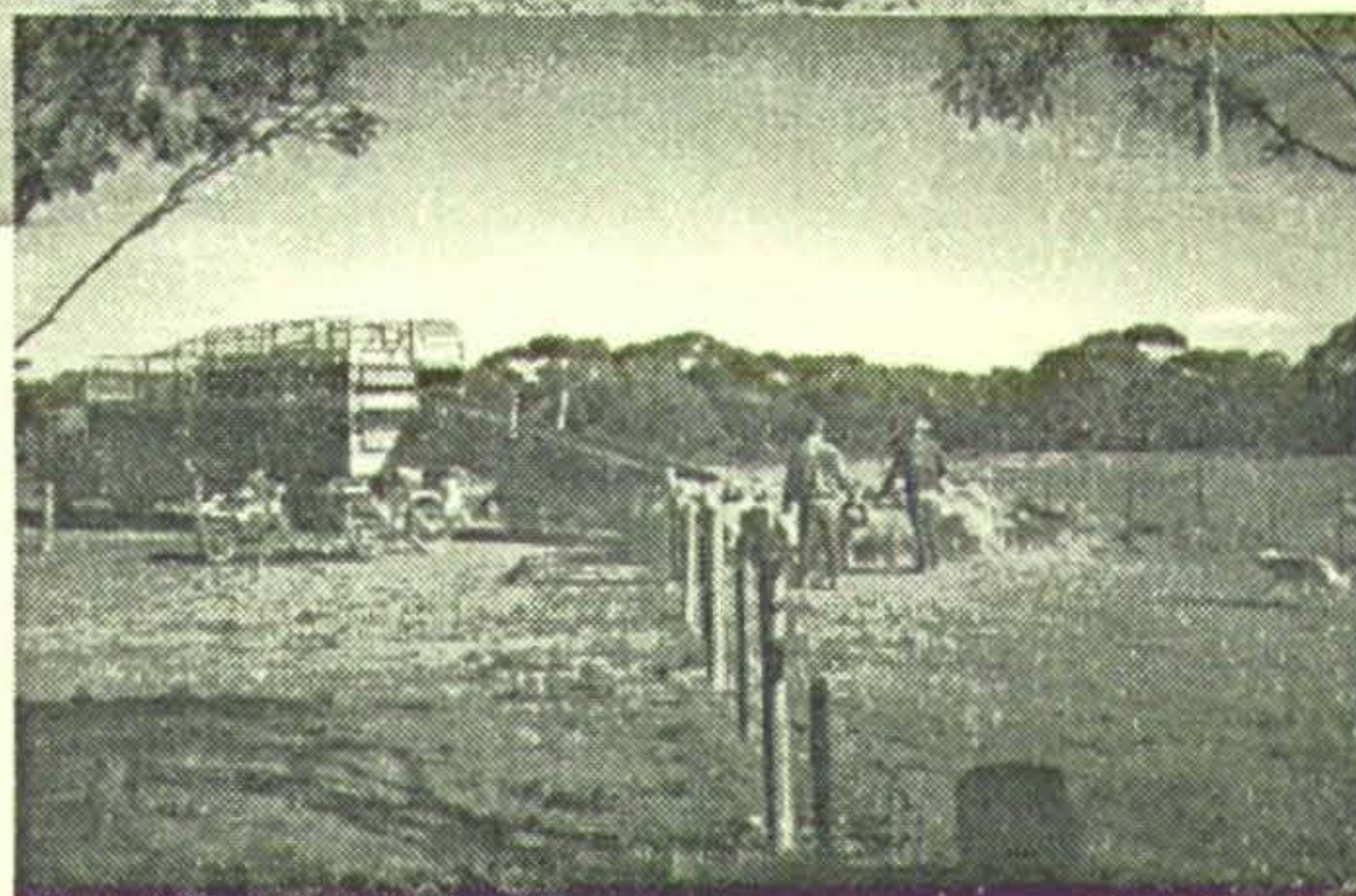


Chowilla Regional Reserve and Chowilla Game Reserve Management Plan

Murraylands

SOUTH AUSTRALIA



National Parks and Wildlife Service
DEPARTMENT OF ENVIRONMENT AND NATURAL RESOURCES

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**This plan of management has been prepared and
adopted in pursuance of section 38 of the
National Parks and Wildlife Act, 1972-81**

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Department of Environment and Natural Resources

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Corporate Services Group
DEPARTMENT OF ENVIRONMENT AND NATURAL RESOURCES

FOREWORD

This document is the management plan for both Chowilla Regional Reserve and Chowilla Game Reserve. It has been produced in accordance with the provisions of the *National Parks and Wildlife Act*, 1972. The draft was released for public comment and eight public submissions were received and have been taken into consideration in the preparation of this plan.

The Reserves are located in the Murraylands Region of the Department of Environment and Natural Resources approximately 18 km north east of Renmark. The Reserves form part of the Bookmark Biosphere Reserve registered under the UNESCO Man and the Biosphere program. The Reserves are important for the conservation of rare plants and animals of the region and forms a link between the River Murray and Dangali Conservation Park. A number of commercial industries also occur on the Reserve which include sheep grazing, fishing and tourism activities.

This plan outlines proposals to effectively conserve the natural and cultural values of the Reserves while at the same time permitting the utilisation of the natural resources of the Reserves.

The Berri office of the Department of Environment and Natural Resources maintains records and resource information on the Reserves. This information can be accessed by the general public.

Hon David Wotton MP
MINISTER FOR THE ENVIRONMENT AND NATURAL RESOURCES

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ACKNOWLEDGMENTS

This plan was compiled by the Office of Planning and Urban Development on behalf of the Department of Environment and Natural Resources and the Interim Chowilla Committee. It incorporates the recommendations of an extensive community consultation program undertaken during 1990/92 - a process which has been well reported by the Murray-Darling Basin Commission's Chowilla Working Group in its three reports, *Chowilla Community Consultation Program* (1991), *Chowilla Resource Management Plan - Progress Report* (1992) and *Chowilla Resource Management Plan - Final Report* (1993).

The former National Parks and Wildlife Service and its two advisory bodies, the Murray River Reserves Working Group and the Murraylands Consultative Committee were closely involved in the initial conception of the idea of a Reserve at Chowilla.

As a result of the community consultation process, the Murray River Reserves Working Group was disbanded and a new committee established with a membership more representative of the Chowilla situation. This group has been closely involved in the development of the present plan. The group comprised the following members:

- * Mr John Chappel, former Pastoral Manager, Chowilla
- * Mr Peter Clarke, representing the NSW Department of Conservation and Natural Resources
- * Mr Michael Harper, Manager Operations, Murraylands Region, SA Department of Environment and Natural Resources
- * Mr Trevor Loxton, representing the Riverland Local Government Association
- * Ms Colleen O'Malley, Adelaide
- * Mr Jock Robertson, representing Robertson-Chowilla Pty Ltd
- * Mr Jack Seekamp, Renmark
- * Mr Graham Smith, Renmark, representing Region 5, Murray Darling Association
- * Mr Ken Smith, Berri
- * Mr Kevin Smith, Berri (Chairman)
- * Mr Peter Teakle, Renmark.
- * Mr George Townsend, representing NSW National Parks and Wildlife Service

1 INTRODUCTION

1.1 Background

Chowilla Regional Reserve and Chowilla Game Reserve were constituted in early 1993 after a prolonged period of community consultation. Details of the consultation program have been published by the Murray-Darling Basin Commission in its three reports on the Chowilla floodplain (MDBC, 1991, 1992, 1993).

Establishment of a Regional Reserve at Chowilla was one of the principal recommendations in the Murray-Darling Basin Commission's Chowilla Resource Management Plan (MDBC, 1992). A Regional Reserve is a category of reserve under the National Parks and Wildlife Act which allows for multiple-use within a conservation framework. In the case of Chowilla this means the continuation of sheep grazing, mining and tourism activities but in accordance with strict guidelines laid down in this plan, the *National Parks and Wildlife Act*, 1972 and other legal instruments.

The Chowilla community consultation process also recommended that hunting of waterfowl be a permitted activity in selected areas of the Chowilla floodplain. However, at the time of establishment of the Regional Reserve, there was no provision in the *National Parks and Wildlife Act* which allowed for such activity. The decision was therefore taken to proclaim the floodplain portion of Chowilla as Game Reserve to specifically enable the continuation of controlled waterfowl hunting. Thus, while there are legally two separate reserves, effectively Chowilla Regional Reserve and Chowilla Game Reserve are the one management unit and treated as such in this document.

The balance of this document consequently uses the term "Chowilla Regional Reserve" in a generic sense to refer to both Chowilla Regional Reserve and Chowilla Game Reserve.

1.2 The Planning Area

Chowilla Regional Reserve comprises of Blocks 990 and 993 Out of Hundreds (Chowilla) and Chowilla Game Reserve comprises Allot. DP36288 and sections 17, 945, 1229 Out of Hundreds (Chowilla) and Allot. DP35727 and sections 94, 95, 112, 125, 126 and 127 Hundred of Murtho (Figures 1 and 2)

The area includes parcels of land recently held under Pastoral Lease by Robertson-Chowilla Pty Ltd as well as areas purchased by the Murray-Darling Basin Commission in the 1960's for the now abandoned Chowilla Dam. The latter includes most of the South Australian portion of the Chowilla floodplain as well as the Old Customs House and adjoining areas on the south side of the River Murray.

The highland areas (former Pastoral Lease) link the floodplain with the Danggali Conservation Park to the north, while in the east the "Chowilla Regional Reserve" adjoins the State Border and an area proposed as a Conservation Reserve under the NSW Crown Lands Act.

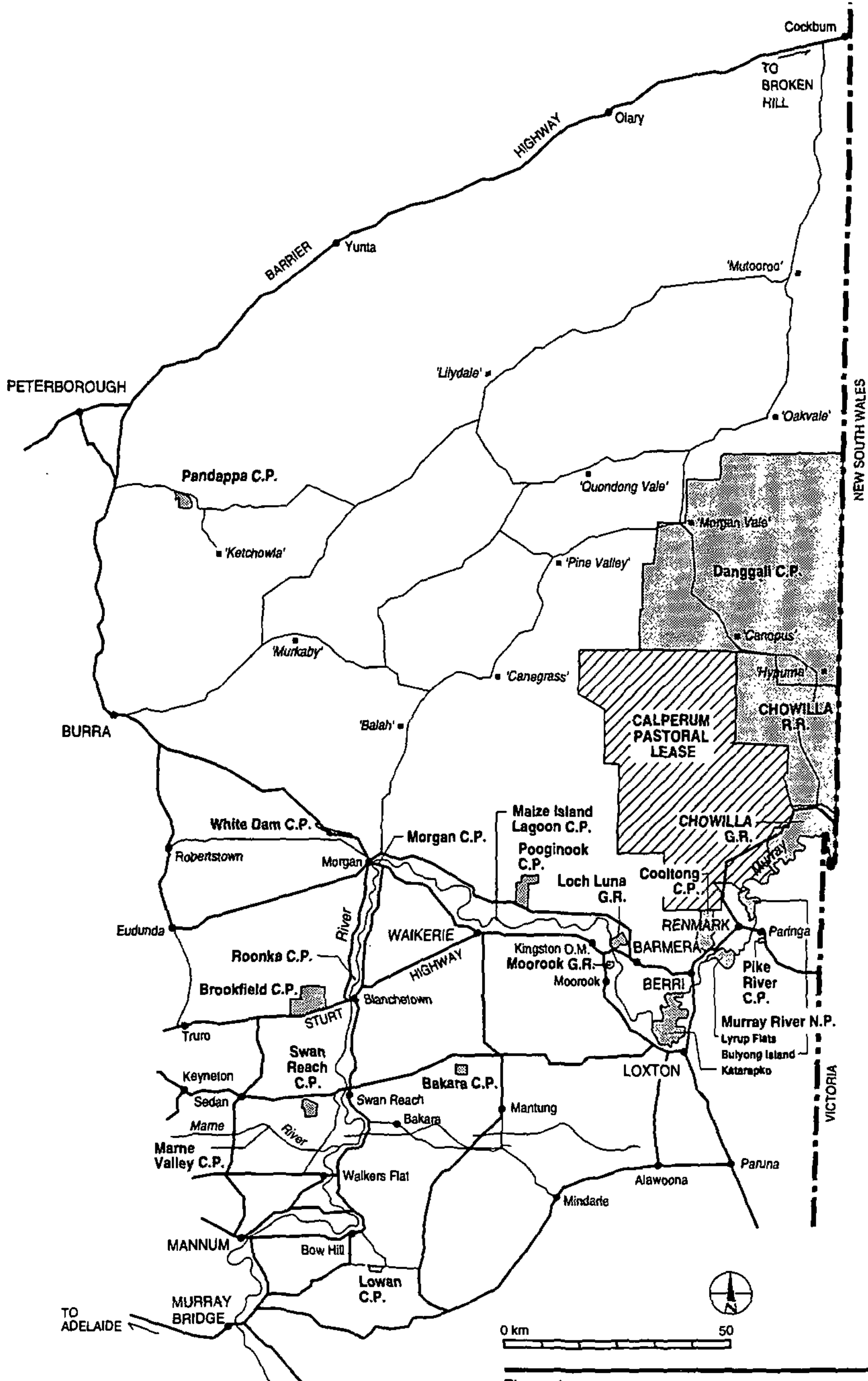


Figure 1

CHOWILLA REGIONAL RESERVE and
CHOWILLA GAME RESERVE
Location Map

- | | | | |
|-------|---------------|------|-------------------|
| — | Sealed Road | C.P. | Conservation Park |
| - - - | Unsealed Road | G.R. | Game Reserve |
| N.P. | National Park | R.R. | Regional Reserve |

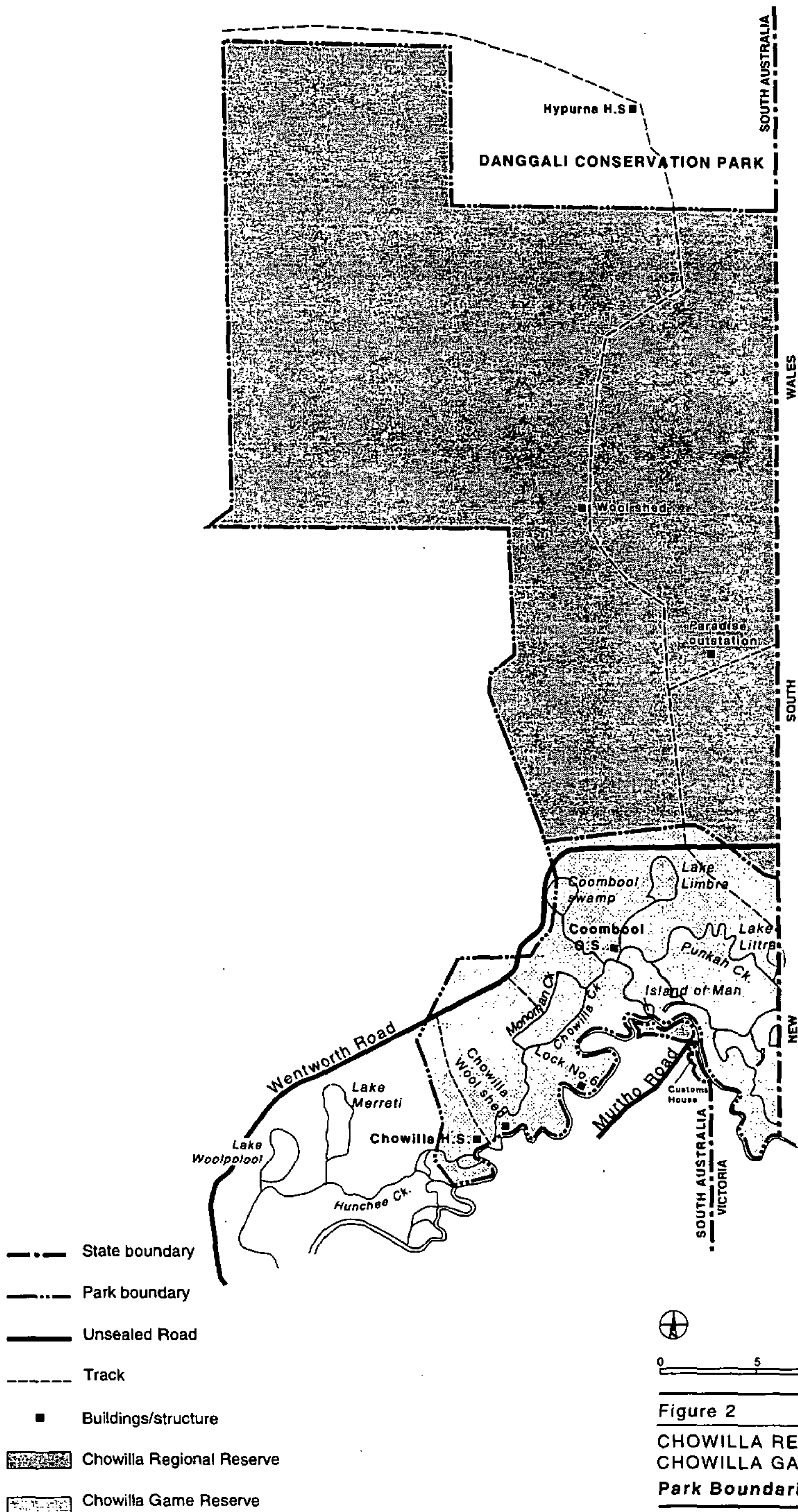


Figure 2

CHOWILLA REGIONAL RESERVE and
CHOWILLA GAME RESERVE
Park Boundaries

In the west, "Chowilla Regional Reserve" adjoins the Calperum Pastoral Lease, which has been purchased by the Commonwealth Government in co-operation with the Chicago Zoological Society as a model for conservation and ecologically sustainable land use. The Calperum area links Chowilla with the Murray River National Park to the south and, together, the reserves complex is considered to protect unique floodplain areas, wetlands and waterfowl habitat of international significance.

The present draft plan considers Chowilla Regional Reserve and Chowilla Game Reserve only. Draft plans have previously been released for Murray River National Park and Dangali Conservation Park.

1.3 The National Parks and Wildlife Act

This Draft Management Plan has been prepared in accordance with the *National Parks and Wildlife Act, 1972*.

Section 38 of the Act states that a management plan is required for each reserve, and should "set forth proposals" in relation to the management and improvement of the reserve and the methods by which it is aimed to accomplish the objectives of the Act in relation to the reserve.

Upon completion of a draft plan an announcement is made in the *Government Gazette* and copies of the final plan are made available for sale to the public.

Once a plan of management is adopted, its provisions must be carried out in relation to the reserve in question and no operations undertaken unless they are in accordance with the plan. However, the Act does make provision for amending adopted plans, and this process is similar to the one described above.

1.4 The Regional Reserve Concept

Amendments to the National Parks and Wildlife Act in 1988, included an amendment to establish a new category of reserve to be called a "Regional Reserve". Such reserves were to be constituted "for the purpose of conserving any wildlife or the natural or historic features of that land while, at the same time, permitting the utilisation of the natural resources of that land".

Once constituted, the abolition of (or excision of land from) a Regional Reserve requires a resolution of both Houses of Parliament.

Furthermore, the Minister must, at intervals of not more than 10 years, prepare a report which -

- (a) assesses the impact of the utilisation of natural resources on the conservation of the wildlife and the natural and historic features of the reserve;

and

- (b) assesses the impact, or the potential impact, of the utilisation of the natural resources of the reserve on the economy of the State; and cause a copy of the report to be laid before each house of parliament.

1.5 Principal Values

This document is the draft Management Plan for Chowilla Regional Reserve and Chowilla Game Reserve. Together with adjoining areas of floodplain in both South Australia and New South Wales, the principal environmental and economic values of the floodplain area are:

1.5.1 Environmental Values

- * the system of anabranches of the Chowilla floodplain which are unique to this section of the Murray Basin; it is substantially undeveloped and it is the only section of country approaching "wilderness" status along the lower part of the River Murray;
- * this length of river (46 km) contains the entire range of riverine characteristics which were identified by Pressey (1986) as occurring between Lock 3, South Australia and Wentworth, New South Wales;
- * the bio diversity of Chowilla's riverine wetland - a consequence of the range of habitats it contains - give it significance as a temperate riverine conservation area within Australia;
- * the conservation values of Chowilla as shown by the rare and endangered species found there has been recognised by its listing as a Wetland of International Importance under the Ramsar Convention (see Section 4.6.3 below);
- * the Chowilla region was recently accepted by the Ramsar Bureau as an international case study for the wise use of wetlands

Details of the biological characteristics of the Chowilla floodplain are described in the report *Chowilla Floodplain Biological Study* (Nature Conservation Society of South Australia, 1990).

The highland sections of "Chowilla Regional Reserve" have not received such comprehensive study although broad land system descriptions are provided in Laut et al. (1977) and a detailed assessment of range condition in the early 1980s is described in a Rangeland Assessment Manual for Chowilla Station prepared by the SA Department of Lands (Barratt and Choate, 1983).

1.5.2 Economic Values

- * since the 1860s the area has been a prosperous sheep station;
- * the area has both mineral and petroleum potential.

2 MANAGEMENT CONTEXT

2.1 Location and Regional Context

"Chowilla Regional Reserve" is located in the Riverland region of South Australia, approximately 250 kilometres north east of Adelaide. The southern portion of the reserve sits astride the River Murray where it enters South Australia from the east. From here it extends nearly 50 kilometres northwards to the Dangali Conservation Park. The reserve is bounded by the New South Wales State border to the east and by the former Calperum Pastoral Station (see Section 1.2 above) to the west.

The Bulyong Island Section of Murray River National Park is located some 20 kilometres from the Southwest corner of "Chowilla Regional Reserve" which is also adjoined to the east by an area proposed (MDBC, 1992) as a conservation reserve under the NSW Crown Lands Act. Across the border to the Southeast, in Victoria, lies the vast Murray-Sunset National Park.

"Chowilla Regional Reserve" is thus a centrepiece, and an integral part of, a major National complex of reserves straddling three States of Australia. Together, the complex presents boundless opportunities for recreational use and "eco tourism" (Victorian Department of Conservation and Environment, 1992), whilst maximising environmental values and, in the case of "Chowilla Regional Reserve", also allowing sustainable utilisation of natural resources.

2.2 Management Objectives

The *National Parks and Wildlife Act, 1972* describes the general objectives of managing National Parks and Reserves in South Australia as:

- * preservation and management of wildlife;
- * preservation of historic sites, objects and structures of historic or scientific interest;
- * preservation of features of geographical, natural or scenic interest;
- * destruction of dangerous weeds and eradication or control of noxious weeds and exotic plants;
- * control of vermin and exotic animals;
- * control and eradication of disease of animals and vegetation;
- * prevention and suppression of bush fires and other hazards;
- * encouragement of public use and enjoyment of reserves, and education in, and a proper understanding and recognition of their purpose and significance; and
- * generally the promotion of the public interest.

The Act also provides the following objective which relates only to the management of Regional Reserves:

- * to permit the utilisation of natural resources while conserving wildlife and the natural or historic features of the land.

Specific objectives for management of the "Chowilla Regional Reserve" are:

to protect and conserve the natural, historic and cultural features and native flora and fauna of the reserve

to rehabilitate degraded areas and restore habitat suitable for native species

to provide appropriate opportunities for recreation in a near natural environment

to provide opportunities for environmentally sensitive tourism activities which will generate economic and social benefits for local communities

to allow for the continuation of existing legal uses of natural resources via the development of leases and agreements, and to provide for a multiple use management framework in the planning process

to allow for the establishment of a groundwater interception scheme which will have the dual benefits of lowering groundwater levels which are artificially high as a result of river regulation activities whilst also enabling reductions in saline accessions to the River Murray.

to ensure that wherever possible mineral and park activities do not conflict.

2.3 Management Strategies

To achieve the above objectives the following strategies will be employed:

- * management agreements and leases will be developed which allow the continued utilisation of natural resources in a manner which minimises impact on species diversity, rare species and items and features of geographic, scenic, cultural and historic interest
- * over the majority of the "Chowilla Regional Reserve" area, public access routes will be designated and only minimal facilities provided to allow for public use and enjoyment with minimal interruption to people's ability to visit and enjoy the area's fundamental natural character
- * a few selected areas will be developed to cater for anticipated increases in visitor numbers
- * Natural Resources programs will be undertaken to reduce threats to natural values and to monitor environmental changes.
- * information and education materials will be produced to inform the community of the area's opportunities and values.
- * MESA and DENR to establish administrative arrangements to ensure that each keeps the other informed of activities which will have ramifications for either conservation of natural resources or access to mineral land.
- * establish and maintain a management group ("The Murraylands Conservation Trust") comprising members of the local community and representatives of particular interest groups to provide community inputs to the management process.

3 SUMMARY DESCRIPTION

3.1 History

Australia is a signatory to the International Charter for the Conservation of Monuments and Sites (ICOMOS) and Australia ICOMOS has adopted a Charter known as *The Burra Charter* which provides guidelines for the maintenance, preservation and restoration of places of cultural significance.

The Chowilla region has a rich history, both in terms of its occupation by Aboriginal man which goes back some 12 000 years and its relatively recent exploration and occupation by European settlers some 150 years ago.

The Aboriginal word *Chowilla* (or "Tjowilla") is reported by Tindale (1974) to mean "place of spirits and ghosts", although the Robertson family (Jock Robertson, *pers. comm.*) record an interpretation as "good camping place".

3.1.1 Aboriginal Occupation

Prior to European settlement, the Maraura and Ngintait tribes occupied the area around Chowilla. The Maraura lived a semi-permanent life style which centred on a favoured camping area at Lake Victoria. Their territory was the on the north side of the River Murray and extended from Chowilla upstream as far as the junction of the Murray and Darling Rivers. The Ngintait were confined principally to the southern side of the River Murray between Paringa and Wentworth although their territory apparently did include the northern side of the river around Salt Creek and between Chowilla and Huncree Islands.

The Aboriginal population had a strongly ritualist culture, with strict spiritual laws and taboos. They had a keen understanding of plants and animals and incorporated the physical features of the land into their rich mythology. They were skilled craftsmen, making reed baskets and reed and grass nets which were used to catch fish and ducks. They also made canoes from the bark of redgum trees. Possums, kangaroos mussels, yabbies and tortoise were also eaten along with baked bulrush sprouts and seeds which were often ground into flour.

Possum skins were sewn with tendons from kangaroo tails and used as cloaks. Tortoise shells were used to carry water.

Even before the arrival of European settlers smallpox and other diseases spread down the River Murray causing considerable loss of life. Undoubtedly conflicts over land settlement led to further deaths and, today, there are no known remaining descendants of the Maraura or the Ngintait tribes.

The Adelaide *Advertiser* (8 August, 1921, p.10) records the following account of Aboriginal occupation at Chowilla under the heading "Blacks on the Murray".

There were, about half a century ago, when the present head station at Chowilla was built, many hundreds of aborigines in the neighbourhood. There was a big camp near the Murray between the Woolshed, half a mile away, and the station, which is about 12 miles from the New South Wales border. Today, there are no blacks near the place, although there are plenty of vestiges of their occupation. On the sandhills back from the river, many skeletons and primitive implements have been found. In the centre of the Chowilla orangery, which covers about 25 acres of the plain adjacent to the homestead and the river, there is a plot of ground which is sacredly preserved. This was for hundreds of years an aboriginal cemetery. The last king of the Murray blacks in the Chowilla district (known as "Tommy Dodd") is buried there. He died 30 or 40 years ago, and his grave was crowned by the tribe with a quaint structure of box-tree limbs, the dried remnants of which remain. There were also about the grave the clay mourning masks used on the occasion of his burial. A nardoo stone was still lying there last week. There are great numbers of blacks buried in the area, including kings, queens and princes.

During 1991/92 the Murray-Darling Basin Commission funded an aboriginal site survey of the upper River Murray region of South Australia. The project was supervised by the then Aboriginal Heritage Branch of the Department of Environment and Planning and a consultant archaeologist, Ms Vanessa Edmunds, engaged. Because of the expectation that the Chowilla area would become a reserve under the National Parks and Wildlife Act, and because of the known richness of Aboriginal occupational sites on the Chowilla floodplain, the survey paid particular attention to the floodplain portion of Chowilla. Despite this, the level of funding available only permitted approximately two days of field work in the Chowilla area.

A report of the field survey is yet to be completed, however preliminary results (Edmunds, pers. comm.) confirm the following:

- (a) in contrast to floodplain area further down stream (around Paringa), Chowilla is very rich with aboriginal sites
- (b) site types include skeletal remains (burials), artefact scatters, middens, hearths, scarred trees and isolated artefacts
- (c) the history of occupation dates back some 12 000 years to the Pleistocene era, although it is uncertain that occupation has been continuous over that period
- (d) sand bodies (dunes and lunettes), which are particularly rich with sites, are also extremely archaeologically sensitive. In many places they are being eroded as a result of soil degradation resulting from overgrazing by domestic stock and rabbits.
- (e) other areas which are particularly rich with midden sites are banks of the River Murray where drainage lines join with the main river and large sweeping bends of the main river
- (f) collectively, the data assembled in the preliminary survey, indicates that there is an interesting and complex story to be unravelled of the history of occupation of the area
- (g) a comprehensive site survey and, possibly, excavation is warranted to further understand the history of occupation

Edmunds' major recommendations from her preliminary survey were that:

1. a comprehensive site survey should be undertaken
2. stock grazing should be removed from the floodplain, particularly from sandy areas and island areas
3. a comprehensive land rehabilitation plan should be completed which recognises problems associated with attempting to rehabilitate dune areas which are rich in aboriginal sites such as burial sites

Management of these sites in a grazing environment undergoing rapid changes in its vegetative cover due to rising saline groundwater, presents a major challenge for future management.

3.1.2 European History

The following account of the history of Chowilla Station has, in part been prepared by local historian, Brian Glenie of Renmark.

The first European pastoralists settled at Chowilla in 1846. Crown Land was occupied by "squatters" who had been granted an annual occupation licence.

Albemarle Bertie Cator obtained the first Chowilla lease, which covered an area roughly from Spring Cart Gully along the general course of the River Murray to the State Border. The lease changed hands several times between 1851 and 1864, and during this period the downstream portion of Chowilla became known as Bookmark.

Chowilla was an established property when Richard Holland obtained the lease in 1864. Both Chowilla and Bookmark homesteads had managers and the property was stocked with cattle, sheep and horses. When Holland obtained the Chowilla lease, he also got control of Boundary Run (New South Wales) which was adjacent to Chowilla.

Holland used the Bookmark portion of Chowilla for sheep. Chowilla was a cattle station, renowned for the quality of its cattle. Boundary Run was also a sheep property. However, Chowilla started to change over to sheep in about 1875, with the transition occupying a number of years.

John, William and Robert Robertson were the sons of the widowed Margaret Robertson, who married Richard Holland in 1852. The three Robertson brothers took control of Chowilla-Bookmark and the Boundary Run in the 1870s.

Stone homesteads were erected at both Bookmark, and Chowilla in 1876-1877. Soon after, the historic woolshed and shearers quarters were built at Chowilla.

The biggest tally ever recorded was in 1881 when 70,250 sheep were shorn by 30 blade shearers. This comprised all the sheep on Chowilla-Bookmark and Boundary Run. Food for the sheep was abundant because the area was naturally irrigated annually with the spring flush of the river and the fact that no rabbits were present. Sheep were also much smaller than those of today, allowing the areas to support much larger numbers.

Wool bales were stored in the old Chowilla woolshed on the bank of the Murray River until river levels were high enough to allow paddle steamers to collect it. Except for recent re-enactments, the last wool was shipped by steamer in about 1940.

In 1888 William Robertson left the partnership for other pastoral pursuits and John and Robert formed a new partnership.

Robert lived at Bookmark and John at Chowilla. When this partnership dissolved in late 1896, the brothers exchanged homesteads. John, dropping the name of Bookmark in favour of Calperum. Chowilla-Bookmark was one property until the partnership dissolution. John also retained Boundary Run.

John proposed a boundary line between the two properties, mainly following existing fences. It must have been acceptable to Robert, as the existing Chowilla-Calperum boundaries follow nearly the same line as proposed in 1896.

Over the years Chowilla was built up as a pastoral holding and today there are four homesteads spread over the present area of the "Chowilla Regional Reserve" and two shearing facilities, one on the river and one thirty kilometres to the north to serve the "back country".

In the 1950s 85 kilometres of pipelines were laid to give the back country permanent, good quality stock and domestic water supplied from the River Murray.

Over the years there were various attempts at diversification to gain some independence from the one pastoral enterprise. The establishment of the orangery was one of few successes and remains today as a small inlayer to the Regional Reserve.

In 1963 the River Murray Commission acquired 184 square kilometres of the Chowilla floodplain where it was proposed to construct a dam and create a major water storage for South Australia.

Problems associated with shallow waters and high salinity levels soon became evident and the much vaunted Chowilla scheme lapsed and was replaced by upstream water storage with controlled water releases to South Australia.

In the interim, Robertson-Chowilla Pty Ltd secured a short term lease-back arrangement over the land which had been acquired by the River Murray Commission. Compensation paid to the company for loss of assets had also enabled it to purchase alternative land in higher rainfall country to the south. The two properties complement each other by enabling transfer of stock during times of stress at either place.

A formal decision to abandon the Chowilla dam and release the land was not made until 1992. This followed an extensive public consultation exercise by the Murray-Darling Basin Commission and State Government agencies. It was agreed that the lands purchased for the Chowilla Dam should revert to public lands managed within a conservation framework, but that provision should also be made for continuation of a sheep grazing enterprise.

Prior to establishment of the "Chowilla Regional Reserve" in early 1993, a lease agreement was drawn up to clarify grazing and ownership rights (see Section 4.1.1 below).

Today, there are a variety of features and structures resulting from European man's exploration, settlement and pastoral occupation. Such structures range from blazed trees, old bridges, track crossings, fence lines and stock watering points through timber harvesting and processing facilities, shepherds huts and stock yards to large capital items such as shearing sheds, staff quarters and the impressive Chowilla Homestead itself.

3.2 Climate

The Murraylands region has a temperate climate with cool winters and warm to hot summers. Diurnal and seasonal temperatures variations can be significant, and because the area is in the rain-shadow of the Mount Lofty Ranges, it is considered to be within the southern extension of the arid zone in South Australia. Annual rainfall at Chowilla is low and irregular, varying between 100 mm and 500 mm, but averaging 220 mm per annum, with a slight winter and spring predominance.

3.3 Landform and Soils

Laut et al. (1977) place the southern portion of the Chowilla area in the Renmark Environmental Association of the Upper Murray lands Environmental Region of the Murray Mallee Province. The main feature of the landscape in this Association is the incised ancestral floodplain of the Murray River with a variety of fluvial land forms including discontinuous levees, oxbows, back swamps, lakes and low terraces. Many of these wetlands are seasonally inundated although the overall effect of river regulation has been to maintain river levels higher than their natural summer depth but with a substantially reduced frequency of winter flooding.

Deep, grey, self-mulching, cracking clay soils occur in the low-lying, river terraces. Much of the region to the south has been cleared for the Town of Renmark and for grazing and irrigation purposes. The two large pastoral properties "Calperum" and "Chowilla" both contain extensive areas of floodplain. A considerable volume of natural resource information is available (see National Environmental Consultancy, 1987, NCSSA, 1990 and Murray-Darling Basin Commission, 1991).

3.4 Vegetation

A detailed description of the vegetation of the Chowilla floodplain is provided by O'Malley (in NCSSA, 1990) and descriptions of the major land systems of the whole of the former Chowilla Station is outlined in Barratt and Choate (1983) (Figure 3). Major structural vegetation types on the floodplain are outlined in the Chowilla Flood and Groundwater Analysis (1993).

The soils, vegetation and salinity of the Chowilla floodplain are associated with the elevation and form of the landscape which reflects the environmental conditions prevailing during sediment deposition and soil formation as well as changes in river course and levels (Hollingsworth, 1990). Three broad Landform patterns may be identified: the upland rise, which, as its name suggests, is the rising ground immediately to the north of the floodplain; terrace (including lunettes), the former floodplain which is now inactive because deepening and enlarging of the river has lowered the level of flooding; floodplain which includes the current meander plain of the river as well as two old (relict) meander plains. The present anabranch creek system follows the lines of drainage depressions in the lower of the two old meander plains. The vegetation on each of these three systems are described below.

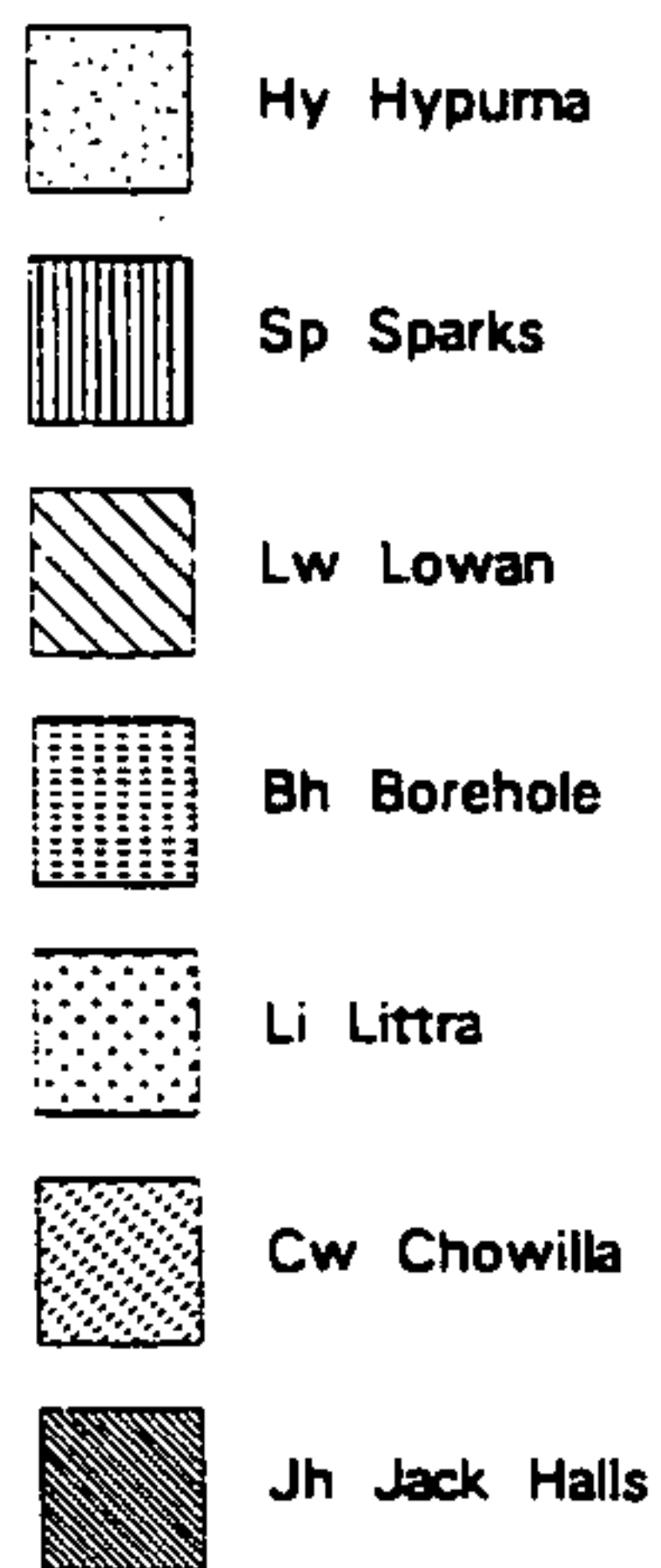


Figure 3
CHOWILLA REGIONAL RESERVE and
CHOWILLA GAME RESERVE
Land Systems

Chowilla Station

Key to Figure 3

LAND SYSTEMS

- Hy Calcareous plains and scattered low dunes with black oak low open-forest and a diverse, often dense shrub understorey including bullock bush, narrow-leaved hop bush, sennas and chenopods (bluebushes, saltbushes, bindeis).
- Sp Calcareous open plains with sugarwood open woodland over grasslands of speargras and wallaby grass. Scattered low sand dunes with black oak woodland and narrow-leaved hopbush.
- Lw Low, discontinuous sand dunes with narrow, sandy swales supporting mixed mallee open-scrub with summer red mallee and white mallee common and ridge-fruited mallee and porcupine grass found on the taller dunes.
- Bh Low discontinuous sand dunes with summer red mallee and white mallee open-scrub and wide swales with sugarwood open woodland and scattered groves of red mallee, white mallee and black oak.
- Li Gently undulating lake terraces with southern native pine open woodland and scattered groves of black oak over an understorey of blackbush, bladder saltbush and bush minuria.
- Cw Major and secondary channels of the Murray River with river red gum forest: flood plains with black box woodland and tall shrub lands of lignum and silver saltbush: freshwater lakes fringed with black box low open-forest: lunettes with blackbush low open shrubland and narrow-leaved hopbush.
- Jh Gently undulating calcareous plains and run-on areas with pearl bluebush and blackbush low shrubland. Clay depressions with spotted emubush, nitre-bush and thorny fan-leaf.

3.4.1 Upland Rise

Near the turn of the century large volumes of timber were removed from this area. The timber was used for a variety of purposes, for example Sandalwood was used as a fuel to produce hot-dips for curing sultanas, and Native Pine was used as posts to support vine trellises. Grazing of domestic and feral animals (especially rabbits) meant that little regeneration was possible. As remaining trees aged and died, the population was severely depleted and, today, only a few scattered remnants are left. Typical species occupying this area included *Myoporum platycarpum*, *Casuarina cristata* spp. *pauper*, *Hakea leucoptera*, *Alectryon oleifolium* ssp. *canescens* and Native Pine (*Callitris preissii*).

3.4.2 Terrace

Since early European settlement of rural South Australia, the Chowilla floodplain has been subjected to intensive grazing pressure. The area was once part of the overland stock route which saw numbers of sheep as high as 300 000 head per year. Mobs of 10 - 20 000 at one time were not uncommon. This level of grazing led to the degradation of large areas of saltbush (*Chenopod* spp.) shrub lands on the terraces. Continued local grazing combined with a high infestation of rabbits has meant that the degraded areas could not regenerate on their own. This has resulted in large areas of terrace becoming scalded and prone to wind and water erosion.

3.4.3 Floodplain

The Chowilla floodplain is underlain by highly saline groundwater contained in the Monoman sands. Locking of the main river channel has resulted in the groundwater rising closer to the soil surface. Capillary rise has caused salt to be deposited in the upper root zone, degrading large areas of woodland, predominantly Black Box (*Eucalyptus largiflorens*).

Some areas of the floodplain that are periodically flooded have had salinization impacts reduced through leaching. Such areas have responded well to recent floods. Those parts of the high relict meander plain that have not received recent flooding are continuing to decline, but so too are other areas of floodplain which have received regular flooding, i.e. the critical factor at play appears to be depth to saline groundwater.

During the period 1989 - 92 rehabilitation work was undertaken on a portion of the floodplain and upland rise under a co-operative project involving the Murray-Darling Basin Commission, the South Australian Department of Agriculture and the company, Robertson-Chowilla Pty Ltd. A range of techniques were employed involving planting of tube stock, direct niche seeding and contour furrowing to promote natural regeneration. Re vegetation work was complemented by erosion control work and a large scale rabbit eradication program.

3.4.4 Highlands

Barratt and Choate (1983) have divided the highland portion (the "Pastoral Lease Section) of Chowilla into four land systems. Vegetation associated with each land system is described as follows:

(a) Paradise Land System

Vegetation in this system is comprised of two major units; the black oak woodlands with a diverse under storey of *Cassia*, *Maireana*, and *Rhagodia* species, and the open ephemeral plains consisting of copperburrs, spinach and geranium.

Small pockets of mallee or native pine also occur on sandier soils, and canegrass is associated with freshwater claypans

(b) Jack Halls Land System

Plant cover in this system is relatively monotypic and consists of fairly dense stands of pearl blue-bush with the occasional black-bush.

(c) T-Block Land System

Mallee dominates the over storey in this system with white mallee favouring the dune crests and red mallee in the swales. The under storey is diverse with *Maireana*, *Cassia*, *Acacia*, *Rhagodia* and *Eremophila* species representing the major genera. Porcupine grass is also common on the dune crests.

(d) Borehole Land System

The vegetation in this system is similar to that of T-Block although the swales mostly support an admixture of mallee with bullock-bush and sugar-wood. Also, the under storey more often supports bladder and bitter saltbush or shrubby peppercress in higher densities.

The Chowilla "back country" also contains what is believed to be the most southern occurrence of the unique Australian arid zone tree, mulga (*Acacia aneura*).

3.5 Native Animals

Fauna of the Chowilla floodplain have been described in the Chowilla Floodplain Biological Study (NCSSA, 1990). Key features are:

- * a rich diversity of avian species including the presence of species such as Pink Cockatoos, Regent Parrots, Striped Honey eaters, White-winged Choughs and Square-tailed Kites, which are not found readily elsewhere in South Australia
- * following high river levels, waterbird populations in floodplain areas with particular concentrations of waterbirds around the small number of permanent lagoons, reed-beds and shallow margins of anabranches. The latter areas are also important refuges during drought periods
- * the presence of endangered species such as the Bush Thick-knee which, because of clearance and grazing pressures and predation by introduced predators, have been in decline elsewhere in southern Australia
- * woodland habitats which support a diverse array of resident avian species, many of high conservation significance. These habitats also provide a corridor for bird movements interstate.

- * a rich assemblage of mammal fauna, including 13 bat species. Whilst Chowilla has not escaped the changes which have devastated Australia's semi-arid to arid zone mammal fauna it remains host to at least 17 native mammal species
- * again, it is the low lying floodplain areas which are especially rich in mammal fauna, particularly the low lying self-mulching, cracking clays which provide refuge and abundant insect food. A notable example was the discovery of three male paucident planigales (*Planigale gilesi*) by the Nature Conservation Society of SA (Brandle and Bird In NCSSA, 1990). These animals were trapped at Werta Wert Lagoon and on the northern edge of Punkah Island
- * at least twenty-four species of reptiles and fifteen species of frogs. The latter appear to be following international trends and, reportedly, have undergone a substantial decline over the past 30 years.

A survey of kangaroos undertaken at Chowilla in September 1992 indicated that populations of both red and grey kangaroos were very high with an estimated density on the floodplain and adjoining mallee areas of 52 animals per square kilometre (51% western grey and 49% red kangaroos). This compared with a density of approximately 18 per square kilometre (predominantly red kangaroos) for the whole property. Densities of this level add substantially to grazing pressures.

Research evidence from Hattah-Kulkyne National Park in western Victoria has shown a relationship between availability of food supplies and impact of kangaroos. Here, when palatable biomass is reduced to below 400 kg/ha, it has been demonstrated that western grey kangaroos start to browse on regenerating perennial plants. Consequently, in any land rehabilitation program, and to minimise land degradation in drought periods, it is essential that a controlled management program be undertaken to contain kangaroo numbers.

Consideration must also be given to the different habitat requirements and population distributions of the two resident kangaroo species. For example western grey kangaroos prefer areas where there is overhead vegetation compared with reds which prefer open plains. Red kangaroos are much more widespread and common throughout the pastoral zone of South Australia and Chowilla therefore represents an important component of the habitat for western grey kangaroos.

Also, kangaroo culling programs are not, in themselves, sufficient to maintain low grazing pressures. Red kangaroos in particular are very common in adjoining areas and very mobile and, will migrate from adjoining areas to fill the vacuum created (Norbury and Norbury, 1992). Thus, if red and grey kangaroos were to be continuously culled in equal numbers, grey kangaroos would be at a selective disadvantage i.e. red kangaroos would maintain their population through recruitment and greys would become less prevalent. A strategy which minimises recruitment is therefore also required.

The Chowilla situation is particularly suited to red kangaroo migration as there are numerous individuals on adjoining properties and in the Danggali Conservation Park to the north. Migration is assisted by the convenient spacing of man-made dams and water troughs. The restoration of a more natural kangaroo habitat through the use of selective "filters", which allow access to stock but not kangaroos, such as the Findlayson Watering Trough (Norbury and Norbury, 1992) suggest themselves as a possible mechanism to reduce kangaroo migration to areas where it is desirable that low populations densities be maintained.

Whilst use of Findlayson's Troughs is still experimental, these do appear to offer potential as a humane method of minimising kangaroo recruitment and should be further evaluated for this purpose.

3.6 Hydrology

Prior to regulation the River Murray had seasons with extreme high and low flows. In spring and early summer the flow was generally high, cool, turbid and fast but gradually changed to become low, warm, clear and slow moving towards the end of summer. At times it receded to little more than a series of saline waterholes. At most times the river acted as drain, by intercepting regional saline groundwater.

Prior to the construction of Lock 6, flow in the creeks of the Chowilla anabranch only bypassed the lock site during periods of high river (Figure 4). They now flow continuously because the water level in the river has been raised by the establishment of the lock. Regional saline groundwater now flows into the creeks. It later reaches the River Murray downstream of Lock 6 through Chowilla Creek.

Prior to river regulation, the low lying areas of the floodplain would have been inundated on average every two years, and the higher areas every 3 to 7 years. Since regulation the flooding frequency for the lower lying areas has been reduced to once every three years and for the higher areas once every 5 to 35 years.

A flood with a peak of 162 000 ML per day covers the majority of the floodplain. A flood of this magnitude has an estimated return period of 1 in 35 years. A flood of 69 000 ML per day covers about half of the floodplain and has an estimated return period of 1 in 5 years.

Saline inflows usually return to normal about a year after a flood. At that time discharges into the creeks are at the rate of approximately 43 tonnes of salt per day. About two thirds of that comes from the Punkah, Salt and Hypurna creeks in the eastern half of the anabranch system. After a flood, salt loads increase enormously and have reached as much as 1700 tonnes per day immediately following a major flood. Most of the salt in the immediate post flood peak comes from the saline lakes and billabongs, but high salt inflows continue for several months due to raised groundwater levels which increase seepage into the creek beds.

The effects of increased salt inflows are not noticeable while river flows remain high as there is ample water for dilution, but floods in the River Murray end very quickly when the locks are re-instated and the same salt inflows can then cause a severe increase in salinity. The post-flood salt-inflow peaks from the Chowilla anabranch system raise the long term average salt inflow into the River Murray to 145 tonnes per day, compared to the steady background level of 43 tonnes per day (which re-establishes after the effect of floods has passed).

The 145 tonnes per day results in an average salinity increase in the river at Morgan of 40 EC, but the peaks can be as high as 300 EC.

3.7 Petroleum and Mineral Resources

Petroleum exploration commenced in the 1950s in the area south of the Nadda and Berri basins (figure 5) and it was not until 1961 that a deeper basin outline was revealed by an aeromagnetic survey commissioned by the Department of Mines and Energy.

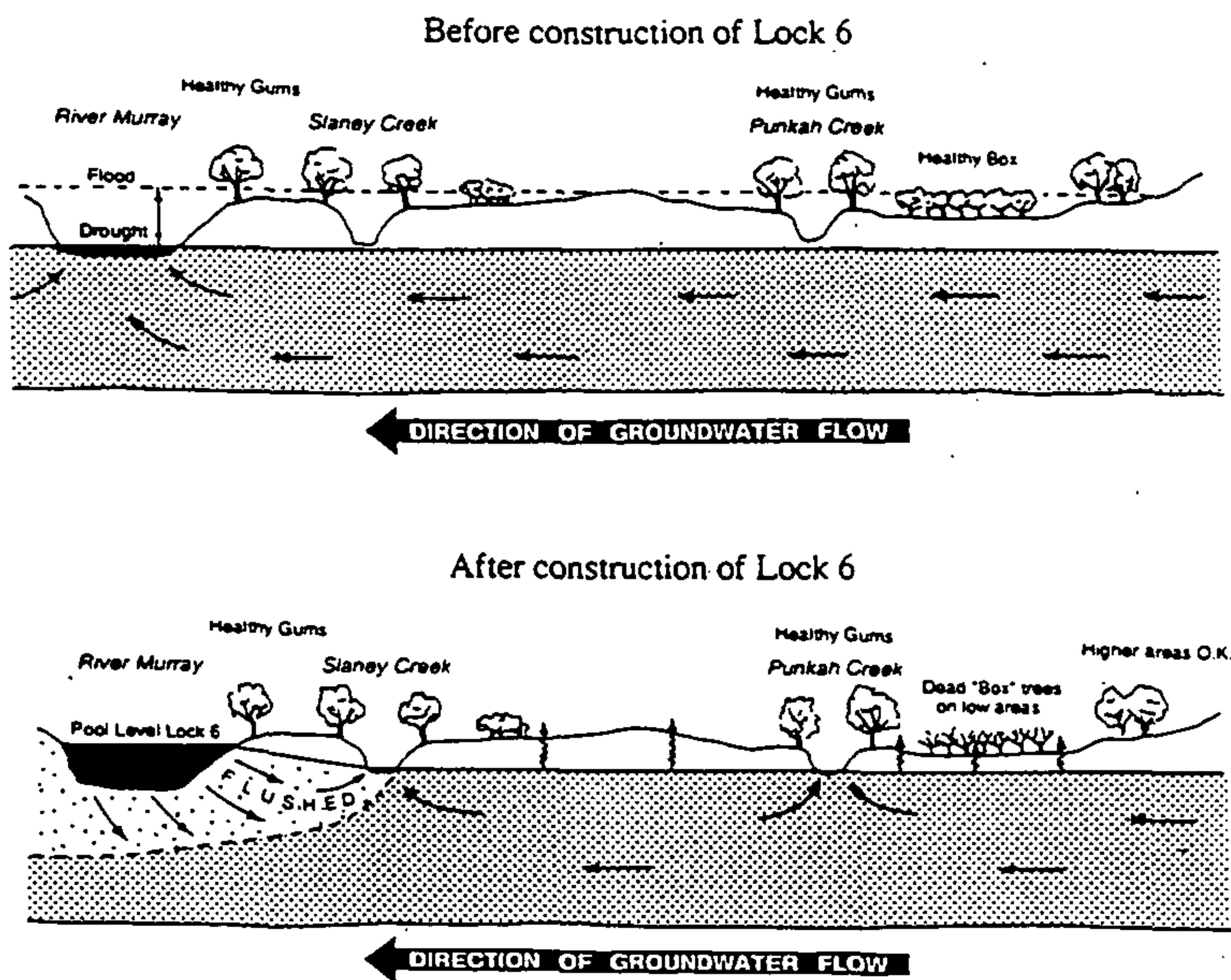


Figure 4

CHOWILLA REGIONAL RESERVE and
CHOWILLA GAME RESERVE
Effects of Rising Groundwater

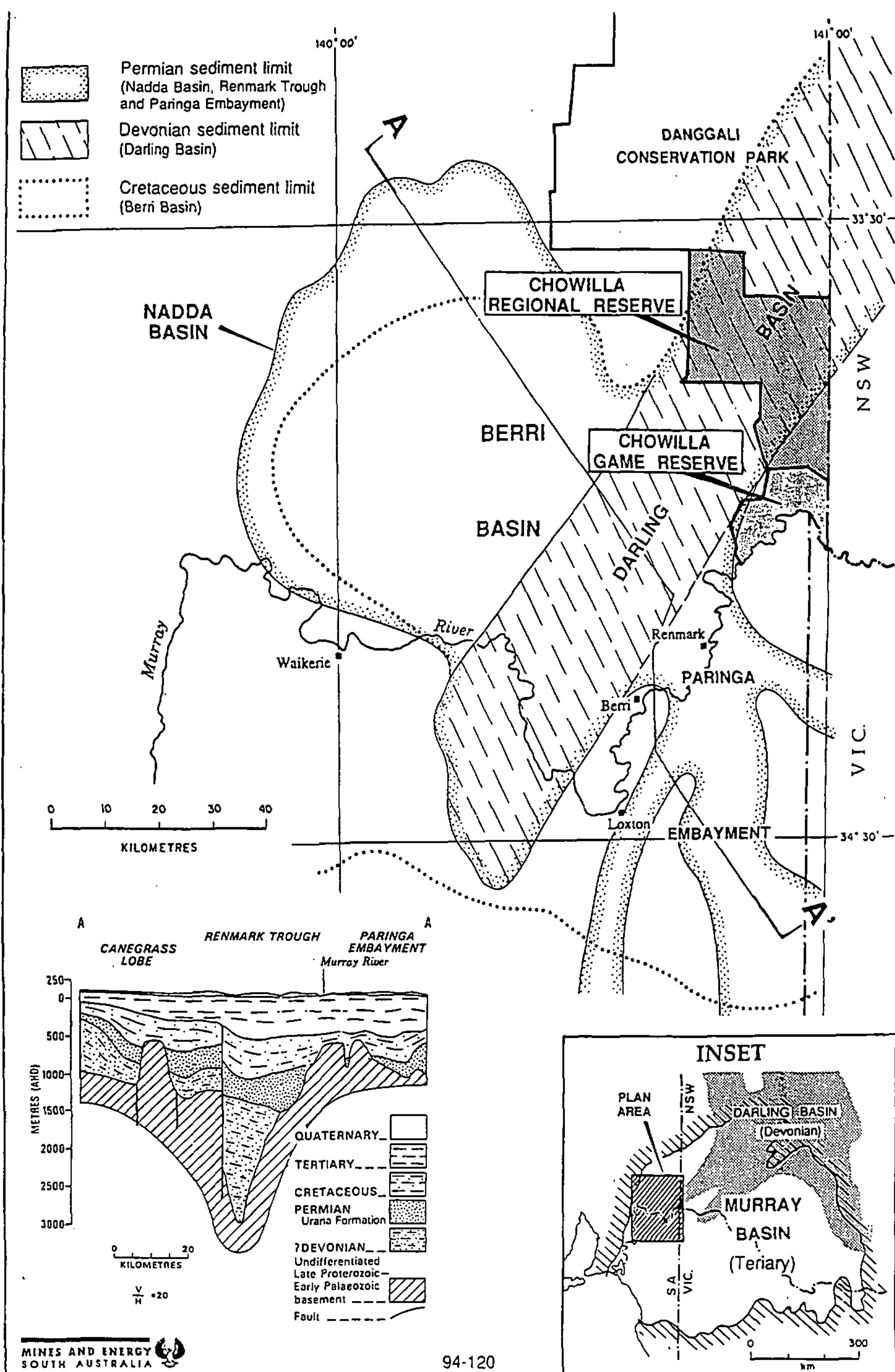


FIGURE 5 Geology of the Renmark Trough region

In the ensuing ten years numerous petroleum exploration licences were taken out and an additional 8 wells drilled in the Renmark Trough region, south of "Chowilla Regional Reserve", without commercial success.

No further exploration was undertaken until 1980 when PEL 16 was granted to International Mining Corporation NL and since then only 2 additional wells have been drilled. The basin has not been under licence since July 1990.

In summary, approximately 1500 km of seismic data have been acquired over the Renmark Trough region, of which 107 km occurs within the "Chowilla Regional Reserve" and 14 petroleum exploration wells drilled, all outside the reserve.

The area of the park is generally underlain by Tertiary sand units of the Murray Basin which in Victoria and New South Wales host massive heavy mineral sands deposits. First pass exploration for heavy mineral sand deposits in the area has been undertaken with wide spaced, very shallow drilling along major tracks. The area is still rated as having moderate to high potential for the discovery of significant heavy mineral sand deposits.

There is low to moderate potential for the discovery of agricultural grade gypsum.

The area has high potential for construction sands, however any exploitation of such resources is unlikely given that there are adequate resources available closer to the major towns in the region.

While basement to the Murray Basin may comprise rocks with significant base and precious metal potential the very thick cover sequence renders any exploration unlikely at this time.

There are no mining tenements in the reserve at present.

3.8 Stock Management

The Robertson family have held and operated Chowilla Station as a wool growing operation since 1865.

For sheep raising purposes, floodplain and highland areas complement each other with post-flood flushes of floodplain vegetation providing critical summer feed, particularly for young lambs. Proximity of River Murray water to highland areas and hence relatively low pumping costs, is an important factor.

In the early days of Chowilla Station (see Section 3.1, History) the river was also a major transportation vehicle and the property retains much of its rich history of pastoral operation, including three out stations, 2 shearing facilities, staff quarters, stock yards, traps, and holding paddocks.

The present "Chowilla Regional Reserve" area has more than a hundred kilometres of pipelines and associated water points and over 300 kilometres of fencing which divides the property into 26 main paddocks.

In 1989/90 17 945 sheep were shorn on the property and 519 bales of wool pressed, placing the property in the top 5 percent of South Australian wool clips. The company, Robertson Chowilla Pty Ltd, has also been a leader and innovator in pastoral management and its responsible stock management has undoubtedly been a major factor in retaining the property in as good a condition as it is today.

In 1982 the company requested assistance from the SA Pastoral Board to install a network of vegetation monitoring points over the property. This resulted in the first Rangeland Assessment of a Pastoral Lease in South Australia (Barratt and Choate, 1983) which later became mandatory under the SA Pastoral Natural Resources Act. The baseline assessments were conducted at the end of a drought and resulted in a full range of land condition classes from poor to very good. The photo point sites have been monitored regularly since and have shown a trend toward improvement or stabilisation except in areas which have been adversely affected by rising water tables.

A 7 000 hectare area which was so affected has been the subject of a major rehabilitation project over the period 1989 - 92. This project required destocking of the area and also involved financial support from Robertson-Chowilla Pty Ltd as well as from the Murray-Darling Basin Commission and the SA Department of Agriculture.

In 1989 the Commonwealth Bank and the then Department of Environment and Planning launched the IBIS Awards in recognition of attempts by farmers to incorporate nature conservation into their farming systems. Robertson-Chowilla Pty Ltd was awarded the inaugural IBIS Award for the Pastoral Division.

Impacts resulting from pastoral use of the area are discussed in Sections 3.4 (Vegetation), 3.11 (Degradation) and 4.1.1 (Grazing Stock).

3.9 Wetlands

One of the most important features of the Chowilla region is its diversity of aquatic habitat types which exist at several scales of complexity.

As water levels drop, flowing channels become backwaters and eventually dry anabranches, floodplain lakes change into swamps before becoming dry land.

Lloyd and Walker (1986) have recognised six macro habitat types within the River Murray floodplain:

- * river channel - large wide channel of the River Murray
- * anabranches - much narrower channels with a variety of flow regimes, usually remaining connected to the main river channel
- * backwaters - water bodies that are connected to the main channel at normal pool level
- * billabongs - mostly still, isolated water bodies that are only connected to the main channel at times of flood
- * swamps - wetland areas with shallow basins and little free water but highly saturated soils
- * floodplain - "terrestrial" areas that are subject to occasional flooding episodes and are free draining, retaining water only during flood.

The major effect of river regulation on the Chowilla wetlands has been increased frequency and level of inundation of the anabranches. However, the inundation frequency of the floodplain and its swamps and billabongs has been reduced markedly due to the decrease in frequency of high flows (floods). Despite this, much of the Chowilla floodplain appears to flood more frequently than other areas of floodplain in South Australia, possibly due to lower banks and low lying areas of floodplain.

Some of the more notable wetlands (Figure 6B) which O'Malley and Sheldon (in NCSSA, 1990) consider to have high conservation status are:

- * Werta Wert
- * Queen Bend
- * Hypurna, Wilperna, Grand Junction, Punkah, Isle of Man and Slaney Islands and associated anabranch creeks
- * Coombool Swamp, Lake Limbra, Gum Flat, Lake Littra and surrounds
- * Chowilla Island and Chowilla and Pilby Creeks

At Werta Wert, Queen Bend and the Coombool complex, the NCSSA recommended reduced grazing pressure, the fencing-off of reference areas and the establishment of a monitoring program. On the islands, total destocking was recommended.

Goonan *et al.* (1992) have also undertaken a preliminary survey of the biota and physico-chemistry of ten River Murray wetlands including Pilby Creek and Clover Lake at Chowilla, Lake Merreti from the adjoining Calperum Station, and Disher Creek and Katarapko Basins from the Murray River National Park further downstream. Their analysis showed that, like most inland waterbodies in Australia, all the wetlands were dominated by sodium chloride. The regulated wetlands, ephemeral swamp, and saline reach of the Pilby Creek anabranch had higher salinities due to the effect of evapotranspiration. Nutrient concentrations reflect those of the lower River Murray generally and are particularly high in total phosphorous and are enriched with nitrogen although the latter element often seems to be fixed in sediments or incorporated into phytoplankton. High levels of algal biomass occur. If these conditions are sustained the authors suggest that alteration of phytoplankton communities in favour of nuisance species of cyanobacteria is probable. Aquatic invertebrate fauna was diverse and dominated by insects and crustaceans.

Two sites from the Pilby Creek wetland stood out in Goonan *et al.*'s invertebrate fauna analysis. This was attributed to the causeway across Pilby Creek which has reduced the water quality of the western reach in favour of organisms adapted to saline, organically enriched conditions. Placement of a culvert under the causeway is suggested as a simple means of reducing the salinity and water concentrations in the western reach.

3.10 Fisheries

According to Pierce (1990), the Chowilla anabranch system is a relatively small portion of the River Murray floodplain ecosystem, but is a significant (15%) contributor to fish stocks in the lower river (South Australian) system.

Pierce suggests that the fishery values of the Chowilla region are poorly indicated by the commercial catch value and that, whilst overall lower Murray native fish production (especially Murray Cod) has declined, the Chowilla region continues to provide a significant contribution to these severely reduced fish populations in the lower river.

Native fish production at Chowilla is directly tied to flooding. The construction of Lock 6 has allowed the Chowilla creek system to be flooded with near natural regularity while other South Australian reaches are less often inundated. Chowilla is also useful as running water habitat where remnant populations of two endangered fish species (trout cod and southern pygmy perch) exist and into which the other two endangered River Murray fish species (southern purple-spotted gudgeon and western Chanda perch) may be successfully reintroduced.

The Chowilla system is known to act as a rearing habitat for both Murray cod and callop with evidence of *in situ* breeding of the former. Breeding of callop in the system has not yet been demonstrated although juveniles approximately one month old have been found in the region.

Juvenile Murray cod are now rarely seen in the lower Murray, indicating low levels of recruitment. Most cod recently taken from the South Australian river have been fifteen or more years old. However, Pierce (1990) reports catching juvenile Murray cod in the Chowilla system in 1989, which contrasted with their apparent absence in the lower river system.

A moratorium on the recreational and commercial harvesting of Murray cod in South Australia was introduced in 1989. Recreational drum-netting has also been prohibited under Fisheries legislation.

Pierce also suggests that refinement of flow management in the creek system and extension of flood duration are two techniques which offer potential to enhance fish stocks.

Many tourists to the Riverland region include fishing on their agenda. The Chowilla environment offers the increasingly uncommon "natural" floodplain surroundings in which to enjoy this activity.

3.11 Pest Plants and Animals

3.11.1 Plants

Twenty-two percent (68) of the 307 vascular plant species recorded in the NCCSA survey were introduced species, the majority being ephemeral forbs or grasses that are dependent on seasonal rainfall or local flooding events for their growth. Most introduced species were found to be more prevalent adjacent to grazed areas, particularly adjoining water points isolated from the main channel system where stock concentrate in periods of drought, or in sandy sites where rabbit warrens are locally abundant.

Proclaimed pest plant species Californian burr (*Xanthium californicum*) and Bathurst burr (*Xanthium spinosum*) commonly occur along watercourse margins and are sometimes parasitised by dodder (*Cuscuta epithymum*), a species which also parasitises small commercial crops such as clovers. The burr (*Xanthium*) species are of concern to graziers because the spine-covered woody fruits significantly devalue the wool of sheep grazed in such areas.

Mud dock (*Rumex bidens*) is a native plant which periodically blooms in confined water ways, restricting water flows and boating access. This plant is subject to predation by a native weevil which provides a reasonable level of biological control and major control programs are not warranted.

Willow trees (*Salix* sp.) are scattered along the river margin. Potential exists for this species to spread and progressively displace native plants if left uncontrolled.

There are several native species such as hopbush (*Dodonaea viscosa* var. *angustissima*) and *Senna* (formerly *Cassia*) spp. which tend to increase in abundance under a grazing regime where other, more palatable, species are actively selected against by both grazing stock and native herbivores (Barratt and Choate, 1983). In this situation the "increasers" are regarded by graziers as "woody weeds" which require active management to ensure that they do not dominate a site and suppress growth of palatable species.

3.11.2 Animals

Rabbits, while relatively restricted on the floodplain have, historically, been abundant in the sandy soils of the adjacent terraces, lunettes and floodplain rises. A substantial program of rabbit eradication involving fumigation, ripping and blasting of warrens and the laying of poison baits was undertaken during the period 1989 -1992. Whilst this program was effective in controlling rabbit numbers in a 7 000 hectare area of floodplain, little control work has been done on the island or highland portions of Chowilla or on neighbouring properties. There is consequently considerable potential for rapid population build up if control programs are not maintained.

For a number of years Chowilla Station has maintained a goat control program by means of trapping and mustering of which the animals are then sold. Hares, foxes, cats and cattle are also a problem from time to time and feral pigs sometimes penetrate river frontages.

3.12 Degradation

Chowilla Station, relative to other pastoral properties, had an excellent pastoral management record, but more than a century of land settlement has seriously affected the productive capacity of the land to support both domestic and native animals. Unpalatable species have displaced palatable ones. Soil and wind erosion have adversely affected wide areas of plant growth. There is now a need to limit overall grazing by feral animals and kangaroos as well as by domestic stock.

Other factors also interact to determine the health of plants and the condition of the floodplain. These include soil moisture store, soil salinity, groundwater depth, salinity, flood frequency and height, and run off. Under optimal or "pre-disturbance" conditions, most of these factors varied within ranges which matched the environmental tolerances of the plants in that particular community.

For example, red gums are extremely tolerant to saline conditions and can grow in salinities of 20 000 mg/L or 33 000 EC while black box can grow in salinities of 35 000 mg/L or 58 000 EC. However vigour decreases at even moderate salinities especially where the water table is high leaving only a shallow depth of aerated soils in which to grow. Red gums can tolerate quite shallow water tables as occurs adjacent to the main river because fresh water enters the root zone from the water table by capillary action.

Fewer floods also mean that the surface salt deposits are flushed away less frequently. Excessive sodium ions in the soil have detrimental effects on soil structure, resulting in poorer capacity to hold air and water.

Aquatic flora is also affected by increasing salinity. Upper ranges recorded for some plants which are found in the River Murray are:

*	500 EC	nardoo, <i>Marsilea drummondii</i>
*	2 500 EC	ribbon weed, <i>Vallisneria spiralis</i>
*	2 500 EC	water-fern, <i>Azolla filiculoides</i>
*	3 800 EC	pondweed, <i>Potamogeton ochreatus</i>
*	15 000 EC	water-milfoils, <i>Myriophyllum elatinoides</i> and <i>M. verrucosum</i>

At higher salinities, loss of aquatic plants affects aquatic fauna habitat. This in turn can affect the food supply of fish and birds although, because of natural high seasonal salinity levels in the River Murray, many of the local species are relatively salt tolerant.

However, if salinity levels in the flowing creeks were allowed to rise excessively, either through deliberate regulation or because of excessive saline groundwater inflows, there would be major changes in species composition of the aquatic communities.

Because of river regulation, water-tables on the floodplain area have risen. If no remedial action is taken, soils and vegetation will deteriorate further and this will not only lower pastoral production but also cause a decline in the natural values of the area.

3.13 Fire

Historically, there have been occasional large fires at Chowilla (Jock Robertson, pers. comm.) but, because of the arid to semi-arid climate and resultant sparse vegetation, wildfires are not normally a major concern.

Nevertheless, high river levels and sporadic rainfall events can result in vegetation flushes and local high fuel loads. Furthermore, dry electrical storms are also a frequent event in the December - March period and provide a regular source of fire ignition. Similarly, increasing numbers of campers and their accompanying camp fires, present a threat, particularly to large individual trees.

Adequate precautions must therefore be taken to minimise outbreak and spread of fire and to protect assets.

3.14 Access and Recreational Values

The Chowilla anabranch system, especially in its eastern sector, provides an exceptional location for a range of water-based recreational activities. Historically, it has been used primarily by South Australians, although it is increasingly becoming a destination for interstate visitors. The main recreation activities pursued in the Chowilla system are , fishing, canoeing, house boating, hunting and general boating. Camping is an activity which is incidental to all these recreational activities.

In recent times Roberston Chowilla Pty. Ltd. issued permits to the general public to camp on the floodplain. The Company also allowed vehicle access to Danggali Conservation Park via the main pipeline road. However access along the pipeline road did cause some problems with the management of sheep at watering points and holding paddocks.

The area is recognised as being the most valuable of all areas in South Australia for the canoeing component of outdoor education programs for secondary schools, tertiary education classes and youth agencies, as it is possible to select routes to suit a variety of different objectives. The area is also used by canoeing clubs, informal groups and a small, but growing, number of Adelaide based adventure tour operators favour Chowilla as a destination.

Canoeing groups visit Chowilla for a natural area experience and usually choose their own camp sites. Border Cliffs Customs House is the most frequently used staging point for canoe expeditions. There is little evidence of undesirable impacts from this style of usage.

Recreational waterfowl hunting is another seasonally popular activity enjoyed by enthusiasts. However, while the Chowilla floodplain has historically provided an accessible area for hunting, such activity has not been encouraged by the former Pastoral Lessees and the numbers of individuals participating has been moderate.

Under the provisions of the *National Parks and Wildlife Act, 1972* waterfowl hunting is not permitted in Regional Reserves and this was initially seen as a barrier to Regional Reserve establishment. However during the preparation of this plan a decision was made to establish the floodplain portion of Chowilla as a Game Reserve to specifically allow for continuation of controlled waterfowl hunting.

Establishment of the Chowilla Game Reserve, combined with loss of access for hunting in the Bulyong Island and Katarapko sections of the newly constituted Murray River National Park, is likely to see an increase in demand for hunter use of Chowilla Game Reserve. Such use will require careful management to ensure that conflicts with other users are minimised.

The Chowilla area, particularly the floodplain anabranch system, contains many other features of interest to visitors. Such features include rapidly changing and contrasting scenery, remoteness, a sense of adventure and excitement, relatively undisturbed areas, closeness to flora and fauna, good camping spots, environmental diversity and the ready availability of produce such as yabbies, fish and waterfowl.

4 PROPOSED FUTURE MANAGEMENT

Policies and actions for the management of "Chowilla Regional Reserve" which are outlined below are guided by:

- (a) the Articles of the Convention on Wetlands of International Importance especially as Waterfowl Habitat
- (b) South Australian Government policy
- (c) the SA *National Parks and Wildlife Act, 1972* and Regulations
- (d) agreements between South Australian and are other members of the Murray-Darling Basin Ministerial Council
- (e) legal agreements between the Minister for Environment and Natural Resources and other parties
- (f) Department of Environment and Natural Resources policies
- (g) decisions of the Murraylands Conservation Trust, and
- (h) community attitudes and expectations.
- (i) mining within the park is regulated by the Mining Act, 1971 and the Petroleum Act, 1940 and the respective Regulations as well as MESA policies.

4.1 Grazing Stock

4.1.1 Zones

Explanation

Wright (1992) suggests that, whilst pastoralism may not be the most damaging agricultural practice, because it is the most extensive it is associated with much of the land degradation in Australia. He also suggests that:

ecologically sustainable development is a vague concept open to wide interpretation; a concept which postulates an ideal, but does not offer the means to achieve it

and concludes that sustainability cannot be imposed on agriculture from above by bureaucrats, politicians, scientists and environmentalists, but must be brought about by farmers adopting sustainable farming practices.

Historically, stocking rates at Chowilla have varied considerably. The floodplain portion once formed part of a major overland stock route and received very heavy grazing pressure. In more recent years stocking rates have been more conservative.

Varying degrees of degradation have occurred as a result of domestic stock. This includes pugging of soil on the floodplain margin, vegetation losses and subsequent sheet erosion during heavy downpours as well as physical damage to lunettes such as those bordering Lake Limbra, Coombool Swamp and Gum Flat.

According to the Nature Conservation Society of SA (NCSSA, 1990), grazing has also reduced the conservation value of the area by habitat disturbance which has enabled introduction and dispersal of exotic plant species, by altering species composition through regeneration mechanisms and by selective browsing of more palatable species. It is also likely that grazing, by reducing vegetative growth along creek ecosystems, exacerbates erosion in these areas, although R.L. Robertson (pers. comm.) suggests that such effects may be minor compared with wave action and wash from boating activities. The combined effects ultimately lead to bank collapse, accelerated siltation, infilling of creeks and increased salinisation.

Domestic stock grazing, however, is not the only factor causing degradation and impacts of domestic stock have been compounded by vegetation dieback caused by rising water tables and increased soil salinity as well as by recreational use and grazing by high populations of native and feral herbivores, including kangaroos, rabbits, hares and goats.

Policies

It is proposed that grazing of sheep, cattle and horses ("livestock") continue as a primary land use over the greater part of "Chowilla Regional Reserve" but that areas of high conservation value or of particular vulnerability to grazing be excluded from such activity.

The maximum stocking conditions for "Chowilla Regional Reserve" has been set at 12,800 dry sheep equivalent. The figure was derived from the 10 and 20 year stock average plus consideration of factors within that period.

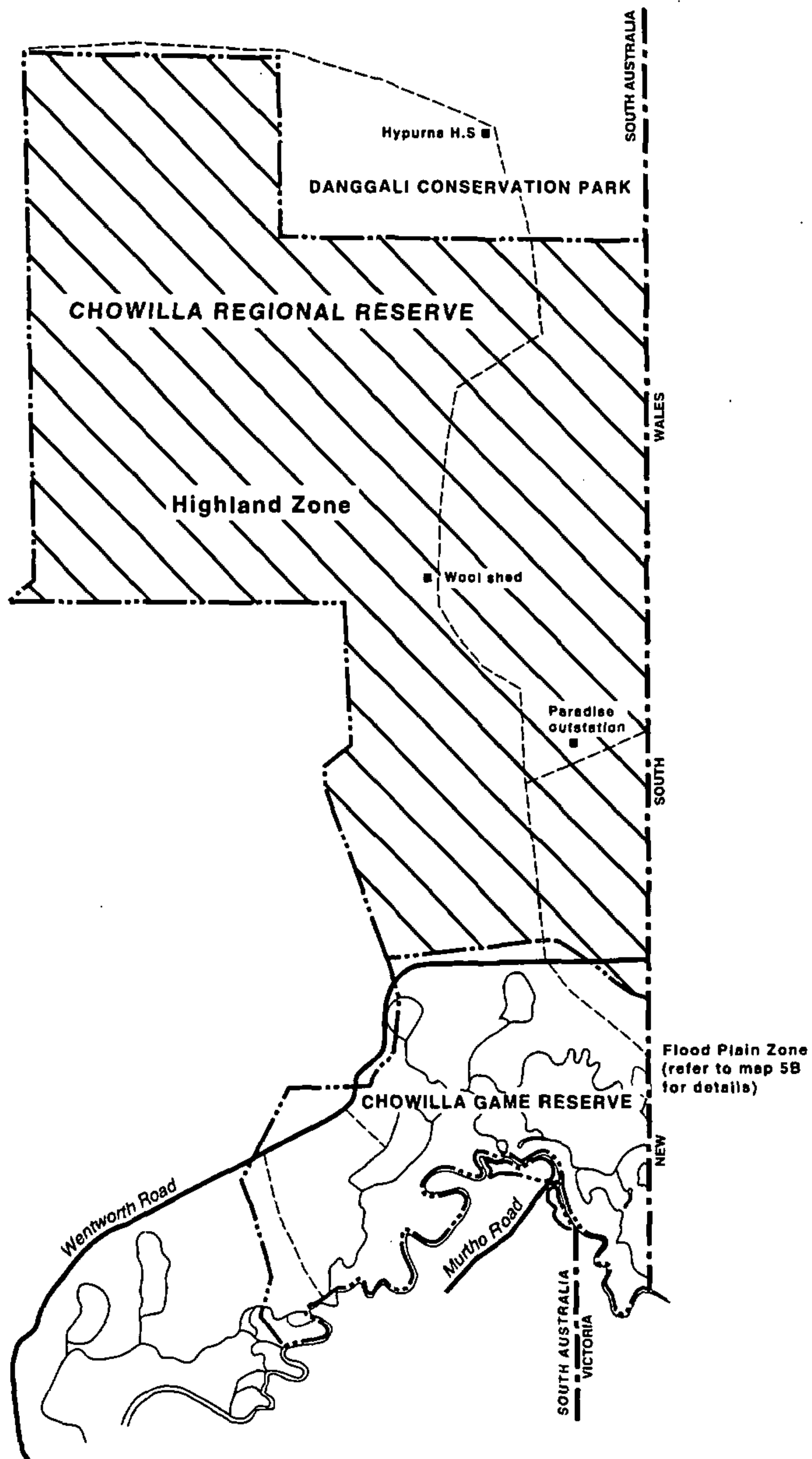
The lessees may apply to the Murraylands Conservation Trust, (refer section 4.6.1) through the Rangeland Monitoring Committee, (refer section 4.1.2) for a temporary increase in the maximum stocking condition. (This provision is available to Pastoral Lessees under the Pastoral Act - stock numbers in excess of the maximum stocking condition may be carried on a Pastoral Lease, for a specified period, subject to prior approval of the Pastoral Board). In the past, the Board has approved increases in the maximum stocking condition following exceptional seasons when feed is extremely abundant and it is considered that the extra numbers may be carried safely.

The lessee may apply to the Murraylands Conservation Trust, through the Rangeland Monitoring Committee for a "permanent" increase in the maximum stocking condition as a result of substantial changes to factors affecting carrying capacity eg. subdivision of paddocks, provision of additional watering points or feral animal control programs.

"Chowilla Regional Reserve" has also been divided into three distinct grazing zones (Figures 6A and 6B,) which indicate the long term intention of managing grazing activities. These zones are:

(a) Pastoral Zone

This zone comprises essentially the whole of the highland portions of "Chowilla Regional Reserve" north of Wentworth Road.



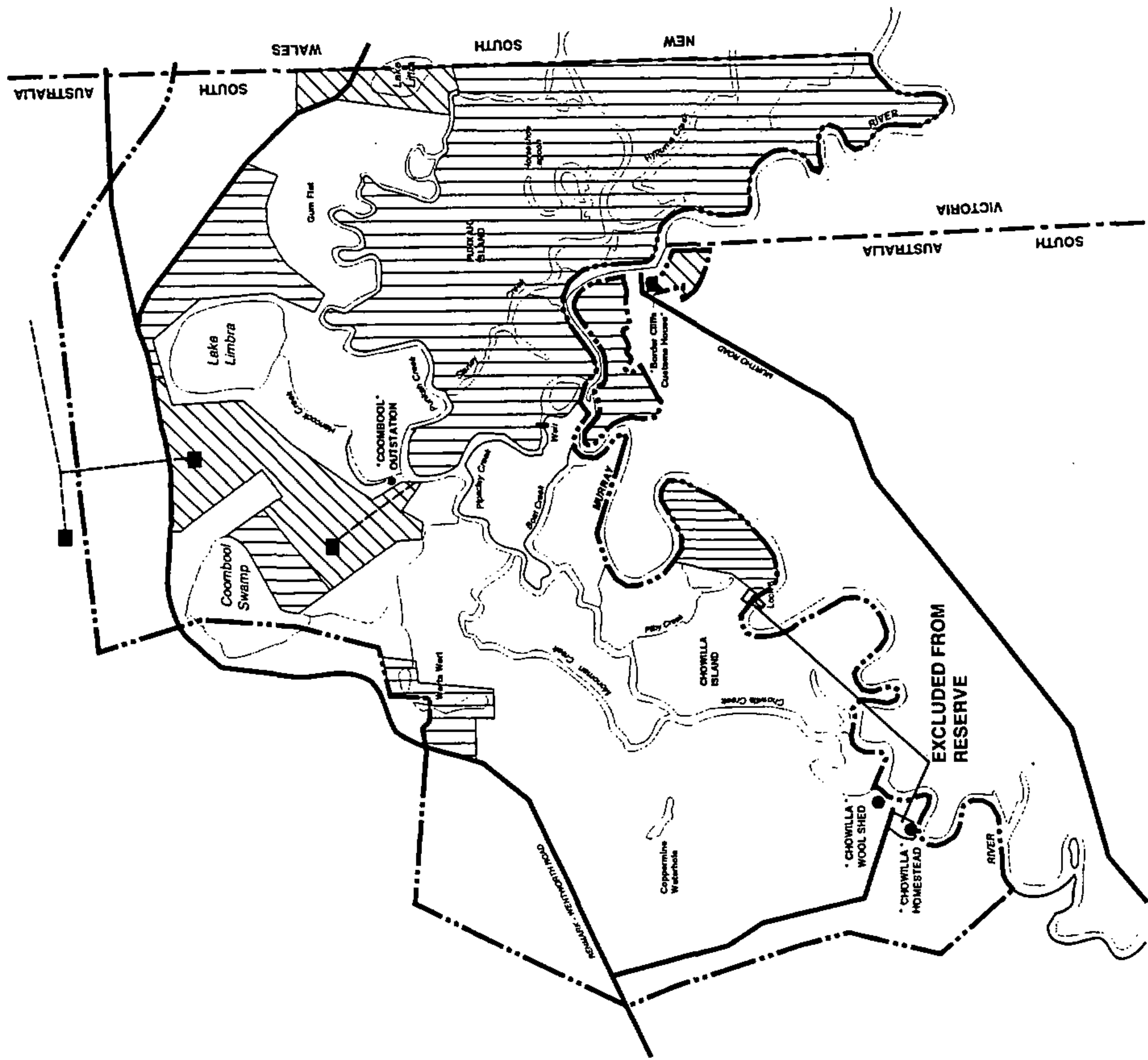
- . — State boundary
- . . . Park boundary
- — — Unsealed Road
- - - - Tracks
- Buildings/structure
- ▨ Grazing Zones



0 5 10 km

Figure 6A

CHOWILLA REGIONAL RESERVE and
CHOWILLA GAME RESERVE
Grazing Zones



- State boundary
 - Park boundary
 - Major Vehicular Access Routes
 - Grazing
 - Low Intensity Grazing
 - No Grazing
 - New Stock Watering Points
 - New Pipelines
 - New Fence
- 0 5km

Figure 6B

CHOWILLA GAME RESERVE
Grazing Zones - Floodplain

Subject to specific lease terms to the contrary (see below), within this zone livestock will be managed as if the area were a Pastoral Lease and the terms and conditions which apply will be those which would normally operate under the *Pastoral Natural Resources and Conservation Act, 1989*. In effect, this means that the area should be managed and utilised prudently so that its renewable resources are maintained and its yield sustained. Production of palatable species for stock production purposes is considered to be more important than species diversity and maintenance of habitat for native fauna.

Subject to satisfactorily meeting land condition requirements and other criteria for Pastoral Leases laid down by the Pastoral Board, stocking rates and stock movements in this zone will be determined by the Lessee.

(b) Floodplain Grazing Zone

The Floodplain Grazing Zone comprises the greater part of the floodplain section of "Chowilla Regional Reserve" south of Wentworth Road.

Livestock grazing is recognised as being an acceptable long-term land-use within this zone but such use is considered to be equalled in importance by the requirement to maintain and protect natural habitat values and species diversity. Stocking rates will therefore be conservative, with broad stocking parameters being determined by the Rangeland Monitoring Committee using the results of the proposed monitoring program (see Section 4.1.3 below).

Within the Floodplain Grazing Zone additional sub-zones may be identified where special stocking regimes are to be applied. An example of such a sub-zone is the area between Coombool Swamp and Lake Limbra which is designated in Figure 6B as Low Intensity Grazing (Environmental Management).

(c) Non Grazing Zone

This section comprises environmentally sensitive lunette areas adjoining Lake Limbra and Coombool Swamp, important wetland areas at Werta Wert, species rich areas on the eastern extremity of Chowilla Island (Queens Bend) and the whole of the island areas in the south eastern portion of the reserve bounded by Punkah Creek in the north and Pipeclay Creek in the west.

Subject to phase out provisions, it is proposed that the whole of this zone be designated as an area to be free of grazing stock in the long term. Within this zone, as in other sections of "Chowilla Regional Reserve", there may also be a requirement to control numbers of native herbivores as well as pest species.

Notwithstanding the above zone boundaries, within the constraints of operational lease conditions, the Minister for Environment and Natural Resources maintains the right to alter the boundaries of grazing zones, establish Reference Areas (as defined in the *Pastoral Natural Resources and Conservation Act, 1989*), or to declare sub-zones for specific management purposes, without the need for formal amendment to this plan. Such alterations will not be made without consulting the lessee and the Murraylands Conservation Trust (see Section 4.6.1). Boundaries will normally be derived through negotiation. Notice of such boundary changes will be published in The South Australian *Government Gazette*.

Actions

- * fences and watering points to be established to enable efficient livestock management within the constraints of the zoning plan
- * lease conditions to be developed to reflect the zoning plan
- * grazing management should aspire to be at paddock level.
- * to enable adequate time for completion of rehabilitation projects and establishment of necessary infrastructure, a phase-in period will apply allowing interim grazing use of areas proposed to be livestock free. The phase-in period for areas north of the River Murray will conclude no later than 31.12.1995.
- * the proposed Grazing Licence over Section 96 (described in paragraph 4.1.4, below) to be terminated by 31.12.2002
- * the monitoring system to be developed (see Section 4.7) will include Reference Areas and photo points within each zone and land system. Distinct criteria involving use of indicator species (e.g. "increasers" and "decreases" - see Barratt and Choate, 1983) will apply to each;
 - in the Pastoral Zone it is recognised that there will be changes to vegetation attributes.
 - in the Floodplain Grazing Zone any significant trend showing undesirable changes in species composition, structure or diversity will be regarded as cause for close scrutiny of stocking rates
 - changes in vegetation in the Non-Grazing Zone will also be monitored as a comparison to other areas, to indicate success or otherwise of rehabilitation programs and to provide warning of overgrazing by kangaroos, rabbits and other herbivores

4.1.2 Rangeland Monitoring Committee

Explanation

The day to day management of stock is an activity requiring good knowledge of rangeland condition, including local rainfall events, water supplies and feed availability. Economic factors such as interest rates and market fluctuations must be taken into consideration in the overall property plan. Many pastoral companies also adopt the strategy of moving stock from one property to another to take advantage of climate variations and seasonal variability. The present lessees are no exception. Furthermore, the random rainfall pattern at Chowilla frequently means that such decisions must be taken with minimal advance warning.

It is therefore not realistic to impose a rigid system of prescribed stock levels, or to require unnecessary approvals for short term changes in numbers, either on a property basis or for individual paddocks. Also, given the long term nature of the lease proposed over the major section of "Chowilla Regional Reserve", it is in the interest of the lessee not to overstock and degrade the area.

There are also subtle differences in the objectives of the pastoralist and those of the conservation manager. For example, while the pastoralist does not want to see degradation resulting in breakdown of soil structure and resultant erosion and reduced plant growth, he may be more than happy to see shifts in species composition which result in increased production of palatable vegetation. Such changes are likely to be at the expense of reduced species diversity or the loss of a particular species which are considered by botanists to be rare or endangered.

It is therefore desirable that a mechanism be put in place which allows for balancing of the dual objectives of sustainable pastoral management and maintenance of species diversity and viable populations of rare and endangered species of native plants and animals.

Policies

- * a Rangeland Monitoring Committee will be established to oversee monitoring of rangeland condition and the structure and composition of plant communities and animal habitats at Chowilla
- * membership of the Rangeland Monitoring Committee will comprise the following:
 - a representative of the Company which holds the grazing lease over the greater part of the "Chowilla Regional Reserve" area (i.e. Robertson-Chowilla Pty Ltd)
 - a field manager of the Department of Environment and Natural Resources
 - a conservation representative with particular knowledge of the State's flora
 - a rangelands scientist with knowledge of the pastoral industry and expertise in monitoring rangeland condition (desirably, also a member of the Pastoral Board)
- * the convenor of the Rangeland Monitoring Committee will be the Department of Environment and Natural Resources representative
- * the Rangeland Monitoring Committee will have the following responsibilities:
 - provide a broad but flexible framework for pastoral use of "Chowilla Regional" Reserve in terms of stock numbers and stock movements
 - design and recommend to the Murraylands Conservation Trust a monitoring program, based on that developed by the Pastoral Management Branch of Department of Environment and Natural Resources for Pastoral Leases, which will provide an objective assessment of rangeland condition, vegetation structure and species composition in the different land systems of the reserve
 - oversee the implementation of the monitoring program
 - at intervals not exceeding 1 year, assess the data collected and report to the Murraylands Conservation Trust on the assessed effects of the pastoral operation

- recommend on the establishment of any Reference Areas and any other areas which it considers should be stock-free or which should have special stocking provisions
 - provide recommendations to the Murraylands Conservation Trust and the Department of Environment and Natural Resources on desirable population levels of kangaroos
 - if requested by the Murraylands Conservation Trust, develop specific prescriptions for pastoral management in part or all of "Chowilla Regional Reserve"
 - periodically undertake informal inspections of "Chowilla Regional Reserve" and watch for ecological changes which are not being reflected in the objective monitoring program.
 - recommend appropriate modifications to the monitoring program
- * in the event of a split decision between members of the Rangeland Monitoring Committee, the issue will be referred to the Murraylands Conservation Trust for decision. The latter body may seek further advice from the Pastoral Board. (Note: As outlined below, under the terms of the lease agreement between the Minister of Environment and Natural Resources and the company, Robertson-Chowilla Pty Ltd, the company retains the right to refer such issue to the Minister for decision should it still be dissatisfied with the outcome).

Actions

- * establish the Chowilla Rangeland Monitoring Committee
- * develop and implement the proposed monitoring program

4.1.3 Robertson-Chowilla Pty Ltd

Explanation

As has been described above in the history section (Section 3.1), the former Chowilla Station recently comprised two major parcels of land held under two forms of tenure:

- | | | | |
|-----|-----------------|---|--|
| (a) | Pastoral Lease | - | the highland portions of the property, and |
| (b) | 20 Year Licence | - | the bulk of the floodplain (Minister of Water portions of the Station, south Resources of Wentworth Road |

As a result of the public consultation process it has been agreed that the highland sections of "Chowilla Regional Reserve", and large proportions of the floodplain section, should continue to be available for a grazing enterprise based on domestic sheep, cattle and horses. This has been facilitated through the establishment of a Lease Agreement between the Minister for Environment and Natural Resources and the company, Robertson-Chowilla Pty Ltd. The lease was finalised on 4th May 1993 and spells out the following terms and conditions:

- * a 40 year lease with conditions and rental based on equivalent terms to Pastoral Leases granted under the *Pastoral Natural Resources and Conservation Act, 1989*.

- * after each 10 years of operation, and subject to the laying before both Houses of Parliament of a report prepared pursuant to Section 34(5)(a) of the *National Parks and Wildlife Act, 1972*, the lease may be extended for a further period of 10 years. New conditions may apply to any such lease extension which brings the total term of the lease back to 40 years
- * the lessee to comply with the provisions of the reserve management plan, in particular, provisions applying to specified management zones
- * rights of entry by the lessor and the Lessor's agents for management purposes such as surveying, road building and operation and management of water installations
- * public entry in accordance with terms and conditions set out in the management plan
- * public risk insurance liability (\$10 000 000) to be borne by the lessee
- * the lessee to comply with the *National Parks and Wildlife Act, 1972*, the *National Park Regulations, 1972*, the *Hunting Regulations, 1975* and the Plan of Management as well as other legislation impinging on Natural Resources responsibilities
- * stock levels to be managed so as to be ecologically sustainable
- * the lessee to report annually to the Director National Parks and Wildlife on stock numbers
- * within areas to be grazed, the lessee to be responsible for prevention and suppression of fires, and for the control of all pests, vermin, weeds, and diseases of animals or vegetation which fall within the ambit of *Animal and Plant Control Act (Agricultural Protection and other Purposes) Act, 1986*.
- * should implementation of any plan of management prepared pursuant to Section 38 of the *National Parks and Wildlife Act, 1972* result in a 15 percent reduction in the sustainable livestock carrying capacity as reflected by the maximum stocking condition of the leased area then special termination provisions may be implemented

Schedules to the lease clarify ownership of the various improvements of Chowilla and assigns maintenance responsibilities. Special conditions apply to structures registered on the Register of State Heritage Items.

The lease also provides Robertson-Chowilla Pty Ltd with first option to develop any tourist facilities identified in the plan of management (see Section 4.4, below).

Policies

- * continue a grazing operation at "Chowilla Regional Reserve" in accordance with:
 - (a) the zoning plan included in this document
 - (b) the proposed monitoring program, and
 - (c) the lease agreement between the Minister and Robertson-Chowilla Pty Ltd

Actions

- * implement the provisions of the lease agreement and review as prescribed in that document, this plan and in the *National Parks and Wildlife Act, 1972*

4.1.4 Other Areas

Policies

- * progressively phase out domestic stock grazing on Section 96, which is on the south side of the River Murray adjacent to the Victorian Border.
- * control numbers of both feral and native mammals to further reduce grazing impacts

Actions

- * finalise details of a grazing licence to allow interim grazing use of Section 96, on the south side of the River Murray near the Victorian Border
- * progressively reduce the area available for grazing under this licence and undertake revegetation programs
- * terminate this licence no later than 31 December 2002.

4.2 Natural Resources

4.2.1 Native Plants

Policies

- * diversity of habitat will be maintained
- * aquatic and wetland habitats will be protected and improved by enhancement of natural floods
- * sensitive and important plant communities will be accorded special protection measures
- * management will ensure visitor activities do not cause unacceptable degradation of habitat
- * degraded areas will be progressively rehabilitated
- * long term trends in vegetation condition will be monitored

Actions

- * encourage fundamental survey and mapping of the biological resources of "Chowilla Regional Reserve" to provide a database to assist future decision making.
- * identify high conservation value areas along major watercourses where there is a conflict between recreational use and protection of the resource
- * encourage prolonged flooding and increased flood height and frequency by controlled releases of water from Lake Victoria and other upstream catchments when water storage volumes and river flow rates permit,

- * implement pest plant and animal control programs
- * monitor spread of "woody weeds" and, if necessary, seek relevant approvals for the pastoral lessee to undertake appropriate control measures
- * encourage investigation of habitat requirements for the maintenance of native fauna populations
- * provide protection to riverfront trees which are being ring-barked by mooring ropes
- * continue revegetation schemes as resources permit
- * encourage community interest groups to be involved in revegetation programs
- * at regular intervals photograph and record vegetation condition at permanent monitoring points

4.2.2 Pest Plants

Policies

- * control proclaimed pest plants which constitute a threat to downstream agricultural activities or which are of substantial nuisance value in popular recreational areas
- * replacement of weed species by re-establishment of native vegetation will be the preferred method of weed control where practical
- * willow trees to be progressively controlled by poisoning and/or physical removal. Individual trees which play an important role in providing shade or stabilising erosion-prone banks may be deliberately retained.

Actions

- * spray burrs (*Xanthium* spp.) in popular visitor areas
- * liaise with the Riverland Plant and Animal Control Board with regard to the need to control dodder (*Cuscuta epithymum*) and undertake agreed works
- * eradicate outbreaks of any other primary (Schedule 1) pest plants whenever discovered
- * encourage and assist with willow destruction programs

4.2.3 Native Animals

Policies

- * endeavour to improve habitat for a wide cross-section of native animal species by reducing grazing pressure of rabbits, domestic stock and macropod species
- * progressively phase out domestic stock grazing from the island sections of the Chowilla floodplain as indicated above in Section 4.1

- * within Chowilla Game Reserve recreational waterfowl hunting seasons may be proclaimed in accordance with seasonal conditions and population levels. The *Gazette* notice establishing any hunting season may further specify bag limits, species to be taken and any limit on numbers of hunters.
- * such proclamations may stipulate zones of the reserve in which hunting is either permitted or not permitted, or in which special limitations apply
- * develop and undertake a kangaroo management program which will:
 - (a) identify kangaroo population levels that enable regeneration objectives to be achieved
 - (b) use a combination of habitat modification and culling strategies to lower population levels
- * incorporate in the kangaroo management program strategies which will minimise recruitment
- * all kangaroo culling operations to be required to be undertaken mid-week in non-holiday periods by a professional shooter so as to minimise risk to reserve visitors.
- * seek to establish complementary kangaroo management program on adjoining properties

Actions

- * in conjunction with State conservation groups and hunter organisations, the Department of Environment and Natural Resources will undertake an annual assessment of waterfowl habitat conditions and population levels and, if appropriate, arrange for the proclamation of open seasons for waterfowl hunting. The Minister for Environment and Natural Resources will also seek the views of the Murraylands Conservation Trust before setting hunting seasons.
- * supervise waterfowl hunting activity in accordance with the Hunting Regulations and season proclamations
- * subject to seasonal conditions and regular review by the Rangeland Monitoring Committee, kangaroo numbers to be controlled according to the following strategy:
 - within the Floodplain Grazing and Non-Grazing zones (see section 4.1.1), particularly in areas where active vegetation regeneration projects are being undertaken, attempt to maintain total kangaroo numbers at an average density that will enable the survival of regenerating perennial plants
 - within the Pastoral Zone maintain total kangaroo numbers at an average density which is compatible with the goal of sustainable stock grazing
 - enter into a formal agreement with, and issue kangaroo seal tags to, professional kangaroo shooters to allow the taking of kangaroos in such numbers that will achieve the above desired stocking rates

- undertake regular, accurate kangaroo population surveys to determine animal densities on the different land systems of the reserve and compare these results with those of the proposed rangeland monitoring program. Review target stocking rates accordingly.
- in cooperation with the pastoral lessee, experiment with modification of kangaroo habitat by the establishment and/or modification of stock watering points so that they do not allow access by kangaroos
- * liaise with adjoining landholders and with NSW wildlife authorities with a view to establishing complementary kangaroo management programs

4.2.4 Introduced Animals

Policies

- * control, and if practicable eradicate, vertebrate pests including rabbits, goats, cats, foxes, hares and pigs
- * within zones available for domestic stock grazing, responsibility for feral animal control to rest with the lessee. In all other zones, responsibility will lie with the Department for Environment and Natural Resources and the Murraylands Conservation Trust
- * adjoining landholders will be encouraged to co-operate in the development of a joint approach to feral animal control
- * as a component of planned feral animal eradication programs, the expertise of recognised hunting groups may be called upon

Actions

- * liaise with lessees and adjoining landholders in the development of uniform approach to feral animal control in the district
- * continue and extend feral animal control programs such as the rabbit eradication program undertaken on the floodplain during 1989 - 1992

4.2.5 Rehabilitation

Policies

- * facilitate investigations for, and the establishment of, a groundwater interception scheme which will lower the level of saline groundwater beneath the Chowilla floodplain
- * where practical, increase the frequency, duration and extent of flooding of the Chowilla floodplain
- * until such time as ground water levels are lowered by the preferred option of tube wells (see MDBC, 1993) recognise that the hydrological regime of the river and ground water levels and salinities have been significantly changed and attempt to re-establish indigenous vegetation best suited to the present circumstances rather than attempt to re-establish the original vegetative cover
- * involve the local community in revegetation projects
- * manage recreational use to ensure that impacts are minimised

- * reduce feral animal populations and control kangaroo numbers
- * improve domestic stock management and destock designated areas of particular sensitivity to grazing animals
- * only indigenous plant species to be used for rehabilitation purposes

Actions

- * support increasing the frequency and effectiveness of flooding of the floodplain through controlled releases of water from upstream storage
- * along flushed creek banks and in other areas where salt conditions permit, undertake active revegetation programs, particularly during flood recessions, using locally occurring species
- * seek funding from the Murray Darling Basin Commission Natural Resources Management Strategy to undertake a major revegetation and rehabilitation program. Such a program would aim to:
 - re-establish a mixed woodland vegetation on upland rises
 - minimise runoff and erosion in scalded areas by earthworks such as contour furrowing and by establishing saltbush which would also maintain the area's productivity for sheep grazing
 - fence and destock areas as indicated in Section 4.1 above
 - revegetate degraded floodplain areas
 - eradicate feral animals
 - control numbers of kangaroos
- * encourage and support the involvement of voluntary community groups in revegetation projects
- * undertake appropriate actions (see section 4.4) to minimise impacts of recreational use

4.2.6 Wetlands

Policies

- * improve the habitat value of wetlands by introducing a wetting and drying cycle and increasing the area of floodplain that is inundated during minor floods
- * support river management measures (see MDBC, 1993) which will increase the frequency, height and duration of floods on the Chowilla floodplain
- * particular effort will be made to enhance flooding when River Murray flows exceed 33 000 ML/day

- * subject to the availability of funds, undertake specific works recommended in Section 5.4 of the Murray-Darling Basin Commission's *Chowilla Resource Management Plan - Final Report* (1993)

Actions

- * liaise with the Engineering and Water Supply Department with a view to allowing releases of water from Lake Victoria during periods when River Murray flows to South Australia exceed 33 000 ML/day
- * install levee banks and regulators on the inflow creeks of Lakes Littra and Limbra
- * to permit controlled flushing during suitable river conditions, install an inlet regulator between the River Murray and Pilby Backwater on Pilby Creek and an outlet regulator into the road crossing over Pilby Creek
- * breach levee banks in the banked off creeks above Lock 6 on Chowilla Island so as to reinstate channel flows on Chowilla Island when river flows exceed 20 000 ML/day
- * construct a series of low mounds within Lakes Littra and Limbra to act as a substrate for the colonisation of littoral vegetation
- * subject to the establishment of the preferred option of tube wells (MDBC, 1993) and a resultant lowering of saline groundwater levels, further lower groundwater elevations along the creek systems affected by saline seepages by:
 - (i) intercepting and lowering groundwater using "tile" drains, tube wells and well points, and/or
 - (ii) a combination of groundwater interception and surface flow regulation

4.3 Cultural Resources

4.3.1 Aboriginal

Policies

- * management of Aboriginal sites will be undertaken in accordance with the International Charter On Monuments and Sites ("The Burra Charter")
- * sites and objects of archaeological value or of significance to Aboriginal people will be protected
- * management of Aboriginal sites or objects will have regard to the views of Aboriginal people who have an affiliation with the area

Actions

- * undertake a comprehensive survey of aboriginal sites
- * remove stock from a major proportion of the floodplain, particularly from sandy areas and islands (see Section 4.1 above)

- * prepare and implement a comprehensive land rehabilitation plan which recognises problems associated with attempting to rehabilitate dune areas which are rich in aboriginal sites such as burial sites (see Section 4.2.5 above)
- * in conjunction with the Department of Aboriginal Affairs, further research the site of the reported Aboriginal cemetery adjacent to the Chowilla orangery
- * encourage additional research for the inventory, analysis and assessment of sites or objects of archaeological or historic significance
- * ensure development sites are surveyed before disturbance occurs
- * liaise with Aboriginal people regarding management of sites or objects of significance

4.3.2 European

Policies

- * conservation of culturally significant sites or objects will have regard to the Articles of the Burra Charter
- * solid remnants of pastoral history of Chowilla will be retained and interpreted
- * unused relics such as old stockyards, bridges and fence-lines will be individually assessed as to the historical value. Those which merit retention will be tidied up by the removal of loose wire and other debris and interpreted. Others will be removed.
- * the old Chowilla Woolshed, which remains in service, will be conserved and interpreted as an integral component of the living history of the pastoral industry in the area
- * the Chowilla Homestead will be maintained
- * the old Border Cliffs Customs House will be conserved in accordance with the State Heritage Branch Conservation Plan
- * the assistance of the State Heritage Branch will also be sought to prepare a conservation plan Littra House and adjoining structures

Actions

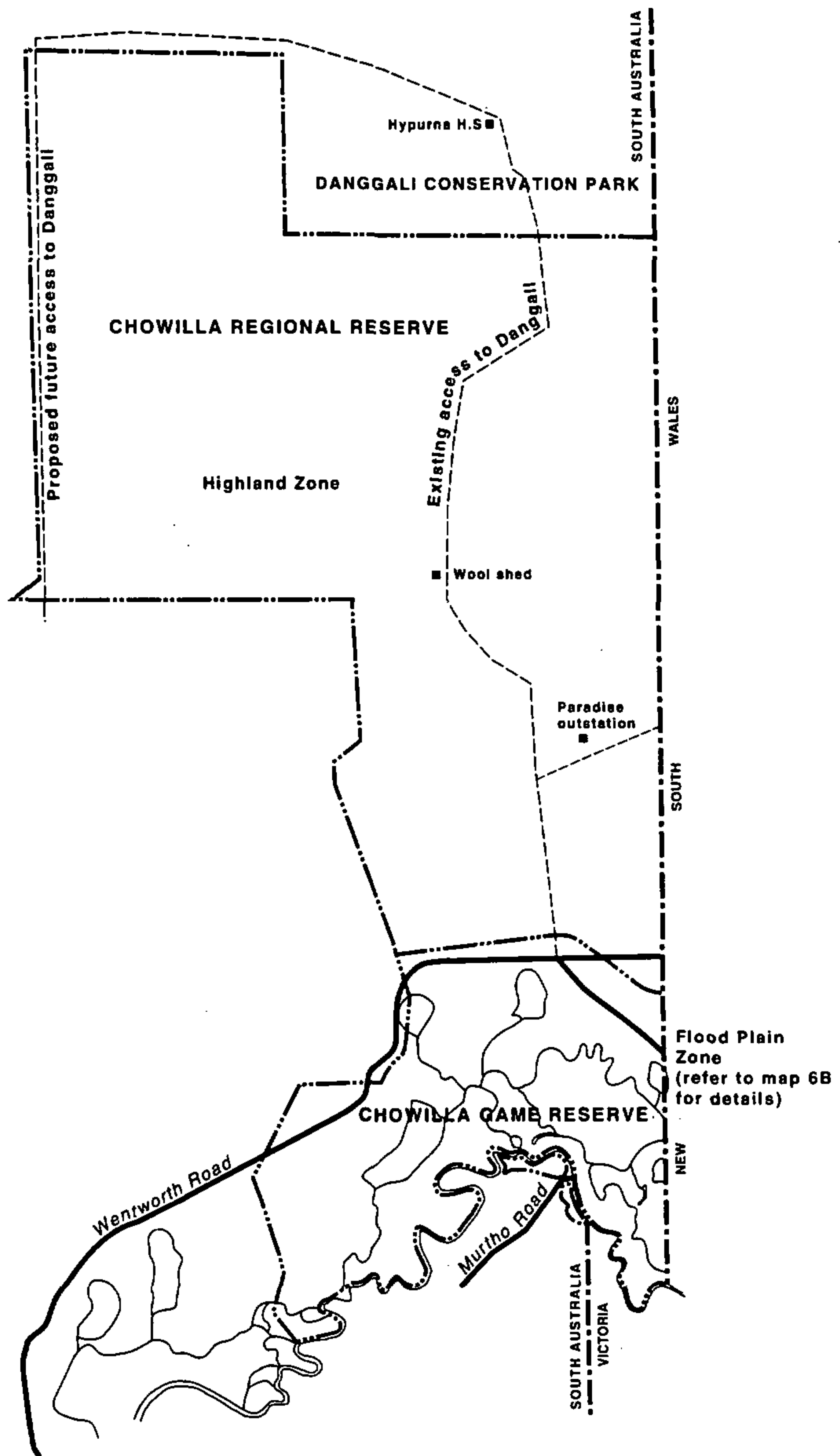
- * encourage research for the inventory, analysis and assessment of places of historic significance
- * liaise with the State Heritage Branch to determine the conservation significance of historic places and if appropriate submit items for registration to the State's Heritage Register.
- * seek advice from State Heritage Branch before undertaking any restoration works on items listed on the State Heritage Register

4.4 Visitors

4.4.1 Access

Policies

- * unless there are pressing reasons to do otherwise, and with the exception of power craft in Coombool Swamp, Coppermine Waterhole, Werta Wert Lagoon and Lake Littra, navigation along all water bodies within "Chowilla Regional" Reserve will be unrestricted
- * similarly there will be minimal restriction on movement and mooring of boats along creeks and river banks
- * all boating activities will be required to be in accordance with the *South Australian Boating Act, 1974* and Regulations
- * no formal boat ramps are in the Reserve, however ramps do exist at Murtho Landing, lock 6 access road and at the Murtho Customs House. Small craft can access the water at any suitable site.
- * on the terrestrial sections of "Chowilla Regional Reserve" a system of vehicular access tracks will be identified as shown in Figures 7A and 7B. Each track will be classified as either major (2WD) vehicular access, primary public vehicular access, or limited access, as follows:
 - (a) **major vehicular access routes** which, desirably, should be maintained and/or upgraded as all weather public access roads are:
 - (i) Wentworth Road
 - (ii) the old spur road which leaves Wentworth Road at Lake Limbra and heads Southeast toward Lake Victoria
 - (iii) a new vehicular access route to be constructed from the above road and head southward on high ground along the western side of Lake Littra to the proposed camping area at the southern end of that Lake
 - (iv) existing dirt roads from Wentworth Road to the proposed Information Centre in the vicinity of the Chowilla Homestead (see Section 4.4.7 below) to the Coombool Outstation area and Monoman Bridge.
 - (v) the Murtho Road from Paringa to the old Border Cliffs Customs House
 - (b) **primary public vehicular access tracks** - two such tracks are proposed:
 - (i) a semi-circular dry weather access track (with linkages back to Wentworth Road) to be maintained around the northern perimeter of the anabranch system and developed as a feature "guided drive" around the Chowilla floodplain
 - (ii) the existing public access track from Wentworth Road to Danggali Conservation Park to be re-routed away from stock watering points to an alignment approximating the old boundary between Calperum and Chowilla Pastoral Leases



- . — . — . State boundary
- . . — . Park boundary
- Major Vehicular Access Routes
- - - - - Primary Public Access Track
- Buildings/structure



0 5 10km

Figure 7A

CHOWILLA REGIONAL RESERVE and
CHOWILLA GAME RESERVE
Access/Recreational

(c) secondary vehicular access tracks

- (i) a network of spur tracks will branch off the primary public vehicular track on the floodplain, to afford access to camping and day visitor sites along the anabranch system. (these tracks are not marked on figure 7B).

(d) limited public access tracks

road access can be gained to Chowilla Island and to Lock 6 by way of a road bridge across Monoman Creek. This road will continue to be available for management purposes and for access by authorised personnel eg EWS and MDBC staff. However general public access will not be granted except by special permit and a locked gate will be retained in this location. Permission for organised groups to visit the island will not be unreasonably withheld, although a nominal entrance fee may apply.

(e) restricted access tracks

A number of additional vehicular access tracks occur throughout "Chowilla Regional Reserve". In most instances these tracks will continue to be required for stock and reserve management purposes and minor maintenance may be performed on them by the pastoral lessee. Public access to these tracks will not normally be permitted.

- * a signing system will be developed to clearly designate access routes and an information brochure will be prepared to accompany the guided drive around the Chowilla floodplain
- * vehicular tracks not required for reserve or stock management purposes may receive minor scarification or other works to assist their recovery to a natural condition
- * the Engineering and Water Supply Department will be permitted to maintain the existing airstrip adjacent to Lock 6

Actions

- * monitor boating activities with regard to:
 - (a) safety of park visitors
 - (b) environmental impacts
- * enforce Boating Act and Regulations
- * provide boat safety information at formal information sites
- * in consultation with the Department of Road Transport and Paringa and Renmark Councils, establish responsibility and funding arrangements for desired road establishment, upgrading and maintenance.
- * undertake minor upgrading, track rationalisation and re-routing of the vehicular access track around the Chowilla floodplain (generally following the outside bends of Chowilla, Monoman and Punkah Creeks) and maintain this area as the reserve's primary area for informal recreation activities such as camping, fishing, yabbing, boating and sight-seeing.

- * in consultation with pastoral lessees, relevant managers and road construction authorities, identify an optimal route and establish a new north-south access track between Wentworth Road and Dangali Conservation Park
- * close off and/or rehabilitate vehicular tracks which are excess to requirements

4.4.2 Camping

Policies

- * designate the outer creek system adjoining Chowilla, Monoman and Punkah Creeks as the primary area for vehicle-based, recreational camping and progressively establish "nodal" camping sites, i.e. separate, distinguishable sites with reasonable screening between sites similar to those in the Katarapko Section of Murray River National Park
- * to minimise the scatter of charcoal in camping areas, individual fireplaces will progressively be provided at each camping node. Otherwise facilities in such areas to be limited to basic information signs
- * allow dispersed bush camping (foot, boat and canoe access) throughout "Chowilla Regional Reserve" except within 500 metres of staff residences, engineering installations, stock management facilities and watering points or where there is undue damage being caused by camper activity
- * subject to seasonal restrictions on fires during summer fire ban periods, campfires will be permitted:
 - (a) in fireplaces in nodal camping areas, and
 - (b) at dispersed bush camping areas (canoe, boat and foot access)
- * generators may be used between 7 am and 9 pm.
- * at the following two localities, provide a higher level of facilities for those campers who prefer a more formal camping experience or a greater level of comfort
 - Border Cliffs
 - adjacent to the lower section of Chowilla Creek
- * facilities to be provided in the above areas may include:
 - convenient water access
 - toilets
 - a rubbish collection depot (for packaged rubbish only)
 - an adjoining short, signposted nature walk
 - fireplaces
- * all campers will be encouraged to package their litter and take it away with them

Actions

- * monitor levels of use and impacts
- * gazette appropriate camping activities and conditions

- * designate nodal camping areas around Chowilla, Monoman and Punkah creek system
- * progressively establish formal camping areas and associated facilities at Bordercliffs and Chowilla Creek.
- * in conjunction with the Department of Housing and Urban Development (Recreation and Sport Division), update and amend the Chowilla Creek Canoe Guide to more accurately illustrate camping policy and promote low impact camping philosophy
- * liaise with Paringa and Renmark Councils with a view to operating a mutually acceptable rubbish collection and disposal operation

4.4.3 Fishing and Yabbying

Policies

- * no restrictions on amateur or professional fishing other than those under Fisheries Act and Regulations, i.e. restrictions on species to be taken and methods of capture

Actions

- * ensure compliance with Fisheries Act and Regulations
- * provide information to recreational fishers to ensure that they are familiar with the legal vehicle access routes

4.4.4 Camp Fires

Policies

- * outside of fire ban periods camp fires will be allowed
 - (a) in all bush camping areas where supplies of firewood are adequate, and
 - (b) in fireplaces in formal camping and nodal camping areas
- * the use of fuel stoves will be encouraged, as will responsible use of fire and the conservative use of limited wood supplies

Actions

- * annually Gazette fire ban periods according to seasonal conditions and holiday periods
- * in conjunction with the development nodal camping areas and structured camping areas for school and other groups in the vicinity of Lake Littra, Border Cliffs, Chowilla Creek and Coombool Outstation, progressively establish fireplaces and communal campfire facilities

4.4.5 Visitor Facilities

Policies

- * in keeping with the natural character of the reserve, the level of facilities will be minimal (Figure 7B). In most instances, the primary purpose of providing facilities will be as a measure to protect the area from impacts of visitors. Facilities to be provided may include:
 - internal pedestrian access tracks (nature trails)
 - information and interpretation signs
 - maps and information brochures
 - camping areas and fireplaces
 - a park information and administration centre
- * in the case of the locality of the old Shearing Shed and Shearers Quarters adjoining Chowilla Homestead, an effort will be made to provide a higher level of service to cater for tourists seeking basic overnight accommodation and a closer understanding of the history of the Aboriginal occupation and European settlement, or of the wool and river trade industries in the Chowilla area. Here the established practice of catering for visits from passing tourist boats such as the Murray Princess will be built upon. Opportunity will be provided for a concession to upgrade and operate the existing shearers quarters in this vicinity as a small scale cultural tourism development
- * in accordance with lease agreement between the Minister for Environment and Natural Resources and the pastoral lessee Robertson-Chowilla Pty Ltd, the latter company will be given first preference to develop a prospectus to upgrade and operate the tourist facility which, it is envisaged, may incorporate the proposed camp ground in the Chowilla Creek area

Actions

- * provide basic visitor facilities
- * invite Robertson-Chowilla Pty Ltd to submit an expression of interest for the provision of tourist services in the vicinity of the Chowilla Woolshed area
- * assess any such proposal from Robertson-Chowilla Pty Ltd and, if appropriate, the Murraylands Conservation Trust will enter into a further commercial agreement with that company
- * in the event that Robertson-Chowilla Pty Ltd declines to proceed with such a development, or fails to prepare a prospectus within 12 calendar months of this plan receiving Ministerial approval, expressions of interest may be sought from other parties
- * if a company other than Robertson-Chowilla Pty Ltd or Chowilla Proprietors is involved in such development (including any company which holds an interest greater than 50 percent in partnership with the above) it will be required that the proposal be advertised for public comment before any commercial agreement is entered into

4.4.6 Walking Trails

Policies

- * because of the relatively long distances involved and the often severe climate of the Chowilla region, it is not envisaged that special purpose long distance walking trails will be established in the reserve
- * short walks to features of particular interest may be developed in the vicinity of primary visitor destinations, particularly along river and creek frontages and in conjunction with the proposed guided drive (see section 4.4.1)

Actions

- * identify a simple system of walkways to features of particular interest
- * erect signs and produce appropriate accompanying interpretation materials

4.4.7 Information and Education

Policies

- * to maintain the natural character of the area, on-site information signs will be kept to a minimum
- * simple information signs may be erected to demarcate park boundaries and to interpret features of particular interest
- * a variety of printed information to be prepared and made available, including a guide for boaters and canoeists
- * provide basic information and interpretation materials at this location which would also serve as a meeting place for the commencement of guided tours

Actions

- * erect information signs which incorporate a signing system which clearly demarcates tracks and their availability to general reserve visitors
- * prepare and erect additional interpretative signs in conjunction with the proposed guided drive, walking trails and formal camping areas
- * revise, update and reprint the *Chowilla Creek Canoe Guide*
- * prepare other simple, low-cost, interpretation leaflets
- * establish a small interpretative area and information outlet in conjunction with any reserve administrative office

4.4.8 Litter

Policies

- * as indicated in Section 4.4.2 above, litter bins will not be provided.
- * visitors will be expected to package rubbish and take it away with them.

- * a low impact camping philosophy to be promoted.
- * a joint system for bulk handling of refuse will be developed in co-operation with adjoining Councils and, if necessary, a refuse disposal pit will be established in consultation with the Waste Management Authority on the reserve, in an unobtrusive location away from the floodplain and public areas

Actions

- * low impact camping philosophy to be promulgated through information materials and other media
- * periodic clean up campaigns to be undertaken, ideally involving user groups and organisations such as KESAB, River Murray Boat Owners Association and River watch, each of whom has previously been involved in highly successful clean up programs in the area
- * establish bulk rubbish collection facilities and an appropriate refuse disposal area

4.4.9 Dogs

Policies

- * while visitor numbers remain low and users continue to act responsibly in controlling their pets, visitors dogs will be permitted on the reserve provided that they are kept on a leash
- * working dogs used on the reserve for stock management or vermin control purposes will not be subject to such restriction nor will dogs used as retrievers by licensed hunters during proclaimed waterfowl hunting periods

Actions

- * monitor levels of use and behaviour of dogs and, take any necessary action to ensure they do not present a significant threat to wildlife and/or domestic stock

4.4.10 Hunting

Explanation

Provisions of this plan relating to recreational waterfowl hunting are addressed in Section 4.2.3 (Native Animals). Co-operative ventures with hunter organisations for the purpose of controlling pest species is covered in Section 4.2.4 (Introduced Animals).

4.5 Other Interests

4.5.1 River Murray Water Regulation

Explanation

The Chowilla area is an integral part of the River Murray system which is carefully managed in accordance with the Murray-Darling Basin Commission's Salinity and Drainage Strategy to achieve optimal use of water resources throughout the Murray-Darling Basin.

In the Chowilla region, the River Murray itself and its anabranch system, has its flow regulated by a series of embankments and control structures. The latter include a weir and Lock No. 6 on the River Murray and weirs on Slaney and Pipeclay Creeks near the entrances to those creeks.

These control structures and embankments (Banks "A" to "M" inclusive) are operated and maintained by the SA Engineering and Water Supply Department under the terms of the Murray-Darling Basin Agreement.

The Engineering and Water Supply Department, on behalf of the River Murray Wetlands Committee, has also undertaken a series of works to improve environmental management of floodplain wetlands such as enhanced flooding of Lake Littra.

Additional research and monitoring of ground waters has been proposed in the MDBC's Chowilla Resource Management Plan (see Section 4.5.2 below)

Policies

- * in managing the waters of the Chowilla floodplain, both the Engineering and Water Supply Department and the Department of Environment and Natural Resources will endeavour to conserve and enhance riverine habitat values
- * surface waters of the Chowilla area to continue to be regulated in accordance with broad Murray-Darling Basin objectives and the MDBC Salinity and Drainage Strategy
- * control structures and embankments to continue to be operated and maintained by the SA Engineering and Water Supply Department
- * subject to appropriate care, Engineering and Water Supply Department personnel will have free and unrestricted access to the whole of "Chowilla Regional Reserve" for such purposes as well as for necessary inspections, research and monitoring of both surface and ground waters and for operation and maintenance of structures and embankments
- * the Murraylands Conservation Trust will consult with the River Murray Wetlands Committee and the Engineering and Water Supply Department before undertaking any wetland enhancement projects
- * all buildings, structures, improvements and facilities existing and constructed within "Chowilla Regional Reserve" by the Engineering and Water Supply Department will be the property of that Department
- * E&WS retains the right to withdraw any of its buildings, structures, improvements or facilities at any time
- * should the Department of Environment and Natural Resources wish to retain any such items on withdrawal by E&WS, appropriate compensation will be negotiated
- * E&WS will not be held liable for, nor obliged to mitigate or remedy any effect upon the environment caused by its installations
- * in the event of any dispute between the Chief Executive Department of Environment and Natural Resources and the Chief Executive E&WS, the Minister for Environment and Natural Resources will seek advice from the Murray-Darling Basin Commission

- * E&WS will maintain all existing access roads and tracks to E&WS installations including the main access route to Lock 6. The latter route may be upgraded to all-weather access
- * subject to agreed rehabilitation measures and authorisation by the Murraylands Conservation Trust, E&WS will be permitted to excavate material from nominated pits for local maintenance of roads, structures and banks and construction of new facilities if required
- * from time to time E&WS may, without further consultation, undertake minor modifications to access tracks to allow access by heavy equipment required for the operation, maintenance and construction of E&WS facilities. Any major realignments or new roads or tracks required for such purposes will be by agreement of the Murraylands Conservation Trust

Actions

- * E&WS to manage surface waters of the Chowilla floodplain in accordance with the MDBC Salinity and Drainage Strategy
- * subject to funding approval, the Department of Environment and Natural Resources will proceed with wetland enhancement projects described in the MDBC Chowilla Resource management plan
- * before proceeding with any additional floodplain wetland enhancement projects not described in that document or the park management plan, the Department of Environment and Natural Resources will refer the proposal to the River Murray Wetland Committee, the Engineering and Water Supply Department and the Murraylands Conservation Trust.

4.5.2 Possible Future Groundwater Interception Scheme

Explanation

The MDBC Chowilla Resource Management Plan has advocated the establishment of a groundwater interception scheme entailing the construction of a series of tube wells across the floodplain and the establishment of a disposal basin, off the floodplain, but within the region.

The Murray Darling Basin Ministerial Council at its meeting on 15th May 1992 agreed:-

- to adopt the option for salinity mitigation by tubewells as the favoured method of environmentally sound salt interception;
- to defer consideration of construction of a tubewells scheme until 1997.

It is possible that the most suitable site for a disposal basin could be located within "Chowilla Regional Reserve".

Policies

- * further investigations into the practicality and cost effectiveness of a groundwater interception scheme will be undertaken by the Engineering and Water Supply Department on behalf of the Murray-Darling Basin Commission

- * the Department of Environment and Natural Resources will not oppose such a scheme should the MDBC decide to proceed and suitable provisions will be made to allow for appropriate servicing including access and power supply
- * should the most suitable location for a disposal basin for such a scheme be located in "Chowilla Regional Reserve", then the Department of Environment and Natural Resources will allow for its construction and also provide additional advice to ensure that habitat values are considered in its design

Actions

- * the Department of Environment and Natural Resources will liaise with the Engineering and Water Supply Department whilst investigations into the establishment of a groundwater interception scheme at Chowilla continue, as proposed in the MDBC's Chowilla Resource Management Plan

4.5.3 Mining and Petroleum Exploration and Development

Explanation

Employment of the Regional Reserve category under the National Parks and Wildlife Act recognises that full rights of entry, prospecting, exploration and mining under the *Mining Act, 1940* and the *Petroleum Act 1940* are to be retained.

Hydrocarbon prospectivity over the Chowilla Regional and Game Reserves is generally considered to be poor with only minor methane shows and fluorescence being recorded by drilling. Available sparse seismic coverage over the Renmark Trough have not detected sizeable anticlinal structures.

The Nadda and Berri basins appear to be immature for hydrocarbon generation although the deeper portions of the Renmark Trough, where up to 1500 m of Devonian sediments of the Darling Basin remain largely unknown and untested, may be more prospective and cannot be discounted.

Exploration and development activities are subject to conditions placed on approvals agreed by Mines and Energy SA (MESA) and DENR prior to approval of an activity or tenement. Such conditions should recognise the multiple use objectives of the reserve.

Regulation of mining activities is undertaken by MESA. As part of the regulatory framework MESA require Companies to undertake their activities in accordance with a code of environmental practice. The code describes the management framework and activities by which the Company will manage their activity. It should incorporate any relevant aspects of the Management Plan as well as any conditions placed on the approval as a result of the assessment by DENR and MESA.

Policies

- * to ensure through the assessment and planning that environmental risks are so identified that effective decisions can be made about the natural and cultural resources to be avoided or about the scope and form of management, including rehabilitation, in those areas where avoidance is unnecessary

- * to ensure through monitoring and auditing that codes of practice and guidelines developed to manage activities are implemented in the field

Actions

- * all mining applications or notifications received by the Minister for Environment and Natural Resources will be referred to the Department of Environment and Natural Resources for information and comment. The Minister will consider these comments in drafting any directions for the carrying out of proposed works.
- * monitoring of activities authorised under the mining acts will be undertaken by Inspectors and Authorised Officers of MESA
- * MESA and DENR will liaise on mining issues to ensure compliance with park objectives

4.5.4 Commercial Fishing

Explanation

Primary responsibility for control of fishing in South Australia rests with the Minister of Fisheries through the Department of Primary Industry. Regulations under the Fisheries Act prescribe species that can and cannot be taken and sets limits on the use of various devices for capturing fish. In the case of recreational fishing, such activity is normally permitted in all sections of the River Murray and its backwaters using rods, hand lines, shrimp nets and yabby hoops. For commercial fishers such arrangements are more lenient, with commercial fishers being allocated specific reaches within which they may use nets and other fish capture devices.

Subject to restriction on species to be taken, the Minister of Fisheries' policy for commercial fishing in backwaters of the River Murray also allows licence holders to fish from specified backwaters which may include backwaters on reserves dedicated under the National Parks and Wildlife Act as well as on private property. In the case of reserved areas, licence holders are still required to comply with the *National Parks and Wildlife Act, 1972* and Regulations, and to obtain permission of the Minister for Environment and Natural Resources.

Floodplain areas which are not accessible at normal river (pool) level, but are linked with the River Murray during periods of flood are then considered to be part of the river itself and thus commercial fishers are allowed access in flood periods.

There are several commercial fishing reaches upstream of Renmark in the River Murray and two located within the Big Huncree and Ral Ral Creek anabranch system. At normal pool level none of these reaches extend into the "Chowilla Regional Reserve". However, when the river is in flood and extends continuously across the floodplain, licensees are permitted to fish "at right angles to the bank" within the flooded area. In such instances they may then be entitled to net fish in floodplain creeks (and over the floodplain) within "Chowilla Regional Reserve".

Because of the varying shape of the flooded river, it is sometimes difficult to precisely define the area of fishing reaches.

Policies

- * in accordance with Department of Primary Industry regulations and policy on commercial fishing in River Murray backwaters, commercial licence holders will be authorised to take non-native fish (except redfin) and bony bream from backwaters within the "Chowilla Regional Reserve"
- * should it become evident that such activity is having a significant detrimental effect on the ecology of any part of the creek system, the Department of Environment and Natural Resources, on behalf of the Murraylands Conservation Trust, will consult with the Department of Primary Industry, commercial fishers and users, with a view to having such areas excluded from commercial fishing
- * additional conditions over and above Department of Primary Industry regulations may be developed to enhance management arrangements. Such conditions will be negotiated through the Department of Primary Industry
- * established Department of Primary Industry policy allowing commercial fishers access to floodplain wetlands during periods of flood will be continued

Actions

- * assess working arrangements of all commercial fishers who's license allows them to operate in "Chowilla Regional Reserve" and, through the Department of Primary Industry negotiate any desirable modifications which will lead to improved environmental management
- * monitor commercial fishing activities in all waters of "Chowilla Regional Reserve"
- * to meet National Parks and Wildlife Act requirements for Ministerial approval for commercial fishing activities, publish an appropriate notice in the SA Government Gazette

4.5.5 Border Cliffs Customs House

Explanation

The Border Cliffs Customs House was constructed in 1884 as an inspection point for river trade between States. The first Sub Collector was a Mr Robert Norton Scruton Baker who was reputedly (State Heritage Branch, 1987) allocated 300 pounds p.a. as well the house and an allowance for a servant.

The Customs house itself was a simple, four roomed structure, constructed of local stone. There was a front office with direct entry from the front veranda, two living rooms, and a large kitchen as well as a variety of outbuildings.

With the establishment of the Federal political system in 1901, the Customs House became superfluous and was eventually sold to a local family, the Richard Stoeckels, with whom it remained until April 1967 when the land was once more resumed by the Government, this time as part of the Chowilla Dam proposal.

In the early 1900s the building was used as a Post Office with Richard Stoeckel having a mail run to Tareena, NSW. The Post Office later moved to Paringa. Other uses the building was put to in this period was as a school and as a temporary recruiting office during the First World War.

Once it had been acquired by the Stoeckel family in the early part of the new century it became necessary to enlarge the house and add to the original four rooms. In 1912 Mr Jack Egel removed the rear veranda and built two rooms along the rear portion. At the same time the partially underground cellar was also constructed. Further additions were made in 1950.

When the Chowilla Dam did not eventuate, R.D. Stoeckel purchased and removed some of the outbuildings. The SA Engineering and Water Supply Department retained control of the land and granted the Renmark National Trust a peppercorn lease of the remaining buildings on 1.1.73. Initially a caretaker was placed in the building but no restoration work was undertaken and the building gradually fell into disrepair.

In the late 1980s the present licensees T.J. and I.V.H. Van Beukering, in collaboration with the State Heritage Branch, commenced restoration of the buildings and began operating a general store and fuel depot serving passing river traffic.

Located at the terminal point of the only sealed road to come within close proximity to "Chowilla Regional Reserve", and only some thirty kilometres from the Paringa Bridge, the site also has considerable potential for further development as a focal point for visitors to the reserve (see Section 4.4.5 - "Visitor Facilities" above).

Policies

- * the Border Cliffs Customs House to be maintained in a condition indicative of its original condition. It may be altered sufficiently in structure to provide for its continued utilisation as a retail outlet
- * security of tenure to be provided to the occupants to provide incentive for the further upgrading and continued maintenance of the building in accordance with the State Heritage Branch Conservation Plan
- * provided that such venture remains viable, the building and the surrounding area to continue to be used as a tourist service centre providing fuel, stores and information for passing river traffic

Actions

- * negotiate a term lease agreement with the present licensees so as to provide for the continued upgrading and maintenance of the building and for its continued operation as a visitor service centre.

4.5.6 Pumps and Pipelines

Explanation

Several pumps and pipelines cross "Chowilla Regional Reserve". They include:

- (a) an arterial pipeline from Punkah Creek south of Lake Limbra servicing stock watering points on the highland portion of Chowilla,

- (b) a pump and pipeline (through Werta Wert) from Monoman Creek servicing stock watering points on Calperum Station
- (c) a pump and pipeline from Punkah Creek near the SA/NSW and Lake Littra which services several properties in New South Wales including "Pine Camp" and "Narweena"

Policies

- * existing stock watering facilities to be retained and, where appropriate upgraded
- * all pumps and pipelines to be retained under lease agreement or licence to the Minister of Environment and Natural Resources
- * licences to detail any associated conditions such as term, location, maintenance

Actions

- * assess routes and infrastructure associated with pumps and pipelines and issue licences which detail operating conditions

4.5.7 Bee Keeping

Explanation

The Chowilla area has an established use for bee keeping by Mr Keith Gibbs of Loxton who has operated in the area by agreement with the managers. However, because of the arid environment and the ephemeral vegetation patterns, the style of bee keeping practised differs from that of more humid areas. In general, formal bee-sites have not been identified and hives are simply moved around to optimise the harvest from nectar flows which result from vegetation flushes after local rainfall events. Minimal vegetation clearing is required for sites used.

Policies

- * continuation of bee keeping at Chowilla is consistent with multi-use management as a Regional Reserve
- * bee keeping will be permitted under licence in all areas of the reserve except those which have been designated as areas to be stock-free (see Section 4.1) or which are popular visitor destinations. A buffer zone around visitor use areas will be maintained.
- * no additional licences will be granted other than to Mr Gibbs who has had permission from Robertson-Chowilla Pty Ltd to operate in the area since early 1988
- * the number of bee sites to be kept on the reserve at any one time will be limited to 5.
- * lease conditions will be negotiated, the general principle to be followed will be one of user pays, with fees payable reflecting numbers of hives and duration of occupation
- * all apiary activities will be required to be of a high standard, consistent with reservation status of the area

Actions

- * negotiate terms and, if agreeable, issue a licence to Mr K. Gibbs
- * manage apiary activity, including access to temporary hive areas, to ensure environmental impacts and conflicts with visitors are minimised

4.6 Administration

4.6.1 Minister for Environment and Natural Resources

Explanation

As a reserve established under the provisions of the *National Parks and Wildlife Act, 1972*, administrative responsibility for "Chowilla Regional Reserve" rests with the Minister for Environment and Natural Resources and, subject to delegation, the Chief Executive of the Department of Environment and Natural Resources and the Director of National Parks and Wildlife.

"Chowilla Regional Reserve" lies within the Murraylands Region of the Department for Environment and Natural Resources which is administered from Berri. Day to day management of reserves in the region is undertaken by Departmental staff in accordance with State Government and Departmental policies and according to the provisions of any approved plan of management.

The National Parks and Wildlife Act enables the Minister to grant leases and licences for entry, use or occupation of reserves. Also, when any lease of licence is in force immediately before a reserve is constituted such lease of licence remains in force for the remainder of the term for which it was granted as if it were a lease granted by the Minister of Environment and Natural Resources

Sections 45a - 45l of the National Parks and Wildlife Act provides for the establishment of Development Trusts for reserves. Such Trusts are considered to be a body corporate and;

- (a) are capable of suing and being sued
- (b) are capable of holding, acquiring, dealing with and disposing of real and personal property'
- (c) are capable of acquiring or incurring other rights and liabilities
- (d) have powers, rights, duties, and functions conferred, imposed or prescribed by or under the National Parks and Wildlife Act or any other Act;

and

- (e) hold property on behalf of the Crown

Development Trusts may also delegate powers, functions or duties to any committee appointed by it, or to any member of the Trust or officer or employee of the Trust

The Department of Environment and Natural Resources has established a consultative network for each of its administrative Regions and the Murraylands Consultative Committee provides a forum for community advice back to the Department of Environment and Natural Resource's Murraylands Region. The Murraylands Consultative Committee presently comprises representatives from a variety of general and special interest groups including, Local and State Government representatives, boating interests, landowners, conservation groups and educators.

Policies

- * to manage "Chowilla Regional Reserve" in accordance with the provisions of this management plan
- * to administer a range of leases and licences for the following purposes -
 - stock grazing
 - old Customs House (tourist services and Heritage conservation)
 - commercial guided tours
 - other tourism activities
 - water pumping
 - commercial fishing
 - kangaroo harvesting
 - waterfowl hunting
- * to delegate day to day decision making in relation to the reserve to a Development Trust, called the Murraylands Conservation Trust (gazetted on the 8th April, 1993). | ?
o
- * to use the Department for Environment and Natural Resources as the operational arm of the Murraylands Conservation Trust to organise and undertake reserve management programs
- * to maintain the Murraylands Consultative Committee as a consultative forum for provision of advice to the Minister and Department of Environment and Natural Resources
- * to continue to liaise with user groups, interested bodies and adjacent landholders on matters of mutual concern

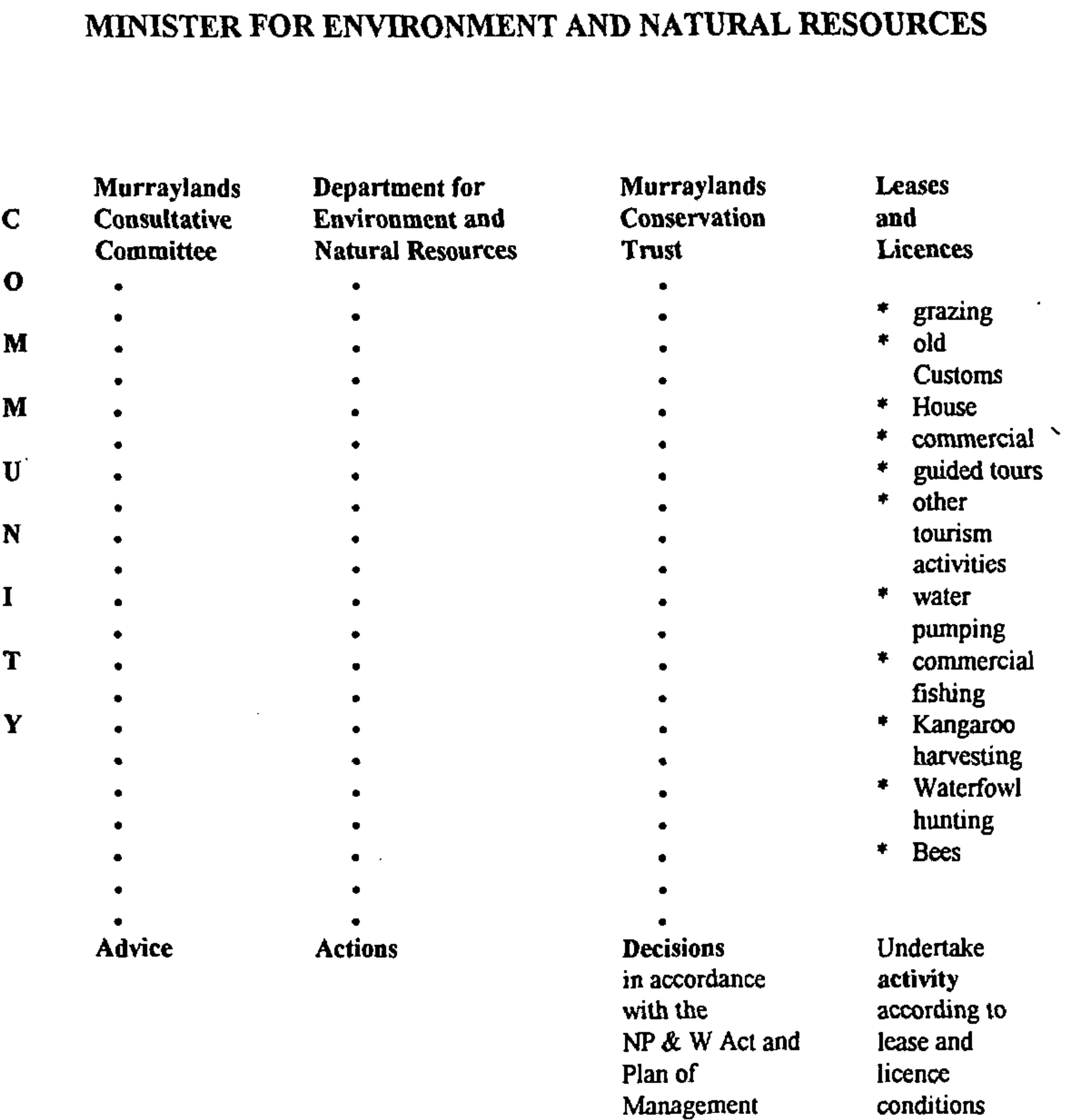
The agencies to be involved in management of "Chowilla Regional Reserve" are shown diagrammatically in Figure 8.

Actions

- * support the Murraylands Conservation Trust
- * utilise available permanent and casual staff to implement the fundamental provisions of this plan
- * seek external funds from funding sources such as the Murray-Darling Basin Commission to enable completion of major projects which have a regional significance
- * maintain the Murraylands Consultative Committee as a forum for community consultation

- * negotiate management agreements with government, private enterprise and community interest groups in the provision of Natural Resources and visitor services. Formalise such agreements with leases, licences and other instruments.

Figure 8: Administrative Arrangements



4.6.2 Inter-State Agreements

Explanation

"Chowilla Regional Reserve" is one reserve in a complex of reserves spanning three States of Australia. These reserves are of considerable importance in their own right and, together constitute an area of National and International significance.

In this regard there are many parallels with the Australian Alps area where the Victorian, New South Wales, Australian Capital Territory and Commonwealth Governments have entered into formal agreements to undertake co-operative management programs.

This high level of interest from South Australia, Victoria and New South Wales is further reinforced by that of the Commonwealth government which recently supported the acquisition of the former Calperum Pastoral Lease to enable it to be set aside for conservation purposes.

The region therefore provides an excellent opportunity for the four governments to combine resources and management programs in a major national conservation initiative. An appropriate mechanism to bring about such joint programs is a Memorandum of Understanding between participating governments.

Policies

- * the Department of Environment and Natural Resources, on behalf of the Government of South Australia, will enter into discussions with counterparts from Victoria, New South Wales and the Commonwealth, with a view to developing a Memorandum of Understanding between the four governments for the co-operative management of reserved areas in the border area.
- * advice will also be sought from the Murraylands Conservation Trust which will, in turn, liaise with management Trusts associated with adjoining and nearby areas
- * Any Memorandum of Understanding developed will emphasise the multi-purpose nature of the South Australian reserve complex and the objectives of the UNESCO Action Plan for Biosphere Reserves.

Actions

- * liaise with representatives of management bodies from adjoining areas with a view to developing a formal Memorandum of Understanding between the governments of South Australia, Victoria, New South Wales and the Commonwealth.

4.6.3 International Agreements

(a) Wetland of International Importance

Explanation

The Convention on Wetlands of International Importance Especially as Waterfowl Habitat is widely known as the Ramsar Convention. Ramsar is the name of the city in Iran where the convention was adopted in 1971.

A list of wetlands of International Importance has been established under this convention. Australia has 40 sites covering approximately 4.5 million hectares. World-wide over 30 million hectares of wetlands in approximately 60 countries are included on the Ramsar List.

Australia was the first nation to become a party to this Convention. Each State and Territory, in co-operation with the Commonwealth Government, nominates areas to be included on the List. The "Riverland" Wetland, which encompasses an area of River Murray floodplain upstream of Renmark to the Victorian/New South Wales border and includes the floodplain portion of "Chowilla Regional Reserve" as well as the Bulyong Island Section of Murray River National Park, is one such area.

The Ramsar Convention requires Contracting Parties to formulate and implement policies guaranteeing the sustainability and wise use of the wetlands. "Wise use" is defined as "sustainable utilisation for the benefit of humankind in a way compatible with the maintenance of the natural properties of the ecosystem" and "sustainable utilisation" is considered to be "human use of a wetland so that it may yield the greatest continuous benefit to present generations while maintaining its potential to meet the needs and aspirations of future generations".

In 1991 the Riverland Wetland was nominated as a case study for the "The wise use of Wetlands Project" of the Convention on Wetlands of International Importance.

Policies

- * management of the Chowilla floodplain will recognise its status as part of a listed wetland under the Ramsar Convention

Actions

- * as required under Article 4 of the Convention:
 - research and exchange of data on the "Chowilla Regional Reserve" wetlands and their flora and fauna will be encouraged
 - management of the "Chowilla Regional Reserve" wetlands will aim to increase waterfowl populations
 - opportunities will be provided for training of personnel "in fields of wetland research, management and wardening"

(b) Bookmark Biosphere Reserve

Explanation

On the 21st December 1993 the Prime Minister announced that the Commonwealth would purchase Calperum Station, which adjoins Dangali to the south, in conjunction with the Chicago Zoological Society. This represented an extension of the Zoological Society's long-standing interest and involvement in research and conservation management in South Australia.

A month later at a public ceremony at Renmark which over 200, principally local guests attended, the Commonwealth Environment Minister and the South Australian Minister for Environment and Natural Resources indicated that the Calperum initiative signalled a new venture in cooperation for the conservation of bio diversity and the pursuit of ecologically sustainable development. They announced the establishment of a Biosphere Reserve (Bookmark) centred on Danggali/Chowilla and Calperum and a number of other reserves in the Riverland area.

The U.N.E.S.C.O. Man and the Biosphere program was launched in 1971 and was aimed to combine natural and social sciences in designing strategies to guide the rational use of natural resources. This awareness of the linkage between environmental conservation and socio-economic development culminated in the development of the Biosphere Reserve concept. It is an approach to conservation and sustainable use that has the potential of uniting the conservation efforts of the public and private sectors and contributing to the well being of the communities in which these reserves are established.

The Biosphere Reserve fulfils three main functions:-

- * the conservation of species diversity;
- * research, monitoring of the environment, education and recreation;
- * to provide assistance in ecologically sustainable development in the surrounding regions.

The Biosphere Reserves consists of three regions or zones:-

- * a core area subject to minimal human disturbance;
- * a buffer zone where the emphasis is on the implementation of resource use strategies which minimise long-term dependency on those resources present in the core;
- * transition area characterised as an area of active cooperation between reserve management and the local people, for promoting sustainable socio-economic development.

The Biosphere Reserve model offers something that few plans do:-

1. the success and future of the Reserve are in the hands of the local people.
2. there is commitment to management for long-term goals.
3. the intent to achieve intergenerational equity, that the next generation will not pay the debts of the present generation, is real.

Activities within the Biosphere Reserve are coordinated by the establishment of an Action Plan which is developed in conjunction with the community and the relevant land management agencies. The community based Murraylands Conservation Trust which has been established under the SA National Parks and Wildlife Act to manage the parks within Bookmark, will also coordinate management by the parties, of the Biosphere Reserve and to oversee implementation of the Action Plan. The Action Plan will be a dynamic document made up of a series of issue papers which will reflect relevant issues of common concern.

Policies

- * maintain the Murraylands Conservation Trust as a mechanism for involving the local community in decision making and for resolving resource allocation conflicts.
- * undertake at least the minimum set of activities required by the MAB Action Plan for Biosphere Reserves, i.e.
 - . baseline inventories of flora and fauna
 - . establish a procedure for monitoring key biological parameters
 - . maintain an inventory of past and on-going research and relevant publications
 - . establish a research program
 - . establish a training and education program
 - . prepare a management plan

Actions

- * through the Australian Nature Conservation Agency, liaise with Commonwealth agencies in preparation of a nomination to expand the present Danggali Biosphere Reserve and rename it "Bookmark".
- * maintain the Murraylands Conservation Trust as the peak body for day to day decision making and coordination
- * undertake the research, inventory and monitoring program as outlined in this plan
- * provide appropriate training for park management staff, researchers and volunteers
- * provide public information and education materials and opportunities as outlined in this plan
- * seek community involvement in the drafting of the Action Plan for the Biosphere Reserve and forward such plan to the Man and Biosphere Program Executive

4.7 Research, Inventory and Monitoring

Explanation

Research is a function which assists in understanding the resources of reserves, their use and management. It is also a legitimate intrinsic use to further scientific knowledge.

In the case of Regional Reserves there is also a statutory requirement for monitoring, as Section 34a of the *National Parks and Wildlife Act*, 1972 requires the Minister, at intervals of not more than ten years, to:

- (a) *prepare a report-*
- (i) *assessing the impact of the utilisation of natural resources on the conservation of the wildlife and the natural and historic features of the reserve;*
 - (ii) *assessing the impact, or the potential impact, of the utilisation of the natural resources of the reserve on the economy of the State;*
- and*
- (iii) *making recommendations as to the future status under this Act of the land constituting the reserve;*
- and*
- (b) *cause a copy of the report to be laid before each House of Parliament.*

Policies

- * all research to be subject to Department of Environment and Natural Resources policy and procedures for granting of scientific permits, the conduct of research and the forwarding of results to the Department of Environment and Natural Resources. If proposed research projects are likely to impact on other Chowilla management programs, comment will be sought from the Murraylands Management Trust before approvals are granted
- * approval to conduct research will normally be routine if:
 - (a) it has potential to facilitate better management,
 - (b) it does not conflict with the natural and cultural features and visitor use of the area, and/or
 - (c) it adds to the reserve data base
- * subject to agreement from on-site managers, bonafide researchers will have reasonable rights of access to all sections of the "Chowilla Regional Reserve"
- * to continuously monitor the impact of activities involving the utilisation of fish stocks and wildlife and the natural and historic features of the reserve
- * as soon as possible, to prepare a baseline report of reserve values and condition, against which future impacts and improvements can be measured
- * provide a comprehensive land condition report to both Houses of Parliament at ten yearly intervals

Actions

- * encourage research which has potential to facilitate better management
- * prepare a baseline land condition report which:
 - (a) describes the land systems in the reserve and their condition

- (b) assesses the potential for further impacts resulting from present and projected activities which utilise natural resources
- (c) proposes appropriate measures to reduce future impacts and restore existing degraded areas
- * encourage the South Australian Research and Development Institute to undertake fundamental research and monitoring of fish stocks, including both commercial and endangered native species
- * develop and implement a monitoring program which provides an adequate basis for assessing the impact of activities which utilise the natural resources of the reserve. The monitoring program should:
 - (a) consider the impact of all activities allowed by this plan
 - (b) provide for the establishment and quantitative assessment of reference areas free of such activities which will enable comparisons to be made with similarly assessed impacted areas
 - (c) encompass each of the major land systems of the reserve
 - (d) where possible, draw upon research information to make comparisons with similar environments and activities

4.8 Infrastructure

Explanation

As indicated above, "Chowilla Regional Reserve" is managed by the Department of Environment and Natural Resources on behalf of the Murraylands Conservation Trust.

The Department of Environment and Natural Resources has a ("Murraylands") Regional Office at Berri which is approximately an hours drive from Chowilla. Some 35 field officers, administrators and support staff operate from the Berri office which has a wide variety of property, survey, valuation and Natural Resources responsibilities. There are ten ranger and park assistant positions in the region. These officers have responsibility for 20 National Parks and Wildlife Act reserves and off-reserve wildlife conservation. Until recently the nearest field officer was based at Danggali Conservation Park where there was one park assistant, a residence and workshop facilities. As a part of the arrangements for the establishment of "Chowilla Regional Reserve", two new positions were added to assist with management

On 27th January 1993 the Hon. Ros Kelly, Minister for the Arts, Environment, Tourism and Territories, announced that the Commonwealth Government in co-operation with the Chicago Zoological Society would purchase the adjoining Calperum Station. This acquisition has major implications for the management of "Chowilla Regional Reserve" as it is logical that the two properties, together with Danggali Conservation Park be managed as a unit and in a co-operative manner with adjoining and nearby reserved areas in New South Wales and Victoria. These co-operative management arrangements are still being developed.

Until there is more certainty it is not possible to prescribe the precise locations of park management facilities.

Policies

- * support an co-operative approach to the protection and maintenance aspects of the management of "Chowilla Regional Reserve"; Dangali Conservation Park and Calperum.
- * support the establishment of joint management facilities (workshop, office etc.) between the Department of Environment and Natural Resources and the Australian Nature Conservation Agency.

Actions

- * liaise with the Australian Nature Conservation Agency to establish a co-operative approach to the management of Chowilla Regional Reserve and Calperum.

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