Vol. 10 No. 2
Summer 1980

SWANS

State Wildlife Authority News Service

SWANS

Vol. 10 No. 2
Summer 1980

Issued by direction of the Hon. Gordon Masters, M.L.C. Minister for Fisheries and Wildlife.

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.

S.W.A.N.S. is published quarterly by:

Extension and Publicity Service, Department of Fisheries and Wildlife, 108 Adelaide Terrace, Perth, Western Australia 6000

Editor:
Malcolm Taylor
B.Sc.(Hons.) Dip.M.S.

Assistant Editor:
Kevin Carhart

Contents

COVER PHOTO: Spiny-cheeked Honeyeater *Acanthagenys rufogularis* a bird of arid and semi-arid scrubland throughout Australia. Photographed feeding on a Lesser Bottlebrush flower *(Callistemon phoeniceus)* by A.G. Wells F.R.P.S., E.F.I.A.P., A.A.P.S., Wildlife Photographer. (Copyright exists on this photograph). The Spiny-cheeked Honeyeater is one of the commonest birds to be found on Cooloomia nature reserve, which is featured on page 7 of this publication.

Bald Island Survey

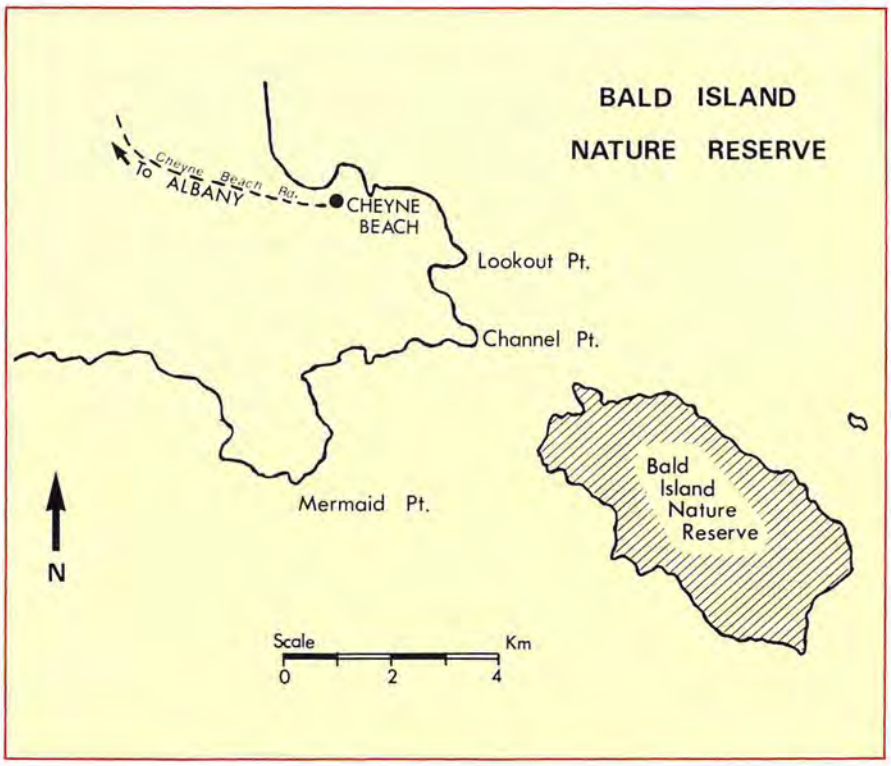
During February 1980 members of a University of Western Australia research team were accompanied by officers of the Department of Fisheries and Wildlife to Bald Island Nature Reserve No. 25869 which is situated 20 kilometres east of Two Peoples Bay on the south coast of Western Australia.

This uninhabited island (768.9 hectares in area) is actually within 2 kilometres of the mainland coast, as can be seen from the map, but it is relatively unchanged by human visitors, as it has no beaches on which a boat can easily land. The survey team used a rubber dinghy to gain access. Bald Island Nature Reserve was gazetted on March 3, 1961 principally because it was the only island apart from Rottnest on which the 'Quokka' *Setonix brachyurus* occurs. It was vested in the Western Australian Wildlife Authority on January 1, 1964 (Government Gazette February 7, 1964) and reclassified to 'Class A' on October 1973. It is the presence of the Quokka that attracted the University of Western Australia research team's interest in the Island. The team was seeking to check Quokkas for the presence of Salmonella bacteria and compare the results with these previously obtained from Quokkas on Rottnest Island.

The only sign of human interference on the island is an extremely old stack of firewood on the north-eastern side. At first the team thought that the firewood was evidence of the early sealing operations that took place on the island, but afterwards it was determined that the wood had been deposited at a much later date from a passing vessel.

Some evidence of small fires in the distant past has been found but most of the island appears not to have been burnt for a very long time.

There is no sign of any environmental damage to the island.



▼ Quokka *(Setonix brachyurus)*—Until the 1930s, the quokka was a common animal in the wetter areas of south-west Western Australia where it was often shot for 'sport'. Now they are only abundant on Bald Island (where this photograph was taken) and on Rottnest Island. (Photo: R. Smith).

▲ Vegetation of the island centre. The foreground is dominated by Swordsedge *(Lepidosperma)* and *Rhagodia baccata* with a background of *Melaleuca pubescens* and areas of rocky outcrops. (Photo: R. Smith).

▲ Gully on the north-east of the island vegetated with *Melaleuca pubescens, Rhagodia baccata. Threlkeldia diffusa,* and *Parietaria debilis* over a grassland of *Poa* species and *Scirpus nodosus.* This is the typical nesting area of the Great-winged Petrel. (Photo R. Smith).

▼ Great-winged Petrel *(Pterodroma macroptera)* is present in large numbers on Bald Island where it commences to lay its eggs during May each year. (Photo: R. Smith).

The island is composed of hard granite-gneiss with a thin covering of grey sand. There are a few limestone hilltops, but the steep sides of the hilly terrain showed no signs of erosion.

The island is well vegetated with excellent specimens of Moonah Paper Bark *Melaleuca pubescens,* Rottnest Island Pine *Callistris preissii* and Bald Island Marlock *Eucalyptus lehmanni* of an impressive size. The ground is covered with deep litter reflecting the long period since a fire.

The team used hand nets to capture the Quokkas which proved commonplace throughout the Island regardless of vegetation type.

A total of fourteen animals were captured and then released after swabs were taken to check for the presence of Salmonella bacteria. The animals proved to be in a generally good condition compared with those on Rottnest Island. The island abounds in birdlife with the ground being riddled with burrows of the Great-winged Petrel *(Pterodroma macroptera)* and large numbers of these birds arrived each night. The Little Penguin

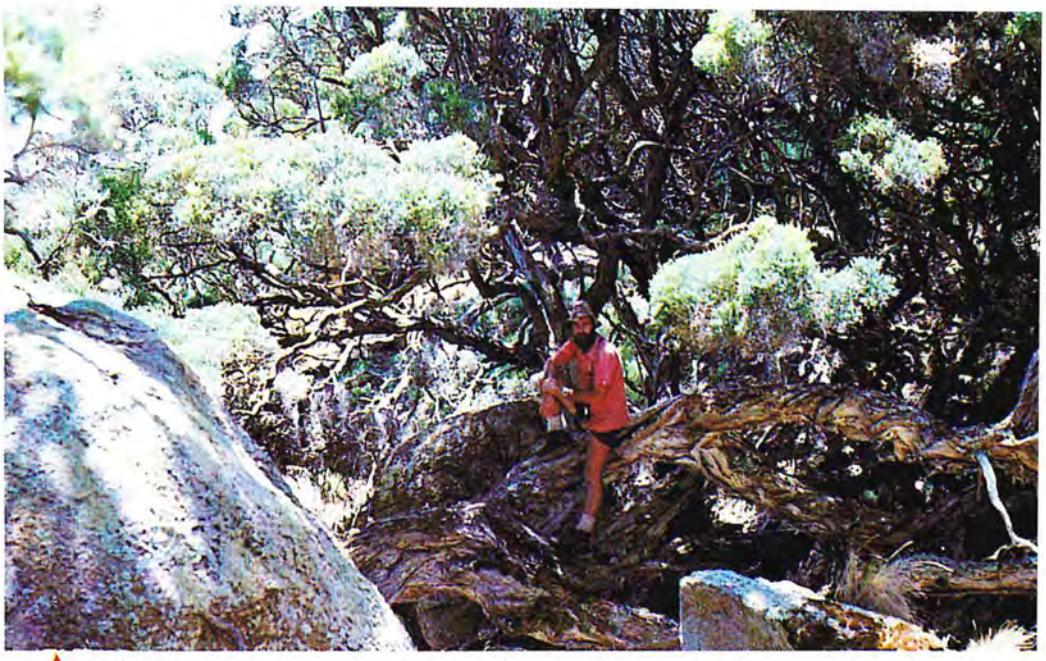
(Eudyptula minor) is also common throughout the island.

Birds of ten other species were also observed although they were not present in such large numbers. A total of 27 bird species, 21 of them land birds, have previously been reported as occurring on the island (Smith G.T. "The Birds of Bald Island" *W.A. Naturalist* 14:17-19).

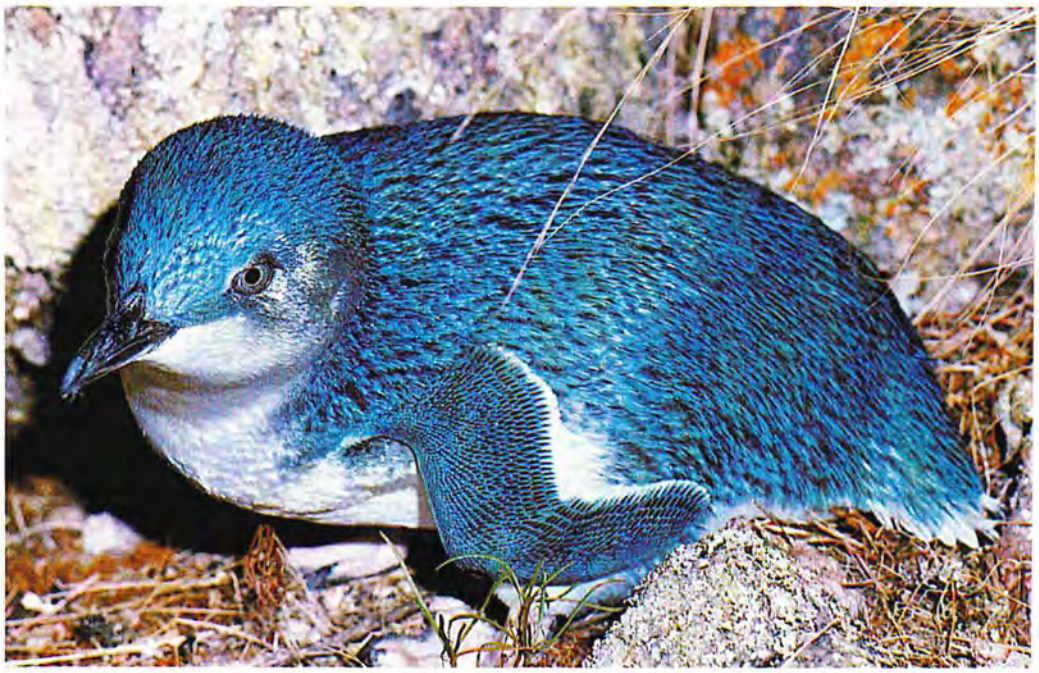
The team observed numerous King's Skinks *(Egernia kingii)* particularly near water edges and the presence of a smaller skink, that the party was unable to catch and identify, was also noted.

The number of reptile species on Bald Island is impoverished compared with the adjacent mainland. However, previous reports indicate that five species—a gecko and four skinks—do exist on the island. (Storr G.M. "Notes on Bald Island and the adjacent mainland *W.A. Naturalist* 9:187-196)

The island is a haven for seals despite its early sealing history. Fairly large numbers of Fur Seals *(Arctocephalus forsteri)* and specimens of the Australian Sea Lion *(Neophoca cinerea)* can usually be observed there.



▲ Specimen of Moonah paperbark *(Melaleuca pubescens)* showing the great height and age of this species on the island. (Photo: R. Smith).



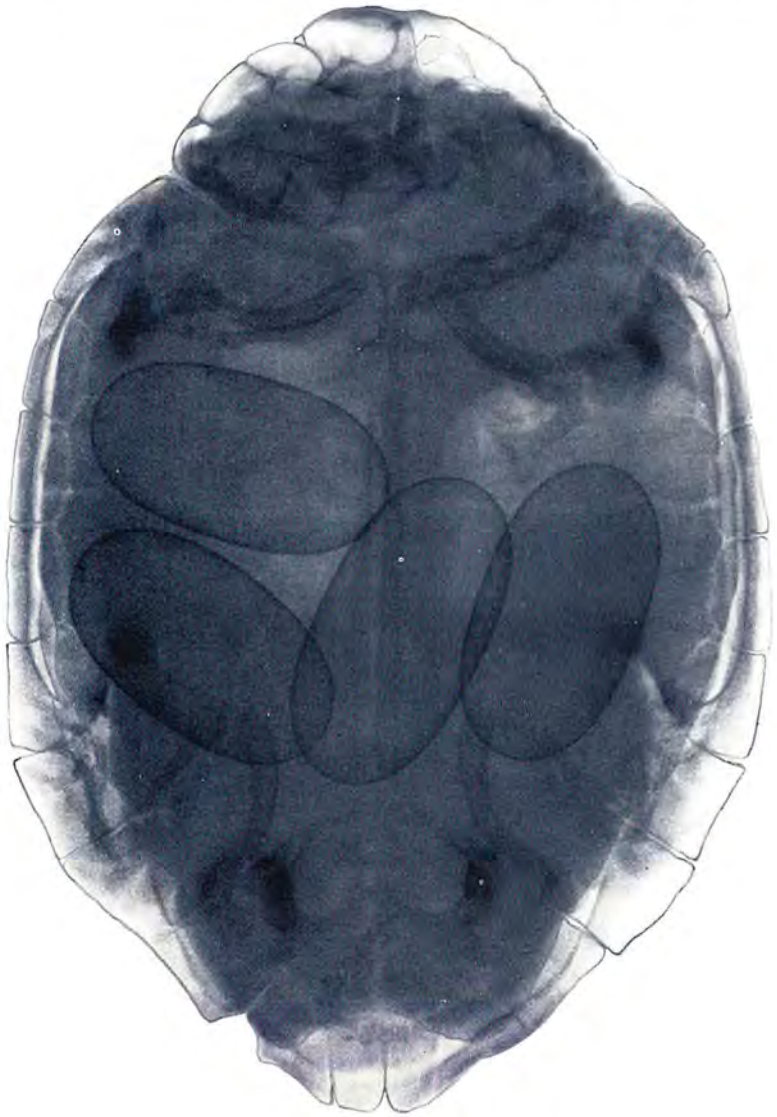
▲ Little Penguin *(Eudyptula minor)* is a common species on the island. (Photo: R. Smith).

▼ Fur seals *(Arctocephalus forsteri)*, two of the twenty nine animals sighted on the Island. (Photo: R. Smith).

Western Swamp Tortoise Breeds in Captivity

▲ Mature female with a young tortoise produced as a result of the artificial induction method under laboratory conditions.

▼ An X-ray taken of a gravid female (actual size) Western Swamp Tortoise before hormone injection. The four eggs seen inside the tortoise are typically large compared with the size of the adult's shell. The female must loosen the upper and lower parts of her shell in order to lay the hard-shelled eggs.
Note how the tortoise curves its neck to retract its head. a feature that is found in side-necked turtles. the group to which the Western Swamp Tortoise belongs.



Officers of the Western Australian Wildlife Research Centre at Wanneroo, have succeeded in artificially inducing the Western Swamp (or Short-necked) Tortoise *(Pseudemydura umbrina)* to breed in captivity. The Western Swamp Tortoise is an extremely rare animal confined to a small region of south-west Western Australia. Its known range of about 25km extends south from Bullsbrook to swampy country on the outskirts of metropolitan Perth.

Two reserves, Ellen Brook (53 ha) and Twin Swamps (142 ha) were established in 1962 to protect the species.

The total population of the species in both reserves is estimated at less than 50 individuals, and recruitment into the population has been limited since 1964, mainly due to a series of dry winters. In a bid to ensure the survival of the species, a breeding colony has been established at Perth Zoological Gardens.

The precarious state of survival of this species led the research officers from the Wildlife Centre to attempt breeding the species under laboratory conditions. A mature female tortoise was injected with hormones to induce egg laying, and the experimenters were rewarded when 3 eggs were laid, of which 2 hatched after a further 23 and 27 weeks respectively in an incubator.

The young hatchlings were extremely small, about the size of a 20 cent coin. They eat small aquatic animals such as tadpoles, small crustacea and insects.

Adult Western Swamp Tortoises are the smallest of the Australian side-necked turtles, so called because of the sideways manner in which the head and neck are retracted in to the shell, so rapid growth cannot be expected. The length of an adult male is about 14cm (weight about 400 grams) with the female being slightly smaller, i.e.

about 13cm (weight about 325 grams)

In nature the species requires a long period of 10-15 years before it reaches maturity, but this may be prolonged to 20 years or more if there are any dry intervening years, all of which suggests that building up a breeding colony, even with the assistance of artificial methods would be a long term project.

Nevertheless the initial success with the method will lead to further attempts to increase the size of the colony.

"Cooloomia" Nature Reserve

Cooloomia Nature Reserve consists of an area of 50 350 hectares situated about 50 kilometres north of Kalbarri within Shark Bay Shire as shown on the map. The reserve was declared (for the purpose of Conservation of Flora and Fauna) and vested in the Western Australian Wildlife Authority on June 22, 1979.

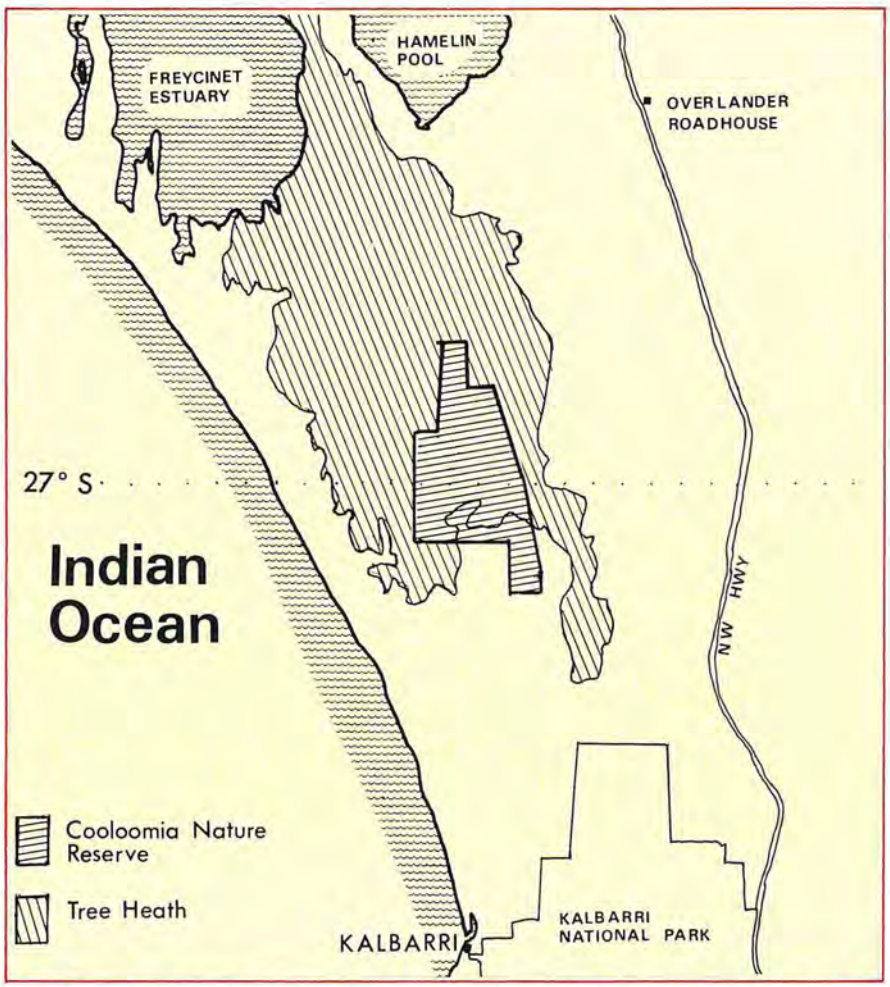
Cooloomia is surrounded by land held under pastoral leases and can only be entered on unmade roads. This general remoteness and difficulty of access are contributing factors towards its relatively natural state which makes it an important addition to the State's nature reserve system.

The reserve lies at the northern extremity of the South West Botanical Province.

The area also lies near the edge of the State's arid zone, a fact that has important ramifications, particularly for the flora of the area which is enriched by the presence of arid species of the Eremean Botanical Province as well as south western species of the South-West Botanical Province.

Areas such as Cooloomia which lie near the boundaries of the South-West and Eremean Botanical Provinces are of particular importance to scientists and Departments involved in Nature Conservation because:-

1. They contain many vegetation formations, plants and animals found only in the Interzone area.
2. Extensive clearing in the boundary areas in the past means that few suitable areas for conservation remain.



▲ Cooloomia Nature Reserve showing its position relative to the unique tree heath vegetation zone of Western Australia.

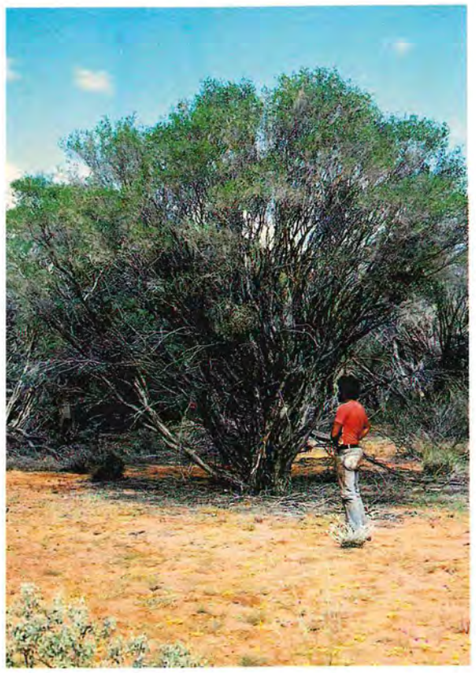
▼ Tree Heath vegetation in Cooloomia showing the typical blending of heath and taller trees. (Photo: S. Hopper).

"Cooloomia"—Special Features

▲ The outstanding yellow *Verticordia* of Cooloomia discovered by the survey team in 1979. It has erect stems to 2.5 metres and grows in heath on yellow sand. (Photo: S. Hopper).

▲ Polythene pipe pitraps and flywire drift fence used to trap native marsupials and frogs. The mallee eucalypts. *E. ororia* occur only in small isolated clumps on Cooloomia Nature Reserve. (Photo S. Hopper).

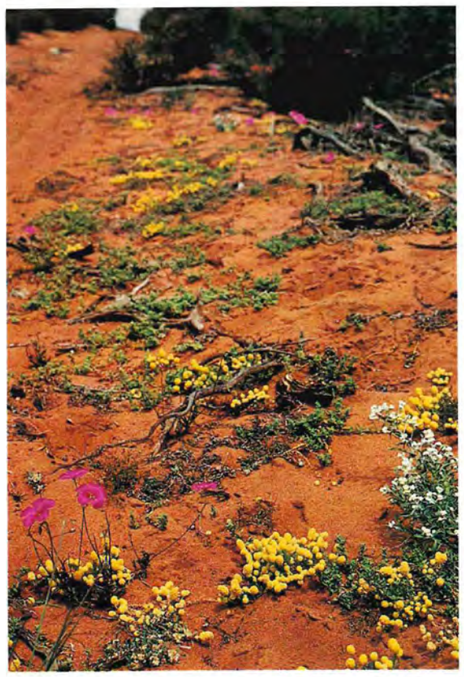
▲ One nights catch of *Arenophryne rotunda*, the very rare frog that lives in this water free area. (Photo S. Hopper).



▲ Giant plants, (above) an *Eramaea* and, (below) a *Calothamnus* both un-named species which are a feature of the area. Species of both these genera are usually shrubs less than two metres tall. (Photo S. Hopper). ▼

▲ A native bee *Chalicodoma semiluctuosa* on flowers of *Swainsona canescens.* This pea-flowered herb is a common occupant of swales in undulating red sand dunes on Cooloomia Nature Reserve. It flowers in spring. (Photo: S. Hopper).

▲ *Banksia lindleyana* provides a brilliant effect during its flowering season in March. It is a relatively rare species that reaches its northern limit at Cooloomia Nature Reserve. (Photo S. Hopper).

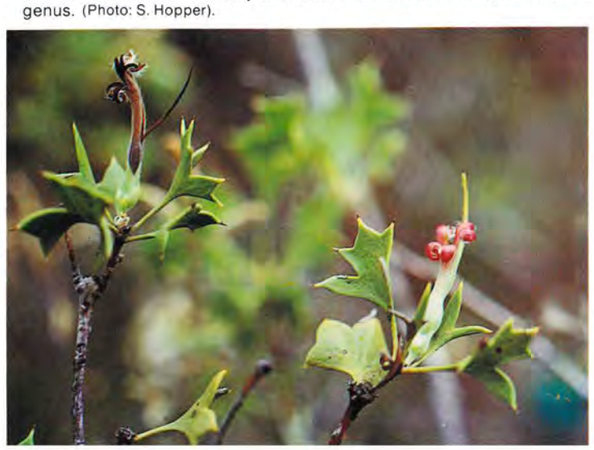


▲ Ephemeral spring wildflowers on the edge of a track through red sand dunes on Cooloomia. The yellow button daisy is *Calocephalus francisii,* while the pink flowered herb is Parakeelya *Calandrinia polyandra.* The white flowered everlasting *Helipterum condensatum* in the right foreground is restricted to the Shark Bay—Murchison River region. (Photo: S. Hopper).

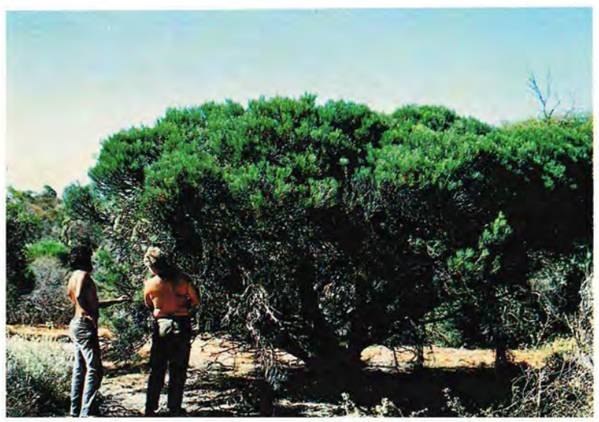
▲ *Grevillea rogersoniana* with Spiny Cheeked Honey-eater feeding. This *Grevillea* is another of the species restricted to the area. It flowers in spring. (Photo: S. Hopper).

▼ Delicate flowers of Parakeelya *Calandrinia polyandra,* an ephemeral herb common on Cooloomia Nature Reserve. It ranges from the north-west coast of W.A. southwards and east to the Nullabor Plain and South Australia. Each flower opens for only one day. (Photo S. Hopper).

▼ *Adenanthos acanthophyllus* one of the plant species restricted to tree heath area. The holly-like leaves are unusual for species in this genus. (Photo: S. Hopper).



▼ Mallee heath vegetation in which the yellow flower heads of the rare un-named *Verticordia* of Cooloomia rise up to 2.5 metres. The emergent mallee is *Eucalyptus roycei,* an uncommon species confined to the Shark Bay—Cooloomia region. (Photo: S. Hopper).



3. Many south western species reach the limit of their geographical range in this region and scientific study of species in such places is of value in determining the adaptation of species to their environment and the factors which limit distribution and abundance.

The formation of these 'boundary' reserves was strongly recommended by the Conservation Through Reserves Committee report of 1974.

Botanically, Cooloomia Nature Reserve is particularly important for a further reason as it lies within a band of unique type of vegetation known as "tree heath" which is not known to occur elsewhere in Western Australia.

The tree heath zone extends in a south-easterly direction from the shores of the Freycinet Estuary, as shown on the map.

Tree heath is essentially heathland with small trees of any height up to 6 metres indiscriminately arranged without discernible stratification. The plant community is open at all levels and very irregular, and shows features of both south-west and arid type plant associations.

A fairly large number of plants are restricted, or nearly so, to this community including *Eucalyptus beardina*, *E. roycei*, *Grevillea rogersoniana*, *Adenanthos acathophyllus*, *Newcastelia chrysophylla*, *Hakea stenophylla*, and undescribed species of *Melaleuca* (two species), *Acacia*, and *Macarthuria*, *Verticordia*, *Eremaea* and *Calothamnus*. The undescribed *Verticordia* is an outstanding yellow-flowered species up to 2.5m tall that was only discovered by officers of the Department of Fisheries and Wildlife in September 1979 and the small populations on the reserve are the only ones known at present.

Several shrub species are present in "giant" forms in Cooloomia e.g. the undescribed species of *Eremaea* regularly attains a height of four metres. The reasons for the "gigantism" behaviour are not fully understood at present.

Numerous other components mainly occur in this community and only sparingly and to a limited range outside it, or are more abundant and vigorous in it than elsewhere, all adding to the unique character of the reserve.

The extreme southern portion of the reserve is vegetated by scrub heath dominated by *Banksia sceptrum*, *Actinostrobus arenarius* (Sandplain Cypress) and *Xylomelum angustifolium* (Woody Pear). The Woody Pear is one of a number of typical south-western sandplain species that reach their northernmost limit in the reserve e.g., *Stylidium macrocarpum*, *Conostylis aculeata*, Tamma, *Casuarina campestris*.

Survey of Reserve

In September 1979 and March 1980 survey teams from the Department of Fisheries and Wildlife visited the reserve and observed (or found evidence of) a wide variety of bird life comprising 43 species.

The birds were of species typical of both the South West Zone and of the Arid Zone. Four of the South West species were at the northernmost limit of their range i.e. the Red Wattle Bird, Western Yellow Robin, Fan-tailed Cuckoo and Golden Whistler. After the survey it was found that the Fan-tailed Cuckoo had never been recorded north of the Murchison River before and Cooloomia therefore represents a northern extension to its range.

A wide variety of reptiles were also observed including a rare small striped skink *(Lerista humphriesi)* about 60mm in length, which is only known to occur very locally in the area.

The team set trap lines, as shown in the photograph, and were surprised to discover large populations of the frog *Arenophryne rotunda* which was previously thought to be extremely rare. In the past only isolated specimens had been found by scientific surveys on the western side of Freycinet Estuary. This frog is unusual as at Cooloomia it is living in an area that appears devoid of all surface water and that in itself is an achievement for frogs which are, of course, normally aquatic in lifestyle.

In fact, the evidence suggests that this species has eliminated the aquatic tadpole stage in its lifestyle completely and appears to exhibit direct development from egg to adult form, a truly remarkable example of adaptation to dry conditions.

The frogs dig to just below the interface of the moist subsurface layer and the overlying dry sand where they remain in a small cavity to avoid the heat of the day and emerge in the cooler periods between evening and dawn at which times they were trapped by the team.

The frogs are small (head and body length about 30mm) but they have an exceptionally long tongue and from analysis of faecal pellets it appears that they use this long tongue to catch their main diet of ants and small beetles.

The survey team also sought native marsupials, however, only Red Kangaroos and Grey Kangaroos were observed in any numbers. Single specimens were also collected in pit traps of two species of native mice, i.e., the Pebble Mouse or Sandy Inland Mouse, *Pseudomys hermannsburgensis* and the Ashy Mouse *Pseudomys albocinerius*. The Common Dunnart *Sminthopsis murina* was also found.

The reserve was found to be heavily populated with introduced species, particularly goats and rabbits, with foxes, camels and the common house mouse also in evidence.

The Department of Fisheries and Wildlife has now taken action to reduce the number of goats on the reserve, as they represent the greatest threat to the unique vegetation in the area.

Creating Islands for Waterbirds

By D. R. Munro, Technical Officer, W.A. Wildlife Research Centre.

Most of us are aware of the progressive degradation of waterbird habitat which has become a major area of concern among conservationists, ornithological groups and duck hunting organizations. Large areas of wetland have been drained, cleared and become saline with the inevitable loss of natural vegetation. Wetland management programmes to date have been directed toward reinstating water levels and acquisition of adjacent bushland for the protection of water quality. Because of the considerable cost involved, and the limited funds available, there are obvious limitations to what can be achieved in this field. As an extension to these existing programmes, other measures to improve waterbird habitat have been under consideration.

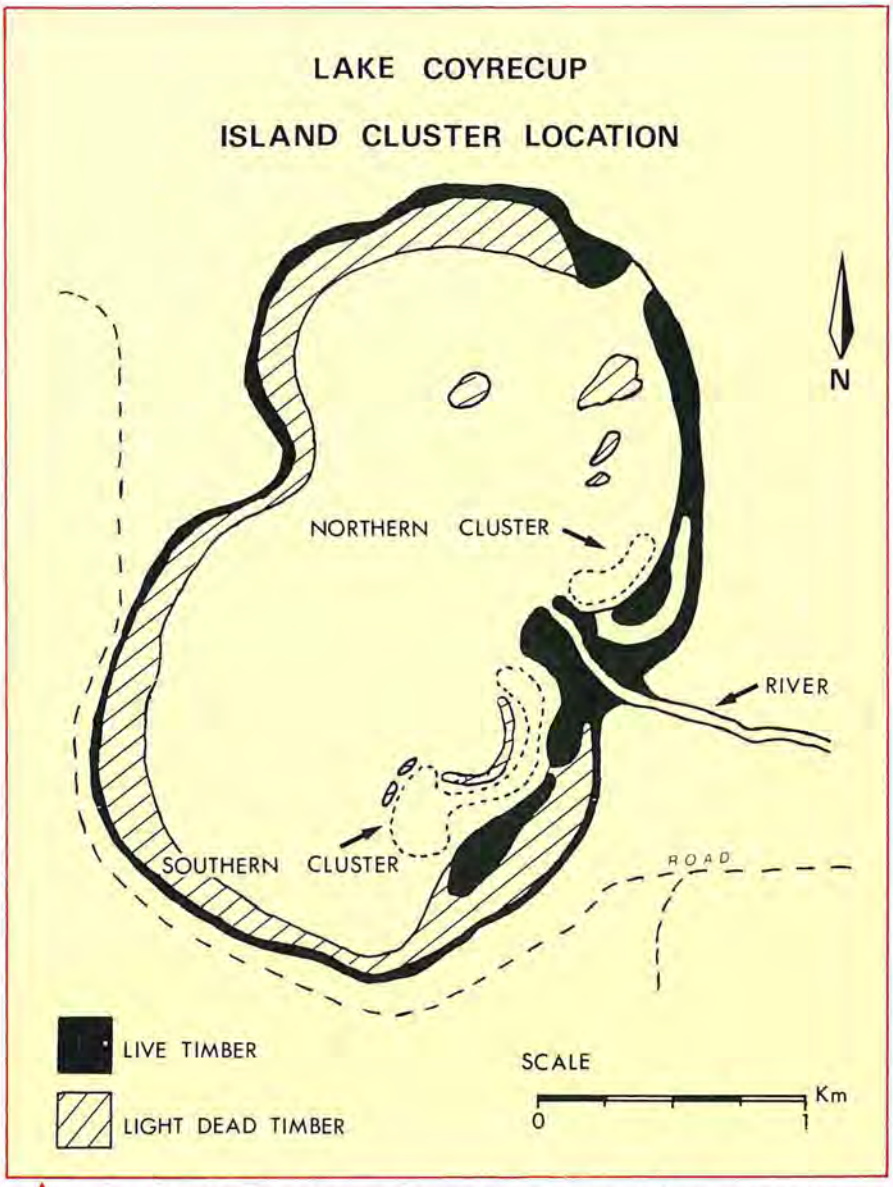
Acting on a proposal by Mr Neville Beeck; the Bird Committee of the Western Australian Wildlife Authority recommended the allocation of $5 000 from the Wildlife Conservation Trust Fund for the construction of artificial islands on selected lakes in the Great Southern district. The scheme was devised as a pilot study to determine the most suitable type of islands and to assess their value as nesting and refuge areas for waterbirds. It is worthy of note that duck hunters, through the purchase of their duck hunting licenses, provide the principal source of revenue to the Wildlife Conservation Trust Fund.

With the advantage of dry lake beds, resulting from recent years of drought, we were provided with an opportunity to complete the earthworks phase of the project late last summer.

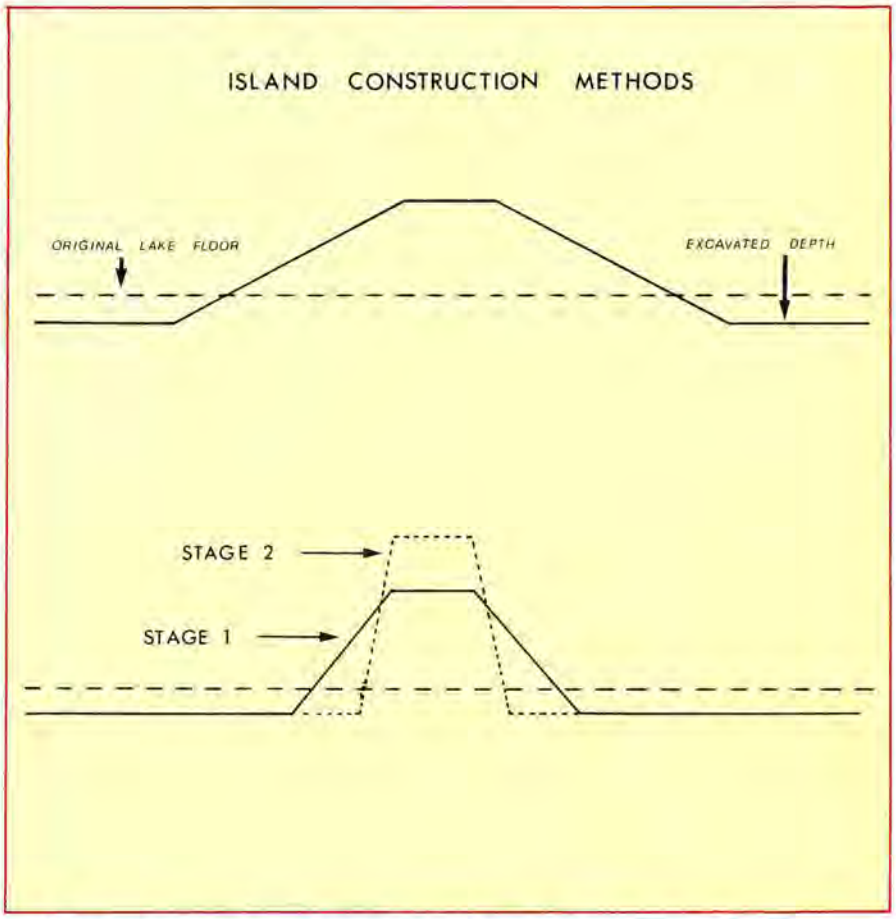
The two lakes selected for the project were Coyrecup and Little White. The drainage system from Lake Coyrecup flows down the Coblinine Flats into Lake Dumbleyung. Only in years of well above average rainfall does Lake Dumbleyung overflow in which event the flow continues through the Wagin and Woodanilling lakes system before it enters the Beaufort River near Albany Highway.

Little White Lake is situated in the Arthur River drainage system at the lower end of a series of lakes, the uppermost being Lake Toolibin. Little White Lake however receives additional runoff from an independent catchment area to the north and west which receives greater rainfall than the catchments of the other lakes in the system, consequently it usually carries water well into summer even in years of below average rainfall when the other lakes dry out.

Preliminary investigations, surveys, estimates, planning and the hiring of earthmoving contractors were conducted during the latter part of February 1980 in preparation for the commencement of stage I at Lake Coyrecup in March.



▲ Map of Lake Coyrecup showing positions of Northern and Southern clusters of artificially created islands.



▲ The top diagram shows original concept with long sloping banks and wide undisturbed base. Bottom diagram shows technique actually employed at Lake Coyrecup with steep banks and a narrow undisturbed base.

Numerous island shapes were considered but for economic and practical reasons only three basic shapes were decided on as being suitable, these were:

(i) a simple mound which would provide an area above maximum high water of approx. 2 m to 3 m in diameter.

(ii) a three-armed shape with the length of each arm being from 5m (smallest island) to 20 m (largest island). The width of each arm above maximum high water being approx. 1.5 m; and

(iii) an arc shape with a diameter of approx. 10 m and a width above maximum highwater of 1.5 m.

To achieve these dimensions it was necessary to form the islands to a height up to 2.5 metres above the natural lake floor. Although the lakes only attain depths up to 1.5 metres, additional height was necessary to allow for consolidation and erosion.

During actual construction at Lake Coyrecup additional islands were created by the building of protection banks and from spoil which was excavated to provide moats. These banks or islands are in the shape of an arc of varying lengths, heights, widths and acuteness of bend.

Islands at both lakes were constructed in "clusters" comprising twenty odd islands, each being spaced an average of 50 metres apart. This arrangement of the islands is intended to provide additional protection (from wave action) to one island by another. There are two clusters on each of the lakes. When selecting sites for the island clusters, foremost consideration was given to those areas provided with protection from the prevailing weather.

A total of forty-four islands were formed at Lake Coyrecup requiring 25 hours plant operation over three days. The combination of island types at Lake Coyrecup were 28 mound, 11 three-arms, 2 small arc, 2 long arc and 1 long bank which resulted from moat spoil.

To provide additional protection to the islands of the northern cluster against terrestrial predators, it was decided to build a moat around the shallow side of the entire group opening at each end into the nearby deep section of lake. The same system was not practical for the Southern cluster because of the larger area involved. Alternatively, each of the moats around the individual islands (created when the islands were formed) were connected by one common channel. This channel also entered a deep section of lake at each end of the cluster. The principle of these systems was to maintain a water barrier around the islands for the "life" of the lake each season.

The two clusters at Little White Lake comprise a total of 43 islands with a combination of 32 mound, 10 three-arm and 1 arc. No deep moats were excavated but each of the islands was connected with a shallow channel similar to that as described for the south cluster at Lake Coyrecup.

Although a balance of $2 500 remained for the works at Little White Lake, total expenditure was only $2 100. Because of continuous rain during the 2nd and 3rd days, operating conditions deteriorated considerably so that at the completion of the 43rd island it became impractical to continue. However, it was felt that a sufficient number of islands had been constructed in respect to the size of the lake and the purpose of the exercise.

With the completion of stage II at Little White Lake a total of 87 islands and banks had been formed which involved a total of 46 hours plant operation. The hire cost for bulldozers was $100 per hour for both the T.D.25 employed at the Coyrecup and the D8 used at Little White Lake; therefore expenditure

for the earthworks totalled $4 600. There were other incidental costs involved but taking all factors into consideration this phase of the project exceeded preliminary capability estimates.

Only a minimum amount of compaction was possible at Lake Coyrecup because of the fine composition of the clay. Even though it was only slightly wet to touch and very firm prior to excavation, it became very "puggy" during the building of an island. Subsequently compaction could not be effected because the clay was unable to support the bulldozer when an attempt was made to climb the island.

Because of the different soil structure at Little White Lake operating conditions were much improved. Here there was a higher sand and silt content which when combined with the clay enabled it to support the bulldozer. Maximum compaction was therefore possible on a majority of the islands until the last day when, due to the persistent rain, the soil became too wet.

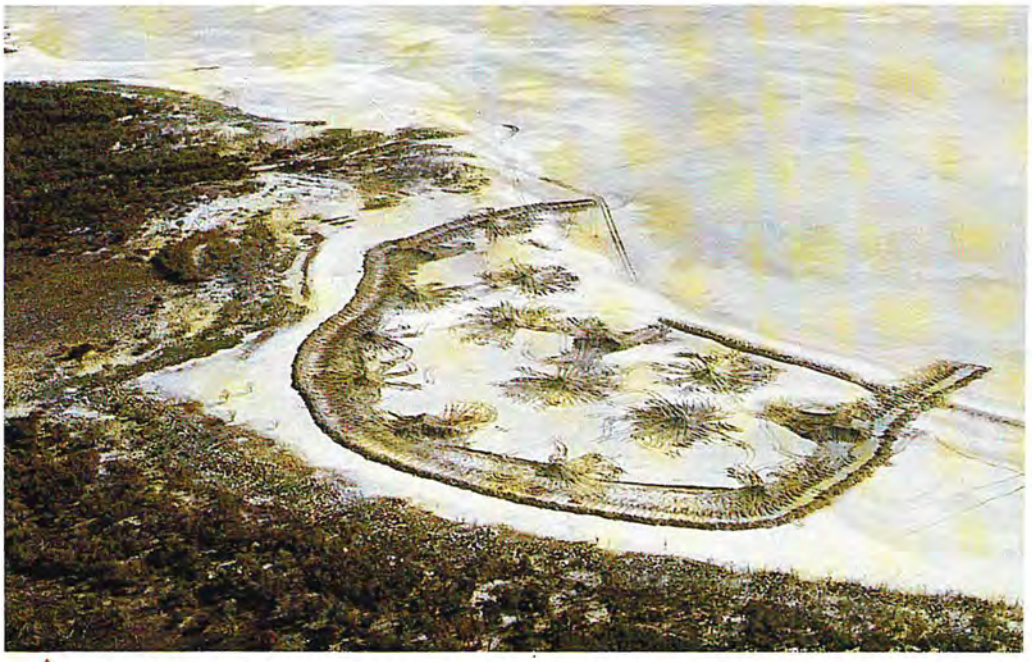
Erosion is bound to occur in varying degrees at all locations but in particular at Lake Coyrecup. This can be expected to be considerable during the first year or two as the islands consolidate and while they are unvegetated.

In respect to plant germination, it is probable that samphire and some grasses will become established naturally. Trials will be conducted on a selected number of islands to artificially germinate *Casuarina, Melaleuca* and scrub species common to each of the areas. For this exercise it is planned to either broadcast seed which has previously been extracted, or by simply laying seed-pod bearing branches on the islands.

Ultimately, of course, the merit of this type of management activity will depend upon the extent to which waterbirds use the islands for nesting and other purposes.

Evaluation of the programme has not yet been possible because of the continuing drought.

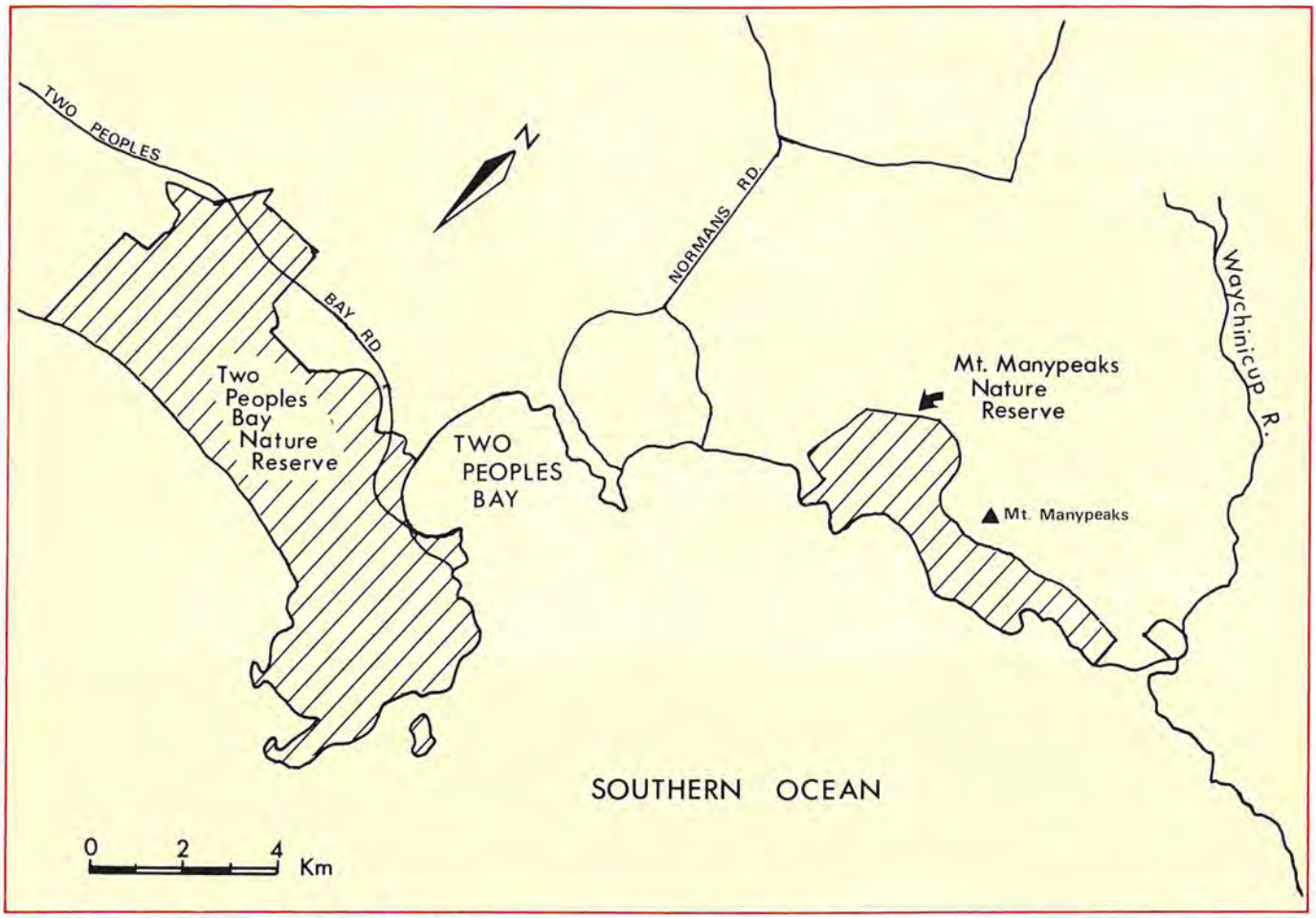
▲ View of southern island cluster of Lake Coyrecup facing north. (Photo: J. Lane).



▲ Close up view of northern island cluster on Lake Coyrecup facing west. (Photo: J. Lane).

▼ View of both north and south island clusters of Lake Coyrecup facing north east, with the northern most cluster in the foreground. (Photo: J. Lane).

Proposed Colonisation of Noisy Scrub Birds at Mount Manypeaks



▲ The map illustrates the location of Mount Manypeaks nature reserve, the site of the proposed new colony of the Noisy Scrub Bird.

▼ Noisy Scrub Bird *(Atrichornus clamosus).*

The Noisy Scrub Bird *(Atrichornis clamosus)* is one of the world's rarest species of birds and it was thought to be extinct until its rediscovery in Western Australia in 1961.

Today the world's only known Noisy Scrub Bird colony is at the Western Australian Wildlife Authority's Two Peoples Bay Nature Reserve on the south coast of Western Australia.

When the world's stock of a single species is concentrated in a reserve in this way the threat of an unforeseen disaster overtaking the colony becomes a continuing concern. Accordingly the Western Australian Wildlife Authority has been considering further suitable sites in order to attempt to establish another colony of the birds. At its April 21, 1980 meeting the Western Australian Wildlife Authority made its decision and recommended that a programme of colonisation of Noisy Scrub Birds be undertaken at Mount Manypeaks Nature Reserve which, as the map indicates, is situated some 15km from Two Peoples Bay. The decision was based on studies into the breeding habits of the Noisy Scrub Birds by the CSIRO. Division of Wildlife Research, which suggested Mount Manypeaks was the best locality for the attempt.

There appears to be no shortage of suitable habitat in the Mount

Manypeaks Nature Reserve, with dense patches of eucalypts and short closed heath in abundance, and most importantly there are heavily vegetated gullies which are the favoured home of the Noisy Scrub Bird.

Despite the presence of favourable habitat at Mount Manypeaks Nature Reserve, no previous sightings of the Noisy Scrub Bird have been made in the area, probably because of the frequency of large fires that have marred the otherwise suitable character of the reserve.

The original colony of Noisy Scrub Birds at Two Peoples Bay appears more secure from the effects of fire because the reserve is on a peninsula and prevailing winds do not direct fires into it, also extensive migmatite rock sheets act as natural fire-breaks. The Department of Fisheries and Wildlife Reserve Management Section will accordingly give greater attention to fire control within the Mount Manypeaks Nature Reserve area as the proposed new colony would probably not be able to survive a widespread fire.

Breeding pairs to establish the new colony will be taken from Two Peoples Bay reserve where the numbers have nearly doubled since 1973, to a total of 72 breeding pairs plus about 20 non-breeding males which are holding territory.

As breeding male birds require a territory of about 10 hectares the population increase has been forcing young males out of the Two Peoples Bay reserve.

This breeding success in the original colony fortunately enables breeding pairs to be safely removed to Mount Manypeaks Nature Reserve without reducing the colony to dangerously low levels, and offers the chance of repeating the breeding success record at Mount Manypeaks reserve.

Departmental Fisheries and Wildlife Offices

Head Office: 108 Adelaide Terrace, Perth. 3255988.

District Offices:

Albany: Stirling Terrace, Albany. 414811.
Broome: Hamersley Street, Broome. 921121.
Bunbury: Stirling Street, Bunbury. 212598.
Busselton: 12 Queen Street, Busselton. 522152.
Carnarvon: Carnarvon Marina, P.O. Box 774. 411185.
Denham: Knight Terrace, Denham—Denham 481210.
Dongara: Lot 322, Carnarvon Street, Port Denison, Dongara. 271187.
Esperance: Wallaceway Centre, Esperance. 711839.
Fremantle: Cnr Collie St and Marine Tce, Fremantle. 3356369 and 3353405.
Geraldton: Fisherman's Wharf, Geraldton—Geraldton 211956 (Fisheries), 213510 (Wildlife).
Jurien Bay: Padbury Street, Jurien Bay. 481166.
Kalgoorlie: Maritana House, cnr Cheetham and Boulder Roads, Kalgoorlie—Kalgoorlie. 214148.
Karratha: Lot 750, Welcome Road, Karratha—Karratha. 851427.
Lancelin: Gingin Road, Lancelin. 781111.
Ledge Point: Deburgh Street, Ledge Point. 781078.
Mandurah: 15 Leslie Street, Mandurah—Mandurah 351240.
Manjimup: c/o. Agric. Dept. Manjimup. 711299.
Moora: Padbury Street, Moora—Moora 411055.
Mt. Magnet: Hepburn Street, Mt. Magnet—Mt. Magnet 96.
Pingelly: Park Street, Pingelly—Pingelly. 273.
Waroona: Fouracre Street, Waroona—331331.
Wongan Hills: Tel. 711395.
Wyndham: Lot 1215 Delamere Road, Wyndham—Wyndham 173.

Index to S.W.A.N.S. Volume 10 Nos 1-2 (1980)

WILDLIFE DISTRICTS IN WESTERN AUSTRALIA