

Management Plan

for the Moot-Yang-Gunya Swamp and Mundulla Common

2009-2019



The Management Plan for the Moot-Yang-Gunya Swamp and Mundulla Common articulates strategies and specific actions to maintain and enhance the environmental and recreational values of the area.



Department
for Environment
and Heritage



Government
of South Australia

Management Plan for the Moot-Yang-Gunya Swamp and Mundulla Common

by Emily Fearn and Luke Geelen

Conservation Programs - South East



Government of South Australia

Department for Environment
and Heritage

for



Government of South Australia

South East Natural Resources
Management Board



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COUNTRY

2009

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Cover Images:

Red Gum (*Eucalyptus camaldulensis* var. *camaldulensis*) Woodland, Mundulla SA.

Photograph: Michelle Le Duff, 2009.

SUMMARY

The Management Plan for the Moot-Yang-Gunya Swamp and Mundulla Common articulates strategies and specific actions to maintain and enhance the environmental and recreational values of the area. Through community consultation and extensive research, it has been proposed that the Common and Swamp be divided into specific 'Zones' and management sections according to their environmental priority and perceived fire threat.

Though it has been determined by an experienced fire management professional to be of low to moderate fire danger, a crash grazing regime has been proposed for systematic, seasonal weed control in the hopes of improving biodiversity and seedling recruitment whilst reducing fuel load.

Environmental weed and feral animal control actions will also be undertaken annually, in line with similar actions taken in previous years.

Specific areas of the swamp and common will be dedicated to specific recreational activities including bicycling, horse riding, walking and an educational area, in the hopes that all persons interested in using the Swamp and Common may do so safely and with as little negative environmental impact as possible.

Motorcycles will not be permitted on either the Swamp or Common.

Please note:

The Department for Environment and Heritage and Tatiara District Council accept no responsibility for the safety of any person entering the Mundulla Common or Moot-Yang-Gunya Swamp. Persons entering or using the Common or Swamp do so at their own risk. Any misuse or abuse of facilities, infrastructure or natural assets by persons using the Common or Swamp may be penalised accordingly.

The Crown Land Management Act (2009) stipulates that any person who injures or destroys any tree, shrub or sapling, or cuts, saws, removes, or sells any timber being on Crown lands without a licence or other valid authority shall be liable to pay a penalty of up to twenty thousand dollars (\$20,000) or an expiation fee of three hundred and fifty dollars (\$350) as an on the spot fine. For more information, including policy regarding leaving gates open, injuring monuments, obstructing authorised persons, depasturing livestock and unauthorised occupation or use of Crown and other property please refer to the Crown Lands Act (1929) at www.legislation.sa.gov.au

TIMETABLE OF ACTIONS

Action	Priority	Zone/Section	Method	Time
<u>Weed Control</u> 1. EO 2. BC 3. AB	1. Very High 2. Very High 3. Very High	All Zones throughout the Common and Swamp.	1. Cut and Swab 2. Rust/Spray 3. Cut and Swab	Annually, for all weeds: 1. N/A 2. Jun – Aug 3. Jun – Sept
<u>Grazing</u> 1. NT 3. ET 5. Sw	1. Moderate 3. High 5. High	Horse riding Zone	All targeted grazing areas to be Crash Grazed for 2 - 3 days and strictly monitored.	Annually (or as required), in Spring.
<u>Monitoring/ Situation Analysis</u> 1. NT 2. ET 3. Sw	1. Very High 2. Very High 3. Very High	Horse riding Zone	Undertake grazing pressure monitoring/ vegetation assessment after each grazing event.	Preferably after each grazing event- late spring/summer.
<u>Fire Break/Buffer Maintenance</u>	Very High	Around the entire Mundulla Common and Moot-Yang-Gunya Swamp.	1. Slash/mow around external and internal fences. 2. Grade access tracks.	1. Annually, in early summer Oct – Nov 2. As needed (every few years)
<u>Rabbit Control</u>	Very High	All Zones throughout the Common and Swamp.	Extermination via: 1. Firearm 2. 1080 Grain Baiting 3. Fumigation (Phostoxin)	1. Annually (Spring) 2. February – March 3. Soon after baiting, Mar – April
<u>Fox Control</u>	Very High	All Zones throughout the Common and Swamp	Extermination via: 1. Firearm 2. Meat Baiting	1. Annually. 2. Autumn (April – June).

Key:

- **EO = European Olive**
- **AF = African Boxthorn**
- **BC = Bridal Creeper**
- **NT = North Terrace**
- **ET = East Terrace**
- **Sw = Swamp**

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1 INTRODUCTION

This management plan has been developed in conjunction with the Mundulla Community and the Tatiara District Council to articulate strategies and actions to maintain and enhance the natural and recreational values of the Moot-Yang-Gunya Swamp and Mundulla Common. The Moot-Yang-Gunya Swamp and Mundulla Common Management Plan highlights the environmental values of the native vegetation surrounding the township of Mundulla and identifies appropriate management actions to maintain those values (removal of litter, fallen wood, grazing etc.). Many such actions may also serve to reduce overall fire hazard. The plan also addresses recreational activities in the subject areas of walking, bird watching, horse riding, and cycling. Through the process of consulting with the local community all appropriate on-ground actions have been identified, some of which will require approval from statutory bodies before they can be implemented.

1.1 MANAGEMENT PLAN AIMS/ GOALS

The aim of this management plan is to identify best practice management options to:

- Reduce fuel hazards in dedicated ‘zones’, while balancing the community’s desire (and statutory requirements) to maintain the character and biodiversity of the surrounding vegetation.
- Identify suitable recreational activities that can be undertaken and allocate appropriate areas for these activities within the Swamp and Common.
- Identify priority weed control actions that need to be undertaken.
- Foster a positive working relationship between the community of Mundulla, the Tatiara District Council and the Department for Environment and Heritage.

1.2 SOCIAL AND RECREATIONAL VALUES

The Mundulla Common and Moot-Yang-Gunya Swamp provide a perfect area for many social and recreational activities for the Mundulla community. These include BMX riding, bird watching, walking, children’s recreational/play activities and horse riding (including the annual Moot-Yang-Gunya Swamp Festival and Mundulla Horse Show). This section of woodland provides an ideal area for such outdoor activities, with its stately Grey Box (*Eucalyptus microcarpa*), Red Gum (*E. camaldulensis* var. *camaldulensis*) and Blue Gum (*E. leucoxylon* ssp. *pruinosa*) canopy and pleasant grassy understorey. However there is the potential for conflict to arise between the different social groups that wish to use the

reserve, through competition for space, issues of safety, and potential for negative environmental impacts on the woodland vegetation and its associated flora and fauna.

1.3 ENVIRONMENTAL VALUES

Woodlands such as those found in the Common and Swamp were once widespread throughout south-eastern Australia. Today such woodlands are some of the most extensively modified environments in Australia. Woodlands in Australia have been subject to widespread clearing for intensive and extensive agricultural uses, and consequently are subject to increased soil salinity and erosion (Lindenmayer *et al.* 2005). As aforementioned, much of the woodland vegetation in the Upper South East of South Australia has been cleared for agriculture, mostly due to the relatively fertile soils that woodlands are found on.

Today vegetation associations such as Grey Box (*Eucalyptus microcarpa*) Grassy Woodlands are endangered in the region with less than 3% of their original extent remaining (Croft *et al.* 1999). Grey Box Woodlands are currently being considered for listing as an endangered ecological community under the Australian Government's *Environment Protection and Biodiversity Conservation Act 1999*. The Mundulla Common and Moot-Yang-Gunya Swamp support important remnants of Grey Box (*Eucalyptus microcarpa*), Blue Gum (*Eucalyptus leucoxylon* ssp. *pruinosa*) and River Red Gum (*Eucalyptus camaldulensis* var. *camaldulensis*) Woodland, as described in detail in Section 3.7 below.

In line with their threatened status, there are few areas dedicated to the protection of these types of threatened woodland communities in surrounding districts. The only area of Grey Box Woodland that is formally protected in the South East is Custon Conservation Park, approximately 20 kilometres east of Mundulla, which contains approximately 28 hectares of Grey Box (*E. microcarpa*) Woodland. Poocher Swamp Conservation Park, located five kilometres north of Mundulla, comprises 77 hectares of protected River Red Gum (*Eucalyptus camaldulensis* var. *camaldulensis*) Woodland.

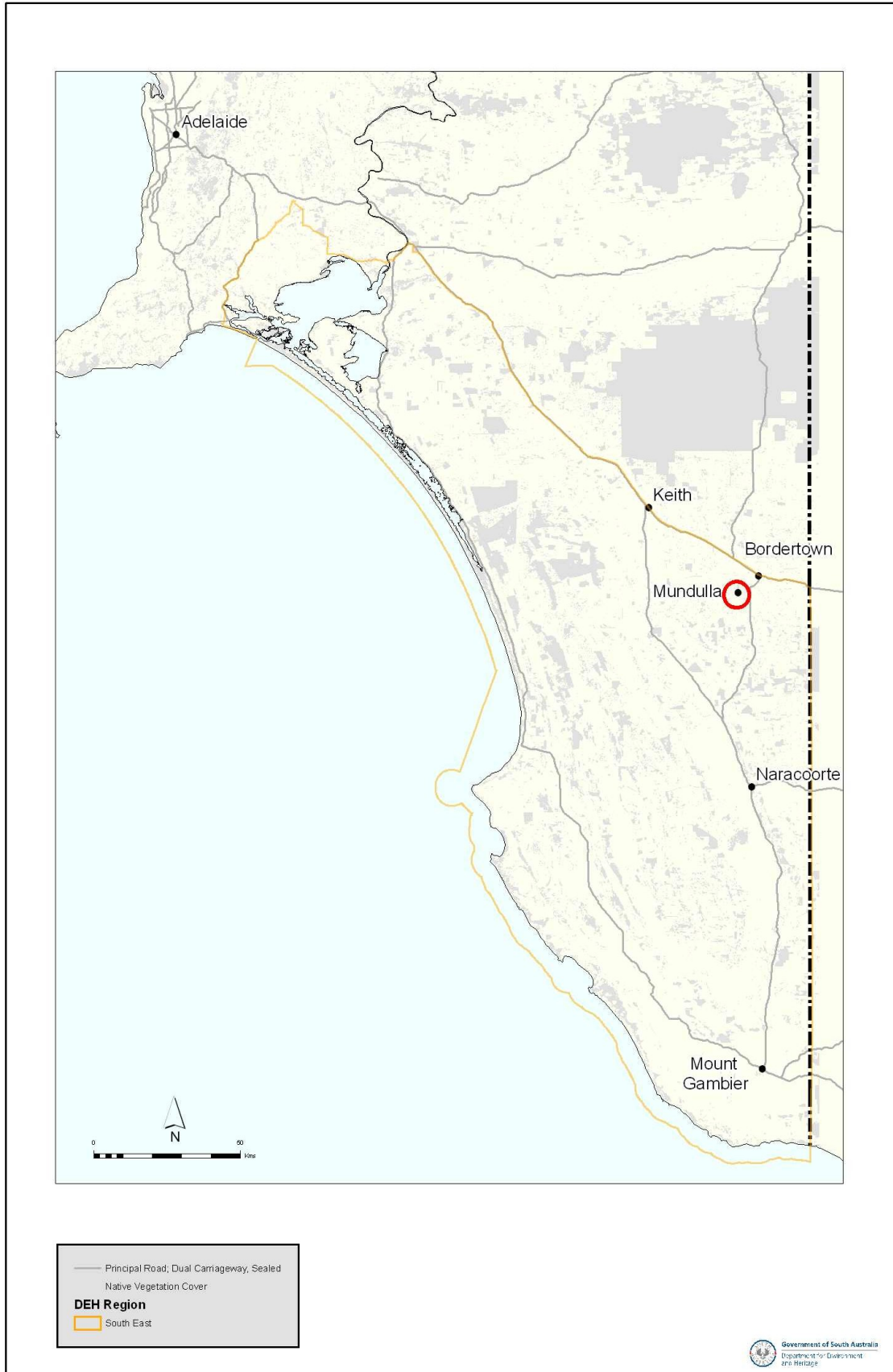


Figure 1. Location of Mundulla in the South East Region of South Australia

2 LOCATION AND SITE DESCRIPTION

The historic town of Mundulla is located 11 km southwest of Bordertown, in the South East of South Australia (Figure 1). The township was first settled in the 1880's and the historic hotel opened in 1884. Today the township has a population of 1,042 residents (www.abs.gov.au) and is surrounded to the north-west, west, south and east by the Common and to the north-east by the Moot-Yang-Gunya Swamp. The latter is intermittently flooded and holds water approximately one in every seven years (Packer, pers. comm 2007).

The Common and Moot-Yang-Gunya Swamp are publicly owned lands which are dominated by majestic River Red Gums (*Eucalyptus camaldulensis* var. *camaldulensis*), Grey Box (*E. microcarpa*) and SA Blue Gum (*E. leucoxylon* ssp. *pruinosa*), which add much of the beauty and charm to the township along with its European cultural heritage (the Mundulla Hotel and Wirrega Council Chambers). These remnant patches of native vegetation, covering an area of 100 hectares, are unfortunately a rare scene in the district given that much of the former extent of these grassy woodlands have been preferentially cleared for agriculture.

The Mundulla Common and Moot-Yang-Gunya Swamp can be found in the Hundred of Wirrega and in the Environmental Association of Bordertown (2.3.1) (Laut et al. 1977). The Hundred of Wirrega has 4717 hectares of native vegetation remaining (7.6% of the original cover) of which 23.5% (or 1107 hectares) is protected through Heritage Agreements and Department for Environment and Heritage (DEH) reserves. The Environmental Association of Bordertown has 2526 hectares of native vegetation remaining (or 4.6% of the original vegetative cover), of which 5.7% (176 hectares) is protected through Heritage Agreements and DEH reserves.

NB: For the purposes of this report the sections of the Mundulla Common adjacent to the North, South, East and West Terraces will be referred to as the North Terrace, South Terrace, East Terrace and West Terrace, and the Moot-Yang-Gunya Swamp will be referred to simply as the Swamp. Please refer to Figure 3 (page 12) for further clarification.

2.1 TOPOGRAPHY AND SOILS

Laut *et al.* (1977) described the Environmental Association of Bordertown as being dominated by mottled-yellow duplex soils and grey self mulching cracking clays which are imperfectly drained. Minor swamps in the region which are seasonally inundated can also

be found and the landform is generally flat with some gently undulating hills. The area is predominately made up of woodland communities, which are typically dominated by Blue Gum (*Eucalyptus leucoxylon* ssp. *pruinosa*), Grey Box (*Eucalyptus microcarpa*) and Buloke (*Allocasuarina luehmannii*). Any surface water is channelled to flow into the seasonal swamps.

2.2 CLIMATE

Keith, which has a very similar climate to Mundulla (R. Johnson, pers. comm., 2009) is located 41.6km to the North West of the township. Keith experiences mild summers with an average daily maximum temperature of 29.8°C in January and February. Keith also experiences mild winters with an average daily minimum temperature of 5.5°C in July. The highest mean 3pm temperature for Keith is 28.4°C in February (summer), with a lowest mean 3pm temperature of 13.7 Celsius in July (winter).

The average annual rainfall for Keith is 462.3 mm, with the highest rainfall in August (57.9 mm) and lowest in January (18.8 mm). Information for the climate of Keith has been used as it is the closest active weather (temperature) station to Mundulla.

The following rainfall data for Mundulla is sourced from two locations, Mundulla (Status: closed 31 December 1962, site number 25510) and Karrawirra (near Bordertown, Status: active, 3.9km from Mundulla, site number 25505). This information was provided by the Bureau of Meteorology (www.bom.gov.au).

Table 1. Summary of Rainfall Statistics for Mundulla for all years (1887 – 1962)

Statistic	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	Annual
Mean	19.1	21.6	21.1	40.0	54.9	62.4	63.8	59.9	58.9	48.5	32.3	27.0	513.4
Lowest	0.0	0.0	0.0	0.0	0.0	10.1	6.6	5.9	6.3	4.1	0.0	0.0	268.0
5th percentile	0.0	0.0	0.0	3.7	12.9	14.4	20.0	17.2	16.1	17.7	1.5	0.0	339.8
10th percentile	0.0	0.0	0.2	4.6	18.8	17.8	25.1	25.0	26.3	21.3	7.4	1.5	379.3
Median	12.5	11.2	14.7	32.9	42.8	57.4	59.8	55.7	61.3	43.6	26.9	18.8	507.9
90th percentile	47.9	46.2	46.0	80.5	107.1	110.4	103.2	95.0	96.2	77.3	66.1	52.2	649.5
95th percentile	63.6	78.7	72.8	88.7	116.5	118.2	109.9	116.1	100.1	100.9	76.4	79.2	690.4
Highest	100.1	107.7	135.1	208.1	142.1	140.0	170.8	147.7	133.0	140.0	100.4	108.7	813.5

Table 2. Summary of Rainfall Statistics for Karrawirra (Bordertown) for all years (1920 – 2008)

Statistic	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	Annual
Mean	20.1	23.0	20.3	34.4	53.4	52.4	59.4	58.5	52.5	44.6	33.4	27.2	482.1
Lowest	0.0	0.0	0.0	1.3	2.1	2.1	17.1	3.3	10.6	0.8	2.3	0.0	245.6
5th percentile	0.0	0.0	1.0	3.4	14.9	14.3	21.6	20.8	18.8	9.9	7.1	2.2	318.4
10th percentile	1.5	0.0	2.4	6.5	20.7	16.2	23.7	26.8	22.9	15.6	9.8	5.0	348.7
Median	14.5	15.2	15.5	31.0	46.2	47.0	57.9	59.2	50.2	36.2	26.6	21.0	477.0
90th percentile	48.4	56.3	46.1	70.2	95.6	96.8	91.9	87.6	85.9	87.9	64.8	58.6	604.9
95th percentile	57.9	73.9	50.3	91.9	109.7	104.7	98.9	111.4	94.1	91.7	77.3	74.3	629.9
Highest	110.0	102.0	132.2	106.8	130.1	117.5	140.6	145.4	112.5	131.0	91.9	121.1	720.9

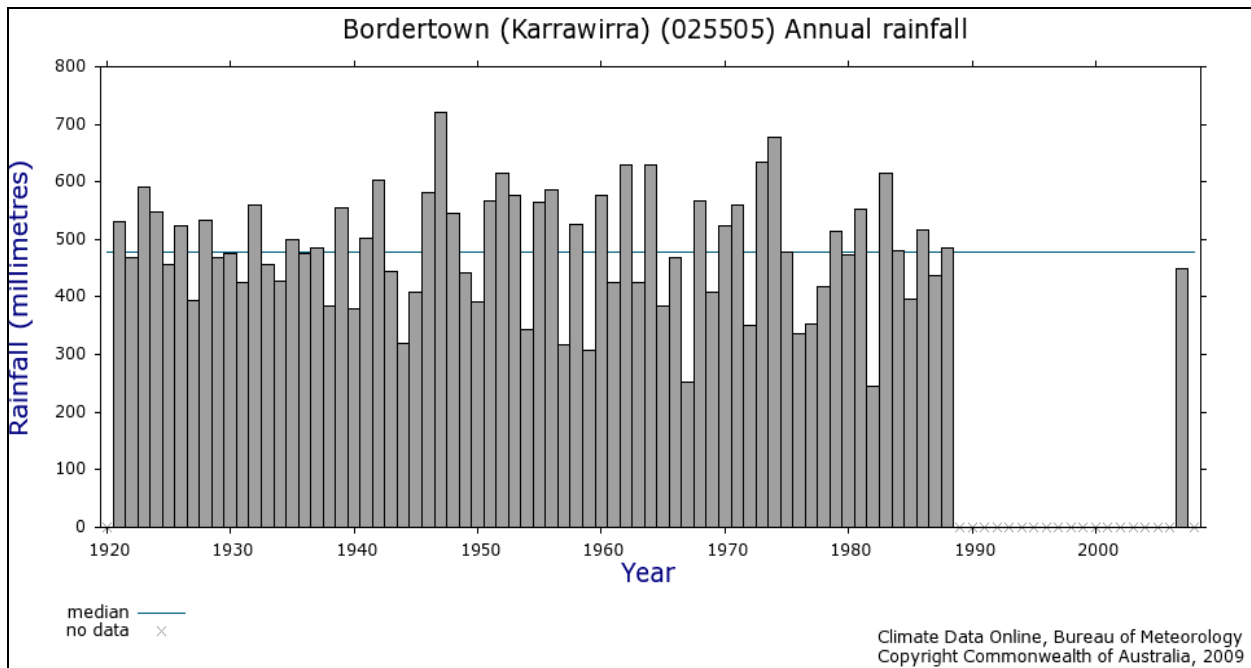


Figure 2. Graph of Annual Rainfall for Karrawirra for all years (1920 – 2008)

Figure 2 (above) indicates that there has been a slight increase in the average rainfall recorded in Karrawirra over the 88 year period of recording. Though there are gaps on the graph, some data was recorded in those years which can be found at:

<http://www.bom.gov.au/jsp/ncc/cdio/weatherData> .

One very important aspect to rainfall in recent decades has been an autumn and early winter drying linked with changes in weather patterns, which can be attributed to climate change. Essentially this is due to the tropics expanding in response to a warmer planet, and

rain bearing systems staying further south. This is particularly the case with the southeast of SA and Victoria (Darren Ray (BOM), pers. comm. 2009).

2.3 OWNERSHIP AND MANAGEMENT

The Mundulla Common and Moot-Yang-Gunya swamp are Crown Lands dedicated to the control and care of the Tatiara District Council. Council are required to notify the Department for Environment and Heritage of any activity on Crown Land that constitutes development, including the issuing of leases or licences.

While the Tatiara District Council is responsible for the day-to-day management of this land, the Mundulla community and the Department for Environment and Heritage have varying degrees of involvement in the management of the area. Specific roles and responsibilities for all parties will be identified throughout this management plan.

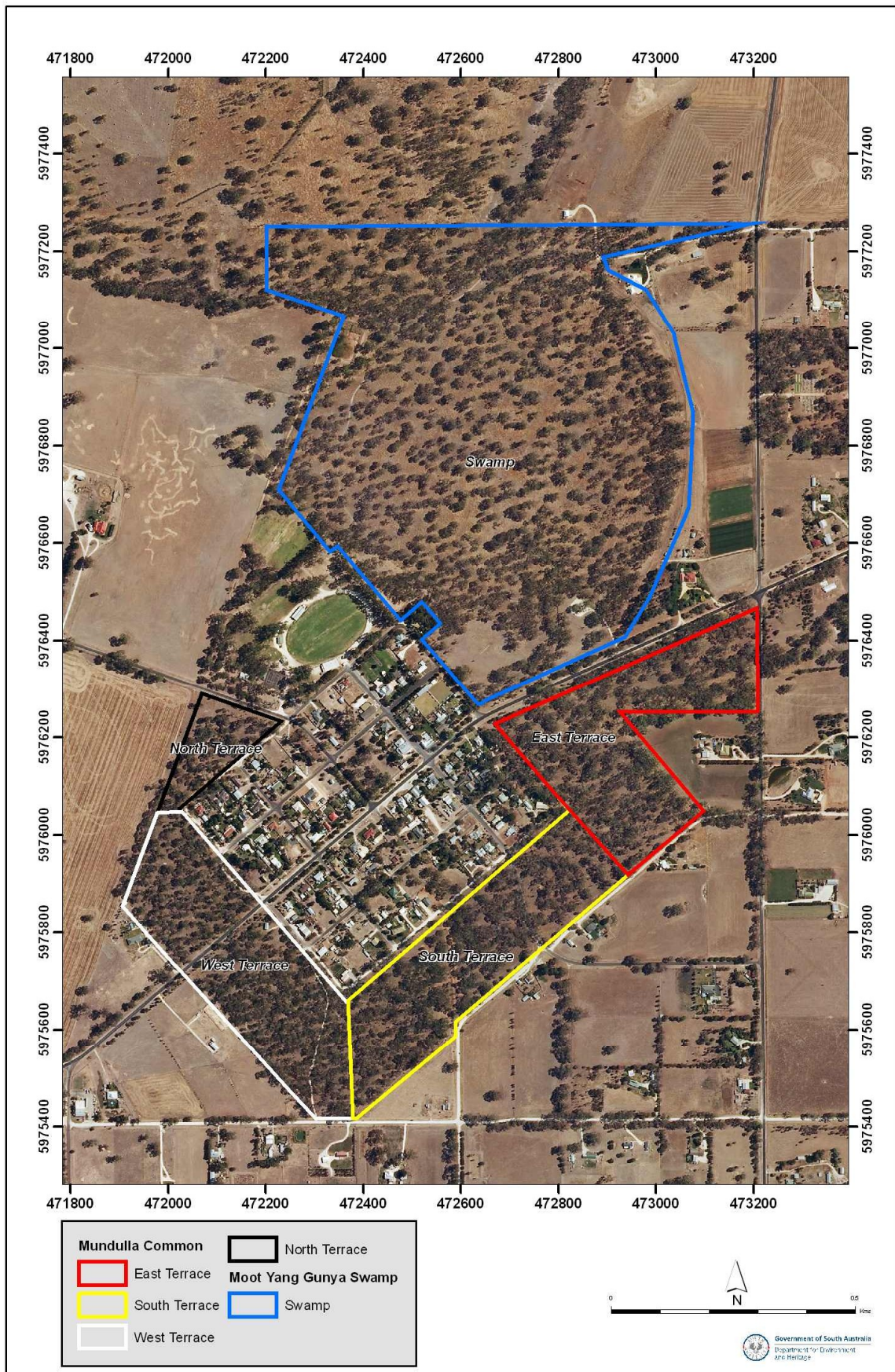


Figure 3. Sections of the Mundulla Common and Moot-Yang-Gunya Swamp

3 FLORA AND FAUNA

The Common and Swamp are home to a vast number of native and exotic species of plants and animals. In order to determine a relevant management plan for Mundulla it was necessary to undertake a flora and fauna assessment of the species present. The findings were as follows:

3.1 NATIVE FLORA

A total of 82 native species have been recorded from the Mundulla Common and Moot-Yang-Gunya swamp (see APPENDICES

Appendix 1 for a complete list). Eleven of these species are listed as Rare under the *National Parks and Wildlife Act 1972* and one is listed as Vulnerable. Additionally 28 species are considered to be of conservation significance in the South East region (Appendix 1). No species are listed as threatened at a National level.

Table 3. List of threatened flora recorded in the Moot-Yang-Gunya Swamp and Mundulla Common

COMMON NAME	SCIENTIFIC NAME	RATING SA
Poison Lobelia	<i>Lobelia pratioides</i>	R
Poison Pratia	<i>Pratia concolor</i>	R
Swamp Daisy	<i>Brachyscome basaltica</i> var. <i>gracilis</i>	R
Smooth Solenogyne	<i>Solenogyne dominii</i>	R
Spreading Goodenia	<i>Goodenia heteromera</i>	R
Swollen Spear-grass	<i>Austrostipa gibbosa</i>	R
Red-leg Grass	<i>Bothriochloa macra</i>	R
Barren Cane-grass	<i>Eragrostis infecunda</i>	R
Native Pennyroyal	<i>Mentha satureioides</i>	R
Leafy Templetonia	<i>Templetonia stenophylla</i>	V
Pale Flax-lily	<i>Dianella longifolia</i> var. <i>grandis</i>	R
Blue Devil	<i>Eryngium vesiculosum</i>	R

3.2 WEEDS

A total of 50 weed species (Appendix 1) have been recorded from the Mundulla Common and Moot-Yang-Gunya Swamp. Of these species, eight are serious environmental weeds that need to be controlled and there are several species of exotic grasses that can contribute to fuel loads in some situations. Three of the weed species, Olive, African Boxthorn and Bridal Creeper, are declared under the *Natural Resource Management Act 2004* and require ongoing monitoring and management.

3.3 MAMMALS

Records from the Biological Database of South Australia identify seven species of mammals from the Common and Swamp, three of which are native (

Appendix 2). Two of these species, Common Brushtail Possum (*Trichosurus vulpecula*) and Sugar Glider (*Petaurus breviceps*) are listed as Rare under the South Australian *National Parks and Wildlife Act 1972*. Western Grey Kangaroos have been observed in the Moot-Yang-Gunya Swamp (R. Johnson, pers. comm., 2009).

3.4 BIRDS

A total of 25 bird species have been recorded in the Mundulla Common and Moot-Yang-Gunya Swamp. All but one recorded species, the introduced House Sparrow (*Passer domesticus*), are native. One native species of importance recorded in the area is the Bush Stone-curlew (*Burhinus grallarius*), which is listed under the South Australian *National Parks and Wildlife Act 1972* as Rare and is considered to be Near Threatened in the Action Plan for Australian Birds (Garnett and Crowley 2000).

3.5 REPTILES

Four species of Reptiles have been recorded in the Moot-Yang-Gunya Swamp and Mundulla common. More species are likely to be present but have not been formally recorded. None of the recorded species are currently listed as threatened.

3.6 AMPHIBIANS

Frogwatch (1991) data has recorded six species of amphibians from the Moot-Yang-Gunya swamp. One of these, the Southern Bell Frog (*Litoria raniformis*) is listed as Vulnerable under the Commonwealth's *Environment Protection and Biodiversity Conservation Act 1999* and the South Australian *National Parks and Wildlife Act 1972*. This is the most northerly occurrence of the species in the South East Region.

Table 4. List of rare and threatened fauna recorded in the Moot-Yang-Gunya Swamp and Mundulla Common

COMMON NAME	SCIENTIFIC NAME	RATING	
		AUS	SA
Mammals			
Common Brushtail Possum	<i>Trichosurus vulpecula</i>		R
Sugar Glider	<i>Petaurus breviceps</i>		R
Birds			
Bush Stone-curlew	<i>Burhinus grallarius</i>	NT	V
Amphibians			

Southern Frog	Bell	<i>Litoria raniformis</i>	V	V
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3.7 SITE COMPOSITION

The grassy woodlands that surround Mundulla are of great environmental significance for the native flora and fauna communities represented there. To provide a better understanding of the flora in the Mundulla Common and Moot-Yang-Gunya Swamp below is a series of descriptions of the specific vegetation associations found in the area.

3.7.1 Grey Box (*Eucalyptus microcarpa*) Woodland



Figure 4 Grey Box Woodland, showing an open grassy understorey.

Photograph: M. Le Duff, DEH

Eucalyptus microcarpa (Grey Box) Woodland is the dominant plant community of the North and West Terraces of the Common, with a further occurrence in the adjacent South Terrace (Figure 3). Inland South Australian Blue Gum (*Eucalyptus leucoxylon* ssp. *pruinosa*) ranges from being a co-dominant tree in the North Terrace to occasional trees in the West Terrace, before grading into Blue Gum Woodland which dominates much of the South Terrace. Buloke (*Allocasuarina leuhmannii*) is sparsely present in the Grey Box Woodland, particularly in the West Terrace of the Common north of Rowney Road.

Grey Box (*Eucalyptus microcarpa*) Woodland supports an open understorey with a groundlayer dominated by the following native grasses: Wallaby-grasses (*Austrodanthonia* spp.), Spear-grasses (*Austrostipa* spp.), Rigid Panic (*Homopholis proluta*), Wheat-grass

(*Elymus scaber*) and Kangaroo Grass (*Themeda triandra*). Other native plants in this association include the graminoids (grass-like plants) Small Mat-rush (*Lomandra nana*) and Black-anther Flax-lily (*Dianella revoluta* var. *revoluta*) and the perennial herbs New Holland Daisy (*Vittadinia cuneata*), Lemon Beauty-heads (*Calocephalus citreus*) and less frequently Grassland Sida (*Sida corrugata* ssp. *angustifolium*). Occasional shrubs of Sweet Bursaria (*Bursaria spinosa*) may be present. Plants of particular conservation significance include the low shrub Leafy Templetonia (*Templetonia stenophylla*) and the graminoid Pale Flax-lily (*Dianella longifolia* var. *grandis*).

Common weed species in this association include the perennial herbs Purple Pincushion (**Scabiosa atropurpurea*), Common Ribwort (**Plantago lanceolata*) and Peppergrass (**Lepidium africanum*) and the perennial grasses Rice Millet (**Piptatherum milliaceum*), Cocksfoot (**Dactylis glomeratus*) and *Phalaris* sp. The annual exotic grasses Bearded Oat (**Avena barbata*), Compact Brome (**Bromus madritensis*) and Rat's-tail Fescue (**Vulpia myuros*) are common in places. The highly invasive climber Bridal Creeper (**Asparagus asparagoides*) is common, particularly south of Rowney Road. African Boxthorn (**Lycium ferocissimum*) and European Olive (**Olea europea*) are sparsely present. For a full list of native/exotic plant species associated with Grey Box Woodlands, refer to Appendix 1.

3.7.2 Inland SA Blue Gum (*Eucalyptus leucoxylon* ssp. *pruinosa*) Woodland



Figure 5 SA Blue Gum Woodland, with interspersed Grey Box (front right of picture).

Photograph: M. Le Duff, DEH

Inland South Australian Blue Gum (*Eucalyptus leucoxylon* ssp. *pruinosa*) Woodland is the dominant plant community of the southern sections of the Mundulla Common.

The understorey is largely consistent with Grey Box (*Eucalyptus microcarpa*) Woodland and is open with a groundlayer dominated by the following native perennial grasses: Spear-grasses (*Austrostipa* spp.), Wallaby-grasses (*Austrodanthonia* spp.), Rigid Panic (*Homopholis proluta*), Wheat-grass (*Elymus scaber*) and Kangaroo Grass (*Themeda triandra*). Other native plants include the graminoids (grass-like plants) Small Mat-rush (*Lomandra nana*) and Black-anther Flax-lily (*Dianella revoluta* var. *revoluta*) and the perennial herbs New Holland Daisy (*Vittadinia cuneata*), Lemon Beauty-heads (*Calocephalus citreus*) and less frequently Grassland Sida (*Sida corrugata* ssp. *angustifolium*). Occasional shrubs of Sweet Bursaria (*Bursaria spinosa*) may be present. Plants of particular conservation significance include the low shrub Leafy Templetonia (*Templetonia stenophylla*) and the graminoid Pale Flax-lily (*Dianella longifolia* var. *grandis*).

Weed species in this association are largely consistent with Grey Box (*Eucalyptus microcarpa*) Woodland and include the perennial herbs Purple Pincushion (**Scabiosa atropurpurea*), Common Ribwort (**Plantago lanceolata*) and Peppergrass (**Lepidium africanum*), and the perennial grasses Rice Millet (*Piptatherum milliaceum*), Cocksfoot (**Dactylis glomeratus*) and Phalaris sp. The annual exotic grasses Bearded Oat (**Avena barbata*), Compact Brome (**Bromus madritensis*) and Rat's-tail Fescue (**Vulpia myuros*) are common in places. The highly invasive climber Bridal Creeper (**Asparagus asparagoides*) is widespread. African Boxthorn (**Lycium ferocissimum*) and European Olive (**Olea europea*) are sparsely present. For a full list of native/exotic plant species associated with Blue Gum Woodlands, refer to Appendix 1.

3.7.3 Red Gum (*Eucalyptus camaldulensis* var. *camaldulensis*) Woodland



Figure 6 River Red Gum Woodland adjacent to the Nalang Creek channel

Photograph: M. Le Duff, DEH

River Red Gum (*Eucalyptus camaldulensis*) Woodland is the dominant community of the Moot-Yang-Gunya Swamp, and to a lesser extent East Terrace where the Nalang Creek enters the Common (Figure 3).

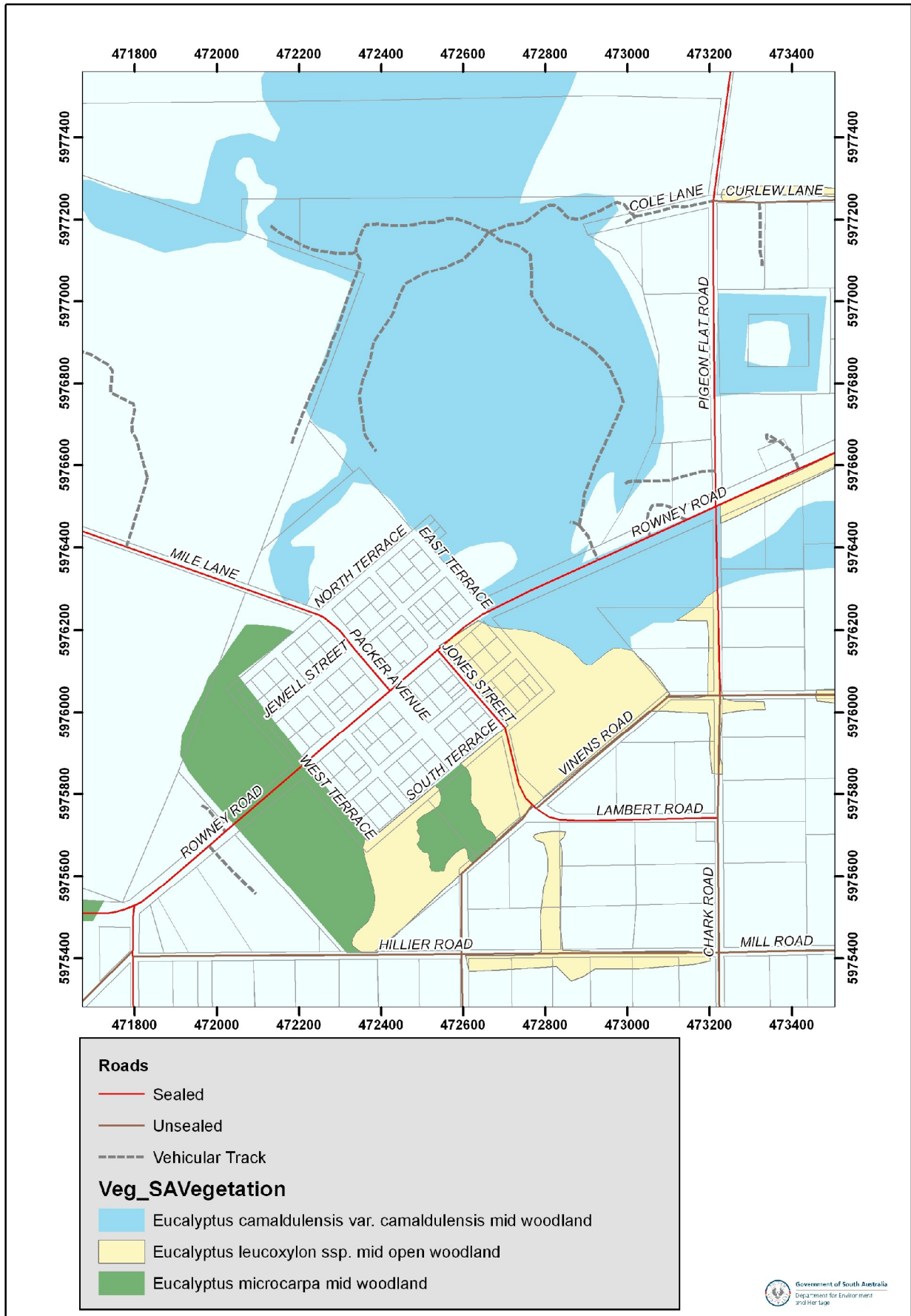
The Swamp supports River Red Gum (*Eucalyptus camaldulensis*) Woodland over an open grassy understorey. The understorey is disturbed but continues to support a high number of native species, many of which have conservation significance at regional and/or state level.

A number of native plant species are (currently) largely restricted to the banks of Nalang Creek in the southern section of the Swamp. These include the sedge Rush Sedge (*Carex teriticaulis*) and the herbs Native Pennyroyal (*Mentha satureioides*), Spreading Goodenia (*Goodenia heteromera*), Lesser Joyweed (*Alternanthera denticulata*) and Common Sneezeweed (*Centipeda cunninghamii*). Species with a more widespread distribution in the Swamp include the sedges Finger Rush (*Juncus subsecundus*) and Small Spike-sedge (*Eleocharis pusilla*), the grasses Barren Cane-grass (*Eragrostis infecunda*), and Rigid Panic (*Whalleya proluta*) and the herbs Poison Pratia (*Pratia concolor*), Native Sorrel (*Oxalis perennans*) and Blue Devil (*Eryngium vesiculosum*). The cryptogam Nardoo (*Marsilea* sp.) is also widespread, although like many species listed above only really detectable during suitable conditions. The shrub Lignum (*Muehlenbeckia florulenta*) is sparsely distributed throughout the reserve and patches of regenerating plants are present. Other species of

interest present in the Swamp include Pale Flax Lily (*Dianella longifolia* var. *grandis*), Poison Lobelia (*Lobelia pratioides*) and Swamp Daisy (*Brachyscome basaltica* var. *gracilis*). For a full list of native plant species recorded for the site refer to Appendix 1.

Exotic species are common in places and include the tree Desert Ash (**Fraxinus angustifolia*) which is presently restricted to the creek banks. The shrubs Wild Rose (**Rosa* sp.) and European Olive (**Olea europea*) are sparsely present throughout. The perennial grass Canary Grass (**Phalaris* sp.), the annual grasses Oat Grass (**Avena* spp.) and Compact Brome (**Bromus madritensis*) and the herbs Prickly Lettuce (**Lactuca serriola*), Ox-tongue (**Helminthotheca echioides*) and Lippia (**Phyla nodiflora*) are widespread and dominate sections.

NB: * indicates an exotic species.



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Figure 7. Distribution of woodland communities across Mundulla Common and Swamp

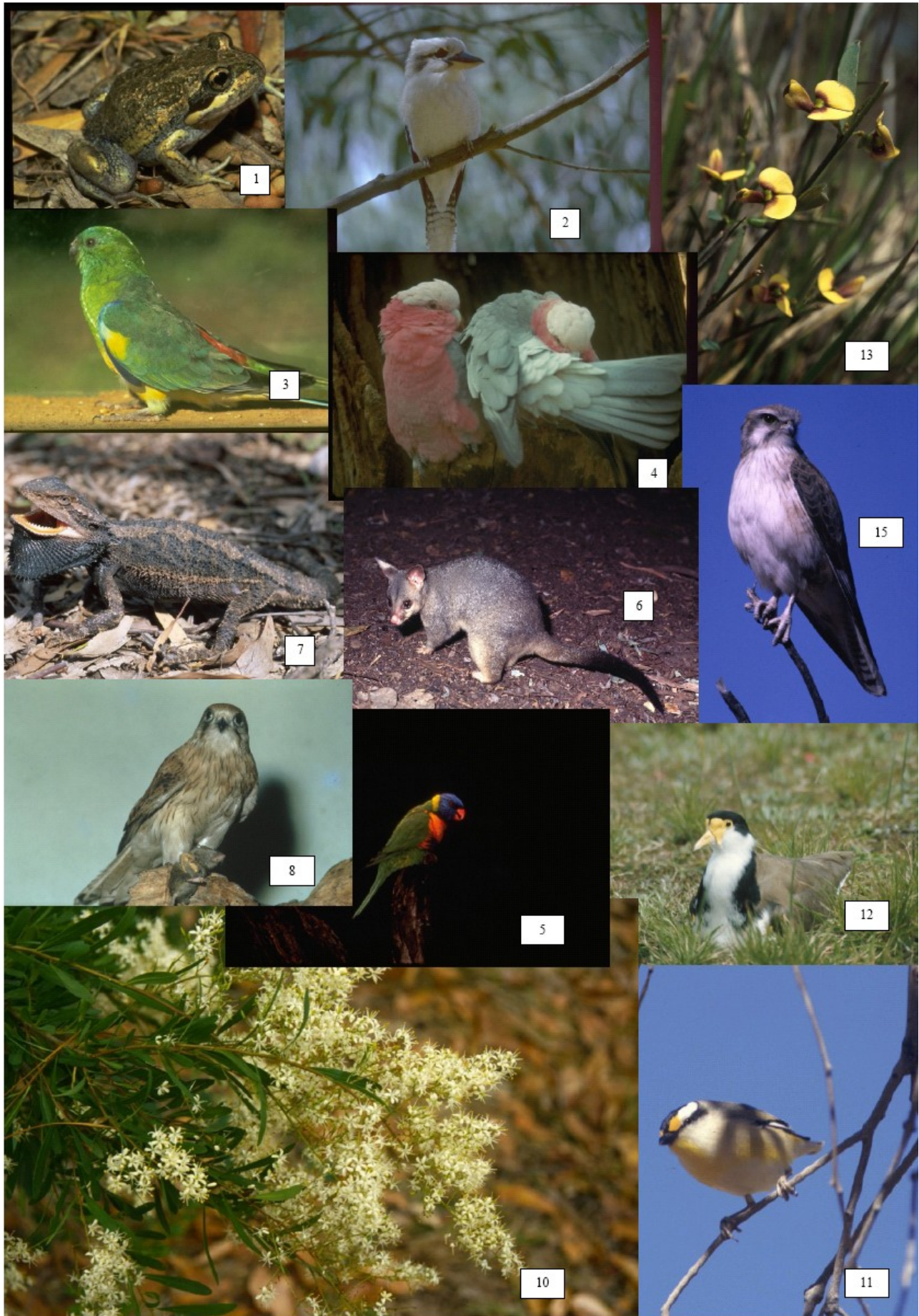


Figure 8 Mixture of species found throughout Mundulla Common and Moot-Yang-Gunya Swamp.

[1] Eastern Banjo Frog (*Limnodynastes dumerili*), photo by Tony Robinson; [2] Kookaburra (*Dacelo novaeguineae*), photo by Tony Robinson; [3] Red-rumped Parrot (*Psephotus haematotus*), photo by the Australian Ornithological Association; [4] Gallah (*Cacatua roseicapilla*), photo by Tony Robinson; [5] Rainbow Lorikeet (*Trichoglossus haematodus*), photo by Lynn Pedler; [6] Brush-tailed Possum (*Trichosurus vulpecula*), photo by Peter Canty; [7] Bearded Dragon (*Pogona vitticeps*); [8] Nankeen Kestrel (*Falco cenchroides*), photo by the Australian Ornithological Association; [10] Sweet Bursaria (*Bursaria spinosa* ssp. *spinosa*), photo by Tony Robinson; [11] Striated Pardalote (*Pardalotus striatus*), photo by Brian Firby; [12] Hooded Plover (*Thinonius rubricollis*), photo by DEH, [13] Tatiara Pea (*Templetonia stenophylla*), photo by DEH; [15] Brown Falcon (*Falco berigora*), photo by Deb Hopton.

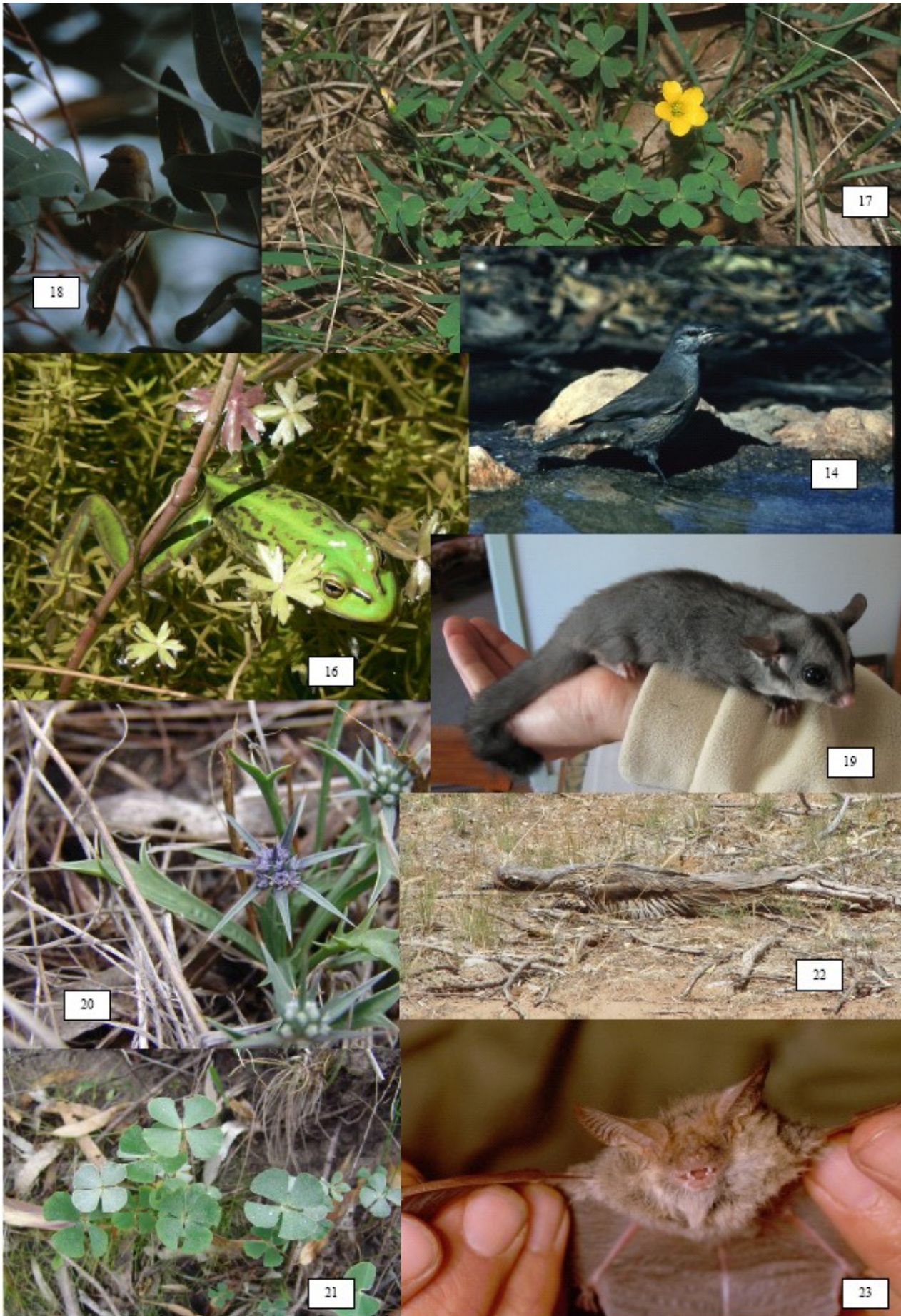


Figure 9 Mixture of species found throughout Mundulla Common and Moot-Yang-Gunya Swamp cont.

[14] Brown Tree-creeper (*Climacteris picumnus*), photo by Deb Hopton; [16] Southern Bell Frog (*Littoria reniformis*), photo by Cath Dickson; [17] Yellow Wood-sorrel (*Oxalis perennans*), photo by Tony Robinson; [18] White-plumed Honeyeater (*Lichenostomus penicillatus*), photo by Deb Hopton; [19] 'Gonzo' the Sugar Glider (*Petaurus breviceps*), photo by DEH; [20] Blue Devil (*Eryngium vesiculosum*), photo by Randall Johnson; [21] Nardoo (*Marsilea sp.*), photo by Randall Johnson; [22] Bush Stone-curlew (*Burhinus grallarius*), photo by Randall Johnson; [23] Lesser Long-eared Bat (*Nyctophilus geoffroyi*), photo by Steve Doyle.

4 TRAIL NETWORK AND MANAGEMENT ZONES



Figure 10 The annual ‘Stockman’s Challenge’, Moot-Yang-Gunya Swamp

Photograph: Courtesy of Tatiara DC

It was strongly identified at the community meetings that the recreational tracks throughout the Swamp and Common should be open for all users, such as walkers, bike riders and horse riders (e.g. Figure 10). For this reason the existing track network has been identified as a shared resource for all the above. However, some limitations have been imposed to protect different users and the natural environment.

There are many existing walking trails through the Common and Swamp and these trails are clearly marked (Figure 13). These trails provide excellent views of the Common and the Swamp and much of the flora and fauna that inhabits the area can be seen from these trails. The main functions of these trails are for walking, however, bike riders and horse riders also expressed an interest in using these pathways if the community and Tatiara District Council wish to allow this.

These trails are working well and no problems have arisen through their use. No further trail development is required through the Common and Swamp, and is discouraged as further construction may detrimentally impact fragile native species of plants, and/or disturb threatened species of animals.

There is the possibility of developing an interpretive walk through the Common and the Swamp using the existing trail network. This will serve to highlight the history and significant environmental values of the area. This would include signage similar to those

already in the Swamp highlighting important natural aspects and areas of interest to sightseers and members of the community. Staff from DEH will be able to assist with the development of an interpretive walking trail.

As these trails are a shared resource, walkers, cyclists and horse riders need to exercise a duty of care to themselves and other trail users at all times.

The following management zones and recommendations were developed in discussion with members from the Mundulla community at the two community meetings held in late 2007 and early 2008. An attempt has been made to address all concerns raised by the Mundulla community, and the following have been created to serve the purposes of the recreational users of the Mundulla Common and Swamp whilst protecting its environmental and cultural values.

4.1 BUSH STONE-CURLEW ZONE



Figure 11 An adult Bush Stone-curlew (*Burhinus grallarius*).

Photograph: D. Harley, DEH

Bush Stone-curlews are an iconic woodland bird species and seven individual birds have been recorded in the Common and Swamp. The population of Bush Stone-curlews in Mundulla comprises approximately 40% of the known population of these birds in the South East, making Mundulla an important refuge site for this species. Many members of the Mundulla community identify with the Bush Stone-curlew population and see them as another natural asset that adds to the character and charm of their township.

Historically, birds have been observed regularly throughout the common though they are declining not only in the South East of South Australia, but throughout south-eastern

Australia as a whole, with the possible exception of Kangaroo Island and other offshore islands which are free from significant predators such as foxes.

The aim of the Curlew Zone is to protect the Bush Stone-curlews that utilise the Swamp and the Common and the habitat that they frequent. The Bush Stone-curlews regularly roost during the day in the same areas of the Common, as indicated in Figure 5. At all times care should be taken so as to not disturb the individual birds, vegetation, fallen branches and leaf litter in this zone.

Reduced disturbance to individual birds can be achieved by minimising the human activity in the areas where the Bush Stone-curlews regularly roost. No walking, bike riding or horse riding should occur in these areas, unless it is on a marked track.

The habitat of these 'Curlew Zones' is extremely important for the survival of these birds. Bush Stone-curlews prefer lightly timbered open forest and woodland, or remnant patches of woodland like the Common and Swamp, with a ground cover of grasses, fallen timber and few or no shrubs (Gates & Paton, 2005).

As such, no timber is to be collected from within these Curlew Zones at any time, unless it is within 20 metres of a boundary fence, and then only pieces of wood smaller than 10cm in diameter/2metres in length, as identified below in Section 5.3.

Leaf litter in the Curlew Zone should not be disturbed in any way, as leaf litter supports much of the diet of the curlews (insects and other invertebrates) and provides suitable camouflage both for mature birds and eggs during nesting seasons.

4.2 FLORA CONSERVATION ZONES



Figure 12 Lemon Beauty Heads (*Calocephalus citreus*).

Photograph: E. Fearn, DEH

Throughout the areas of the Common adjacent West Terrace and South Terrace, and where Nalang Creek enters the Swamp north of Rowney Road, significant plant communities in good condition and/or threatened flora species can be found. Some of these species are considered rare or threatened under the South Australian *National Parks and Wildlife Act* 1972, while other species are of conservation significance in the South East.

In these areas, recreational users should keep to well-defined pathways at all times so as to minimise any accidental damage to threatened flora in this area.

In all sections of the Common, recreational users are encouraged to keep to the appropriate tracks identified below so as to minimise damage to any native flora, not just threatened species, which may be present.

The threatened flora zone in the Swamp is located where Nalang Creek enters the Moot-Yang-Gunya Swamp. There are no walking tracks in this area and the only potential impact comes from crash grazing cattle to control grasses (Refer Section 4- Fuel Reduction and Fire Management). No recreational activities should impact upon this area, and individuals are discouraged from entering it. The impact of cattle crash grazing will be monitored as identified in Section 6 (Vegetation Monitoring) and appropriate actions will be taken to minimise the impact of grazing in these areas if off-target grazing occurs.

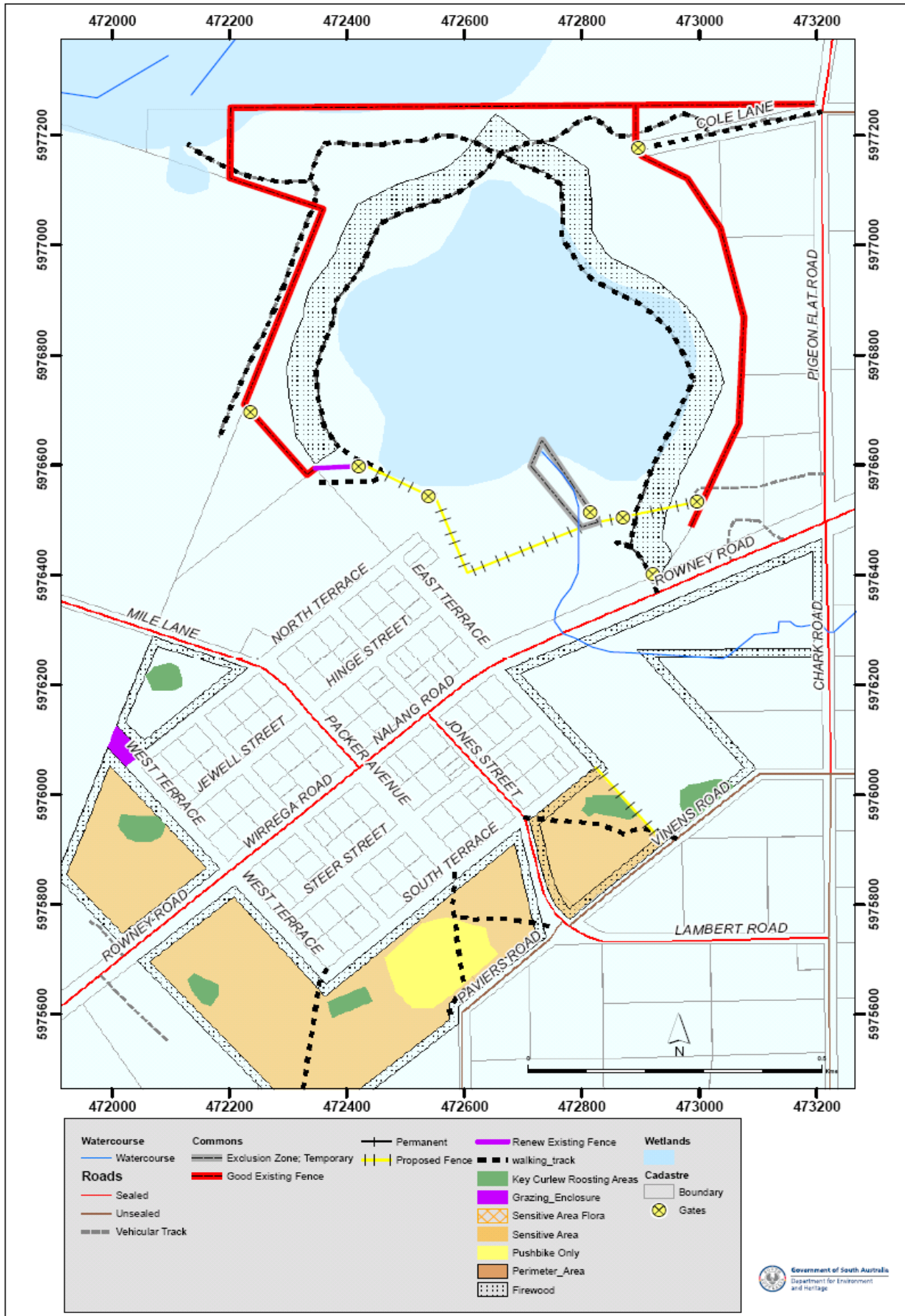


Figure 13. Proposed Zones and Infrastructure for the Mundulla Common and Moot-yang-Gunya Swamp

4.3 BIKE ZONE

The Bike Zone refers to areas where push bikes (including Mountain and BMX bikes) can be used in the Common and Swamp. Due to the risk of fire from combustion engines and threat to other park users, Motorbikes are not to be used in the Common or Swamp at any time.

This management plan is the only place where the use of bikes in the Common and Swamp will be identified for the community and no signage regarding the use of bikes will be erected around the Common or Swamp (at the request of the community). Bikes can be used on all existing tracks found throughout the Common and Swamp, and no new tracks are to be made in the future, particularly in the area of the Common adjacent West Terrace.

In the South Terrace, a network of tracks has been established by local children, primarily for the use of bicycles (Figure 13). This network of tracks should only be used by bike riders due to the intensive track network produced for this purpose. Any other trail users utilising this area may find themselves in conflicting circumstances with bike riders in this area, and they do so at their own risk.

It is recommended that a discreet sign be posted encouraging patrons to remain on established tracks at all times whilst using this zone.

4.4 HORSE RIDING ZONE

Horse riding was identified at the community meetings as being able to occur anywhere throughout the Common and Swamp, including on and off all trails. The point was also made that horse riding is currently largely restricted to existing tracks due to the length of the long grass.

However, due to the environmental values of the Swamp and Common, horse riding should preferably be restricted to the extensive existing trail network in the South and West Terraces of the Common and in the Swamp. Due to the highly degraded state of the Common adjacent East Terrace, horse riding is not permitted anywhere in this area. Also, as there are no existing tracks in the Common adjacent to North Terrace horse riding is not permitted in this area at all either. In the section of the Common adjacent to South Terrace dedicated to bike riding, horse riding is allowed on established tracks.

It is recommended that discreet signs be erected directing patrons to remain on marked tracks at all times, with the exception of riding horses on tracks when they are wet to avoid track deterioration and possible injury.

Horse riders acknowledge that horses/ponies are unpredictable and potentially dangerous animals and assume all responsibility for their own safety when riding in the Common and Swamp. Horse riders must wear an approved safety helmet and appropriate riding equipment when riding in public areas. Horse riders do so at their own risk.

4.5 EDUCATIONAL AREA

The aim of an Educational Area is simply to educate school aged children within the Mundulla Community about the biological/environmental significance of the Swamp and Common and what they can do to protect the biodiversity in the township of Mundulla. An interpretive trail could be prepared within the Swamp and Common as a guide for teachers, students and community members on the reserve as part of a self guided walk. Staff from the Department for Environment and Heritage will be able to assist with the sourcing of funding to implement such a programme should the community and Tatiara District Council wish to proceed with this option.

An interpretive trail with a brochure was created approximately twenty years ago (Vida Maney, pers comm. 2009), and it has been identified that the Mundulla community would consider simply upgrading this existing track.

5 FUEL REDUCTION & FIRE MANAGEMENT

Fire protection for the township of Mundulla was recognised as the highest concern for the community. The following have been identified as issues that are relevant to the management of Mundulla in the event of a fire, and include crash grazing to reduce fuel loads within the Swamp and Common, timber collection, and fire break maintenance. This section aims to address the ways in which grass fuel loads will be managed to control the density of Phalaris and other introduced grasses to reduce the threat of fire to the Mundulla community, without compromising remnant vegetation values.

The details of a fire risk assessment conducted by a local fire professional, and the potential fire management options he and members from the Mundulla community identified are outlined below.

5.1 FIRE HISTORY AND THREAT

Mundulla falls into Region 5 of the South Australian Country Fire Service, the details of which can be found at the CFS website (www.cfs.sa.gov.au). Region 5 covers about 20,000 square kilometres of the state, with a population of 70,000 people. In general terms, it covers the Upper and Lower South East.

Concern has arisen amongst community members with regard to fire threat to houses, lives and the older River Red Gum trees in the Common and Swamp. The community noted that while houses are insurable and replaceable, the valuable old River Red Gums once lost would be lost forever. So, in an effort to address some of the residents concern the Tatiara District Council initiated an assessment of the Swamp and developed a long-term vegetation management plan (McDonough, 2007). It was determined that the drought currently being experienced in south-eastern Australia has led to a reduction in water draining into the swamp. This, in turn, has encouraged some annual grasses in particular to become more prevalent, whereas under normal rainfall conditions there would have been no opportunity for this to occur.

Phil McDonough, the Regional Prevention Officer for the SACFS conducted a fire threat assessment on the Mundulla Common and Moot-Yang-Gunya Swamp on 28/11/2007. His observations and recommendations were as follows:

5.1.1 Observations

There are (as of November 2008) three houses that adjoin the swamp area that could be affected by fire. From an external threat the swamp is very well protected by vineyards that are located North and round to the western side of the town. This provides an excellent buffer to the town for a fire travelling in its direction. The swamp is still susceptible to spot fires occurring but due to good access these fires should be easily controlled.

The main cause of a fire starting in this area would be from human contact- either a deliberate or accidental fire from campfires, bushwalkers or motorbikes. As there are very few campfires in this area the most likely cause would be motorcycles, which are not permitted on either the Swamp or Common at this stage.

The maximum fuel load is estimated at 40 tonnes per hectare, with the minimum at 5t/Ha. There is a significant amount of dead timber on the ground, which adds to the fuel loads. However, most of the fuel loads are of a grassy nature and they “look worse than they

really are” (McDonough, 2007). “If a fire were to burn through this area we would see it act more like a grass fire with the odd bit of crowning in the lower type trees. As the trees are so sparse and separated it would be difficult for a fire to maintain a crown fire through the whole swamp. In saying this there would be significant heat produced which could result in foliage damage to most trees”.

5.1.2 Recommendations

Although Grazing may be an effective method to reduce the entire fuel load throughout the swamp there are some alternative strategies that will mitigate the fire risk to the adjoining properties:

Tatiara Council increase the buffer zone to 50m, within 200m either direction of the adjoining houses, where they remove the dead timber from the buffer zone (placing it deeper in the reserve) and slash this buffer zone on a regular basis throughout summer.

Educate the adjoining properties in preparation of houses for bushfires. This would include encouraging the adjoining landowners to instigate bushfire mitigation strategies on their own properties instead of relying on the Tatiara Council to undertake all prevention activities.

Reduce the risk of a fire starting by restricting motorcycle access to the area, and erecting signage to prevent campfires during the summer period.

5.2 GRAZING OF THE SWAMP AND COMMON

During the current string of dry years, Phalaris (an introduced pasture grass) and other introduced grasses such as Wild Oats (*Avena* spp.) and bromes (*Bromus* spp.) are believed to have become more abundant in the South East and are likely to have contributed to increased fuel loads in Moot-Yang-Gunya Swamp and Mundulla Common. While most sections of the Common are more intact and do not support the overall fuel hazard present in other more degraded areas, the Swamp and the East Terrace have become cause for concern.

Permanent fencing will be required to be established in the Swamp and Common so as to delineate the area to be crash grazed. Certain access points will only be for stock and fire fighting access and will be padlocked when not in use. The only people with access

through these gates will be the Tatiara District Council and the Country Fire Service (CFS). The Tatiara District Council will be responsible for the maintenance of this infrastructure. While these areas are stocked, public access to these areas will not be permitted due to the risk of harm posed by livestock to the public.

Before stock are put into any areas of the Swamp and Common the public will be notified in the local newsletter, *Mundulla on the Move* to make sure the community are aware of the fact that this crash grazing is occurring.

Note: While this method of control is being proposed by DEH in consultation with the Mundulla Community, the Native Vegetation Council (NVC) will be required to approve any proposed grazing regime and no such regime will be implemented until approval from the NVC has been granted.

5.2.1 Annual Grazing Area

It is proposed that the Swamp and the East Terrace will be grazed annually as part of an experimental crash-grazing regime. Many studies have been conducted to test the effects of grazing livestock as a tool for reducing fuel in woodland areas. The impacts this grazing has on the survival of native seedlings, and the times of year most appropriate for conducting grazing events in order to minimise negative impacts have been recorded. This information needs to be considered and as such has been incorporated into the proposed regime below.

In order to reduce abundance of annual exotic grasses grazing needs to be targeted around flowering/seeding in spring, with the cattle being pulled quickly off the area to allow native grasses to flower and set seed in early summer.

On the property immediately north of the Moot-Yang-Gunya Swamp, it has been observed that young heifers avoid eating River Red Gum (*Eucalyptus camaldulensis* ssp. *camaldulensis*) saplings (A. Packer, pers. comm., 2008). For this reason, young heifers will be used so as to reduce the likelihood of River Red Gum saplings being destroyed. A maximum of 120 head of cattle (young heifers) will be used to graze these areas. The Swamp may be divided into two sections using electric non-permanent fencing only, and can be roughly described as the northern two-thirds and the southern third. The duration of

grazing will need to be adaptive, but cattle will be kept in any section of the Swamp for a minimum of a week. Given the larger size of the northern section of the Swamp, this will preferentially be grazed first and will influence the duration of grazing in the smaller southern section of the Swamp. Certain monitoring triggers described below will influence the duration of grazing on an annual basis.

No grazing of the Swamp will occur in the event that the Swamp is filled with even a small amount of water. This is due to the fact that annual weeds will not grow in inundated areas, removing the necessity to graze. In addition, wetting encourages the growth of numerous herbaceous native species which will be impacted by grazing.

The East Terrace of the Common will be grazed using the same regime as above for a minimum of 4 days. The stock owner will be responsible for the welfare of the stock during these times.

Daily vegetation monitoring will be undertaken by Adrian Packer, the Tatiara District Council Fire Prevention Officer (and any other subsequent Fire Prevention Officer for the Tatiara DC, should Adrian vacate his position). Triggers for the removal of cattle will include the amount of thatch (dry dead grass) remaining and the herbivory of significant flora species such as River Red Gum saplings, Lignum (*Muelenbeckia florulenta*) and Pale-flax Lily (*Dianella longifolia* var. *grandis*). Permanent monitoring points for these plants will be established so they can be observed on a daily basis. These monitoring sites will be established by Department for Environment and Heritage staff in conjunction with the Tatiara District Council Fire Prevention Officer.

5.2.2 Intermittent Grazing Areas

The North Terrace section of the Common (refer Figure 3) will be grazed only by sheep as required.

The remaining areas of Mundulla Common (South and West Terrace) will not be grazed on an annual basis as grass fuel loads in these areas are not considered to be significant and because biodiversity values in these sections are likely to be sensitive to this form of management.

These areas will only be grazed in the unlikely event that there is a strong justification for crash grazing. This strong justification includes high fuel loads of native and introduced grasses which are considered a fire threat, and the build up of thatch from native and introduced grasses is having a negative impact on the biodiversity of the common, though in studies conducted by Stern et al (2002) it was shown that there were significantly fewer plant species (lower biodiversity) overall in areas subjected to intermittent grazing, compared to areas with no grazing. If any grazing of these remaining areas is to occur, it will preferentially be conducted in autumn (between March and May) as mortality of native seedlings is higher following spring grazing (Semple & Koen, 2001).

It is suggested in cases such as this, where areas are sensitive to grazing, that alternative fire prevention measures be evaluated, including hand cutting of grasses and other small fuels, the creation of one or more fire breaks and the development of green-breaks (Stern et al, 2002). As such any grazing of these remaining areas will only occur in consultation with DEH and CFS staff, who will identify the necessity of grazing according to the present fuel load.

Any crash grazing which occurs in the South or West Terraces of the Common will utilise sheep only, as sheep will have a lesser impact on the biodiversity of these areas than cattle. This will include older Merino (or similar) wethers, as they in particular have been shown to cause minimal damage to native saplings (Haines *et al*, 1994). This method will involve 40-60 head of dry sheep (preferably wethers) equivalent per hectare and the duration will be for 3 days at a minimum. The sheep will be fasted for no more than 24 hours prior to ensure that they do not bring in any new weed species to the common in their faeces, and also to ensure that when they are put into the common they are hungry. This will help force the sheep to focus on green pick. During this fasting period the sheep will have adequate access to water. No water will be present in the Common during the grazing period as this will also help force the sheep to focus on green pick, from which they will be able to obtain adequate water for a period of up to 3 days.

Triggers for the removal of sheep from these areas will include the density of thatch and length of grass remaining after the 2 day mark. Once the annual grass sward is grazed to within 4 cm of the ground, the sheep will be removed from the Common.

Again, the stock owner is responsible for the welfare of stock while they graze the Common.

PLEASE NOTE: The Tatiara District Council has used grazing for fuel reduction since 2005 in both the North Common and the Swamp, and will continue to do so as the need arises.

5.3 TIMBER COLLECTION

Timber collection from within Crown Lands is prohibited under the Crown Land Management Act 2009. However, collection of timber from roadsides and council parklands is at the discretion of the local council body. In this instance, the Tatiara District Council.

For the purposes of fire threat reduction, timber may be collected from the Common and Swamp within the following parameters:

1. Timber collection can only occur within 20-metres of a boundary fence of the Common or Swamp (exception being within 50-metres of a property boundary in the Swamp). This does not apply to the North Terrace as indicated in Figure 13.
2. Only pieces of timber that are smaller than 2 metres in length and 10cm in diameter may be collected.
3. Larger pieces of wood in the buffer zone should be moved deeper into the Common or Swamp to supplement habitat.

Ground foraging birds and other small vertebrates including reptiles that reside in woodlands like the Swamp and Common rely heavily on a safe and undisturbed microhabitat. Microhabitat features of particular importance include a low density of trees and shrubs, a high cover of native herbs, and fallen timber on the ground (Antos *et al*, 2008). As such, timber collection is an important issue for the Common and Swamp as this fallen timber provides critical habitat for many species of wildlife that call the Tatiara home. Most notably the Bush Stone-curlew, which is listed as Rare in South Australia, uses fallen branches both for nesting and camouflage, particularly in the Mundulla Common which is home to three recorded breeding pairs. Similarly this plant material provides valuable feeding habitat for many other bird species, reptiles and mammals.

Acceptable areas for timber collection for firewood or other uses are indicated clearly in Figure 13.

5.4 FIRE BREAK MAINTENANCE

Effective fire breaks should be maintained around the swamp and common. The *Native Vegetation Act 1991* permits the clearance of native vegetation within 5-metres of the fence line for internal boundaries. Where the fence line is adjacent a roadside this is reduced to 1-metre, and again falls under the jurisdiction of the *Crown Lands Act 1929*. However, vegetation clearance is not an issue on the roadsides in Mundulla, as most of the vegetation in this zone is already cleared. As for the internal boundaries of the Swamp and Common (North and East Terraces only), the area within five metres of fence lines may be slashed or sprayed prior to the fire season on an annual basis.

This should be done using a slasher lowered no further than ten centimetres from the ground, to help prevent any smaller protected native species from being cut. A clear earth break should not be created as this will only generate soil disturbance and facilitate further weed invasion. Any slashing is to be carried out by the Tatiara District Council only.

6 VEGETATION MONITORING

Research on species interactions (i.e. competition and predation) and physical and ecological processes that determine the abundance of species in natural communities has helped generate many of the leading theories of how ecological communities are organized and how they persist through time (www.piscoweb.org). But rapid growth of agricultural land and an increasing number of human activities focused on these sparse natural habitats frequently exposes them to various threats.

Critical to the ecological understanding and protection of the types of communities found in areas like the Mundulla Common and Moot-Yang-Gunya Swamp is our ability to distinguish their natural dynamics from changes caused by local or global human influences- in this instance the changes caused by the crash grazing of hard, cloven-hoofed animals.

Each year a suitably qualified representative from the Department for Environment and Heritage or an appointed contractor will conduct vegetation monitoring activities to record and collate the status of native and exotic flora in the Common and Swamp. Based on the species inventory, changes to the management of certain sections or zones may be made.

This will ensure best practice management both for the health of the site and those who use it.

6.1 FOR EACH VEGETATION ASSOCIATION

For each vegetation association within Mundulla Common and Moot-Yang-Gunya Swamp, it is recommended that individual monitoring protocols be set up due to the different responses each vegetation community may have to grazing and other pressures. The following are a series of recommendations based on best practice vegetation monitoring techniques, and in order to determine if the grazing is helping or in fact hindering biological diversity in the Swamp and Common, it is recommended that the monitoring actions be implemented annually.

6.1.1 Initial Site Assessment

An initial site assessment should be carried out to provide a general site description and assess how best to address the monitoring questions.

This should involve:

- Visual assessments of plant diversity, plant demographics, weed infestation, grazing pressure and other threats.
- Collection of data for a species-area curve to determine the minimum quadrat size for assessing understorey species.
- Collection and identification of plant specimens from across the site, to compile a species list.
- Estimating the average distance between adult trees to determine the quadrat size required for calculating tree density and age structure.

6.1.2 Transect Selection

A random numbers table should be used to select transect base points, with the condition that they are at least 35 m apart to avoid potential overlap or abutting of quadrats, and allowing at least 15 m distance between the ends of quadrats.

6.1.3 Quadrat Selection

Quadrats should be selected based on the following considerations:

- Quadrats are set up along transects so that they are easy to relocate each year.

- Quadrats are located at least 20 m from edges at either end (approximately one tree height, to account for canopy effects, fire breaks and firewood collection), and at least 30 m from side edges (20 m buffer plus the length of half a quadrat).
- Quadrat size: quadrats chosen based on Species Curve
- Quadrat shape: linear (for example 20 m x 1 m) quadrats should be used because they are easier and quicker to monitor by one person. Also, rectangular shapes are less affected by clumped vegetation (reduced variance between quadrats).
- Quadrats are at least 15 m apart to ensure that each quadrat can be treated as an independent sample and therefore can be pooled across transects.

6.1.4 Method

A perpendicular transect line should be set up from each base point. Along each of these, 3 points should be randomly selected using a random numbers table.

1. Each point should be marked with a star-dropper post (~1 m tall once installed). These will be the permanent markers for quadrats, photopoints and tree measurements.
2. The location of each permanent marker should be recorded using GPS coordinates, maps and landmarks.
3. Each star dropper should have a metal tag clearly identifying the transect number and quadrat number. In addition, each post will be labelled with a metal disc (obtained from Biological Surveys, DEH) displaying the SA Government logo and a unique identification number.

6.1.5 Assessment of Understorey Species Frequency Within Quadrats

Method:

1. At each point lay a tape measure perpendicular to the transect line
2. Place a second tape measure parallel to this, to the width appropriate to the quadrat size. This will become the permanent quadrat to be monitored annually.
3. Walk along the tape measure and within each sub-quadrat, record the presence or absence of each species (including any seedlings, < 10 cm tall).

6.1.6 30 x 30 m Quadrats to Assess Tree Density and Age Structure

Regeneration is critical for the long-term persistence of vegetation communities, and assessment of population demography is an important component for monitoring population viability. The age classes of each dominant tree species should be recorded within 30 x 30 m quadrats within each of the sections of the Common and the Swamp. The

size of these quadrats was selected based on the recommendations of Biological Databases and Biosurveys SA (BDBSA). The recommended methods for monitoring are as follows:

1. Along each transect the first quadrat point (for example the quadrat closest to the road) should be used to set up the 30 x 30 m quadrats.
2. Lay one 30m tape measure along the length of each transect (use the second and third permanent markers to help line it up).
3. Facing down the transect from the first quadrat, lay a second 30m tape measure perpendicular to the first, on the right-hand side.
4. Within each quadrat:
 - Count the number of adult trees, young trees (reproductive but not full size), saplings (> 1m, not reproductive) and seedlings (< 1m);
 - Count the total number of other tree species and large shrubs;
 - Record fallen timber and hollow logs (> 10 cm diameter).

6.1.7 Tree Size and Number of Hollows

To provide information required for assessing the condition of the mature trees within each community according to EPBC guidelines (DEWHA 2008), the number of hollow bearing trees and the size of each tree should be recorded within the above quadrats. Hollows provide valuable habitat for many fauna species present in the area, including the Common Brushtail Possum (*Trichosurus vulpecula*), the Sugar Glider (*Petaurus breviceps*), and the Eastern Rosella (*Platycercus eximius*).

Method:

1. For each mature tree record the number of hollows and the diameter at breast-height.
2. Assess tree health using the following attributes
 - percent dieback;
 - percent insect attack (eg. lerps, caterpillars, borers);
 - evidence of disease (e.g. Mundulla Yellows) and;
 - the number of mistletoes.

PLEASE NOTE: A monitoring framework has already been set up (as of November 2009) in the Western Terrace of Mundulla Common according to the above parameters. DEH seeks the cooperation of the community of Mundulla in maintaining these important vegetation monitoring points and reporting anyone who tampers with, destroys or removes any of this equipment. For further information on the results of the vegetation monitoring carried out in 2009 please contact DEH Mount Gambier.

7 WEED AND PEST MANAGEMENT

After land clearance, weed invasion is among the highest threats to flora/habitat conservation in highly fragmented landscapes. In the Swamp and Common there are many species of weeds which will be effectively managed using the grazing regime described previously in Section 5. In addition to the grassy weed species, six significant weed species have been recorded throughout the Swamp and Common. These are Bridal Creeper, Olives, African Boxthorn, Desert Ash, Dog Rose and Soursob.

There are several species of feral animals that have been recorded in the Swamp and the Common. The species of highest concern are the Red Fox (*Vulpes vulpes*) and European Rabbit (*Oryctolagus cuniculus*). The control of these species is highly recommended and the best methods to control these species are discussed below.

7.1 ENVIRONMENTAL WEED CONTROL

There are several weeds of increasing significance in the South East that can also be found in the Mundulla Common and Moot-Yang-Gunya Swamp. The details of each of these and the specific actions required to best ameliorate these threats are outlined below.

7.1.1 Bridal Creeper



Figure 14 Bridal Creeper (*Asparagus asparagoides*) overtaking understory.

Photograph: DEH

Bridal Creeper originated in South Africa and was introduced to Australia in the late 1800's. Since then it has become widespread throughout Australia and is a Weed of National Significance (WoNS). It is also a proclaimed plant under the South Australian

Natural Resource Management Act 2004 (Thorp and Lynch 1999). It is a high priority for control throughout the Swamp and Common.

Bridal Creeper can be controlled by spot-spraying using a non-specific herbicide (glyphosate) mixed with water at an appropriate rate (Muyt 2001). It is most effective if this is applied when the Bridal Creeper is in flower in September. Given that the scale of the Bridal Creeper infestation is considered manageable using chemical methods continuation of the control programs is considered the highest priority weed management action.

Other integrated measures can be implemented for Bridal Creeper, including the application of 'rust' (*Puccinia myrsiphylli*) a fungus released by CSIRO in June 2000 as a biocontrol agent. This is an extremely effective though slightly longer term management option. As mentioned, given the scale of the infestation continuation of the chemical control program is of the highest priority and rust should only be resorted to if resourcing was no longer possible

Further information on Bridal Creeper rust fungus can be found at:

<http://www.csiro.au/resources/BridalCreeperRustFungus.html>

Several years of Bridal Creeper control has already occurred in the Swamp and Common to date.

7.1.2 Woody Weeds

African Boxthorn and European Olives (excluding plantations) are declared plants under the South Australian *Natural Resource Management Act 2004*, which means there is a legal requirement for land managers to implement measures for control/amelioration. Desert Ash and Sweet Briar, two other woody weed species found in the Common and Swamp, are not declared plants. Desert Ash is mainly confined to Nalang Creek, while the other species can be found throughout the Swamp and Common.



Figure 15 Sweet Briar Dog Rose (*Rosa canina*)

Photograph: DEH

These four species can be controlled using the same method, as follows:

European Olives, Boxthorn and Desert Ash should be treated in September when they are actively growing. The best method for controlling these woody weeds is the cut and paste method, followed by ‘frilling’ the base of the plant. The cut and paste method involves cutting the trunk of the plant below any growing stems and swabbing a specific herbicide (triclopyr) mixed with diesel onto the freshly cut area. This should be performed as soon as possible after the tree/shrub has been cut. The remaining trunk of the plant should then be ‘frilled’ using a tomahawk. This involves peeling back the top few millimetres of bark on the trunk so the cambium is exposed. The exposed cambium should then be swabbed with the same herbicide mix as soon as possible.

This frilling treatment is not required for Dog Rose. Dog Rose should be treated in December (using hand saws/loppers) when it is actively growing.

DEH, in partnership with the South East Natural Resources Management Board, has funded the control of Olives, Boxthorn and Desert Ash for several years and will continue to assist where possible.

7.1.3 Herbaceous Weeds

Soursob is an herbaceous weed found throughout the Swamp and Common and is not a proclaimed plant under the South Australian *Natural Resource Management Act 2004*, however it is highly invasive and should be managed where possible. This species is best controlled by spot spraying using a non-selective herbicide (glyphosate) diluted with water. This species needs to be sprayed when its bulb is drying, which is just prior to or while it is flowering (August or September) (Muyt 2001). The community of Mundulla have

identified soursob as one of the worst weeds to invade the Common in the last few decades, and as such all residents are encouraged to be vigilant in recording its spread and reporting any findings to the appropriate authorities so that it may be dealt with in a timely fashion.

7.1.4 Garden Waste

Many environmental weeds have become established in bushland because people dump their garden waste in these areas. Mundulla Community members are strongly encouraged not to dump their garden waste in the Swamp or the Common. Garden waste can include lawn clippings which have the ability to smother native vegetation, but also range to unwanted plant material and pot plants. From this material new plants are potentially able to propagate and will then spread further into the Swamp and Common.

Alternative uses can be found for lawn clippings and other green waste such as starting a compost heap or drying clippings out and using as mulch. Alternatively, Tatiara District Council provides Green Waste Vouchers to residents each year (one per quarter) that grants free access to the local rubbish dump. Mundulla community members are strongly encouraged to make use of these vouchers as their contribution to this issue is valuable and appreciated.

PLEASE NOTE: *weed control and bio-security is everyone's business! If you're not part of the solution, take care that you are not part of the problem! Do your bit to help reduce weed and pest impacts in Mundulla Common and Moot-Yang-Gunya Swamp.*

7.2 FERAL ANIMAL CONTROL

There are several species of feral animals that have been recorded in the Swamp and the Common. The species of highest concern are the Red Fox (*Vulpes vulpes*) and European Rabbit (*Oryctolagus cuniculus*). The control of these species is highly recommended and the best methods to control these species are discussed below.

Other domesticated animals can potentially pose threats to native fauna through both direct and indirect competition. Mundulla community members are strongly encouraged to have any pets (cats, dogs, rabbit, ferrets etc.) sterilised to prevent unwanted procreation and further stress on the native animals in the Common and Swamp.

7.2.1 Fox Control

The Mundulla community would like to see Fox control occurring throughout the whole Common and the Swamp 2-3 times per year. However, there are social, environmental and legal issues which conflict with this action. The main problem is that fox baits are prohibited from being used within 500-metres of any dwelling as identified in the South Australian *Natural Resource Management Act 2004*. This effectively rules out any fox baiting occurring in the Common and much of the Swamp.

Neighbouring landowners around the township of Mundulla which are the required distance from dwellings will be encouraged and supported where possible to undertake fox control on their properties. As Foxes are extremely territorial and have large areas of occupancy, this fox control should be effective in reducing fox numbers in the township of Mundulla and throughout the Swamp and the Common without having off-target impacts, such as domestic dogs.

The local Authorised Officer will be able to assist with the coordination of these landowners to undertake either fox baiting or other mass eradication events (i.e. through shooting) on their properties, and insure that it happens twice per year, in Autumn and Spring. In Autumn young foxes are most susceptible to taking baits as they are leaving the den at this time, and have a significantly smaller body size than a fully grown adult. Whilst in Spring breeding females (vixens) are more susceptible as they usually have a litter to take care of and the likelihood of taking a bait is increased.

7.2.2 Rabbit Control

Rabbits are not in high numbers across the reserve. However, the Mundulla community would like to see regular rabbit control occurring across the whole reserve.

This work should be undertaken by professional contractors, with input from the local Authorised Officer and DEH staff.

Best practice Rabbit control techniques involve an integrated control program of poisoning, warren destruction and warren fumigation. The Mundulla community has indicated that they would not like rabbit baiting to occur.

Rabbit warren destruction should occur using the most appropriate techniques and machinery. Larger dozer machinery should not be used as this will create large amounts of soil disturbance and facilitate weed invasion, as well as inevitably cause extensive habitat

destruction. Given the sensitivity of the site, warrens should be fumigated and filled in by hand. If warrens re-open, they should be fumigated using phostoxin and filled in. Note phostoxin is extremely toxic and only Authorised Officers or other suitably qualified people are able to use this poison.

Regular Rabbit monitoring will need to occur. This can be undertaken by community members and DEH staff when visiting the Swamp and the Common. This component will require input from community members, as community members will be spending more time in the Common and the Swamp, and people will be encouraged to report any sightings of active rabbit activity. Any active rabbit activity should be reported to the local Authorised Officer or Department for Environment and Heritage staff that will undertake the rabbit control works where appropriate.

7.3 DOGS AND OTHER INTRODUCED PETS

People are encouraged to use the Swamp and Common whenever they want to. If people want to walk their dogs throughout the Swamp and Common this is also encouraged. However, due to the risk that dogs off-lead pose to public safety, other recreational users and wildlife, dogs should be kept on the lead at all times. Dogs may potentially frighten horses, younger children and more elderly members of the Mundulla community. For this reason, dogs should remain on the lead at all times to protect all recreational users.

Dog owners are also required to pick up any dog droppings, which is a requirement in most public areas, as a matter of courtesy, health and safety to others. Tatiara District Council will provide a bins and a plastic bag dispensing unit for this purpose.

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10 APPENDICES

Appendix 1 Flora species recorded from the Moot-Yang-Gunya Swamp and Mundulla Common. Field assessments 7/12/06 & 28/3/07, Randall Johnson and Luke Geelen. Regional ratings of Flora from Lang & Kraehenbuehl (1995).

FAMILY	COMMON NAME	SCIENTIFIC NAME	STATUS			VEGETATION ASSOCIATION		
			AUS	SA	SE			
AMARANTHACEAE	Pussy-tails	<i>Ptilotus spathulatus</i> f. <i>spathulatus</i>			K			
CAMPANULACEAE	Poison Lobelia	<i>Lobelia pratioides</i>		R	R	1		
CAMPANULACEAE	Poison Pratia	<i>Pratia concolor</i>		R	V	1		
CAMPANULACEAE	Salt Pratia	<i>Pratia irrigua</i>			U	1		
CAMPANULACEAE	Tufted Bluebell	<i>Wahlenbergia communis</i>				1		
CARYOPHYLLACEAE	*Chickweed	* <i>Cerastium pumilum</i>						
CARYOPHYLLACEAE	*Common Mouse-ear Chickweed	* <i>Cerastium glomeratum</i>				1		
CASUARINACEAE	Bull Oak	<i>Allocasuarina luehmannii</i>			U			3
CASUARINACEAE	Drooping Sheoak	<i>Allocasuarina verticillata</i>					2	
CHENOPODIACEAE	Wingless Fissure-plant	<i>Maireana enchylaenoides</i>			U			3
COMPOSITAE	*Cape Weed	* <i>Arctotheca calendula</i>						3
COMPOSITAE	*Common Sow-thistle	* <i>Sonchus oleraceus</i>				1		3
COMPOSITAE	*Cretan Weed	* <i>Hedypnois rhagadioloides</i>						
COMPOSITAE	*Hawksbeard	* <i>Crepis</i> sp.					2	
COMPOSITAE	*Ox-tongue	* <i>Helminthotheca echioides</i>				1		
COMPOSITAE	*Prickly Lettuce	* <i>Lactuca serriola</i>				1		
COMPOSITAE	*Rough Cat's Ear	* <i>Hypochaeris radicata</i>				1		3
COMPOSITAE	*Smooth Cat's Ear	* <i>Hypochaeris glabra</i>						
COMPOSITAE	Common Everlasting	<i>Chrysocephalum apiculatum</i>						3

COMPOSITAE	Common Sneezeweed	<i>Centipeda cunninghamii</i>			N			
COMPOSITAE	Fuzzy New Holland Daisy	<i>Vittadinia cuneata</i> var. <i>cuneata</i> f. <i>cuneata</i>						
COMPOSITAE	Lemon Beauty-heads	<i>Calocephalus citreus</i>			V			3
COMPOSITAE	Scaly Buttons	<i>Leptorhynchos squamatus</i> ssp. <i>squamatus</i>						3
COMPOSITAE	Scotch Thistle	* <i>Onopordum acanthium</i>				1		
COMPOSITAE	Smooth Solenogyne	<i>Solenogyne dominii</i>			R			3
COMPOSITAE	Swamp Daisy	<i>Brachyscome basaltica</i> var. <i>gracilis</i>		R	E	1		
COMPOSITAE	Woolly New Holland Daisy	<i>Vittadinia gracilis</i>					2	3
CONVOLVULACEAE	Grassland Bindweed	<i>Convolvulus angustissimus</i> ssp. <i>peninsularum</i>			U			
CONVOLVULACEAE		<i>Convolvulus erubescens</i> complex					2	3
CYPERACEAE	Knob Sedge	<i>Carex inversa</i> var. <i>inversa</i>			T	1		
CYPERACEAE	Rush Sedge	<i>Carex tereticaulis</i>				1		
EPACRIDACEAE	Cranberry Heath	<i>Astroloma humifusum</i>					2	
GENTIANACEAE	*Centaury	* <i>Centaureum</i> sp.				1		
GERANIACEAE	*Long Heron's-bill	* <i>Erodium botrys</i>						
GERANIACEAE	Magenta Pelargonium	<i>Pelargonium rodneyanum</i>						
GOODENIACEAE	Cut-leaf Goodenia	<i>Goodenia pinnatifida</i>			V	1		
GOODENIACEAE	Spreading Goodenia	<i>Goodenia heteromera</i>		R	V	1		
GRAMINEAE	*Annual Beard-grass	* <i>Polypogon monspeliensis</i>						
GRAMINEAE	*Annual Veldt Grass	* <i>Ehrharta longiflora</i>						3
GRAMINEAE	*Bearded Oat	* <i>Avena barbata</i>						
GRAMINEAE	*Bulbous Meadow-grass	* <i>Poa bulbosa</i>						
GRAMINEAE	*Canary Grass	* <i>Phalaris</i> sp.				1	2	
GRAMINEAE	*Compact Brome	* <i>Bromus madritensis</i>						
GRAMINEAE	*False Brome	* <i>Brachypodium distachyon</i>						
GRAMINEAE	*Hair-grass	* <i>Aira</i> sp.						

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GRAMINEAE	*Hybrid Ryegrass	* <i>Lolium perenne</i> X <i>Lolium rigidum</i>						
GRAMINEAE	*Large Quaking-grass	* <i>Briza maxima</i>				1	2	
GRAMINEAE	*Lesser Quaking-grass	* <i>Briza minor</i>				1	2	3
GRAMINEAE	*Oat	* <i>Avena sp.</i>				1	2	
GRAMINEAE	*Rat's-tail Fescue	* <i>Vulpia myuros</i> f. <i>myuros</i>						
GRAMINEAE	*Ryegrass	* <i>Lolium sp.</i>				1	2	3
GRAMINEAE	*Small Hair-grass	* <i>Aira cupaniana</i>						
GRAMINEAE	*Soft Brome	* <i>Bromus hordeaceus</i> ssp. <i>hordeaceus</i>						
GRAMINEAE	*Wall Fescue	* <i>Vulpia muralis</i>						
GRAMINEAE	Balcarra Spear-grass	<i>Austrostipa nitida</i>						3
GRAMINEAE	Barren Cane-grass	<i>Eragrostis infecunda</i>		R	R	1		
GRAMINEAE	Common Wallaby-grass	<i>Austrodanthonia caespitosa</i>						3
GRAMINEAE	Crested Spear-grass	<i>Austrostipa blackii</i>			V			3
GRAMINEAE	Fine-hairy Spear-grass	<i>Austrostipa puberula</i>					2	
GRAMINEAE	Hill Wallaby-grass	<i>Austrodanthonia eriantha</i>			K			
GRAMINEAE	Kangaroo Grass	<i>Themeda triandra</i>			N	1	2	
GRAMINEAE	Kneed Wallaby-grass	<i>Austrodanthonia geniculata</i>						
GRAMINEAE	Leafy Wallaby-grass	<i>Austrodanthonia fulva</i>			R			
GRAMINEAE	Native Wheat-grass	<i>Elymus scaber</i> var. <i>scaber</i>					2	
GRAMINEAE	Perennial Blown-grass	<i>Lachnagrostis filiformis</i>						
GRAMINEAE	Red-leg Grass	<i>Bothriochloa macra</i>		R	R			
GRAMINEAE	Rigid Panic	<i>Whalleya proluta</i>					2	3
GRAMINEAE	Short-crest Spear-grass	<i>Austrostipa curticoma</i>			V			
GRAMINEAE	Slender Spear-grass	<i>Austrostipa scabra</i> ssp. <i>falcata</i>						
GRAMINEAE	Slender Wallaby-grass	<i>Austrodanthonia racemosa</i> var. <i>racemosa</i>			U			
GRAMINEAE	Small-flower Wallaby-grass	<i>Austrodanthonia setacea</i>						
GRAMINEAE	Swollen Spear-grass	<i>Austrostipa gibbosa</i>		R	E		2	

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HALORAGACEAE	Bluish Raspwort	<i>Haloragis glauca</i> f. <i>glauca</i>			T	1		
HALORAGACEAE	Milfoil	<i>Myriophyllum</i> sp.					2	3
HALORAGACEAE	Rough Raspwort	<i>Haloragis aspera</i>			U	1	2	3
IRIDACEAE	*Onion-grass	* <i>Romulea</i> sp.					2	
JUNCACEAE	Finger Rush	<i>Juncus subsecundus</i>						
JUNCACEAE	Rush	<i>Juncus</i> sp.				1		
JUNCACEAE	Yellow Rush	<i>Juncus flavidus</i>			K			
LABIATAE	*Horehound	* <i>Marrubium vulgare</i>						3
LABIATAE	*Pennyroyal	* <i>Mentha pulegium</i>				1		
LABIATAE	*Wild Sage	* <i>Salvia verbenaca</i> var. <i>verbenaca</i>						
LABIATAE	Grey Germander	<i>Teucrium racemosum</i>						
LABIATAE	Native Pennyroyal	<i>Mentha satureioides</i>		R	E	1		
LEGUMINOSAE	*Hare's-foot Clover	* <i>Trifolium arvense</i> var. <i>arvense</i>						
LEGUMINOSAE	*Hop Clover	* <i>Trifolium campestre</i>				1	2	
LEGUMINOSAE	*Narrow-leaf Clover	* <i>Trifolium angustifolium</i>				1	2	3
LEGUMINOSAE	*Rough Clover	* <i>Trifolium scabrum</i>						
LEGUMINOSAE	*White Clover	* <i>Trifolium repens</i>						
LEGUMINOSAE	Leafy Templetonia	<i>Templetonia stenophylla</i>		V	E			3
LEGUMINOSAE	Scarlet Runner	<i>Kennedia prostrata</i>					2	
LILIACEAE	*Bridal Creeper	* <i>Asparagus asparagoides</i>						
LILIACEAE	Black-anther Flax-lily	<i>Dianella revoluta</i> var. <i>revoluta</i>					2	3
LILIACEAE	Common Vanilla-lily	<i>Arthropodium strictum</i>					2	3
LILIACEAE	Nodding Vanilla-lily	<i>Arthropodium fimbriatum</i>						3
LILIACEAE	Pale Flax-lily	<i>Dianella longifolia</i> var. <i>grandis</i>		R	E	1		
LILIACEAE	Small Mat-rush	<i>Lomandra nana</i>			N	1	2	3
LILIACEAE	Small Vanilla-lily	<i>Arthropodium minus</i>			T			3
LILIACEAE	Sword Mat-rush	<i>Lomandra sororia</i>			U			
LILIACEAE	Yellow Rush-lily	<i>Tricoryne elatior</i>					2	
LYTHRACEAE	Lesser Loosestrife	<i>Lythrum hyssopifolia</i>				1		
MALVACEAE	Grassland Sida	<i>Sida corrugata</i> var. <i>angustifolia</i>			V		2	3
MARSILEACEAE	Nardoo	<i>Marsilea</i> sp.				1		
MYRTACEAE	Grey Box	<i>Eucalyptus microcarpa</i>			V			3

MYRTACEAE	Inland South Australian Blue Gum	<i>Eucalyptus leucoxyton</i> ssp. <i>pruinosa</i>						
MYRTACEAE	River Red Gum	<i>Eucalyptus camaldulensis</i> var. <i>camaldulensis</i>				1		
MYRTACEAE	South Australian Blue Gum	<i>Eucalyptus leucoxyton</i>					2	3
OLEACEAE	*Desert Ash	* <i>Fraxinus angustifolia</i>						
OLEACEAE	*Olive	* <i>Olea europaea</i> ssp. <i>europaea</i>				1	2	3
ONAGRACEAE	Variable Willow-herb	<i>Epilobium billardierianum</i> ssp. <i>intermedium</i>						
OXALIDACEAE	*Soursob	* <i>Oxalis pes-caprae</i>				1	2	3
OXALIDACEAE	Native Sorrel	<i>Oxalis perennans</i>				1	2	3
PITTOSPORACEAE	Sweet Bursaria	<i>Bursaria spinosa</i> ssp. <i>spinosa</i>					2	3
PLANTAGINACEAE	*Hairy Plantain	* <i>Plantago bellardii</i>					2	
PLANTAGINACEAE	*Ribwort	* <i>Plantago lanceolata</i> var. <i>lanceolata</i>						3
PLANTAGINACEAE	Narrow-leaf Plantain	<i>Plantago gaudichaudii</i>						3
POLYGALACEAE	*Annual Milkwort	* <i>Polygala monspeliaca</i>					2	
POLYGONACEAE	Dock	<i>Rumex</i> sp.				1		
POLYGONACEAE	Lignum	<i>Muehlenbeckia florulenta</i>			R	1		
PRIMULACEAE	*Pimpernel	* <i>Anagallis arvensis</i>						
RANUNCULACEAE	*Pricklefruit Buttercup	* <i>Ranunculus muricatus</i>				1		
RANUNCULACEAE	Ferny Buttercup	<i>Ranunculus pumilio</i> var. <i>pumilio</i>			R	1		
ROSACEAE	*Dog Rose	* <i>Rosa canina</i>					2	
ROSACEAE	Sheep's Burr	<i>Acaena echinata</i>						
RUBIACEAE	Common Woodruff	<i>Asperula conferta</i>				1		
RUBIACEAE	Rough Bedstraw	<i>Galium gaudichaudii</i>				1		
SCROPHULARIACEAE	Slender Monkey-flower	<i>Mimulus gracilis</i>			E	1		
SOLANACEAE	*African Boxthorn	* <i>Lycium ferocissimum</i>						3
STACKHOUSIACEAE	Creamy Candles	<i>Stackhousia monogyna</i>					2	

THYMELAEACEAE	Curved Riceflower	<i>Pimelea curviflora</i> var. <i>gracilis</i>				1		
THYMELAEACEAE	Low Riceflower	<i>Pimelea humilis</i>				1	2	
UMBELLIFERAE	Blue Devil	<i>Eryngium</i> <i>vesiculosum</i>		R	R	1		
VERBENACEAE	*Lippia	* <i>Phyla nodiflora</i>						
VERBENACEAE	*Trailing Verbena	* <i>Verbena supina</i> var. <i>supina</i>				1	2	3

Ratings: E – Endangered, R – Rare, U – Uncommon, * – Exotic Species, V – Vulnerable
 Vegetation Association: 1 – *Eucalyptus microcarpa* Woodland, 2 – *Eucalyptus leucoxylon*
ssp. pruinosa Woodland, 3 – *Eucalyptus camaldulensis* Woodland (Refer Section 3.7 for
 more detail).

Appendix 2 Fauna species recorded from the Moot-Yang-Gunya Swamp and Mundulla Common. Native species and ratings sourced from the National Parks and Wildlife Act (1972). Species list compiled by R. Johnson & L. Geelen (2006).

COMMON NAME	SCIENTIFIC NAME	RATING	
		AUS	SA
Mammals			
Common Brushtail Possum	<i>Trichosurus vulpecula</i>		R
Sugar Glider	<i>Petaurus breviceps</i>		R
Lesser Long-eared bat	<i>Nyctophilus geoffroyi</i>		
Horse	* <i>Equus caballus</i>		
Feral Goat	* <i>Capra hircus</i>		
Fox	* <i>Vulpes vulpes</i>		
Rabbit	* <i>Oryctolagus cuniculus</i>		
Western Grey Kangaroo	<i>Macropus fuliginosus</i>		
Birds			
Brown Treecreeper	<i>Climacteris picumnus</i>		
White-plumed Honeyeater	<i>Lichenostomus penicillatus</i>		
Straw-necked Ibis	<i>Threskiornis spinicollis</i>		
Masked Lapwing	<i>Vanellus miles</i>		
Brown Falcon	<i>Falco berigora</i>		
Nankeen Kestrel	<i>Falco cenchroides</i>		
Bush Stone-curlew	<i>Burhinus grallarius</i>	NT	V
Galah	<i>Cacatua roseicapilla</i>		
Long-billed Corella	<i>Cacatua tenuirostris</i>		
Musk Lorikeet	<i>Glossopsitta concinna</i>		
Cockatiel	<i>Nymphicus hollandicus</i>		
Eastern Rosella	<i>Platycercus eximius</i>		
Red-rumped Parrot	<i>Psephotus haematonotus</i>		
Mulga Parrot	<i>Psephotus varius</i>		
Rainbow Lorikeet	<i>Trichoglossus haematodus</i>		
Laughing Kookaburra	<i>Dacelo novaeguineae</i>		
Striated Pardalote	<i>Pardalotus striatus</i>		

Weebill	<i>Smicrornis brevirostris</i>		
Red Wattlebird	<i>Anthochaera carunculata</i>		
Noisy Miner	<i>Manorina melanocephala</i>		
Grey-shrike Thrush	<i>Colluricincla harmonica</i>		
Magpie-lark	<i>Grallina cyanoleuca</i>		
Australian Magpie	<i>Gymnorhina tibicen</i>		
Black-faced Cuckoo-shrike	<i>Coracina novaehollandiae</i>		
Little Crow	<i>Corvus mellori</i>		
White-winged Chough	<i>Corcorax melanorhamphos</i>		
House Sparrow	* <i>Passer domesticus</i>		
Reptiles			
Eastern Bearded Dragon	<i>Pogona barbata</i>		
Beaded Gecko	<i>Diplodactylus damaeus</i>		
Sleepy Lizard	<i>Tiliqua rugosa</i>		
Sand Goanna	<i>Varanus gouldii</i>		
Amphibians			
Southern Bell Frog	<i>Litoria raniformis</i>	V	V
Common Froglet	<i>Crinia signifera</i>		
Eastern Banjo Frog	<i>Limnodynastes dumerili</i>		
Spotted Grass Frog	<i>Limnodynastes tasmaniensis</i>		
Painted Frog	<i>Neobatrachus pictus</i>		
Sudell's Frog	<i>Neobatrachus sudelli</i>		

NT – Near Threatened, V – Vulnerable, R – Rare

Appendix 3 Community Consultation

To foster a fair and open consultation process, the Department for Environment and Heritage applied for a grant through the *Native Vegetation Fund Grants Scheme* in 2006, seeking funds to engage the services of an independent facilitator to undertake the community consultation process and to collate these views and knowledge toward the production of a management plan.

Initial planning meetings were held with the Tatiara District Council to discuss the successful grant application and to seek consensus on the planning process. An independent facilitator, Leanne Muffet, from consulting firm Strategic Matters was engaged to facilitate two meetings. The first meeting was held in November 2007. Participants included members of Tatiara District Council, Mundulla on the Move, local conservation groups, Country Fire Service and other members of the community with particular interests such as fuel hazard reduction, farming, horse riding, and parents whose children use the Common for varied recreational purposes.

The facilitation process solicited community involvement by encouraging participants to:

- Explore what is currently working well in the Mundulla Common and Moot-Yang-Gunya Swamp.
- Explore what is not working well in the Mundulla Common and Moot-Yang-Gunya Swamp.
- Explore what opportunities there are for the Mundulla Common and Moot-Yang-Gunya Swamp both from an environmental and community perspective.
- Identify what each participant values about Mundulla Common and Moot-Yang-Gunya Swamp.
- Share their ideas with the discussion group in order to identify available options.

A variety of issues were discussed on the night, with key issues raised being: fuel loads, weed control, community uses and grazing. Notes were recorded from the meeting by the facilitator and were summarised at a later date and given back to participants to be added to their records.

A second meeting was held in March 2008 to build on the findings from the November 2007 meeting. The second meeting examined zoning for specific activities and the actions that might be required within the zones. Another objective of the meeting was to develop management protocols. The main issues covered included:

grazing, firewood collection, curlew protection, walking and horse riding, weed/vermin control and vegetation monitoring. At the meeting maps of the township and the surrounding Mundulla Common and Moot-Yang-Gunya Swamp were used to visualise and plan for specific zones. At a later date the summarised meeting notes and annotated maps were given back to the community for further distribution and comment.

