

CONSERVATION PARKS OF THE MURRAYLANDS (WESTERN PLAINS) MANAGEMENT PLANS

Brookfield, Ridley and Swan Reach

South Australia



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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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Cover Photograph
Hairy-nosed Wombat, Brookfield Conservation Park
(P. Canty)

FOREWORD

These management plans for Brookfield, Swan Reach and Ridley conservation parks set out management objectives and guidelines for their implementation. The objectives are governed by the requirements of the *National Parks and Wildlife Act 1972-1981*, and its attendant regulations.

The background information contained in these documents and upon which the management guidelines are based, is derived from previously existing information sources. The three parks are considered together because they occur in a single geographical region and to a large extent share similar management problems.

The area of the State considered in these park management plans falls within the Blanchetown Environmental Association as defined by Laut *et al.* (1977). This association is described as: "a gently undulating calcrete plain thinly veneered with sand and with occasional low dunes. It is traversed from north to south by the old entrenched floodplain on the River Murray. Low terraces occur along the river. Degraded natural low open woodland and mallee are interspersed with areas cleared to an open parkland. The land is mostly used for grazing wool sheep".

Brookfield, Swan Reach and Ridley conservation parks all contain populations of the Southern Hairy-nosed Wombat (*Lasiornhinus latifrons*).

Although large viable populations of this animal exist elsewhere in South Australia, the Murraylands population is of great significance and interest since it occupies the most arid portion of the wombat's range.

In the past, wombat populations in the region have had to compete with a pastoral industry mostly given over to sheep. Recently, however, considerable subdivision for hobby farms and weekend retreats has occurred, particularly in the vicinity of Swan Reach Conservation Park. The probable immediate effect of this trend will be the removal of sheep and a concomitant rise in the number of wombats. Wombats are known to be destructive to property and improvements (for example, fences) and the attitudes of the new, small landowners to this destruction remain to be seen.

While the three conservation parks serve an important function by preserving samples of the environmental associations representative of this region, the area of wombat habitat currently protected by public and private reserves (for example, Moorunde Wildlife Reserve) is considered inadequate to ensure the continued survival of the Southern Hairy-nosed Wombat in the Murraylands; consequently changes in land-use must not threaten the long-term viability of the wombat populations outside of parks and reserves.

This document has been adopted under the provisions of the *National Parks and Wildlife Act 1972-1981*. The plans have been prepared by the Programmes Branch of the National Parks and Wildlife Service. Suggestions made by interested

members of the public when the plans were released in draft form in 1980 have been considered and advice on the plan has been obtained from the Reserves Advisory Committee, resulting in a number of amendments to the original draft versions.

The text of each plan is divided into four main sections: the first contains background information relating to the physical features, history, visitor use and biology of the park area. The management objectives are listed in the second section which is now formally adopted as required by Section 38 of the *National Parks and Wildlife Act 1972-1981*. The third section outlines strategies for the implementation of these objectives, while the fourth section contains a summary of management proposals to enable the reader to obtain a general overview of the implications of the plans.

(D.J. Hopgood)

MINISTER FOR ENVIRONMENT AND PLANNING

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BACKGROUND INFORMATION

DESCRIPTION OF THE AREA

LOCATION AND PHYSICAL FEATURES

Brookfield Conservation Park is located to the north of the Sturt Highway (Highway 20), 11 kilometres west of Blanchetown, covering an area of 5527 hectares comprising the following Sections: County Eyre, Hundred of Skurray: 8, 45, 46, 47, 48, 56, 57, 58, 59, 60, 61, 72, 73, 74, 75, 76, 77, 78, 79, 183, 184, 185, 186, 187, 188, 189, 190, 191 and 192.

The park lies 100 kilometres north-east of Adelaide and is approximately 126 kilometres from Adelaide by road (Figure 1).

The park comprises an area of gently undulating country (Figure 2) with a thick layer of calcrete overlying Miocene limestone and forming caps to the ridges. Located in the rain-shadow of the Mount Lofty Ranges, the reserve falls within the southern-most extension of the arid zone in South Australia. The nearest location where long-term temperature data are available is Waikerie. The average maximum temperature for January is 32.8°C and the minimum 15.2°C; the lowest monthly average maximum occurs in July (16.2°C) with an average minimum of 5.3°C for the same month. The highest recorded temperature is 46.5°C and the lowest -1.7°C. Rainfall at nearby Blanchetown is low and irregular, averaging 248 millimetres but varying from 150-550 millimetres per annum (Figure 3). Using the measure of drought frequency determined by Trumble (1948), it has been calculated that over the last fifty years the area has recorded a drought frequency of 78 per cent. The area is, therefore, the most drought-prone portion of the present range of the Southern Hairy-nosed Wombat (*Lasiorhinus latifrons*) (Wells 1973, 1978).

HISTORY

ABORIGINAL OCCUPATION

To date, no evidence of Aboriginal occupation has been found in the park itself. However, a body of knowledge has been built up from archaeological investigation elsewhere in the Western Murray Plains; a detailed description is given in the South Australian Museum publication *Ngaiawang Folk Province* (1977). Archaeological exploration, combined with the reports of early colonists such as the journals of Edward John Eyre which describe Aboriginal customs and land-use, have contributed to an increasing understanding of how Aboriginal man lived in the region.

At the time of arrival of European man, the Ngaiawang tribe occupied an area of approximately 388 000 hectares on the Western Murray Plains (Figure 4). Within this area the river was the main focus of activity, providing a permanent water source and a continuous food supply. Fish were caught in nets and in ingenious stone fish traps, one of which is still preserved in the northern end of McBeans Pound. The river was also a major communication and transport route. Bark canoes were obtained from large River Red Gums, and several of these canoe trees can still be seen near Blanchetown. Providing for most needs, the river became the nucleus of settlement.

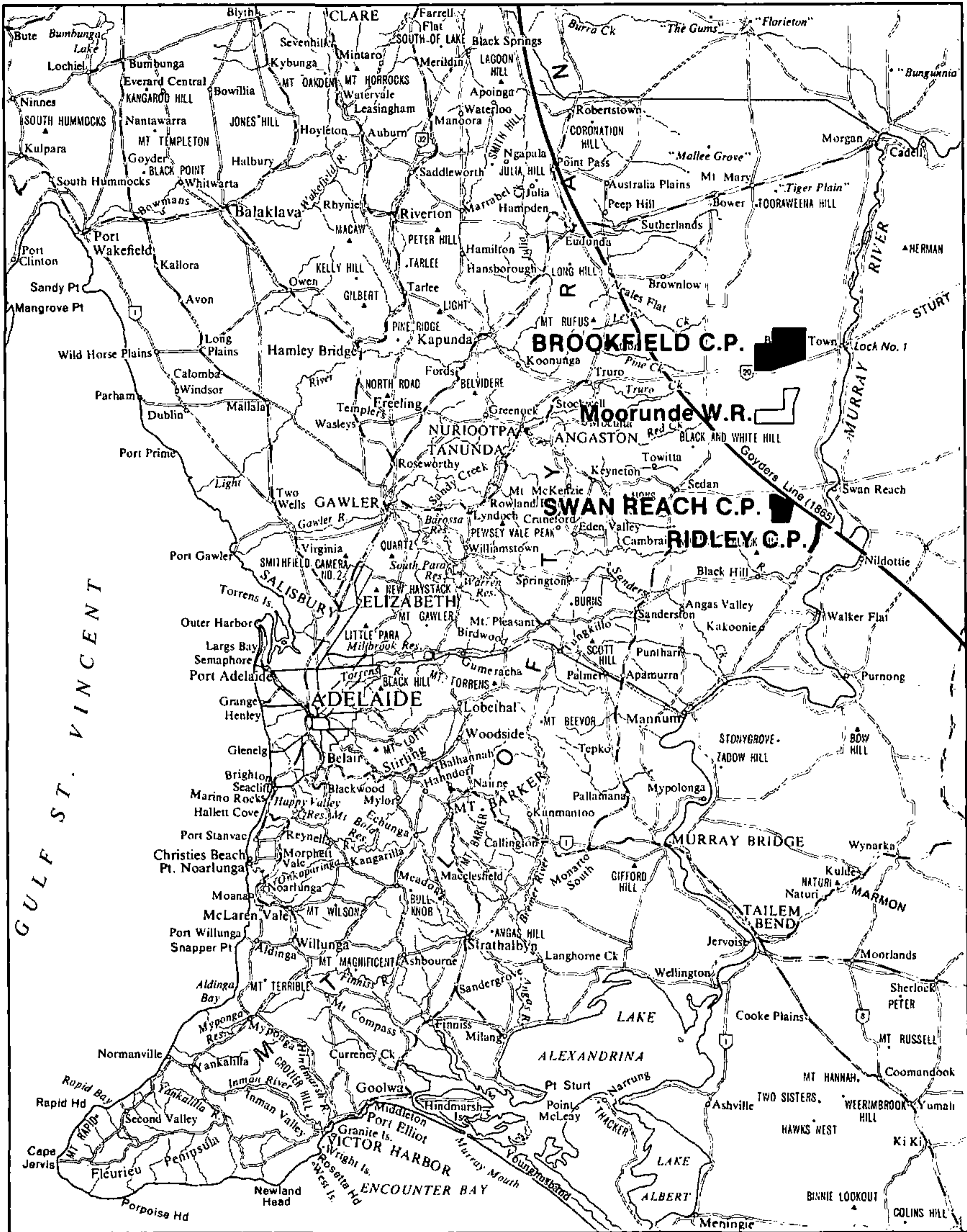
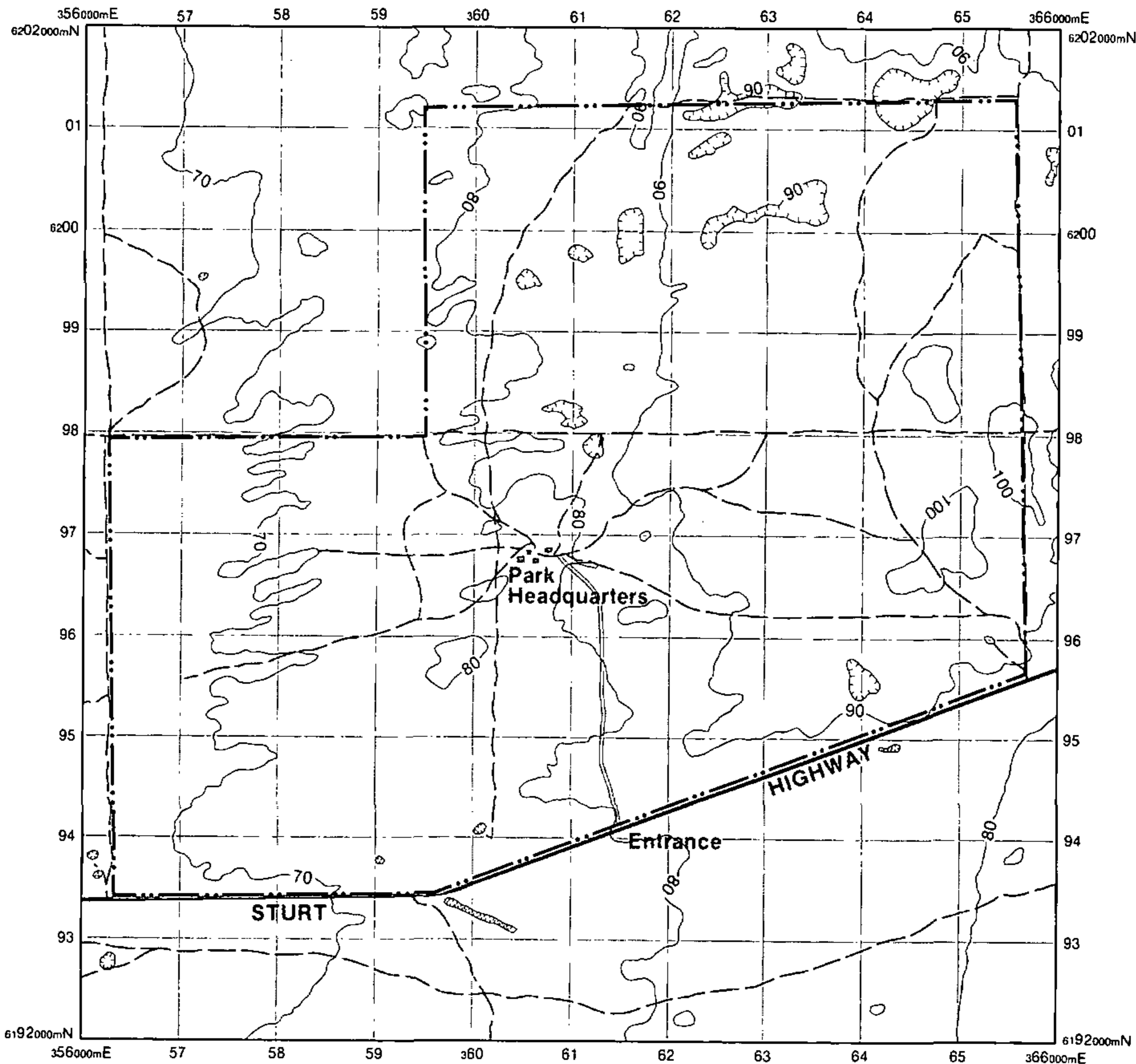


Figure 1

SCALE 1:1 000 000
 0 10 20 30 40 50 km

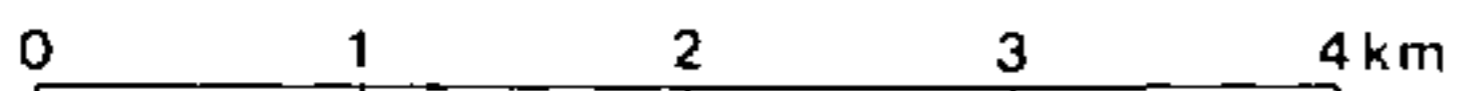
Murraylands Park Locations



- Park Boundary** - · - · -
- Sealed road** - - - - -
- Unsealed road** - - - - -
- Access and Walking Tracks** - - - - -

Figure 2

Brookfield C.P. Topography



Settlements of various forms have been uncovered along the river and several settlements have been found further to the west along creeklines. Evidence of an occasional open camp was uncovered in 1974 at the Craigie Plain lake-bed, which is approximately 10 kilometres to the north of the park and is described in detail in *Ngaiawang Folk Province*. Rock openings, formed by weathering, were frequently used as shelters by river dwelling Aborigines. At Haylands and Devon Downs these shelters were adorned with symbolic incisions and rock paintings. Excavations carried out by the South Australian Museum from 1968 to 1972 at Roonka Flat also revealed an Aboriginal cemetery or necropolis which had been covered by a later open-air settlement.

In comparison with the river environs, the plains to the west of the Murray provided little vegetable food and were inhospitable. Possessing no surface water, the plains were visited only occasionally by Aborigines; in the winter months, hunting expeditions possibly ventured into areas west of the river. An Aboriginal path has been discovered to the north of the park. Called the Ngaiawang Trackway, it extends from just north of Roonka Flat westwards to Mount Rufus and possibly follows a line of subsurface water.

Although the confines of the park offer a seemingly inhospitable environment, the possibility of Aboriginal settlement or sites of significance being found on the park should not be ruled out. Ongoing investigation throughout the Western Murray Plains continues to reveal significant information, especially relating to early Aboriginal man.

The Archaeological Record

The first Aboriginal occupation of the Western Murray Plains was believed to date from the late Pleistocene about 10 000 years ago. Recent work at Roonka Flat, however, has yielded carbon dates extending back 18 000 years. Prehistoric Aboriginal occupation along the River Murray has been divided into two periods: the Older Stone Age and the Younger Stone Age (Tindale 1974). Although assigned no precise dates, the Older Stone Age describes those sites which date from the late Pleistocene or period of the Great Ice Age. The Older Stone Age is distinguished from the Younger Stone Age by the level of sophistication of the stone tools used. Evidence of both these periods has been found on the Western Murray Plains and suggests that Aboriginal man was more widely dispersed across the plains during the Older Stone Age. The Ngaiawang Trackway is attributed to this period, and the Roonka Flat and Devon Downs rock shelters show evidence of being occupied during both the Older Stone Age and Younger Stone Age.

The Advent of Europeans

In his journals, Charles Sturt described the diseased and miserable condition of the Aboriginal tribes he saw in 1830 along the River Murray; European diseases such as smallpox and influenza actually preceded the arrival of Europeans to this region and devastated the local population. Clashes between Aborigines and Europeans overlanding stock, notably at Rufus River, also contributed to the decline in the number of Aborigines. This bloodshed resulted in the establishment of the settlement at Moorunde (Figure 4) and the appointment of Edward John Eyre in 1841 as Protector of Aborigines. By 1844, the conflict between Europeans and the Murray River Aborigines had ceased. With the advent of pastoralism on the Murray Plains, Aboriginal settlements and territories were given over to sheep and cattle, and local tribes were collected into Government settlements along the river. From this time, Aboriginal numbers and tribal organisation and customs declined.

EXPLORATION AND EARLY SETTLEMENT

Following the course of the River Murray in early 1830, Captain Charles Sturt was the first European to explore this part of the continent. By the late 1830s the plains between the river and Truro were traversed by overlanders moving large numbers of sheep and cattle from the eastern colonies to stock the expanding pastoral industry in South Australia. In these early days, notably at Mount Rufus (Figure 4), overlanders clashed with the Aboriginal tribes of the River Murray; only when Edward John Eyre had brought comparative harmony to the area in his role as Special Magistrate and Protector of Aborigines from 1841-1844, did Europeans look to settle in the Murray Plains. At Moorunde, a small settlement between what later became Blanchetown and Swan Reach, Eyre maintained peace between the European settlers and Aborigines. He also issued rations to the Aborigines and recorded their economy and culture.

Not surprisingly, the land nearest the river was the first to be settled. Occupational Licences were issued to several "squatters" including Eardley Heywood who took up land near Moorunde; his properties became known as Portee Station and Swan Reach Station. Lachlan McBean was also a significant land-holder at this time, occupying land to the north of Moorunde, an area which now comprises the northern portion of the present park (Figure 5).

Lachlan and Alexander McBean

Lachlan McBean and his brother Alexander McBean were noted pastoralists in South Australia and Victoria. Cockburn described them as "men of iron constitutions and possessed of the grit necessary for successful pioneering" (Cockburn 1925-1977). Lachlan McBean was born in Scotland and arrived in Adelaide in 1838. Driving stock from the settled eastern colonies to South Australia, he was soon possessed of considerable capital which enabled him to establish pastoral runs east of the Mount Lofty Ranges. Early stations included "Dust Hole" at Baldon, near Truro, where McBean lived in a tent for some time; and Roonka Station on the River Murray (Figure 5). From Baldon Station, the McBean brothers walked a distance of 120 kilometres through rough country to transact their business in Adelaide (Cockburn 1925-1927).

In 1851, Occupational Licences were cancelled, and by 1853, McBean had obtained a Pastoral Lease for 148 square kilometres near the river which included the northern portion of the park; the western and southern portions of the park were Unallotted Crown Lands at this time. Although the Pastoral Lease was issued for a term of fourteen years, it was cancelled with many others in the district and "all the run" was resumed in 1861 when the Hundreds were proclaimed. McBean retained 810 hectares freehold including the area known as McBeans Pound, a watering point on the river, and land to the north at Roonka. From this time, however, McBean concentrated his efforts on several properties in Victoria, and on breeding horses.

Alexander McBean developed Baldon Station from the time of his arrival in the colony in 1846; this property has remained in the hands of members of the McBean family ever since. In 1861, Alexander McBean took over the northern portion of the park, under lease, as an outstation. Sections 8, 45, 46, 47, 48, 56, 57, 58, 59 and 60 within the park, and a large area to the north, comprised the lease which McBean held until 1891. Sections 47, 48, 57 and 58 were held by Lachlan McBean (possibly one of Alexander McBean's twelve children) from 1892 to 1895 when the lease was finally surrendered.

Rainfall
Year (mm)

1868 216
1869 223
1870 503
1871 461
1872 272
1873 333
1874 263
1875 346
1876 176
1877 355
1878 313
1879 311
1880 289
1881 307
1882 195
1883 304
1884 335
1885 222
1886 199
1887 394
1888 156
1889 435
1890 452
1891 172
1892 370
1893 370
1894 310
1895 176
1896 183

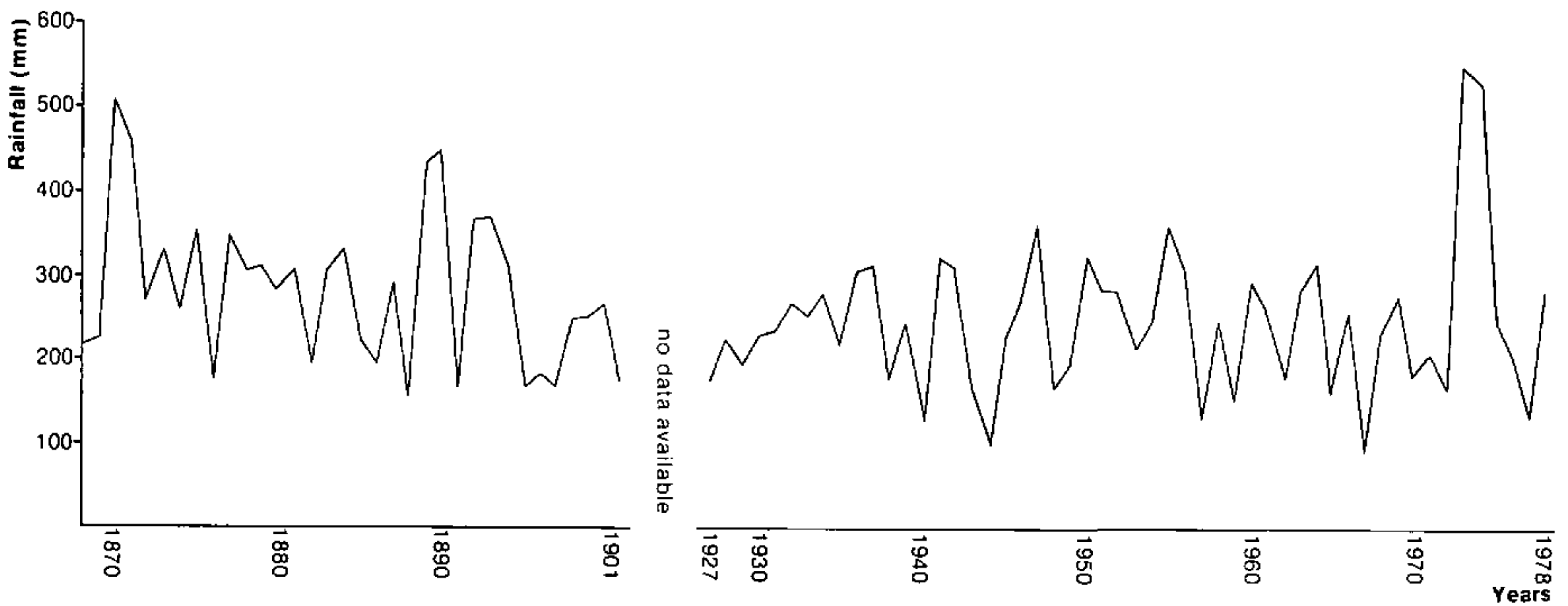
Rainfall
Year (mm)

1897 169
1898 248
1899 254
1900 267
1927 175
1928 223
1929 199
1930 226
1931 238
1932 276
1933 256
1934 281
1935 216
1936 308
1937 315
1938 178
1939 246
1940 132
1941 323
1942 311
1943 172
1944 103
1945 233
1946 275
1947 363
1948 166
1949 197
1950 329
1951 289

Rainfall
Year (mm)

1952 287
1953 214
1954 245
1955 363
1956 305
1957 129
1958 249
1959 160
1960 293
1961 263
1962 181
1963 284
1964 319
1965 167
1966 260
1967 91
1968 231
1969 283
1970 186
1971 206
1972 166
1973 556
1974 532
1975 252
1976 206
1977 140
1978 288

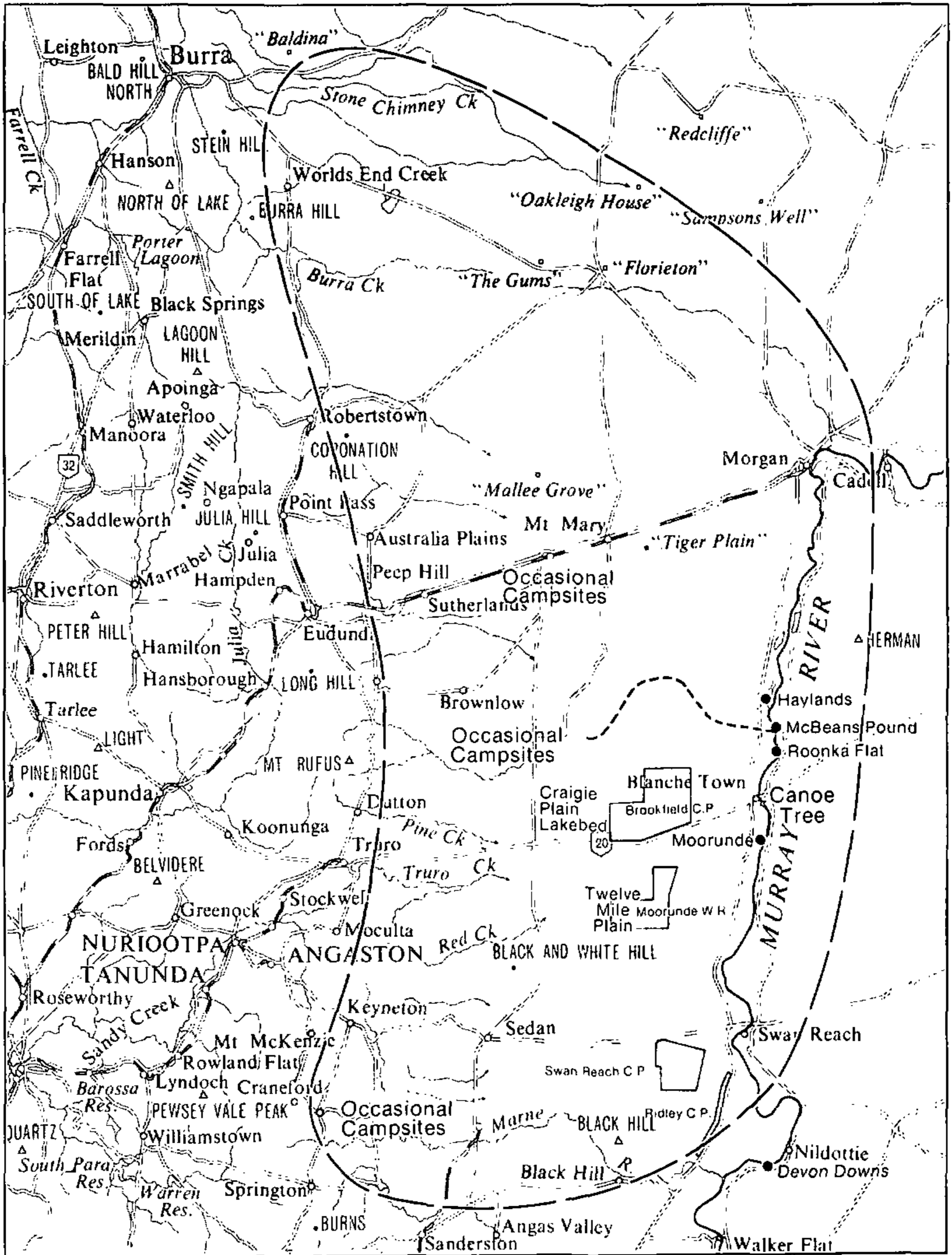
*Records 1901-1926 not available



Mean average 264 mm for 86 years

Figure 3

**Annual Rainfall for
Blanchetown 1868-1978**
(Bureau of Meteorology)

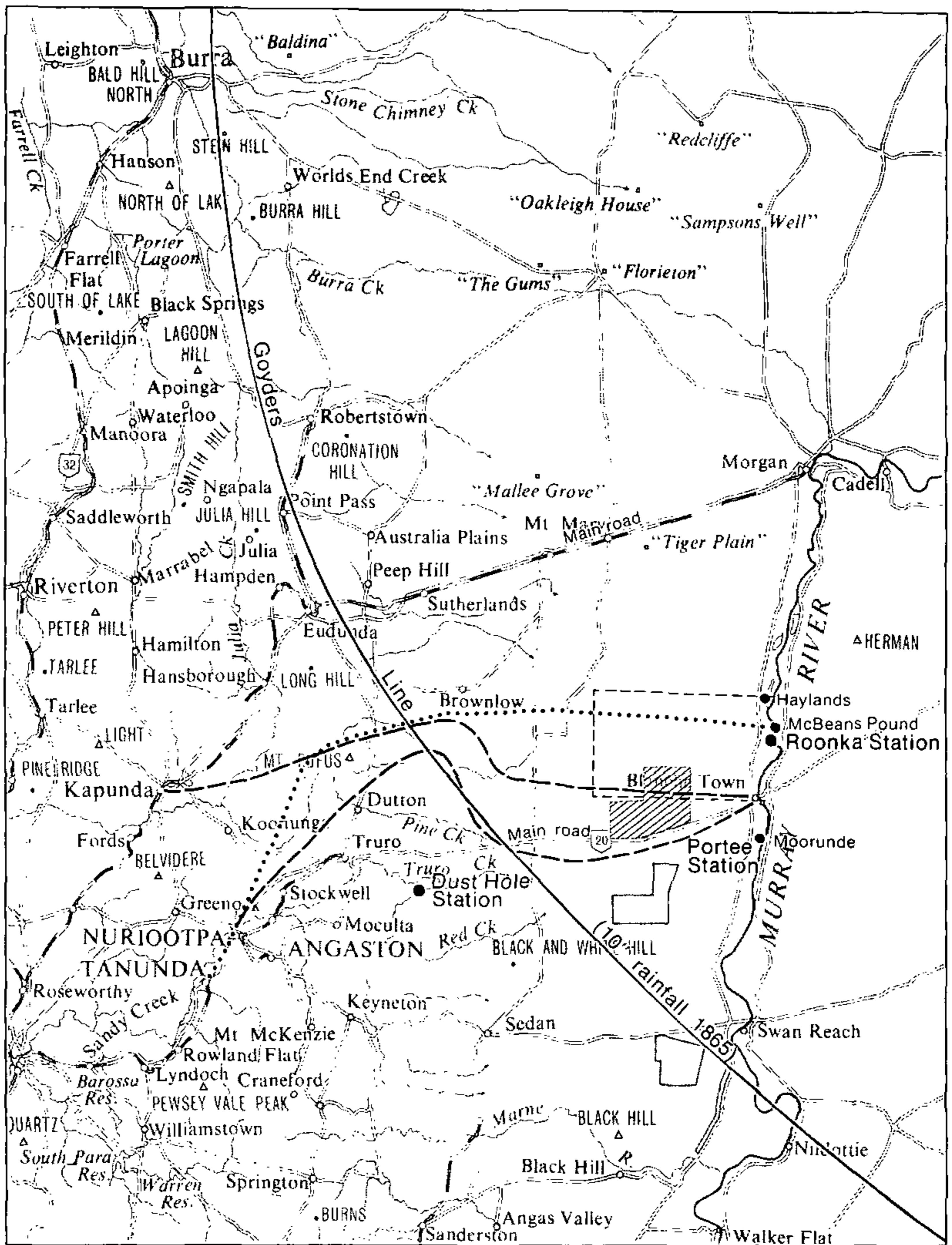


Ngaiawang Tribal Boundary ———
 Ngaiawang Trackway - - - - -

Figure 4

0 10 20 30 40km

Aboriginal Occupation



- Brookfield Conservation Park
- Approximate boundary to McBean's lease near Blanchetown
- Early Overlanders Track
- Railway Line
- Proposed Rail Routes

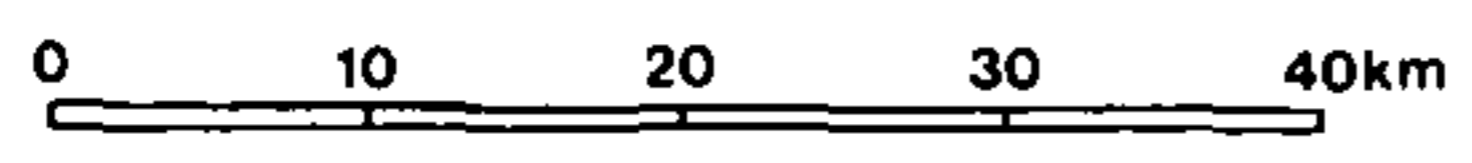


Figure 5
Western Murray Plains
Historical Information

Pastoralism on the Murray Plains

Early forms of leasehold in the colony did not offer the same favourable conditions as the Perpetual Lease which operates today. Occupational Licences were issued annually and Pastoral Leases were for a longer term but could be resumed at any time. Such brevity of tenure meant that improvements such as houses, tracks and fences were often of a temporary nature; only on freehold property after about 1860 were structures more permanent. On early pastoral runs, shepherds lived in tents or simple slab huts. Brush yards were constructed to confine sheep at night, and woven stake and brush fences were constructed around property boundaries. The remains of one such fence with looped wire and brush can still be seen running east-west along the road in Sections 73, 74 and 77 marking the southern boundary of McBean's run (Figure 6). These brush fences were nearly all burnt in the 1880s as they harboured rabbits. Not only were rabbits and dingoes a problem, but recurrent droughts with feed and water shortages contributed to considerable stock losses. Lack of surface water prevented Crown Land further from the River Murray from being occupied. These areas were only settled when water was obtained by drilling bores.

Proclaiming the Hundreds

Land shortages in the more fertile districts led to the cancelling of many Pastoral Leases and the opening up of Hundreds west of the River Murray after 1860. Brookfield Conservation Park falls within the Hundred of Skurray which was one such Hundred proclaimed at this time. The Hundreds were divided into Sections of around 120 to 200 hectares in area, and these were surveyed in the years following proclamation. The Hundred of Skurray was first surveyed in 1873 by A. J. Mitchell and additional surveys were carried out later. Survey pegs marking the boundaries of the Sections can still be found within the park. The Survey Diagram Book of 1884 for the Hundred of Skurray accurately depicts the transition from False Sandalwood to dense mallee scrub much as it appears within the park today. Brush fences are also marked on the plans. By 1884, Sections 80, 81 and 90 had been subdivided, possibly intended as homestead blocks (Figure 6). The southern Sections of the park, including these Sections, were not leased until 1895 and were possibly retained as a transport corridor towards Blanchetown.

Blanchetown—Routes of Transport and Communication

When sheep and cattle were overlanded from New South Wales, McBeans Pound became a stopover for watering stock (Figure 5). The early track to the Pound ran approximately 2 kilometres north of the park. A track which crosses the northern section of the park is shown on early plans and was possibly used as a track for McBean to take his own stock to the river (Figure 6). Local residents offer a different explanation, calling this track the "Coach Route". This track may have been part of the early mail route to New South Wales. It is uncertain, however, if the mail couriers crossed the river at McBeans Pound.

Blanchetown was established in 1855, growing out of the Moorunde Survey and virtually replacing the earlier settlement. By 1860 there was a road surveyed which adjoins the southern boundary of the park (Figure 5). At Blanchetown the travellers using this road crossed the River Murray by punt. A telegraph line which followed the road was established in 1866. From 1863, Blanchetown was an important port on the River Murray highway. Wool from the pastoral properties was shipped from Blanchetown to Goolwa and supplies were taken on the return journey. Although this

function gradually declined, Blanchetown remained a significant river crossing with a Government ferry service established in 1879. The Blanchetown Bridge was opened in 1919.

In 1856, 1858 and 1874, there were several proposals to extend the steam railway from Gawler to the River Murray. One of the shortest of the proposed routes was from Truro to Blanchetown; another route to Blanchetown extended through Kapunda. The east-west road which virtually bisects the park was surveyed for this proposed rail route but never eventuated (Figure 6). In 1878, the railway was extended to North West Bend where the town of Morgan was subsequently established. Other tracks in the park provided access to the charcoal pits which were developed during the 1940s and to grazing stock in the outer confines of the station.

Closer Settlement

From 1895, relatively small parcels of land now within the park were held under Miscellaneous Lease. After several favourable seasons, farmers in the mallee attempted to cultivate smaller areas of land; very often, however, their efforts were thwarted by subsequent droughts. This was the case with the closer settlement of the Blanchetown and Swan Reach districts, which, after severe droughts in the late 1890s, were once again given over to larger pastoral properties.

Herman Rooke held Sections 57 and 58 within the park from July 1895 to 1900, and Joseph Leiblich of Laura held Sections 47 and 48. For this same period, Samuel McBean held a slightly larger area comprising Sections 8, 45, 46, 59 and 60 (Figure 6). All of these leases, which were issued with a right to purchase, were surrendered or cancelled, often through non-payment of rent. During this period of closer settlement, the southern Sections of the park (Sections 73, 74, 77 and 78, previously Unoccupied Crown Lands) were leased for the first time by George Teasdale from 1895 to 1905.

The promise of good seasons was not fulfilled for these farmers and it is unlikely that any crop cultivation or clearing took place during the years 1895-1905 although there was undoubtedly some sheep grazing.

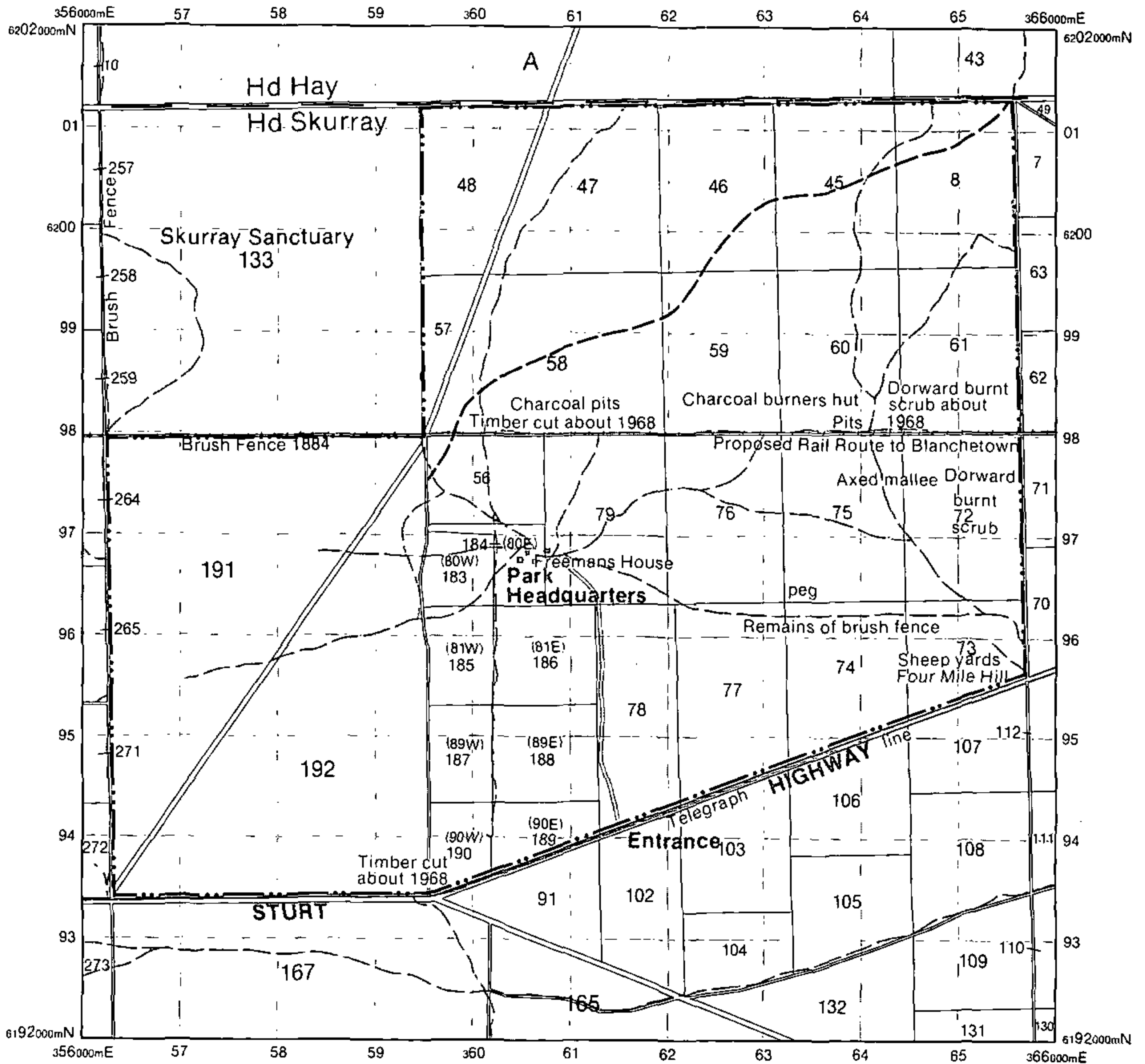
FREEHOLD OWNERSHIP

George Freeman and Son

In March 1906, following the demise of the small leaseholders, George Samuel Freeman, grazier of Palmer House, North Unley, gained right of purchase on an extensive area of land west of Blanchetown which included what is now Brookfield Conservation Park. This was to begin a new era of land tenure organisation which was reminiscent of the pastoral runs of Lachlan McBean and Eardley Heywood and has largely survived to the present day.

According to a local Blanchetown resident Bob Edson (pers. comm.), Freeman found a squatter in occupation when he arrived at his newly-purchased property. From about 1906, a local squatter named Crabb (who was possibly related to William Crabb, an early settler in the district) had been running stock on the area now within the park. When Freeman began fencing his property, Crabb, who at the time occupied a large stone house in Blanchetown, immediately packed his bags and left the district.

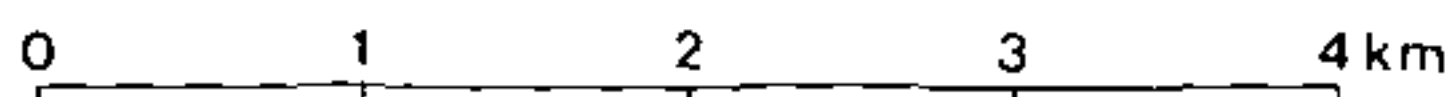
From 1912, Freeman was recorded as living in Blanchetown. Possessing capital, he built many new farm structures including a large shearing-shed where the BP Service Station now stands. "Daddy" Freeman, as he was known, fenced his property by employing members of the Edson family to cut and cart River Red



- Park Boundary** - · - · -
- Sealed road** ————
- Unsealed road** = = = =
- Access and Walking Tracks** - - - -
- Coach Route** - - - -
- Early Sections in brackets** (81E)

Figure 6

**Brookfield C.P.
Cadastral and Historical Information**



Gum strainers. Freeman and his son, George James William Freeman, then commenced to erect flat-iron dropper fences completing a half a kilometre a day. A windmill was installed north of the present lock on the river and water was pumped to the "Four Mile Hill" sheep-yards on the south-eastern boundary of the property. The four-roomed stone and brick house, which is presently the ranger's residence, was built by "Daddy" Freeman for his son soon after purchasing the property (Figure 6). By 1916 all the property was vested in the name of George James William Freeman, the son of George Samuel Freeman, the original grantee.

Glen Leslie—Portee Outstation

In 1921, the total property was purchased by Walter Curtis Cooper of Balaklava. However, in 1926, which was a year of severe drought, Cooper sold the property to Kathleen Tennant and her husband, Frederick Tennant, who was a solicitor in Adelaide. Frederick Augustus Tennant was the son of John Tennant, a prominent station owner after whom Tennant Creek takes its name. Portee Station was owned by John and later Frederick Tennant who purchased the area now in the park as an outstation of Portee; this he named Glen Leslie Station. Frederick Tennant, who employed a manager on his Blanchetown properties, lived at Glenelg in a large residence called Seafield Tower. While held by Frederick Tennant, charcoal burning was carried out on Portee and Glen Leslie stations (see below).

In 1948, Glen Leslie and Portee stations were transferred to Murray Pastoral Company; the proprietor of the company is Mr L. B. Power who is the nephew of Frederick Tennant by marriage. Bert Power, who held properties at Waterloo Corner and Phillips Creek Station in the Northern Territory, is presently living at Somerton Park. A manager named Lyndsay Beckman was employed at Portee Station. In the 1950s Beckman was overseer at Glen Leslie Station, living in the house built by George Freeman which had not been occupied for approximately thirty years.

Improvements undertaken in the 1950s included sinking a bore which piped water to all parts of the property; today this bore and a rainwater tank provide the water supply for the park. Fencing and repairs to the house were also undertaken. Little clearing was carried out and sheep grazing was the only land-use. There were no major fires while Glen Leslie was an outstation of Portee.

Charcoal Burning

Although charcoal was burnt in the mallee country from the beginning of this century, it became especially common during the second World War. At this time there were widespread petrol shortages and charcoal was used to generate producer gas to power motor vehicles. Charcoal was obtained from burning mallee and there was much clearing of the mallee scrub west of the River Murray as a result. Charcoal burning was carried out *in situ* on many mallee properties, including Glen Leslie which is now Brookfield Conservation Park. It was common practice for the property owners to receive some fee or commission for timber cutting and camping rights, however, the Tennants, who owned Glen Leslie and Portee stations during the war, did not demand such payment.

There are two charcoal burning sites in the park; one is located in Section 60 and the other is in Section 58 (Figure 6). In Section 60 there are approximately fifteen pits grouped close together near the eastern track. During the war, an Italian named Vic Panizzon and his wife worked this site. They lived in a small, two-

roomed, dirt-floored hut which is still standing.

Resourcefully constructed around a mallee frame, the hut has external walls of flattened kerosene drums and each room has a timber-framed window and door. One of the rooms which was a kitchen has a fireplace. The roof consists of half a corrugated-iron rainwater tank and a guttering system was erected around the roof to collect water in a small tank. The interior walls are linked with a curtain and sacking bags stitched together. Early photographs taken when Glen Leslie became a reserve, show a brass bed which dwarfed the small bedroom. This bed, which has since disappeared, was one of the few luxuries in the house. Initially Mr Panizzon carried out the work by himself; with no vehicle he carried the cut mallee to the pits on his shoulders. However, charcoal burning provided a good living and he could soon afford a truck and hired an assistant to cut the timber.

In Section 58, there were also fifteen pits which were worked by Mr Elze of Truro and members of his family. Mr Jack Lindo of Blanchetown, who was employed by his uncle, can recall that up to thirty people were engaged on a piecework basis at this site. At a time when the basic wage was £3.10s per week, workers at the pits could expect to earn a good living of £9 to £10 a week. They camped at the site in rough shelters and tents from Monday to Thursday night and then returned to their homes for the weekend. Although the working week was relatively short, their day was long, beginning before sunrise and ending at sunset. In addition, working conditions were dry and dirty as water was in short supply and had to be carted to the site on trucks.

The charcoal burning process was relatively simple and is described below. Although few large mallees can be found in the park today, some trees cut during the war were 60 centimetres in diameter and up to two tonnes of wood could be obtained from one tree. Initially, the trees nearest the pits were cut, but as this supply became exhausted, the cutters ventured further to obtain wood, chopping the mallee by axe. Once cut into lengths, the wood was trucked to the pits for burning. The pits were initially earthen holes but were later lined with brick and stone. The average dimensions of a pit were 3 metres wide, 4 metres long and 2 metres deep. The bottom of the pit was filled with dry wood and freshly-cut mallee was placed on top. Galvanised-iron sheets covered the wood which was then ignited; when alight the whole pit was covered with soil. Once it was burnt and cooled, the charcoal was graded and sewn into bags which were loaded on to trucks. The bags were then transported to Adelaide via Truro or to depots in several local towns where it was sold directly to the public.

"Skurray Sanctuary"

In June 1939, Dr M. Schneider of Burnside contacted the Minister of Lands requesting that portions of his Blanchetown Station be declared a sanctuary as he wished to keep intruders off the land to protect the existing bird and animal life. As a result, an area to the north-west of the park including Section 133, Hundred of Skurray, was declared a closed area in accordance with the provisions of the *Animals and Birds Protection Act 1919-1938* and was called Skurray Sanctuary.

This proclamation was revoked in 1966, when a smaller area which did not include Section 133 was proclaimed a Fauna Sanctuary under the *Fauna Conservation Act 1964-65* (FFC775/66). The *National Parks and Wildlife Act 1972* revoked all fauna sanctuaries and Skurray Sanctuary has never been re-proclaimed (DE1031/AX/72). Section 133 is referred to in Part 3: Additional Land.

Recent Landowners

In May 1962, Glen Leslie Station was purchased by the Glen Benda Pastoral Company. The manager of this company was Mr Laurie Holds, who was at one time overseer of Haylands Station and who later managed Glen Leslie Station for his wife's family. Although few improvements were undertaken on the property while held by Glen Benda Pastoral Company, up to 1800 sheep were grazed at one time, this being reduced to 1500 in dry years. A workman lived in the house for several years during this period. After the station was sold in 1968, Mr Holds, who now lives at Grange, purchased a hotel in north-west Victoria.

Mr Raymond Clifton Dorward became the next owner in September 1968. Mr Dorward, who was born in Port Lincoln, settled on Kangaroo Island after the second World War. He later purchased a house at Clarence Park as an Adelaide base, but mostly lived at Glen Leslie Station. Up to 2000 sheep were grazed on the property but this number was reduced to 1800 in the dry year of 1969-1970. To improve pasture Mr Dorward burnt two small areas. One is near the eastern boundary in Section 72 and the other in Section 60 (Figure 6). He also carried out some weed eradication and repairs to fences. For approximately eighteen months, timber was cut by axe and saw from Section 58 (north of the road) and from Section 190 and sold in Adelaide for firewood. In the year before selling the property, Mr Dorward experienced difficulties in obtaining water. The bore, located close to the house, nearly went dry and water obtained from sinking further bores proved salty. The hardships experienced during this time contributed to Mr Dorward selling Glen Leslie Station in July 1971 to the Chicago Zoological Society.

THE CREATION OF THE WOMBAT RESERVE

In 1971, the Chicago Zoology Society, using funds donated by the Forest Park Foundation of Peoria Heights, Illinois, USA, purchased Glen Leslie Station covering an area of 5527 hectares (13 800 acres). The moves to purchase a reserve for the Southern Hairy-nosed Wombat were initiated by the Director of the Brookfield Zoo in Chicago, Dr W. P. Crowcroft. At this time, R. T. Wells of the Zoology Department, University of Adelaide, began a study of the behaviour and physiology of the wombats on the reserve. Dr Crowcroft was formerly director of the South Australian Museum and had been in the forefront of wombat research while holding that position. The registered freehold owners were the Chicago Zoological Society of Brookfield, Illinois 60513, USA.

The property was renamed the Brookfield Zoo Wombat Reserve and was administered by a committee of management using funds supplied by the Chicago Zoological Society. The foundation members of the committee were Basil Newland (Chairman), Peter Aitken (Secretary), Drs Crowcroft, James and Wells (Committee Members). The committees' duties were to manage the reserve and administer the funds made available for that purpose by the Chicago Zoological Society. Raymond Clifton Dorward, the former landholder, was employed as full-time warden, resident on the property. The Committee of Management has since undergone a number of personnel changes and in April 1982 consisted of: Rod Wells (Chairman), Tony Robinson (NPWS), Ken Stokes (NPWS), Brian Cooke (Vertebrate Pests Authority) and Pamela Parker (Chicago Zoological Society) with Meredith Bogisch (NPWS) (Secretary).

The reserve was originally purchased to fulfil the following objectives:

1. To provide a permanent refuge for the Hairy-nosed Wombat (*Lasiorchinus latifrons*).

2. To provide an area where study of the biology of the wombat could be encouraged and undertaken.
3. To provide an area for research into the conservation and/or restoration of the various habitats and their associated flora and fauna which existed in this semi-arid zone before the influence of white settlement.
4. To provide an area where changes of land-use could be studied, including regeneration of flora, weed control, rabbit control, etc., after removal of stock.
5. To provide an area where the operation and impact of the foregoing could be seen and/or studied by members of the public, especially students and others with a relevant interest.

The following guidelines were laid down by the Committee of Management:

1. To achieve a wombat population of optimum size and structure consistent with the maintenance of an intact habitat.
2. As destruction of native animals within the reserve was contrary to the principle under which the reserve was established, it should only be undertaken as a last resort. When (a) there is a consensus of scientific opinion that an animal population had developed an imbalance and there was no likelihood that natural events would restore the balance before the reserve suffered an irreversible loss of fauna and flora, (b) the methods used and the monitoring of results should be based on current and continuing scientific research programme, and (c) the destruction, monitoring and research should be carried out by qualified personnel appointed by the Committee of Management.
3. Species which are not, and never have been, native to the region should not be introduced into the reserve unless for some carefully considered purpose which was consistent with the objectives of the reserve.
4. As a general principle, the artificial influences of human presence should be minimised and tranquility and naturalness should be the rule.

In early 1977, faced with rising costs, the Chicago Zoological Society instructed the Committee of Management to offer the reserve as a gift to the Government of South Australia subject to certain conditions:

1. The reserve be proclaimed a Conservation Park.
2. The primary purpose of the reserve to be for conservation of and research into the Hairy-nosed Wombat and its environment.
3. The proclamation be accompanied by a relatively simple management plan giving effect to the purpose for which the reserve was established.
4. The Warden, D. G. Newell, was to continue in his employment at the reserve.
5. Subject to the approval of the Public Service Board, he be accorded the status of Ranger Grade I.
6. A small 'Research Advisory Committee' be set up which would include a nominee of the Chicago Zoological Society.
7. The reserve be named Brookfield Conservation Park.

The proposal was approved by the then Minister for the Environment, Mr Simmons. Consequently, the National Parks and Wildlife Division of the Department for the Environment assumed financial and managerial responsibility for the reserve on 1 August 1977; it was proclaimed as Brookfield Conservation Park on the 6 July 1978 with amended Section numbers (Figure 6). As part of the agreement between the department and the Chicago Zoological Society, the Brookfield

Conservation Park Scientific Advisory Committee was set up and met for the first time on 28 September 1979.

Improvements undertaken after dedication and prior to the release of the Draft Management Plan in 1980 included renovations to the homestead and re-casing of the bore.

VISITOR USE

Up until now, visitors to the reserve have been restricted to approved persons or bodies with a bona fide interest in conservation.

TABLE 1: VISITOR NUMBERS IN THE BROOKFIELD CONSERVATION PARK

Year	Number Of Visitors
1972 (commenced 21 June)	78
1973	83
1974	103
1975	199
1976	179
1977 (ceased 31 July)	140

These were mainly visiting scientists and groups of students from Flinders University and Torrens College of Advanced Education (now Adelaide College of the Arts and Education).

The visitor's book was discontinued on 31 July 1977 and no formal record of number of visitors has been kept since that time. Casual visits by members of the general public has not been encouraged and public awareness of the park is minimal. Consequently the numbers of visitors has continued to be low and restricted almost entirely to visits of a scientific nature.

BIOLOGY

VEGETATION

Two major vegetation formations are found in the park. Open scrub covers most of the north-east of the park and a small portion of the south-west corner; the dominant trees are Red Mallee (*Eucalyptus socialis*), Mallee Box (*E. porosa*), Yorell (*E. gracilis*), and Sheep Bush (*Geijera linearifolia*). The understorey contains a number of forbs and grasses including Gull Weed (*Zygophyllum apiculatum*), Bindyi (*Sclerolaena* spp.), *Olearia muelleri* and tussocks of Spear-grass (*Stipa nitida*), (Lehmann pers. comm.). The rest of the park is occupied by low woodland and tall shrubland typically dominated by Sheep Bush and Sugarwood (*Myoporum platycarpum*); Dryland Tea-trees are often found around claypans. The understorey is characterised by Australian Boxthorn (*Lycium australe*), Bullock Bush (*Heterodendrum oleaefolium*), Caustic Weed (*Euphorbia drummondii*) and Heron's Bill (*Erodium cygnorum*) (Lehmann pers. comm.) (Figure 7). A notable variation in the understorey occurs in the south-east of the park where regenerating Bluebush (*Maireana* spp.), reaching 0.5 metres high, contrasts sharply with the adjacent property to the south which is still being grazed by sheep.

The most conspicuous feature of the understorey layers in the park, however, is the extreme variation between good and poor seasons. After a good wet season, much of the shrubland is covered by expanses of fresh, green Spear-grass intermingled with many small ephemeral flowering plants. A plant list compiled by P. Lehmann is given in the section on Plants in the Appendices.

WOMBATS

The reserve was set aside primarily to conserve Southern Hairy-nosed Wombats (*Lasiorhinus latifrons*) and their habitat. In 1971 little more than taxonomic information was available on this animal; since then, R. T. Wells, M. D. Gaughwin and P. Lehmann have added significantly to the knowledge of its ecology. The following brief account has been prepared from their collected published and unpublished data.

The Southern Hairy-nosed Wombat is a nocturnal, colonial animal that survives its harsh environment by spending the hottest part of the day in underground burrows. The burrows are grouped into warrens and many burrows within a warren are interconnected. A large warren may have up to ten major burrows and be inhabited by as many as ten wombats.

Active warrens are characterised by fresh dung-heaps, grooming posts and tracks leading away to pasture areas which are sometimes more than 100 metres from the warren; it is likely that each warren has its own particular pasture areas. Sometimes, distinctive halos of grazed vegetation appear around warrens and may be up to 140 metres across.

In the Murraylands, the main food for wombats is Spear-grass; wombats shun Gull Weed (*Zygophyllum* spp.) and Bindyi (*Sclerolaena* spp.). Research has indicated that heavily grazed Spear-grass rootstocks possibly take much longer to regenerate than less grazed tussocks. On pastoral properties, therefore, the presence of sheep probably reduces the feed available to wombats. In good years, wombats are unlikely to compete for food with sheep outside their defined grazing areas. When their principal food plants are in short supply, wombats resort to consuming plants high in fibre but low in protein content; this often results in high mortality among juveniles.

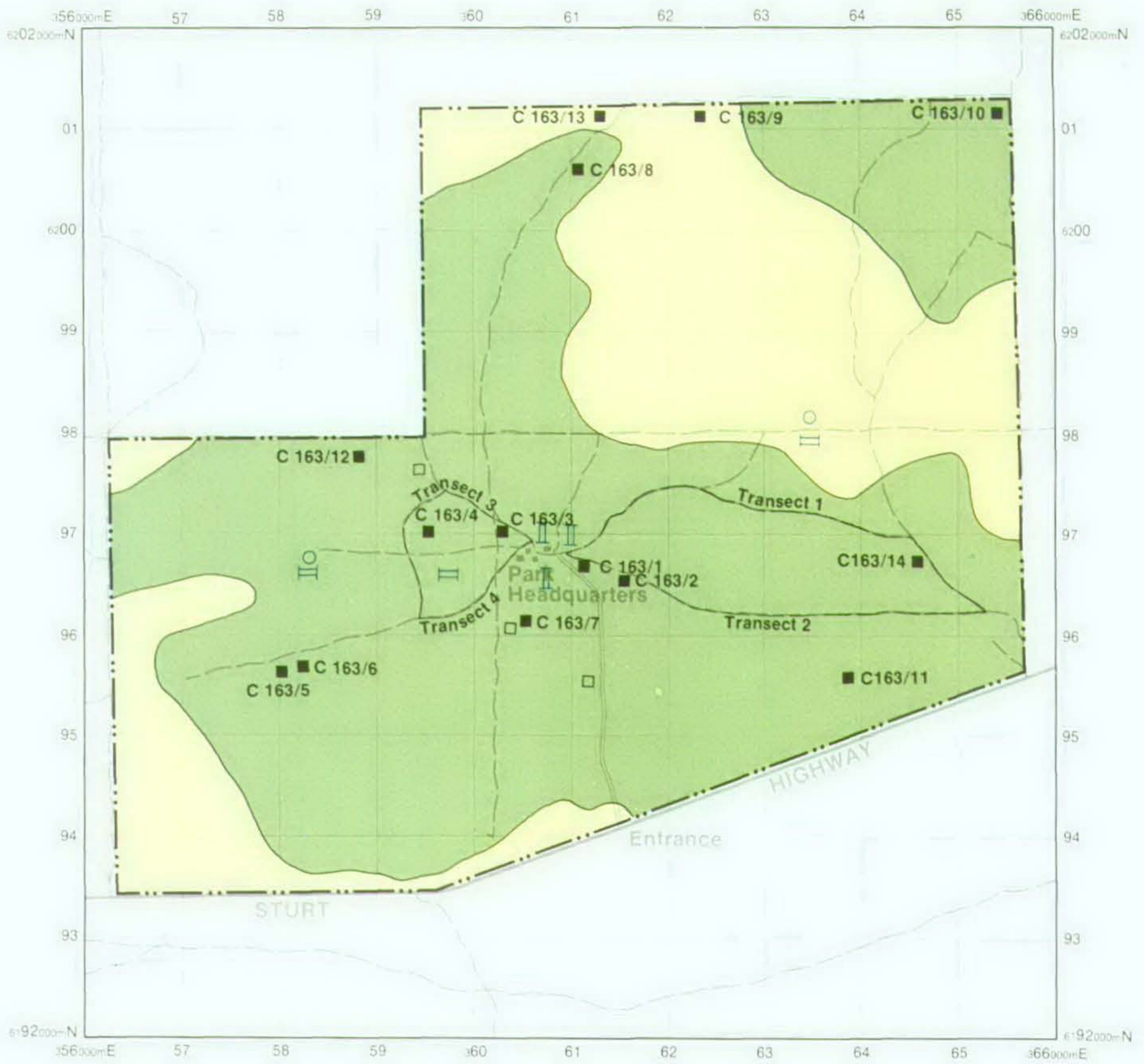
Breeding occurs only in years when food supply is good. Small young first appear in late November to January and leave the pouch after six to nine months, after which they may spend a further one to two months in the burrow before venturing out. The availability of food is important for successful reproduction: a breeding rate of 43 per cent on the conservation park was much higher than the rate of 10 per cent on a nearby sheep property for the same period. Therefore, competition with livestock is likely to influence the viability of wombat populations outside parks.

The behaviour and physiology of wombats is well adapted to semi-arid conditions. Water and energy are conserved by remaining underground during hot conditions. The activity of wombats is determined by the weather: they emerge in early evening during the cooler winter months, but not until after midnight during summer. Sometimes, if it is very hot, they may not emerge at all. Occasionally, during the winter months, wombats may be seen during the day basking in the sun. The role of this behaviour is unknown but it may possibly assist in conserving energy.

Southern Hairy-nosed Wombats survive on a diet low in protein. They conserve nutrients very well and, during drought, can tolerate a loss of body weight of at least 50 per cent before dying. Healthy adults can easily survive droughts exceeding thirteen months. During these times, they often have to move further from their warrens for food, travelling as far as 600 metres on pastoral properties.

Other Vertebrates

On the park, competition from Rabbits, Red Kangaroos (*Macropus rufus*) and Western Grey Kangaroos (*Macropus fuliginosus*) may pose problems for the



- Park Boundary - · - · -
- Sealed road —
- Unsealed road - - -
- Access and Walking Tracks - · - · -
- Tank ○
- Trough ⌌
- Photopoints C 163/6 ■
- Wombat trapping areas □
- Vertebrate transect counts —
- Open scrub □ (yellow)
- Low-woodland/ tall shrubland □ (green)

Figure 7

**Brookfield C.P.
Biological Information**

0 1 2 3 4 km

future management of the wombat population. The regular transect counts maintained by the ranger have shown a steady increase in kangaroo numbers since the removal of sheep. Part of this increase could be due to the reserve being treated as a refuge by the kangaroos. Close monitoring of the populations of these herbivores will be needed to ensure that proper management decisions can be made. Research also needs to be undertaken to determine the extent to which kangaroos and wombats compete.

A number of small mammals and reptiles have been recorded from the park and are listed in the sections on Amphibians, Reptiles and Mammals in the Appendices. The amphibians of the area remain imperfectly known.

The bird life of the park has been extensively studied by John Eckert and by Neville Forde and his students of the Adelaide College of the Arts and Education. Most of this work has concentrated on the ecology of honeyeaters and is incomplete. A list of birds is given in the section on Birds in the Appendices. The mallee scrub is particularly interesting because many of the older trees afford nesting hollows for numerous Australian Owlet-nightjars as well as habitat for honeyeaters, thornbills and other birds.

Research

In addition, the park has provided a valuable resource for other research work; these are listed, along with the above-mentioned projects, in section on Research Projects Undertaken in Brookfield Conservation Park in the Appendices.

APPENDICES

PLANTS

The following list of plants recorded at Brookfield Conservation Park was compiled from information supplied by Mr J. Z. Weber of the State Herbarium of South Australia, Mr P. Lehmann and the Nature Conservation Society of South Australia.

Introduced species are prefixed with an asterisk.

AIZOACEAE

Tetragonia eremaea

AMARANTHACEAE

Ptilotus spathulatus

APIACEAE (= UMBELLIFERAE)

**Bupleurum semicompositum*
Daucus glochidiatus Native Carrot

ASTERACEAE (= COMPOSITAE)

Angianthus preissianus
Angianthus strictus
Angianthus tomentosus
**Arctotheca calendula* Cape Weed, Cape Dandelion
Athrixia athrixoides
Brachyscome ciliaris
Brachyscome lineariloba
Calotis hispidula
Centipeda minima Sneeze Weed
Centipeda thespidioides Sneeze Weed
**Chondrilla juncea* Skeleton Weed
Crepis sp.
Elachanthus pusillus
Gnaphalium lutioalbum
Gnephosis skirrophora
Helichrysum leucopsidium Everlasting
Helipterum jessenii Everlasting
Helipterum pygmaeum Everlasting
Isoetopsis graminifolia
Leptorhynchus tetrachaetum
Minuria leptophylla
Olearia muelleri
**Onopordum acaulon* Stemless Onopordon
Picnomon acarna Soldier Thistle
Reichardia tingitata
Senecio lautus Variable Groundsel

<i>Senecio quadridentatus</i>	Cotton Fireweed
* <i>Sonchus asper</i>	Prickly Sow-thistle
<i>Vittadinia cuneata</i>	
<i>Vittadinia megacephala</i>	
<i>Vittadinia triloba</i>	
BORAGINACEAE	
* <i>Echium lycopsis</i>	Salvation Jane
<i>Halgania lavandulacaea</i>	Smooth Halgania
<i>Omphalolappula concava</i>	
BRASSICACEAE (= CRUCIFERAE)	
* <i>Carichtera annua</i>	Ward's Weed
* <i>Sisymbrium erysimoides</i>	
* <i>Sisymbrium irio</i>	London Rocket
* <i>Sisymbrium orientale</i>	Wild Mustard
<i>Stenopetalum lineare</i>	
CAMPANULACEAE	
<i>Wahlenbergia communis</i>	Blue Bell
CARYOPHYLLACEAE	
* <i>Herniaria hirsuta</i>	Rupture Wort
* <i>Silene apetala</i>	
* <i>Spergularia diandra</i>	Sandspurry
CASUARINACEAE	
<i>Casuarina cristata</i>	Black Oak
CHENOPODIACEAE	
<i>Atriplex acutibractea</i>	Saltbush
<i>Atriplex nummularia</i>	Old Man Saltbush
<i>Atriplex suberecta</i>	Saltbush
<i>Atriplex vesicaria</i>	Bladder Saltbush
<i>Chenopodium cristatum</i>	Crested Goosefoot
* <i>Chenopodium murale</i>	Nettle-leaved Goosefoot
<i>Enchylaena tomentosa</i>	Ruby Saltbush
<i>Maireana brevifolia</i>	Bluebush
<i>Maireana enchylaenoides</i>	Bluebush
<i>Maireana excavata</i>	Bluebush
<i>Maireana pentatropis</i>	Bluebush
<i>Maireana radiata</i>	Bluebush
<i>Maireana sedifolia</i>	Bluebush
<i>Rhagodia parabolica</i>	Old Man Saltbush
<i>Rhagodia spinescens</i> var. <i>deltophylla</i>	
<i>Rhagodia spinescens</i> var. <i>spinescens</i>	
<i>Salsola kali</i>	Roly Poly Bush, Buckbush, Prickly Saltwort
<i>Sclerolaena discantha</i>	Bindyi
<i>Sclerolaena paradoxa</i>	Bindyi
<i>Sclerolaena paratelluspis</i>	Bindyi
<i>Sclerolaena patentiuspis</i>	Bindyi
<i>Sclerolaena sclerolaenoides</i>	Bindyi
CONVULVULACEAE	
<i>Convolvulus erubescens</i>	
CRASSULACEAE	
<i>Crassula colorata</i>	
<i>Crassula pedicelloso</i>	
EUPHORBIACEAE	
<i>Euphorbia drummondii</i>	Caustic Weed, Milkweed, Spurge
GERANIACEAE	
<i>Erodium cicutarium</i>	Heron's Bill
<i>Erodium cygnorum</i> var. <i>cygnorum</i>	Heron's Bill
GOODENIACEAE	
<i>Goodenia pusilliflora</i>	
<i>Velleia paradoxa</i>	
IRIDACEAE	
* <i>Romulea longifolia</i>	Onion Weed
LAMIACEAE	
* <i>Ajuga iva</i>	
* <i>Marrubium vulgare</i>	Horehound
<i>Prostanthera baxteri</i>	
* <i>Salvia lanigera</i>	Sage, Salvia
<i>Teucrium racemosum</i>	
<i>Westringia rigida</i>	
LEGUMINOSAE	
* <i>Astragalus hamosus</i>	
<i>Cassia nemophila</i> var. <i>coriacea</i>	Desert Cassia
<i>Cassia nemophila</i> var. <i>nemophila</i>	Desert Cassia
<i>Cassia nemophila</i> var. <i>platypoda</i>	Desert Cassia
<i>Eutaxia microphylla</i>	Desert Cassia
* <i>Medicago minima</i> var. <i>brevispina</i>	Medic
* <i>Medicago polymorpha</i> var. <i>vulgaris</i>	Medic

LILIACEAE	
<i>Anguillaria dioica</i>	Early Nancy
LORANTHACEAE	
<i>Amyema miquelii</i>	
<i>Amyema preissii</i>	
<i>Lysiana exocarpi</i>	
LYTHRACEAE	
<i>Lythrum hyssopifolia</i>	Lesser Loose Strife
MALVACEAE	
* <i>Malva verticillata</i>	
<i>Selenothamnus squamatus</i>	
<i>Sida cardiophylla</i>	
MIMOSACEAE	
<i>Acacia colletioides</i>	Wait-a-while
<i>Acacia ligulata</i>	Umbrella Bush
<i>Acacia oswaldii</i>	Umbrella Wattle
MYOPORACEAE	
<i>Eremophila glabra</i>	Tar Bush
<i>Eremophila scoparia</i>	
<i>Myoporum montanum</i>	Native Myrtle
<i>Myoporum platycarpum</i>	Sugarwood, False Sandalwood
MYRTACEAE	
<i>Eucalyptus dumosa</i>	White Mallee
<i>Eucalyptus foecunda</i>	Slender-leaved Mallee
<i>Eucalyptus gracilis</i>	Yorrell
<i>Eucalyptus porosa</i>	Mallee Box
<i>Eucalyptus socialis</i>	Red Mallee
<i>Eucalyptus viridis</i>	Green Mallee
<i>Melaleuca acuminata</i>	
<i>Melaleuca lanceolata</i>	Dryland Tea-tree
OXALIDACEAE	
<i>Oxalis corniculata</i>	Wood Sorrel
PITTIOSPORACEAE	
<i>Bursaria spinosa</i>	Native Box, Christmas Bush, Australian Blackthorn
<i>Pittosporum phylliraeoides</i>	Native Apricot, Native Willow
PLANTAGINACEAE	
<i>Plantago drummondii</i>	Plantain
POACEAE	
* <i>Bromus rubens</i>	Red Brome
<i>Danthonia auriculata</i>	Lobed Wallaby-grass
<i>Danthonia caespitosa</i>	Common Wallaby-grass
* <i>Hordeum leporinum</i>	Barley Grass
* <i>Lophochloa cristata</i>	Animal Cat's Tail
* <i>Lophochloa pumila</i>	Tiny Bristle-grass
* <i>Schismus barbatus</i>	Arabian Grass, Kelch Grass
<i>Stipa drummondii</i>	Cottony Spear-grass
<i>Stipa nitida</i>	Balcarra Grass, Spear-grass
<i>Stipa platychaeta</i>	Flat-awned Spear-grass
<i>Triodia irritans</i>	Porcupine Grass
PORTULACACEAE	
<i>Calandrinia eremaea</i>	
RESEDACEAE	
* <i>Reseda lutea</i>	Cut-leaved Mignonette
RUTACEAE	
<i>Geijera linearifolia</i>	Oil Bush, Sheep Bush
SANTALACEAE	
<i>Exocarpos syrticola</i>	
SAPINDACEAE	
<i>Dodonaea attenuata</i>	
<i>Heterodendrum oleaefolium</i>	Bullock Bush
SOLANACEAE	
<i>Lycium australe</i>	Australian Boxthorn
* <i>Nicotiana glauca</i>	Tobacco Tree
<i>Nicotiana velutina</i>	
<i>Solanum coactiliferum</i>	
<i>Solanum nigrum</i>	Black Nightshade
VERBENACEAE	
<i>Verbena officinalis</i>	Common Vervain
ZYGOPHYLLACEAE	
<i>Zygophyllum apiculatum</i>	
<i>Zygophyllum aurantiacum</i>	Gull Weed
<i>Zygophyllum ovatum</i>	

AMPHIBIANS AND REPTILES

The following list of amphibians and reptiles recorded in Brookfield Conservation Park was compiled from information contained in the Brookfield Zoo Wombat Reserve Progress Reports (BZWR Committee of Management 1972, 1973, 1976 and 1979) and data collected by Messrs T. and P. Morley, J. S. Popper and M. Thompson.

Taxonomy follows that of Cogger (1975); amendments as given in Cogger (1979) cannot be made because specimens have usually not been taken.

AMPHIBIANS

<i>Limnodynastes tasmaniensis</i>	Marbled Frog
<i>Litoria peroni</i>	Peroni's Tree Frog
<i>Neobatrachus pictus</i>	Desert Burrowing Frog

REPTILES

<i>Amphibolurus barbartus</i>	Bearded Dragon, Jew Lizard
<i>A. fordi</i>	Mallee Dragon
<i>A. nobbi coggeri</i>	Mallee Tree Dragon
<i>A. nobbi</i>	Nobbi
<i>A. pictus</i>	Painted Dragon
<i>A. vitticeps</i>	Central Bearded Dragon
<i>Cryptoblepharus plagiocephalus</i>	Snake Eyed Skink
<i>Ctenotus atlas</i>	Striped Skink
<i>C. schomburgkii</i>	Striped Skink
<i>C. uber orientalis</i>	Striped Skink
<i>Demansia psammophis</i>	Yellow-Faced Whip Snake
<i>Diplodactylus intermedius</i>	Eastern Spiny-Tailed Gecko
<i>D. vittatus</i>	Wood Gecko
<i>Egernia inornata</i>	Desert Skink
<i>E. striolata</i>	Tree Skink
<i>Gehyra variegata</i>	Tree Drella, Variegated Gecko
<i>Hemiergis decresiensis</i>	Three Fold Skink
<i>H. peronii</i>	Four Toed Skink
<i>Heteronotia binoei</i>	Bynoe's Gecko
<i>Lerista bipes</i>	
<i>L. frosti</i>	
<i>L. muelleri</i>	
<i>Lialis burtonis</i>	Burton's Snake-Lizard
<i>Morethia adelaidensis</i>	
<i>M. boulengeri</i>	
<i>M. obscura</i>	(R17828, R17829 AB)
<i>Phyllodactylus marmoratus</i>	Marbled Gecko
<i>Phyllurus millii</i>	Thick-Tailed Gecko
<i>Pseudonaja nuchalis</i>	Western Brown Snake, Gwardar
<i>P. textilis</i>	Eastern Brown Snake
<i>Sphenomorphus richardsoni</i>	Broad-Banded Sand Swimmer
<i>Trachydosaurus rugosus</i> (= <i>Tiliqua rugosa</i>)	Sleepy Lizard, Shingleback
<i>Tympanocryptis lineata</i>	Striped Earless Dragon
<i>Typhlina australis</i>	Australian Blind Snake
<i>Underwoodisaurus millii</i>	Thick-Tailed Gecko
<i>Unechis brevicaudus</i>	Mitchell's Short-Tailed Snake
<i>Varanus gouldii</i>	Gould's Goanna, Sand Monitor

BIRDS

The following list of birds recorded in Brookfield Conservation Park was compiled from information collected by Mr J. Eckert and Mr N. Forde.

The order of species and scientific nomenclature follows that of Condon (1975) and Schodde (1975) with amendments and vernacular nomenclature following that of the Royal Australian Ornithologists Union (1978).

Introduced species are marked with an asterisk.

<i>Acanthagenys rufogularis</i>	Spiny-cheeked Honeyeater
<i>Acanthiza chrysorrhoa</i>	Yellow-rumped Thornbill
<i>Acanthiza uropygialis</i>	Chestnut-rumped Thornbill
<i>Aegotheles cristatus</i>	Australian Owllet-nightjar
<i>Anas gibberifrons</i>	Grey Teal
<i>Anthochaera carunculata</i>	Red Wattlebird
<i>Anthus novaeseelandiae</i>	Richard's Pipit
<i>Aphelocephala leucopsis</i>	Southern Whiteface
<i>Aquila audax</i>	Wedge-tailed Eagle

Birds (Cont.)

Ardea novaehollandiae
Ardea pacifica
Artamus cinereus
Artamus cyanopterus
Artamus personatus
Artamus superciliosus
Barnardius barnardi
Biziura lobata
Burhinus magnirostris
Cacatua galerita
Cacatua roseicapilla
Caprimulgus guttatus
Cecropis nigricans
Charadrius melanops
Chenonetta jubata
Chrysococcyx basalis
Cinclorhynchus cruralis
Cinclorhynchus mathewsi
Cinclosoma castanotum
Climacteris picumnus
Colluricincla harmonica
Coracina maxima
Coracina novaehollandiae
Corcorax melanorhynchus
Corvus coronoides
Corvus mellori
Coturnix novaezealandiae
Cracticus torquatus
Daphoenositta chrysoptera
Dicaeum hirundinaceum
Dromaius novaehollandiae
Drymodes brunneopygia
Elanus notatus
Ephianura albifrons
Falco berigora
Falco cenchroides
Gallinula ventralis
Glossopsitta porphyrocephala
Grallina cyanoleuca
Gymnorhina tibicen
Halcyon pyrrhophygia
Hieraaetus morphnoides
Hirundo neoxena
Lalage sueurii
Lichenostomus leucotis
Lichenostomus ornatus
Lichenostomus virescens
Malurus lamberti
Malurus splendens
Manorina flavigula
Melithreptus brevirostris
Melithreptus lunatus
Melanodryas cucullata
Melopsittacus undulatus
Merops ornatus
Microeca leucophaea
Myiagra inquieta
Ninox novaeseelandiae
Nymphicus hollandicus
Ocyphaps lophotes
Oreoica gutturalis
Pachycephala inornata
Pachycephala rufiventris
Pardalotus striatus
Pardalotus xanthopygus
**Passer domesticus*
Petroica goodenovii
Phaps chalcoptera
Phylidonyris albifrons
Phylidonyris melanops
Phylidonyris novaehollandiae
Plectorhyncha lanceolata
Poephila guttata
Poliiocephalus poliocephalus
Pomatostomus ruficeps
Pomatostomus superciliosus
Psephotus haematonotus
Psephotus varius
Rhipidura fuliginosa
Rhipidura leucophrys
Sericornis cautus
Sericornis brevirostris
Strepera versicolor
**Sturnus vulgaris*
Tachybaptus novaehollandiae
Tadorna tadornoides
Turnix varia
Turnix velox
Tyto alba
Vanellus tricolor
Zosterops lateralis

White-faced Heron
Pacific Heron
Black-faced Woodswallow
Dusky Woodswallow
Masked Woodswallow
White-browed Woodswallow
Mallee Ringneck
Musk Duck
Bush Thick-knee
Sulphur-crested Cockatoo
Galah
Spotted Nightjar
Tree Martin
Black-fronted Plover
Maned Duck
Horsfield's Bronze-Cuckoo
Brown Songlark
Rufous Songlark
Chestnut Quail-thrush
Brown Treecreeper
Grey Shrike-thrush
Ground Cuckoo-shrike
Black-faced Cuckoo-shrike
White-winged Chough
Australian Raven
Little Raven
Stubble Quail
Grey Butcherbird
Varied Sittella
Mistletoebird
Emu
Southern Scrub-robin
Black-shouldered Kite
White-fronted Chat
Brown Falcon
Australian Kestrel
Black-tailed Native-hen
Purple-crowned Lorikeet
Australian Magpie-lark
Australian Magpie
Red-backed Kingfisher
Little Eagle
Welcome Swallow
White-winged Triller
White-eared Honeyeater
Yellow-plumed Honeyeater
Singing Honeyeater
Variegated Fairy-wren
Splended Fairy-wren
Yellow-throated Miner
Brown-headed Honeyeater
White-naped Honeyeater
Hooded Robin
Budgerigar
Rainbow Bee-eater
Jacky Winter
Restless Flycatcher
Southern Boobook
Cockatiel
Crested Pigeon
Crested Bellbird
Gilbert's Whistler
Rufous Whistler
Striated Pardalote
Yellow-rumped Pardalote
House Sparrow
Red-capped Robin
Common Bronzewing
White-fronted Honeyeater
Tawny-crowned Honeyeater
New Holland Honeyeater
Striped Honeyeater
Zebra Finch
Hoary-headed Grebe
Chestnut-crowned Babbler
White-browed Babbler
Red-rumped Parrot
Mulga Parrot
Grey Fantail
Willie Wagtail
Shy Hylacola
Weebill
Grey Currawong
Common Starling
Australian Grebe
Australian Shelduck
Painted Button-quail
Little Button-quail
Barn Owl
Banded Lapwing
Silvereye

MAMMALS

The following list of mammals recorded from Brookfield Conservation Park was compiled from information contained in the Brookfield Zoo Wombat Reserve Progress Reports (BZWR Committee of Management 1972, 1973, 1976 and 1979)

Goats and Sheep are now only observed as strays and are not normally present in the park.

Registration numbers of specimens lodged with the South Australian Museum are given after each species.

Introduced species are prefixed with an asterisk.

<i>*Capra hircus</i>	Goat
<i>Chalinolobus gouldii</i>	Gould's Wattled Bat (M9172 to 9189 inclusive.)
<i>*Felis catus</i>	Domestic Cat.
<i>Lasiorchinus latifrons</i>	Southern Hairy-nosed Wombat (M8663.)
<i>Macropus fuliginosus</i>	Western Grey Kangaroo
<i>Macropus rufus</i>	Red Kangaroo
<i>*Mus musculus</i>	House Mouse (M10141, M10142, M10177, M10178, M10179, M10180.)
<i>Nyctophilus geoffroyi</i>	Lesser Long-eared Bat (M9169, M9170, M9171.)
<i>*Oryctolagus cuniculus</i>	European Rabbit
<i>*Ovis aries</i>	Sheep
<i>Sminthopsis crassicaudata</i>	Fat-tailed Dunnart (M7617, M9643.)
<i>Tachyglossus aculeatus</i>	Short-beaked Echidna
<i>Tadaria australis</i>	White-tailed Mastiff-bat (M9166, M9167.)
<i>Tadaria planiceps</i>	Fiat-headed Mastiff-bat (M9168.)
<i>Trichosurus vulpecula</i>	Common Brushtail Possum
<i>*Vulpes vulpes</i>	Fox

RESEARCH PROJECTS UNDERTAKEN IN BROOKFIELD CONSERVATION PARK

WOMBAT RESEARCH

Dr R. T. Wells has investigated the physiological and behavioural adaptations of the Southern Hairy-nosed Wombat. Mr M. D. Gaughwin has continued with this work, providing information about the reproductive and behavioural aspects of the biology of the wombat. Publications and theses resulting from this research are listed in the references.

BOTANICAL RESEARCH

Apart from the initial list compiled by the State Herbarium of South Australia (see Appendices: Plants), the only major botanical work has been undertaken by Mr P. Lehmann. His studies have concentrated on mapping the flora of the park using influence analysis, examining the environmental variables that might determine the germination and growth of selected plants, and investigating the effects of grazing by wombats on the vegetation around their warrens.

ORNITHOLOGICAL RESEARCH

Mr N. Forde of the Adelaide College of Advanced Education has been studying how honeyeaters compete for and partition food resources. This work involves capturing, banding and releasing birds and collecting and analysing faeces.

INVERTEBRATE RESEARCH

A project to which Brookfield Conservation Park was readily suited has been carried out by Dr R. Laughlin of the Waite Agricultural Research Institute. He used a portion of the park to investigate the dispersal and flight behaviour of the Dried-fruit Beetle (*Carpophilus hemipterus*).

INVESTIGATIONS BY UNDERGRADUATE STUDENTS

A portion of the park is used by students of the Adelaide College of the Arts and Education and of the Flinders University of South Australia for field studies of terrestrial ecology. The most commonly attempted projects include description of vegetation formations and surveys of vertebrate fauna. The area seems to be an excellent educational resource, offering opportunities for arid zone field studies in close proximity to Adelaide.

RESOURCE MATERIALS AND REFERENCES

MAPS

- 1:50 000 Topographic Sandleton 6729 II and Blanchetown 6829 III (South Australian Department of Lands unpublished 1978)
- 1 inch—2 miles Cadastral Plan County Eyre (South Australian Department of Lands 1967)
- 1 inch—40 chains Cadastral Plan County Eyre (South Australian Department of Lands 1967)
- 1 inch—40 chains Cadastral Plan Hundred Skurray (South Australian Department of Lands)
- Survey Diagram Book: Hundred of Skurray (South Australian Department of Lands, Central Plan Office)
- 1:250 000 Geological Series Adelaide and Renmark.
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AERIAL PHOTOGRAPHS

- South Australian Department of Lands River Murray (1972) 1:40 000 Survey 1407 Nos. 154, 156, 157.

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- DE 1322/77 Brookfield Conservation Park, water supply
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A number of people readily volunteered valuable background information for this management plan.

Dr R. T. Wells and Messrs M. D. Gaughwin and P. Lehmann are thanked for allowing access to published and unpublished data about the biology of the Southern Hairy-nosed Wombat. Mr N. Forde offered information on the avifauna and Dr G. Kirby allowed access to information gathered by his and Dr Wells' students.

Thanks must go to the following people who provided and corroborated the historical information: Mr R. Edson, Mr R. Dorward, Mr J. Lindo, Mr E. M. Esau, Mr L. B. Power and Mr L. Holds. In addition Mr W. Marchant of the South Australian Department of Lands and Mrs J. Chilman gave valuable assistance.

Ms Penny Ruddock conducted the historical research and Mr Leon Barmuta the biological research embodied in Part 1 of this plan.

PART 2:

MANAGEMENT OBJECTIVES

INTRODUCTION

The following objectives for the management of Brookfield Conservation Park are designed to serve as a rigorous guide to the uses and developments permitted within the park. All park management should be constrained within the limits of these objectives. This section has been formally adopted by the Minister of Environment and Planning under the provisions of Section 38 of the *National Parks and Wildlife Act 1972-1981*.

ZONING

To zone the various habitats and features of Brookfield Conservation Park to ensure the conservation, in perpetuity, of the population of Southern Hairy-nosed Wombats within the park, and to ensure the conservation of the natural environment of the park.

SOUTHERN HAIRY-NOSED WOMBATS

To maintain monitoring programmes of the population of Southern Hairy-nosed Wombats to ensure their continued survival.

RESEARCH

1. To set up and maintain a scientific advisory committee which should co-ordinate research and educational projects undertaken on the park as well as administer funds for such projects.
2. To refer to the Programmes Branch of the National Parks and Wildlife Service results of such research which it deems pertinent to the management of the reserve.

FACILITIES FOR VISITORS

To regulate the numbers and activities of visitors so as to minimise their impact on the park.

PLANT AND VERTEBRATE PESTS

To control, where possible, pest plants and any other introduced species of plants and animals.

NATIVE FLORA AND FAUNA

To monitor and, if necessary, actively manage native animals and plants so as to ensure the survival of a healthy population of Southern Hairy-nosed Wombats in the park.

FIRE

To ensure that provision is made to control all fires.

INFORMATION FOR VISITORS

To provide basic information for visitors.

HISTORIC RELICS

To ensure the preservation of the historic relics and other features associated with the area now occupied by the park.

ROADS AND TRACKS

To upgrade, close or alter existing roads and tracks to facilitate management of the park.

FENCING

1. To prevent the entry of straying stock.
2. To rationalise internal fencing to facilitate management of the park.

BEE SITES

To grant bee licences, subject to established National Parks and Wildlife Service policy, provided such activities do not conflict with other management objectives.

ADDITIONAL LAND

To rationalise park boundaries, to increase conservation values and to facilitate management by acquiring suitable additional land.

STAFFING

To ensure that staff levels are adequate to properly maintain and develop the park and to ensure the proper management of wildlife in the surrounding district.

PART 3

IMPLEMENTATION OF MANAGEMENT OBJECTIVES

ZONING

To zone the various habitats and features of Brookfield Conservation Park to ensure the conservation, in perpetuity, of the population of Southern Hairy-nosed Wombats within the park, and to ensure the conservation of the natural environment of the park.

The primary purpose of Brookfield Conservation Park is the conservation of the Southern Hairy-nosed Wombat. To facilitate this purpose the park should be divided into three zones; "Restricted Access", "Natural Area" and "Development" (Figure 8).

In the Restricted Access Zone, only National Parks and Wildlife Service staff and those engaged in legitimate scientific research or other activities approved by the Director of the National Parks and Wildlife Service should be permitted entry. The borders of this zone should be regarded as flexible as particular research projects may extend out of the area and may also need to exclude casual visitors.

Casual visitors should generally be allowed access to the Natural Area Zone but vehicles should be restricted to existing tracks.

In the Development Zones, which encompass the park headquarters and the proposed picnic and barbecue area, some disruption of the natural environment should be permitted in the interest of efficient park management.

SOUTHERN HAIRY-NOSED WOMBATS

To maintain monitoring programmes of the population of Southern Hairy-nosed Wombats to ensure their continued survival.

Since 1973, monthly transect counts have been used to monitor changes in wombat numbers (see Figure 7). There appears to have been a steady increase since that time. Although the results obtained from this method often show strong seasonal fluctuations, transect counting, when interpreted together with trapping results, gives a reliable estimate of long-term changes in the wombat population (Wells 1978). Transect counting should, therefore, continue to form part of the duties of the ranger-in-charge.

The two studies carried out on wombats on the park since 1971 have resulted in the establishment of a marked population of known-age animals. Wombats appear to be quite long-lived, as some individuals marked as adults in 1971 were still alive in 1978. To ensure continuity of this valuable data resource, the ranger-in-charge should continue to trap, mark and measure wombats using the trapping points established in the above studies. Trapping, for a period of one week, four times per year in spring, summer, autumn and winter, should be adequate. As an alternative to the metal ear-tags used in the past, tattooing of distinctive ear symbols should be investigated.

Wombats appear to favour the low woodland areas of the park, preferentially grazing on Spear-grass. Considerable regeneration of False Sandalwood occurred in the high rainfall years of 1973-1974, and in

the absence of sheep grazing, this could lead to a significant alteration in wombat habitat through reduction of grassland areas. In addition, kangaroo and rabbit populations have increased over the same period. These animals may compete with wombats for food. The long-term effects of all these interactions are at present unknown, but continued research may point to the need for active manipulation of the vegetation and animal populations to maintain optimum wombat habitat

RESEARCH

1. To set up and maintain a scientific advisory committee which should co-ordinate research and educational projects undertaken on the park as well as administer funds for such projects.

2. To refer to the Programmes Branch of the National Parks and Wildlife Service results of such research which it deems pertinent to the management of the reserve.

In accordance with the conditions of gifting the reserve to the South Australian Government, a small scientific advisory committee including a nominee of the Chicago Zoological Society, a representative of the Programmes Branch of the National Parks and Wildlife Service and the Regional Superintendent (Murraylands) of the National Parks and Wildlife Service, a secretary and two other scientists has been established. Members of this group may change from time to time. The main function of this committee should be to co-ordinate research and educational projects undertaken on the park and to refer to the Programmes Branch of the National Parks and Wildlife Service results of such research which it deems pertinent to the management of the reserve. The committee should also administer any surplus funds accumulated and solicit further funds from the Chicago Zoological Society and other sources for research on the park.

Since the dedication of this area as a Conservation Park all scientific research projects either current or proposed are subject to the provisions of the *National Parks and Wildlife Act 1972-1981* as it relates to the scientific research. Hence, all researchers are required to hold a current permit to undertake scientific research in a reserve and are required to submit a report on any such research to the National Parks and Wildlife Service for its records.

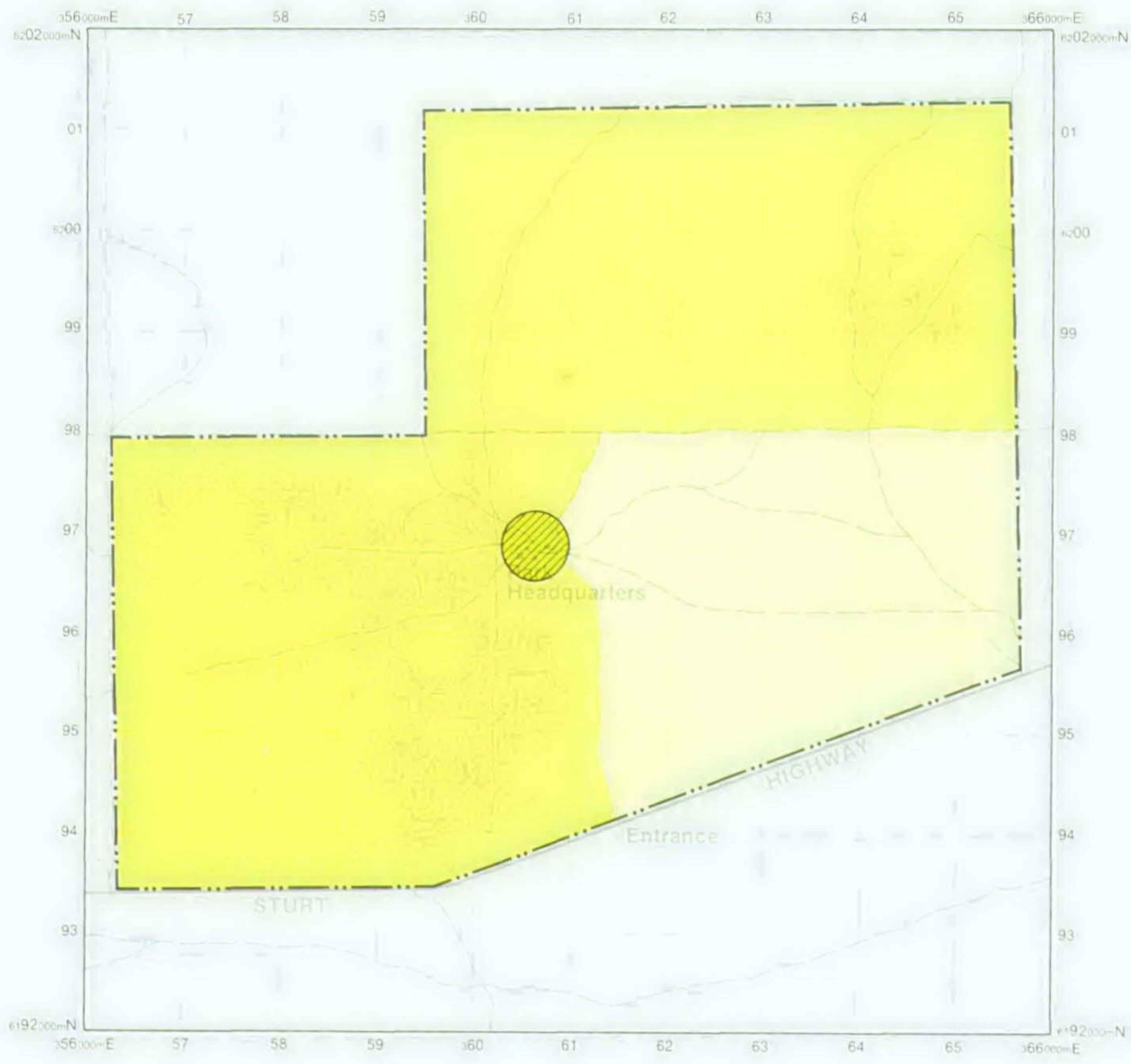
To be granted a scientific research permit, applicants must be associated with an approved research organisation or obtain written support from the appropriate curator in the museum in their State.

In the past, a number of universities and colleges of advanced education have utilised the reserve for student teaching. The National Parks and Wildlife Service, at present, should continue to encourage this form of activity. This is not considered, however, to constitute scientific research, but it is important that adequate controls are placed on such groups. In this regard the research advisory committee should examine and co-ordinate all proposals for teaching exercises.

FACILITIES FOR VISITORS

To regulate the numbers and activities of visitors so as to minimise their impact on the park.

To date, Brookfield Conservation Park has not been formally opened for general visitation. It was, however, the stated aim of the previous management committee



- Park Boundary
- Sealed road
- Unsealed road
- Access and Walking Tracks
- Development Zone
- Natural Area Zone
- Restricted Access Zone

Figure 8



Brookfield C.P. Zoning

to develop this aspect of the reserve. The dedication of the reserve as a Conservation Park under the *National Parks and Wildlife Act 1972-1981* brought the area into the State reserve network and hence available for visiting by the people of South Australia. The zoning of the park (Figure 8) will enable visitors to traverse a road through the "Blue Paddock" and provide them with an opportunity to see a variety of habitats and fauna, including wombats. There should be only one main entrance and consequently all visitors must pass near the ranger's residence. The Natural Area Zone is already fenced, but this requires some repair work. A barbecue and picnic area should be developed along the stretch of track shown on the plan—no fires should be permitted elsewhere in the park. Fixed barbecues, pit toilets and rubbish bins to cater for up to 100 visitors per day (approximately twenty car loads) should be provided. Once this number have entered the park as recorded by a traffic counter on the entrance road, the ranger should erect a "Park Full" sign to prevent further visitors entering. If visitor demand constantly exceeds the limit set for the park, it may be necessary to issue permits to visit the park through the booking clerk at Head Office in Adelaide.

Before any visiting is allowed to this park, the area must be adequately signposted to demarcate tracks, gates, etc., and a routed wood sign indicating the name of the park should be erected at the park entrance. Two standard information signs for conservation parks should be erected—one beside the entrance road and one in the picnic/barbecue area. Triangular boundary markers should be placed at strategic intervals around the park boundaries, while the larger triangular gate markers should be placed on all park gates.

The park will primarily cater for day trippers from Adelaide, and because of the distance involved, a lunch stop would be expected—hence the need for picnic/barbecue facilities.

Overnight camping, except by persons engaged in scientific research or teaching programmes, should not be permitted. As a rule, members of the general public should not be permitted to enter the Restricted Access Zone (Figure 8).

The ranger-in-charge should maintain a record of the numbers of visitors entering the park.

PLANT AND VERTEBRATE PESTS

To control, where possible, pest plants and any other introduced species of plants and animals.

The principal vertebrate pest on Brookfield Conservation Park is the rabbit. These animals pose an especially difficult control problem because they share the same warrens as wombats. Thus, any attempts at rabbit control could endanger wombats as well. Nonetheless, the National Parks and Wildlife Service has an obligation to control vertebrate pests. An acceptable rabbit control programme should be worked out with a possible avenue of approach being the design of a number of portable poisoning enclosures which would allow access for rabbits but exclude wombats. Any programme of rabbit control should be developed in close co-operation with the Vertebrate Pests Authority. Other pests such as Feral Cats, Goats and Foxes should be shot on sight by the ranger-in-charge.

In common with all land in this part of South Australia with a long history of heavy grazing, a number of species of pest plants have become established in the degraded natural vegetation. The removal of sheep in 1971 and the good seasons subsequent to that have resulted in a significant recovery of the native

vegetation on the park, with a consequent reduction in the weed problem. However, in the disturbed areas surrounding wombat warrens, a significant weed problem still exists. The main species include Horehound, Onion Weed, Salvation Jane, Skeleton Weed, Ward's Weed and Tobacco Tree. A weed control programme consisting largely of manual destruction has been, and should continue, to be an important part of the duties of the park staff. In addition, a comprehensive programme of pest plant control for the park should be developed in association with officers of the Pest Plants Commission and local Pests Plants Control Board.

Under special circumstances relating to research conducted at the park, or to a specific management aim, certain introduced species or certain areas of the park may be exempted from the general control practices.

NATIVE FLORA AND FAUNA

To monitor and, if necessary, actively manage native animals and plants so as to ensure the survival of a healthy population of Southern Hairy-nosed Wombats in the park.

As mentioned above, it is possible that regeneration of natural vegetation on the park may reduce the area of preferred wombat habitat. In the future, it may be necessary to actively manage areas of habitat for wombats. To this end the existing series of fourteen photopoints should continue to be photographed four times a year by the ranger-in-charge (Figure 7).

The transect counts already mentioned which have been conducted since 1973 to monitor changes in numbers of wombats, kangaroos and rabbits, should also continue to be an important part of the responsibilities of the ranger-in-charge. This involves the driving of a standard route at night and recording the numbers of animals seen in the beam of a spotlight. Evidence from these transect counts indicate that kangaroo numbers are increasing. If this trend continues, and as the reserve is being managed primarily for wombats, it may be necessary to cull a proportion of the kangaroo population. As destruction of native animals within the reserve is contrary to the principle under which the reserve was established, it should only be undertaken as a last resort when: (a) there is a consensus of scientific opinion that an animal population has developed an imbalance and there is no likelihood that natural events will restore the balance before the reserve suffers an irreversible loss of fauna and flora; (b) the methods used and the monitoring of results are based on a current and continuing scientific research programme; and (c) the destruction, monitoring and research are carried out by qualified personnel.

The Brookfield Conservation Park Scientific Advisory Committee should be consulted with regard to:

1. The determination of the conditions necessitating control.
2. The exact identification of the species and numbers for control.
3. Documentation of the reasons why this is advisable.
4. The extent, timing, location and method of that control.

FIRE

To ensure that provision is made to control all fires. Because of the nature of the vegetation on the park, wildfires have been an infrequent occurrence in the

past. However, the cessation of sheep grazing and the recent good seasons have resulted in vegetative growth that could possibly carry a fire. Fire control measures should therefore be taken and should include:

1. The maintenance of existing boundary access tracks and the internal track network. It is not necessary at this stage to establish any additional tracks on the park (Figure 2).
2. A drop-on fire unit for the ranger's truck should be available for immediate use.
3. Grass should be mown or slashed around the park headquarters.
4. Liaison should be maintained with the local Country Fire Service unit.
5. The present three tanks, six troughs and associated piping should continue to be maintained. These are all filled from a bore near the park headquarters (Figure 7).

INFORMATION FOR VISITORS

To provide basic information for visitors.

As the park is first and foremost an area for the conservation of the Hairy-nosed Wombat, it is important that potential visitors should be able to obtain up-to-date, interesting and attractively-produced information on the park. Suitable material should be produced to ensure that visitors are able to fully appreciate their visit. Information material should include pamphlets on wombats and on the historical charcoal burning ventures in the area. As mentioned above, adequate standardised signposting in the Natural Area Zone should also be part of this public education programme. The opportunity exists to develop a nature trail in the vicinity of the proposed picnic/barbecue area to further enhance the quality of a visit to the park.

HISTORIC RELICS

To ensure the preservation of the historic relics and other features associated with the area now occupied by the park.

As outlined in Part 1: History, the principal remaining items of cultural significance are remains of brush fencing, survey markers, the Glen Leslie homestead and the charcoal burning pits (Figure 6).

No active measures should be taken to demolish or remove these sites or relics without prior historic assessment and documentation. The sites of charcoal burning, in particular the hut and the brush fences, are prone to rapid deterioration. For this reason it is recommended that site survey and photographic documentation be made of these sites in the near future.

The Glen Leslie homestead has been extensively restored and renovated to act as a residence for the ranger-in-charge.

It is not possible to restore the remaining historical relics, however, attempts should be made to minimise deterioration wherever practicable. The charcoal burning pits are located in the Restricted Access Zone (Figures 6 and 8); visitors with a bona fide interest in these features should be allowed access after prior arrangement with the ranger-in-charge. It may ultimately be desirable to re-zone this area as Natural Area and promote and interpret this historical feature to the visiting public.

ROADS AND TRACKS

To upgrade, close or alter existing roads and tracks to facilitate management of the park.

As mentioned above, the existing track network within the park is considered to be adequate and should be maintained. No new tracks should be established at this stage. The main entrance road from the main highway to the park headquarters should be upgraded to a formed gravel road suitable for conventional vehicles.

The park is crossed by a number of public road reserves (Figure 6). It is normally the policy of the National Parks and Wildlife Service to formally close such road reserves under the *Roads (Opening and Closing) Act 1932-1946* and add them to the park, and thereby bring all land within park boundaries under the control of the one authority.

In this case it may not be possible to close all of the road reserves which cross the park as some of them may be required for through access. Ridley Council should be approached to determine future road requirements. Routes around the park rather than through it should be encouraged, and those road reserves which are not required and which pass through the park should be formally closed.

The central north-south road reserve, for example, should be formally closed as an alternative means of access is available outside the park.

The diagonal "coach" road should also be closed as there is now no readily discernible track on this alignment.

FENCING

1. **To prevent the entry of stray stock.**
2. **To rationalise internal fencing to facilitate management of the park.**

The present boundary fence is considered to be adequate at this stage to exclude stock from the park. However, it should be progressively replaced with standard park fencing. The eastern boundary faces an area of subdivision and should receive immediate attention, otherwise priority should be given to areas where wombats and kangaroos are causing problems to neighbouring landowners. As virtually the whole park boundary is contained within surveyed road reserves, it will be necessary for the National Parks and Wildlife Service to meet the entire cost of this fencing and its maintenance rather than reaching agreement with neighbours.

The present internal fence bounding the Natural Area Zone should be maintained, but other subdivisional fences should be progressively removed. Their position should be demarcated by leaving every third or fourth post. This will help explain effects of past grazing regimes on the native vegetation.

BEE SITES

To grant bee licences, subject to established National Parks and Wildlife Service policy, provided such activities do not conflict with other management objectives.

In line with the Service's policy on bee-keeping in parks, it is considered that the existing three bee licences should be continued. Attention has been drawn to the fact that bees compete with native insects for nectar and pollen and can consequently significantly change the native insect fauna. This, in turn, can result

in subtle but progressive shifts in plant populations. Research by academic institutions into the magnitude of these phenomena should be encouraged and the National Parks and Wildlife Service policy amended in the light of further findings.

ADDITIONAL LAND

To rationalise park boundaries, to increase conservation values and to facilitate management by acquiring suitable additional land.

Consideration should be given to the possibility of purchasing Section 133, Hundred of Skurray (1038 hectares) to the north-west of the existing park (Figure 6). This section was part of a fauna sanctuary until 1966 and contains mallee open scrub and some low woodland supporting a wombat population. It also contains a functional bore. Purchase of this section would square off the park boundaries, facilitate management and provide additional reserved wombat habitat in the Blanchetown area.

STAFFING

To ensure that staff levels are adequate to properly maintain and develop the park and to ensure the proper management of wildlife in the surrounding district.

Brookfield Conservation Park is one of several parks in the Brookfield District of the Murraylands Region of the National Parks and Wildlife Service. The parks managed by the one ranger located at Brookfield Conservation Park are: Brookfield, Ridley, Swan Reach, Roonka and Ngautngaut conservation parks. The District is also responsible for offpark wildlife management and law enforcement. For adequate management and development of the parks in the District, the equivalent of 2.7 full-time positions, consisting of two permanent rangers and a casual contract maintenance worker is required. The additional ranger, like the maintenance worker, need not be housed in the Brookfield Conservation Park but could be based at Blanchetown.

PART 4

SUMMARY OF MANAGEMENT PROPOSALS

As a guide to the orderly application of the provisions of this Management Plan for Brookfield Conservation Park, the foregoing management proposals are summarised and ranked. This ranking indicates the relative priority of projects and whether they are of a short-term or continuing nature. A distinction has been made between research and monitoring projects and those requiring funding for works and maintenance.

RESEARCH AND MONITORING

PROJECT	PRIORITY	DURATION	Page
Photopoints by ranger	High	Continuing	20
Transect counts of kangaroos rabbits and wombats by ranger	High	Continuing	20
Wombat trapping programme by ranger	High	Continuing	20,22
Evaluation of proposed research and teaching programmes by Scientific Advisory Committee	High	Continuing	20
Maintain a continuous record of visitor numbers	High	Continuing	22
Periodic estimate of active wombat warrens by the ranger	Moderate	Short	22
Biological inventory	Moderate	Continuing	22

WORKS AND MAINTENANCE

PROJECT	PRIORITY	DURATION	Page
Repair fence around Natural Area Zone	High	Short	23
Develop picnic and barbecue area	Moderate	Short	20
Prepare publicity material	High	Short	23
Maintain fire unit	High	Short	22,23
Maintain access tracks and clear around headquarters	Moderate	Continuing	23
Initiate road closing under Roads (Opening and Closing) Act	Moderate	Short	23
Replace and maintain boundary fences	Moderate	Continuing	23
Purchase additional land	High	Short	24
Control pest plants	Moderate	Continuing	22
Control vertebrate pests	Moderate	Continuing	22
Minimise deterioration of historic relics	Moderate	Continuing	23

BACKGROUND INFORMATION

DESCRIPTION OF THE AREA

LOCATION AND PHYSICAL FEATURES

Ridley Conservation Park is located on the western side of the Mannum-Swan Reach road, approximately 10 kilometres south of Swan Reach. It is a long narrow park, 10 kilometres by 0.4 kilometres, covering an area of 414.3 hectares and comprising the following sections: County Sturt, Hundred of Ridley: Sections 479, 480, 483; County Eyre, Hundred of Fisher: Section 144.

The park lies 90 kilometres north-east of Adelaide and is approximately 120 kilometres from Adelaide by road (Figures 1, 9 and 10).

The southern boundary of the park is on the edge of the valley of the River Marne. The highest point in the park known locally as Hayward's Hill occurs here, while the remainder of the park to the north comprises flat country typical of the limestone plains west of the River Murray (Figure 9).

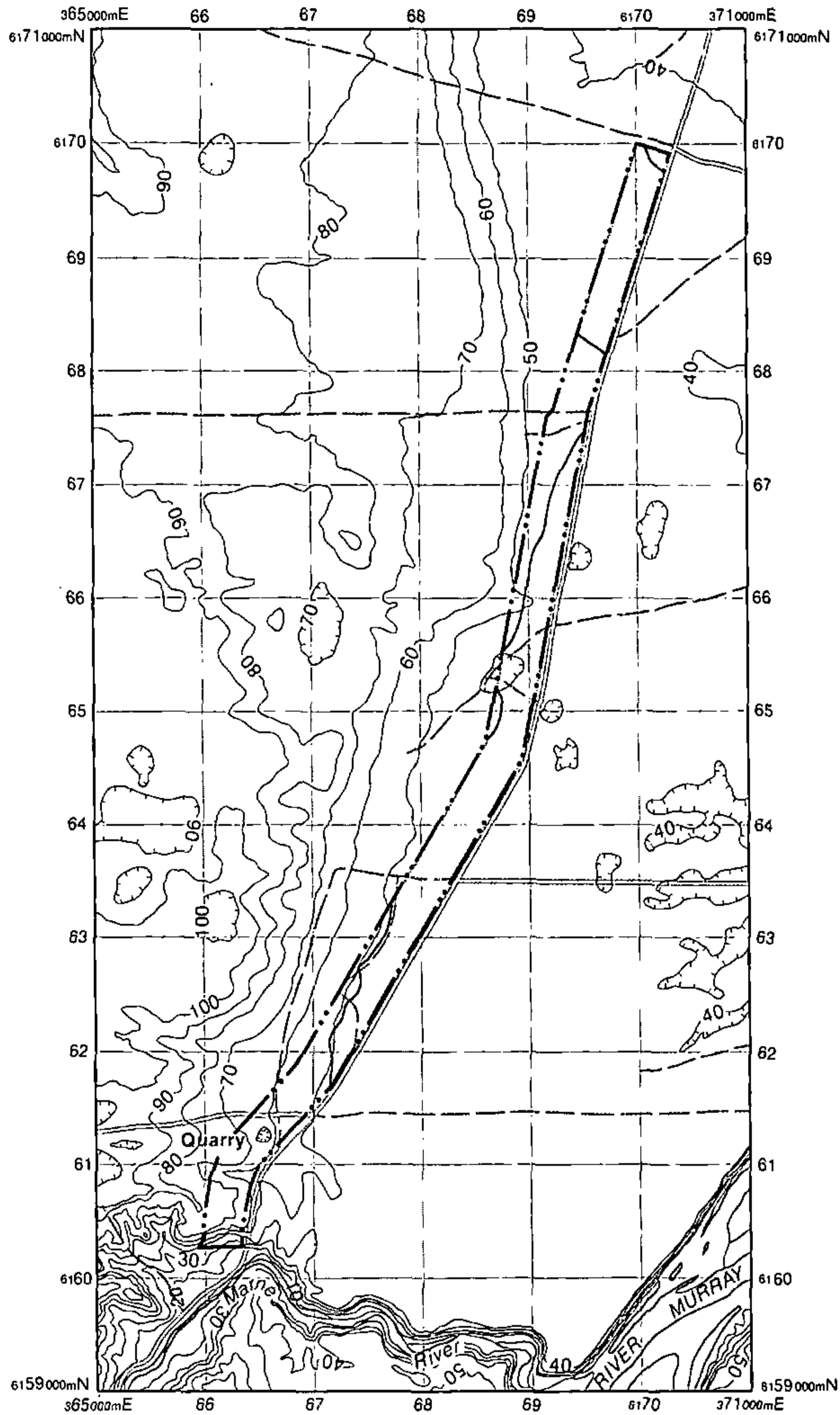
The park covers a transition zone in the natural vegetation just to the south of Goyder's Line between the mallee open scrub to the south and the semi-arid, low woodland to the north (Figure 9). The climate of Ridley Conservation Park is similar to Brookfield Conservation Park which is described in the preceding Management Plan for that park

HISTORY

TRAVELLING

In the early days of the colony, sheep and cattle were driven overland from New South Wales to stock the newly-developing pastoral industry in South Australia. The first stock to be transported to this State were overlanded by Joseph Hawdon in 1838. A year later in 1839, Edward John Eyre overlanded the first sheep to the colony, driving 1000 sheep on one occasion and later 600 cattle from New South Wales. The overlanders blazed their way through the scrub until they reached the River Murray; the river provided an obvious attraction to the overlanders who sheltered and watered their stock in a natural enclosure along the river near Blanchetown which became known as McBeans Pound. The Pound was a small area of land enclosed by the river and steep-sided cliffs and was accessible only by a small track. The practice of overlanding was not long-lived, however, becoming obsolete by the time Eyre left Moorunde in 1842. At this time stock numbers were increasing in the district with Occupational Licences issued to pastoralists in the 1840s, and from 1851 Pastoral Leases were in operation.

In the early 1860s when the Hundreds were proclaimed on the western plains of the River Murray, it was necessary to provide areas under the Crown for localised movement of stock and to give access to markets (Figure 11). Travelling Stock Reserves (TSR), usually of 20-chain (approximately 400 metres) width, were given fixed boundaries and often followed existing stock tracks as these were invariably cleared and

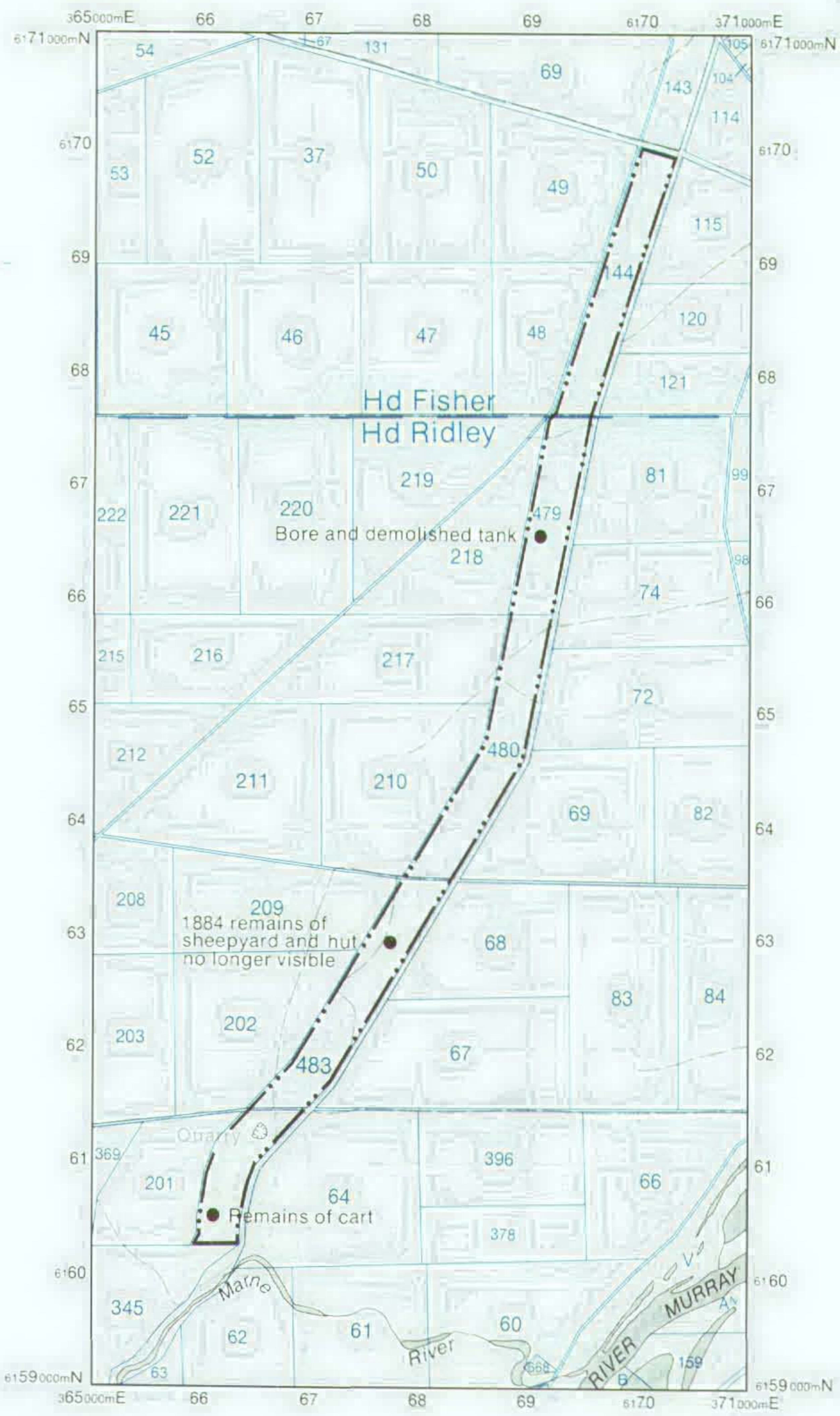


- Park Boundary** - - - - -
- Unsealed road** = = = = =
- Access and Walking Tracks** - · - · -
- Mallee- open scrub** []
- Low open- woodland** []

Figure 9

**Ridley C.P.
Topography and Vegetation**

0 1 2 3 4 km



Park Boundary - · - · -
Unsealed road ———
Access and Walking Tracks - - -



Figure 10
Ridley C.P.
Cadastral and Historical Information

grazed; for the same reason roads were often surveyed alongside Travelling Stock Reserves. Thus by confining stock movement to designated areas, there was minimal interference with surrounding properties and stock movement could be supervised by the Department of Lands Ranger.

Ridley Conservation Park, approximately 11 kilometres in length, was part of a Travelling Stock Reserve which ran for roughly 5-10 kilometres parallel to the River Murray. This reserve linked the stock market of Burra to the north with Murray Bridge to the south (Figure 11). A similar Travelling Stock Reserve ran north-south along the eastern foothills of the Mount Lofty Ranges, and a reserve which ran east-west from Black Hill linked the north-south Travelling Stock Reserves (Figure 11).

Many of the Travelling Stock Reserves within Hundreds linked with Travelling Stock Routes (Out of Hundreds) which provided for movement of stock from far-north pastoral properties to city markets (Figure II).

LAND ACQUISITION AND PARK DEDICATION

With the advent of mechanised transport, it was no longer necessary to move stock long distances "on the hoof". This trend contributed to the obsolescence of Travelling Stock Reserves throughout the State and increasingly there were moves to resume and allot these reserves to adjoining landowners. The TSR along the River Murray similarly became obsolete, most probably with the completion of the Morgan to Adelaide railway in 1878.

By 1901, local landholders had approached the Department of Lands, requesting that the Travelling Stock Reserve in the Hundreds of Ridley and Fisher be resumed and made open for allotment. Proposals to this effect went before Parliament in 1901 and 1907 but were not approved. In 1910, given the previous failure to resume the land from the Crown, farmers adjoining the reserve requested permission to erect fences and graze sheep on the TSR. It was claimed by the farmers that the disused reserve harboured vermin and tied up valuable grazing land. Subsequently, fences and roads were constructed across the reserve giving access to the properties to the west. The fences were constructed under the auspices of the local council but without the formal approval of the Department of Lands. No objection was raised to the fences remaining, however, but grazing on the reserve was not permitted.

In 1934, the District Council of Caurnamont contacted the Director of Lands requesting that the TSR be resumed for allotment. The council claimed that the reserve harboured vermin and was a drain on council funds. The year 1937 also saw further requests to use the reserve for grazing. The reserve was inspected in 1939 by the ranger of the Crown Lands Department. Inspector Klau reported that the TSR was used for camping and watering stock when feed was scarce in the districts to the north of the reserve. Since he felt sure that the reserve would be used for this purpose in the future he recommended that the area not be resumed.

In 1938, 1939 and 1940 there were several requests to cut wood in the reserve for charcoal burning. One proposal was to clear 28 hectares of the reserve north of Hayward's Hill. The ranger, echoing more modern conservation sentiments, described the reserve "as an asset to the State" and recommended that it be retained in its present uncleared condition (DL 4978/39). Further, there had been serious sand drifts and erosion in the district and the reserve was needed as a windbreak for the adjacent land.

In 1956 there were further requests to utilise the TSR and on this occasion Annual Licences were granted for only grazing purposes. From March 1957, Mr G. A. Roy, Mr L. G. Peters and Mr C. A. Rachow leased portions of the TSR adjacent to their properties (Figure 10). As shown below, the Department of Lands strictly regulated the number of stock that could be grazed by the lessees. Mr George Alan Roy leased 105 hectares abutting Sections 217 and 218, Hundred of Ridley; twenty-six sheep or three head of cattle could be agisted on the reserve for the annual rental of £2. Mr Carl Arthur Rachow leased 65 hectares abutting Section 210, Hundred of Ridley; sixteen sheep or two cattle could be agisted on the reserve for the annual rental of £1. Mr Leslie George Peters leased 154 hectares abutting Sections 209, 202 and 201E, Hundred of Ridley; thirty-eight sheep or five head of cattle could be agisted for an annual rental of £3.

Previously Mr Roy had been employed by the Department of Mines to sink a bore to draw water to his adjoining property. In the agreement of the Annual Licence of 1957, the bore, wind pump and trough were to be shared by Mr Rachow and Mr Roy.

In 1966 when land was being resumed and purchased for the purpose of national parks, the Land Board proposed that portions of the TSR "be retained and dedicated as a Wildlife Reserve under the control of the Commissioners of the National Parks and Wildlife Reserves at the expiration of the current Annual Licence" (DL1919/6). A field officer of the National Parks Commission, Mr G. C. Cornwall, inspected the Travelling Stock Reserve in September 1967 and submitted the following favourable report: "Although a long narrow strip of land such as this is not the ideal shape for a national park, the idea of preserving natural vegetation and bird habitats by setting aside portions of the Travelling Stock Reserve is an excellent one and the area under investigation is suitable for this purpose" (DL1919/60).

He described the vegetation of the 13-kilometre strip as being divided into two quite distinct associations. The northern end of the area was almost devoid of trees and the ground had been eaten almost bare of native and introduced grasses by heavy grazing. The area did, however, contain a good cover of Wait-a-while, with some bushes very dense and up to 2.5 metres in height; the few trees present were Native Apricot (*Pittosporum phylliraeoides*). The southern area, in contrast, was quite heavily timbered and interspersed with areas of open grassland.

Although it was agreed that the area was suitable for a national park, it was recommended by the Commission that the position with regard to the fencing of the western boundary be investigated by the Department of Lands prior to dedication. The matter of fencing was inadvertently overlooked, and lack of adequate fences was to create problems with straying stock over the next ten years.

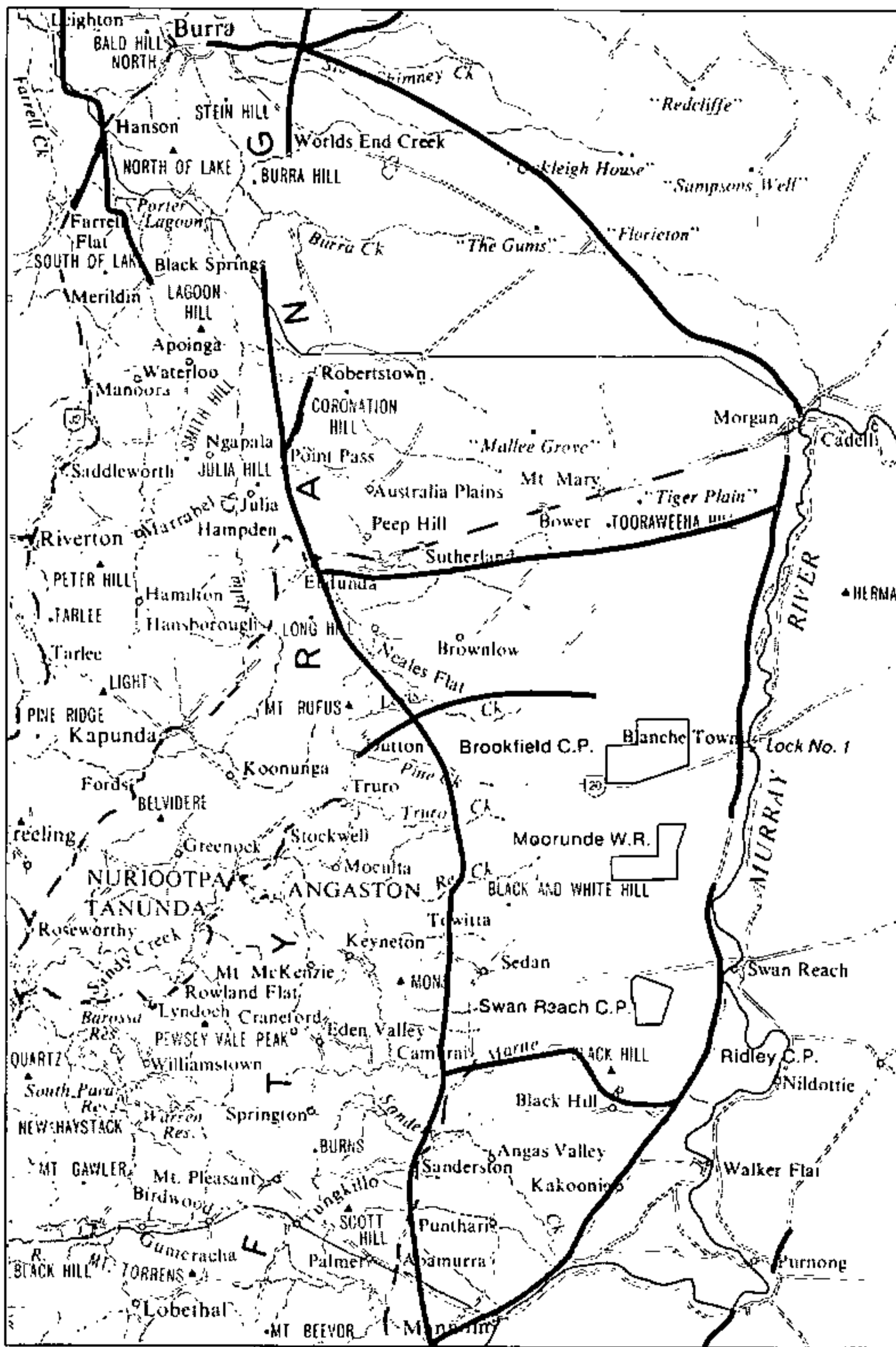
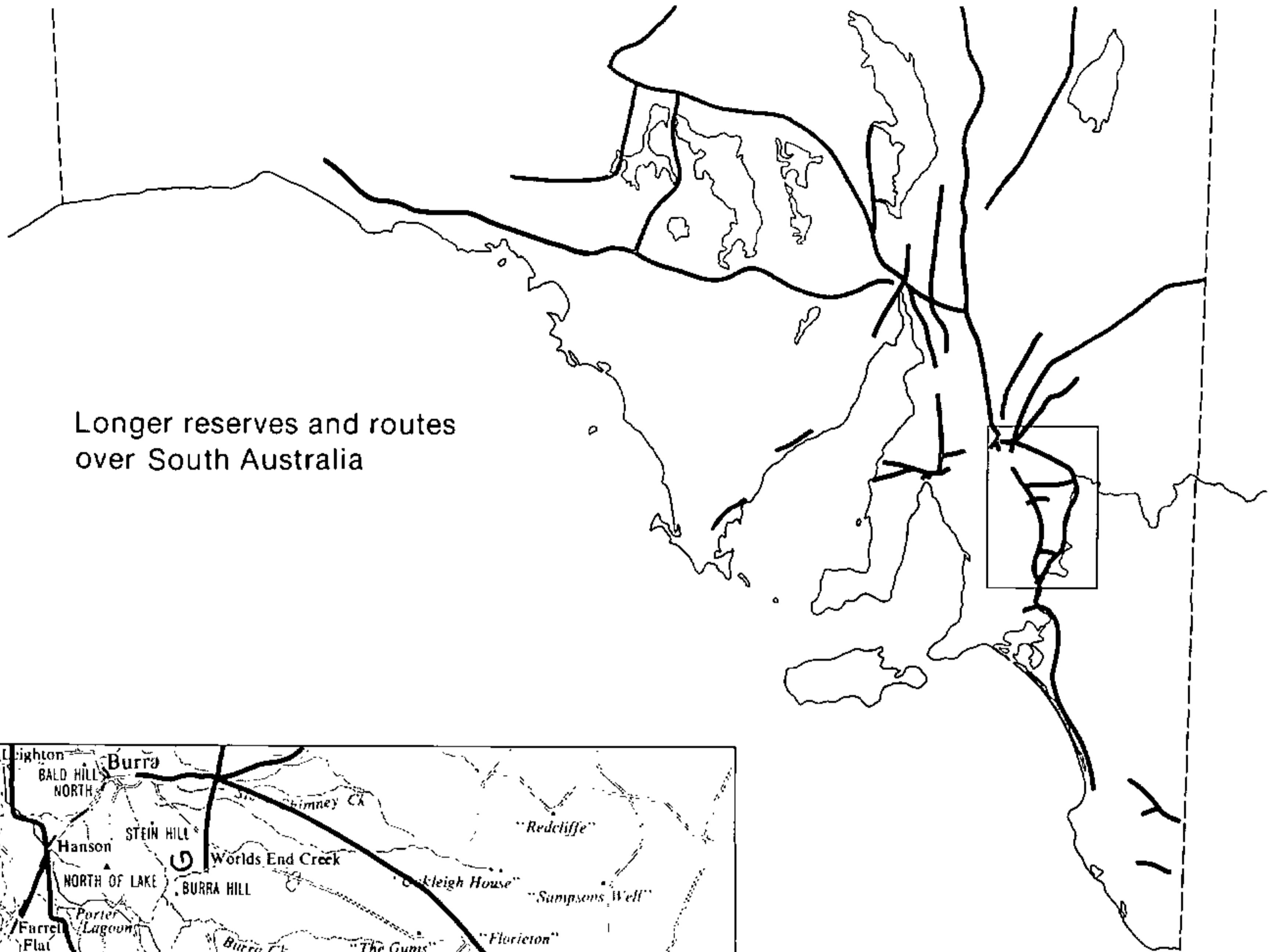
Ridley National Parks Reserve was officially dedicated in May 1968. The park, comprising 414.3 hectares, appeared on the Public Plan as Section 144, Hundred of Fisher and Sections 479, 480 and 483, Hundred of Ridley.

QUARRY

A disused quarry occurs in the southern extremity of the park (Figure 9). Time available for research for this plan did not permit an investigation of its history or of the materials won from this site.

RECENT MANAGEMENT

Over the years since 1968, management has consisted of regular inspections, signposting, weed and vermin



Inset—Reserves and routes in the Murray plains

Figure 11

Travelling Stock Reserves and Routes in South Australia

control and liaison with neighbouring landowners regarding fencing and other matters. In 1974, there was an infestation of Prickly Pear discovered on the northern boundary of Section 144; fortunately this pest was quickly eradicated. As described later in the history section of the Management Plan for Swan Reach Conservation Park, there were various land acquisition proposals relating to Ridley Conservation Park, none of which came to fruition.

VISITOR USE

Apart from occasional reports from the ranger of illegal shooters, not a lot is known of visitor use of the park. This aspect needs attention, and it is proposed that the ranger-in-charge obtain a regular quantitative estimate of numbers of visitors to this park. It is known that the area is favoured by bird observers, and scientific permits have been issued for research on honeyeater ecology to be carried out in the park.

BIOLOGY

Ridley Conservation Park is covered by two major vegetation formations: 35 per cent comprises an open scrub of Red Mallee (*Eucalyptus oleosa*) and Yorrell (*E. gracilis*), including some very large specimens. Also present in this formation are stands of Murray Pine (*Callitris columellaris*) and associated areas of shrubland dominated by Hop Bush (*Dodonaea attenuata*), and Cassias (*Cassia sturtii*) and (*C. nemophila*).

The remaining 65 per cent of the park comprises low open woodland of Native Apricot (*Pittosporum phylliraeoides*) and False Sandalwood (*Myoporum platycarpum*). The understorey consists of Spear-grass (*Stipa* spp.) and ephemeral herbs; Wait-a-while (*Acacia colletioides*) also occurs in this formation.

A small area near the southern boundary of the park and much of the northern part is almost devoid of trees and can be sub-categorised as open grassland. The section on Plants in the Appendices contains a preliminary plant list for the park.

The park was originally set aside to conserve native vegetation and bird habitats. In addition, the open areas of the park include a number of warrens of the Southern Hairy-nosed Wombat (*Lasiornis latifrons*). The 1972 aerial photograph reveals at least six major warrens within the boundaries of the park. Wombats were noted as being "quite plentiful" in the park in 1968 and these animals are still active in the area. An estimate of their numbers should be obtained by systematically counting and mapping active warrens.

Other mammals in the park are Spiny Anteaters, Western Grey Kangaroos, Foxes, European Rabbits, Brown Hares and House Mice (Adelaide University Biology Society 1979).

The presence of large, mature mallees in the park provides nesting hollows for birds. Mallee Ringnecks, Mulga Parrots and Galahs have all been recorded as breeding in these hollows. However, much of the mallee in this region was cut over for firewood in the past, and large, mature trees are quite rare. An incomplete bird list is given in the section on Birds in the Appendices.

Apart from sightings of *Hemiergis decresiensis* and Shingle-backs (*Trachydosaurus rugosus*), the herpetofauna of the park is unknown.

APPENDICES

PLANTS

The following list of plants was compiled from information collected by the Adelaide University Biology Society (1979); this list is far from exhaustive.

Introduced species are prefixed with an asterisk.

ASTERACEAE	
* <i>Centaurea calcitrapa</i>	Starthistle
CACTACEAE	
<i>Opuntia stricta</i>	Erect Prickly Pear
CHENOPODIACEAE	
<i>Atriplex stipitata</i>	
<i>Atriplex vesicaria</i>	Bladder Saltbush
<i>Chenopodium</i> sp.	Goosefoot
<i>Enchylaena tomentosa</i>	Ruby Saltbush
<i>Maireana brevifolia</i>	
<i>Maireana turbinata</i>	Bluebush
<i>Maireana sclerolaenoides</i>	
<i>Maireana</i> sp.	
<i>Sclerolaena discantha</i>	
<i>Sclerolaena obliquicuspis</i>	Bindyi
<i>Salsola kali</i>	Roly Poly Bush, Buckbush, Prickly Saltwort
EUPHORBIACEAE	
<i>Beyeria opaca</i>	
FABACEAE	
<i>Medicago</i> sp.	Medic
GOODENIACEAE	
<i>Scaevola spinescens</i>	
LEGUMINOSAE	
<i>Cassia nemophila</i>	
<i>Cassia sturtii</i>	
LORANTHACEAE	
<i>Amyema</i> sp.	
MIMOSACEAE	
<i>Acacia colletioides</i>	Wait-a-while
<i>Acacia oswaldii</i>	Umbrella Wattle
MYOPORACEAE	
<i>Eremophila alternifolia</i>	
<i>Eremophila scoparia</i>	
<i>Myoporum platycarpum</i>	False Sandalwood, Sugarwood
MYRTACEAE	
<i>Eucalyptus gracilis</i>	Yorrell
<i>Eucalyptus largiflorens</i>	River Box
<i>Eucalyptus oleosa</i>	Red Mallee
<i>Eucalyptus porosa</i>	Mallee Box
PITOSPORACEAE	
<i>Pittosporum phylliraeoides</i>	Native Apricot, Native Willow
POACEAE	
<i>Stipa</i> spp.	Spear-grass
SANTALACEAE	
<i>Exocarpos aphyllus</i>	
SAPINDACEAE	
<i>Heterodendrum oleaefolium</i>	Bullock Bush
SOLANACEAE	
<i>Lycium ferocissimum</i>	African Boxthorn
ZYGOPHYLLACEAE	
<i>Zygophyllum apiculatum</i>	Gull Weed
<i>Zygophyllum aurantiacum</i>	

BIRDS

The following list of birds recorded in Ridley Conservation Park was compiled from casual observations made by patrolling ranger staff since the dedication of the park and other records collected by Reid and Vincent (unpublished).

The order of species and scientific nomenclature follows that of Condon (1975) and Schodde (1975), with amendments and vernacular nomenclature following that of The Royal Australian Ornithologists Union (1978).

Introduced species are marked with an asterisk.

<i>Ardea novaehollandiae</i>	White-faced Heron
<i>Aquila audax</i>	Wedge-tailed Eagle
<i>Accipiter fasciatus</i>	Brown Goshawk
<i>Falco cenchroides</i>	Australian Kestrel
<i>Coturnix novaezelandiae</i>	Stubble Quail
<i>Phaps chalcoptera</i>	Common Bronzewing
<i>Ocyphaps lophotes</i>	Crested Pigeon
<i>Cacatua roseicapilla</i>	Galah
<i>Cacatua galerita</i>	Sulphur-crested Cockatoo
<i>Nymphicus hollandicus</i>	Cockatiel
<i>Melopsittacus undulatus</i>	Budgerigar
<i>Barnardius barnardi</i>	Mallee Ringneck
<i>Psephotus varius</i>	Mulga Parrot
<i>Chrysococcyx basalis</i>	Horsfield's Bronze-Cuckoo
<i>Podargus strigoides</i>	Tawny Frogmouth
<i>Caprimulgus guttatus</i>	Spotted Nightjar
<i>Merops ornatus</i>	Rainbow Bee-eater
<i>Hirundo neoxena</i>	Welcome Swallow
<i>Cecropis nigricans</i>	Tree Martin
<i>Anthus novaeseelandiae</i>	Richard's Pipit
<i>Coracina novaehollandiae</i>	Black-faced Cuckoo-shrike
<i>Lalage sueurii</i>	White-winged Triller
<i>Petroica goodenovii</i>	Red-capped Robin
<i>Microeca leucophaea</i>	Jacky Winter
<i>Colluricincla harmonica</i>	Grey Shrike-thrush
<i>Oreica gutturalis</i>	Crested Bellbird
<i>Rhipidura leucophrys</i>	Willie Wagtail
<i>Pomatostomus superciliosus</i>	White-browed Babbler
<i>Pomatostomus ruficeps</i>	Chestnut-crowned Babbler
<i>Cinclorhampus cruralis</i>	Brown Songlark
<i>Malurus splendens</i>	Splendid Fairy-wren
<i>Acanthiza reguloides</i>	Buff-rumped Thornbill
<i>Aphelocephala leucopsis</i>	Southern Whiteface
<i>Daphoenositta chrysoptera</i>	Varied Sittella
<i>Acanthagenys rufogularis</i>	Spiny-cheeked Honeyeater
<i>Lichenostomus virescens</i>	Singing Honeyeater
<i>Lichenostomus leucotis</i>	White-eared Honeyeater
<i>Melithreptus brevirostris</i>	Brown-headed Honeyeater
<i>Epthianura albifrons</i>	White-fronted Chat
<i>Pardalotus xanthopygus</i>	Yellow-rumped Pardalote
<i>Pardalotus striatus</i>	Straited Pardalote
<i>Poephila guttata</i>	Zebra Finch
<i>*Sturnus vulgaris</i>	Common Starling
<i>Corcorax melanorhampus</i>	White-winged Chough
<i>Artamus superciliosus</i>	White-browed Woodswallow
<i>Artamus cyanopterus</i>	Dusky Woodswallow
<i>Cracticus torquatus</i>	Grey Butcherbird
<i>Gymnorhina tibicen</i>	Australian Magpie
<i>Corvus coronoides</i>	Australian Raven

RESOURCE MATERIALS AND REFERENCES

MAPS

- 1:50 000 Topographic Swan Reach 6821—IV (South Australian Department of Lands)
- 1 inch—2 miles Cadastral plans Counties Eyre and Sturt (South Australian Department of Lands)
- 1 inch—40 chains Cadastral plans Hundreds: Ridley and Fisher (South Australian Department of Lands)
- Survey Programme Books: Hundreds of Fisher and Ridley (Department of Lands)
- 1:250 000 Geological Series Adelaide and Renmark (Geological Survey of South Australia)

AERIAL PHOTOGRAPHS

- Firman, J. B. (1972).—Renmark, South Australia. Explanatory Notes, 1:250 000. *Geological Series, Geological Survey of South Australia*. (South Australian Mines Department)
- South Australian Department of Lands Swan Reach (1972) 1:41 000 Survey 1380 No. 89 and Survey 1375 No. 31.

DOCKET REFERENCES

- | | | |
|-----|--------|--------------------------------|
| CLO | 998/10 | Petition requesting resumption |
| SGO | 762/98 | As above |

SGO	1028/09	As above
SGO	8729/10	Permission to erect fences
DL	3204/34	Resumption and annual licences
DL	5600/37	Request to purchase portions of the TSR
DL	233/39	Request for timber licences
DL	4978/39	Request to take timber from the TSR
DL	4469/54	Annual licences
DL	4190/62	Annual licences
DL	1441/64	Annual licences: transfers
DL	4318/71	Land offered to add to Ridley
National Park Commission		
File	143/A/-	Ridley National Parks Reserve
NPC	171/70	Straying stock
NPC	255/70	Vermin re rabbits
NPC	198/71	Weed control
NPC	24/72	Additional land, Sections 218-223, Hundred of Ridley
NPC	132/72	Fencing
DEC	1128/72	General correspondence
NPWS	73/72	Scientific permits
DL	2103/67	Dedication

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- Condon, H. T. (1975).—"Checklist of the Birds of Australia. I. Non-passerines." (Royal Australian Ornithologists Union: Melbourne.)
- Firman, J. B. (1973).—Regional Stratigraphy of Surficial Deposits in the Murray Basin and Gambier Embayment. *Geological Survey of South Australia. Report of Investigations*. 39.
- Royal Australian Ornithologists Union. (1978).—Recommended English Names for Australian Birds. *Emu*. 77: 245-310.

ACKNOWLEDGEMENTS

Thanks are due to Ms Penny Ruddock who conducted historical research and to Mr Leon Barmuta who coordinated biological information for this park.

PART 2

MANAGEMENT OBJECTIVES

INTRODUCTION

The following objectives for the management of Ridley Conservation Park are designed to serve as a rigorous guide to the uses and developments permitted within the park. All park management should be constrained within the limits of these objectives. This section has been formally adopted by the Minister of Environment under the provisions of the *National Parks and Wildlife Act 1972-1981*.

ZONING

To zone the various habitats and features of Ridley Conservation Park to ensure the conservation, in perpetuity, of the natural environment of the park.

FACILITIES FOR VISITORS

To provide facilities for visitors in a manner consistent with conserving the natural environment of the park.

PLANT AND VERTEBRATE PESTS

To control, where possible, pest plants and any other introduced species of plants and animals.

FIRE

To ensure that provision is made to control all fires.

FENCING

To prevent the entry of straying stock.

STAFFING

To ensure that staff levels are adequate to properly maintain the park and to ensure the proper management of wildlife in the surrounding district.

PART 3

IMPLEMENTATION OF MANAGEMENT OBJECTIVES

ZONING

To zone the various habitats and features of Ridley Conservation Park to ensure the conservation, in perpetuity, of the natural environment of the park.

The majority of the park should be zoned as "Natural Area". Except for the quarry and major access routes, visitor access by vehicle should be minimised and only permitted along existing tracks. Visitors should be encouraged to travel on foot in the Natural Area Zone. There is no evidence that extensive camping is occurring in the park at present. It also seems unlikely that there will be significant demand for camping in the future as this small park caters primarily for day visitors. While camping should not be prohibited, those who wish to stay overnight in this area would be better advised to camp in Swan Reach Conservation Park which has more scope for such activities.

However, the park does cater for day visitors and it is proposed to develop simple facilities for such people in the vicinity of the old quarry at the southern end of the park. This area should be zoned "Development". The history of the quarry should be investigated for interpretation purposes.

FACILITIES FOR VISITORS

To provide facilities for visitors in a manner consistent with conserving the natural environment of the park.

There is a pressing need for signposting to mark the boundaries of this park. In spite of the activity in this regard following the park's dedication in 1968, very few signs remain today. Adequate signposting is especially important in view of the fact that much of the area surrounding the park has recently been subdivided into small holdings. This will result in an influx of people to the area who may be unaware of the park's existence. Routed wood signs, indicating the name of the park, should be erected at the southern and northern boundaries adjacent to the main road. Triangular boundary markers should be placed at strategic intervals around the park boundaries, while the larger, triangular gate markers should be placed on all park gates. Two standard information signs for conservation parks should be erected, one near the quarry in the southern end of the park and the other adjacent to the Fisher-Ridley Hundred Line track (Figure 10). The old quarry zoned "Development" near the southern boundary is located in quite a pleasant area of the park and with some cleaning up of rubbish could provide a pleasant area for visitors to have picnics and barbecues. From this area a track should be developed to a lookout point at the highest point in the park (Hayward's Hill) which provides extensive views over the River Marne Valley (Figure 12). As mentioned above, camping in this park should not be encouraged.

PLANTS AND VERTEBRATE PESTS

To control, where possible, pest plants and any other introduced species of plants and animals.

Rabbits do occur on the park, but at present their numbers are low. However, the ranger should keep a watch on rabbit numbers and take steps to control them should they increase in the future.

Over the years, outbreaks of the two major pest plants on this park, Boxthorn and Prickly Pear, have been controlled by selective poisoning and hand grubbing. The ranger should continue this programme.

FIRE

To ensure that provision is made to control all fires.

The shape and location of this park makes it vulnerable to the entry of fire from neighbouring properties. Repeated fires in the areas of mature mallee in this park would be most undesirable in view of the comparative scarcity of this type of vegetation in the region. The eastern boundary of the park adjoins the main road and is thus afforded an effective firebreak. A standard access track should be developed along the western boundary of the park where at present no track exists. This track should be constructed using a tritter or similar machine which creates little soil disturbance.

An old bore exists in Section 479, Hundred of Ridley. It is presently unserviceable as there is no tank or windmill. It is not proposed to recommission the bore at this stage but the bore itself should be properly capped to allow the possible provision of a water supply in the future.

FENCING

To prevent the entry of straying stock.

Despite problems with straying stock on the park in the past, the western boundary of the park is now completely fenced. The southern boundary is only partly fenced and this fence should be completed and upgraded. There is felt to be no need at this stage for the erection of a fence along the eastern boundary in the Hundred of Ridley as the property owners on the eastern side of the main road all have adequate fences. It is felt that to fence the park along this section of the road would significantly detract from the attractiveness of the park. However, in the Hundred of Fisher, the property owners on the eastern side of the road have not yet fenced their properties. It is therefore proposed to fence the eastern park boundary north from the Fisher-Ridley Hundred Line. Also in the Hundred of Fisher, the park has road reserves on three sides (Figure 10). The present fences are on the western and northern sides of the road reserves away from the park. In time, it will be necessary to erect fences on the park side of these two road reserves.

STAFFING

To ensure that staff levels are adequate to properly maintain the park and to ensure the proper management of wildlife in the surrounding district.

Ridley Conservation Park is one of several parks in the Brookfield District of the Murraylands Region of the National Parks and Wildlife Service. The park is managed by the Ranger-in-charge of the Brookfield District who is based at the Brookfield Conservation Park. For details of staffing requirements for this District, refer to the Brookfield Conservation Park Management Plan.

PART 4

SUMMARY OF MANAGEMENT PROPOSALS

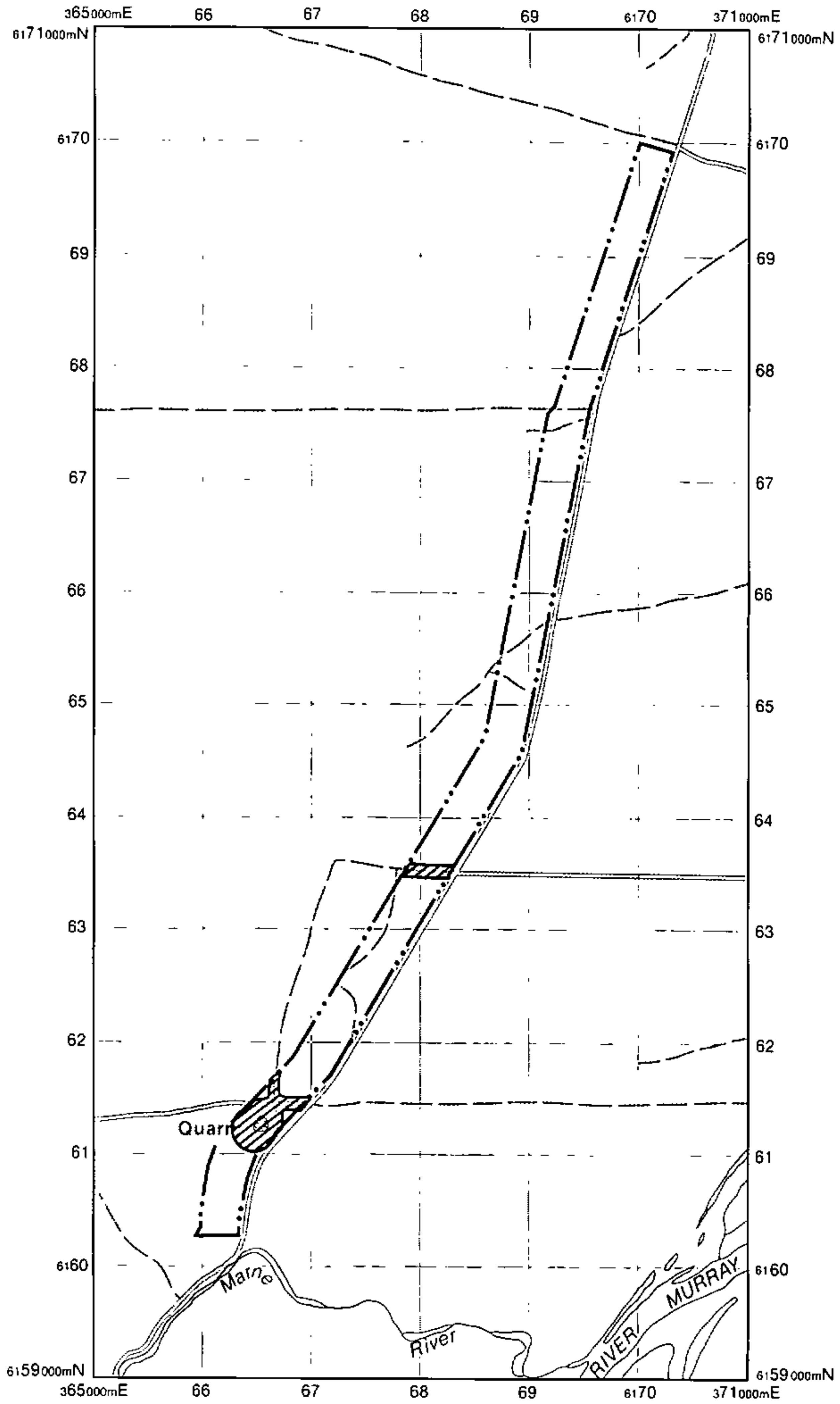
As a guide to the orderly application of the provisions of this Management Plan for Ridley Conservation Park the foregoing management proposals are summarised and ranked. This ranking indicates the relative priority of projects and whether they are of a short-term or continuing nature. A distinction has been made between research and monitoring projects and those requiring funding for works and maintenance.

RESEARCH AND MONITORING

PROJECT	PRIORITY	DURATION	Page
Estimate of active wombat warrens by ranger	Moderate	Short	32
Estimate of visitor use	Moderate	Continuing	32
Biological inventory	Moderate	Continuing	32

WORKS AND MAINTENANCE

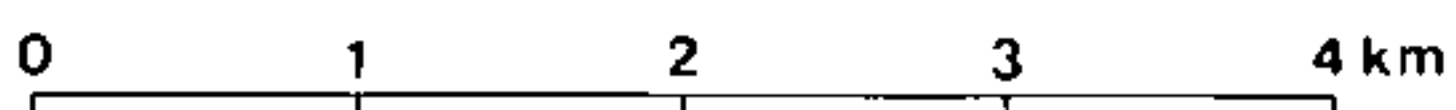
PROJECT	PRIORITY	DURATION	Page
Signposting	High	Short	35
Cap bore	High	Short	35
Construct boundary access track	High	Short	35
Develop picnic and barbecue area	Moderate	Short	35
Construct Hayward's Hill lookout track	Moderate	Short	35
Fencing	High	Short	35
Control pest plants	Moderate	Continuing	35
Control vertebrate pests	Moderate	Continuing	35



- Park Boundary** - · - · -
- Unsealed road** ————
- Access and Walking Tracks** ······
- Development Zone** ◉
- Natural Area Zone** □

Figure 12

Ridley C.P. Zoning



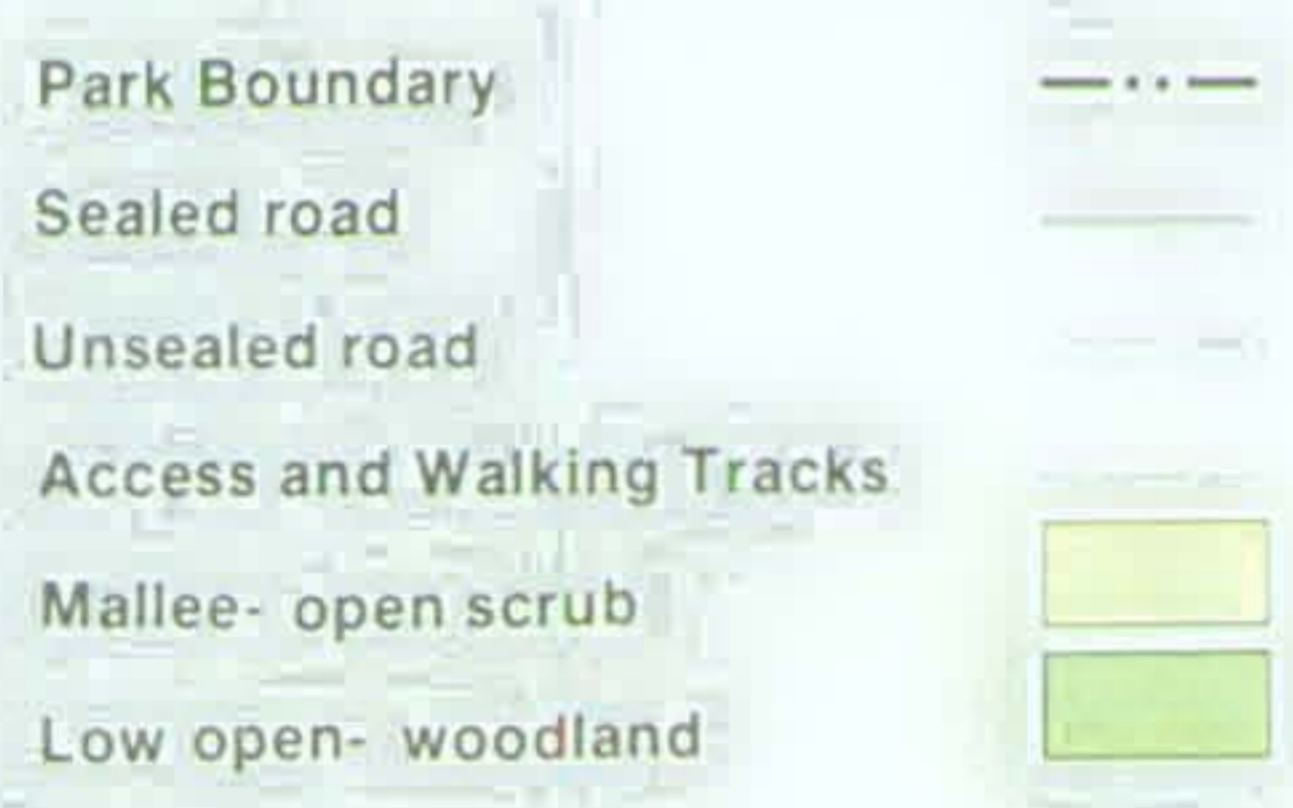
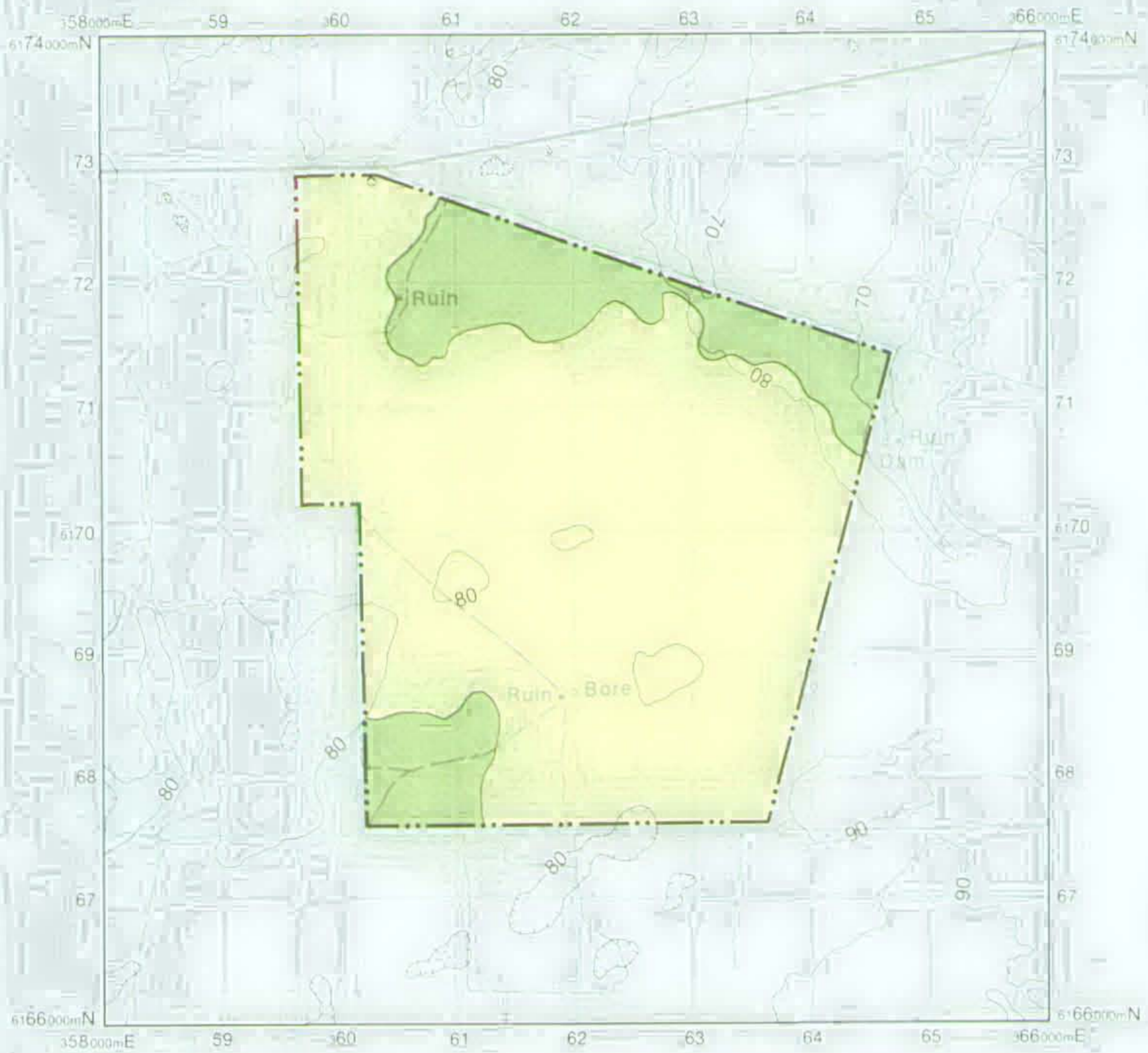


Figure 13

Swan Reach C.P.
Topography and Vegetation

BACKGROUND INFORMATION

DESCRIPTION OF THE AREA

LOCATION AND PHYSICAL FEATURES

Swan Reach Conservation Park is located south of the Swan Reach to Sedan Road, about 10 kilometres west of the town of Swan Reach. It covers an area of 2017 hectares comprising the following Sections: County Eyre, Hundred of Fisher, Sections 38-43, 55-60 and 212.

The park lies 90 kilometres north-east of Adelaide and is approximately 120 kilometres from Adelaide by road (Figure 1).

The park encompasses an area of gently undulating country with underlying limestone typical of the region west of the River Murray. It is located in a transition zone in the natural vegetation in a southerly extension of the arid zone in South Australia (Figures 1 and 13). Its climate is similar to that of Brookfield Conservation Park which was described in Part 1 of the Management Plan for that park. In addition, the annual rainfall statistics for Swan Reach from 1898 to 1978 are shown in Figure 14.

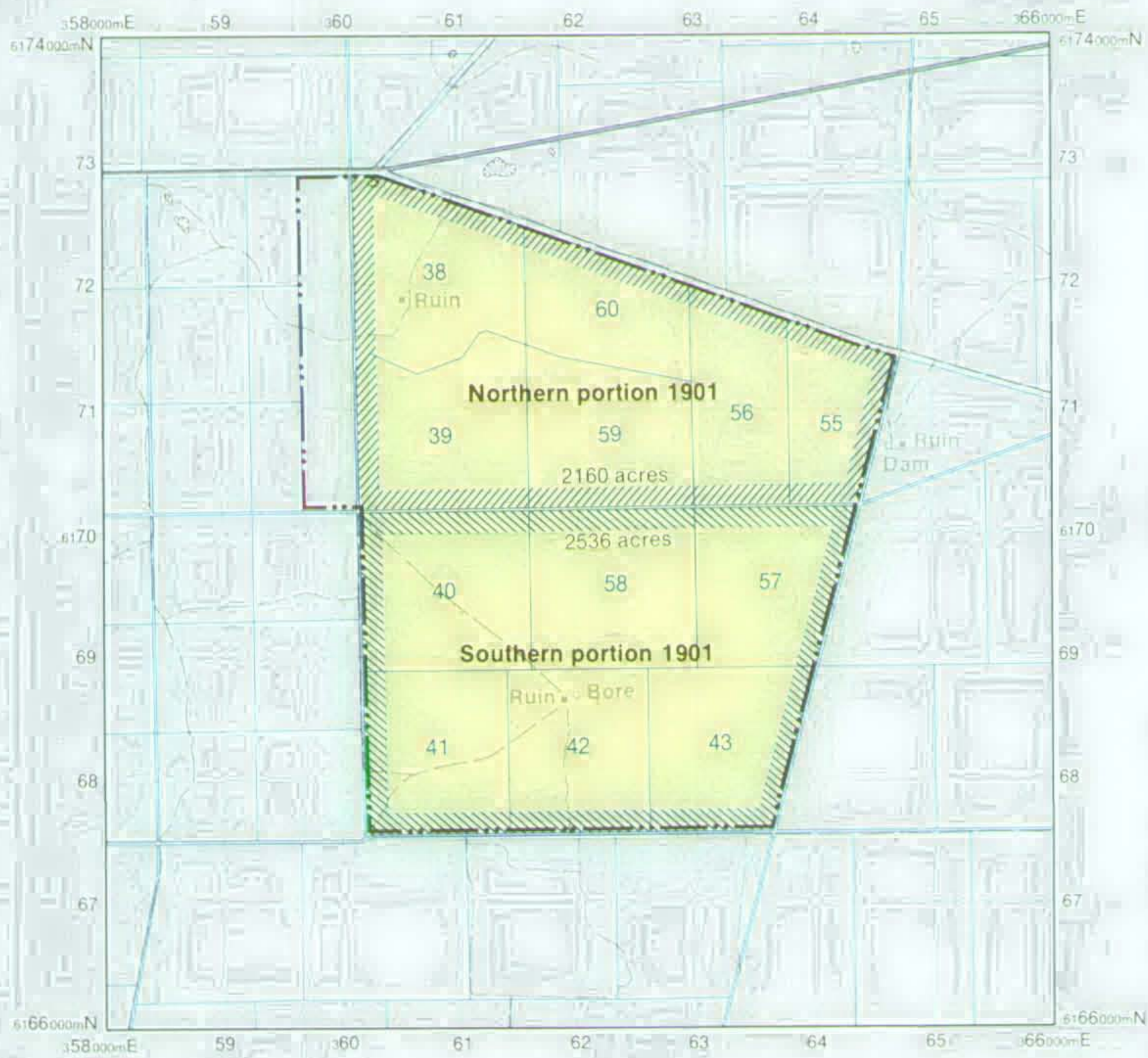
HISTORY

ABORIGINAL OCCUPATION

Information on the Aboriginal occupation of the Western Murray Plains is given in Part 1 of the Brookfield Conservation Park Management Plan.

SETTLEMENT AND LAND-USE HISTORY

Although Occupational Licences were issued to pastoralists in the early 1840s and Pastoral Leases from 1851, the area south-west of Swan Reach township and including the park was not taken up at these times. Even the proclaiming of the Hundred of Fisher in 1860 did not immediately attract settlement. The Swan Reach district was eventually occupied in the last decades of the nineteenth century, much later than Blanchetown. The township of Swan Reach was established in 1896, largely to cater for the small farms which were being developed in the surrounding district. When the best agricultural land in the fertile plains and ranges had been occupied, settlers turned to less favourable country in the mid-north and the Murray Mallee. This thrust of settlement included Swan Reach, although the area was classified as marginal land according to Goyder's Line which depicted those areas of adequate rainfall for agriculture. To provide water, therefore, many farmers sunk bores, often to a depth of 40 metres, which enabled them to graze stock away from the River Murray. In addition, improved machinery facilitated clearing of the mallee scrub. Many of the small farmers, especially those growing crops, barely eked out a living and were destined to hardships and despair as the many ruined farmhouses (Figures 15 and 16) in the district testify. Successive droughts, rabbits and overgrazing created in places a desolate, unproductive landscape capable of supporting only a few sheep per hectare.



Park Boundary

Sealed road

Unsealed road

Access and Walking Tracks

Transacted as one unit until 1901

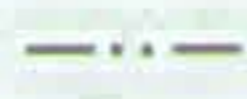


Figure 15

Swan Reach C.P.
Early Land Transactions

0 1 2 3 4 km

Rainfall		Rainfall		Rainfall	
Year	(mm)	Year	(mm)	Year	(mm)
1899	259	1926	224	1953	234
1900	269	1927	154	1954	271
1901	146	1928	240	1955	385
1902	212	1929	179	1956	318
1903	382	1930	244	1957	126
1904	217	1931	259	1958	263
1905	279	1932	283	1959	189
1906	360	1933	292	1960	332
1907	252	1934	279	1961	303
1908	319	1935	248	1962	236
1909	279	1936	253	1963	298
1910	419	1937	303	1964	361
1911	229	1938	182	1965	196
1912	257	1939	257	1966	277
1913	253	1940	140	1967	104
1914	179	1941	400	1968	253
1915	245	1942	363	1969	339
1916	400	1943	182	1970	255
1917	338	1944	137	1971	265
1918	207	1945	243	1972	186
1919	236	1946	379	1973	551
1920	326	1947	370	1974	534
1921	433	1948	228	1975	238
1922	268	1949	223	1976	226
1923	274	1950	316	1977	152
1924	324	1951	344	1978	267
1925	250	1952	332		

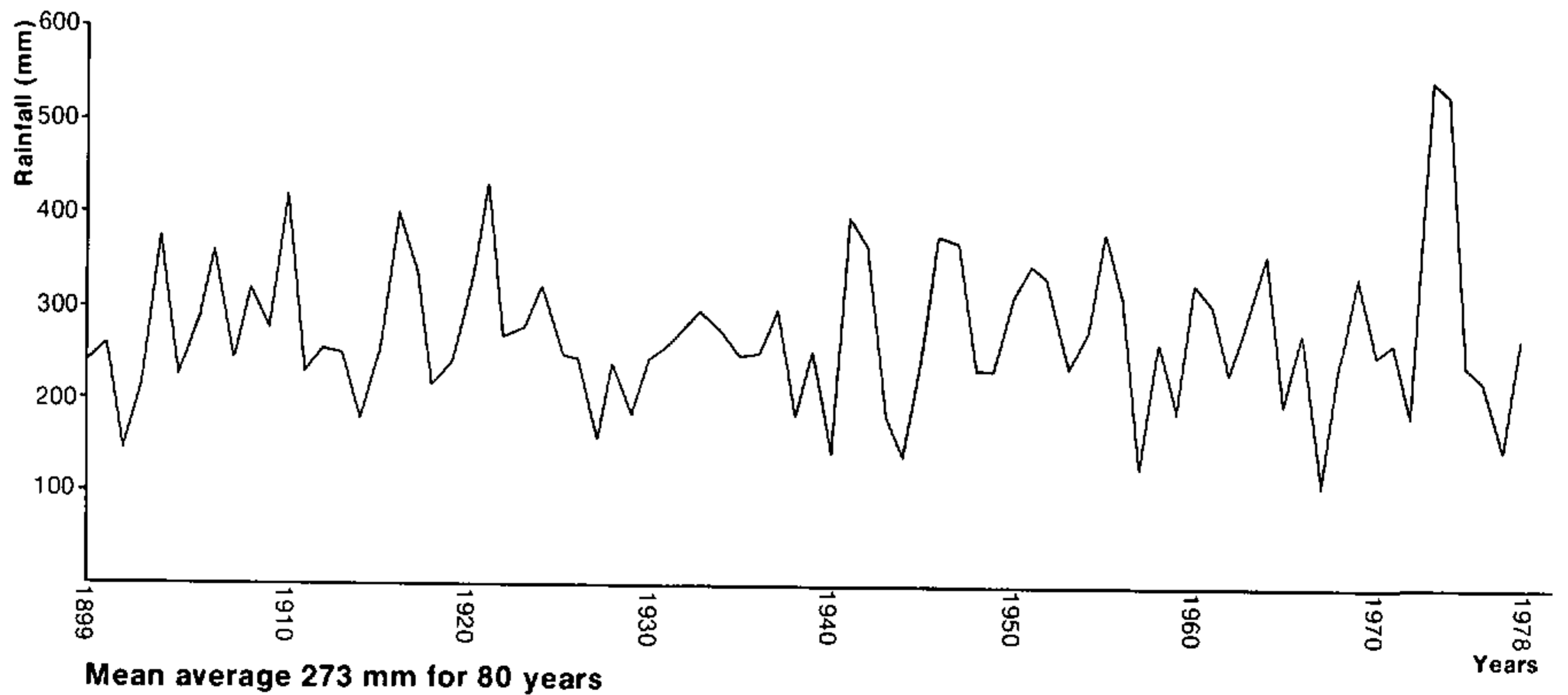
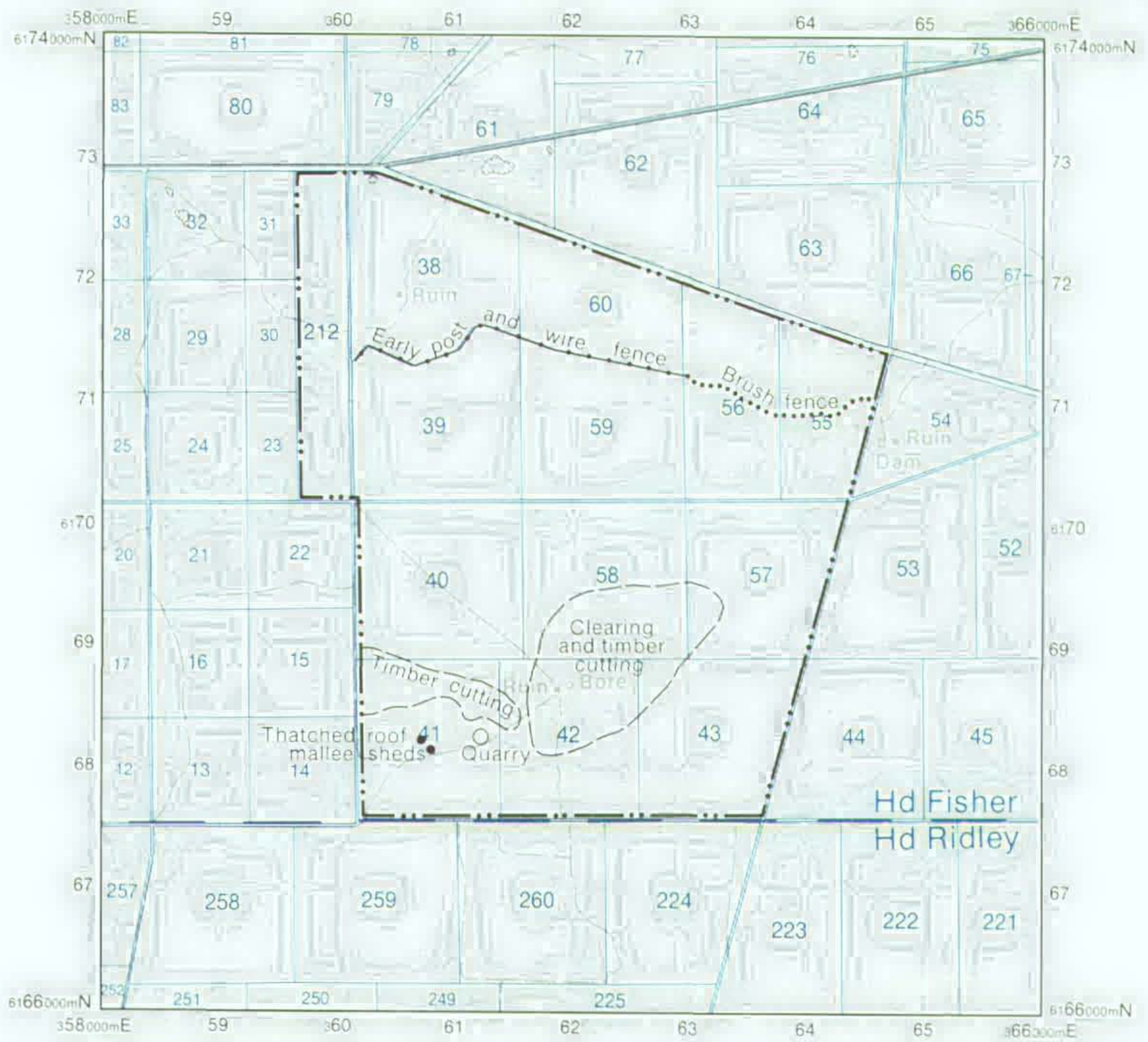


Figure 14

**Annual Rainfall for
Swan Reach 1898-1978**
(Bureau of Meteorology)



- Park Boundary**
- Sealed road**
- Unsealed road**
- Access and Walking Tracks**

Figure 16
Swan Reach C.P.
Cadastral and
Historical Information

0 1 2 3 4 km

Especially after the droughts and the Depression of the 1920s (Figure 14), many of the small farms were amalgamated into larger pastoral properties or were annexed to properties in the more fertile districts. A recent trend, however, is the subdivision of several properties neighbouring the park into 30-hectare allotments used as weekend retreats for city dwellers. The recent subdivision of land near Swan Reach, coupled with the altered nature of the landscape under pastoralism and agriculture, makes it imperative that an area of comparatively untouched mallee such as Swan Reach Conservation Park remains protected from further abuse and deterioration.

Landowners

Sections 38, 39, 40, 42, 43, 55, 56, 59 and 60 Hundred of Fisher, were first allotted directly from the Crown in April 1890 (Figure 15). Arthur Scammell of Punyelroo, manufacturer, possibly took out the lease with the view of extracting timber from the land. No clearing took place, however, and although the lease was granted until 1904, it was voluntarily surrendered in 1891.

Johann Friedrich Fischer, farmer of Mendella, near Mannum, became the next lessee in April 1895. This lease was cancelled in 1901 for non-payment of rent.

From 1901, what is now the park area, was divided into two leases. The northern portion of 875 hectares (2160 acres) comprised Sections 38, 39, 55, 56, 59 and 60, and the southern portion of 1025 hectares (2536 acres) comprised Sections 40, 41, 42, 43, 57 and 58 (Figure 15).

(a) NORTHERN PORTION

William Blackburn Start of Rhine Villa, which became known as Cambrai in the first World War, was the first lessee of the northern portion in September 1903; it is probable, however, that he had occupied the area before this time. On his small farm Start built the two-roomed stone cottage in the natural clearing on Section 38, the walls of which are still standing (Figure 15).

Although his main activity was grazing sheep, Start also cleared a small area of the scrub to grow crops; the natural clearing was not cropped because it was too stony.

Start possibly found the area he held was inadequate in size, because in 1908, his small farm and three others nearby were purchased by Ernest Edward Esau of Woodside and amalgamated into one property. Initially Esau employed a manager on the property, but in 1919 he moved to the district, building a sizeable house at Punyelroo in 1922.

The main land-use in the area was sheep grazing, and soon after purchase, Mr Esau constructed fences along the southern and eastern boundary of the northern portion. Little clearing was undertaken and Ernest Esau's son Malcolm remembers a fire on the property during the second World War which burnt 80-120 hectares. Ernest Esau died in 1961, aged ninety years, and the northern portion of the park was transferred to his son Malcolm who now lives in the house at Punyelroo. The northern portion, comprising Sections 38, 39, 55, 56, 59 and 60 was sold to the National Parks Commission in 1969 as an area to preserve the Hairy-nosed Wombat.

(b) SOUTHERN PORTION

In August 1904, the southern portion was leased by William Henry Hussey, agent of Adelaide. Hussey, who possibly leased the area for its speculative value, held the lease until June 1925 when it was transferred to Robert Henry Adams, farmer of Plympton. Adams died the same year and the property came to his widow Emily Adams of Brighton and Albert Henry Adams, farmer of Meadows. In September 1926 George

Fulham Smith leased the southern portion of the park but the lease was cancelled due to non-compliance with its conditions: Smith had failed to adequately fence the area.

Leslie Ernest Wiebrecht, farm labourer, of Kongolia near Black Hill, leased the property in 1929. Wiebrecht, who farmed for most of the year at his property at Black Hill, spent several weeks of the year at this property, staying in a tent and grazing sheep. The remains of two thatched mallee sheds are located on a track near the southern boundary in Section 41 and were constructed by Wiebrecht to shelter horses when he was staying in this area. During the Depression in 1932, Wiebrecht's rent was reduced by the Department of Lands.

In February 1936, the property was transferred to Friedrich Adolph Johannes Starick, farmer of Kongolia, near Black Hill. As did Wiebrecht, Starick used the park as an extension of his farm at Black Hill, depasturing sheep in the park in winter and spring.

During the second World War, while the area was leased by Starick, woodcutters occupied an area in Section 42. A bore had already been sunk by a previous owner and the woodcutters constructed a two-roomed mud mortar stone hut, the walls of which are still standing. In addition, a simple garden bed bordered by stones was established near the house (Figure 15).

As a recent aerial photograph reveals, timber was cut around the house extending further to the north-east. The timbercutters were not licensed to cut, but merely paid 'a few bob per ton' to the lessee in payment for access to timber.

Timber cut on the park was possibly carted to Portree Station to the north to be burnt in charcoal kilns.

Harold Edward Ridgway Dinham, farmer of Brighton, was the next lessee from July 1947 until October 1949 when Ormonde Bracton Kermode, teacher of Oliver, took over the lease. It is unlikely that either Dinham or Kermode grazed sheep in the park.

Eric Roy Graetz and his wife Roma, farmers of Keyneton, were the next lessees from June 1964. Although they periodically grazed sheep on their property, it had not been grazed for several years prior to being sold to the National Parks and Wildlife Service in 1974.

LAND ACQUISITION AND PARK DEDICATION

In the mid to late 1960s, after several years of devastating droughts and increasing land subdivision, there was growing public concern for the fate of the Southern Hairy-nosed Wombat. This concern resulted in attempts being made to conserve habitat for this animal on the plains west of the River Murray at the eastern-most extremity of its range.

Instrumental to this end were the Field Naturalists' Society of South Australia, who from about 1964, approached landowners in the district and submitted various reports concerning wombats to the Government. The reports advocated that an area of 180 square kilometres be purchased near Blanchetown as a National Park for the conservation of wombats. The National Parks Commission considered the scheme desirable but highly impractical since the funds necessary to purchase such an area would have been in the vicinity of \$300 000 and were not available. Further, it would have been difficult to secure agreements to sell land from the number of landholders involved.

The purchasing of strategic areas for wombat conservation was considered a more workable solution. One such opportunity to purchase land came in 1969

when Sections 39, 39, 55, 56, 59 and 60, Hundred of Fisher, were offered to the Government by Mr E. M. Esau. In its favour, there were a number of wombat warrens on the property and the majority of the area was in its natural state. The offer was accepted in August 1969, the purchase price being \$7500 for 875 hectares. As part of the contract, the former owner was required to fence the western boundary of Sections 38 and 39.

Swan Reach National Park was proclaimed on 28 May 1970, and with the passage of the *National Parks and Wildlife Act 1972*, was re-dedicated as Swan Reach Conservation Park.

In 1972, several local landowners offered to sell land to the Government for conservation purposes. Various proposals to acquire land to be added to the original park were investigated, however, only two additional areas have been purchased and dedicated to date (1982).

Sections 40-43, 57 and 58, Hundred of Fisher (1026 hectares), south of the original park were offered to the Government by E. R. and R. M. Graetz in January 1972. The area, which possessed a permanent water source supplied by a 57-metre bore, had not been grazed for some time. Only a small portion of the proposed land was cleared and it was well fenced on all but the northern boundary which adjoined the park. Reasonably priced at "\$3 an acre", this land was considered a logical addition to the existing area. Ministerial approval to purchase the land was given in September 1972, and it was subsequently dedicated in May 1974.

A small area was added to the western boundary of the park and dedicated as Section 212 in January 1979, bringing the park to its present size of 2017 hectares. The events leading to the acquisition of this area, which are rather unorthodox, are described below. In June 1969, soon after Ridley National Parks Reserve had been proclaimed, an adjoining landowner, Mr E. M. Esau, who had offered the original land of Swan Reach Conservation Park, contacted the Minister of Lands. Esau outlined how he had grazed sheep for many years on the northern unfenced portion of the reserve which had previously been a Travelling Stock Reserve without any formal agreement with the Department of Lands. Esau claimed that to preclude his use of this piece of land (Section 144, Hundred of Fisher) which divided his land, would seriously inconvenience the running of his property. For this reason, he requested permission to exchange nearby Section 121 and Part Section 122, Hundred of Fisher, which were still largely uncleared, for the piece of the reserve in question (Figure 17).

Despite the problems associated with removing the dedication on this land, since approval was needed from both Houses of Parliament, the Department of Lands and the National Parks Commission generally agreed to the land exchange in October 1969. This transaction did not take place, however, and in August 1970 Esau proposed exchanging a different piece of land for Section 144. The area he proposed to exchange comprised the eastern portion of Sections 23, 30 and 31 which adjoined the western boundary of the recently-dedicated Swan Reach National Park (Figure 17). This proposal was approved by the Minister of Environment and Conservation and the Land Board in November 1971.

In March 1972 the situation was reassessed when Mr R. G. Lyons, Director of National Parks, requested an inspection of the areas to be exchanged by the Commission's ecologist, Mr R. Shearer. His report submitted on 21 March 1972, recommended retaining the northern portions of Ridley National Parks Reserve.

"Section 144, Hundred of Fisher, offers excellent stands of the more arid tree/shrubs (Acacias, Tea-trees etc.) not conserved in the more southerly sections" (D.L. 2103/1967).

In addition, he stressed the need to adequately fence the area to protect it from unnecessary grazing. As a result, the land exchange did not proceed, but the Department of Environment and Conservation inadvertently failed to notify Esau.

Assuming the exchange had taken place, Esau included the northern portion of Ridley Conservation in the land he offered for sale in 1975. Further, when Esau sold land west of Swan Reach Conservation Park, it became apparent that the lease for this land purchased by Mr R. E. Faulkenberg of Mannum, from Esau, covered the area which was to be annexed to the park as part of the land exchange. In short, Esau had been deprived of 115 hectares of land. After airing his complaint with the Ombudsman Mr G. D. Coombe, the matter was resolved. Esau received \$1425 reimbursement for the 1975 value of 115 hectares and Faulkenberg surrendered to the Crown Part Sections 23, 30 and 31, Hundred of Fisher, which he had not contracted to purchase. This area, now called Section 212, was added to Swan Reach Conservation Park and proclaimed in January 1979.

The following properties were inspected but were not purchased owing to the lack of necessary funds. In February 1972, Mr E. M. Esau wished to sell additional land to the east and west of Swan Reach Conservation Park (Figure 17). The area to the east, Sections 37, 44-50 and 52-54, Hundred of Fisher (approximately 2400 hectares), would have linked Swan Reach Conservation Park with Ridley Conservation Park. The area involved was considered suitable for conservation purposes but was not purchased and has since been subdivided.

Also in 1972, the possibility arose of purchasing land to the north-east, comprising Part Sections 61, 62, 64, 65, 73, 74, 75 and 102, and Sections 63, 66, 67, 69-72 and 131, Hundred of Fisher, owned by E. L., T. K. and I. R. Atkinson and B. Graetz. This area, which would have permitted the park limits to fall on the more manageable boundary of the Swan Reach Road, was considered by the Departmental ecologist to be the most favourable of those areas offered in the district. The land included some river swamp country, and although the bulk of the area was cleared, there were large mallee and *Callitris* trees containing hollows suitable for nesting birds. The asking price, however, was "\$6 an acre" which was considered prohibitive.

Again in 1972, Sections 218-223, Hundred of Ridley (968 hectares), owned by Mr B. Roy were considered, but no purchase was made.

RECENT MANAGEMENT

Management since 1970 has consisted of regular inspections, signposting, vermin control (rabbits and goats) and liaison with neighbours regarding fencing and straying stock. Permits have been issued for five bee sites and scientific permits have been issued for studies into the ecology of Honeyeaters and the social behaviour of Babblers.

VISITOR USE

Little is known about the number of visitors to this park. However, the park is known to be used by bird observers, and indeed, the old homestead site in the southern part of the park was popular with bird trappers in previous years when the bore was still functional. As mentioned above, scientific permits for research on Honeyeaters and Babblers have been

issued for the park. It is known that visitors occasionally camp in this park, although the level of use is not high. Since dedication, permits for five bee sites have been issued, and bee-keepers are obviously interested in the area.

BIOLOGY

Two major vegetation formations are found on Swan Reach Conservation Park: 84 per cent of the area is an open area of scrub of Mallee Box (*Eucalyptus porosa*), Red Mallee (*E. oleosa*) and Yorrell (*E. gracilis*). The remaining 16 per cent comprises low woodland with False Sandalwood (*Myoporum platycarpum*) and Bullock Bush (*Heterodendrum oleaefolium*) over an understorey of Spear-grass (*Stipa* spp.), and ephemeral herbs. Most of the mallee scrub in this region has been cut over for firewood and the present vegetation is mostly regrowth. Some areas were completely cleared and now exist as grassland. Presently the park lacks the numbers of large, mature mallees which originally occurred in the area and provided nesting hollows for birds.

Overall, sixty species of birds have been recorded in the park (see Appendices: Birds) and more species are likely to frequent it (see the Brookfield Conservation Park Management Plan). Cockatiels, Mallee Ringnecks, Galahs, Banded Lapwings and White-winged Choughs are all known to have bred in the park.

The park was primarily set aside to conserve the Southern Hairy-nosed Wombat (*Lasiornis latifrons*). However, only 16 per cent of the park area that is low woodland is really suitable for these animals. An assessment based on 1972 aerial photography indicates that there are between fifteen and thirty wombat warrens in the park.

Knowledge of other vertebrates in the park is incomplete; the only other mammals recorded so far are Western Grey Kangaroos (*Macropus fuliginosus*) and Red Kangaroos (*Macropus rufus*), while Shingle-backs (*Trachydosaurus rugosus*), Gould's Goannas (*Varanus gouldii*) and Central Bearded Dragons (*Amphibolurus vitticeps*) comprise all the recorded reptiles.

APPENDICES

BIRDS

The following list of birds recorded in Swan Reach Conservation Park was compiled from inspection reports from the National Parks Commission and from information provided by several observers and collected by Reid and Vincent (unpublished).

The order of species and scientific nomenclature follows that of Condon (1975) and Schodde (1975), with amendments and vernacular nomenclature following that of The Royal Australian Ornithologists Union (1978). Introduced species are prefixed by an asterisk.

<i>Aquila audax</i>	Wedge-tailed Eagle
<i>Vanellus tricolor</i>	Banded Lapwing
<i>Phaps chalcoptera</i>	Common Bronzewing
<i>Cacatua roseicapilla</i>	Galah
<i>Glossopsitta porphyrocephala</i>	Purple-crowned Lorikeet
<i>Nymphicus hollandicus</i>	Cockatiel
<i>Barnardius barnardi</i>	Mallee Ringneck
<i>Psephotus haematonotus</i>	Red-rumped Parrot
<i>Psephotus varius</i>	Mulga Parrot
<i>Northiella haematogaster</i>	Blue Bonnet
<i>Chrysococcyx basalis</i>	Horsefield's Bronze-Cuckoo
<i>Aegotheles cristatus</i>	Australian Owlet-nightjar
<i>Caprimulgus guttatus</i>	Spotted Nightjar
<i>Hirundo neoxena</i>	Welcome Swallow
<i>Cecropis nigricans</i>	Tree Martin

<i>Anthus novaeseelandiae</i>	Richard's Pipit
<i>Petroica goodenovii</i>	Red-capped Robin
<i>Melanodryas cucullata</i>	Hooded Robin
<i>Microeca leucophaea</i>	Jacky Winter
<i>Pachycephala inornata</i>	Gilbert's Whistler
<i>Pachycephala pectoralis</i>	Golden Whistler
<i>Pachycephala rufiventris</i>	Rufous Whistler
<i>Colluricincla harmonica</i>	Grey Shrike-thrush
<i>Oreoica gutturalis</i>	Crested Bellbird
<i>Myiagra inquieta</i>	Restless Flycatcher
<i>Rhipidura fuliginosa</i>	Grey Fantail
<i>Rhipidura leucophrys</i>	Willie Wagtail
<i>Cinlosoma castanotum</i>	Chestnut Quail-thrush
<i>Pomatostomus superciliosus</i>	White-browed Babbler
<i>Pomatostomus ruficeps</i>	Chestnut-crowned Babbler
<i>Cinchorhamphus cruralis</i>	Brown Songlark
<i>Malurus splendens</i>	Splendid Fairy-wren
<i>Smicronis brevirostris</i>	Weebill
<i>Acanthiza uropygialis</i>	Chestnut-rumped Thornbill
<i>Acanthiza reguloides</i>	Buff-rumped Thornbill
<i>Acanthiza nana</i>	Yellow Thornbill
<i>Aphelocephala leucopsis</i>	Southern Whiteface
<i>Daphoenositta chrysoptera</i>	Varied Sittella
<i>Climacteris affinis</i>	White-browed Treecreeper
<i>Climacteris picumnus</i>	Brown Treecreeper
<i>Anthochaera carunculata</i>	Red Wattlebird
<i>Acanthagenys rufogularis</i>	Spiny-cheeked Honeyeater
<i>Plectorhyncha lanceolata</i>	Striped Honeyeater
<i>Manorina falvigula</i>	Yellow-throated Miner
<i>Lichenostomus virescens</i>	Singing Honeyeater
<i>Lichenostomus leucotis</i>	White-eared Honeyeater
<i>Lichenostomus ornatus</i>	Yellow-plumed Honeyeater
<i>Melithreptus brevirostris</i>	Brown-headed Honeyeater
<i>Phylidonyris albifrons</i>	White-fronted Honeyeater
<i>Certhionyx niger</i>	Black Honeyeater
<i>Pardalotus xanthopygus</i>	Yellow-rumped Pardalote
<i>Pardalotus striatus</i>	Striated Pardalote
<i>Zosterops lateralis</i>	Silvereye
* <i>Sturnus vulgaris</i>	Common Starling
<i>Corcorax melanorhamphus</i>	White-winged Chough
<i>Cracticus torquatus</i>	Grey Butcherbird
<i>Gymnorhina tibicen</i>	Australian Magpie
<i>Corvus mellori</i>	Little Raven

RESOURCE MATERIAL AND REFERENCES

MAPS

- 1:50 000 Topographic Swan Reach 6821-IV and Cambrai 6728-1 (South Australian Department of Lands)
- 1 inch—2 miles Cadastral Plan Country Eyre (South Australian Department of Lands)
- 1 inch—40 chains Cadastral Plan Hundred of Fisher (South Australian Department of Lands)
- Survey Diagram Book: Hundred of Fisher (South Australian Department of Lands)
- 1:250 000 Geological Series Adelaide and Renmark (Geological Survey of South Australia)
- Firman, J. B. (1972).—Renmark, South Australia. Explanatory Notes, 1:250 000. *Geological Series, Geological Survey of South Australia*. (South Australian Mines Department)

AERIAL PHOTOGRAPHS

- South Australian Department of Lands Swan Reach (1972) 1:41 000 Survey 1375 Nos. 32 and 33.

DOCKET REFERENCES

Department of Lands		
DE	2103/67	Re dedication of Ridley N.P. and proposed land exchange
DL	2574/69	Dedication of Swan Reach N.P.
DL	4313/71	Re land owned by E. R. and R. M. Graetz. Dedication

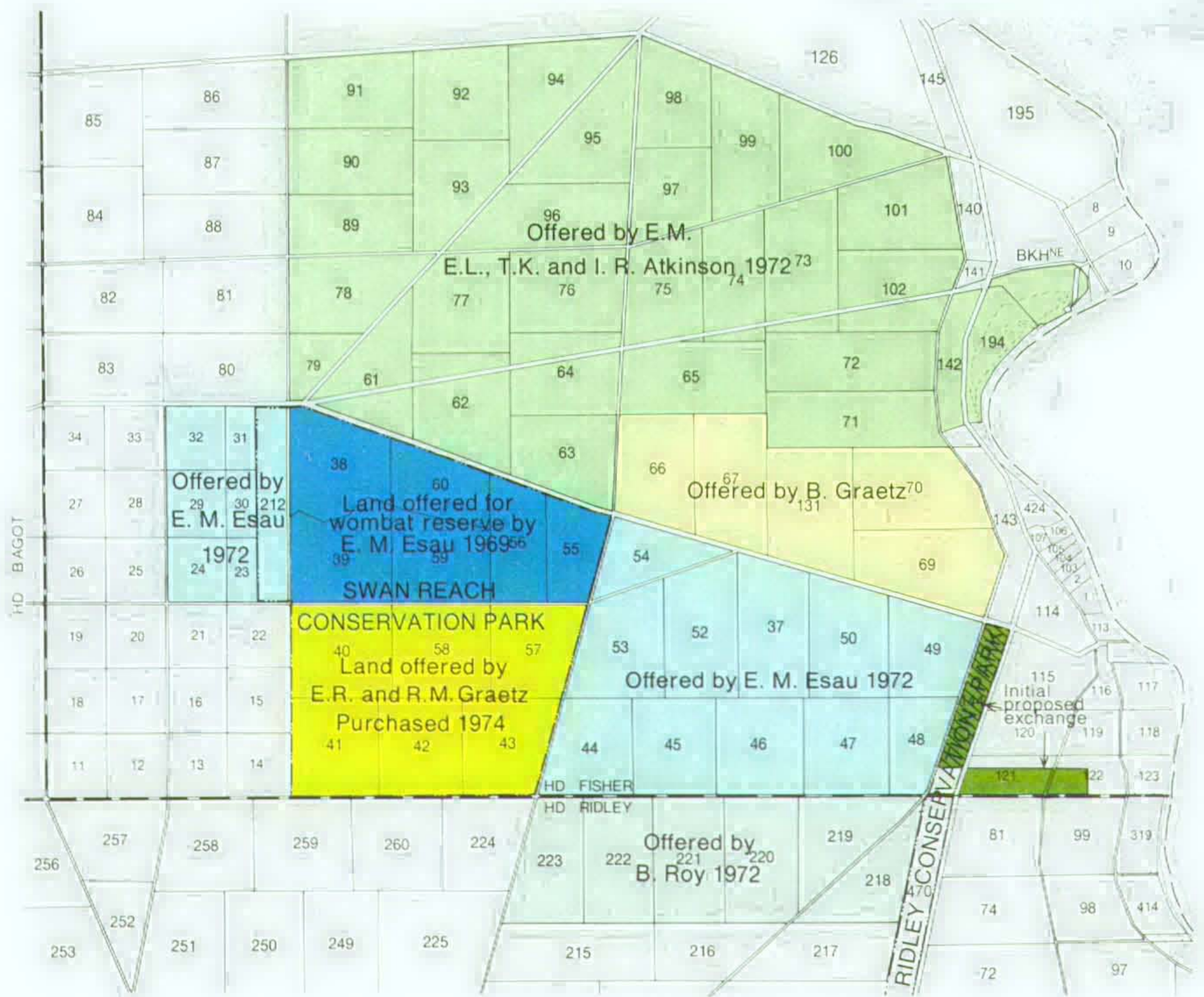


Figure 17

Land Acquisition Proposals

- DL 4318/71 Re land near Swan Reach owned by E. L., T. K. and I. R. Atkinson
- DL 1548/75 Ombudsman — re land owned at Swan Reach by Esau
- National Parks Commission
- NPC 8/70 Fencing
- NPC 181/70 Additional land — exchange of land from Ridley N.P.
- NPC 316/71 Straying stock
- Department of Environment and Conservation
- DEC 1135/72 General correspondence and proposed land exchange
- DEC 1135A/72 Beesites
- Department for the Environment
- DE 3772/77 Ombudsman — re land owned at Swan Reach by Mr Esau
- National Parks and Wildlife Service
- NPWS 90/72 Scientific permits

REPORTS

South Australian Archives—Research Note 1324/83.
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- Royal Australian Ornithologists Union. (1978).—Recommended English Names for Australian birds. *Emu*. 77 : 245-310.
- Schodde, R. (1975).—"Interim List of Australian Songbirds. Passerines." (Royal Australian Ornithologists Union: Melbourne.)
- Williams, M. C. (1974).—"The Making of the South Australian Landscape: A Study in the Historical Geography of Australia." (Academic Press: London.)

ACKNOWLEDGEMENTS

We wish to thank Mr. N. Forde and Mr E. M. Esau for their co-operation in providing information for this Management Plan.

PART 2

MANAGEMENT OBJECTIVES

INTRODUCTION

The following objectives for the management of Swan Reach Conservation Park are designed to serve as a rigorous guide to the uses and developments permitted within the park. All park management should be constrained within the limits of these objectives. This section has been formally adopted by the Minister of Environment and Planning under the provisions of the *National Parks and Wildlife Act 1972-1981*.

ZONING

To zone the various habitats and features of Swan Reach Conservation Park to ensure the conservation, in perpetuity, of the natural environment of the park.

FACILITIES FOR VISITORS

To provide facilities for visitors in a manner consistent with conserving the natural environment of the park.

PLANT AND VERTEBRATE PESTS

To control, where possible, pest plants and any other introduced species of plants and animals.

FIRE

To ensure that provision is made to control all fires.

FENCING

To prevent the entry of straying stock.

ROADS AND TRACKS

To upgrade, close or alter existing roads and tracks to facilitate management of the park.

BEE SITES

To grant bee licences, subject to established National Parks and Wildlife Service policy, provided such activities do not conflict with other management objectives.

ADDITIONAL LAND

To add to the park adjoining areas of available land which are suitable for park purposes and which facilitate management of the Reserve as an integral unit.

STAFFING

To ensure that staff levels are adequate to properly maintain the park and to ensure the proper management of wildlife in the surrounding district.

PART 3

IMPLEMENTATION OF MANAGEMENT OBJECTIVES

ZONING

To zone the various habitats and features of Swan Reach Conservation Park to ensure the conservation, in perpetuity, of the natural environment of the park.

As the primary purpose of Swan Reach Conservation Park is conservation of the mallee vegetation and the population of Hairy-nosed Wombats, the park should be divided into two zones (Figure 18).

The majority of the park should be zoned as "Natural Area". Public access by vehicle should be permitted along existing tracks and elsewhere by foot. The ranger-in-charge should attempt to estimate wombat numbers in this zone by systematically counting and mapping active wombat warrens.

Low intensity camping occurs in the park at present, the most popular site being near the ruined hut in the south-central part of the park. Camping in the cleared areas both near this ruin and near the second ruin in the north-western corner of the park should continue to be permitted and these two areas should be zoned "Development".

In the Development Zones simple facilities such as parking areas and barbecue sites for campers and day visitors may ultimately be provided.

FACILITIES FOR VISITORS

To provide facilities for visitors in a manner consistent with conserving the natural environment of the park.

In spite of the erection of signs in this park in the past, there are few of these signs in evidence today. In addition, much of the land near this park has been subdivided into small holdings and the sale of these blocks will result in an influx of people to the area who may be unaware of the park's existence.

Routed wood signs indicating the name of the park should be erected at the north-western and north-eastern corners of the park. Triangular boundary markers should be placed at strategic intervals around the park boundaries, while large triangular gate markers should be placed on all park gates. Two standard information signs for conservation parks should be erected, one on the entrance track near the north-western corner and one in the cleared area near the ruin in the south-central part of the park.

As mentioned above, simple facilities for campers and day visitors should be provided in the two Development Zones. These should be commensurate with the level of use, and at present little needs to be done except for general tidying up of the southern site. However, should numbers of campers increase in the future, the provision of defined parking areas and toilets should be considered. Visitor numbers should be periodically monitored by the ranger-in-charge so as to provide a guide to appropriate levels of development.

PLANT AND VERTEBRATE PESTS

To control, where possible, pest plants and any other introduced species of plants and animals.

Rabbits occur on the park but at present their numbers are low. However, the ranger should keep a watch on rabbit numbers and take steps to control them should they increase in the future. Feral Cats, Goats and Foxes should be shot on sight by the ranger staff.

Pest plants have not been a major problem in this park in the past, however, particularly in the low woodland and "cleared areas", there are now some minor outbreaks of pest plants, in particular Horehound. Where possible, such outbreaks should be controlled by hand pulling and grubbing, but should a major outbreak occur a spraying programme may need to be developed.

FIRE

To ensure that provision is made to control all fires.

In accordance with established National Parks and Wildlife Service policy, boundary access tracks are normally constructed around the perimeter of all parks. In the case of Swan Reach Conservation Park adequate tracks or roads exist on three sides. However, a boundary access track will need to be constructed along the eastern boundary of the park, especially as the land to the east has recently been divided into small holdings. This track should be constructed using a tritter with as little impact on the environment as possible.

These tracks will thus provide a measure of protection for the park in the event of fires entering from adjacent land, and in addition will protect the neighbours from fires which start within the park.

Internal tracks are considered to be adequate at this stage and no further tracks should therefore be constructed.

An old bore exists in Section 42 near the ruined hut. It is presently unserviceable as there is no windmill and the tank and trough have rusted out. It is not proposed to recommission the bore at this stage, but the bore itself should be properly capped to allow for the possible provision of a water supply in the future.

FENCING

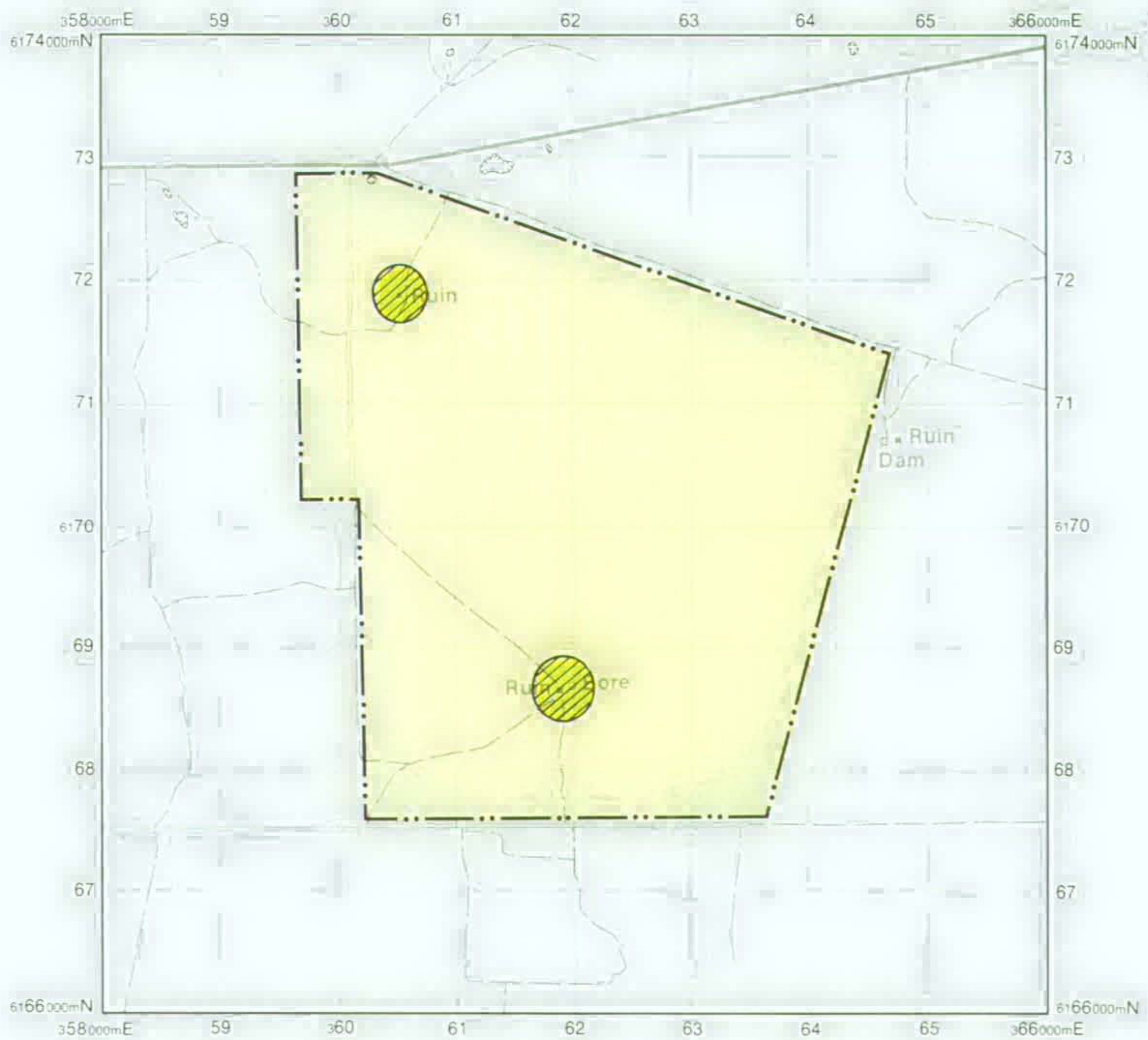
To prevent the entry of straying stock.

With the exception of the western boundaries of Sections 38 and 39, the park is completely fenced, although these fences are not necessarily on the park side of boundary road reserves. At this stage this is not considered to be a problem as the existing fences are generally adequate. In the future, however, it may be necessary to fence the park side of these road reserves at the expense of the National Parks and Wildlife Service. The latest addition to the park, Section 212, is adequately fenced and its inclusion in the park obviates the need to fence the western boundary of Sections 38 and 39 provided some road closing under the *Roads (Opening and Closing) Act 1932-1946* can be arranged in the future.

ROADS AND TRACKS

To upgrade, close or alter existing roads and tracks to facilitate management of the park.

As mentioned above, there is no need to expand the present track network in the park (Fig. 13). In the Development Zone in Section 42 near the ruined hut there may be a need in the future for signposting and vehicle barriers to stop a proliferation of tracks in this area.





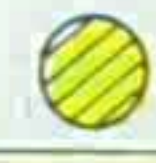
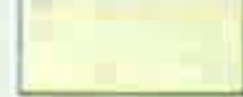
- Park Boundary** 
- Sealed road** 
- Unsealed road** 
- Access and Walking Tracks** 
- Development Zone** 
- Natural Area Zone** 

Figure 18

**Swan Reach C.P.
Zoning**



Running east-west roughly through the centre of the park is a public road reserve. Although there is a rough track on portion of this alignment, it is not used for through traffic and should be formally closed under the *Roads (Opening and Closing) Act 1932-1946* and added to the park. The public roads on the northern and southern boundaries of the park should remain open as they are used for through traffic. However, it would be desirable to close the roads on the eastern and western sides if agreement can be reached with neighbouring landowners and the local council. These roads are virtually undeveloped at the moment. Mr R. J. Lang has expressed opposition to closing the road between Sections 54 and 55. Options for future closure of the road south of this point should be examined in conjunction with the investigation for purchase of Section 54.

BEE SITES

To grant bee licences, subject to established National Parks and Wildlife Service policy, provided such activities do not conflict with other management objectives.

As mentioned above, in the years since dedication, there have been five licences for bee sites issued in this park. In accordance with National Parks and Wildlife Service policy on bee-keeping in parks it is considered appropriate that the two current bee licences be continued. Continuation of bee licences should be periodically reassessed in the light of research findings on the competition effects of bees with native flora and fauna.

ADDITIONAL LAND

To add to the park adjoining areas of available land which are suitable for park purposes and which facilitate management of the Reserve as an integral unit.

Section 54, Hundred of Fisher, has been offered for sale as an addition to the park. It should be examined apropos its suitability for park purposes and, if appropriate, ultimately added to the park.

STAFFING

To ensure that staff levels are adequate to properly maintain the park and to ensure the proper management of wildlife in the surrounding district.

Swan Reach Conservation Park is one of several parks in the Brookfield District of the Murraylands Region of the National Parks and Wildlife Service. The park is managed by the Ranger-in-charge of the Brookfield District who is based at the Brookfield Conservation Park. For details of staffing requirements for this District refer to the Brookfield Conservation Park Management Plan.

PART 4

SUMMARY OF MANAGEMENT PROPOSALS

As a guide to the orderly application of the provisions of this Management Plan for Swan Reach Conservation Park, the foregoing management proposals are summarised and ranked. This ranking indicates the relative priority of projects and whether they are on a short-term or continuing nature. A distinction has been made between research and monitoring projects and those requiring funding for works and maintenance.

RESEARCH AND MONITORING

PROJECT	PRIORITY	DURATION	Page
Estimate of active wombat warrens by ranger	Moderate	Short	50
Estimate of visitor use	Moderate	Continuing	50
Biological inventory	Moderate	Continuing	46

WORKS AND MAINTENANCE

PROJECT	PRIORITY	DURATION	Page
Signposting	High	Short	50
Cap bore	High	Short	50
Minimise deterioration of historic relics	Moderate	Continuing	39
Consult neighbours and Ridley Council with a view to road closing under <i>Roads (Opening and Closing) Act 1932-1946</i>	Low	Medium	50
Construct boundary access track	Moderate	Short	50
Control pest plants	Moderate	Continuing	50
Control vertebrate pests	Moderate	Continuing	49
Fencing	Moderate	Short	50
Develop camping areas	Low	Short	50
Investigate surrounding land for suitability as future additions to park	Low	Short	62
