A DRAFT PROGRESS REPORT ON THE DRAFT PLAN TO MANAGE A SYSTEM OF NATURE RESERVES OF THE PERTH REGION AS AN ENVIRONMENTAL EDUCATION RESOURCE

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1.1. INTRODUCTION AND OBJECTIVES

The purposes of this plan are to develop the following nature reserves of the Perth Region (PNR) as an environmental education resource and to protect the wildlife habitats which these reserves support. The PNR are:

Carnac Island	19 hectares
Clackline	459 hectares
Forrestdale Lake	244 hectares
Goonaring Spring	40 hectares
Beelaring Spring	40 hectares
Lake Joondalup	465 hectares
Mokine	289 hectares
Ellen Brook	67 hectares
Twin Swamps	155 hectares
St Ronans	118 hectares
Wambyn	215 hectares

The Plan also aims at integrating its programmes with those of three other Reserve Management Plans which have been previously gazetted for the nature reserves of:

Thomsons Lake	509 hectares
Modong	154 hectares
Moondyne	1991 hectares

A preliminary summary of this Plan was presented at the 1982 Wildlife Research and Management Seminar. This report elaborates on that summary and outlines in more detail the Plan's objectives and how these will be achieved.

Habitat management prescriptions generally follow those of previously gazetted Management Plans. This aspect therefore is not emphasised here. This Plan however is innovative because it includes an environmental education component. This latter aspect therefore receives the main emphasis at this seminar.

The PNR represent a resource which is rich both culturally and biologically. They are easily accessible to the Region's residents who amount to more than 70% of the State's population, and as such these reserves are already being used by people to enjoy nature. Thus, if deliberately managed to accommodate environmental education uses aimed at promoting an interest in flora and fauna, these reserves could have substantial values to nature conservation.

It is for these reasons that this Plan aims at taking advantage of the PNR's proximity to people by accommodating uses that are both appropriate and compatible with the reserves' conservation. It could be argued that such a use may jeopardise their biological values. Quite the contrary, this Plan includes management approaches that justify the reserves' retention as living outdoor museums for future generations:

1) The environmental education programme is designed to accommodate a public relations function aimed at projecting the image that the Department of Fisheries and Wildlife is both a competent and concerned wildlife manager. This can be expected to identify the Department with the wildlife for which it has legislative responsibility and through woodwill can be expected to solicit cooperation in the way that people use the PNR.

2) The Plan aims at providing a specialised service not yet supplied by other open space managers throughout the Region. It follows a deliberate policy of avoidance of competition for participants of other open space programmes. Such a policy will also assist in the of identification, by the public, of the Department as a specialist manager of flora and fauna.

3) This Plan broadly aims at developing the educational resource represented by the PNR's biological, geological and historical features. In turn all such

features, if understood by visitors, will influence the quality of the outdoor experience, and attitudes will develop that, if strong enough will motivate an interest in the conservation of flora and fauna.

1.2. PROCEDURES

This Plan is based on a systems approach. The first step has been to identify and map units of land/vegetation, by integrating airphoto interpretation and ground surveys. While this was being done the floral species present in each unit and the bird species on each reserve were noted. Other vertebrate lists are being obtained from Departmental files, and from the literature. It is obvious that the 11 metropolitan reserves are biologically valuable. They support 52 different units of land/vegetation, and at least 166 bird species. Moreover, the surveyed units represent elements of the vegetation complexes which have been mapped within the scope of the Darling System Study (Heddle et al. 1980).

The Plan aims at protecting these units, and in turn their wildlife inhabitants will also be conserved. It follows that these units can be regarded as the basic unit of management. These units display environmental attributes which indicate their suitability to accommodate environmental education uses. Moreover, each reserve has its own degree of accessibility to the public. This latter fact, and each reserve's environmental attribute, can be utilised as criteria to categorise the reserves into four groups (explained below). These groups form an integrated environmental education system whose purpose will be to convey information to those people interested in the PNR.

A systems approach also demonstrates that lands which abut the four reserves, Joondalup, Forrestdale, Beelaring Springs and Goonaring Springs, complement the reserve. The Plan therefore proposes (after consultation with the controlling authorities) that such lands are to be granted

the status of "land to be managed in sympathy with the nature reserve".

The PNR extend from Carnac Island, 11 km offshore from Fremantle, across the Swan Coastal Plain to the Darling Plateau. The following table illustrates their distribution across the vegetation complexes of the Darling System (E. Heddle, pers. comm.):

Reserve	Major Landform and Darling System Vegetation Complex
	Marine Island
Carnac Island	Quindalup
	Swan Coastal Plain
Forrestdale Lake and Reserve A27165	Herdsman. Southern River. Bassendean - Central and South.
Lake Joondalup and Surrounds	Herdsman. Cottesloe - Central and South. Karrakatta - Central and South.
Ellen Brook	Guildford. Yanga. Swan.
Twin Swamps	Bassendean - North.
	Darling Plateau

Clackline	Cook. Michibin. Yallanbee in low rainfall. Goodaping.
Goonaring and Beelaring Springs	Pindalup and Yarragil in low to medium rainfall. Swamp Complex.
Morangup Hill catchment area	Yallanbee and Dwellingup in low rainfall.
Mokine	Yallanbee in low rainfall. Michibin.
St Ronans	Yallanbee in low rainfall. Coolakin.
Wambyn	Yallanbee in low rainfall. Michibin. Coolakin.

1.3. RESULTS: PLAN FOR MANAGEMENT

1.3.1. Introduction

1.3.1.1. Mapping of Biophysical Resources and Individual Prescriptions.

The biophysical resources of each reserve i.e. units of land/vegetation, contours (where this is warranted by steep relief), existing management trails, fencing, etc. have been represented on one series of maps with appropriate captions, including lists of plant species found within each unit of land/vegetation. Proposed developments, uses and management prescriptions are presented on a second series of maps. Such mapping will be presented at the seminar for discussion.

This mapping indicates that the PNR displays a wide range of the Darling System's wildlife habitats found within the Perth Region i.e. terrestrial, wetland, lake-shore, and sea-shore; and that there is a dearth of reserves containing such habitats. This enhances their values as sites within the Region for future reference. They warrant therefore the status of key sites for wildlife conservation. Their accessibility to people endows them with the potential to be developed for environmental education uses.

1.3.1.2. Wildlife Habitat

The habitat management programme is to direct priorities at protecting the units of land/vegetation. General aims are the prevention of soil erosion, the rehabilitation of eroded and salinated soils, the maintenance of native vegetation and of the visual values of landscape, and the protection of aquatic habitats.

1.3.1.3. Environmental Education

The habitat management and environmental education programmes are conceptually separable, but in the field they are to be interdependent. Thus:

1) Environmental education uses of reserves will only be permitted on those areas of land with which they are compatible.

2) The ongoing refinement of habitat management prescriptions will be dependent, to some degree, on the environmental education programme for the collection of more detailed information.

Conceptually, the environmental education programme will be implemented by a system of modules located on and off reserves. The modules will be represented by techniques, on-reserve installations, and textual materials. The

modular concept implies flexibility of the environmental education programme. The programme therefore can be tailored in size and composition to suit the management resources available, and can be influenced by visitor needs that become evident throughout this Plan's development.

The success of this programme will be underwritten by the deliberate inclusion of a public relations component. Goodwill and recognition are to pervade the programme by means of educational techniques, consistent nomenclature, the use of uniform high quality signs and distinctive attire for management personnel. Such techniques can be expected to improve public awareness of the PNR and of their role as a managing authority.

1.3.2. Management Objectives

1.3.2.1. Wildlife Habitat

1) To take such measures as may be necessary to prevent or control bushfires in order to protect life and property.

2) To protect the reserves and surrounding private property from damage from pest plants and animals.

3) To restore areas disturbed by mining and refuse disposal and to take such measures as may be necessary to curtail any mis-use of the Reserves.

4) To protect and to maintain terrestrial and aquatic habitats.

1.3.2.2. Environmental Education

1) To introduce incrementally, to all those who are interested, the wildlife and the habitat of each reserve, the Perth Region Nature Reserve System, the Darling System and thence the biogeographic systems of

Western Australia.

2) To enrich visitors' understanding of the intricacies of the reserves' environments without intruding into their peaceful enjoyment of the reserves.

3) To enrich the outdoor experience by providing installations and information (both on and off reserves) about the biological and environmental features of each reserve.

4) To solicit and encourage serious study and research by amateurs, professionals and educational groups from schools, and tertiary institutions.

5) To communicate Departmental policies to visitors in order to promote good public relations, and in order to project the image that the Department of Fisheries and Wildlife is a competent and concerned wildlife manager.

6) To develop an understanding by people of the natural environment in order to develop a personal commitment towards wildlife conservation.

1.3.3. The Programmes

1.3.3.1. Habitat Management

All reserves are to be classified as "limited access" areas under Section 12A of the Wildlife Conservation Act. This means that all (with some minor exceptions) are to be accessible only to pedestrians along prescribed routes utilising existing management trail systems. These are generally adequate for fire protection purposes. For this reason, no more management trails are to be installed.

Throughout the PNR fencing is generally adequate. Environmental quality however is being impaired at

Forrestdale Lake by incursions into the reserve by equestrians and pedestrians; for this reason the reserve is to be fenced.

Fire protection throughout the PNR will consist of prevention by means of well maintained perimeter and internal firebreaks. No campfires or picnic-fires will be permitted at any time. It is doubtful that these reserves represent fire hazards as they are no more than small islands of bushland scattered throughout the Region. Therefore no prescribed burning is programmed. Nevertheless, this Plan includes provisions for prescribed burning when it can be demonstrated to the Chairman of the Western Australian Wildlife Authority (WAWA) that a hazard does exist.

Another problem which a reserve may pose is that it may harbour pest animals or plants. Again provision is made that application may be made to the Chairman of WAWA in order that such a problem may be resolved.

1.3.3.2. Environmental Education

There are logistic constraints to the too rapid development of this programme even if unlimited staff were available. Moreover, use demands are likely to arise unexpectedly as the programme develops. Such demands will need to be anticipated by means of an effective exchange of information with visitors, so that such demands can be channelled into appropriate uses. It is for these reasons that this programme is to be developed within the two following categories of priorities:

1) Generally

i) Some reserves by their character, location and existing uses warrant the rapid installation of on-reserve facilities.

ii) More information is required about the reserves and their uses.

iii) Additional management resources will need to be directed at the developing programme.

iv) The most important aim is to coordinate the implementation of (i), (ii) and (iii), either around a particular reserve, around a group of reserves, or around a particular theme related to the PNR.

2) Specifically

i) There is a pressing need for more information concerning the wildlife of some reserves, as well as of visitor-use patterns. The Plan proposes that monitoring of visitor-use is to be implemented by selected Departmental personnel involved in the management of, or enforcemenent of, the Wildlife Act and Regulations on the PNR. Consequently research and serious study by amateurs, professionals and educational groups, are to be encouraged. Moreover, to ensure that information collection and other works are proceeding at a satisfactory rate, there are provisions for the employment of contractors who could undertake a spectrum of duties ranging from manual to research work.

ii) Priorities are to be allocated to the installation of on-reserve environmental education modules, thus:

GROUP 1

Reserves near or easily accessible to urban populations where people can be relatively easily accommodated. These reserves are suitable for self-guiding techniques, displays communicating information, nature trails and appropriate passive uses that are compatible with their conservation.

Only pedestrian access is to be permitted.

All aquatic uses are to be prohibited.

Lake Joondalup and Surrounds

This lake lies in an area of rapid urbanization. A major management problem is that the nature reserve boundary does not include any of the lake reserve's shorelines or surrounds. Ownership is fragmented among private owners and Governmental Authorities. In an effort to rationalise the fact that the reserve's boundaries exclude shorelines, the Perth Metropolitan Region Planning Authority (MRPA) in 1974 put forward a concept plan to develop the lake and its surrounds as a region open space and subsequently began a programme of land purchase in and around the reserve. The broad aims of the concept plan are:

1) To protect the single aquatic system which Lake Joondalup, its islands, and some shorelines represent.

2) To accommodate uses, of the region's open space, which are compatible with the lake's conservation.

Such objectives are totally consistent with those provisions of the Plan which apply to Lake Joondalup. In order to pursue these objectives this Plan proposes (with the consent of the controlling Governmental Authorities) to manage non-privately owned land outside the reserve's boundaries in sympathy with the management of the nature reserve.

Proposed Developments

A static display has already been erected at a cost of $6 000 at Hawkins Park, which is a focal point for the lake on its mid-western shoreline.

Additional signposting.

Nature Trails.

Proposed Uses

Passive uses relative to environmental education.

Only pedestrian access is to be permitted.

Some supervised aquatic uses are to be permitted but only on designated areas of the water body. Such proposed uses are completely consistent with the MRPA's Plan.

Wambyn

This reserve abuts the Great Southern Highway 12 km on the Perth side of York. Also adjoining the highway is a 20 ha cleared area which, with some minor modifications, would become an ideal parking area and a starting point for walking trails on this biologically diverse reserve.

Proposed Developments

Parking area.

Signposting to be upgraded.

Nature trail.

Proposed Uses

Passive uses related to environmental education.

Only pedestrian access is to be permitted beyond the parking area.

Thomsons Lake is also included in this group.

GROUP 2

Reserves not so accessible to large populations and their natural resources are appropriate for educating the public within relatively natural areas. This group includes St Ronans, Mokine, Clackline and Moondyne Nature Reserves.

These reserves are located on the Darling Plateau, remote from centres of population, although easily accessible by motor vehicle. They lie in an area whose rainfall is transitional between inland and coastal areas. This is reflected in the diverse environments which they support.

Proposed Developments

Parking area.

Signposting to be upgraded.

Nature trail.

Proposed Uses

Passive uses related to environmental education.

Only pedestrian access is to be permitted beyond the parking areas.

Overnight camping with permission.

GROUP 3

Reserves which are attracting passive and special activities.

Beelaring and Goonaring Springs

These are supplied by water which flows from a privately owned 779 ha catchment site on Morangup Hill to the

north-west. The catchment has provided a potable water source for nearby farms, for domestic uses, and for picnickers who have used the two spring reserves in the past. Recently, the catchment was "parkland" cleared, thus posing the threat of salination to the potable water source. The catchment therefore warrants protection by being returned to the Crown as a reserve. Such a possibility is being negotiated by Toodyay Shire Council and the catchment's owners. It is anticipated that these negotiations will be successfully executed, and in such anticipation the Plan proposes (after consultation with the Toodyay Shire Council) that this catchment is to be managed in sympathy with the two nature reserves with which it is contiguous.

Proposed Developments

Parking area.

Signposting to be upgraded.

Nature trail to the historic well on Beelaring.

Proposed Uses

Passive uses related to environmental education.

Only pedestrian access is to be permitted beyond the parking area.

Study of regeneration of vegetation on the Morangup Hill catchment following its expected return to the Crown.

Carnac Island

This reserve is of great historical, biological and recreational interest. The reserve was initially named by Peron and Freycinet in 1801 as one of the "Isles de Louis Napoleon". It was subsequently renamed Carnac Island by

Captain Stirling after one of his ensigns. The Island was settled for 5 days (at the formation of the new Western Australian colony in 1829) by 28 of the first European settlers. Subsequently it has been the site for a whaling station, a prison, and a quarantine station. It became an "A" class reserve in 1942. It is now used for scientific studies and provides a sheltered anchorage for as many as 74 pleasure craft on any summer's weekend. The main biological features are the large numbers of sea-birds and Tiger snakes. There is also a resident Sea-lion population of about 30 animals.

Proposed Developments

A trail to the vantage point to the island's northern headland has already been installed.

A static display designed to encourage aquatic activities which are the island's main use.

Proposed Uses

Use of the beach by visitors is to continue to be permitted although visitors will be encouraged to make use of the island's aquatic environments in preference to use of the island itself.

Modong is included within this group. Its special activity is horse-riding along a designated bridle-trail.

GROUP 4

Reserves which are attracting serious attention by interested groups and individuals. This includes:

Ellen Brook and Twin Swamps

The Short-necked Tortoise Reserves are the only reserves of

the PNR which have been set aside for a rare and endangered animal i.e. Pseudemydura umbrina. This animal has been studied by the Chief Research Officer of the Department of Fisheries and Wildlife since 1963. There are several difficulties which face the management of these reserves. These reserves are relatively small. Moreover, this animal must aestivate during summer in cracks in the ground covered by debris and leaves, because unlike the Long-necked Tortoise, it is not a carrion feeder but is sustained by live aquatic animals which are generated in shallow surface waters when its habitat floods during winter. Such criteria dominate the management philosophies of both reserves.

Proposed Developments

An existing stock-proof and vermin-proof fence is to be maintained on both reserves.

An existing well-planned and well-maintained system of perimeter and internal management tracks are to continue to be maintained.

Sign-posting is to be upgraded.

Proposed uses

Passive uses related to environmental education are to continue to be permitted and all such uses are to be rigidly supervised by Departmental personnel.

1.4. References

Heddle, E.M., Loneragan, D.W. and Havel, J.J. (1980). Vegetation of the Darling System. In Darling System Atlas. Department of Conservation and Environment, Western Australia.