

Tilley Swamp Conservation Park Management Plan

South East

South Australia



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December 2000

Department for Environment and Heritage

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

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National Parks and Wildlife SA
Department for Environment and Heritage

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Foreword

This management plan sets out objectives and actions for the Tilley Swamp Conservation Park. It has been prepared in accordance with the *National Parks and Wildlife Act, 1972*. The Park is of considerable conservation value and is managed by National Parks and Wildlife South Australia (NPWSA), a unit of the Department for Environment and Heritage.

Located north of Kingston in the Upper South East of South Australia, Tilley Swamp Conservation Park is one of a few reserves in the district containing threatened plant associations. Three of the vegetation associations in the Park are poorly conserved within the National Parks and Wildlife Reserve system and only exist as small populations in this park. The Park also provides habitat for several other threatened species including the Metallic Sun-orchid, Common Wombat and Rufous Bristlebird. Management aims to conserve this remnant vegetation and associated wildlife.

Historically, Tilley Swamp was seasonally inundated watercourse habitat receiving surface flows from several upstream watercourses to the south-east. The Tilley Swamp Watercourse, including the Tilley Swamp Conservation Park, are integral components of the Upper South East Dryland Salinity and Flood Management Plan. The watercourse will be utilised for moving surface water north-west from the central and southern catchments towards the Morella Basin and the Martin Washpool Conservation Park, before flowing into the southern lagoon of the Coorong at Salt Creek. Implementation of this scheme provides opportunities to improve the wetland values of the Park.

This plan of management was released in draft form for public review in January 2000. At the close of the period for public consultation, five written submissions had been received. Those comments, and the draft plan, were subsequently reviewed by the Reserve Planning and Management Advisory Committee of the South Australian National Parks and Wildlife Council, resulting in a number of changes being made to the plan text. These changes were subsequently endorsed by Council. Public involvement in the planning process makes a worthwhile contribution to better park management, and those who took the time to make representations are thanked for their efforts.

The management objectives and actions for Tilley Swamp Conservation Park have not been prepared in isolation but rather in consultation with other agencies and community groups. The location of other DEH reserves and areas of remnant vegetation have also been considered to ensure that Tilley Swamp Conservation Park is managed in a regional context.

The plan of management for Tilley Swamp Conservation Park is now formally adopted under the provisions of section 38 of the National Parks and Wildlife Act, 1972.

A handwritten signature in black ink, appearing to read 'Iain Evans', written in a cursive style.

The Hon. IAIN EVANS, BAppSC (Building Technology), MP

MINISTER FOR ENVIRONMENT AND HERITAGE
MINISTER FOR RECREATION, SPORT AND RACING

Acknowledgments

This park management plan has been prepared in consultation with other agencies, community groups and individuals.

NPWSA staff from Mt Gambier, Meningie, Salt Creek, and Adelaide have provided considerable assistance, advice and information. The Coorong Consultative Committee was involved in the development of the plan.

Contents

Foreword	i
Acknowledgments	iii
1.0 Introduction	
1.1 Planning Process	1
1.2 Park Classification	2
2.0 Management Framework	
2.1 Park Description	4
2.2 Park Significance	4
2.3 Management Obligations	6
2.3.1 <i>Simultaneous Proclamation</i>	6
2.3.2 <i>Upper South East Dryland Salinity and Flood Management Plan</i>	6
2.4 Management History	8
3.0 Park Management Plan	
3.1 Biodiversity	11
3.1.1 <i>Co-operative Management</i>	11
3.1.2 <i>Fire Management</i>	12
3.1.3 <i>Native Animals</i>	13
3.1.4 <i>Native Plants</i>	15
3.1.5 <i>Hydrology and Drainage</i>	17
3.2 Cultural Heritage	19
3.3 Recreation and Tourism	21
4.0 Summary of Management Actions	22
5.0 References and Bibliography	24
List of Figures	
Figure 1 - Parks of the Upper South East	3
Figure 2 - Tilley Swamp Conservation Park	9
Figure 3 - Proposed Drainage Route for the Tilley Swamp Watercourse	10

1.0 Introduction

1.1 Planning Process

There is a requirement under Section 38 of the *National Parks and Wildlife Act 1972*, to prepare a management plan for each reserve constituted under the Act. Such plans set forth proposals to manage and improve reserves and the means by which the objectives of the Act will be accomplished. A management plan provides the framework for management of the park by stating the philosophy on which management should be based and by setting out objectives and actions for management. The objectives related to management of reserves are stated in Section 37 of the Act as:

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

National Parks and Wildlife SA (NPWSA) as a matter of policy invites comments from key agencies, groups and individuals before the draft management plans are formally released for comment from the general public. This stage aims to gain a measure of understanding amongst various stakeholders before the subsequent public exhibition period. The Coorong Consultative Committee was consulted during the preparation of this plan.

Once a draft management plan has been prepared, an announcement is made in the *Government Gazette* and the plan is placed on public exhibition for at least three months. Any person may make submissions in relation to the plan.

The plan and submissions are then referred to the National Parks and Wildlife Council who may make further comments or recommendations to the Minister.

The Minister, after considering all representations, may then adopt the plan with or without alterations. Notice of adoption is published in the *Government Gazette* and copies of the plan are made available to the public.

Once a plan is adopted, the provisions will be carried out in relation to the reserve in question, and no activities will be undertaken in conflict with the management plan. A similar process applies for any amendment proposed to a management plan.

1.2 Park Classification

The classification that a reserve receives on being dedicated under the *National Parks and Wildlife Act 1972* is a general statement of the purpose for which that area was acquired. Examples of such classifications can be found below.

National Parks are areas considered to be of national significance by reason of wildlife or features of that land.

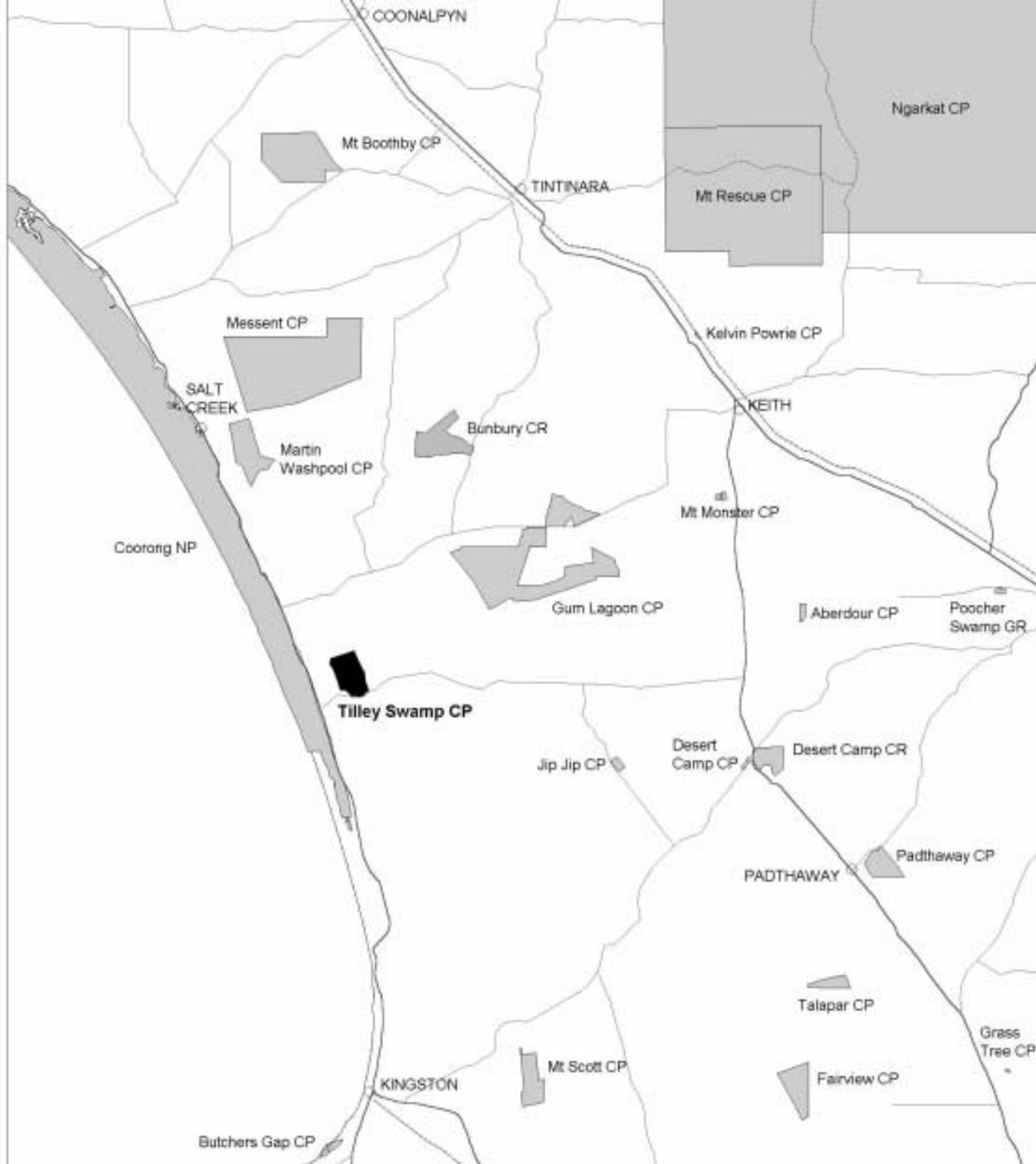
Conservation Parks are areas of land protected for the purpose of conserving any wildlife or the natural or historical features of that land. The development of visitor facilities in conservation parks tends to be kept to a minimum.

Game Reserves are established to conserve wildlife and manage game species. They have an important conservation role and may be declared open at prescribed times for strictly controlled hunting.

Recreation Parks conserve areas of significance, which are managed for public recreation and enjoyment.

Regional Reserves are areas proclaimed for the purpose of conserving any wildlife or the natural or historical features of that land while, at the same time, permitting the utilisation of the natural resources of that land (i.e. mining).

Conservation Reserves are areas set aside for conservation purposes under the *Crown Lands Act, 1929* and held under the care, control and management of the Minister for Environment and Heritage. They are areas with significant conservation values that for various reasons were not proclaimed under the *National Parks and Wildlife Act, 1972*.



 Tilley Swamp Conservation Park

 Other Parks of the South East

Reserves under NP&W Act

CP Conservation Park

NP National Park

GR Game Reserve

Reserves under the Crown Lands Act

CR Conservation Reserve



Figure 1

PARKS OF THE UPPER SOUTH EAST
Location Map

2.0 Management Framework

2.1 Park Description

The Tilley Swamp Conservation Park is located 40 kilometres south of Salt Creek, and 5 kilometres inland from the Coorong coast in the Upper South East of South Australia (Figure 1). Moves to establish this reserve began in the late 1980's following an application for vegetation clearance through the Native Vegetation Management Branch by the owner. The Native Vegetation Management Authority refused the application and subsequently the allotment was registered as a Heritage Agreement and eventually sold to NPWSA. This large patch of vegetation is a significant addition to the reserve system as it is considered to be the "most significant scrub block in the Hundred of Neville" (Native Vegetation Management Branch, 1987).

The Park conserves an area of 1,525 hectares in allotment 100 of the Hundred of Neville (Figure 2). The allotment was proclaimed and gazetted in 1993 as the Tilley Swamp Conservation Park primarily to "conserve remnant vegetation associations".

The Park consists of a seasonally inundated wetland with associated heathland on low-lying areas, and diverse vegetation associations on a dunal system to the west. Soil formations include shallow red to red-brown, well-drained loams and broad limestone rises with stony surfaces.

The Park forms an integral part of the significant Tilley Swamp Watercourse, which moves surface waters northerly through the Park. Tilley Swamp Conservation Park is an important refuge for thousands of water birds during summer, and for at least twenty other species throughout the year, including the *vulnerable* (in SA and the SE) Rufous Bristlebird. The Park provides important habitat for a number of mammal species, including the *rare* (SA) Common Wombat and *rare* (SA) Red-necked Wallaby.

Two of the vegetation associations existing in the Park have high conservation significance (Croft and Carpenter, 1996). These associations are the *Allocasuarina verticillata* low woodland and *Eucalyptus fasciculosa* low woodland.

Past land use has been predominantly seasonal grazing and drainage.

2.2 Park Significance

The Tilley Swamp Conservation Park conserves significant wetland habitat and associated biodiversity. The Park supports vegetation associations and species of important conservation status, both within the region and State, whilst providing low-impact recreational opportunities.

The area containing Tilley Swamp Conservation Park is identified in the Biodiversity Plan for the South East of South Australia (Croft et al., 1999) as a ‘Key Biodiversity Area’ for conservation. Croft et al state that this large remnant area, known as the North West District, is highly important as it contains:

- high habitat value (based on GIS modelling results);
- blocks of remnant vegetation > 1000 hectares;
- supporting blocks of remnant vegetation > 200 hectares;
- high species diversity;
- good estimated population sizes for most species within these areas;
- populations of species of high conservation significance at least at the Regional level.

The North West District retains the “largest area of remnant native vegetation of any district” within the South East region (Croft et al., 1999). It includes Coorong National Park, several Conservation Parks of more than 1000 hectares in size, Bunbury Conservation Reserve (1951 hectares), 18 Heritage Agreements and large blocks of remnant scrub on private land. This area contains the western most Australian populations of the *rare* (SA) Common Wombat and Red-necked Wallaby and is predicted habitat for the *endangered* (SA) Malleefowl (*Leipoa ocellata*) (Croft et al., 1999). The Park forms part of the Tilley Swamp Watercourse, which is identified as a key wetland for the Upper South East (Upper South East Dryland Salinity and Flood Management Plan Steering Committee 1993).

Natural Values

- Represents 19% of the remaining native vegetation in the Tilley Swamp Environmental Association.
- Represents 22.6% of the remaining native vegetation in the Hundred of Neville.
- Significant component of the Tilley Swamp Watercourse system.
- Supports important wetland habitat for waterbirds including Painted Snipe, Wood Sandpiper, and Glossy Ibis.
- Supports significant vegetation communities, particularly Drooping Sheoak Low Woodland and Pink Gum Low Woodland.
- Significant vegetation and fauna species inhabit the Park, including Beautiful Firetail, Metallic Sun-orchid, and Slender Daisy.

Cultural Values

- Inhabitation by the Ngarrindjeri tribe of the Coorong region for thousands of years, and an important part of their culture.
- Pastoral settlement in the early 1840’s.

Tourism and Recreational Values

- In close proximity to Coorong National Park where visitor facilities are available.
- Readily accessible from the Princes Highway.
- Opportunities for visitors interested in natural history to appreciate and experience the natural and cultural features of the Park.

2.3 Management Obligations

2.3.1 Simultaneous Proclamation

The Tilley Swamp Conservation Park was simultaneously proclaimed in 1993 pursuant to Section 43 of the *National Parks and Wildlife Act, 1972*, to allow the continuation of pre-existing mining access.

This type of proclamation allows entry, prospecting, exploration and mining under the *Mining Act, 1971* and the *Petroleum Act, 1940* subject to the approval of the Minister for Environment and Heritage and the Minister of Primary Industries and Resources, to persons in whom existing rights are vested. Normandy Exploration Ltd currently holds an exploration licence (EL 359) that covers the Park

In the simultaneous proclamation of Tilley Swamp Conservation Park, the rights of entry, prospecting, exploration and mining were subject to the following conditions:

- at least 3 months prior to beginning any proposed work the person must notify and supply information as required to the Minister of Primary Industries and Resources;
- the person must comply with the Minister of Primary Industries and Resources in relation to carrying out work to minimise damage to the land, environment, vegetation or wildlife, and to preserve objects and sites of historic, scientific or cultural significance;
- the person must comply with the provisions of the reserve's management plan.

Additionally, the person undertaking mining works is required to:

- ensure objects and sites of significance, and vegetation and wildlife are not unduly affected by the right to entry, prospecting, exploration and mining;
- take steps to minimise the damage to vegetation;
- maintain work areas in a clean and tidy condition, and;
- obliterate and remove all structures upon the completion of the work.

2.3.2 Upper South East Dryland Salinity and Flood Management Plan

The Upper South East Dryland Salinity and Flood Management Plan was developed in response to the community's concern about increasing areas of salinised land and prolonged flooding. Those concerns were raised following extensive flooding in 1988 and successive years of water pondage across the region. It was realised that the region was being increasingly affected by dryland salinity and flooding problems. These problems have been exacerbated by extensive native vegetation clearance, which has resulted in increased groundwater recharge and the rise of groundwater levels. High water tables increase the rate of surface run-off during winter, which contributed to

flooding in many low lying areas (Upper South East Dryland Salinity and Flood Management Plan 1993).

The Upper South East Dryland Salinity and Flood Management Plan (1993) provides details on how the community can combat the effects of dryland salinity and flooding. The report recommends the coordinated use of deep and shallow drains with complementary revegetation and wetland management programs. The wetland rehabilitation component of the plan, “Wetlands Waterlink”, aims to re-establish watercourse systems that provide sustainable wetland and terrestrial habitats, breeding grounds and wildlife corridors.

The Upper South East Dryland Salinity and Flood Management Plan (1993) is a government initiative that impinges upon several NPWSA reserves in the region. Decisions on the overall scheme and drainage route options are made by the Upper South East Implementation Group and the South Eastern Water Conservation and Drainage Board in consultation with the Upper South East community. Endorsement for the Tilley Swamp proposal has been sought from the local community, in addition to approvals from the Native Vegetation Council and consultation with the National Parks and Wildlife Council. Decisions are made with reference to the Upper South East Dryland Salinity and Flood Management Plan (1993).

A large portion of Tilley Swamp Conservation Park contains a seasonally inundated wetland system which forms part of the Tilley Swamp Watercourse, an integral component of the dryland salinity and flood mitigation scheme. Together with Martin Washpool Conservation Park, the reserves will play an important role in better utilising surface flows, while disposing of poor quality groundwater, for the Wetlands Waterlink component of the Upper South East Scheme.

Several drainage options have been proposed for the Tilley Swamp Watercourse (refer to the Upper South East Dryland Salinity and Flood Management Plan, 1993). Each proposal differed in the degree of construction required, the volume and salinity of drainage water and the planned duration of ponding (Stewart *et al*, 1998). The general requirements by NPWSA with respect to surface water management include minimisation of vegetation clearance and re-instatement of wetland hydrology. In regard to groundwater control, de-watering of natural areas should be avoided.

A proposal based on option 3 was approved for Tilley Swamp Conservation Park (see Section 3.1.4). Excess surface waters from the central and southern catchments (West Avenue Range, Bakers Range, and Marcollat Watercourses) will flow through Henry Creek to the Tilley Swamp Watercourse and Morella Basin in the north-west (Figure 3). The waters will then outflow to the Coorong via an outlet drain at Salt Creek.

2.4 Management History

Tilley Swamp Conservation Park is managed by NPWSA, South East Region. District staff are located at Salt Creek, Meningie and Noonamena.

NPWSA utilise a broad range of resources to assist in the management of Tilley Swamp Conservation Park. This workforce includes rangers, construction and maintenance workers, contract employees and volunteers (Friends of Parks Inc.). The Coorong Consultative Committee provides NPWSA with a means of obtaining public input into park management.

The assistance provided by volunteers greatly advances the achievement of the management objectives and actions of the *National Parks and Wildlife Act, 1972* and will aid the implementation of this management plan.

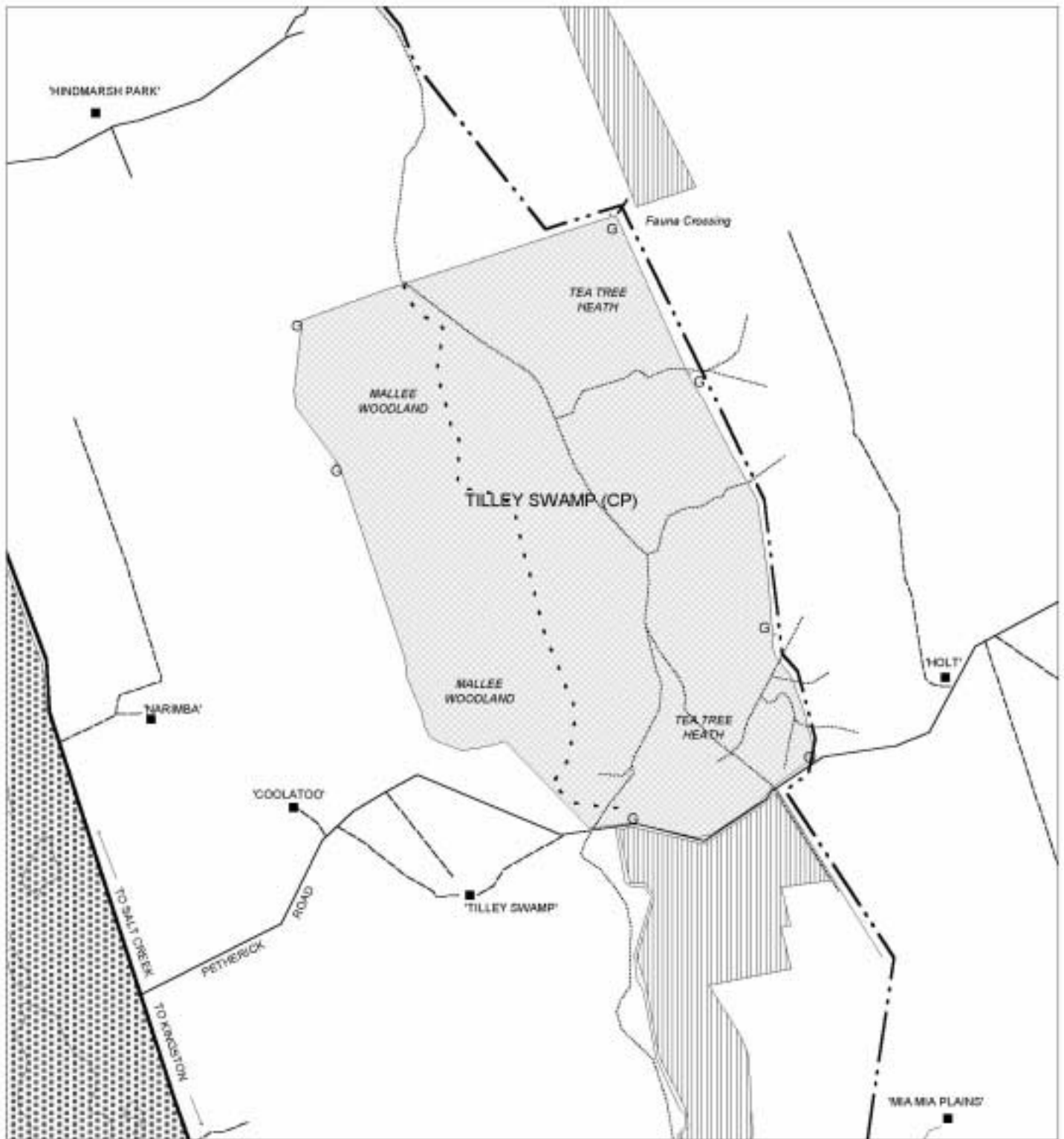
The management of Tilley Swamp Conservation Park has been focused upon ameliorating threats to the Park's flora and fauna. Since the gazettal of the Park in 1993, great progress has been achieved in the control and lowering of introduced species' impacts upon the Park's biodiversity. Annual weed control programs have achieved a lowering of weed abundance. Work programs have targeted Salvation Jane, Horehound, and thistles along the northern, southern and western boundaries.







The presence of European Rabbits in the Park has been a significant problem in the past. The western and northern boundaries, and areas previously subjected to grazing were of particular concern. In liaison with the Lacepede/Tatiara Animal and Plant Control Board Authorised Officer, an annual baiting program has resulted in a marked decline in population numbers, and thus environmental impacts.

Flora and fauna research within the Park has been largely focused upon the drainage route proposed by the Upper South East Dryland Salinity and Flood Management Plan. The results of the biological survey are detailed in Stewart *et al* (1998).

Visitor facilities have not been developed because of low usage.

Fire access has been established on the eastern, northern and western boundaries and a new fence on the western boundary.



-  Two Lane Access (sealed)
-  Two Lane Access (unsealed)
-  Single Lane Access
-  Park Access Track
-  Existing Drains
-  Proposed Drainage
- G** Gate



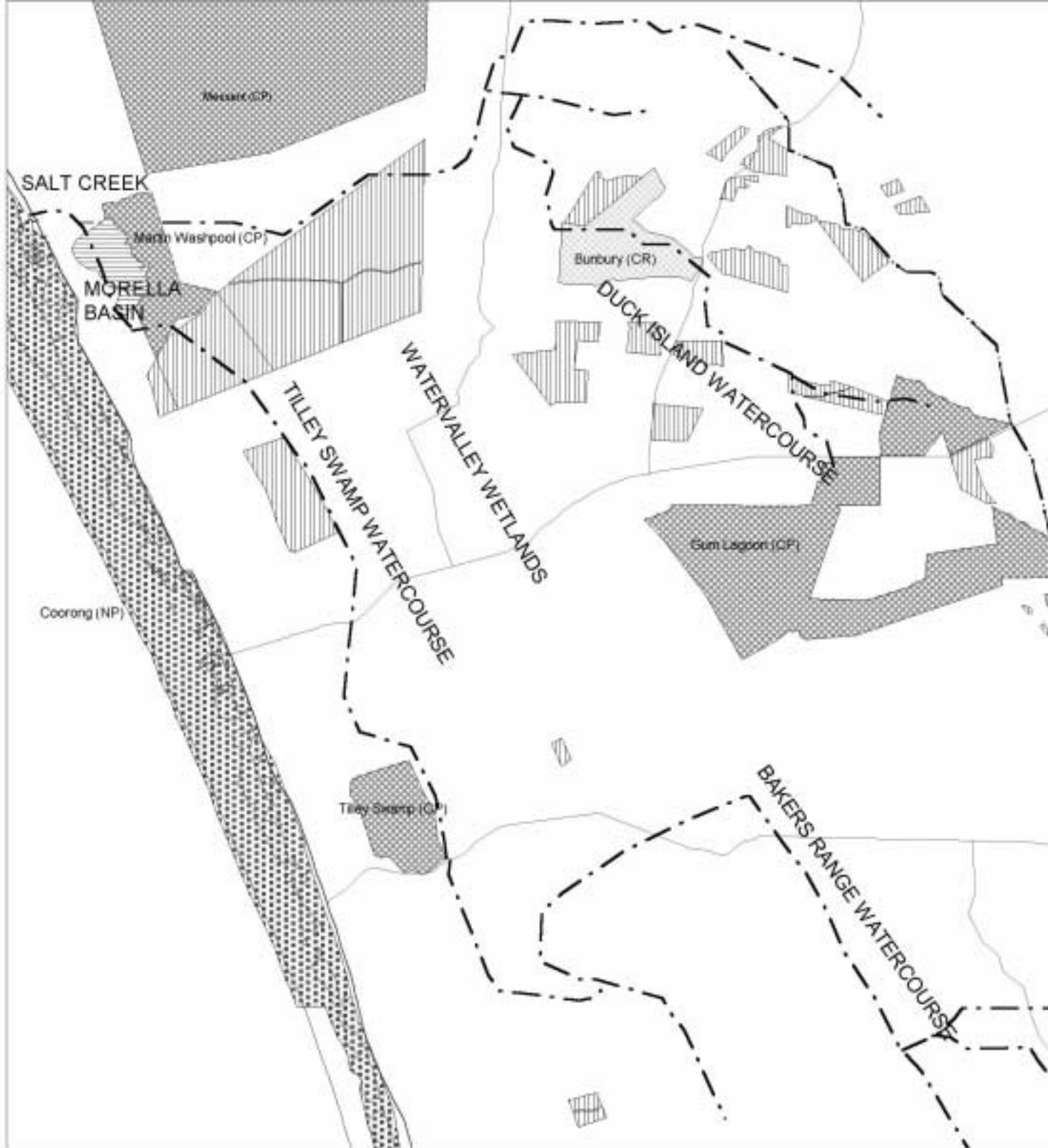
-  Native Vegetation
-  Coorong National Park



Figure 2

TILLEY SWAMP CONSERVATION PARK



- Major Road
- - - Minor Road
- ▨ Heritage Agreements
- Reserves under NP&W Act
- ▤ Conservation Park
- ▧ National Park
- Reserves under the Crown Lands Act
- ▩ Conservation Reserve

- - - Drainage Route
- ▨ Morella Basin

0 5 10
Kilometres

↑ N

Figure 3
PROPOSED DRAINAGE ROUTE FOR THE TILLEY SWAMP WATERCOURSE

3.0 Park Management Plan

3.1 Biodiversity

3.1.1 Co-operative Management

The Tilley Swamp Conservation Park is one of two reserves within the Tilley Swamp Environmental Association (Laut *et al*, 1977). The Park represents 19% of the remaining native vegetation (8026 hectares) in this association of which the Martin Washpool Conservation Park contributes a further 23.7%. Tilley Swamp Conservation Park also represents 22.6% of the remaining native vegetation (6748 hectares) in the Hundred of Neville (Department for Environment and Planning, 1987).

Tilley Swamp Conservation Park is one component of the larger wetland ecosystem of the Tilley Swamp Watercourse. To the west is the southern section of the Coorong National Park, whilst in the north is Messent, Martin Washpool and Gum Lagoon Conservation Parks, Bunbury Conservation Reserve, and large wetland areas held in trust for conservation purposes by the Wetlands and Wildlife Trust. A significant number of heritage agreements are located in the north, and north-east of the Park (Figure 3). All of these remnant blocks provide a significant wildlife corridor link to Messent Conservation Park and other patches of native vegetation.

It is well recognised throughout Australia that the achievement of conservation goals can not be achieved through the reservation of public land alone, but is dependent on the conservation efforts of private landowners and other non-government organisations. This is particularly the case with small reserves, where attempting to maintain long-term biological integrity in isolation is difficult.

NPWSA encourages adjacent landowners to consider a co-operative approach to the management of remnant vegetation and other habitat in the vicinity of the reserves, particularly where it adjoins the reserve boundary.

Co-operative management arrangements can vary from the development of formal joint management plans to informal voluntary meetings between park managers and park neighbours to discuss issues of common interest. Benefits include more effective pest plant and pest animal control programs through an integrated approach, practical fire prevention and fencing arrangements, opportunities for landowners to contribute to park management and an improved chance of maintaining biodiversity.

The maintenance of biodiversity of Tilley Swamp Conservation Park would benefit from such an approach. Managed co-operatively, this important area has the potential to enhance biodiversity values and threatened species survival in the region.

Objectives

- To achieve cooperation in management of biodiversity.
- Maintain the biodiversity and community integrity of the Park.

Actions

- Liaise with landowners to identify opportunities for co-operative management arrangements.

3.1.2 Fire Management

The Australian biodiversity has evolved and adapted to the event of fire, and many ecosystems now rely upon its influence to maintain the community composition and structure. A change in fire regime can modify this by favouring either fire dependant or fire sensitive species, depending on whether frequency is increased or decreased. Too frequent fires can also impact negatively on fire dependant species by not allowing enough time for recruitment. Fire intensity and seasonality are significant factors.

The role of fire in biodiversity at Tilley Swamp Conservation Park has not been investigated. Some species within the Park, particularly those of high conservation significance, may require specific management techniques, including the use of fire.

Fire management in NPWSA reserves is based on guidelines and objectives contained in the Fire Management and Protection Manual (1989) and the Bushfire Prevention Plans. The Fire Management and Protection Manual is an internal report which sets out objectives of fire management and the Service's fire policy and guidelines.

The objectives of fire management as stated in the Manual are to:

- Protect human life and the assets of properties adjacent to parks;
- Foster sound land use planning in relation to fire hazard;
- Maintain diversity of native plant and animal communities;
- Protect special features including cultural sites and park facilities; and
- Manage fire, thus protecting the land from degradation by erosion and subsequent invasion by weeds.

Croft *et al* (1999) list the following as important factors to benchmark fire management:

- prevent a single fire event from burning an entire vegetation island;
- restrict the burning of any one vegetation community to less than 25%; and
- prevent a fire entering a community that has experienced wildfire in the last 20 years.

In accordance with the *Country Fires Act, 1989* a Bushfire Prevention Plan has been developed for the Park. The plan summarises the risks and hazards associated with and surrounding the Park. Fire suppression and prevention strategies outlined within the plan provide management direction for NPWSA staff and the Country Fire Service.

Objectives

- Maintain the biodiversity and community integrity of the Park.
- Protect people and property from damage by wildfire.

Actions

- Undertake an assessment of the need for fire in biodiversity management.
- Determine the need for fire in managing specific species.
- Implement and maintain fire prevention strategies as outlined in the Bushfire Prevention Plan.
- Review the Bushfire Prevention Plan to address the benchmark criteria specified by Croft *et al* (1999).

3.1.3 Native Animals

The diverse nature of the Park provides habitat suitable for many different animal species ranging from birds, mammals, amphibians, reptiles and invertebrates. The seasonal swamp habitat is of particular conservation value, as it provides a refuge for waterbirds and wetland fauna.

Several bird surveys have been undertaken along the Tilley Swamp Watercourse since the late 1970's. During a survey in 1981 (to assess the status and conservation of waterbirds in the South East) Jaensch and Auricht (1989) counted nineteen waterbird species at a site less than 10 kilometres north of the Tilley Swamp Conservation Park. Of those species the *vulnerable* (SA & SE) Painted Snipe (*Rostratula benghalensis*), migratory Wood Sandpiper (*Tringa glareola*) and the *rare* (SA & SE) Glossy Ibis (*Plegadis falcinellus*) were considered significant sightings for the area. Other significant birds sighted included the Whiskered Tern (*Sterna hybrida*), White-faced Heron (*Ardea novaehollandiae*) and *uncommon* (SA) Musk Duck (*Biziura lobata*). Jaensch and Auricht (1989) indicated that the Tilley Swamp area was one of three top sites in the South East for the Silver Gull (*Larus novaehollandiae*) and the Whiskered Tern.

A further survey in 1987 (undertaken by D. Kraehenbuel and G. Carpenter) found that up to forty five terrestrial bird species utilised the Tilley Swamp Conservation Park and surrounds. Several of these species are of conservation significance.

Stewart, *et al* (1998) undertook a detailed biological survey along the entire Tilley Swamp Watercourse, including both the Martin Washpool and Tilley Swamp Conservation Parks, in 1996. This survey found that a number of significant fauna species utilised the Tilley Swamp Conservation Park. They describe how the Park provides suitable habitat for the *vulnerable* (SA & SE) Rufous Bristlebird (*Dasyornis broadbenti*), *vulnerable* (SE) Yellow Thornbill (*Acanthiza nana*), *rare* (SA & SE) Beautiful Firetail (*Emblema bellum*), Australasian Shoveler (*Anas rhynchos*) and Southern Emu-wren (*Stipiturus malachurus*), and the *indeterminate* Elegant Parrot (*Neophema elegans*). (SA status from NP&W Act, 1972. SE status from Carpenter and Reid, 1988).

The survey also included an aquatic component that provided detailed records of aquatic organisms including invertebrates, frogs, and fish along the Tilley Swamp drainage system (Nichols, 1996). Due to insufficient scientific information regarding the conservation status of invertebrates, frogs and fish in the region no species recorded in the Park are classified as a threatened species at this point in time.

A comprehensive mammal survey has not been undertaken. The *rare* (SA) Common Wombat (*Vombatus ursinus*) occurs in the Park, and whilst the *rare* (SA) Red-necked Wallaby (*Macropus rufogresius*) has not been recorded it is expected to be present. Both the Common Wombat and Red-necked Wallaby remain moderately conserved in the region's reserve system, and are considered to be on the western edge of their distribution.

Introduced animals such as the Fallow Deer (*Dama dama*), Goat (*Capra hircus*), European Rabbit (*Oryctolagus cuniculus*), and the Red Fox (*Vulpes vulpes*) occur in varying numbers in the Park. Each species has a varying impact upon the natural values of the Park.

Objectives

- To protect and conserve indigenous fauna with an emphasis on the rare and vulnerable species and their habitats.
- To encourage research on fauna species.
- To increase our knowledge of the fauna in the Park.
- To control introduced animals, which are an environmental/agricultural threat.

Actions

- Encourage volunteer groups and individuals to conduct fauna surveys and population monitoring.
- Promote research into the biology and habitat requirements of the rare and vulnerable species in the Park.
- Undertake surveys to determine if the Red-necked Wallaby occurs in the Park.

-
- Implement an annual rabbit and fox control program within the Park.
 - Liaise with the Coorong Animal and Plant Control Board Authorised Officer and adjacent landowners to encourage an integrated approach to pest control operations.
 - Liaise with the Animal and Plant Control Commission regarding feral deer and goat populations.

3.1.4 Native Plants

The vegetation in the Tilley Swamp Conservation Park varies from woodlands, open scrub, open heath and herblands. All of the vegetation associations are found in other areas of the South East. Three are poorly represented in the South East and only exist in small populations.

Tilley Swamp Conservation Park contains eight vegetation associations as identified by the Native Vegetation Management Branch (1987).

- ******Drooping Sheoak (*Allocasuarina verticillata*) - Low woodland over Coastal Wattle (*Acacia longifolia sophorae*) and Yacca (*Xanthorrhoea caespitosa*).
- *****Pink Gum (*Eucalyptus fasciculosa*) - Low woodland.
- Coastal Mallee (*E. diversifolia*) - Open scrub.
- Mallee-honey Myrtle (*Melaleuca brevifolia*)/Yellow Hakea (*Hakea nodosa*)/Saw Sedge (*Gahnia filum*) - Open heath.
- Salt Paperbark (*M. halmaturorum*) - Open scrub.
- Salt Paperbark (*M. halmaturorum*)/Mallee-honey Myrtle (*Melaleuca brevifolia*) - Tall shrubland.
- Creeping Brookweed (*Samolus repens*)/Emu Grass (*Distichlis distichophylla*)/Swamp Weed (*Selliera radicans*) - Herbland.

**=Presently *endangered* association in the South East

* = Presently *vulnerable* association in the South East.

The first three associations are found on the limestone rises and the others on the interdunal flats, creating a diversity of habitats within the Park.

Small populations of the *vulnerable* (SE) Pink Gum low woodland existing in a variety of reserves in the region. The *endangered* (SE) Drooping Sheoak low woodland is only found in a few NPWSA reserves, including Big Heath Conservation Park.

The Native Vegetation Management Branch (1987) identified 101 plant species in the Park with several of significant conservation value. Stewart *et al* (1998) collated information from several surveys to assist in producing the following list of plants of high conservation value, which have been recorded in the Tilley Swamp Conservation Park:

Wedge-leaf Daisy	<i>Brachycome cuneifolia</i>	Endangered (SE)
Metallic Sun-orchid	<i>Thelymitra epipactoides</i>	Endangered (SE & SA)
Small Milk-wort	<i>Comesperma polygaloides</i>	Rare (SA)
Feather Bush-pea	<i>Pultenaea vestita</i>	Rare (SE)
Slender Daisy	<i>Brachycome exilis</i>	Rare (SE)
Slender Buttercup	<i>Ranunculus robertsonii</i>	Rare (SA)
Thick-fruit Buttercup	<i>Ranunculus pachycarpus</i>	Rare (SE)

SA status from *National Parks and Wildlife Act, 1972*.

SE status from Lang and Kraehenbuehl (1997)

The *endangered* species have extremely limited distributions in the South East with this record being the first for the Wedge-leaf Daisy in the region.

Most areas of the Park have been subject to some level of disturbance from previous occupation and activities. These include grazing, weed control, and drain construction and maintenance. Future management as a conservation park should aim to decrease the effects of past disturbances.

Several introduced weed species exist in the Park. Horehound (*Marrubium vulgare*), Salvation Jane (*Echium plantagineum*), African Boxthorn (*Lycium ferocissimum*), and Bridal Creeper (*Asparagus asparagoides*) are four species in particular which have required control. The control of weeds in the Park, particularly Bridal Creeper, is important for the conservation of many species, particularly those species of significance listed above.

Objectives

- To protect and conserve indigenous flora with an emphasis on rare, vulnerable and endangered species and communities.
- To encourage research into the rare, vulnerable and endangered flora species and associations.
- To increase our knowledge of the flora in the Park.
- To control introduced plants, which are an environmental/agricultural threat.

Actions

- Encourage flora surveys and research into the requirements of the Park's flora, especially rare, vulnerable and endangered species.
- Establish monitoring programs for the Wedge-leaf Daisy and Metallic Sun-orchid.
- Protect areas that may be susceptible to disturbance and/or weed invasion.

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- Review any research on the Wedge-leaf Daisy and Metallic Sun-orchid to determine management requirements, particularly fire, and implement.
 - Liaise with tertiary institutions to facilitate research to meet any knowledge gaps in Wedge-leaf Daisy and Metallic Sun-orchid ecology.
 - Develop and implement, in consultation with the Coorong Animal and Plant Control Board Authorised Officer, an introduced plant control program in the Park.
 - Liaise with adjacent landowners to develop an integrated approach to introduced plant control operations.
 - Allow revegetation to take place in degraded areas by managing threats.
 - Maintain effective boundary fencing to exclude stock.

3.1.5 Hydrology and Drainage

Prior to European settlement Tilley Swamp Watercourse existed as a seasonally inundated swamp with average water depth about 30 centimetres. These waters typically remained well into the summer period. The water regime in the area has been dramatically changed since European settlement in the 1840's. At present, only major surface water flows drain from the south and east and flow in a north-westerly direction towards the Morella basin. This drainage system forms part of the Tilley Swamp Watercourse (Figure 3).

Since the 1970's, the surface water flows through the Tilley Swamp Watercourse (especially the Tilley Swamp Conservation Park) have been dramatically reduced. This occurred through construction of the Jacky Whites and Blackford drains to the south, which divert water from Reedy Creek and Keilira Flat directly to the sea, north of Kingston. Surface waters still reach the Tilley Swamp Watercourse from a variety of other catchments, but volumes are significantly reduced.

Present day surface water movements originate from the southern catchment of the Tilley Swamp Flat and enter the Tilley Swamp Conservation Park along the southern boundary. Flows from the West Avenue Range Watercourse can make their way to the Tilley Swamp Conservation Park when sufficient volumes reach Henry Creek and flow across the range into the Tilley Swamp Watercourse.

The Morella Basin is the terminal wetland for the Tilley Swamp Watercourse. The Basin holds water in most winters and half of the Basin area is contained in the Martin Washpool Conservation Park. Morella Basin is moderately saline due to the low frequency of inundation and subsequent evaporation, and high watertables. This basin will become an integral component of the Upper South East Dryland Salinity and Flood Management Plan as a wetland pondage area before release of waters to the Coorong at Salt Creek.

The consultation and approval process has agreed to the implementation of a small groundwater drain, principally for the movement of groundwater northward to the Morella Basin, for the Tilley Swamp Watercourse. This drain will bypass the Tilley Swamp Conservation Park due to the high salinity recordings predicted for groundwater flows. A diversion weir will be constructed at the downstream end of Henry Creek to ensure all surface flows utilise the natural watercourse. Continual water quality monitoring will guarantee freshwater is always diverted to the natural watercourse systems in the Park. Marginally increased surface flows are expected along the watercourse (B. Gear, pers. com.)

The construction of the groundwater carrier drain requires minor vegetation clearance in the south-eastern corner of the Tilley Swamp Conservation Park. Clearance of 0.2 hectares of *Melaleuca halmaturorum* tall shrubland requires approval from the Native Vegetation Council.

The drains that presently exist in the Park will not be maintained but allowed to revegetate.

Fauna crossings will be constructed across the groundwater carrier drain when the drain bisects natural areas along the Watercourse. These crossings will be implemented to maintain the natural range of native animals. A fauna crossing will be established adjacent to the north-eastern corner of the Park to maintain access to a nearby block of vegetation held under Heritage Agreement.

It should also be noted that several private drains constructed by adjacent and previous landowners currently enter the Park from the south and east (Figure 2). These drains will be cut-off from the Park upon the construction of the approved drainage option.

Prior to construction, a formal memorandum of understanding between the Director, Heritage and Biodiversity Division of the Department for Environment, Heritage and Aboriginal Affairs, and the presiding member of the South Eastern Water Conservation & Drainage Board (SEWCDB) will require satisfactory documentation. The agreement should detail the drain design, construction methodology, water management, maintenance and access requirement for the SEWCDB and other authorities in the Tilley Swamp Conservation Park.

Objective

- To mitigate the effects of dryland salinity and ensure appropriate flood management.
- Improve wetland values.

Action

- Ensure drainage infrastructure established as part of the Upper South East Dryland Salinity and Flood Management Plan does not compromise wetland hydrology.
- Allow revegetation of existing drainage infrastructure to occur.
- Liaise with the South Eastern Water Conservation and Drainage Board to manage the drain reserve along the eastern boundary complementary to the Park.
- Liaise with the South Eastern Water Conservation and Drainage Board to determine appropriate water quality parameters for the Tilley Swamp Watercourse.
- Develop a Memorandum of Understanding with the South Eastern Water Conservation and Drainage Board to ensure appropriate drain design, construction methodology, water management, maintenance and access requirements.
- Encourage the South East Water Conservation Drainage Board to reinstate historical surface water flows into Tilley Swamp.

3.2 Cultural Heritage

Human habitation of Australia began with the movement of Meganesians down from South East Asia, to Australia at least 40 000 years ago, possibly 60 000 years ago (Flannery, 1994). Flannery (1994) describes the occupation of Australia to have likely been “a rapid and complete invasion by the ancestors of the Aborigines.” The discovery of Aboriginal remains at Lake Mungo, New South Wales (32 000 years old) and south-west Tasmania (35 000 years old) validates this hypothesis of Aboriginal occupation of Australia. Consequently, the establishment of Aboriginal cultures and tribe differentiation, in the South East, took place at least 35 000 years ago.

The Aborigines who inhabited the Park were known as the ‘Ngarrindjeri’. O’Connor (1992) indicated that the Ngarrindjeri tribe was comprised of 18 hordes ranging in distribution from Cape Jervis and Swanport in the north to Lacepede Bay in the south. This tribe is one of the few Aboriginal clans to survive European settlement with many descendants alive today. The past misunderstandings of the complex and detailed culture of Aboriginal tribes, and the lack of detailed cultural study have restricted the quantity and quality of information available to general details of tribal life.

O’Connor (1992) wrote how the land of the Ngarrindjeri was rich in resources providing an idealistic environment for its traditional owners. Wildlife was commonly utilised, including kangaroo, wallaby, wombat, snakes, lizards, and on occasions a whale became stranded on the Coorong beach providing a welcome feast. Many species of bird were considered good to eat, including waterbird species.

The vegetation at Tilley Swamp provided Aboriginal people with muntries, sweet edible roots and flowers from Banksias, contributing to a varied diet.

No Aboriginal sites are known to exist in the Park.

The land occupied by Tilley Swamp Conservation Park was first allotted under Pastoral Lease in 1890, including a Miscellaneous Lease over part of the land (having commenced in 1889). Successive Pastoral Leases were issued over this land in 1902, and in 1924: they expired in 1945. The Hundred of Neville was divided into four sections and Blocks B and C, in 1947. Section 2 was allotted under Miscellaneous Lease 11432, commencing in 1949. Section 5 was created by division from Section 2, and held under Pastoral Lease 2106, commencing in 1946. Perpetual Lease 18820 was issued in 1952 and surrendered to the Crown in 1979. Allotment 100 was created from Section 5, and gazetted as the Tilley Swamp Conservation Park in 1993.

Settlement in the area of the Tilley Swamp Conservation Park occurred in the late 1840's. The predominant land use from this time was sheep grazing, but did include other pursuits such as beef cattle and horses. William Tilley, whom the general area was named after, took up the first pastoral lease in 1851. Pastoralists in the late 1800's were plagued by problems of impoverished soils, constant winter floods and had to endure the ravages of dingoes and rabbits, according to Nicholls (1979). Coast disease also hampered farmers as the soils were deficient in minerals. To combat their problems they added essential mineral fertilisers, drained the frequently wet flats, and used innovative machinery to cultivate the lands for pastures (Nicholls, 1979).

Other historical information relevant to the area relates to the first post office in the Hundred of Neville, which was opened at Coolatoo in 1863 (Figure 2). Manning (1990) indicated that the post office remained open until May 1880. Ward (1869) wrote how farmers in the Coolatoo area were successful in cultivating feed for horses despite the poor condition of the land.

Objective

- To ensure the protection and preservation of any archaeological relics and cultural sites that may exist in the Park.
- To record the cultural history of the area.

Action

- Consult with the Aboriginal community and Division of State Aboriginal Affairs to improve knowledge of the area and to seek involvement in the protection of any cultural sites that may occur in the Park.
- Maintain records on the cultural history of the Tilley Swamp Conservation Park area.
- Further research and record local history for use in interpretative material.

3.3 Recreation and Tourism

The Tilley Swamp Conservation Park offers recreation opportunities such as bushwalking and bird watching amongst the areas of Tea-tree, woodlands, wetlands, and heathlands. Vehicle access is for management and emergency vehicles only. Access for a visitor is by foot with field naturalists being common visitors to this park.

Low impact special interest activities that increase the appreciation and understanding of the natural environment are encouraged in this area. Tilley Swamp Conservation Park is currently managed as a day visitor area. This is due to its proximity to the Coorong National Park, which caters for a wider variety of activities and provides more developed facilities.

Objectives

- To provide nature based recreation opportunities for day visitors where a need is demonstrated and where those activities maximise the appreciation of the natural values of the Park.
- To increase public awareness, appreciation and understanding of the Park's values.

Actions

- Provide basic day visitor facilities (car park, walking trail and signage) to accommodate existing need.
- Investigate opportunities for increasing public awareness and understanding of the Park's values.
- Monitor impacts of visitor activities in the Park and change management practices if necessary.
- Provide interpretative material at the Park entrance if a need is demonstrated.

4.0 Summary of Management Actions

This section provides a summary of the management proposals outlined in the plan and gives an indication of the priority and duration of each proposal.

Actions	Priority	Duration
3.1 Biodiversity		
3.1.1 Co-operative Management		
<ul style="list-style-type: none"> Liaise with landowners to identify opportunities for co-operative management arrangements. 	High	Short
3.1.2 Fire Management		
<ul style="list-style-type: none"> Undertake an assessment of the need for fire in biodiversity management. 	Med.	Ongoing
<ul style="list-style-type: none"> Determine the need for fire in managing specific species. 	High	Ongoing
<ul style="list-style-type: none"> Implement and maintain fire prevention strategies as outlined in the fire prevention plan. 	High	Ongoing
<ul style="list-style-type: none"> Review the Fire Prevention Plan to address the benchmark criteria specified by Croft <i>et al</i> (1999). 	Med.	Short
3.1.3 Native Animals		
<ul style="list-style-type: none"> Encourage volunteer groups and individuals to conduct fauna surveys and population monitoring. 	Med.	Ongoing
<ul style="list-style-type: none"> Promote research into the biology and habitat requirements of rare and vulnerable species in the Park. 	High	Ongoing
<ul style="list-style-type: none"> Undertake surveys to determine if the Red-necked Wallaby occurs in the Park. 	High	Short
<ul style="list-style-type: none"> Implement an annual rabbit and fox control program within the Park. 	High	Ongoing
<ul style="list-style-type: none"> Liaise with the Coorong Animal and Plant Control Board Authorised Officer and adjacent landowners to encourage an integrated approach to pest control operations. 	High	Ongoing
<ul style="list-style-type: none"> Liaise with the Animal and Plant Control Commission regarding feral deer and goat populations. 	High	Ongoing
3.1.4 Native Plants		
<ul style="list-style-type: none"> Encourage flora surveys and research into the requirements of the Park's flora, especially rare, vulnerable and endangered species. 	Med.	Ongoing
<ul style="list-style-type: none"> Establish monitoring programs for the Wedge-leaf Daisy and Metallic Sun-orchid. 	High	Ongoing
<ul style="list-style-type: none"> Protect areas that may be susceptible to disturbance and/or weed invasion. 	High	Ongoing
<ul style="list-style-type: none"> Review any research on the Wedge-leaf Daisy and Metallic Sun-orchid to determine management requirements, particularly fire, and implement. 	Med.	Short
<ul style="list-style-type: none"> Liaise with tertiary institutions to facilitate research to meet any knowledge gaps in Wedge-leaf Daisy and Metallic Sun-orchid ecology. 	High	Short

Actions	Priority	Duration
3.1.4 Native Plants (Continued)		
• Develop and implement, in consultation with the Coorong Animal and Plant Control Board Authorised Officer, an introduced plant control program in the Park.	High	Short
• Liaise with adjacent landowners to develop an integrated approach to introduced plant control operations.	High	Ongoing
• Allow revegetation to take place in degraded areas by managing threats.	Med.	Short
• Maintain effective boundary fencing to exclude stock.	High	Ongoing
3.1.5 Hydrology and Drainage		
• Ensure drainage infrastructure established as part of the Upper South East Dryland and Flood Management Plan does not compromise wetland hydrology.	High	Short
• Allow revegetation of existing drainage infrastructure to occur.	Med.	Ongoing
• Liaise with the South Eastern Water Conservation and Drainage Board to manage the drain reserve along the eastern boundary complementary to the Park.	Med.	Ongoing
• Liaise with the SEWCDB to determine appropriate water quality parameters for the Tilley Swamp Watercourse.	High.	Short
• Develop a Memorandum of Understanding with the SEWCDB to ensure appropriate drain design, construction methodology, water management, maintenance and access requirements.	High	Short
• Encourage the South East Water Conservation Drainage Board to reinstate historical surface water flows into Tilley Swamp.	Med	Short
3.2 Cultural Heritage		
• Consult with the Aboriginal community and Division of State Aboriginal Affairs to improve knowledge of the area and to seek involvement in the protection of any cultural sites that may occur in the Park.	High	Short
• Maintain records on the cultural history of the Tilley Swamp Conservation Park area.	Med.	Ongoing
• Further research and record local history for use in interpretative material.	Med.	Ongoing
3.3 Recreation and Tourism		
• Provide basic day visitor facilities (car park, walking trail and signage) to accommodate existing need.	Med.	Ongoing
• Investigate opportunities for increasing public awareness and understanding of the Park's values.	Med.	Ongoing
• Monitor impacts of visitor activities in the Park and change management practices if necessary.	High	Ongoing
• Provide interpretative material at the Park entrance if a need is demonstrated.	Med.	Short

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