney's Crocodile Research Unit headed by Professor Harry Messel. They surveyed three river systems—the Glenelg, the Prince Regent and the Ord. Two hundred and thirteen Crocodiles were sighted in the Gleneg, 189 in the Prince Regent and 179 in the Ord. One hundred and forty-three of these were hatchlings which, because of their high mortality, should not be considered in any assessment of viable Crocodile populations.

The team has now surveyed all major river systems between Derby and Kalumburu except those in the Walcott Inlet area. Only those rivers running into the west arm of Cambridge Gulf remain to be surveyed in the East Kimberley. The total number of non-hatchling Crocodiles in the rivers counted so far is estimated to be about 1 000 and the total non-hatchling crocodile population in Western Australia is believed not to exceed 2 000. Only a maximum of 15 per cent to 20 per cent of these, or about 350 animals, are breeding adults.

The surveys have revealed that breeding habitat is very scarce in the Kimberley and consequently the potential for the recovery of the Salt-water Crocodile population is not good. If it does recover it will take many decades.

Even though Western Australia was the first State in Australia to protect the Salt-water Crocodile scientists can not now be sure that the species will recover. Continued monitoring will be necessary to ensure that the species does not continue to decline.

Salt-water Crocodile—(*Crocodylus Porosus*)

WHITE-TAILED BLACK COCKATOOS

At the suggestion of the Bird Committee the Western Australian Wildlife Authority has recommended that shorter names be used by the Department to describe the two sub-species of the White-tailed Black Cockatoo.

It was recommended the Short-billed White-tailed Black Cockatoo (*Calyptorynchus baudinii latirostris*) be known a Carnabys Cockatoo and the Long-billed White-tailed Black Cockatoo (*Calyptorynchus baudinii baudinii*) be known as Baudins Cockatoo.

DESTRUCTION OF BIRD HABITAT

Today, many of the mature native trees left in our agricultural areas are being axed and chain sawn by nest robbers. Not only are these trees partly or wholly destroyed; it also eliminates the future nesting sites for the generations of birds which could follow if the habitat had not been destroyed.

This was a nesting tree. Nest robbers have reduced it to a pile of dead wood.

In attempts to procure nestlings, robbers cause mutilation and subsequent high mortality to the young. Wire coathangers are extended down hollow tree trunks and the hook is ruthlessly used to jag out young inmates. With the decrease in wild bird populations and their nest sites there is increased competition among illegal trappers which necessitates the continuance of intense and costly enforcement programmes by the Department. Add also the possibility of a climatic catastrophe causing destruction of the vital limited vegetation, and we have a disaster.

Habitat destruction is widespread and is leading to the elimination of such species as Major Mitchell, Red-tailed Black Cockatoo, Corella, Naretha Blue Bonnet and others. The many species of birds which inhabit the sparsely vegetated areas of the State continue to suffer because of the direct and indirect interference from man. Some species today could be best described as remnant populations.

The failure in the past by farmers to leave adequate stands of timber has caused a lack of nesting and breeding sites, thereby creating fierce competition between the different species. These factors, together with harsh climatic conditions, also result in minimal breeding success of the rarer species.

Because of the demand by local and overseas bird fanciers, wilful damage and destruction of the already decimated vegetation by avaricious misfits is now taking place. The effects of this are many and varied, the most severe being the complete loss of future nesting and breeding sites. Wildlife Officers of the Department who often come in contact with habitat destruction and crippled, suffering birds would like to see an end to all aviculture. It is however realized that aviculture in the hands of responsible people can have recreational, scientific and conservation aspects.

The following points and photographs are therefore provided to remind everyone that supreme responsibility in the chosen hobby or business of aviculture is imperative if it is to continue.

1. Aviculturists or those interested in this field should have a copy of "Licensing Requirements for Keeping Aviary Birds", available free from the Department of Fisheries and Wildlife.
2. **Regulations**—Aviculture is strictly controlled under the Wildlife Conservation Act and Regulations. Copies of the Act and Regulations are available from Parliamentary Papers, Government Printer's Office, Wembley, Western Australia. The controlling authority is the Department of Fisheries and Wildlife.
3. **Acquiring Birds**—Birds may be obtained by purchase from legitimate sources only.

A River Gum chopped out on two previous occasions

4. **Licenses**—A license is required to keep in "captivity" any protected species of fauna whatsoever. There are various categories of licenses, depending on the species to be held. The minimum is a basic license costing $1·00. In addition aviaries must conform to certain standards set out in the regulations.

"Milly Soak" approx 15 km north of Cue. A ruined Galah nest.

5. **Notifications**—Any increase or decrease in the number of species of birds requires that the Department be notified. Aviculturists need to maintain a record of all transactions and breeding results.
6. **Protected species**—All native Australian and migratory birds plus others which have been declared to be "fauna" within the meaning of the Wildlife Conservation Act. Therefore the trapping of birds is subject to restrictions and license limitations.
7. **Import/Export**—The import and export of birds is rigidly controlled under State and Commonwealth legislation. Movement interstate requires the importing *and* exporting State to give approval. Commonwealth health and quarantine requirements must also be met. Full details are contained in the Import/Export booklet issued on request by the Department.
8. **Responsibilities of Genuine Aviculturists**—
   (i) Acquire birds only from legitimate sources.
   (ii) Abide by the rules and regulations designed for conservation purposes and protection of species.
   (iii) Do not deal with *unlicensed* persons in any transactions.
   (iv) Report illegal trapping or smuggling activities—you are protecting the role and activity of *genuine aviculturists*.

A young Kestral backs up in defence. This chopped out parrot nest now used by another species.

Flora Conservation

During 1978 the protection of flora remained the responsibility of the Conservator of Forests. However, the Wildlife Conservation Act has been amended to provide the powers for the conservation of native flora within the Wildlife Conservation Act. This amendment has yet to be proclaimed. Meanwhile research on flora conservation continues at the Western Australian Wildlife Research Centre in order to form a solid base of data and procedure for future work on flora conservation.

Research on flora conservation was initiated in October 1977 with the appointment of Stephen Hopper as Research Officer (flora) at the Wildlife Research Centre. Work is currently progressing under the following main categories.

Biogeographic Data Base

Businesses involved in the Western Australian wildflower industry were examined to obtain a list of species exploited in the cut flower, seed and nursery trades. Approximately 1 000 species were found to be exploited. The compilation of a biogeographic data base for these species was commenced using locality details written on specimen sheets at the Western Australian Herbarium.

Rare and Endangered Flora

A trial survey of rare and endangered species was begun using *Eucalyptus caesia* as a case study. Localities of known occurrence were extracted from herbarium specimens, published literature and local botanists. Each of these localities was then visited to determine population size, reproductive capacities, pollinators and habitat status. A report on this study will be written in 1979.

Kangaroo Paws

Several publications dealing with aspects of the hybridization, pollination, taxonomy and biogeography of kangaroo paws were prepared from data acquired during the past five years.

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PINGELLY RESERVE MANAGEMENT TEAM

The Reserve Management Unit of the Department of Fisheries and Wildlife was created in 1968. From that time until September 1978 all members of this unit were based in Perth with the exception of a Reserves Officer located at Two Peoples Bay.

During September 1978 the Operations Section of The Reserve Management Unit established at Pingelly its first rural based team, the Pingelly Reserve Management Team (PRMT). At present this team consists of a Reserve Management Officer (K. J. Wallace, B.Sc. Hons.) and a Technical Officer (J. J. Smith) and it is hoped that a labourer will be added to the unit in the near future. The expansion of the Operations Section of the Reserve Management Unit into rural-based teams constitutes a new phase in the management of Nature Reserves, and it is the aim of this article to explain both the role of the PRMT and its relationship to other personnel involved in management. The latter is most easily explained by examining the process of management itself.

Mobile fire fighting unit with trailer-borne tractor.

PROCESS OF RESERVE MANAGEMENT

In general terms, the aim of reserve management as conducted by the Department of Fisheries and Wildlife is to conserve representative samples of the many Western Australian plants and animals. Within this context the conservation of ecosystems is a primary ideal although in most instances management is aimed at the preservation of portions of ecosystems represented on nature reserves. While in some cases management plans are aimed at conserving particular species, for example the Noisy Scrub-bird, inevitably the protection of a suite of plants and animals is involved due to the complex set of relationships that exist between a particular species and the biotic and physical components of its environment.

A simplified view of the process of reserve management is given in Fig. 1. Arrows represent both the flow of information and the sequence of management action. As can be seen from Fig. 1., the development of management plans is dependent on there being: (a) a fund of management "know-how" or knowledge, and (b) an understanding of the constraints that may exist on the development of management plans due to the demands of various groups involved in land usage. Both these aspects will be briefly examined.

The phrase "management knowledge" is used here to encompass a variety of areas ranging from biological to very practical aspects of management. From a biological standpoint it is of paramount importance that the ecology of individual species and of ecosystems as a whole are understood. However, flora and fauna inventories, historical data, and other general biological information are necessary if comprehensive management plans are to be formulated. Practical aspects of management knowledge are numerous and include an understanding of firefighting techniques, methods of combating erosion, the use of a wide range of equipment and the operation of bulldozers. While such practical information may seem to be of secondary importance, it should be emphasized that to neglect this area may lead to the degradation of reserves, for example by wildfire.

Once a sufficient amount of management knowledge is available, management plans may be formulated which provide the optimum probability for a suite of plants and animals to persist on a nature reserve, or group of reserves. However management plans must be evolved that take into consideration the total pattern of land usage by the general community and there are times when the interests of specific interest groups must be regarded during the planning process. Such interest groups range from the individual (e.g. a farm adjoining a nature reserve) to sections of the general public (e.g. duck shooters); and from other Government Departments (e.g. P.W.D.) to private business (e.g. mining

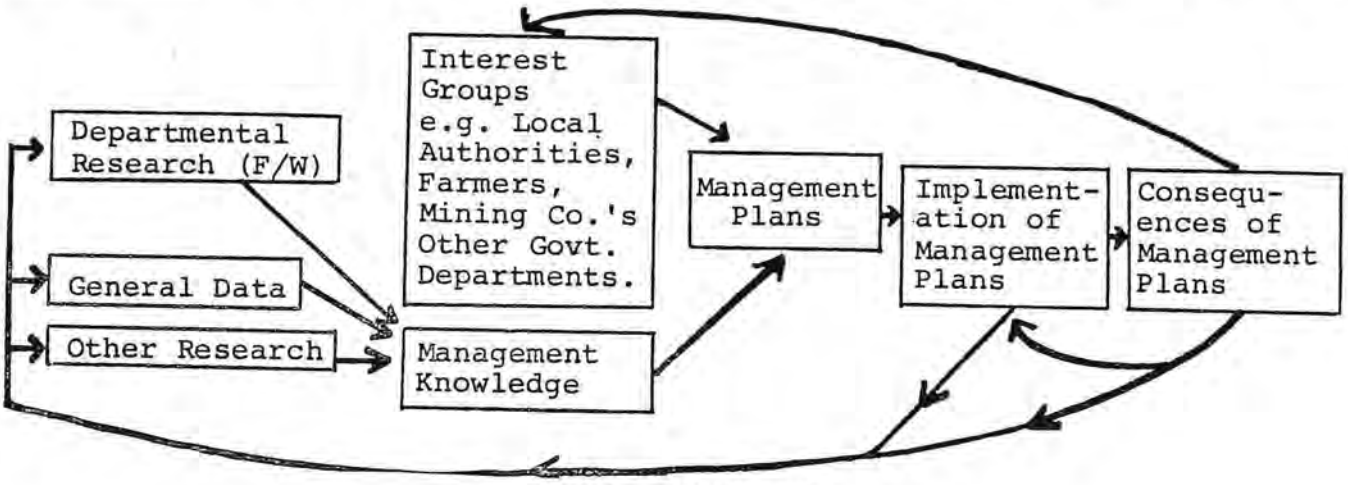


Fig. 1. Process of Management.

companies). The final form of a particular management plan is therefore dependent on the state of management knowledge and the constraints imposed by the diversity of demands that exist in relation to land usage.

Once a strategy for managing a particular reserve or group of reserves has been formulated, then this strategy must be converted into action. It is at this point that management teams such as that based at Pingelly become most involved. Not only do management teams implement management plans, but in performing their duties they also generate information that will provide a useful input to management knowledge. In some cases this feedback of information has immediate consequences as in those cases where a management team needs to adjust its own actions as a result of perceived difficulties in carrying out a management plan. As shown in Fig. 1 the consequences of putting into effect a particular management plan results in data that may, in a variety of ways, influence the character of later management plans.

It should be obvious from the above that the development of management plans is a cyclical process that involves both the monitoring and refinement of strategies with changes in the status of management knowledge. Furthermore, it must be emphasized that neither the environment within reserves nor that external to reserves is static. Therefore, the dynamics of environmental change also necessitate the evolution of new management plans.

On the basis of the above view of the management process personnel of the Department of Fisheries and Wildlife are involved in three stages of management. These are: (a) research; (b) the development of management plans; and (c) the implementation of management plans. At present the Department has personnel primarily involved in the first (Research Officers) and last (PRMT and Perth Reserve Management Team) of these areas. While all these personnel will participate in the development of management plans, the major part of planning would optimally be conducted by personnel able to synthesize information from all areas, and who have an overall perspective of management in the State as a whole. With the appointment of a Management Planning Officer in early 1979 the Department has now moved strongly into this stage of management.

While the above discussion has necessarily been brief, both the general process of management, and the role played by groups such as the PRMT should be apparent. The remainder of this article will concentrate on the activities of the PRMT.

Clearing timber from the dozer during fire break maintenance.

The fire unit in action at a controlled burn in the Two Peoples Bay reserve, Albany.

FUNCTIONS OF THE PINGELLY RESERVE MANAGEMENT TEAM

As has been indicated above the function of the PRMT is primarily to implement reserve management plans, and secondarily to contribute to the fund of management knowledge. The work of the management team is diverse and it will therefore be discussed under a series of headings. However, it should be recognized that although overtly fragmented, the various activities of the PRMT are inter-related and must be approached holistically in practice.

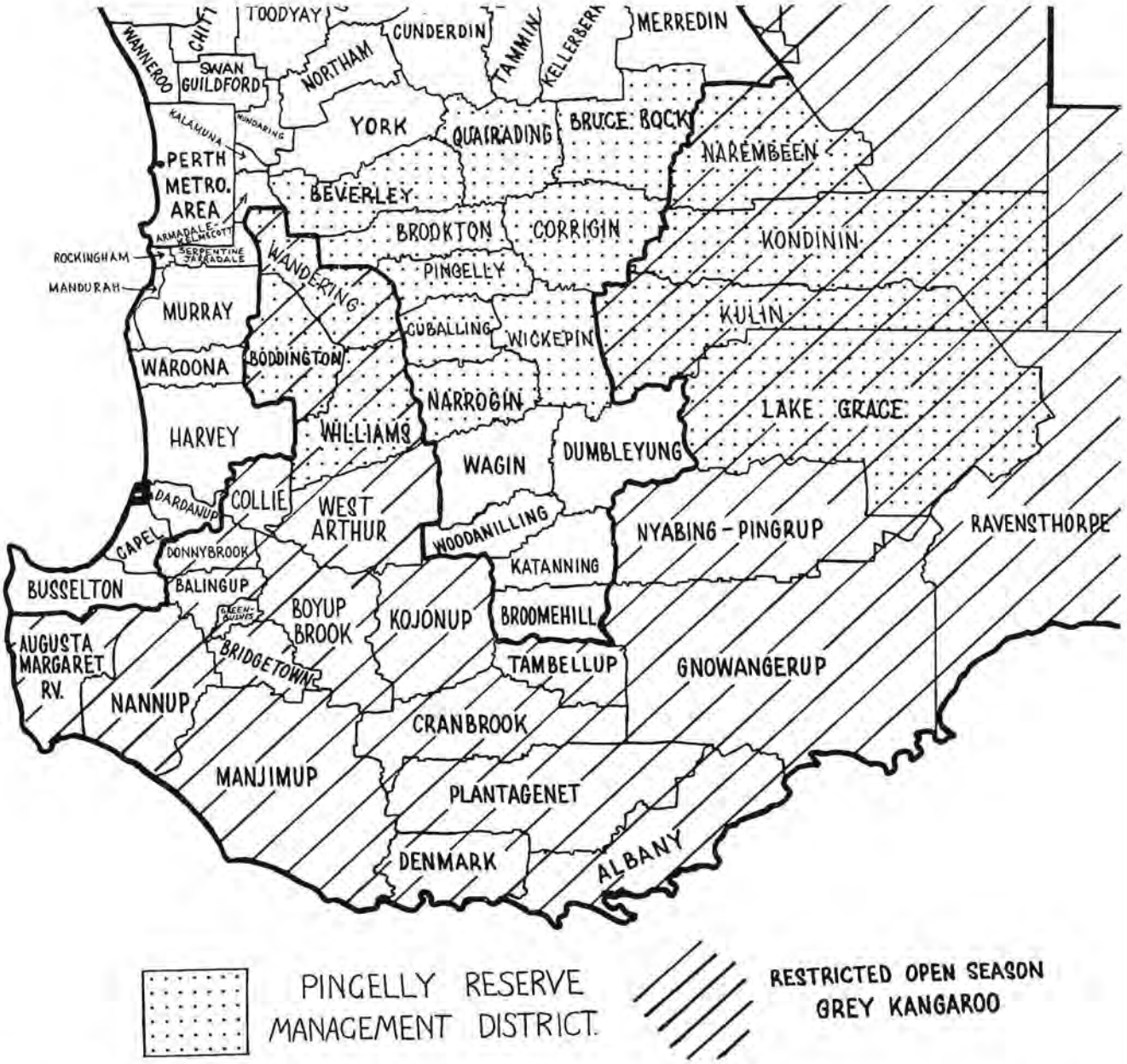
Fire

That fire is an important modifier of terrestrial ecosystems has been recognized for some time. However, the implications of this for reserve management are as yet incompletely understood and research is at present being carried out in this area within the Department. Although one possible management strategy is to permit fire to occur naturally on reserves, neither the size of most reserves, nor the frequency of fire entering reserves from adjoining land permits such a policy. Also, the relationship between reserves and adjoining landholders usually prohibits such a policy being developed. Therefore, wildfires on, or adjacent to, reserves must be rapidly controlled and the role of this natural element be replaced by prescribed burning programmes soundly based on research data. It should be noted here that research may, in some cases, indicate that fire should be excluded from whole, or parts, of particular reserves, at least for a long period of time.

Both the control of wildfires and prescribed burning are activities conducted by the PRMT. For this reason the team has a four-wheel drive truck and a "drop-on" fire unit for the team's four-wheel drive flat-top. As well as being directly involved with fire-fighting, the PRMT also spends a significant proportion of its time designing, constructing and maintaining firebreaks on reserves. Also, the PRMT attends clearing and clover burns adjacent to reserves where these are potentially a fire threat to reserves.

Research

Although the PRMT is not a research group it has been involved and will continue to be involved with research work. Largely, this will consist of the collec-



tion of information and the assistance in the field of Departmental Research Officers. As this research work will ultimately influence management plans, a secondary effect of this involvement is to give the team a greater insight into management plans which it will implement in the future. It is also hoped that the management group may itself conduct minor research projects. Certainly the team is well placed to conduct field work being very close to two major reserves (Tutanning and Boyagin).

Biological Survey

While most of the wheatbelt has been cleared there remain areas of bushland not under the control of the Department that are potentially useful nature reserves. There are also many nature reserves that are not vested in the Western Australian Wildlife Authority which could be better protected if placed under the control of that body. Biological survey of both the above types of areas are required as a precursor to action. One of the groups involved in this type of activity is the PRMT. A number of surveys have been conducted by the team since its location in Pingelly and further surveys are at present in progress. Apart from these types of surveys there is a great need for data to be collected concerning the flora and fauna existing on reserves and the team will become more involved in this type of work during 1979.

Reserve Inspection

As often as possible reserves are vested, usually for a specific purpose such as the inspection of firebreaks, but also so that the Team becomes thoroughly familiar with the reserves under its control. During such trips information with regard to flora and fauna is often collected and any occurrence of illegal activities, such as gravel removal and rubbish dumping, are reported to the Law Enforcement Branch of the Department of Fisheries and Wildlife. It is also important that local people be aware that officers of the Department are actively interested in reserves, a point that will be considered further below.

General Recommendations

From time to time individuals or groups make proposals with respect to particular reserves, the most frequent being requests for excision of land from

reserves for various purposes such as gravel removal or farming. Where such proposals relate to reserves in the area covered by the PRMT, the team usually recommends what action should be taken in response to these proposals.

Public Relations

If nature reserves are to have a secure future then i is essential that the public in general, and people adjoining reserves in particular, hold positive attitudes towards reserves. Often people have little or no understanding and appreciation of the function of nature reserves, and in some cases landholders adjoining reserves are unsympathetic to the Department and its aims because they have infrequently seen Departmental personnel actively involved in reserve work. While all Departmental Officers have a part to play in creating a more favourable public attitude towards reserves, rural-based officers are obviously in a unique position to develop a more informed public in those communities that are close to reserves. In this context reserve inspections as discussed above are important avenues for demonstrating the very real concern the Department has for land in its keeping.

Concluding Remarks

While the above has presented only an overview of the activities of the PRMT, it is hoped that an indication has been given not only of the role of the team itself but of its place in the total strategy of reserve management. The team looks forward to being involved with the increasingly comprehensive approach to nature reserve management taken by the Department of Fisheries and Wildlife and there can be little doubt that rural-based units are an integral part of future management developments. It is to be hoped that this section of operations is expanded in the near future.

RECORDING AUSTRALIA'S FLORA AND FAUNA

The Federal Minister for Science, Sentor Webster, announced that the Federal Government has approved long-term arrangements for recording Australia's flora and fauna.

Senator Webster said that for decades, biological scientists had been urging that there was a great need to record adequately, details of Australia's flora and fauna. It was one of the first matters on which the Government sought the advice of the interim Australian Science and Technology Council. The present arrangements had taken account of its recommendations.

The project would continue to be known as the Australian Biological Resources Study and an advisory Committee to the Minister would shortly be appointed. The Chairman would be a distinguished scientist and the Committee would include representatives of museums and herbaria and other agencies active in the field.

Senator Webster said that the work would be coordinated by a unit within the Department of Science under the Director, Dr. W. D. L. Ride.

In addition, grants would be made for specific studies on the recommendation of the Advisory Committee. These grants would be administered, as at present, by the Department of Science.

The new arrangements would be put in hand immediately and $250 000 had again been provided in the Budget for 1978-79.

Senator Webster said that the programme involved collecting, identifying and recording the animals and plants of Australia. It was a co-operative programme and would make use of resources in Commonwealth and State museums and herbaria and other research institutions.

Further information: Dr. W. D. L. Ride Telephone: Canberra 83 2362

Blue-Ringed Octopus

Reports of people finding Blue-ringed Octopuses increased during December and January and four of these dangerous marine animals were found in Geographe Bay around Busselton.

Although widely distributed throughout Australia the octopus is more common in southern parts of the state during the warmer months.

Identification of the Blue-ringed Octopus is relatively easy. It is small in size, with the tentacles varying up to almost 4 inches in length. It is yellowish-brown in colour, has ringed markings on the tentacles and striations on the body. During feeding or when disturbed, the animal changes the colour of the rings and striations to a vivid blue.

Although the octopus is more deadly when fully-grown, the small one-inch specimens are extremely dangerous. Their poison is reported to be more potent than that of any land animal, including snakes.

This warning is not meant to discourage people from enjoying themselves at the beach, however as the Blue-ringed Octopus can be avoided easily, since it lives in rock pools, in clumps of seaweed and under rocks, etc. in deep water.

The octopus is mainly found by accident when people lift rocks out of pools or when fishermen use lures to catch other types of octopus for use as bait. Most bite cases happen when people have picked up the animal to examine it more closely.

The general safety rule, therefore, is to be a little more careful when near places where the octopus might be found. Also, any small octopus should be treated with extreme caution and never touched by hand.

In cases where small octopuses have been found and safely contained in a receptacle they should be delivered to any office of the Department of Fisheries and Wildlife or the Western Australian Museum for identification.

Cannon net in mid flight (note projectiles on horizon) about to engulf Pelicans at Pt. Walter sandspit in the Swan river.

Pelican Research 1978

In the last edition of S.W.A.N.S. Volume 8 Number 1 an article on Pelican Tagging at Albany Western Australia, drew the attention of Patrick Morant of the University of Cape Town, South Africa.

Mr. Morant wrote seeking information on our capture and tagging techniques to help in the current study of the rare and threatened White Pelican (*Pelecanous onocrotalus*) of South Africa. So far the only marking technique used in South Africa has been the usual metal tarsal band stamped with numerals large enough to see with the aid of a telescope, and only in favourable conditions.

Wing tags used on the Western Australian Pelican (*Pelecanus conspiccilatus*) are made from a heavy grade PVC-coated nylon fabric called "Topspan T.I.R."

The method of affixing a tag is by means of two stainless steel wire pins. The first pin is through the Patagium and is fixed by means of a simple knot. The wire is prevented from working through the tag material by a stainless steel washer. A second pin is inserted through the centre of the trailing edge of the tag between the secondary feathers of the wing. The tag is applied with the wing outstretched to allow a good fit. There have been no reports to date of any birds experiencing difficulty in flying when fitted with a wing tag. In fact, one bird was recently reported flying between Mandurah and Broome in less than 4 months, a distance of some 2 000 km.

Checks on nesting activity of all known Pelican breeding colonies south of the Kimberley Division in W.A. have been continued throughout 1978. Live trapping of free flying birds was also continued throughout the South-West of the state.

Since 1974 more than 900 runners and 800 free-flying Pelicans have been banded by the Department. Among the many recoveries have been two birds at Albany and Augusta originally banded as runners at the Fortescue River in 1976.

Public response has been good, particularly from people possessing Pelican Wing Tag Sighting Books. Numerous reports have been received of movements throughout the state. The most notable being C4 yellow originally tagged at Peel Inlet and sighted at Broome several months later.

Taking Beak measurements.

Firetail Finch Sightings

In the first edition of Volume eight of S.W.A.N.S. a revised list of protected rare fauna was published in accordance with Ministerial approval. The list included various bird, mammal, reptile, and amphibian species. The significance of this information must be emphasized in relation to, not only Australia's heritage but her ecological balance as well, and it seems that certain members of the public are aware and do care about this. An example of this interest was expressed by H. B. Gibbs of Dardanup when he wrote to the Department informing us of observations he had made over the past two years of the Red-eared Firetail (*Emblema oculata*). He noticed the birds in localities of Donnybrook, Wellington, Sue's Bridge (between Nannup and Augusta) and Pemberton where a pair were observed building a nest.

It is pleasing to receive information from readers, especially on rare and endangered fauna.

Red-eared Firetail (*Emblema oclata*) in captivity.
Photo by A. Pepper

ROCKHOPPER PENGUINS

Rockhopper Penguins were once again found on beaches along Geographe Bay. Every summer, small numbers of these birds are "rescued" by well meaning people who find them hidden under bushes just behind the first line of sand dunes. Fortunately there is nothing wrong with the penguins—they are undergoing their annual moulting. This process is essential to the birds as it replaces all their old and worn out feathers with new ones.

Rockhopper penguins are normally found in the Antartic regions but the south west corner of the state appears to be a favourite spot where they can find quiet beaches to carry out their moulting.

Moulting does leave the birds exposed to dangers, as they are unable to escape from their enemies by taking to the sea, but otherwise they are quite healthy and require no assistance. The Department of Fisheries and Wildlife advises that anyone finding a penguin on the beach should leave it where it is. Only if the bird is obviously injured or is likely to be disturbed by dogs or other animals (including man) does the Department ask that it be taken to a more secluded beach area. If a penguin is found in need of help, it can also be taken to either the Bunbury or Busselton offices of the Department.

BOTULISM AND STARVATION

At the time of writing it is autumn and the wetlands of the Swan Coastal Plain are again diminished in quality and quantity. Although the preceeding seasons over the past year have been quite average, it is usual for the deterioration to reach a peak at this time every year.

Numerous requests for food and water for waterbirds at local Perth lakes have again been made in the press and to the Department. The situation however is far better than the drought conditions of the 1977/78 summer. It will be remembered that during that season, many waterfowl died from bacterial and algal poisoning. Although many birds were hand fed at lakes and sick birds rescued and treated, the waterbird populations declined.

Bacterial and algal poisoning and overcrowding on remnant waterways are natural hazards which will always occur somewhere during our dry hot seasons. What is hoped will not happen is a situation where epidemic proportions are experienced.

It is not the Department's role to hinder those people who feel they should tend and treat sick wildlife. Nor is it the role of this Department to become involved in something for which it has no facilities, equipment or staff.

One query from the general public has been the use of lawn clippings in a food crisis situation. The following relevant points have been determined by research officers involved with waterfowl conservation:

1. The nutritive value of lawn clippings is low. The Poultry Branch of the Department of Agriculture considers lawn clippings to have a protein content similar to lucerne which varies from 3 per cent to 6 per cent; by comparison, wheat, bran, pollard and bread have protein values of 10–11 per cent, 14 per cent and 11 per cent respectively.
2. Lawn clippings fed to waterfowl would need to be *freshly cut*. Mouldy lawn clippings would very likely give rise to botulism since the botulism inducing bacterium, *Clostridium botulinum* thrives in anaerobic conditions such as produced by decaying vegetable matter.
3. It has been suggested that waterfowl would find lawn clippings unpalatable.
4. Though some ducks and swans may appear to be "ravenous", most autopsies performed on waterfowl found dead on metropolitan lakes reveal that the cause of death has been botulism, not starvation caused by food shortage.

Since the drought of 1977/78, it has been noticeable at certain lakes in the Perth area, that private individuals, companies and shire councils have been providing bulk food (bread etc.) to supplement natural food stocks.

Unfortunately it is not only providing a "false economy" situation, promoting over population but contributing to bacterial poisoning by left-overs rotting in stagnant summer pools.

Our Diminishing Heritage

Marl was the name given by Aboriginals to one of the most charming of the smaller marsupials found only in Australia. It is a member of the bandicoot family.

In scientific circles, the Marl is known as *Perameles bougainville*. It is also known as the Little Barred Bandicoot.

Aboriginal names are more preferable today as often the first European settlers misnamed many of this continent's animals, likening them to species seen in their homeland.

The Marl was first made known to science as a result of the voyage of the French corvette "Uranie", commanded by Freycinet which visted Shark Bay in 1818. The expedition carried no biologists, but the medical officers Quoy and Gaimard made collections and published an account of them in 1824. The Marl was included in that list.

Quoy and Gaimard obtained a specimen at the foot of the elevated sand dunes of Peron Peninsular, Shark Bay, where they had seen several animals and tracks were common.

The animals were once found across Australia from the islands of Shark Bay to the Liverpool Plains in New South Wales. It was common in some localities across Australia early in the nineteenth century. The last specimen sighted in New South Wales was in 1867 and the taking of a single specimen by the Western Australian Museum at Onslow in 1909 is thought to be the last sighting on the Australian mainland. The Marl is now thought to be extinct on the mainland. The main reasons are unknown, but the introduction of exotic predators such as the domestic cat and fox, plus habitat alteration by rabbits and stock seem obvious factors.

Today it seems that the species is confined to Bernier and Dorre Islands in Shark Bay, Western Australia. The first specimen from there was taken by Tunney on Dorre Island in 1899. In 1906, Shortridge feared that the introduction of cats to the islands had caused him to only find a weathered skull on Bernier Island. Lipfert, however, obtained 12 specimens during his visit in 1910.

Because of the drastic change in its status, the Marl is classified throughout Australia as rare "likely to become extinct or in need of special protection".

On an expedition to Bernier and Dorre Islands in July 1959, a research team found several specimens including females with joeys. One female had a pair of joeys (crown rump length 12.5 mm) and another had a pair each weighing 9.5 g. A third animal, when frightened, relaxed its pouch muscles and dropped a 11 g joey as it fled. This female did not return for its young and it was therefore unknown if she had another suckling. A fourth female had one joey weighing 17 g.

On this expedition, the Marl was commonly found at night among sandhills. At one stage, an animal appeared at the lighted doorway of a tent and another fossicked at arm's length in the camp kitchen.

Occasionally, specimens were seen in daylight, then suddenly appeared from underfoot in low scrub and disappeared into dense vegetation with rapid leaps.

The Little Barred Bandicoot once occurred in many habitats throughout Australia, including woodland, heath, sandplain, desert and stoney ridges.

This animal, as in all the long-nosed bandicoots, feeds mainly on small invertebrates such as insect larvae, earthworms and spiders. They have also been known to eat berries, seeds and fibrous roots.

The nest is well concealed in vegetation with a flattened heap of sticks and plant debris. The animal simply burrows through this covering of the nest entrance each time concealing its pathway behind.

The Marl is an active solitary animal of the dusk or twilight like most of Australia's marsupials. It has been found to become very tame in captivity but is extremely aggressive to its own kind.

This animal is one of those in Western Australia which, since the advent of European settlement, has changed status from once common in its localities to the list of rare and endangered and likely to become extinct.

The continued survival of the Marl seems to be dependent upon the retention of Bernier and Dorre Islands as nature reserves and it is hoped that no changes will ever be allowed to take place on these islands which would in any way interfere with the last remaining habitat of the species.

Breeding Season

Winter and Spring up to three young carried in a back-opening pouch.

Description

A light delicate build, head and body length of adult approximately 28 cm with tail length about 9 cm. The thin ears are held erect, about 4 cm long, broad at the base and tapering to oval tips. The feet, like kangaroos, are elongated, the second and third toes strongly clawed. The nose is long, thin and pointed with the muzzle naked and flesh-coloured. The soft fur is grey-brown on the shoulders and back, with three black bars radiating downwards from the black loins. The chin, throat, belly and tops of the feet are white, the inner part of the limbs is white and the outer part smokey grey, whilst the dark brown tail is finely tapered.

Distribution

Previously on the Australian continent from Shark Bay in Western Australia, through South Australia and along the length of the Murray River to the Liverpool Plains of New South Wales. Now only found on Bernier and Dorre Islands in Shark Bay, Western Australia.

Photo by A. G. Wells

THE MARL

PERAMELES bougainville

A GUIDE TO BUYING AND MAINTAINING BINOCULARS

A subject often overlooked when discussing equipment needed in efficient management of parks and wildlife is the buying, use and maintenance of binoculars.

Brian Morin, planning officer with Parks Canada in Ottawa wrote the following article which gives a clear, concise description of the subject.

The article appeared in Volume 3 Number 2 of "Parks" an international journal for managers of National Parks, Historic Sites and other protected areas.

For resource managers and park officers who are involved in the study of wildlife, or who need to view distant features or activities in greater detail, binoculars are a vital component of every field trip.

Often you will hear the terms field glasses and binoculars used interchangeable, but there is actually a substantial difference between the two. Field glasses function by means of glass lenses only, whereas binoculars have both glass lenses and prisms. The former are usually smaller and lighter, with smaller magnification and are also rather inexpensive. However, the lower power makes field glasses largely unsuitable for park work. In addition, field glasses are not as durable as most binoculars. A stiff jolt may well set them out of alignment, necessitating a trip to the repair shop. It's best to stay clear of them. This article will deal exclusively with binoculars, or more specifically, prism binoculars.

There is a wide range of models, styles and brands on the market to choose from, with prices ranging from less than U.S. $20 to many hundreds of dollars. The quality of the optics is equally variable, making selection a potentially confusing task.

This need not be the case. Before purchasing your binocular, consider the following fundamental points of binocular design and use and compare them with your own needs. Then remember that to protect your investment it is essential to take care in the handling of your binocular and to observe a routine schedule of maintenance. Quality optics can potentially last many decades if they receive the proper attention.

What do the numbers mean?

There is no great mystery to the numbering system applied to binoculars. The numbers are simply a code that is used to classify the various optical features. Once decoded, the information provides essential criteria that should be used in selecting the set that best suits your needs.

First of all, each model has two numbers (i.e., 8 x 40). The number preceding the "x" denotes the power of magnification; 7 power brings an object 7 times closer than the naked eye; 8 power, 8 times, etc. The second number is an expression, in millimetres, of the diameter of the objective lens. The larger the objective lens, the greater the quantity of light that enters. This is an important consideration for viewing under low light conditions.

A binocular's *field of view* refers to the width of the area pictured as you look through it. Most optical companies quote the distance in reference to 1 000 yards (914·4 m) i.e., 386 ft. (118 m) at 1 000 yds. The narrower the field, the smaller the area viewed.

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BIRD BANDING SCHEME

The Australian Bird Banding Scheme began in 1953 and is organized by the Division of Wildlife Research, C.S.I.R.O. The scheme has contributed to investigations into the movements and habits of birds, the factors affecting such movements and habits, and their relation to ecology and conservation. Application of information compiled aids the conservation of native species, the management of game birds and programmes for the control of declared pest species. The project has revealed bird migratory patterns, diseases, life spans, territorial behaviour, etc. and it has called for inquiry into factors determining these developments.

Birds may be banded in variety of ways, the usual manner being a light metallic strip placed around the leg, which causes no inconvenience to the carrier. The bands can be made from aluminium, stainless steel, monel (a less abrasive metal) or from synthetic substances and are in the form of split rings which may be opened or closed accordingly. The information recorded on a band is a serial number and the words "WRITE C.S.I.R.O., CANBERRA". This serial number relates to a triplicated form titled "Bird Species Schedule". A log book record is kept of all serial numbers, the bird's age, species, sex, date and place of banding and the bander. The serial number is unique, in that once it has been issued it can never be issued again. Up to ten billion individuals can be recorded with this system and by introducing letters into the serial code, a much greater number of birds may be allocated a code. The band sizes may vary, depending on size and species of birds.

Often special bands are made for specific species, this alleviates complications and aids those people carrying out research. When colour bands are used, they are in a code of three different coloured rings, each bird carrying a different colour code. This type of banding is most helpful in that it allows an observer to visually check in the field, and follow the territorial or habitat behavioural patterns.

Birds that are banded privately carry a closed ring band which is usually applied when the bird is young. This band cannot be opened and carries information of no research value to the C.S.I.R.O. programme.

Birds are trapped or banded as nestlings by research workers and when they are recovered from the wild, information from their bands is submitted to C.S.I.R.O. and collated to eventually form valuable data patterns.

For the programme to be totally efficient, global co-operation from all peoples is important. The use of digits on bands has enabled international usage of codes and data and at the same time enables the various peoples throughout the world to spot and understand them.

Some information recovered has enabled ornithologists to determine species that have strayed and whether those species have been able to exist in hostile or foreign environments.

In recovering birds that are seen carrying bands, the requirement of the Australian Bird Banding Scheme is that they aren't harmed. Consequently most bands are recovered from birds that have died although research workers using special equipment are able to retrap live birds on occasions. Bands should be returned so that C.S.I.R.O. can carry out research to eventually achieve a successful programme. In Western Australia, for those who have information to return, please ring 299 6477 or contact C.S.I.R.O., Division of Wildlife Research, Fyfe Street, Helena Valley, 6056.

● Three examples of recorded movements of species involving Australia are as follows.

Species	Date and Place Banded		Date and Place Recovered	
Sharp-tailed Sandpiper	5/1/61	Perth, W.A.	28/5/61	Batagaj, Siberia
Straw-necked Ibis	20/10/61	Muchea, W.A.	10/11/62	Orange, N.S.W.
Grey Teal	22/7/58	Swansea, Tas.	29/7/62	Lake Austin, W.A.

● The longest elapsed times between banding and recovery up to November 1973 for some species.

Species	Date Banded	Date Recovered	Elapsed Time
Crested Tern....	26/11/55	18/8/73	17 years, 8 months, 23 days
Grey Teal	24/9/57	19/2/73	15 years, 4 months, 24 days
Fuscous Honeyeater	26/1/59	29/4/72	13 years, 3 months, 3 days
Rufous Whistler	9/1/60	14/11/71	11 years, 10 months, 5 days
Striated Thornbill	24/3/62	17/11/73	11 years, 7 months, 24 days
Eastern Silvereye	1/6/60	19/9/69	9 years, 3 months, 19 days

● Some recoveries in Australia of birds banded overseas.

Species	Date and Place Banded		Date and Place Recovered	
Common Tern	9/7/55	Marum, Sweden	7/1/56	Fremantle, W.A.
Arctic Tern	5/7/55	Murmansk, Russia	16/5/56	Fremantle, W.A.
Cape Petrel	23/2/66	Adelie Land, Antarctica	12/9/68	Cape Byron, N.S.W.
Gannet	7/1/56	Horuhoru, N. Zealand	12/11/56	Rottnest I., W.A.

● The Department's Wildlife Officer at Busselton, Bernard Masters has provided the following statistics on species and bands recovered in that district.

Bird Species	Banded Date	Place	Recovered Date	Place	Distance Travelled
Southern Giant Petrel	23/3/73	Signy Is. in South Orkney Group	10/7/73	Wonnerup	8 450 km; 84 km/day
*Black Duck (male)	13/2/72	Woodanilling	17/8/73	Ferguson	145 km
Southern Giant Petrel	10/3/74	Signy Is. in South Orkney Group	5/8/74	Busselton	8 450 km in less than 150 days
*Grey Teal (male)	7/12/67	Moora....	18/12/71	Ludlow	330 km
*Black Duck (female)	29/4/71	Woodanilling	12/2/72	Blackwood River	220 km
*Black Duck (female)	13/1/70	Woodanilling	19/12/71	Boyanup	150 km
*Grey Teal (male)	17/12/73	Moora....	22/11/76	Tarlabin	300 km
*Black Duck (female)	2/3/74	South Perth Zoo	16/1/76	Witchcliffe	225 km
Southern Giant Petrel	14/3/75	Signy Is. in South Orkney Group	?/7/75	Wonnerup	8 450 km in less than 120 days
Silver Gull	6/11/77	Carnac Island	Less than 3 weeks later	Busselton	172 km
Western Silvereye	23/4/77	Manjimup	8/4/78	Karridale	99 km

* These birds were banded by The Department of Fisheries and Wildlife under a departmental Scheme unrelated to C.S.I.R.O. Australian Bird Banding Scheme.

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In addition to these basic points, consideration should be given to the size of the *exit pupil.* Expressed in millimetres, the exit pupil is the diameter of the area of light reaching the eye. It can readily be seen as the bright disc emitted from the viewing eyepieces or ocular lenses. The diameter is calculated by dividing the magnification into the diameter of the objective lens (i.e., an 8 x 40 mm binocular has a 5 mm exit pupil). The wider the exit pupil, the brighter and clearer the image.

Additional features

There are several other features that should be looked for in binoculars. Most models, nowadays, have a transparent optical coating to reduce reflections of light from the glass surfaces. This not only reduces glare, but also increases the amount of light reaching the eye. To maximize the effect, all lens and prism surfaces should be coated. Lesser quality binoculars may have only an exterior surface coating, letting in a much smaller percentage of light. Older un-coated lenses and prisms can be coated only at expert repair facilities.

Convenience in handling is every bit as important as the optical features. The equipment should suit your own personal requirements for bulk, ease of focusing and weight, just as most people buy a car based not only on its mechanical points, but on how it rides and drives.

Next to optical qualities, more binoculars are chosen on the basis of size and weight than any other features. The key here is personal suitability. Some people like a medium sized binocular that fits their hands well, while for others, the smaller the better. Weight can range from little more than half a pound (0·23 kg) for compact, low-power models, to over 3 pounds (1·36 kg). Remember that for extensive viewing, heavier binoculars are more tiring to handle and can add unnecessary weight on long walking trips.

Unless you always view your subjects at great distances, pick a glass with a center-focusing wheel rather than one that has individual eyepiece focusing. However, even on the center-focusing models, the right eyepiece should be adjustable to fit the precise focus adjustment that your eyes require. Once set, note the position of the calibrations for future reference in the event that the eyepiece is moved. Most binoculars also have a hinge at the center post for adjustment to the distance between an individual's eyes.

The ability to "pick up" moving subjects requires a focusing mechanism that responds quickly to the movement of your finger. Rapid focusing models have an arm extending from the right eyepiece that responds instantly to your right thumb and focuses both lenses. However, the better quality binoculars with center focusing use a lubricant that allows maximum ease in focusing, so you need not look for one of the "insta-focus" type.

If you wear eyeglasses, look for models with either collapsible or retractible rubber eyecups to ensure maximum field of view.

Choosing your binocular

Having given thought to these points, you should be about ready to select the model you need. I would recommend using the following criteria as a guide for meeting the requirements of park personnel and wildlife officers.

Field Glasses or Binoculars?—Binoculars. Some popular models are 7 x 35, 7 x 50, 8 x 36, 8 x 40, 9 x 36.

Magnification—Within the 6-10 power range, but preferably 7, 8 or 9 power. Six power tends to be too small a magnification and 10 power binoculars are usually heavy and bulky, with a narrower field of view. Very steady hands are required to use magnifications over 8 power.

Field of View—Choose a model that allows the maximum field possible in combination with the magnification. It should be at least 380 feet at 1 000 yards.

Exit Pupil—The diameter should be 4 mm or greater.

Coated or Uncoated Lenses—Unquestionably coated.

Weight—Not more than 2½ pounds (1·14 kg.), 1 to 2 pounds (0·5-0·9 kg.) is ideal.

Brands—There are many high quality brand names on the market—Bausch and Lomb, Leitz, Zeiss, Bushnell, Canon, and Nikon, to mention just a few. Pick a reliable brand, one that is backed up by an acceptable warranty, and for which repair facilities are available to you.

Price Range—There is no set price that must be paid to obtain a good binocular, but generally you get what you pay for. Prices will of course vary, depending on geographic location, but I would suggest investing between U.S. $60-$200. You can pay over and over again at the repair shop for cheap models.

Handling and maintenance

If you want to ensure longevity for your binocular, it is important that it be treated with care. Common sense handling procedures suggest that you avoid bumping or dropping the instrument to prevent disalignment of the optics. When hiking in rough terrain, slip the binocular inside your shirt or jacket or hold tightly beneath your arm, with the strap securely over your neck.

If you live in an arid region where blowing dust and sand are a factor, keep the binocular inside the case until needed. In marine localities, where the equipment might be exposed to salt spray, a similar procedure might be followed, or you could use your outer apparel or a plastic bag as a shield. Should salt water fall on the binocular, wipe it off thoroughly as soon as possible to avoid corrosion.

Rain shields are available for many models to protect the exposed eyepieces when not in use on field trips. If you must use the glasses under such conditions, you can avoid getting water on the objective lenses by cupping your hands around the outer surface, like blinders. Avoid use in a downpour and be sure to dry the equipment once you are out of the rain.

If you have the misfortune to drop your binocular in fresh water, allow these procedures: (1) Remove the binocular from the water, but do not dry. Leaving the binocular wet will inhibit the growth of fungus that can damage the lens coating. Place in a plastic bag and, within 36 hours, take to the nearest depot that services binoculars. If this is not possible, dry off as much water as possible and expose the binocular to a stream of very dry air, as from an air conditioning unit. (2) If the binocular falls in salt water, rinse with fresh water as soon as possible and follow the same procedure as in (1) above. Some people prefer not to take binoculars along on boat or canoe trips. Sealed plastic bags can be used to store equipment safely in such circumstances.

Maintenance

Regardless of the price you pay for your equipment, your optics require regular attention. To clean:

1. Blow briskly on lenses and adjacent parts or use a soft brush to remove dirt or grit particles. Blower brushes are available. Grit is the worst enemy of lens surfaces.
2. Moisten the lenses by breathing to form a light mist, or use a recommended lens cleaning fluid.
3. Wipe clean in light circular movements, using lens tissue, lens cloth or a clean handkerchief.

Avoid leaving your binocular with the lenses exposed to direct sunlight when not in use and never, never try to take the instrument apart to remove dirt from interior lens or prism surfaces. You may well disturb the precision alignments of the optical units. If the interior surface needs cleaning, send the binocular to a reputable dealer or repair facility. Similarly, if the optics are out of alignment, forget about trying to make adjustments yourself. Misaligned optics can affect your vision, causing eyestrain and headaches.

Modern binoculars are sturdy but care and maintenance is required. Most of this is merely the exercise of common sense. With a minimum of time and effort and by treating your binocular with the respect that it deserves, you will be able to protect your investment for many years.

Brian Morin is a planning officer with Parks Canada in Ottawa.

EXOTIC GAME SPECIES

With few exceptions, the wildlife of Western Australia has never been considered in the category of "game". Other countries have their various species of deer, pigs, hares, turkeys, pheasants, grouse and other edible animals but Western Australia's only indigenous fauna, which might be considered as game, are wild ducks, quail and kangaroos.

Apart from the use of kangaroos as an important food source for the early settlers and the subsequent development of a valuable export trade in meat and hides, the kangaroo was never really treated as a game species—it was considered generally as "sport" shooting, although some of the more epicurean shooters of late may have utilised the tail for that almost legendary dish—kangaroo-tail soup.

Before we became conscious of the dangers and economic losses caused by the introduction of exotic species, our forefathers, ignorant of the consequences introduced rabbits, goats and foxes which were to plague future pastoralists or they allowed the horse, donkey, pig, goat, buffalo and camel to become feral animals.

Only when it became evident that these animals were having an adverse effect upon the environment and indigenous wildlife—and becoming responsible for agricultural losses—were steps taken to prevent the introduction of further exotic species and control those already introduced, e.g. "Destructive Birds and Animals Act, 1893".

But with all this knowledge gained from past experience there have been many overtures made over the years to introduce "game" species—basically to provide "sport" for those few people who wish to display their skills with a rifle by killing an animal—either for a trophy or to leave its carcass to rot in the bush. A rifle club membership and shooting at targets or clay pigeon could surely satisfy this urge!

If additional species were required for the sake of the meat or food content it would be understandable but more often than not the desire to shoot something (quite often the signs and notices) or bag a trophy is the motivating factor.

In January the Deputy Premier, Mr D. H. O'Neil very aptly spelt out this State's attitude to the introduction of deer into Western Australia when he replied to an enquiry from an Eastern States' Association.

Mr O'Neil's comments, published below in precis form, may be taken as a definitive statement on the hunting philosophy adopted in Western Australia.

- A previous decision made by Cabinet stated that no animals other than ducks and quail should be declared under the Wildlife Conservation Act to be a game species.
- It is believed that the majority of the public is opposed to sport shooting, particularly native (indigenous) animals although limited hunting of feral pigs and rabbits is tolerated.
- Any proposal to introduce an exotic game animal, such as deer, would wake strong reaction from conservationists and the agricultural community which already has to contend with many introduced pests.
- The diminution of wild ducks over the last few decades may be attributed to environmental factors—duck shooting has not been considered a vital factor because in years of drought no shooting season is declared. It is considered that the effects of both drought and shooting may be cumulative rather than concurrent.
- Sport hunting is believed to play a minor role in the control of pest animals, but commercial hunting of kangaroos and feral animals is in a different category and can be of real significance.
- The Government's view is that while sport hunting can be one means of cropping native animals whose populations have to be reduced, it is not one that suits the Western Australian situation or its people. To allow it, there would need to be changes made in the policies relating to firearms and forest and wildlife management programmes—plus the appointment of additional enforcement staff. It is believed these are more acceptable and more economical ways of controlling animal populations.

To introduce further exotic animals into Western Australia could be catastrophic. Already our wildlife is under extreme pressure from man, agricultural expansion, clearing, increased salinities in waterways and growth of new towns. All these take their toll, and the introduction of other species for the sake of game shooting will speed up the rate at which our wildlife is diminishing—it might in fact be the straw which breaks the camel's . . . or rather the kangaroo's back.

Banded Hare Wallaby Reintroduction Programme – Dirk Hartog Island

During the latter part of October and early November 1973, a fire which started at the Northern end of Dorre Island resulted in the destruction of a substantial part of the vegetation on this important nature reserve.

Inspection of the island prior to Christmas 1973 showed selective destruction of the acacia thickets. These appear to have been the major habitat of the Banded Hare Wallaby.

Where remaining patches of cover were found, overcrowding was apparent. There was virtually no evidence of overcrowding and depletion of the available cover suggested an unstable situation on the island, and highlighted the vulnerability of the existing populations. It was therefore decided to spread the site if possible by attempting reintroduction of the species on Dirk Hartog Island.

At the end of the second post-fire trip to Dorre Island in June 1974, 11 Banded Hare Wallabies (four males, seven females) were captured from around the southernmost end of the burnt area in the vicinity of White Beach. These wallabies were subsequently transferred to enclosures on Dirk Hartog Island as the first stage of the attempted re-establishment programme. Six of the females had joeys in the pouch.

On October 15, 1975 a check on the Dirk Hartog Island colony revealed 25 independent animals (13 females and 12 males) including all the original adults.

On December 8, 1976 the colony had increased to 35 individuals (18 females and 17 males). It was noted that two of the original females had been lost. Another three females were lost over the period December 8, 1976-May 1, 1977.

The first stage of the programme for release to the field was commenced on May 1, 1977, when six adult wallabies (three males, three females with pouch young) were released into a four-hectare experimental enclosure near the southern end of the island.

By the end of the year, two of the three females had reared their pouch young to independence.

The second stage of the release programme was commenced during June 1978 with the opening of breaches in the fence surrounding the experimental closure.

At the commencement of the second stage it was noted that the three females had large dependent young—two of the females had therefore reared a second offspring.

A further two females available from the yard colony (established in 1974) were added to this experimental group prior to breaching the fence in an attempt to compensate for the absence of any females among the young produced so far by the original three females within this group.

It was also considered desirable to have more adult females added to this group so as to further increase the population of females. As no suitable individuals were available from the yard colony, the five or six animals required will be obtained from the White Beach area on Dorre I., the source of all animals involved in this experiment to date.

A Banded Hare Wallaby being held by the stump of the tail.

All wallabies on the island were checked four times during the period January-June 1978.

In August 1978 attempts were made to get five to six animals from Dorre Island (White Beach) but due to the scarcity only two females were taken. They were then added to the remaining wallabies in the yards. The experiment continued over the summer and further checks on progress will be made in Autumn 1979.

An attempt to eliminate feral cats from Dorre island was made during February, 1978, in view of the circumstantial evidence pointing to their adverse effect on insular wallaby populations.

Baiting was the method selected, due to non-avaieability of other potentially more specific techniques, and "1080" was selected as the poison in view of the generally higher tolerances of birds and reptiles for this poison, in contrast with the cats, and the knowledge that indigenous mammal species in south-western Australia also appear to have increased tolerances for this compound.

Forty-five thousand specially formulated baits containing compound "1080" were laid by air over the whole island over two days.

Rainfall overnight following the first day's bait laying almost certainly reduced the potential effectiveness of the attempt, while heavy rain (*ca.* 60 mm) within six weeks of bait laying would also have rendered any remaining baits still containing "1080" completely ineffective. The eradication programme was therefore not completely successful and live cats still remain on the island.

White Swan Policy

When the British first arrived in Australia they were amazed and thrilled by the beautiful indigenous Black Swan. In time however some people wished to be reminded of their homeland and for this reason, in 1897 three pairs of White (mute) Swans *Cygnus olor* arrived from Vintners Company of London, on board the S. S. DEVON. Two pairs were allocated to the City of Perth and one pair to the Zoological Gardens. Later records in 1912 state that swans were "turned out for acclimatization" and the breeding colony on the Avon River at Northam may have come from this source.

It is thought that other acclimatization attempts were also made throughout Australia: however to this day, the Northam colony is the only group of White Swans, as far as is known, surviving in the wild on the Australian mainland.

The White Swans which were in zoos and collections in Eastern Australia (excepting one in South Australia) have gradually died out. The same situation occurred in Western Australia until recently when a few strays from the Northam wild flock had been deposited (with ministerial approval) at the Perth Zoological Gardens and a few Wildlife Parks.

As the White (mute) Swan is an introduced (exotic) species that has positively established itself in Western Australia, its restriction in the wild to the Avon River at Northam is doubtful. This has been heightened in recent years by sightings at Warnbro, Mandurah, Busselton and Walpole and the possibility of a breeding pair re-establishing itself in a different part of Western Australia cannot be ignored. Swans eggs and cygnets have in the past been stolen from the Northam colony and it is possible that White Swans could appear in some private person's possession in the future.

Whilst appreciating the obvious beauty of the White Swan and its appeal to travellers and townspeople in Northam, the dangers of it expanding in numbers and competing with our state emblem, the majestic Black Swan, must not be ignored. Corrective measures therefore have been taken.

Because of the tourist attraction and aesthetic value to Northam, plus the fact that it is the only existing wild colony in Western Australia, the animal has been declared "fauna" within the meaning of the Western Australian Wildlife Conservation Act. To further protect the bird from human interference it has been included in Western Australia's Rare "and in need of Special Protection" list. In 1978 a Departmental policy on the White (mute) Swan was therefore established and is as follows:

1. The existing colony on the Avon River at Northam should not be permitted to increase in size.

2. The release or establishment of other colonies, pairs or single Mute Swans should not be permitted elsewhere *in the wild* in Western Australia.

3. Feral Mute Swans (other than those of the existing Northam colony) should be recaptured and donated to the South Perth Zoological Gardens or to approved Wildlife Parks only. Where recapture is not possible, feral Mute Swans should be humanely despatched when a suitable opportunity presents.

4. Surplus stocks produced at Northam may only be distributed to the South Perth Zoological Gardens or to approved Wildlife Parks. All such animals must be pinioned and must be kept in an enclosure or enclosures which will allow any offspring produced to be easily captured. Such offspring must also be pinioned and may only be transferred to other approved Wildlife Parks or to the South Perth Zoo.

The purpose of establishing this policy was to prevent the possibility of White Swans becoming established elsewhere in the wild.

Mute Swans (*Cygnus Olor*) on the Avon river at Northam. These birds have existed in this locality for some seventy years. Mr E. Lawrence of Northam has been the guardian of this colony for many years and is one of the reasons for the birds continued success in the wild. The picture here is typical of the Avon habitat within the town boundaries.

Photo by E. Lawrence

Have You Really Got a Problem With Magpies?

During spring and early summer every year the Department of Fisheries and Wildlife prepares itself for the onslaught of letters and verbal complaints over the persecution of humans by magpies.

It would appear from the relevant four-volume file in the Department's records branch that enough data has been collected on the subject to arrive at a solution to the conflict. What can be determined however is the reaction and attitudes of hundreds of W.A. people and their lack of understanding to conservation and commonsense.

Courtesy W.A. Newspapers

Life is full of "ups and downs" so the saying goes; this also means that life is full of colour and looking back as a boy, part of the heritage of an exciting existence was the annual "dive bombing" by magpies. It was never really funny at any stage and many times one would have given anything to have wrung the villain's scrawny neck—but thank goodness, commonsense prevailed and no harm came to bird or man.

During the nesting season some magpies become aggressive towards humans who move about in the birds' territories. Normally, the attacking birds are little more than a nuisance but some children become very frightened —especially if adults show alarm or exaggerated concern at the swooping birds. Either because some birds press home attacks with greater persistence, or because a child looks up to see which direction the bird is attacking from, some slight facial or scalp wounds are inflicted. Some parents then become deeply concerned for the childrens' safety—they fear serious eye or psychological damage may be caused.

Western Magpie (male) (*Gymnorhina dorsalis*)

Practically all risk of injury can be eliminated if children are given a few simple instructions such as—

- Wear a broad hat or carry a sunshade or umbrella —or even wave a stick or bush above the head.
- Don't look upwards—duck the head if a swish of wings is heard.
- Don't panic—a magpie is not a big or powerful bird and can't do anyone serious harm.
- Avoid aggressive birds' territories. Parents are naturally upset and concerned about their children's safety, precisely the same instincts which drive magpies into their aggressive behaviour. Unfortunately, we can't reason with the birds—but we hope parents will react more reasonable.

Magpies are protected birds and most people don't want them or their babies destroyed. It is quite unnecessary to resort to desperate measures against such relatively harmless creatures and people are urged to calm and pacify any frightened children and protect them by the means set out above. One knows that the swooping, clicking sounds are scary but injury is easily avoided with a little commonsense, just for those 3-4 weeks in a year.

Another cause for complaint has been the beautiful, soft, midnight warblings of magpies in residential areas. If a person is at all interested in life and the beauty of nature, this bird and other night sounds are extremely relaxing. As so aptly put by the Conservator of Wildlife—"the cure lies within the complainant's attitude. If we convince ourselves that any noise is irritating, annoying or simply unbearable, we can work ourselves into a state of thwarted resentment verging on paranoia. On the other hand, if we set about it constructively we can learn to ignore, if not to love, many sorts of sounds and happenings of nature."

ELEGANT PARROT OBSERVATION

An interesting observation was made by Wildlife Officer Trevor Walley (off duty at the time).

During last winter travelling through Baldivis (East of Medina) he sighted approximately 30 Elegant Parrots, feeding on the ground near the corner of St. Albans and Mundijong Roads.

Until recent years the Elegant Grass Parrot was known only in the South-West corner of the state, north to Moora and east to Merredin and near Esperance. Formerly it was not found in the jarrah forest belt or the Swan coastal plain, but since 1937 the species has been undergoing a cycle of expansion, radially in the South-West and north to the pastoral country.

Unfortunately the general public rarely realizes the significance of recognising and reporting the presence of indigenous bird species, therefore unusual movements and events by common species often go undetected.

Any sightings that may be considered irregular or strange should be passed on to government or private institutions dealing with wildlife, so that complete records can be kept for future reference.

Butcher Birds in Grave Situation

During October 1978 Wildlife Officer Bernard Haberley was called to Karrakatta Cemetery in relation to an unidentified bird harassing grave diggers and bereaved relations of deceased persons.

The bird involved was a male Grey Butcher Bird (Western variety) which was quickly identified as it passed in front of the Wildlife Officer's eyes on one of its many sorties. In the immediate area was a female Grey Butcher Bird sitting on a nest containing two young chicks approximately six weeks old.

Wildlife Officer Bernard Haberley with young Butcher birds.

At the time of this observation, concern was expressed, for in three hours, a service was to be performed and no grave had been dug due to the grave diggers concern for their safety. One such gentleman had received a graze to the side of his head which left him severely shaken. The superintendent and head groundsman had also been attacked and in the case of the latter, blood had been drawn. Wildlife Officer Haberley reported that on one occasion a grave digger was exhumed from his task on hearing an ear piercing scream. To his relief he found an elderly lady in full flight, waving a red jumper above her head and the bird in hot pursuit. It had been suggested that in this instant, the hunter appeared more frightened than the victim.

Close up of nest containing the two fledglings.

The male Grey Butcher Bird was a beautiful specimen and to have had it "laid to rest" would have been the easiest thing to do. However, it was decided that "butchery" was not the Department's business and it was decided that to remove the nest and young would subdue the male's behaviour.

Wildlife Officer Haberley proceeded to Karrakatta Cemetery and after a lengthy encounter with the male bird went about his ghoulish task of dislodging the female and taking the nest and young. This was done with the Wildlife Officer perched precariously on top of a departmental motor vehicle and covered by a blanket.

During the confrontation the female bird remained quite angelic, even as her young were being taken. The male however showed tremendous concern and turned on a devilish display after the nest and young were removed.

The two fledgelings were taken to the Perth Zoological Gardens where they were raised with expert care and attention.

The adults, have now returned to their favourite tree to warble their divine service throughout the coming winter. It is hoped that next spring they are a little less persistent in resurrecting their position in the neighbourhood as proud parents.

NATURE RESERVES

There were some 24 new nature reserves totalling 734 971·769 9 hectares added to the already impressive list of nature reserves, in Western Australia during 1977/78. The total 977 nature reserves vary in size from 1 to 2·49 million hectares, each created for a specific purpose, as a representative sample of a particular environment. The largest new reserve acquired was Neendojer Rock Reserve of 2 249·06 hectares. Statistics of nature Reserves now in Western Australia are as follows.

Year (30 June)	Total Number	Area (ha)	Vested in the W.A. Wildlife Authority	
			No.	Area (ha)
1969	278	2 342 966	127	818 442
1970	315	2 100 318	156	867 362
1971	359	4 955 893	213	4 415 595
1972	404	5 077 224	242	4 533 944
1973	440	5 013 287	265	4 607 266
1974	454	5 033 935	281	4 626 617
1975	491	5 103 037	320	4 713 482
1976	918	5 339 947	351	4 747 403
1977	946	7 520 839	385	6 927 627
1978	1 003	8 398 648	435	8 086 314

NEW RESERVES 1977/78

No.	Name	Area (ha)	Vesting	Gazetted
21830	14-mile Brook	44·884 7	W.A.W.A.	1/7/77
A.34720	Neale Junction	723 073 approx.	W.A.W.A.	1/7/77
34761	Gingin Stock Route	65·383 9	W.A.W.A.	15/7/77
30428	Tank Hill	592·055 1	W.A.W.A.	29/7/77
34776	Neendojer Rock	2 249·063 6		29/7/77
34833	Jitarning Railway	12·906 8	W.A.W.A.	26/8/77
34811	Benger Swamp	10·117 2	W.A.W.A.	26/8/77
B.34944	Dolphin Island	3·2030	W.A.W.A.	14/10/77
30463	Baker's Junction	1 324·206 1	W.A.W.A.	11/11/77
35002	Yilgerin Rock	49·472 8	W.A.W.A.	11/11/77
14209	Lake Baylemup	40·468 6	Min. for W.S.S.D.	25/11/77
18730		292·481 5	W.A.W.A.	25/11/77
35066	Alfred Cove	7·000 0	W.A.W.A.	9/12/77
A.22519	Kondinin Lake	1 687·881 6	Kondinin Shire and W.A.W.A.	23/12/77
A.2738	Mealup Point	30·351 4	W.A.W.A.	20/1/78
35134		578·821 9	W.A.W.A.	3/2/78
35163		6·161 4		10/3/78
35168		1 058·667 5	W.A.W.A.	10/3/78
12333		40·468 6	W.A.W.A.	10/3/78
641	Yanganooka	40·420 0	Min. for W.S.S.D.	10/3/78
A.6549	Galamup Swamp	221·836 0	W.A.W.A.	10/3/78
A.10733	Parkeyerring Lake	404·685 6		17/3/78
35191		3·074 1		23/3/78
18735		121·405 7	Min. for W.S.S.D.	23/3/78
7504	Karakin Lakes	485·218 1	Min. for W.S.S.D.	7/4/78
35217	Kirwan	70·117 7		21/4/78
20258	Walburra	21·554 5	W.A.W.A.	19/5/78
27289		673·892 7		2/6/78
16346		44·6393	W.A.W.A.	2/6/78
20834		63·333 3	W.A.W.A.	2/6/78
26792		1 038·860 9	W.A.W.A.	2/6/78
A.14739	Bokarup Swamp	146·091 5	W.A.W.A.	16/6/78
19116		129·499 4	W.A.W.A.	16/6/78
A.16305	Lake Hinds	1 235·255 9	W.A.W.A.	16/6/78
A.9307	Mongelup Pool	39·1634		23/6/78
A.16031		39·724 6		23/6/78
A.16568		22·123 6		23/6/78
	Total—37 New Reserves	739 167·289 0		
	Total Area—24 Reserves W.A.W.A. only	734 971·769 9		

OTHER CHANGES

Amendments to Area 1977/78

No.	Name	Vesting	Old Area	New Area	Difference	Date
14493			297·858 2	297·646 3	—0·211 9	1/7/77
26668	Highbury		81·024 1	16·985 3	—64·038 8	1/7/77
27487	Flat Rock		997·613 3	1 467·786 3	+470·173 0	1/7/77
A.25555	Tutanning	W.A.W.A.	2 047·549 1	2 055·240 4	+7·691 3	1/7/77
1059	Ascot	Min. for Works	2 023·428 0	2 021·427 9	—2·000 1	1/7/77
1998		Albany Shire	39·616 2	37·640 9	—1·975 3	15/7/77 and 29/7/77
24486	Butty Harbour		14 565·040 9	12 622·794 4	—1 942·246 5	15/7/77
14001	Kulin Road Reserve	W.A.W.A.	471·458 8	488·986 7	+17·527 9	29/7/77
30305		W.A.W.A.	850·679 4	1 716·609 6	+865·930 2	29/7/77
2275			5·101 5	5·088 9	—·012 6	29/7/77
24072	Wurgabup		32·374 9	48·514 4	+16·139 5	29/7/77
20262	Jilbadgie Rocks	W.A.W.A.	1 011·714 1	1 020·872 1	+9·158 0	16/9/77
31781	Lancelin	W.A.W.A.	4 574·000 0	4 561·916 1	—12·083 9	9/9/77
31675	Wanagarran	W.A.W.A.	9 550·000 0	9 283·964 3	—266·035 7	16/9/77
25809	Lake Powell	W.A.W.A.	186·155 4	192·010 7	+5·855 3	14/10/77
A.1931	Warrinup Swamp	W.A.W.A.	258·998 8	251·152 5	—7·846 3	14/10/77
26687			377·645 0	303·289 3	—74·355 7	11/11/77
27349	Protheroe	W.A.W.A.	52·204 4	67·892 9	+15·688 5	3/2/78
23366			336·908 4	937·226 0	+600·317 6	3/2/78
31881	Panton	W.A.W.A.	179·586 8	322·086 8	+142·500 0	17/2/78
A.27632	Nuytsland	W.A.W.A.	625 343·367 6	625 347·414 5	+4·046 9	17/2/78
1059	Ascot	Min. for Works	2 021·427 9	1 861·427 9	—160·000 0	10/3/78
31636	Parry Lagoons	W.A.W.A.	12 589·000 0	12 379·000 0	—210·000 0	10/3/78
A.27632	Nuytsland	W.A.W.A.	625 347·414 5	625 343·614 5	—3·800 0	17/3/78

Alfred Cove foreshore, a new 7 ha nature reserve on the Swan river.

BIRD COMMITTEE FIELD TRIP – 1978

On October 11 and 12, 1978, members of the bird Committee of the Western Australian Wildlife Authority and their guests took part in a field excursion. The purpose of the excursion was to inspect a number of wetland areas in the south-west, with emphasis on the Coomelberrup area.

Members of the party were:—

Mr. D. W. Arnold (Chairman, Bird Committee), Drs. Serventy and Davies, Messrs Beeck, Hall, Aitken, Spence and Masters. From the Department of Fisheries and Wildlife were Messrs Carmichael, Marshall, Lane, Munro, Jennings, Allen, Piggott and Lambert.

The first rendezvous was for lunch which was enjoyed on the banks of Lake Coomelberrup. Following the lunch, a canoe inspection of the lake was made with interest mainly being centred on the nesting thickets on the northern shoreline. Bleak weather conditions did not affect the excursion greatly though a disappointingly low number of bird species were observed.

A mountain Duck stands watch at Coomelberrup.

Particular interest was aroused by the locating of Pink-eared Duck (*Malacorhynchus membranaceus*) nests and Coot (*Fulica atra*) nests, some containing eggs, some containing young birds.

Pink-eared duck nest at Coomelberrup. This one contained five eggs.

From Coomelberrup the party travelled to Walbyring (Mud Hut) to inspect a White-necked Heron (*Ardea pacifica*) nesting site. A number of nests containing eggs were observed. This lake was carrying heavy populations of ducks and it was gratifying to see that White Egrets (*Egretta alba*) were still in the area. Sightings of White Egret nests were made during the Toolibin excursion in 1975.

The party then moved to Narrogin and spent the evening in discussion on the future study and use of the wetland systems in Western Australia.

The following morning, with the courtesy and co-operation of Henry Hall, an inspection was made of the Yenyening Lakes commencing at Qualandry Pool. Mr. Hall had provided a number of power boats and vehicles to assist in the inspection. This particular lake system owes much of its existence to a low weir constructed at Qualandry. The water has been able to back up

A White-necked Heron near the nest site at Walbyring

White-necked Herons nest, containing 3 eggs.

approximately 28 kilometres since the installation of this weir. An immense body of water had accumulated during the good rains of 1978 and waterfowl were breeding on many areas of this lake system.

Particularly noticeable was a high number of Black Swans (*Cygnus atratus*), some with cygnets. On one small island visited, a number of swans' nests were observed, all containing eggs.

Messrs Aitken and Allen on the weir at Qualandry pool.

From Yenyening the party moved to Lake Mears to inspect a recently installed diversion system which will allow Lake Mears to hold good quantities of water for a considerable length of time. The depth of the water at the time of inspection was approximately two metres in the deepest part.

One of the many swans' nests on a Narrow Island in the Yenyening Lakes

Following the inspection of Lake Mears, the party moved to the Avon River to inspect areas where siltation appeared to be posing a serious problem.

Inspection was then made of Mr. J. Masters' property where Mr. Masters explained a water catchment and storage system which he had installed a number of years ago to allow virtually fresh water to be kept on hand at all times.

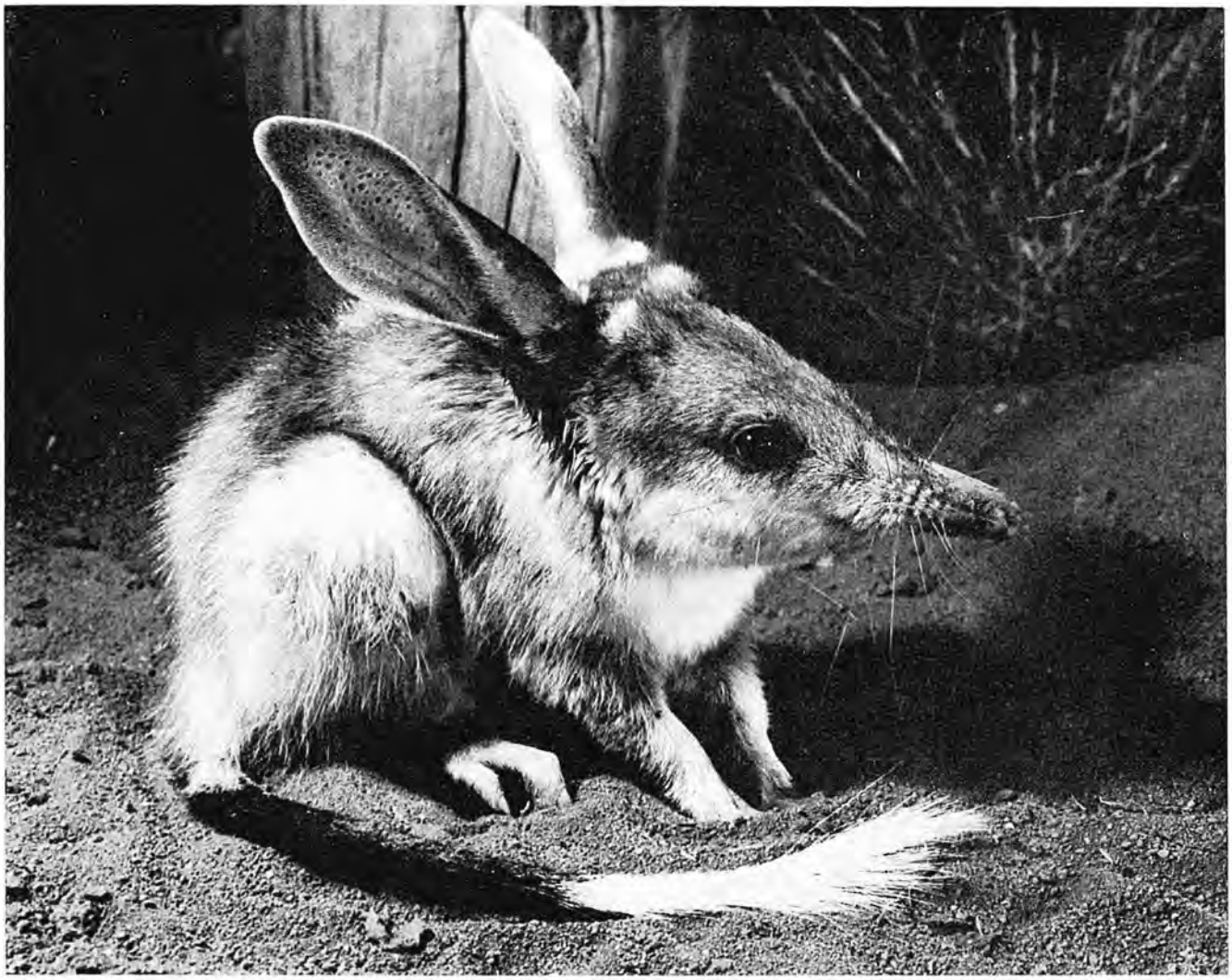
In a family environment where salt has caused many problems, this system had proved to be of considerable value.

One dam (of approximately two ha) on his property contained fresh water and had proved to be a haven for a considerable number of waterfowl.

Inspecting one of the storage dams on J. Masters (4th from left) property.

Following this inspection, the party broke up and headed home.

Appreciation is expressed to Mr. Hall and Mr. Masters for their valuable assistance in the excursion, and also to the others who worked together to make this exercise so worthwhile.



The Dalgyte—(*Macrotis lagotis*) Photo by A. G. Wells

SO RARE

A beautiful portrait of a rare Australian taken by Mr. Bert Wells and more than worthy of inclusion in S.W.A.N.S. The Dalgyte or Rabbit-eared Bandicoot above is currently housed in the Perth Zoological Gardens Nocturnal House and is quite at home in her artificial environment.

The young female had been rescued in late 1977 from an aboriginal's dog at Laverton and Wildlife Officer Leon Silvester managed to convince the locals of its scientific importance.

Although suffering from deep wounds to the hind legs and a large inguinal hernia she has survived and thrived well in captivity.

She has grown well and now shows the beautiful french-grey velvet fur characteristic of this very rare species when in good health.

Zoo Director, Mr. Tom Spence, has stated that as soon as a young male becomes available, there will be every chance of a litter being born in captivity. This is the very essence of a rare and endangered animal being kept in captivity so that its progeny may be stock for re-introduction to the wild or wilderness reserves.

Wild Bird Observations

Generally speaking, when civilized man moves into a wilderness area to live, he displaces nearly all of the wild creatures previously found in that area. Cities of the world and their rambling suburbs, although depauperate in wildlife, still manage at times to have a few areas where species can rest and recuperate—or even live and breed. Such places like natural wetlands, parks and zoological gardens are a boon to the education of the people in these cities and help them to realign themselves with nature.

The City of Perth is and will be quite lucky in the future because of its location near the Indian Ocean, Swan River Estuary and the wetland depressions of the Swan Coastal Plain. Providing Perth's natural assets are maintained and managed, bird migrations and populations will continue.

Throughout every year, spectacular concentrations of our unique waterfowl can be observed on many local waterways. During summer, migratory, local and inland species provide an observers' paradise.

With these movements of waterbirds comes the influx of birds of prey and other predators and parasites alike. Whilst all these animals provide recreation and pleasure for the citizens of Perth, the Perth Zoological Gardens has had its work cut out coping with these intruders.

The Zoological Gardens Board Annual Report 1978, provides an interesting account of the wild birds which visited the park during the year. In his inimitable way, the Director Mr Tom Spence writes:

"The park has become a haven for wild birds, some species not always welcome. Over the years the numbers of Black Duck summering in the zoo have increased and last year's drought forced even greater numbers to take refuge on our lakes. Feeding them and dealing with their faecal contamination proved a big problem. Over 600 were trapped and relocated but it eased the problem not at all. White Ibis and Night Herons have increased: neither are welcome since both are serious nest predators. Although the Great Egrets nest every year, no young have been reared due to these predators. The Royal Spoonbills produced two young in each of two nests: when the young were advanced enough the parents no longer brooded them and the young birds were found disembowelled—characteristic of ibis predation. Silver Gulls continue to be a problem. Sometimes many hundreds invade the zoo and, in a feeding frenzy, soon devour the food intended for our birds and contaminate our lakes. Although measures are taken against them, it is difficult to dissuade their intrusion.

"More welcome are the Great Egrets. Each winter sees over 30 take up residence in the zoo and some full-winged birds remain, mated with the flightless ones. About 40 Little Pied Cormorants roost in the giant bamboo thickets, while Great Cormorants are regular visitors along with an occasional Great Peid Cormorant. Small numbers of darters roost in the tall Araucarias. During the dry period, other waterfowl take up residence. These have included over a score of Shoveller, Grey Teal, Chestnut Teal, White-eyed Duck, even Musk Ducks and Bluebills.

"Perhaps the birds-of-prey are the most spectacular. The zoo harbours Peregrine Falcons regularly, attracted by the numerous Palm Doves, Necklace Doves and street pigeons. As many as four different birds have been present at the one time and at one time a parent pair were accompanied by a still dependent young female. At the time of writing a magnificent male is in residence. He came while still in sub-adult plumage but has now moulted to full splendour. He is the most reckless, impetuous hunter I have ever seen and pitches himself at his prey in breath-taking stoops: I fear that he will collide with branches some day. Little Falcons also visit the zoo but spend as much time chivvying the Peregrines as hunting. Goshawks on migration are a pest and usually about 30 are destroyed each year to protect out aviary birds. Whistling Kites are resident in the neighbourhood of the zoo and steal the fish intended for other birds. Other, rarer visitors include the Squaretailed Kite which has been seen on three occasions in recent years. Ospreys sometimes take a short cut over the Zoo from Perth Water to Melville Water and commonly Caspian and Crested Terns take the same route.

"However, the most spectacular bird invasion has taken place this year: pelicans! First a single adventurer, then ones and twos till the record of 83 wild pelicans joined our captives. They have become so tame that they are indistinguishable from our captive birds. Landing and taking-off is spectacular but unfortunately there have been casualties. Four have struck power-lines, one collided with a motor vehicle and one was killed by the elephant. Numbers vary from week to week but at the time of writing we have 70 of these greedy guests."

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