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CENTRAL YORKE PENINSULA CONSERVATION AREAS STUDY

prepared by

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EXECUTIVE SUMMARY

In response to growing development pressure, particularly in the coastal areas of the Central Yorke Peninsula District Council area, some modification of the existing planning policies was clearly required. The sites and areas listed below were assessed for "Conservation Significance" with respect to a range of physical, biological and cultural attributes. Their Conservation Significance Ratings, and the relevant criteria which determined these ratings are summarised below (Key Map in pocket inside back cover).

	Area	Hundred	Cons. Signif.	Relevant Criteria
1	Dayman's Scrub	Clinton	M	R
2	Young's Scrub	Cunningham	VH	T Q D R
3	Brown's Scrub	Cunningham	VH	T Q D R
4	Heinrich's Scrub	Kilkerran	M	R
5	Gershwitz / Moody's Scrub	Kilkerran	VH	Q D R
6	Adams' Scrub	Maitland	H	D R
7	Lodge's Scrub	Maitland	VH	T Q D R
8	Hill's Scrub	Maitland	VH	Q D R
9	Aldersyde	Maitland	H	R
10	Thomas's Scrub	Maitland	H	R
11	Rogues Gully	Muloowurtie	H	R
12	Crown Scrub	Muloowurtie	VH	T Q D R
13	Rogues Point Reserve	Muloowurtie	L	
14	Joraslafsky's / Watter's Scrub	Muloowurtie	VH	Q D R
15	Rocky Bend National Trust Reserve	Tiparra	VH	Q D R
16	Agery National Trust Reserve	Tiparra	VH	Q D R
17	Jones - Rockwood's Scrub	Tiparra	H	R
18	Colliver's Scrub	Tiparra	M	D R
19	Gardner's Scrub	Tiparra	H	T D
20	Liebelt's Scrub	Wauraltee	H	T R
21	Pt Clinton Foreshore	Cunningham	M	R
22	Mangrove Point	Cunningham Clinton	VH	Q R
23	Tiddy Widdy Beach	Cunningham	M/H	R A
24	Ardrossan to Black Point Cliffs	Cunningham Muloowurtie	H	A G
25	Cape Elizabeth	Tiparra	VH	Q R A
26	Balgowan - The Gap Coast	Kilkerran Tiparra	H	R G
27	Balgowan - Chinaman Wells Coast	Kilkerran	H	Q R
28	Chinaman Wells - Pt Victoria Coast	Kilkerran	L/M/H	A G
29	Coast South of Pt Victoria	Wauraltee	VH	Q D R
30	Maitland - Ardrossan Roadside	Maitland	H	R

Conservation Significance Ratings

L - Low M - Moderate H - High VH - Very High

Relevant Criteria

T	**Threatened**	Presence of plant, animal or plant association which is regionally threatened at any level.
Q	**Quality**	Overall low levels of degradation, incorporating moss and lichen crust, evidence of regeneration, low weed infestations,no accelerated erosion,no dieback, low feral animal numbers, and low human impact.
D	**Diversity**	Range of habitats available, incorporating presence of old or dead trees, discrete vegetation layers, litter, wildlife and number of plants evident.
R	**Remnancy**	In essence, any native vegetation large enough to map in a district where only 3% of the original pre-settlement vegetation exists has value as a remnant, regardless of its other conservation attributes.
A	**Aboriginal**	Presence of sites of Aboriginal significance.
G	**Geology**	Presence of a recommended *Geological Monument* in the area.

Management Recommendations

The following actions are recommended with respect to areas of **High** or **Very High** Conservation Significance:

1. Maintain existing remnant vegetation as large contiguous blocks wherever possible.
2. Restrict access of all types to areas of unstable or fragile coastal dunes.
3. Minimise disturbance by:
   - controlling vehicular access.
   - controlling pedestrian access.
   - controlling development.
   - controlling rabbits.
   - low impact weed control.
   - prepare a Fire Prevention Plan
4. Take advantage of the Heritage Agreement system wherever appropriate.
5. Encourage the formulation of appropriate Land Management Agreements.
6. Link existing remnant vegetation with corridor plantings.
7. Prepare a regional revegetation strategy including roadsides.
8. Prohibit development which degrades in any way areas of high geological significance.
9. Promote the involvement of school and other community groups in landcare and revegetation activities.
10. Promote the formation of community groups to assist with management of conservation areas.
11. Assist and support research into Eucalypt Dieback and Mistletoe.
12. Institute a monitoring program to establish trends in conservation value of significant areas.

INTRODUCTION

Reason for the Study

A range of land use conflicts exist in the Central Yorke Peninsula District and their adequate resolution requires a reasonable level of understanding about the relationships between human land usage and the existing natural environment. Collation and interpretation of the available information about the natural environment is necessary so that appropriate management and development options can be formulated. Issues directly related to human land use and impact include:

- foreshore erosion
- weed and rabbit infestation
- native vegetation clearance and degradation
- inappropriate development on coastal reserves
- impact on natural areas of increasing numbers of holiday dwellings
- impact of off-road vehicle usage
- impact of indiscriminate camping

The Development Plan currently recognises five areas warranting conservation and preservation. These are:

- the coastal strip and dunes south of Port Victoria
- Cape Elizabeth
- cliffs between Ardrossan and Black Point
- remnant native vegetation adjacent to the Minlaton - Ardrossan road
- remnant vegetation on rocky outcrops adjacent to the Maitland - Ardrossan road

There is a need for development to be sensitive to the natural environment, and Council was concerned that the controls in the Development Plan were not sufficiently strong and clear enough to adequately ensure conservation of areas of high conservation significance.

Recent development proposals near Cape Elizabeth threatened the integrity of the area prompting the preparation of an Interim Coastal Areas Supplementary Development Plan.

Aims and Objectives

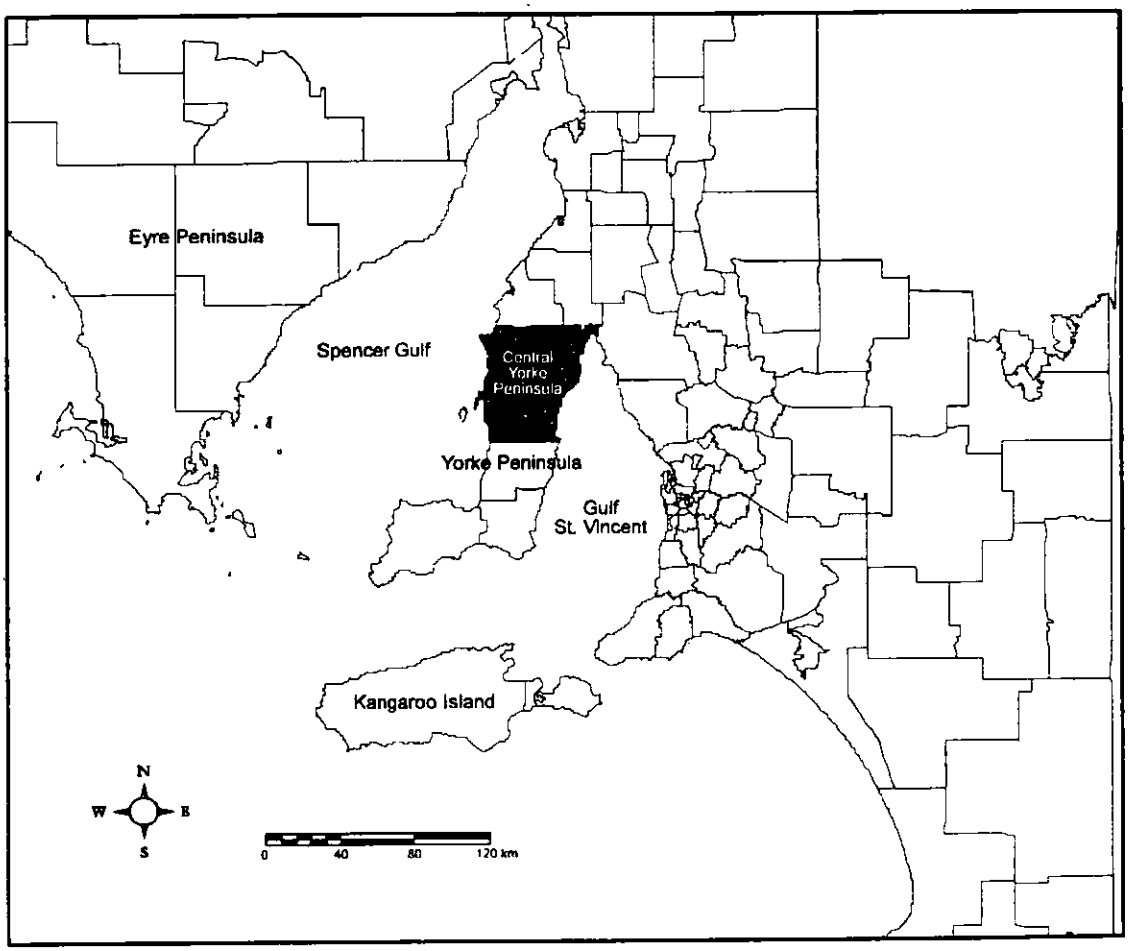
1. Provide a basis for policy formulation for a Plan Amendment Report (PAR), addressing development and management of "Areas of High Conservation Significance".

2. Identify "Areas of High Conservation Significance" likely to be subjected to degrading pressures of future development.

3. Suggest some monitoring procedures and management initiatives appropriate to the long term sustainable management of "Areas of High Conservation Significance".

Study Area

The area under consideration covers the entire jurisdiction of the District Council of Central Yorke Peninsula. Map 1 shows the location of the study area.



Map 1 Location of Central Yorke Peninsula District Council Area

Historical Perspective

Aboriginal Occupation

At the time of the arrival of Europeans in this State, Yorke Peninsula was occupied by the Narungga tribe. Their territory encompassed the whole of the peninsula and extended northwards to Port Broughton and eastwards to the Hummocks Range (Howitt 1904, Tindale 1974). The Narungga were divided into four sub-groups, the Kurnana in the north, Windera in the east, Wari in the west and the Dilpa in the south.

The Narungga were closely related linguistically and culturally to the Kaurna tribe (Curr 1886, Tindale 1976), who occupied the coastal plains on the eastern side of St. Vincent's Gulf. According to Berndt (1940),the Port Wakefield area was a popular fishing spot and meeting place.

Along the coast, Aborigines speared or caught fish in nets woven from vegetable fibres. Shellfish, crustaceans, seabirds and their eggs also formed an important part of the Aborigines' diet. Inland, the men hunted kangaroos, wallabies, wombats, emus and other game, while the women and children gathered plant foods and caught smaller mammals and reptiles. The coastal dunes and inland scrub were rich in plant foods such as Pigface, Quandong, Native Cherry and Muntries, as well as a variety of roots, tubers and seeds.

Fowler (1886) estimated that the Narungga numbered about 500 when Europeans first settled the peninsula in 1847. In the first years, there were sporadic outbreaks of conflict as the newcomers took possession of the water sources and best grazing lands (Hill & Hill 1975). By the late 1850s the Narungga, reduced by that time to about half their original number by introduced diseases such as smallpox and the effects of alcohol and poor living conditions, had been almost entirely dispossessed of their tribal lands. Some of the remaining Narungga people found employment in the copper mines, others on sheep stations and some survived on rations distributed by the Government.

In 1868, Point Pearce mission station was established, providing farm and other skills training and religious services. Many of the remaining Narungga people gathered there and worked in the fields and tended the livestock (Hill & Hill 1975, Mattingly & Hampton 1988).

By 1880 the tribe numbered less than 100 (Fowler 1886), the majority of them living at Pt. Pearce. In 1915 the Government took control of Pt. Pearce, and in 1972, the Pt. Pearce lands, comprising nearly 6000 hectares were transferred to the Aboriginal Lands Trust Act who lease the land back to the Pt Pearce community. The community's affairs are administered by the Point Pearce Community Council, consisting of representatives elected from the community.

The Aboriginal population on Yorke Peninsula currently is around 300, about half of them residing at Pt. Pearce. Others live in the major rural centres. They generally refer to themselves as Narungga, but most have mixed ancestry through marriages with members of other tribes sent to Pt. Pearce late last century.

European Occupation

In 1839, land surveys began at Port Victoria and Port Vincent, however, within 12 months, the area was found to be too arid for European agricultural methods, and was abandoned.

By 1846, the increasing pressure of the population growth around Adelaide forced another attempt to settle on the peninsula. Four claims were made in 1846, and a further twenty in 1847.

1859-60 saw the opening of the hundreds of Wallaroo, Kadina, Kulpara, Tiparra and Clinton after the copper discoveries at Wallaroo and Moonta. It was anticipated that agriculture would develop to provide hay and flour for the mining towns, but by 1867, the land was already becoming impoverished, and the next season saw a considerable reduction in wheat acreage. A resurgence

of interest in the area occurred in 1870, after some good yields, when it was realised the Peninsula had the potential to grow wheat. Land sales increased, and by 1880, 60,000 ha were sown to wheat.

Government plans for town settlements allowed for a town in each hundred. The expected dependence of the town on supplies coming from Port Adelaide led to the planning of three ports on the Peninsula, Edithburgh to be the main one, with two more on the South coast when settlement extended. The late 1860s saw the development of Edithburgh and several other centres inland from there.

In 1876, the hundreds of Curramulka and Cunningham were opened up. These were the last remaining areas of land suitable for agriculture as the thicker mallee areas were being left untouched due to the expense of clearing. Mullenising, the practice of rolling and burning the scrub, then reburning the crop stubble to kill the stumps was readily adopted by the farmers. In June 1876, the invention of the stump jump plough began another era by allowing faster, more efficient agriculture in the mallee areas.

From 1880-96, persistent droughts saw the collapse of the wheat industry on the Peninsula. The answer came in 1896 with the use of superphosphates, and in 1898, the best wheat season for fifteen years was realised. It soon became obvious however, that feeding the weeds was not economically viable, so fallowing was adopted as a regular practice. Shallower ploughing was also employed in an attempt to reduce damage to the soil. This was successful.

1889 was a very wet year, and the hot and humid November resulted in a severe attack of rust. New rust resistant strains of wheat were developed, and by 1901, Marshall's No.3 had become popular due to its high resistance to rust attacks. This strain of wheat proved to be of very high importance to the Australian wheat industry as a whole (Corbett 1973).

High rates of clearance of native vegetation for agriculture continued, and when Cereal Cyst Nematode problems began to decrease the wheat yields, the focus moved to barley as the main cereal output for the Peninsula. The advent of bulk handling cabilities for grain had flow-ons for the viability of cereal growing, and along with new wheat and barley varieties, and the discovery of the importance of trace elements in crop nutrition, added to the pressure to clear to the extent that only about 3% of the original native vegetation remains today (Table 1), and much of that is under stress from stock grazing pressure, edge effects from adjoining land use, and weed and rabbit infestations.

In terms of the natural environment, the main changes to the land since European settlement have been:

Large scale clearance of native vegetation for agricultural development has led to the total destruction of the ecological balance on the most arable soil types and the subsequent extinction of the animals dependent on that vegetation for habitat. The large scale loss of mallee vegetation has removed significant numbers of nest hollows from these habitats, hollows that may not be renewed in 200 years even if the mallee is allowed to regrow. Many bird and mammal species rely on these hollows for reproduction.

The pattern of clearance has left the remaining native vegetation in isolated islands, some of which may be too small for the long-term maintenance of

biological diversity or for the survival of species which require large areas of undisturbed habitat.

Table 1 Remnant Native Vegetation in Central Yorke Peninsula LGA

Hundred	Area (ha)	Remnant Veg (ha)	Remnant Veg %	Park Area (ha)
Clinton	35,483	1,703	4.80	1,853
Cunningham	34,706	485	1.40	0
Kilkerran	31,857	1,083	3.40	0
Maitland	34,118	307	0.90	0
Muloowurtie	27,713	831	3.00	0
Tiparra	69,412	3,054	4.40	0
Wauraltee	30,303	999	3.30	0
Total	263,592	8,462	3.03	1,853

Notes:

Data from **Department of Environment & Planning** (1987) Remaining Vegetation in the Agricultural Regions of South Australia (prepared by the Native Vegetation Management Branch)

Substantial decreases in the size of the remaining blocks of vegetation after clearance has made these more vulnerable to invasion by rabbits and weeds and decreased their habitat value for much of the native fauna.

Clearance also altered the hydrological regime, ultimately causing dryland salinity problems through rising water tables.

Grazing of stock, especially during droughts, decreased the numbers of palatable plants. This decreased the available preferred food plants for native fauna and often brought about accelerated soil erosion through the breaking up of moss and lichen crusts, and the destruction of the surface soil structure. Grazing in the dune systems close to the coast, even at low stocking rates has substantially increased their instability, and regeneration of sand binding vegetation in these harsh conditions is extremely slow.

Increased grazing pressure has also led to increased disturbance with its associated management problems such as the invasion of weeds and rabbits.

Introduction of rabbits has changed significantly the composition of many plant communities and has led to local extinctions of some species of plants. Localised disturbance through rabbit activity has also increased problems with weed invasions in remnant vegetation, and altered the habitat of numerous native animals.

Introduction of foxes has led to the local extinction of some ground dwelling birds, mammals and reptiles.

Holiday accommodation and tourism activities have brought with them degradation through vehicular and foot traffic in sensitive areas, as well as building development, sometimes in environmentally inappropriate places (PPK Consultants 1989).

Relevant Legislation and Management Responsibilities

Current or future ownership of areas of conservation significance does not alter the intrinsic worth of these areas, and does not alter the responsibilities which the relevant landholders have to maintain or enhance the value of these areas. Some of the relevant South Australian statutes and the extent of their influence are listed here.

Clinton Conservation Park is the only Conservation Reserve within the District Council area, and is the responsibility of the National Parks and Wildlife Service, who manage it in accordance with the requirements of the **National Parks and Wildlife Act 1972**.

Aboriginal sites, whether they are listed on the Register or not are protected under the **Aboriginal Heritage Act 1988**. This Act has provisions which control access to, and restrict activities in the vicinity of Aboriginal sites, objects or remains. The Culture and Site Services Section of the Department of State Aboriginal Affairs administers the Act and maintains a Register of Sites. There are 14 registered sites within the study area. The responsibility for these sites rests largely in the hands of local Aboriginal heritage committees, who represent traditional owners. Detailed information on sites and site locations is confidential, and can only be released with the permission of the traditional owners. However general indications of significance and distribution of sites is readily available.

The **Native Vegetation Act 1991** requires all native vegetation clearance, including burning and grazing, to be approved by the Native Vegetation Management Branch (DENR), encourages research into native vegetation management, addresses the general issues of biodiversity maintenance and degradation minimisation, and contains provisions for financial assistance, incentives and Heritage Agreements.

There are currently five Heritage Agreements in the Central Yorke Peninsula District Council area (Table 2). Heritage Agreements are contracts in perpetuity and can only be rescinded by mutual agreement of both parties. The Heritage Agreement is registered on the title of the subject land and the Agreement transfers to the new owners if the property changes hands. Landholder obligations under other statutes remain the same as non-Heritage land (see Appendix 2 for more details).

Under the **Animal and Plant Control Act 1986**, landholders, including Local and State Government bodies, are required to control rabbits and weeds on their properties, as well as on the adjoining roadsides.

The **Coast Protection Act 1972** established the Coast Protection Board whose broad powers and responsibilities are to:

- investigate coastal areas and prepare management plans
- control access to some coastal areas
- assist Councils financially with coastal facilities and protection works

Table 2 Heritage Agreements

Owner	Hundred	Section	Date reg.	Area (ha)
National Trust of S A	Tiparra	PT 225	16 May 1991	3
Jones-Rockwood P/L	Tiparra	PT F4	20 Aug 1992	16
Hill	Maitland	PT 221	7 Jun 1983	7
Joraslafsky	Muloowurtie	12, 13, 14	10 Oct 1990	314
Watters	Muloowurtie	22	15 Jun 1992	90
Total				430

The **Development Act 1993** established the Development Assessment Commission, Development Policy Advisory Committee and the Environment Resources and Development Committee,and embodied a requirement for each "Planning Area" to produce a Development Plan which is basically a document containing policies on development control. Because the main thrust of the Development Act is to do with *land use*, it provides little scope to direct *land management* practices. The initial responsibility for development applications under the Development Act rests with Local Government.

The **Soil Conservation and Landcare Act 1989** recognises that degradation of land resources has occurred, and is still occurring through inappropriate management practices, and involvement from all sectors of the community is required to halt degradation and rehabilitate affected land. It establishes a system which requires land capability assesments to be carried out, degrading factors to be identified, and comprehensive regional management plans to be formulated and implemented. Community involvement, and methods for enhancing the adoption of land management practices which are appropriate to the land's capability to sustained land use are also addressed.

Control of fishing and fisheries falls under the **Fisheries Act 1971**. Under this legislation, Aquatic Reserves can be proclaimed and the Regulations prohibit the cutting or removal of Mangroves, other seabed vegetation, sand and shellgrit from areas below the high water mark.

Methodology

Sites or areas were selected for assessment (Table 3) from:

- a list provided by Council
- submissions from members of the public after advertising in the local press
- areas previously surveyed by the Native Vegetation Management Branch in response to clearance applications
- a few other significant sized native vegetation remnants

There are certainly other sites or areas in the study area worthy of assessment, which were unable to be included in this study due to time constraints.

At each site, chosen to be as representative as possible of the area of interest, the following criteria were applied, results recorded (sample field data sheets are included in the Appendices), and a photograph taken. On the basis of this assessment, and reference to other collated information relating to these sites, a rating of **Low**, **Moderate**, **High** or **Very High** conservation significance was assigned to each site or area.

The descriptions in the *Descriptions and Management Recommendations* section of this report are a brief summary of these assessments.

Assessment Criteria

Native vegetation remnants, whether they are part of a coastal or inland system, provide habitat for a large number of native plants and animals. Undisturbed remnants have a wide range of different plant species, the richness and diversity varying with the local climatic conditions, and through human usage, various forms of degradation have occurred. The following criteria were used to provide a partially objective method of assessing the habitat (and hence conservation) value of certain areas.

Presence of discrete vegetation layers

Remnants in good condition should have (depending on the vegetation type) up to three recognisable layers

- trees
- tall shrubs
- low shrubs and ground covers

The absence of one or more of these layers usually indicates some form of disturbance.

Presence of a crust of mosses and lichens

Mosses and lichens hold the soil surface together minimising soil erosion and helping to conserve soil moisture. They are highly susceptible to destruction from the hooves of grazing animals, and in low rainfall areas are slow to regenerate.

Presence of old and dead trees

Diverse bush should contain trees of all ages, including old and dead ones. Hollows in eucalypts, including mallees provide breeding sites for birds, bats, reptiles and small mammals, and many insects, spiders and other invertebrates live under the bark.

Presence of a litter layer

Litter, including fallen logs and limbs, provides cool, damp habitat suitable for many different types of native fauna. High intensity fires, stock trampling and firewood gathering all detract from the value of this habitat.

Evidence of regeneration

Particularly in low rainfall areas, seedlings are slow to grow back, and are very sensitive to disturbance. If there are young seedlings of the native vegetation in an area, it is a reasonable indication that the prevailing management practices are promoting the overall health of the patch.

Presence of exotic weed species

Invasion by vigorous colonising plants often indicates prior distubance of the mix of native species through fire, grazing (including rabbits), vehicular or pedestrian traffic. Boundaries, where scrub adjoins another land use are very susceptible to wind-blown seed dispersal and the deposition of weed seeds through the droppings of grazing animals. Many exotic plant species are able to out-compete the native species, by utilising available light, nutrients and moisture more efficiently. Fertilizer drift also alters the nutrient balance, and can detrimentally affect the survival of native species which have become well adapted to low nutrient environments such as mallee.

Presence of accelerated soil erosion

Sheet, gully and wind erosion indicate an unstable soil surface and disrupted nutrient cycles. Erosion is a natural process, but where it is accelerated to the extent that native seeds and soil nutrients are being lost, habitats destroyed and soil moisture lost, it brings about a loss of species diversity, and provides easier colonisation opportunities for weed species.

Presence of dieback

Dieback of native vegetation may be due to soil-borne pathogens, altered wind patterns through removal of adjacent protective vegetation, or salinity. In mallee, it is usually characterised by the loss of foliage from the upper branches.

Presence of wildlife

Evidence of the presence of a variety of birds, echidna diggings, reptile tracks and ant nests indicate some level of habitat value. The presence of a variety of wildlife at different levels of the food chain indicates interdependency and some degree of ecological sustainability.

Presence of feral animals

Feral animals such as foxes, cats and rabbits can have a devastating effect on populations and habitats of native fauna and flora. Their presence can be detected through evidence such as diggings, dung, tracks and furballs.

Human impact

Humans when they "use" native remnants leave many obvious signs behind them. Impacts such as trampled vegetation, rubbish, soil compaction, chemical drift, weed seed importation all degrade the conservation value of these remnants.

Size and location

Generally, the larger an area is and the higher its *area to edge ratio*, the greater its conservation value. Larger areas are less susceptible to the influences of the surrounding land uses.

Geological significance

Some areas have rare or unusual geological and geomorphological history, and consequently receive increased scientific attention. Some have been given the status of *Geological Monuments*, and as such, are of higher conservation significance (see *Preservation of Sites of Geological Importance* in the next section).

Presence of rare or threatened species

Plant species, plant associations or fauna which rely on certain environments may be threatened through the destruction of their habitat from a variety of causes. From an overall viewpoint of biodiversity maintenance, the preservation and enhancement of these habitat types is important.

Presence of culturally significant sites

Aboriginal sites and certain features of post-European settlement are worthy of preservation for both spiritual and historical reasons, so ongoing human usage of such areas must take into account these cultural values.

The overall assessment of the areas listed in Table 3 with respect to these criteria is based on a weighted average of all except the last two. Given the historical management regime and its effect on both threatened species and Aboriginal sites, it was felt that the presence of either of these in an area deserved a minimum rating of **High** conservation significance regardless of the other criteria.

Table 3 Areas assessed in this study

	Area	Hundred	Section
1	Dayman's Scrub	Clinton	pt 343, pt 344, pt 345
2	Young's Scrub	Cunningham	pt 37
3	Brown's Scrub	Cunningham	pt 35S
4	Heinrich's Scrub	Kilkerran	pt 138
5	Gershwitz / Moody's Scrub	Kilkerran	pt 136, pt 137
6	Adams' Scrub	Maitland	pt 298
7	Lodge's Scrub	Maitland	pt 213NW
8	Hill's Scrub	Maitland	pt 221
9	Aldersyde	Maitland	pt 16
10	Thomas's Scrub	Maitland	pt 236, pt 371, pt 372, pt 242
11	Rogues Gully	Muloowurtie	pt 61, pt 62
12	Crown Scrub	Muloowurtie	202
13	Rogues Point Reserve	Muloowurtie	pt 193
14	Joraslafsky's / Watter's Scrub	Muloowurtie	pt 12, pt 13, pt 14, pt 22
15	Rocky Bend National Trust Reserve	Tiparra	554
16	Agery National Trust Reserve	Tiparra	pt 225
17	Jones - Rockwood's Scrub	Tiparra	pt F4 ~D picked also adjacent.
18	Colliver's Scrub	Tiparra	pt 50 Kainton
19	Gardner's Scrub	Tiparra	pt 406E Kainton
20	Liebelt's Scrub	Wauraltee	pt 15, pt 19W
21	Pt Clinton Foreshore	Cunningham	Lots 8, 5, 51
22	Mangrove Point	Cunningham Clinton	pt 408 pt 580
23	Tiddy Widdy Beach	Cunningham	383, 385, 386, 387, 388, 409, 410, 411, 412, 464
24	Cliffs between Ardrossan and Black Point	Cunningham Muloowurtie	457, 458, 459 176, 188, 189, 193, 194, 195, 196, 197, 198, 199, 200, 411, 414
25	Cape Elizabeth	Tiparra	C, pt D,547, 548, 553
26	Balgowan - The Gap Coastal Strip	Kilkerran Tiparra	304, 305, 306 AN, 546 , 557, 560
27	Balgowan - Chinaman Wells Coastal Strip	Kilkerran	261, 262, 263, 53, 54, 55, 57, 58, 59, 293, 300, 301
28	Chinaman Wells - Pt Victoria Coastal Strip	Kilkerran	294, 295, 296
29	Coast South of Pt Victoria	Wauraltee	241 - 251, 278, 288
30	Maitland - Ardrossan Roadside	Maitland	adj. 284

MANAGEMENT ISSUES

Loss of Biodiversity

Stable ecosystems consist of a number of different organisms co-existng in the one location.This means soil micro-organisms, invertebrates, mammals, birds and plants. Each organism is dependent on others for either some nutrient, some environmental requirement, or for waste disposal. This inherent sustainability is only possible if there is balance within the system. Removal or alteration of any of the populations which make up these systems will destabilise it, and in the short term, bring about a change in this balance. More complex ecosystems have more chance of finding their balance and becoming self-sustaining than simpler ones, therefore maintenance of a high level of diversity will assist these systems in being able to cope with outside disturbance and environmental changes.

At a genetic level, diversity is also important. Many species of plants and animals display variation in their morphology (life form) from district to district. These differences result from many factors including soil type, nutrition al differences, climatic effects or grazing pressure. Through maintenance of a variety of populations of a species, the genetic diversity or 'gene pool' of wildlife that is characteristic of the district can be maintained. It is important to maintain genetic diversity for many reasons. For instance, when considering the revegetation an area, or even ornamental planting, local seed stock should be sought from within the district. This is because the local plants have adapted to the local conditions and are thus more likely to establish successfully.

It is important that a high genetic diversity is maintained over the entire range of a species when the ecosystems in which they live are subjected to changes in external influences. Climatic changes associated with the *Greenhouse Effect* are one example. Rising saline water tables, and altered wind patterns are others. All these effects are evident in the study area. Communities of species with high genetic variability will be better able to adapt to the predicted climatic changes than those with a small gene pool.

Rare or Threatened Species

Many remnant vegetation areas contain populations of rare plant and animal species or rare plant associations. Often these are inadequately protected within the National Parks System, so other conservation areas play a vital role in their continuing survival.

An example of the importance of "off-park" conservation was seen after a fire burnt more than 80% of Billiat Conservation Park in 1987. The fire burnt out almost all areas of the porcupine (*Triodia irritans*) hummock grassland which is the habitat of the Mallee Emu-wren, a vulnerable bird species. Small areas of this habitat which retain populations of emu-wrens are found in adjacent farming properties that escaped the fire. It is anticipated that birds from these areas will recolonise the Park when the vegetation regrows.

Cleared land acts as a barrier to the movement of many species of wildlife by creating islands of habitat in a sea of hostile environment. Linear remnant vegetation can act as wildlife corridors which link areas of native vegetation

together and allow for wildlife movement. On Yorke Peninsula, where there is very little remnant vegetation (Table 1), roadside vegetation and on-farm shelterbelt plantings become of vital importance for their corridor effect.

Less common species or communities become so, either by selective destruction through human intervention, or they evolve that way because they have slightly different environmental requirements from those which are more common. Either way, their preservation is equally important.

The following section lists some of the animal species of conservation concern because of their regional rarity. Some of these species are not rare when considered at a State or National level, but evidence suggests that they are much less abundant on central Yorke Peninsula than they have been in the past. The codes listed in Table 4 will be used throughout this report whenever referring to threatened species.

Table 4 Codes for Threatened Species (adapted from Leigh et al. 1981)

Code		Description
X	Extinct	
E	Endangered	in serious risk of disappearing from the wild state within one or two decades if present land use and other causal factors continue to operate
V	Vulnerable	not presently endangered, but at risk over a longer period through continued depletion, or which largely occur on sites likely to experience changes in land use which would threaten the survival of the species in the wild
R	Rare	not currently considered endangered or vulnerable, but represented by a relatively large population in a very restricted area, or by smaller populations over a wider range, or some intermediate combination of distribution pattern
U *	Uncommon	declining and inadequately conserved, but not yet rare or vulnerable
K	Poorly Known	suspected, but not definitely known, due to the lack of accurate field distribution information, to belong to any of the above categories

* Applies only to birds (Blakers et al. 1984)

Mammals

- Brushtail Possum (*Trichosurus vulpecula*)
- Dama Wallaby (*Macropus eugenii*)
- Fat-tailed Dunnart (*Sminthopsis crassicaudatus*)
- Lesuer's Rat Kangaroo (*Bettongia lesuer*)
- Rabbit-eared Bandicoot (*Thylacomys lagotis*)

- Red Kangaroo (*Megaleia rufa*)
- Southern Hairy-Nosed Wombat (*Lasiorhinus latifrons*)
- Southern Pigmy Possum (*Cercartetus concinnus*)
- Western Grey Kangaroo (*Macropus fuliginosus*)
- Yellow-footed Rock Wallaby (*Petrogale xanthopus*)

Birds

- Brown Treecreeper (*Climacteris picumnus*) - E
- Chestnut-rumped Thornbill (*Acanthiza uropygialis*) - X
- Crested Bellbird (*Erioica gutteralis*) - V
- Diamond Firetail (*Emblema guttata*) - E
- Mallee Fowl (*Leipoa ocellata*) - E
- Mallee Ringneck (*Barnardius barnardi*) - E
- Mulga Parrot (*Psephotus varius*) - V
- Rock Parrot (*Neophima petrophila*) - R
- Rufous Night Heron (*Nycticorax caledonicus*) - R
- Slender-billed Thornbill (*Acanthiza iredalei*) - V
- Southern Whiteface (*Aphelocephala leucopsis*) - E
- Striped Honeyeater (*Plectorhynca lanceolata*) - E
- Yellow-Plumed Honeyeater (*Lichenostomus ornatus*) - V

Reptiles

- Death Adder (*Acanthophis antarcticus*)

Animal Pest Invasions

Rabbits

In central Yorke Peninsula, as in most of the rest of the agricultural and regions of South Australia, rabbits have had a major impact on, and represent a major threat to wildlife conservation. Rabbits directly compete with native fauna for food resources. In areas of native vegetation rabbit grazing suppresses regeneration of most native species. Soil disturbance, particularly around warrens, leads to erosion and predisposes infested areas to weed invasion which all reduce the integrity of the habitat.

Rabbits are a major threat to the productivity of agricultural and pastoral lands because they compete with livestock for food and water, degrade pasture and can severely damage crops. Rabbits decrease pasture productivity by eating the shoots, roots and seeds of palatable plants. The removal of these plants disturbs the soil and encourages the growth of unpalatable weeds.

Rabbits remove ground cover by eating both foliage and roots. This type of grazing can kill native trees, shrubs and herbs, and prevent any seedlings

establishing. Such overgrazing leads to an increased risk of wind and water erosion. Erosion increases the dust content of the wool decreasing the overall value of the wool cut.

Many native plant species will only successfully regenerate in conditions that also lead to a rapid increase in rabbit numbers, that is, years with good autumn and winter rain followed by a mild summer. Short-lived plants are rapidly grazed out. Large shrubs are often ring-barked and young seedlings are pruned and killed.

Eventually, when feed runs out the rabbit population crashes. By this time extreme damage has been done. Populations of many native plants will have died out. The decrease in the number of plant species leads to a decline in animals that depend on these plants for food and shelter. Even low rabbit numbers can result in an overall change to the plant community. Such changes affect the very survival of some native animals.

Rabbits are widespread in the study area, particularly in sand dune areas, where digging is easy, and around the edges of native vegetation remnants where they derive shelter from the scrub and feed mainly in the adjacent agricultural land. They are especially difficult to control in sandy areas where recolonisation, even after effective control programs,is easy.

Foxes

There is a lot of evidence pointing to fox predation as a significant factor in the decline and extinction of native animals. The actual extent and severity of their effect on other populations is however, not well understood. Some direct and indirect evidence is gradually accumulating relating to a variety of other species. For example, in Western Australia, small colonies of *Petrogale lateralis*, a rock wallaby have significantly grown in response to an intensive fox control program, and malleefowl and bandicoots wearing radio tracking equipment have been taken by foxes and cats very quickly after being released.

Foxes appear to be opportunists, in that they will eat whatever is most readily available and edible. In environments where rabbits are plentiful, they will form a major part of the fox diet, leading to the potentially serious situation where high rabbit numbers may support quite high fox populations, and when the rabbit population falls whether through a control program or by natural means, predation pressure on other species increases.

About 80% of extinct Australian mammals are of a size vulnerable to fox predation (Kennedy 1990). Many species of native birds and mammals in remnant vegetation of the agricultural regions are declining in numbers. Malleefowl, whilst not threatened on a regional basis, is extinct in the study area, mainly due to habitat destruction, and fox predation is a major factor which will affect any recolonisation by these birds of suitable habitat. Fox predation maintains low population levels of many species, compounding the problems they already face, and decreasing the likelihood of recovery and recolonization of formerly occupied areas. Fox control programs in Western Australia have resulted in the stabilization and increase of populations of several rare mammals such as Numbats (*Myrmecobius fasciatus*) and Rock Wallabies (*Petrogale lateralis*) (Kinnear 1988, Kinnear 1989, Friend 1990).

Feral Cats

Feral cats are those domestic cats that live and reproduce without being closely associated with humans. Feral cats can live either near human habitation or in complete isolation in the bush. In closely settled agricultural areas, semi-domesticated farm cats and roaming domestic cats may also behave like feral cats. Feral cats are secretive animals and are seldom seen but probably inhabit most scrub blocks. They are highly skilled hunters and are known to take many types of native animals, especially birds, small mammals and lizards. They usually concentrate their hunting to the species that are most available. In some areas, rabbits make up a large part of their diet. Feral cats are carriers of serious diseases that can be transmitted to humans, domestic stock and some native animals.

Common Starlings

Common starlings are aggressive birds that outcompete many native birds and animals for food and shelter. They are powerful flyers, now found throughout most of Australia. Their large numbers have probably decreased the food resources because they eat a large variety of things. Not only do they feed on fruit crops and cereal grains in large quantities, but they also displace insect-eating native birds, which might otherwise be beneficial for insect control in agricultural crops.

Competition with native birds as large as parrots and nankeen kestrels for tree hollows to nest in is probably the most severe consequence of having starlings in the mallee, because suitable nesting hollows are so scarce. Their breeding season (August to January) is the same as many of the native parrots and they can raise several broods in a season.

Unfortunately there is no really effective way to control starlings without significant off-target effects at present.

Feral Honey Bees

Feral honey bees can also compete for scarce tree hollows. Swarming bees can occupy hollows for many years. Bees also remove large quantities of nectar and pollen, giving them the potential to displace some species of honeyeater and lorikeet. Sometimes, bees can feed without pollinating plants because of their specialised structures. These plants which require specialised insects to pollinate their flowers can have their ability to reproduce significantly reduced if honey bees displace these other insects. In the long term, this can lead to a change in the floristic composition.

Weed Invasions

In a conservation sense, weeds can be considered to be plants which appear to be detrimental to the biodiversity and ecological sustainability of the remnant native vegetation in the area. These are usually plants which are opportunistic colonisers of disturbed areas, plants which produce and disperse large quantities of seed and plants which grow vigorously enough to compete out plants native to the region.

Edges of scrub blocks experience high levels of disturbance from soil drift, fertiliser drift, rabbit and stock activity. These disturbed conditions are ideal for

weed colonisation. Disturbance will be reduced dramatically when rabbits are controlled and stock fenced out.

Weeds generally do not present a major management problem in most scrub blocks at present. Wild turnip is one of the few weeds that is growing deep inside some blocks, mainly on sandy ground where rabbits are active.

Horehound seeds are spread in native vegetation by animals such as kangaroos and rabbits or by overland water flow after storms. It can eventually take over patches of disturbed ground in scrub blocks.

Mallee vegetation is extremely competititve in undisturbed conditions though, and native plants should eventually replace weeds in the edges of scrub blocks.

Some of the problem weeds in the area are:

African boxthorn (*Lycium ferocissimum*)

- introduced from South Africa as a hedge plant
- can form dense thicket when it is neglected
- harbours vermin
- seeds are spread by birds.

Bridal creeper (*Myrsiphyllum asparagoides*)

- introduced from South Africa as a garden plant
- invades native scrub
- forms dense cover that eliminates native shrubs and ground plants
- seeds are spread by birds.

False caper (*Euphorbia terracina*)

- introduced from the Mediterranean area as a garden plant
- requires disturbed vegetation to establish itself
- competes with pasture
- is considered poisonous to stock.

Horehound (*Marrubium vulgare*)

- introduced from Europe as a medicinal garden plant
- requires open disturbed vegetation to establish itself
- is difficult to eradicate once it is established
- is relatively unpalatable to stock
- is a prolific seeder spread by stock, people and vehicles.

Innocent weed (*Cenchrus longispinus*)

- introduced from North America
- requires disturbed vegetation to establish itself
- burrs can damage wool and hides and contaminate produce
- burrs are spread readily on clothing, tyres and stock
- regenerates repeatedly after rain.

Onion weed (*Asphodelus fistulosus*)

- introduced from the Mediterranean
- requires disturbed vegetation to establish itself
- is unpalatable to stock
- is a prolific seeder.

Salvation Jane (*Echium plantagineum*)

- introduced from the Mediterranean
- requires disturbed vegetation to establish itself
- can dominate pasture
- is toxic to stock, in years of high rainfall.

Skeleton weed (*Chondrilla juncea*)

- introduced from Europe and the Mediterranean
- requires disturbed vegetation to establish itself
- can form dense stands
- competes with crops.

A variety of methods are available for active weed control. However, the minimisation of areas where weed colonisation is favoured has a significant effect on their encroachment into scrub blocks. Minimisation of any form of disturbance in scrub blocks will assist efforts to control weeds. Management practices which assist this process are:

- controlling rabbits
- excluding stock
- avoiding vehicle activity where possible
- controlling soil drift
- controlling minor infestations before they spread
- using fertilisers very carefully around scrub edges

After disturbance has been dealt with, a period of stabilisation is required. Mallee vegetation usually successfully recolonises infested areas. The rate at which this happens depends on the native seed availability, and the seasonal conditions. For many infestations, no more active control measures will be required.

Preservation of Sites of Geological Importance

Much of Yorke Peninsula's geology is overlain by recent superficial sedimentary material, and it is only around the coast that the underlying geological sequences and clues to the formation of the peninsula are readily apparent. McBriar & Giles (1984) produced *Geological Monuments in South Australia*, which is a comprehensive list of sites of geological significance for teaching and scientific purposes. A site's listing as a **geological monument** does not actually give it any legal protection as such, but it does highlight its geological importance, and provide a basis for recommending appropriate management or development guidelines for its preservation.

The following descriptions were summarised and adapted from McBriar & Giles (1984) and Heim (1976). The YK numbers are the identifiers of specific geological monuments.

Areas of particular geological interest in the study area are :

- Ardrossan Cliffs
- Balgowan Cliffs
- Hart's Mine
- Horse Gully
- Muloowurtie Point
- Pine Point
- Port Victoria

Ardrossan Cliffs (YK 2)

Pleistocene sediments are exposed in the cliffs at Ardrossan.

These cliffs rise 15-18 m above the narrow beach at Ardrossan. A variety of red-brown, fluviatile Pleistocene sediments are exposed in the cliffs. Instability in the cliffs is caused by the undercutting of the wave action.

Pleistocene sediments were first described by Tepper (1879) and then later by Howchin (1918).

Four lithological units can be recognised in the cliffs:

- Sand rock - basal 2-4 m of the cliffs. The upper boundary is poorly defined in places. The predominantly sandy clay is composed of scattered sand size quartz grains set in a pale greenish, silty muddy matrix
- Coarsely bedded gravels - up to 10 m. deep over the sand rock. Packed with clasts of granite, gneiss, pegmatite, vein quartz, Cambrian Archaeocyathid limestones, Tertiary marls containing gastopods (Turritella) and lateritic ironstone, set in a quartz and ilmenite-rich gritty matrix
- 1-2 m of red clay containing thin (a few cm) sub parallel bands of alunite
- Top of the cliff - buff coloured, sandy, calcareous loess. A calcrete layer commonly caps this unit, and numerous concretionary nodules are scattered through it

The Ardrossan Cliffs offer the best exposure and are the Type area for the oldest Quaternary sediments on the Yorke Peninsula. The area has research and teaching potential, the latter being enhanced by the ease of access provided by the road to the Ardrossan jetty. It is therefore, recommended that a coastal strip extending 1km north from the jetty be declared a geological monument.

Balgowan Cliffs (YK 21)

The cliffs north of the jetty contain excellent exposures of Pleistocene clay overlain by a younger sequence of calcareous deposits. The latter provide a good locality to study the processes involved in calcrete formation.

They represent the most complete section of Quaternary geological history on Yorke Peninsula.

250 m north of the jetty, early Pleistocene Ardrossan clays and sand rock are exposed at the cliff base. The sandy clay has a brilliant orange colour, and extends north 1km before disappearing below the level of the sea. This is overlain by approximately 3 m of red sandy clay.

8-10 m of calcareous loess (fine wind-blown deposits) lies on the red clay. The top of each accumulant is marked by a duricrust of kunkar nodules.

This is in the south-west corner of the seif dune system which extends to Moonta and inland to Maitland and Arthurton.

At Balgowan, the base of the dune complex is a soft, pale orange calcareous rack containing soft nodules of lime and resting on the red clay.

There is an absence of the massive pink kunkar layer which is present on much of the peninsula. The flat sheets occur on lower lying wind swept areas where loessal deposits were thinner and lime-charged water accumulated for short periods, allowing more depositions from solution.

It is recommended that a 1 km section of the cliff, extending north from where the access road meets the beach be declared a geological monument.

Hart's Mine (YK 5)

Hart's Mine is a small abandoned copper mine with two shafts, first operated in 1847. It is situated in the steep cliffs south of Muloowurtie Point, 3.5 km north of Pine Point. This area has a remarkable exposure of highly coloured mainly plutonic Pre-Cambrian rocks (Howchin 1918). These rocks are mainly feldspathic, and often green in colour The basement rocks are immediately overlain by fossiliferous Miocene beds and angular fragments of the basement material. Banded iron formations about 3 m thick inter-penetrate the granite and show some folding.

This section of the east coast between Hart's Mine and Pine Point is unique for its exposure of Proterozoic basement rocks as they do not outcrop anywhere else on Yorke Peninsula. They are therefore considered to be of high scientific importance. 700 m (from 250 m south of the gully, extending northwards) is recommended as a monument. This includes a representative selection of all Preterozoic rocks on the east coast.

Horse Gully (YK 3)

The Type section of Cambrian Parara Limestone is at Horse Gully.

Horse Gully has been carved by a short ephemeral stream flowing from the rolling hills of the central plateau. The Parara limestone has an exposed thickness of about 25 m. and it overlies the Early Cambrian Kulpara Limestone. The distinct layers of this formation contain many trilobite, gastopod, hyolithid and brachiopod fossils. These exposures of Cambrian rocks have high scientific interest, and an area 2 km X 1 km which centrally encloses the gully is recommended as a monument.

Muloowurtie Point (YK 4)

This is the Type area for the Muloowurtie Formation.

It is a combination of Tertiary and Cambrian rocks in coastal cliffs. It is a unique 70 m long outcrop of Cambrian Kulpara Limestone dipping 35 degrees to the east, so that it appears to be sliding into the sea.

It features prominent north/south joints with ferruginous intrusions forming veins of mainly limonite.

A variety of unusual geomorphological processes are present, including rare miliolid and foraminiferous fossils in the Throoka silts which underly the Muloowurtie Formation.

The section from Sliding Rocks to Muloowurtie Point is of scientific significance because it contains two type sites, evidence of Tertiary faulting and folding, and interesting geomorphology. A 1½ km section of the coastal cliffs,

extending from 100 m south of Muloowurtie Point north to 100 m north of Sliding Rocks is recommended as a geological monument.

Pine Point (YK 6)

This area demonstrates an uncomformable relationship of Cambrian and Tertiary sediments on Proterozoic basement and evidence of pre-Tertiary faulting.

The wide sandy beach and dune complex at Pine Point township narrows to the north against steep cliffs composed of Proterozoic granite and overlying Tertiary sediments. The cliffs and beach extend several kilometres to the north. Numerous slumped blocks and talus cones are scattered along the base of the cliffs.

This section of the East coast of Yorke Peninsula is unique for its extensive exposure of Proterozoic rocks. The main lithologies in the area include greenish, metamorphosed mafic and ultramafic rocks, ferruginous zones, calc-silicate rocks and iron-banded formations. Other lithologies include interbedded, red ferruginous sandstone, conglomerate and breccia. Calcareous and fossiliferous sandstones are the dominant lithologies.

It is recommended that a stretch of coastline, beginning at the car park north of Pine Point, and extending northwards for 1 km, be declared a geological monument. This area includes the unique Cambrian sediments, the underlying Proterozoic basement rocks and some evidence of the faulting along this strip.

Port Victoria (YK 20)

Middle Proterozoic acid volcanic and metasedimentary rocks exposed on the Port Victoria foreshore.

The foreshore at Port Victoria comprises a gently sloping platform of crystalline Precambrian rocks and interspersed patches of sandy beach. A low bank of Cainozoic rocks bounds the shore platform on the eastern, landward side. The Precambrian rocks of interest occur to the north and south of the jetty.

Exposed rocks in the area around Port Victoria include:

- rhydoacitic ash-flow tuffs which contain euhedral, sericitised feldspar phenocrysts and rare quartz phenocrysts set in a fine-grained, reddened, hematite-stained felsic matrix
- thinly bedded greywackes and shales, sometimes showing cross lamination and including some thin quartz-epidote-hematite bands
- sandy, well bedded greywackes with conspicuous clots of muscovite
- dykes of unfoliated pegmatite and granite, and amphibolite. Some of the amphibolite is comformable, raising the possibility that it may have developed from intercalated basalt flows.

A 2 km section of coastline, running north from 700m south of the jetty, includes a varied sequence of Proterozoic rocks, and should be declared a geological monument.

Fire

Fire produces a dramatic immediate change to the vegetation community. Even low intensity fires kill almost all the above-ground shoots in their path. The tree and shrub canopies are completely destroyed, and areas that were in gloomy shadow before the fire receive full sun. The demand for soil water is reduced because many trees and shrubs and all annual species are killed, and those that resprout use much less water than they did before the fire. The soil usually contains seeds from most of the plants of the area for which the ash from the fire provides a fertile germination bed. Massive germination usually follows good rain and soon the burnt areas are covered in a carpet of seedlings.

Many mallee plant species have a dual strategy to cope with fires. Not only do they regenerate from seeds but they also reshoot from buds located at or near the soil surface. These tend to be the larger longer-lived trees and shrubs, such as mallee eucalypts and tea-trees.

One or two years after a fire, the seedlings begin to thin out as they succumb to competition from other seedlings and the re-emerging mallee trees. However, it takes a further 20 to 30 years before the regrowing vegetation begins to resemble and function as a mature mallee community.

It is not unusual to find species of plants growing in recently burnt areas that are not present in the scrub before the fire. The majority are short-lived species that live from a few weeks to a few years. During this time, they flower and set seed, which is stored in the soil until the next fire. Some of these species probably rely on fires to allow them to grow and replenish seed stocks.

Fire also causes some native plants to release seeds that have been stored in fruits on adult trees. Many mallee eucalypts and native scrub pine are examples of species that use this strategy.

Even plants that reshoot after a fire are likely to be killed by repeated fires at short intervals, and frequent fires can make some plant species more rare. If an area is reburnt before a population of these plants sets seed, that population may be destroyed. This can be disastrous for wildlife conservation.

Fire affects native animal numbers and may even threaten the survival of some species. This is especially true where scrub blocks are scattered. When a fire burns through a scrub block there are always patches that escape the fire. These small unburnt patches are important because they allow some populations of native animals to survive until the burnt areas recover. However, it can be many years before the habitat becomes suitable for the range of wildlife supported by long-unburnt scrub blocks. As a result, many populations of native animals may temporarily disappear, simply because there is not enough habitat left to support them. Before wide scale vegetation clearance for agriculture, those species would have gradually recolonised burnt areas by migration from the adjoining unburnt scrub. Clearance has isolated scrub blocks, forming barriers to the movement of many native animals, so recolonisation of burnt scrub blocks by those species is difficult.

Fire in coastal dunes has been so rare an occurrence that little information is available on the possible ecological effects. This may be because the flammability of coastal vegetation is low, fuel is discontinuous, or maybe that fires are less often started in these areas, and prevailing winds tend to drive fires inland rather than towards the sea. Interstate there have been cases where dunes have become unstable after fire. The limited information currently

available regarding coastal vegetation responses to fire seems to indicate that most species either resprout or have good seedling regeneration after single event fires. However, the evidence does suggest that too frequent burning will ultimately destroy populations of some species (Pers. comm. D. Fotheringham, J. Choate).

In order to minimise fire risk to dwellings in coastal dune vegetation (under the Country Fires Act), clearance of up to 50m can be required, and this can lead to destabilisation of the dune system if this vegetation is not replaced.

Mistletoe

Mistletoe is a native shrubby stem parasite which grows on the branches of woody plants and taps into the host plant's water and nutrient supply, and has been part of the Australian flora for more than 80 million years (Barratt et al. 1991). Harlequin Mistletoe (*Lysiana exocarpi*), and Box Mistletoe (*Amyema miquielii*) are common in the study area with some minor occurrences of *Amyema melaleucae* (Nixon 1988).

Some controversy exists around the environmental effects of mistletoes and whether they eventually cause the demise of their hosts. There appears to be little scientific data to support this notion. What appears to be more the case is that native vegetation which is under stress tends to become more heavily parasitised than healthy vegetation, making the mistletoe an indicator of tree decline rather than the cause (Ben Kahn 1993). High densities of mistletoes are almost always associated with disturbance, for example roadsides and edges of scrub patches where perching sites for the birds which carry the mitletoe seed are limited. In rare cases where plants become almost completely taken over by mistletoes, their effect may be to add to the stress of old age or disease which is already affecting these hosts and possibly speed up their death (Barratt et al. 1991). Nixon (1988) suggests that some control may be appropriate when the canopy cover of the misletoe exceeds about forty or fifty percent of the total tree canopy. Lopping of affected limbs, or treatment with poison in these cases, can prolong the host trees lives, however reinfestation often occurs (Nixon 1988).

Mistletoe does have environmental benefits. Its brightly coloured flowers attract nectar-gathering birds, particularly honeyeaters, and the foliage provides shelter and nesting sites for a number of animals. 33 species of birds have been recorded as feeding on mistletoe fruits, including the painted honeyeater and the mistletoe bird, species for which these berries are an essential part of the diet (Robertson 1989). Brush-tail possums, caterpillars and other insects eat the foliage. The larval stages of several species of moths and butterflies are associated with mistletoe. These insects in turn, attract insectivorous birds.

The best way to prevent mistletoe becoming a problem in open areas is to encourage regeneration and the development of understorey which will increase the available perching sites and take the pressure off the larger trees (Nixon 1988, Ben Kahn 1993, Barratt et al. 1991).

Dieback

Dieback in mallee vegetation is quite common on Yorke Peninsula particularly in roadside vegetation (Wigan & Malcolm 1989) and is usually characterised by the loss of foliage from the upper branches. It may be caused by soil-borne

pathogens, or may be a result of the increased exposure of remnant patches to coastal winds through removal of adjacent protective vegetation (Rikken 1988).
The Native Vegetation Council advocates revegetation as the best long term approach to this problem. This includes the promotion of natural regeneration as well as the planting of native vegetation on adjoining farming land.

In the short term, there is evidence which suggests that lopping of affected trees at their base can prolong their life. However, lopping does have environmental ramifications and is classified as clearance under the Native Vegetation Act 1991(Native Vegetation Management Branch 1991). It is therefore essential that any lopping program be in accordance with the guidelines prepared by the Native Vegetation Management Branch (DENR) and approval be sought from them.

Dune Erosion

The beaches and dune systems along both the eastern and western coasts of Yorke Peninsula formed over many thousands of years. The dunes themselves act as a buffer to wave attack, and the vegetation on them provides a protective mantle which holds them together and traps sand blown from the beach by the onshore winds. The usual process is that during storms, sand is washed from the foredune into the surf zone, where it forms sand bars. These bars cause waves to break further out, and they then have less impact on the shoreline. During periods of calmer weather, sand is washed back onto the beach, and eventually blown back into the dune area. The dune vegetation traps this sand and gradually rebuilds the dunes. If there are not enough plants on the foredune, instead of the sand remaining in this coastal area, it can be blown inland away from the beach environment. This effectively removes that sand from the beach sand cycle, increasing the potential for subsequent storm damage, and covering the land behind the dunes.

Without the protection of healthy vegetation, dunes become mobile, and can block roads, cover and sand blast other vegetation and buildings, and devalue land. Removal of the dune also speeds up beach erosion and decreases beach sand replenishment.

Development situated too close to the beach, access tracks for people and vehicles, grazing of stock and rabbit infestations are all destructive agents to the delicate balance in dunes.

Shack developments in many areas on both coasts are in environmentally sensitive locations (PPK 1989), where dunes have been "stabilised" by buildings, but the dune has become alienated as a source of sand replenishment for the beach, breaking the natural sand cycle. Associated with these shack settlements is the increased localised impact of people, with their vehicles and pedestrian activities, which very quickly breaks up the surface crust which holds the sand together where the fibrous root systems of the dune plants do not reach. This causes corridors and wind funnelling between the shrubs, increasing the mobility of these areas, and further stressing the adjacent vegetation.

Indiscriminate use of vehicles in dune systems, particularly motorcycles and off-road vehicles, can cause irreparable damage very easily by severely destabilising small areas, which then increase in size through the natural erosion processes.

Dune protection can take two approaches:

- Management of existing healthy dunes within "land capability" principles, which includes:
  - locating developments far enough back from the coast that they do not affect the sand cycle.
  - keeping people and vehicles out of the dunes, by providing stabilised, "sacrifice" pathways to allow access to beaches through the foredunes.
- Repairing damaged dunes by a combination of:
  - rebuilding using earth-moving equipment and / or drift fencing to trap wind-blown sand.
  - planting specialised sand-binding vegetation which is well-adapted to the harsh conditions of strong winds, drifting sand, hot, infertile soil and salt spray
  - fencing people and vehicles out of rehabailitating areas.
  - ongoing maintenance of the dynamic dunes as they stabilise and regenerate.

Dune Care groups of local residents have been very successful in the Adelaide metropolitan area and in the eastern states in assisting with dune management and rehabilitation (Soil Cons. Serv. NSW undated).

Revegetation

Revegetation describes a variety of practices involving the planting or sowing of plants on cleared or semicleared land. Revegetation programs, if designed and maintained properly can:

- stabilise drifting soil
- lower the water table, leading to the halting or possibly the reclamation of saline affected land
- add organic matter to the soil, leading to increased nutrient cycling and better soil structure
- provide habitat for birds, reptiles, mammals and invertebrates
- provide shelter for stock from sun, wind and rain
- decrease wind speeds across paddocks, leading to decreased soil moisture loss through evaporation, and decreased soil erosion
- provide a seed source for future natural regeneration
- be more visually attractive

Natural regeneration is purely letting the land regenerate with little human intervention. This process can be assisted however, by weed removal, stock, rabbit and other herbivore exclusion and if appropriate, some soil scarification or cultivation to provide a seed trap and allow better moisture penetration. Successful natural regeneration is dependent on a good seed source to the windward side, good germination rates, adequate natural maintenance of soil moisture, low competition from weeds, and exclusion of all grazing herbivores.

Direct seeding is a way of helping the natural regeneration process along. It can be done using purpose-built machinery or by hand, using a rakehoe. The basic process is to control the weed competition before planting using a knock-down herbicide, then make a furrow or depression in the soil, deposit a small amount of a seed mixture, gently tamp down the soil over the seed and let nature do the rest. In the low rainfall areas of the Mallee, direct seeding is best done around May to early June, just before the break in the season to give the best possible chance of germination and establishment. In higher rainfall areas, late Winter and Spring seeding is recommended (Barron 1990). Best results are usually obtained where seed sown has been collected from the local area. This gives the natural regeneration a bit of a head start, and as direct seeded areas mature, a seed source becomes available for the ongoing evolution of a balanced mix of ground-covers, shrubs and trees.

Revegetation however, in Heritage Agreement areas or other scrub blocks being managed for wildlife conservation should be limited to the rehabilitation of degraded areas, the creation of corridors between scrub blocks and to assist recovery of rare plants. Because revegetation is demanding of both time and money, it is important to look after existing native vegetation first. Any revegetation projects in Heritage Agreement areas require approval from the Minister of Environment and Natural Resources.

Rehabilitating degraded areas

Cleared or semicleared areas lack the diversity of vegetation needed to provide food and shelter for native animals. Revegetation increases habitat diversity in these areas, stabilises the soil and improves weed control.

Creating corridors

Corridors are strips of vegetation that bridge cleared land and connect scrub blocks. The best corridors are wide belts of native vegetation that have been left during clearing. The extent of clearance on Yorke Peninsula is such that many of these corridors are left along roadsides and are narrower than the ideal, and subject to a range of disturbances. Ayre (1990) provides comprehensive guidelines for roadside corridor planting.

Scrub blocks are literally small "islands" of vegetation surrounded by cleared land. This threatens the survival of species that are unable to migrate over cleared land because of the limited resources and mates that are available in a single scrub block. Such animals succumb to disease or become less fit from inbreeding and eventually die out.

Special purpose revegetation

Revegetation can also help rare plant species to become more plentiful or even re-establish in an area. Rare species that may have seriously declined or have become locally extinct as a result of past disturbances can be planted. Planted areas then act as sources of seeds, which may be dispersed by wind, water, birds or ants to recolonise surrounding scrub areas.

Wherever possible, seeds taken from local plants should be used, whether planting with seedlings or direct seeding. Plants that grow from local seed are the best adapted to the local environment and are more likely to survive and flourish. Also, the 'genetic purity' of the local plant populations is preserved.

Any efforts to revegetate areas will be in vain unless grazing pressure is removed. A high level of rabbit control and a stock-free environment are essential in any serious attempt to revegetate by any means. Densities as low as 1 rabbit per hectare have been shown to halt the process of natural regeneration (pers comm. B Cooke) and established seedlings or newly germinated plants from direct seeding are preferred grazing for other stock also. Even well established trees and shrubs with stem diameters of up to about 7 mm can be severely damaged or killed by adult rabbits.

Table 3 Revegetation Techniques

Technique	Advantages / Disadvantages
Natural Regeneration	+Cheap +Results are more natural +Hardy because of local genetic material +Low maintenance -Unpredictable -Inappropriate in some areas -May need some assistance eg. weed control -Can be low diversity in areas lacking good seed sources
Direct Seeding	+Cheap +Simple +Hardy if seed collected locally +Low maintenance +Higher diversity achievable -Unpredictable germination -Unpredictable seed viability for ongoing regeneration
Hand Planting	+Able to be designed for specific purposes +Low seedling mortality -Expensive -Labour intensive -High maintenance -Long lead time in seedling preparation -Difficult to reproduce a natural balance of species

DESCRIPTIONS AND MANAGEMENT RECOMMENDATIONS

Methodology

Sites and areas visited and described in this study were limited to the five areas which Council nominated as being of interest, remnant vegetation which has been the subject of clearance application and / or Heritage Agreement application, sites of Aboriginal significance, and a few areas which were of concern to members of the local community.They are all listed and described in this section.

At each site / area, an assessment was made with regard to the previously described criteria, and in most cases a list of the plants evident at the time was made, and a representative photograph taken. Copies of the site data sheets and the plant species lists are included in the Appendices.

Table 5 lists the areas covered by this study, and maps showing the relevant sections for each area are included with the descriptions.

Table 5 Sites or areas described in this study

1 Dayman's Scrub
2 Young's Scrub
3 Brown's Scrub
4 Heinrich's Scrub
5 Gershwitz' / Moody's Scrub
6 Adams' Scrub
7 Lodge's Scrub
8 Hill's Scrub
9 Aldersyde
10 Thomas's Scrub
11 Rogues Gully
12 Crown Scrub
13 Rogues Point Reserve
14 Joraslafsky's / Watter's Scrub
15 Rocky Bend National Trust Reserve
16 Agery National Trust Reserve
17 Jones - Rockwood's Scrub
18 Colliver's Scrub
19 Gardner's Scrub
20 Liebelt's Scrub
21 Pt Clinton Foreshore
22 Mangrove Point
23 Tiddy Widdy Beach
24 Cliffs between Ardrossan and Black Point
25 Cape Elizabeth
26 Balgowan - The Gap Coastal Strip
27 Balgowan - Chinaman Wells Coastal Strip
28 Chinaman Wells - Pt Victoria Coastal Strip
29 Coast South of Pt Victoria
30 Maitland - Ardrossan Roadside

Remnant Patches of Native Vegetation

Many of the areas examined during this study have been subject to vegetation clearance applications within the last 10 years, and were consequently assessed by officers of the Native Vegetation Management Branch of the Department of Environment and Natural Resources at the time of application. Some species lists, comments and information on aspects of their conservation significance have been taken from the clearance application documentation and adapted for the following assessments. Information from this source is not individually referenced. Lists of plant species recorded in these areas during these and subsequent field investigations are included in the Appendices.

The photographs in this section are intended as a indication of the overall appearance of these areas.

Species of birds or plants which are known to be threatened have been assigned a rating which conforms to the commonly accepted system as published in Leigh *et al.* (1981) (Table 4) based on assessments of their status on Yorke Peninsula. These ratings are constantly under review (see Appendices), and the status of these species at a State or National level may differ.

1 *Dayman's Scrub*

Sections Pt 343, Pt 344, Pt 345

Hd. Clinton

Map 2 Plate1

General Description

This area of about 70 ha of *Eucalyptus oleosa* tree mallee on very stony calcareous rolling hills occupies the corners of 3 large cropped paddocks on privately owned land, and has a depleted understorey consisting mainly of native and introduced grasses, with the low shrub, *Enchylaena tomentosa* being quite common and *Melaleuca lanceolata* occasional in the mid-storey.

Conservation Significance

The understorey has lost much of its original diversity through stock grazing pressure. However, the canopy is quite continuous, and not exhibiting any signs of dieback. Litter cover is quite high, and moss and lichen moderate, with more on the southerly aspect. There are a few old or dead trees, and some fallen timber of sufficient size to provide nesting hollows and habitat for ground dwelling wildlife.

The soil is structureless and very powdery, stable in most parts and partially stabilised in the gullies. Wild oats and Ward's weed are common throughout, and Wild turnip has infested the edges.

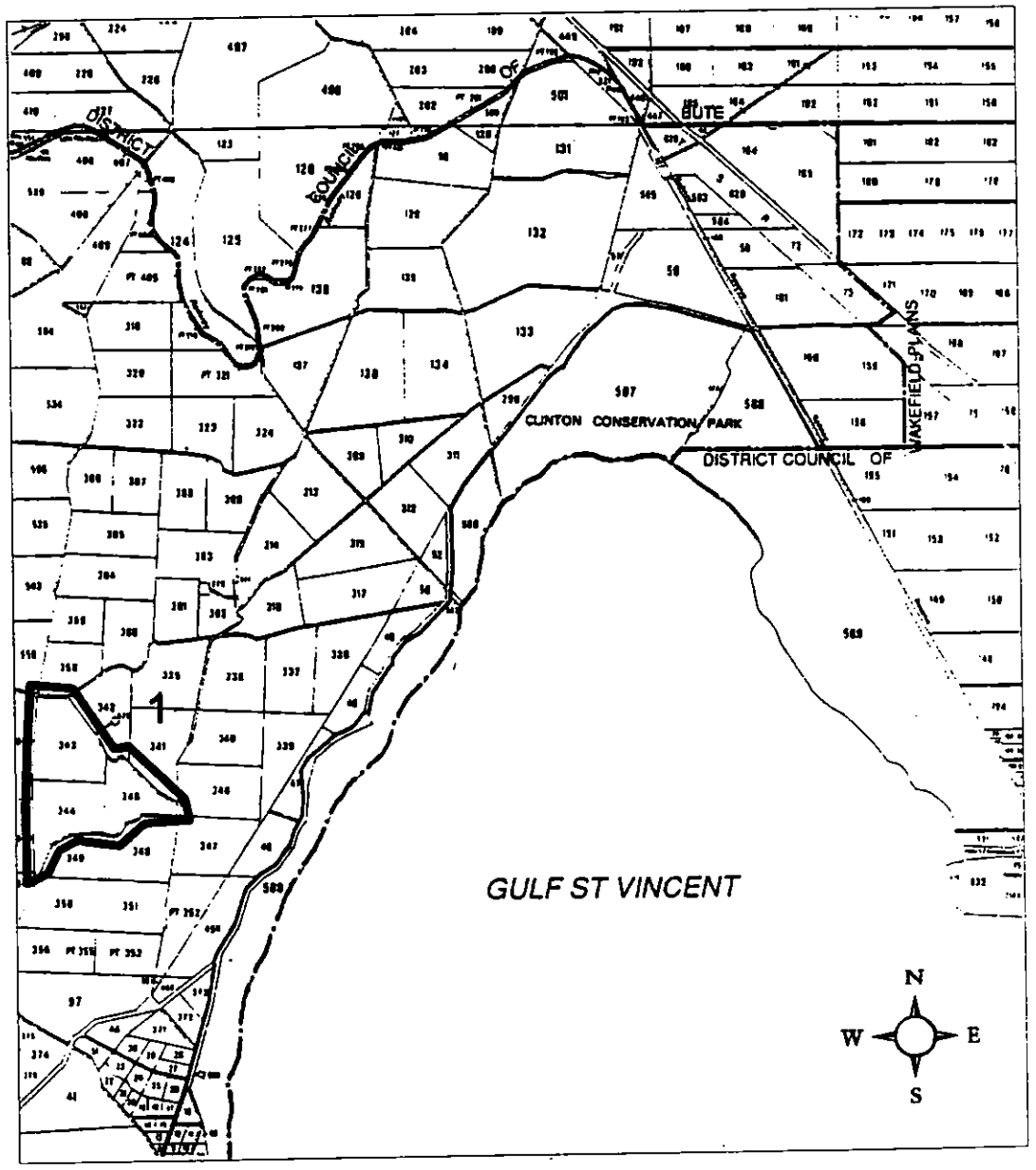
There are some old rabbit scratchings, however this type of land is unlikely to be very susceptible to high levels of infestation because of its stony skeletal nature. Many well worn sheep tracks show high grazing pressure recently, and a significant population of kangaroos dwell and camp in the scrub and feed in the adjoining cropping land. A moderate variety of birds use the scrub as refuge and habitat.

There is no significant evidence of human impacts.

This area is of sufficient size and appropriate shape to provide excellent habitat for many wildlife species if the understorey is allowed to regenerate, and is considered to be of **Moderate** conservation significance, mainly because of its remnancy value. No other significant native vegetation of this size remains in this area.

Management Recommendations

- Fence and exclude stock.
- Ensure that total scrub area remains contiguous and is managed as a whole, regardless of the ownership of each of the sections.
- Apply for a Heritage Agreement covering at least a major part of the total scrub area.


DISTRICT COUNCIL OF
BUTE
CLINTON CONSERVATION PARK
DISTRICT COUNCIL OF
WAKEFIELD PLAINS
GULF ST VINCENT
1
N
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E
S

Map 2

2 *Young's Scrub*

Section Pt. 37

Hd. Cunningham

Map 3 Plate 2

General Description

Two patches of native remnant vegetation, each of about 10 ha exist on Section 37. Both have no history of grazing and are well fenced. These patches of open tree mallee on calcareous sandy loams over limestone, have an upper canopy dominated by *Eucalyptus 'anceps'*, *E. oleosa*, and *E. leptophylla*. The understorey is extremely diverse, containing *Acacia* spp., *Melaleuca* spp., *Dodonaea* spp. over an equally diverse low shrub layer with a ground cover of sedges and grasses.

The current owner has not applied for Heritage Agreements over these patches, and has no intention of clearing or grazing them.

Conservation Significance

A wide diversity of habitats is provided by high levels of vegetation cover in tree, shrub, and ground layers. There is a moderate coverage of moss and lichen, and a high level of litter through both patches. There are few old or dead trees of sufficient size to provide nesting hollows for larger wildlife species. There is no evidence of dieback, and regeneration of *Lasiopetalum* spp., *Melaleuca uncinata*, and *Acacia hakeoides* is common.

The soil is very susceptible to sheeting if the surface crust is broken, and this has occurred very occasionally in small patches. Although no warrens were observed, there are occasional rabbit scratchings and buckheaps. There is no evidence of human impact of any kind.

These areas have resident kangaroo populations, big, well-established old ant nests, and a wide variety of birds. It provides important habitat suitable for the following bird species of conservation significance, all of which were recorded within 15 km in the RAOU bird atlas during l977-81.

Common Bronzewing	U	Striped Honeyeater	E
Restless Flycatcher	U	Yellow-rumped Pardalote	U

One plant species, *Billardiera sericophora*, in the understorey is rated uncommon on Yorke Peninsula.

The high plant species diversity recorded is indicative of the excellent condition of these two areas, and are both therefore considered to be of **Very High** conservation significance.

Management Recommendations

- Continue current management practices.

Plate 1 *Dayman's Scrub*

Plate 2 *Young's Scrub*

Plate 3 Brown's Scrub

Plate 4 Heinrich's Scrub

3 *Brown's Scrub*

Section Pt 35S

Hd. Cunningham

Map 3 Plate 3

General Description

On this section, 54 ha of *Eucalyptus porosa* open woodland on calcarious sandy loams with surface limestone rubble, exists as part of a complex of native vegetation remnant patches on other adjoining sections. The *E. porosa*, with some *E. socialis* and *E. leptophylla* is relatively sparse in the overstorey. The understorey, particularly the low shrub and ground layer is particularly diverse and well developed, including a high percentage of annuals (list in Appendices). Prominent understorey species include *Gahnia lanigera*, *Beyeria lechenaultii*, *Acrotriche patula* and *Helichrysum leucopsideum*.

This area is regrowth estimated to be 40 to 50 years old, is periodically grazed by sheep.

A Heritage Agreement has recently been entered into for some of this area, and is currently unfenced.

Conservation Significance

A wide diversity of habitats is provided by high levels of vegetation cover in tree, shrub, and ground layers. There is a moderate coverage of moss and lichen, and a high level of litter through both patches. There are few old or dead trees of sufficient size to provide nesting hollows for larger wildlife species. There is no evidence of dieback, and regeneration of *Lasiopetalum* spp., *Melaleuca uncinata*, and *Acacia hakeoides* is common.

The soil is very susceptible to sheeting if the surface crust is broken, and this has occurred very occasionally in small patches. There are occasional rabbit scratchings and buckheaps, however, no warrens were observed. Apart from these low levels of rabbit infestation, weed and feral animal invasion is minor.

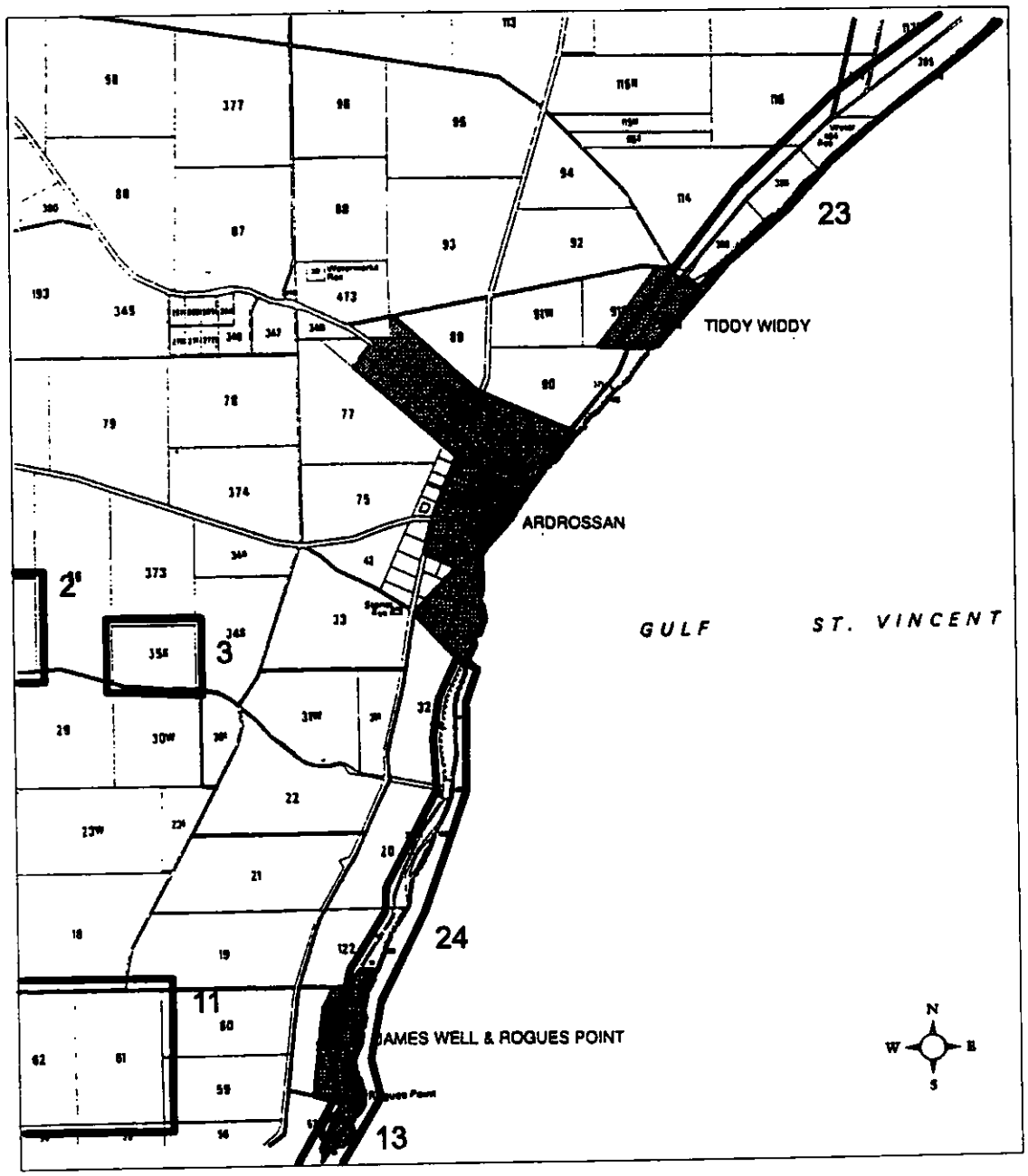
These areas have resident kangaroo populations, big, well-established old ant nests, and a wide variety of birds. It provides important habitat suitable for the following bird species of conservation significance.

Brown Treecreeper	E	Mallee Ringneck	E
Chestnut-rumped Thornbill	X	Red-capped Robin	U
Common Bronzewing	U	Restless Flycatcher	U
Diamond Firetail	E	Southern Whiteface	E
Jacky Winter	U	Striped Honeyeater	E

53 native plant species were recorded during the field inspection which represents a high plant species diversity for a single plant association. The Eucalyptus porosa open woodland association is considered rare in South Australia and poorly conserved within the NPWS reserve system. This significant area is therefore of **Very High** conservation value.

Management Recommendations

- Fence and exclude stock.
- Control the minor rabbit infestations.
- Maintain continuity of habitat with adjacent remnant patches through the adoption of consistent management practices.
- In co-operation with neighbours, undertake some corridor direct seeding to join up the existing remnant patches of high quality habitat.


23
TIDDY WIDDY
ARDROSSAN
GULF ST. VINCENT
24
11
AMES WELL & ROGUES POINT
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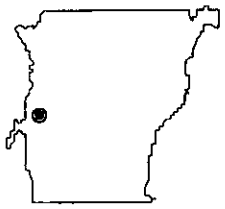
Map 3

4 *Heinrich's Scrub*

Section 138

Hd. Kilkerran

Map 4 Plate 4



General Description

This area of approximately 50 ha of *Eucalyptus porosa / E.gracilis* very open tree mallee (Plate 4) has historically been heavily grazed so that the understorey is of very low diversity and minimal wildlife habitat value. The understorey consists of occasional *Triodia irritans*, *Lasiopetalum discolor*, over a good coverage of herbs and grasses (list in Appendices).

Conservation Significance

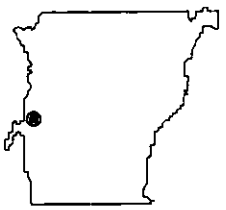
This remnant patch has virtually no shrub layer, a good coverage of litter, moss, and lichen and a few old dead trees which may provide some small hollows. There is no evidence of any dieback or regeneration. Wild sage, wild oats and red brome grass are common in the understorey with occasional occurrences of Boxthorn and Roly-poly. The area has historically and is still currently heavily grazed and very little evidence of wildlife was observed. Some rubbish has been dumped along the roadside.

Whilst this patch has high remnancy value because it is an isolated island within agricultural land, its current lack of habitat diversity and level of degradation makes it of **Moderate** conservation significance in the region.

Management Recommendations

- Fence and exclude stock.
- Eradicate boxthorn.

5 *Gershwitz's / Moody's Scrub*



Sections Pt 136, Pt 137

Hd. Kilkerran

Map 4 Plate 5

General Description

This area of approximately 60 ha extending on both sides of the track, is dominated by *Allocasuarina verticillata*, with *Eucalyptus gracilis*, and *E. 'anceps'* also in the upperstorey. The shrub layer is quite diverse with *Melaleuca acuminata*, *M. lanceolata*, *Lasiopetalum behrii* and *Rhagodia crassifolia* commonly over an equally diverse low shrub and ground layer rich in sedges and grasses (list in Appendices).

Conservation Significance

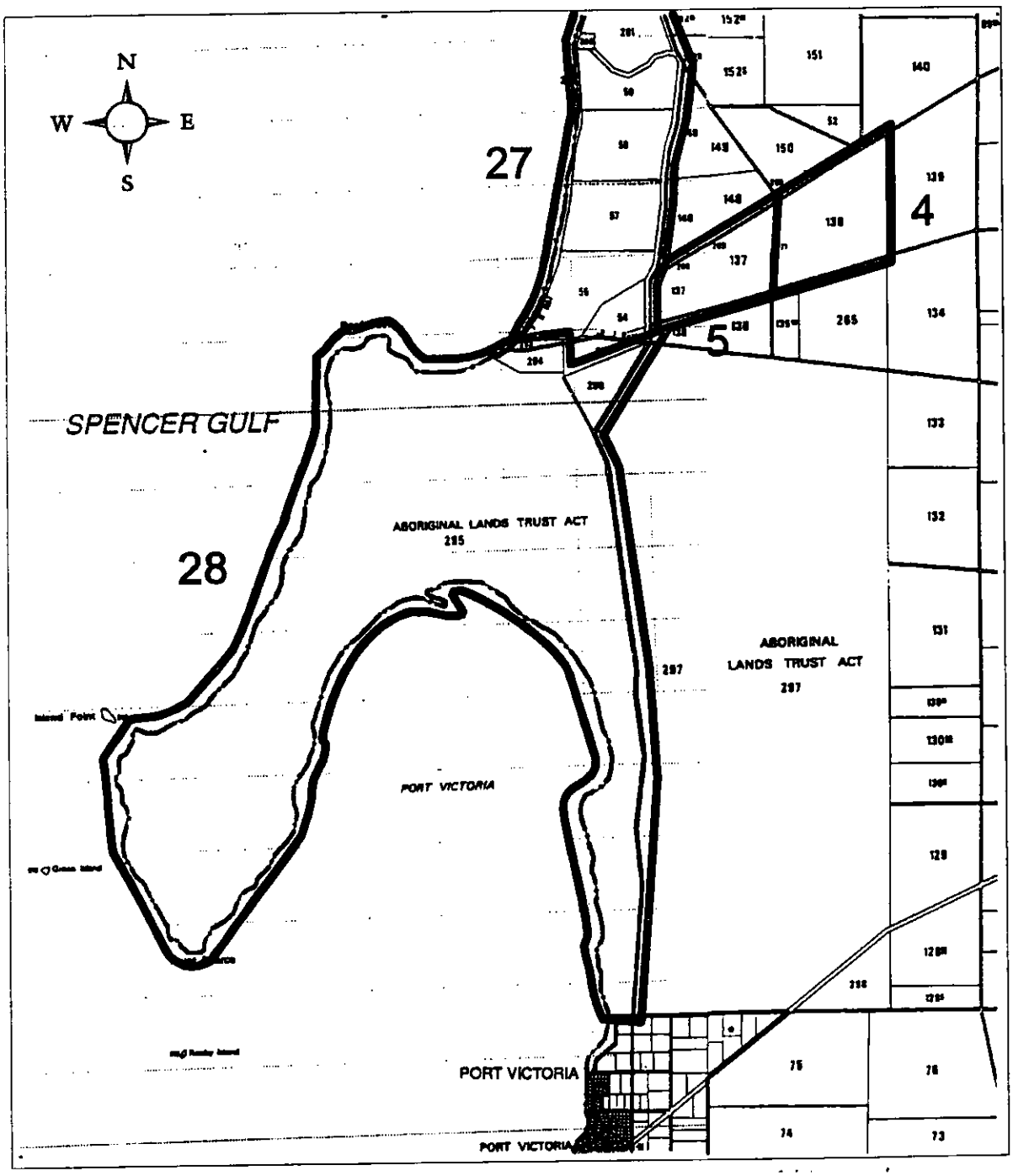
Tree, shrub, and ground layers are all present with very high litter cover and moderate crust of mosses and lichens. Some dead sheoaks are present and there is evidence of regeneration of native cherries and sheoaks. Weed invasions are not significant with some occasional boxthorn, and wild oats and red brome grass being quite common.

Soil is extremely shallow and many fallen trees provide excellent wildlife habitat, particularly for small mammals and reptiles. Occasional rabbit buck-heaps indicate very low rabbit numbers and a wide diversity of birdlife inhabits the area. Occasional household rubbish is the only evidence of human impact.

The uniqueness in the region and quality of this vegetation association, coupled with its current high habitat value makes it of **Very High** conservation significance.

Management Recommendations

- Fence and exclude stock.
- Remove boxthorn bushes.
- Maintain current management practices on both Sections.


N
W
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27
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SPENCER GULF
ABORIGINAL LANDS TRUST ACT
285
ABORIGINAL
LANDS TRUST ACT
287
PORT VICTORIA
PORT VICTORIA
PORT VICTORIA

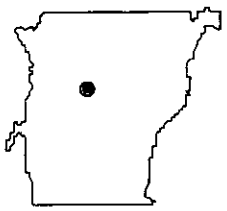
Map 4

6 *Adams' Scrub*

Section Pt 298

Hd. Maitland

Map 5 Plate 6



General Description

This area of *Eucalyptus gracilis / E. incrassata / E. leptophylla* open tree mallee totals approximately 80 ha (Plate 6). It has a rich shrub layer often containing *Melaleuca uncinata*, *Dodonaea hexandra*, *Acacia spinescens* and *Alyxia buxifolia*. The low shrub layer is quite diverse, and includes *Astroloma humifusum*, *Acrotriche* spp., *Lasiopetalum* spp. and *Pimelea glauca* over sedges, herbs and grasses (list in Appendices).

Conservation Significance

This area has very rich tree and shrub layers and a small amount of ground level vegetation. Litter cover is very good and the moss and lichen crust extremely sparse. Occasional old and dead eucalypts provide small mammal, bat and small bird nest sites. There is no evidence of any dieback, and some regeneration of eucalypts near the access track.

Bridal creeper is very dense around the edges, and occasional further in. Red brome grass is common throughout. Very minor sheet erosion is evident in some small areas. Mouseholes are common, and there is evidence of previous grazing of cattle within this scrub.

Ant nests are occasional, bird diversity lower than expected, and there is some evidence of a small resident kangaroo population.

Roadside rubbish has been dumped along the edges, and within the scrub there is evidence of previous disturbance with mounds and holes having been dug, possibly during mineral prospecting.

Due to the significant size of this scrub, its existence as an island of remnant vegetation in an agriculturally cleared area, and its potentially high quality bird habitat, this scrub is of **High** conservation significance.

Management Recommendations

- Fence and exclude stock.
- Control infestations of Bridal creeper.
- Revegetate open areas within the overall scrub area using direct seeding or tube stock plantings of species already existing in this patch.
- Maintain the size and integrity of this scrub.

7 *Lodge's Scrub*

Section 213NW

Hd. Maitland

Map 5 Plate 7

General Description

This gently undulating area of 25 ha of loamy soil with some surface stone is surrounded on all sides by cleared agricultural cropping land. The vegetation is a tree mallee, dominated by *Eucalyptus porosa* with some *Allocasuarina verticillata* in the upper storey, with a wide variety of quite dense middle layer shrubs, including *Acacia microcarpa*, *A. pycnantha*, *A. paradoxa*, *Melaleuca uncinata*, and *Alyxia buxifolia*. Low shrubs include *Dodonaea* spp., *Lasiopetalum baueri*, *Beyeria lechenaultii*, *Rhagodia* spp., and *Olearia pannosa* over sedges and grasses (list in Appendices).

This block has never been burnt , and only very occasionally grazed up until the late 1970s. Stock have not been allowed to graze the area since then (pers comm. D Lodge).

Conservation Significance

This area has a good density of all layers of vegetation, very high litter cover and the moss and lichen crust is intact over a large percentage. There are some old and dead trees which provide wildlife nesting hollows, no evidence of dieback and significant regeneration of *Acacia pycnantha*.

Bridal Creeper, Boxthorn, and Olives are the major pest plant species evident in this area. Introduced grasses (Brome grass and Wild oats) also are common throughout. *Eucalyptus cladocalyx* (Sugar Gum), a native species, but foreign to this region has been planted along the southern boundary.

Occasional rabbit buck heaps and scratchings are the only evidence of feral animals. Current rabbit activity is very low.

Numerous ant nests, some of which are very old and well established exist, and a large variety of birds inhabit the area (pers. comm. Neville Forde 10 Oct 93 - see following list).

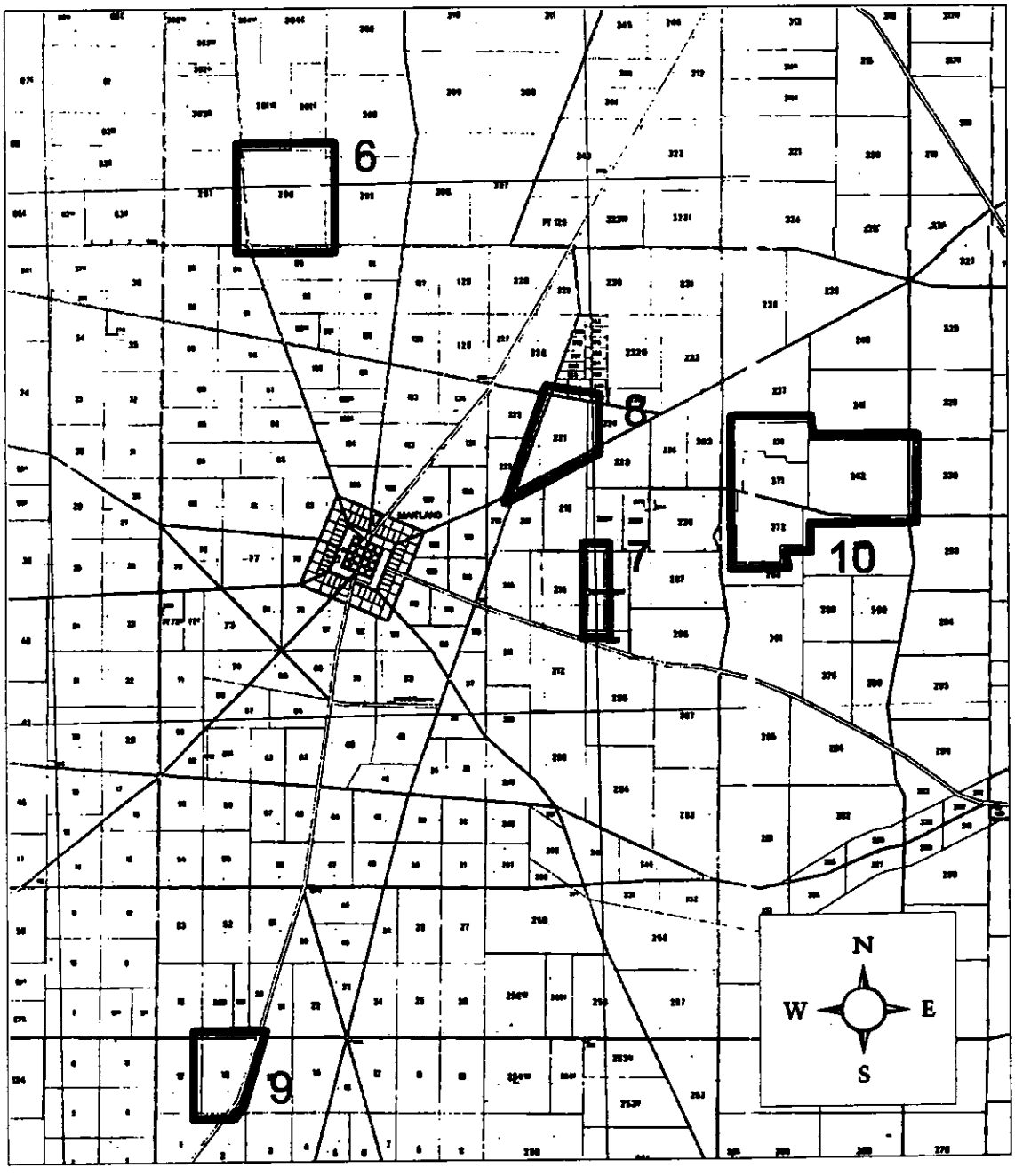
Austrlian Kestrel
Black-faced Cuckoo Shrike
Brown Thornbill
Common Starling
Galah
Golden Whistler
Grey Fantail
Hooded Robin
House Sparrow
Jacky Winter
Mulga Parrot - V
Richard's Pipiit
Singing Honeyeater
Striated Pardalote
Varied Sitella
Variegated Fairy-wren
Welcome Swallow
White-browed Babbler
Willy Wagtail

Human impact has been minimal, with some rubbish and broken glass in some areas, and one vehicle track traversing the scrub exists. Channelling of water down this track has led to some minor rilling.

The high density and wide habitat diversity available in this scrub, and its history of low grazing pressure and minimal disturbance make this area of **Very High** conservation significance.

Management Recommendations

- Seek a Heritage Agreement to ensure this block is preserved if it changes ownership.
- Continue the current non-grazing practices.
- Eradicate the Boxthorn and Bridal creeper.



Map 5

Plate 5 *Gershwitz's / Moody's Scrub*

Plate 6 *Adam's Scrub*

Plate 7 Lodge's Scrub

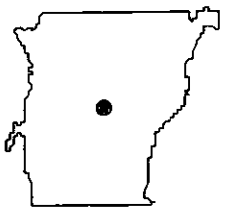
Plate 8 Hill's Scrub

8 *Hill's Scrub*

Section Pt 221

Hd. Maitland

Map 5 Plates 8 & 9



General Description

This area of 7.5 ha of *Eucalyptus porosa* open tree mallee with scattered *Allocasuarina verticillata* has a fairly dense understorey of low trees, shrubs and undershrubs. *Cassinia arcuata* and *Alyxia buxifolia* are the dominant shrubs, over a thick ground cover formed predominantly by *Enchylaena tomentosa*, *Atriplex campanulata* (dense, prostrate mats) and numerous dried grasses (list in Appendices)(Plate 8).

This area was cleared 50 years ago, then fenced from stock and allowed to regenerate. It is in better condition now, having only been grazed lightly and occasionally. At the southern end, 2 ha of the tall timber was felled during the 1970's and allowed to regenerate. It is now covered with very dense *Cassinia arcuata*.

There has been considerable concern over the levels of mistletoe infestation in this scrub, and over recent years, a variety of control techniques have been attempted. Current densities of mistletoe generally are much less than 50% of any tree canopies, and consequently unlikely to be causing host plants undue stress (Rikken, 1988).

This scrub has been protected by a Heritage Agreement for about 10 years, and a rabbit-proof exclosure has been erected within it to monitor the effect of rabbits on the vegetation.

Conservation Significance

Tree, shrub and ground layers are well represented in the majority of the area. Moss and lichen cover is generally high with moderate litter cover, including fallen timber, in most areas. Numerous old and dead trees provide nesting hollows for wildlife (Plate 9). There is evidence of a small amount of dieback on some eucalypts, and some regeneration of *Myoporum platycarpum*, *Pittosporum phylliraoides*, *Acacia pycnantha* and *E. porosa*. No tree or shrub regeneration is occurring in the compacted areas where vehicle tracks have been.

Boxthorn occurs occasionally throughout, and red brome grass is common. There is no evidence of any accelerated erosion. Rabbits are active, and scratchings and buck-heaps widespread outside the rabbit-proof area.

Mistletoe is common on *E. porosa* with up to 20% canopy infestation in some trees, and occasionally highly stressed trees with mistletoe canopy approaching 100%.

There is high habitat diversity for birds, ant nests are common, and there is evidence of brushtail possums inhabiting some of the larger trees.

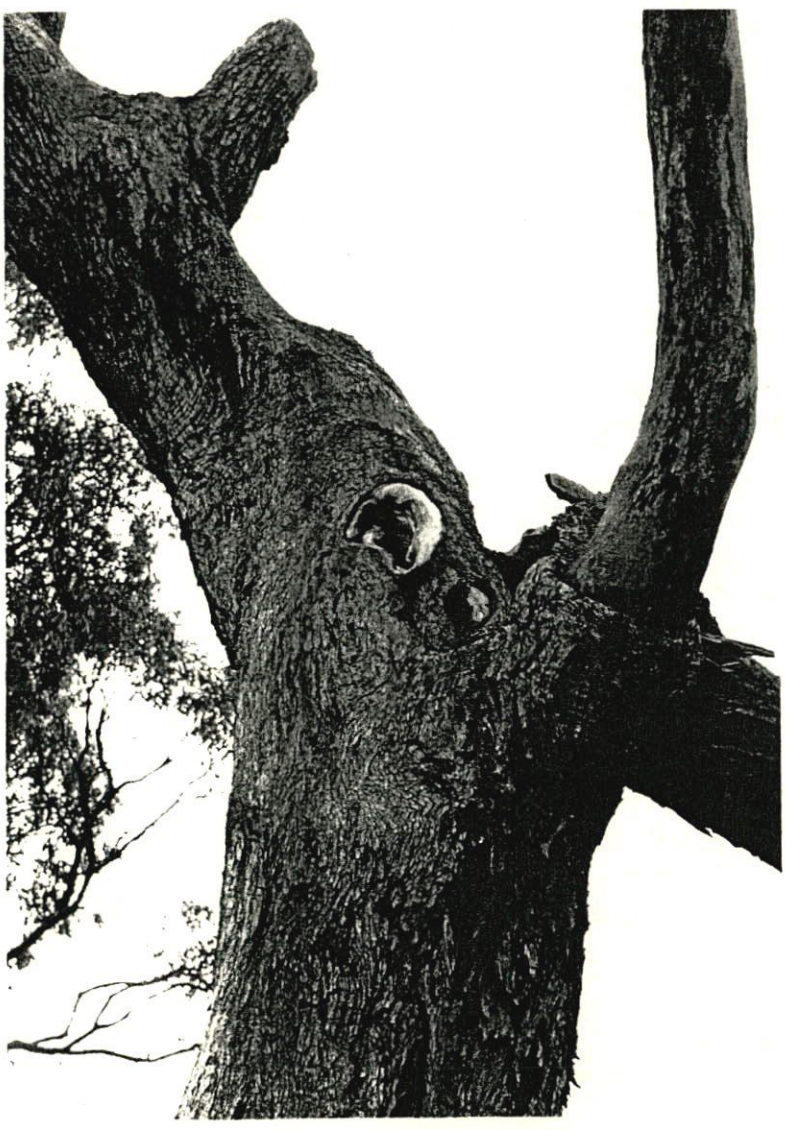
Human impact is mainly historical, with old tracks still very obvious and often quite bare. Some small rubbish can be found occasionally where there has been recent human visitation.

This scrub is a significant, though small representative of the depleted *E. porosa* association, and also contains specimens of Olearia pannosa, a regionally vulnerable plant (pers. comm. P. Lang). It is also contiguous with some good quallity roadside vegetation, and is therefore considered to be of **Very High** conservation significance.

Management Recommendations

- Eradicate rabbits completely.
- Remove mistletoe from trees where the canopy contains more than 50%.
- Hand direct seed with a range of seed collected within the scrub, the open areas where old vehicle tracks exist. Some scarification, ripping, or cultivation of these compacted areas may be necessary to provide an adequate seed bed.
- Restrict pedestrian access to well marked trails so that impact can be minimised.

Plate 9 *Tree hollow in E. porosa, Hill's Scrub*



9 *Aldersyde*

Section 16

Hd. Maitland

Map 5 Plate 10

General Description

This area of approximately 10 ha of *Eucalyptus gracilis* very open tree mallee is situated on privately owned, stony land with shallow soil on rolling hills. The middle shrub layer is dominated by sparse *Melaleuca acuminata*, and the low shrub layer contains *Acrotriche patula*, *Acacia spinescens*, *Ptilotus spathulatus* over a range of sedges and grasses.

Conservation Significance

Trees, shrubs, and ground level vegetation area all well represented, with low litter cover and moderate moss and lichen crusting. A few old or dead trees are available for wildlife nesting hollows. There is no evidence of dieback, and some occasional regeneration of *Myoporum platycarpum* is happening.

Wild oats is common throughout, and there is an occasional Boxthorn. There is no evidence of any accelerated soil erosion due to the stony surface cover.

There are numerous old rabbit buckheaps and recent scratchings, some old warrens, and evidence of foxes in the area.

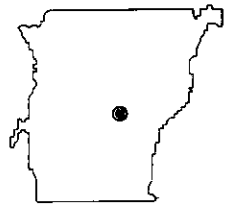
Bird diversity appears high, and reptiles including sleepy lizards and brown snakes use this scrub. Some household rubbish has been dumped within the scrub area.

This area, though small, provides a significant range of wildlife habitats, and has not been significantly degraded through human activity. It is an island in an extensively cleared agricultural area, and is of **High** conservation significance.

Management Recommendations

- Fence and exclude stock.
- Eradicate Boxthorn.
- Control rabbits.

10 Thomas's Scrub



Section Pt 236, Pt 371, Pt 372, Pt 242

Hd. Maitland

Map 5 Plate 11

General Description

Three patches of remnant vegetation totalling about 25 ha exist on this property. The following description relates to a patch of about 10 ha on Section 372 on gently sloping very stony ground. The upper storey of this very open tree mallee consists of *Eucalyptus leptophylla* and *E. socialis*. The most dominant vegetation is the middle shrub layer, which consists of quite dense *Melaleuca uncinata* with some *Alyxia buxifolia*. The very sparse ground level vegetation contains *Correa reflexa*, *Halgania cyanea*, *Hibbertia riparia*, *Acrotriche patula* over very sparse sedges and grasses.

Conservation Significance

The shrub layer dominates this association, with both the tree and ground layers being very sparse. The soil surface is extensively covered by pebbles, with very little litter, moss and lichen.

No old or dead trees with adequate stem diameter to provide nesting hollows exist. There is no evidence of any dieback and some minor regeneration of low shrubs is occurring.

Brome grass is very common throughout, and Bridal creeper has infested the edges. Due to the surface stone cover the only evidence of accelerated soil erosion is restricted to minor sheeting in small patches.

Cattle and some kangaroos graze this patch, and bird diversity appears limited.

Some rubbish has been dumped in a pit, and the extensive regeneration of *Melaleuca uncinata* has since shielded and covered it.

These remnants, though significantly affected by cattle grazing pressure over a long period, are surrounded by agricultural cropping land, and are therefore considered to be of high conservation significance.

Management Recommendations

- Fence and exclude stock to allow understorey regeneration.
- Seek a Heritage Agreement over at least part of this group of remnants.
- Where appropriate to the property plan, revegetate corridors of local plant species to enhance the overall habitat value of this group.

Plate 10 *Aldersyde*

Plate 11 *Thomas's Scrub*

Plate 12 Rogues Gully

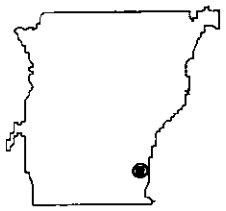
Plate 13 Crown Scrub

11 Rogues Gully

Section Pt 61, Pt 62

Hd. Muloowurtie

Map 3 Plate 12



General Description

This remnant area of 106 ha occurs in particularly stony undulating country composed of shallow red earths over kunkar limestone (Plate 12).

The vegetation comprises *Eucalyptus porosa*, *E. leptophylla* and *E. rugosa*, open tree mallee with scattered *Allocasuarina verticillata*, *Malaleuca acuminata* and *M. lanceolata* over sparse sedges and grasses (list in Appendices).

Most of this scrub has been heavily grazed leading to a substantial depletion of habitat diversity in the understorey.

Conservation Significance

Very little shrub and ground cover exists and the tree canopy is very sparse. A moderate amount of litter covers the ground but very little moss or lichen crust is intact. There are many old and dead trees capable of providing nesting hollows. There is no evidence of dieback and only limited regeneration of *Acacia notabilis* noted. The surface soil structure has broken down, leading to some sheet erosion in small areas. The powdery soil is too shallow to form gullies. Occasional patches of Red brome grass occur throughout. Some rabbit scratchings and buck-heaps were observed, but rabbit populations in this shallow, stony land type are going to be small and easily controlled. No warrens were observed.

Numerous ant nests occur throughout, and the area is frequented by large flocks of galahs. A population of 12 kangaroos resides in this scrub. Bird diversity appears low.

Being surrounded by cleared land, this scrub area has very high remnancy value despite its current low levels of habitat diversity. Regeneration in this land type and climate is likely to be very slow and susceptible to relatively low levels of grazing. It is therefore considered to be of **High** conservation value.

Management Recommendations

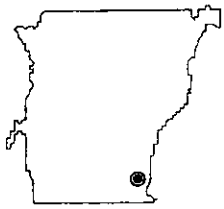
- Fence and exclude stock.
- If appropriate to the property plan, seek a Heritage Agreement over at least part of this scrub.

12 Crown Scrub

Section 202

Hd. Muloowurtie

Map 6 Plate 13



General Description

This small section of Crown Land contains about 5 ha of *Eucalyptus leptophylla / E. 'anceps' / E. brachycalyx* tree mallee over *Melaleuca acuminata*, *M. uncinata*, *M. lanceolata*, *Acacia hakeoides*, *A. spinescens* and *A. rhetinocarpa*. The undershrub layer is quite diverse containing *Lasiopetalum behrii*, *Cassinia arcuata*, *Beyeria lechenaultii*, *Correa reflexa* over sedges and grasses (list in Appendices).

Conservation Significance

Tree, shrub and ground layers are well represented, with good litter cover and a high level of moss and lichen crust. There is no evidence of any dieback in the eucalypts with very few old or dead trees being present. Some fallen limbs provide extra habitat for small mammals and reptiles. Regeneration of *Correa reflexa* and *Acacia rhetinocarpa* is significant.

Some Bridal creeper has taken hold near the edge, occasional Boxthorns occur, and Red brome grass is common throughout. Although this area would be susceptible to sheeting if the surface crust of moss and lichen became broken, there is currently no evidence of accelerated erosion.

No warrens were observed, though occasional rabbit scratchings and buck-heaps were evident.

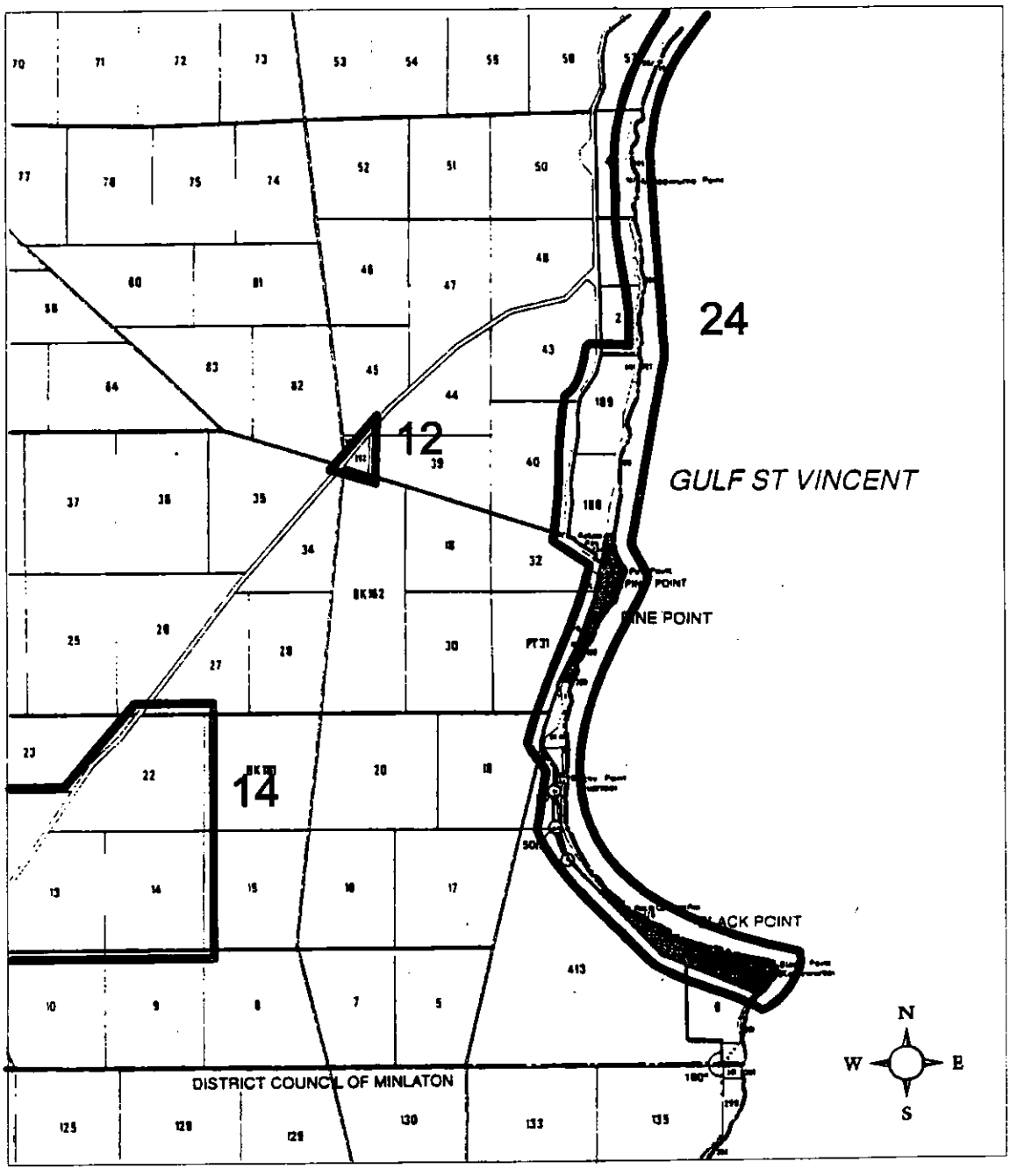
Ant nests, some quite large old ones, and termite mounds are common throughout this scrub. The bird population appeared quite varied and diverse.

The only evidence of human impact is some occasional rubbish blown in from the roadside.

This section contains a significant population of *Acacia rhetinocarpa*, which is endangered on Yorke Peninsula (Lang and Kraehenbuehl 1987, Green 1993), and vulnerable in South Australia (Briggs and Leigh 1988). This population extends into the adjacent roadside vegetation. The presence of this threatened plant, and the quality and diversity of the understorey in this section make it of **Very High** conservation significance.

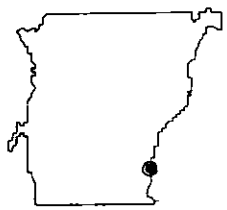
Management Recommendations

- Convert this Section into a reserve under Council or National Parks and Wildlife Service control, or protect it through a Heritage Agreement.
- Harvest seed of *Acacia rhetinocarpa* from this Section for use in roadside revegetation in appropriate areas.
- Remove the Bridal creeper.



Map 6

13 *Rogues Point Reserve*



Section 193

Hd. Muloowurtie

Map 3 Plate 14

General Description

This small Council reserve is surrounded by residential development (Plate 14). The western side is a cliff about 6 metres high, and the central area forms a basin behind the foredunes, which have shacks built on them.

Some local native vegetation species grow on this reserve alongside natives and hybrids from nurseries and other areas (list in Appendices).

Conservation Significance

The area has sparse tree and shrub cover with very little vegetation at ground level. Litter, moss and lichen are very sparse, no old or dead trees exist and no regeneration is occurring. Infestations of onion weed cover much of the area. Numerous rabbits are active and starlings dominate the birdlife.

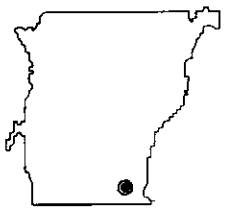
The cliff edge to the west is stable with some minor rilling and pedestrian tracks down it. It could easily become unstable. Household rubbish is common throughout and both vehicle and pedestrian tracks exist all over the area.

As wildlife habitat, this reserve is of very low value, and it has no known cultural or geological significance. It is therefore of low conservation significance.

Management Recommendations

- Eradicate the rabbits.
- Restrict pedestrian access down the cliff on the west side to well-marked stabilised tracks.
- Prevent vehicular access.
- Remove the Onion weed.
- Revegetate with plants grown from seed collected from the local area, and where appropriate direct seed with locally collected varieties.

14 Joraslafsky's / Watter's Scrub



Sections Pt 12, Pt 13, Pt 14, Pt 22

Hd. Muloowurtie

Map 6 Plate 15

General Description

This area of approximately 370 hectares of remnant native vegetation which bridges the Ardrossan to Minlaton road has been broken up by selective clearance of the better agricultural land. There are 5 blocks of significant size in reasonable condition surrounded by cropped land. 4 distinct plant associations are represented:

1. *Eucalyptus porosa* */. E. leptophylla* low woodland with an understorey of *Melaleuca* spp., sedges, daisies and grasses on terra rossa soils with calcareous outcroppings

2. *E. socialis / E. conglobulata* open scrub over *Melaleuca* spp., *Acacia* spp., and grasses on grey-brown sandy loam

3. *E. socialis / E. leptophylla* open scrub over *Melaleuca* spp. and grasses on grey-brown sandy loam

4. *E. incrassata / E. leptophylla* open scrub over *Cassinia arcuata* and grasses on grey sands with calcareous oucroppings

None of these patches have been burnt for at least 50 years, and all have been lightly grazed by sheep until they became Heritage Agreement Areas in 1991.

Conservation Significance

A complex vegetation formation exists over most of the area with 87 native plant species being listed covering all levels. Moss, lichen and litter coverage is almost complete, and a few old dead trees exist, capable of providing at least small hollows for wildlife. There is no evidence of dieback and minor regneration of some shrub species is occurring. Weed invasion is minimal, with some Brome grass occurring, mainly around the boundaries. Some very minor sheet erosion is evident in small open areas where the moss and lichen crust is broken.

Significant kangaroo populations, and a wide range of insects including grasshoppers, native bees and crickets inhabit these blocks.

The area supports a range of birdlife, with 26 species being listed during field inspections, the following being of conservation significance:

Brush Bronzewing (U)
Crested Bellbird (V)
Common Bronzewing (U)
Elegant Parrot (K)
Grey Currawong (U)
Purple-gaped Honeyeater (U)
Restless Flycatcher (U)
Striped Honeyeater(E)
Yellow-rumped Pardalote (U)

In addition, the area also provides habitat for the following birds of conservation significance recorded by Blakers et al. 1984:

Painted Button-Quail (V)
Variegated Fairy-Wren (U)
Shy Hylacola (U)
Southern Scrub Robin (V)

Together, these blocks are large enough to support populations of bird species which have become extinct in smaller blocks in the region.

Echidna diggings were observed in the portion on section 22 and the area is prime habitat for Death Adders. Both are considered rare on Yorke Peninsula.

Of the 87 native plant species recorded during field inspections, six are considered rare or vulnerable on Yorke Peninsula:

- *Boronia inornata* (Desert Boronia) - locally numerous in plant association 2
- *Santalum murrayanum* (Bitter Quandong) - at 2 sites in plant association 2
- *Acacia lineata* (Streaked Wattle) - one specimen in plant association 2
- *Billardiera versicolor* (Apple Berry) - one specimen in plant association 2
- *Hakea muelleriana* (Mallee Needle Bush) - several plants in plant association 3
- *Prostanthera serpyllifolia* ssp. *microphylla* (Mint Bush) - several plants in plant association 2

There is little evidence of recent feral animal impact apart from occasional mouseholes and old rabbit scratchings and buckheaps. As these areas have been under Heritage Agreements for a number of years, the main remaining evidence of human impact is of old vehicular access tracks which are generally well covered with mosses and lichens and are gradually regenerating.

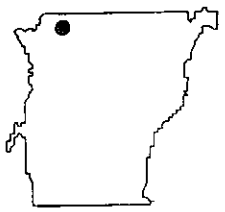
Both individually and as a group largely connected by roadside corridor vegetation, these remnant patches are large enough to support significant populations of many wildlife species, and they also represent the largest inland area of remnant native vegetation in the study area. Furthermore, because of the non-linear shape of these islands, and their relationships with each other, the effect of the adjoining agricultural land management practices is minimised

This area is therefore of **Very High** conservation significance.

Management Recommendations

- Current management practices appear to be maintaining the high habitat value of this area, and the current level of feral animal control must be maintained.
- These blocks are well protected in perpetuity from stock grazing pressure, clearance and subdivision through their Heritage Agreements.
- Augmentation of the existing Echidna population by releasing more individuals in these blocks may provide a safe haven for them, and assist their long term survival on Yorke Peninsula.
- Plantings to fill in the areas between the major blocks and linear links between blocks on adjoining sections (BK161 & 20) and roadside strips would further enhance the habitat value of this area.

15 Rocky Bend National Trust Reserve



Section 554

Hd. Tiparra

Map 7 Plate 16

General Description

This area of 3.5 ha of Crown Land was originally set aside as a stone reserve and has been leased to the National Trust since 1978. The vegetation in this reserve has been undisturbed by grazing, fire or clearance, and consists of a very open tree mallee dominated by *Eucalyptus oleosa*, *E. leptophylla*, and *E. dumosa*. The soil is a skeletal sandy loam over sheet limestone. A range of sclerophyllous shrubs and scattered tussock grasses and sedges occur in the understorey, including *Bursaria spinosa*, *Melaleuca lanceolata*, *Lasiopetalum behrii*, *Lomandra effusa*, *Dianella revoluta* and *Stipa elegantissima*. In a sandy area towards the southern end of the reserve, there is a small community of *Triodia irritans* and *Thryptomene micrantha*.

The Moonta branch of the National Trust of South Australia is the custodian of this reserve, and has prepared a comprehensive management plan addressing a range of conservation issues. Low -impact weed control programs are currently undertaken.

This reserve is ineligible for a Heritage Agreement whilst it remains Crown Land.

Conservation Significance

All three vegetation layers are well represented, with moderate litter cover and a very extensive moss and lichen crust. Many large mallees with hollow limbs provide nesting sites for wildlife, and there is no evidence of any dieback.

Several exotic plants are present including Onion weed, Wild sage, Wild oats and Prickly pear. The major problem weeds, however, are Bridal creeper and Boxthorn which occur along the edges. The illegal dumping of garden refuse is taking place along the western boundary.

The structureless clayey soils are highly susceptible to sheet erosion, and the high level of integrity of the moss and lichen crust currently limits this to very small patches.

No rabbit warrens were observed on this reserve, although frequent buckheaps and scratchings suggest that rabbits are moving in from surrounding areas to feed. There is also evidence of foxes, and horse tracks have destroyed the surface soil structure in one small patch.

Two plants of conservation significance exist on this reserve, *Exocarpus cupressiformis* (uncommon on Yorke Peninsula) and *Eucalyptus dumosa*. *E. dumosa* is rated vulnerable in the region and not represented in any other conservation reserve. Other plants of conservation interest are *Olearia picridifolia* (V), *Eutaxia microphylla* var *diffusa* (R), *Bertya mitchellii* (K), *Amyema melaleucae* (U), *Eriochilus cucullatus* (U).

This reserve is a linear remnant adjacent to a main road and close to an area of remnant native vegetation approximately 100 ha in size (17 Jones -

Rockwood's Scrub). The area would be frequented by migratory bird species, including the Elegant Parrot (K), and is likely to be visited by Striped Honeyeaters (V). Other birds of conservation significance, all uncommon in the region, include the Hooded Robin, Jacky Winter, Red-capped Robin, and Restless Flycatcher.

This area is therefore considered to be of **Very High** conservation significance.

Management Recommendations

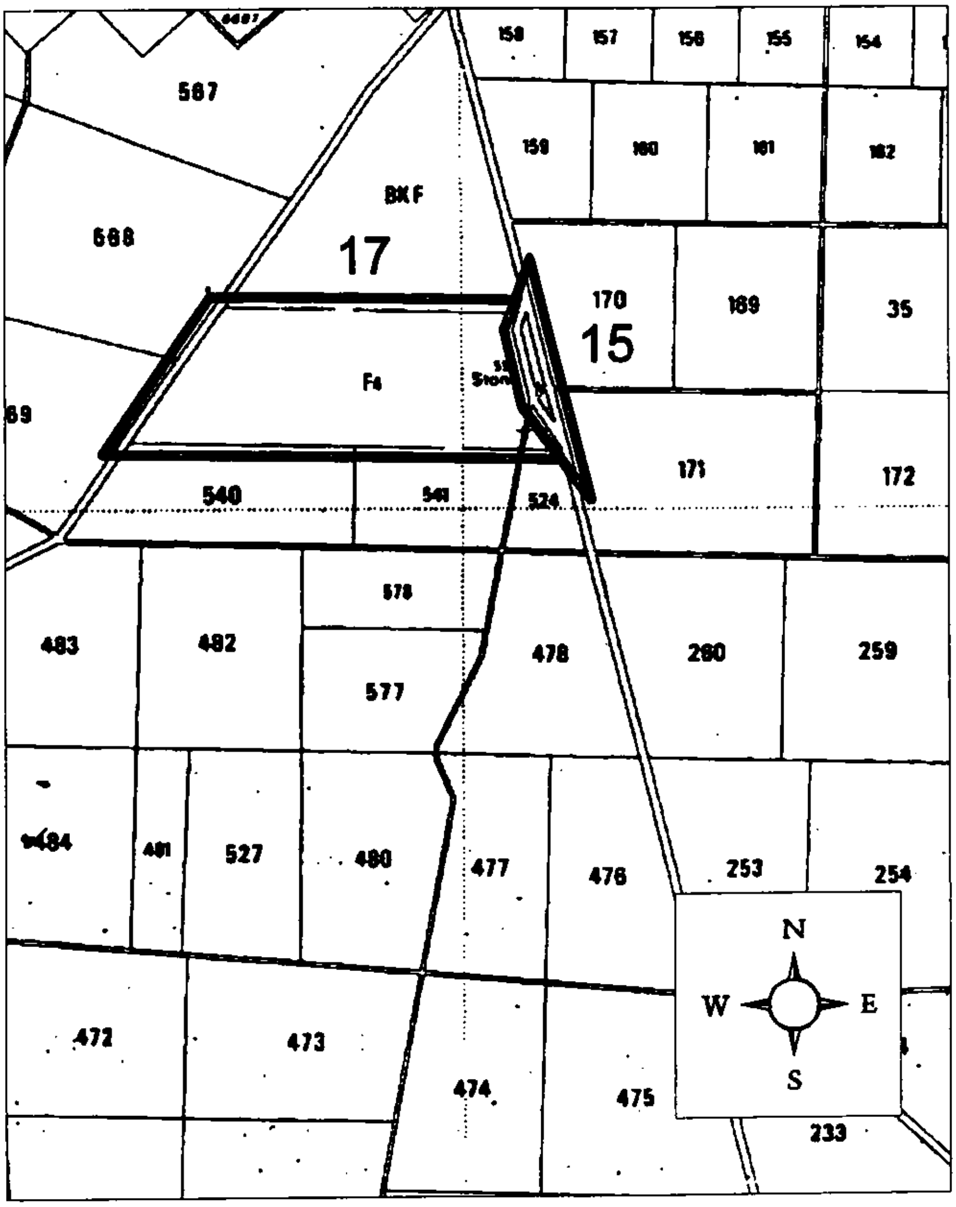
- Maintain current management as detailed in the management plan. This includes ongoing weed control, creation of an interpretive trail, fire control, and litter removal.
- Assist the development of a "Friends Group" of volunteers to undertake management tasks.

Plate 14 Rogues Point Reserve

Plate 15 Joraslafsky's / Watters Scrub

Plate 16 *Rocky Bend National Trust Reserve*

Plate 17 *Agery National Trust Reserve*



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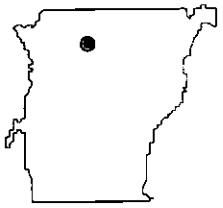
Map 7

16 Agery National Trust Reserve

Section Pt 225

Hd. Tiparra

Map 8 Plate 17



General Description

This reserve area is a small triangular patch (3.3 ha) of open tree mallee in a relatively undisturbed state. It is part of a 6 ha remnant, the rest of which is on private land. 400 metres to the south is another 5 ha patch of remnant native vegetation on private property of similar botanical composition. The dominant canopy species are *Eucalyptus oleosa* and *E. dumosa* on the stony soils, and *E. incrassata* and *E. leptophylla* on the sandy soils. The understorey is generally sparse, and includes *Melaleuca lanceolata*, *Lasiopetalum baueri* and *Dodonaea hexandra* with occasional dense thickets of *M. uncinata* and *M. acuminata*. Common grass species include *Neurachne alopecuroidea*, *Stipa elegantissima* and *Danthonia* sp.

Immediately adjacent on the eastern side is a low lying salt pan, and less than 1 km to the east is a complex group of remnant vegetation patches of variable size and quality.

The Moonta branch of the National Trust of South Australia is the custodian of this reserve, and has prepared a comprehensive management plan addressing a range of conservation issues. Low -impact weed control programs are currently undertaken.

The area was donated to the National Trust in 1979, and a Heritage Agreement was entered into with the Department of Environment and Natural Resources (then DEP) in 1992.

Conservation Significance

All vegetation layers are well represented, and a good coverage of litter, moss, and lichen occurs throughout. Some old and dead trees are of sufficient size to provide wildlife nesting habitat. There is no evidence of dieback and regeneration of overstorey species is insignificant.

Bridal creeper has infested the edge, and also occurs in isolated areas deeper in. The surface soil crust is intact in most parts, and there is no evidence of any accelerated soil erosion.

Rabbit scratchings are isolated, and there is evidence of minor sheep activity. Foxes also inhabit this reserve.

An old vehicle track has almost completely grown over, and some rubbish including a galvanised iron water tank was dumped in this area some years ago.

With over 70 native plant species being listed in such a small area, habitat diversity is quite high. *Eucalyptus dumosa*, a vulnerable species on Yorke Peninsula occurs here, and is not represented in any other conservation reserves in the district. Four other plant species of conservation interest, *Eutaxia microphylla* var *diffusa* (R), *Billardiera sericophora* (U), *Eriochilus cucullatus* (U), *Exocarpus cupressiformis* (U) also occur.

It also provides suitable habitat for two birds of conservation significance, the Common Bronzewing, and the Golden Whistler.

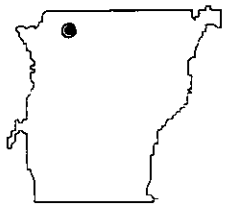
Because of its habitat quality, low levels of disturbance, and the presence of threatened plant species, this reserve area is of **Very High** conservation significance.

Low levels of rabbit and sheep activity have degraded the 10 ha remnant to the south, particularly in the sandier parts. Rabbit control and stock exclusion would significantly increase the habitat value of this area, and its close proximity to the National Trust reserve makes it also of **High** conservation significance.

Management Recommendations

- Maintain current management as detailed in the management plan. This includes ongoing weed control, fire control, and litter removal.
- Fence to exclude stock wandering in from the adjacent roadside.
- Assist the development of a "Friend's Group" of volunteers to undertake management tasks.
- Negotiate with the adjoining landholder regarding extending this reserve (or at least the reserve management practices) to include the low-lying salt-affected area to the east.
- Include in the management plan some proposals for revegetation which include linkages with the remnant vegetation to the south and widening the roadside vegetation to create a corridor. This will require the co-operation of the adjoining landholder and the Council.

17 *Jones-Rockwood's Scrub*



Section Pt F4

Hd. Tiparra

Map 7 Plate 18

General Description

The vegetation of this area is an open tree mallee with the upper canopy primarily dominated by *Eucalyptus gracilis* and *E. oleosa* in the very stony parts, joined by *E. leptophylla* and *Melaleuca uncinata* in the more clayey parts. Previous grazing from sheep and goats has decreased the diversity and the composition of the understorey. Together with native remnants on adjoining properties (Sections 540 & 541), and the Rocky Bend National Trust Reserve (15), this is part of a larger remnant totalling about 100 ha in size.

16 ha of this vegetation on Section F4 is covered by a Heritage Agreement.

Conservation Significance

Tree and ground cover layers are represented, with low coverage of litter, moss and lichen in most parts. Some fallen timber and a few old trees provide some nesting hollows for wildlife.There is no evidence of regeneration or dieback.

A few Boxthorns occur, with Onion weed infesting much of the edges, Brome grass throughout, and some occasional Saffron thistle. Small patches of sheet erosion occur where the litter is gone and the surface soil crust has been broken.

The area is still heavily grazed by sheep and there are frequent rabbit scratchings, though no warrens were observed.

The following birds were observed during site inspections:

Woodswallow
Tree Martin
Willy Wagtail
Magpie
White-browed Babbler
Spiny-cheeked Honeyeater
Black-faced Cuckoo-shrike
Budgerigar
White-fronted Chat
Hooded Robin

The following birds are of conservation significance, and are expected to occur in this habitat type, having been recorded within 15 km of this site during surveys conducted for the R.A.O.U. Bird Altas (1977-1981).

Crested Bellbird (V)
Elegant Parrot (K)
Mulga Parrot (V)
Striped Honeyeater (E)

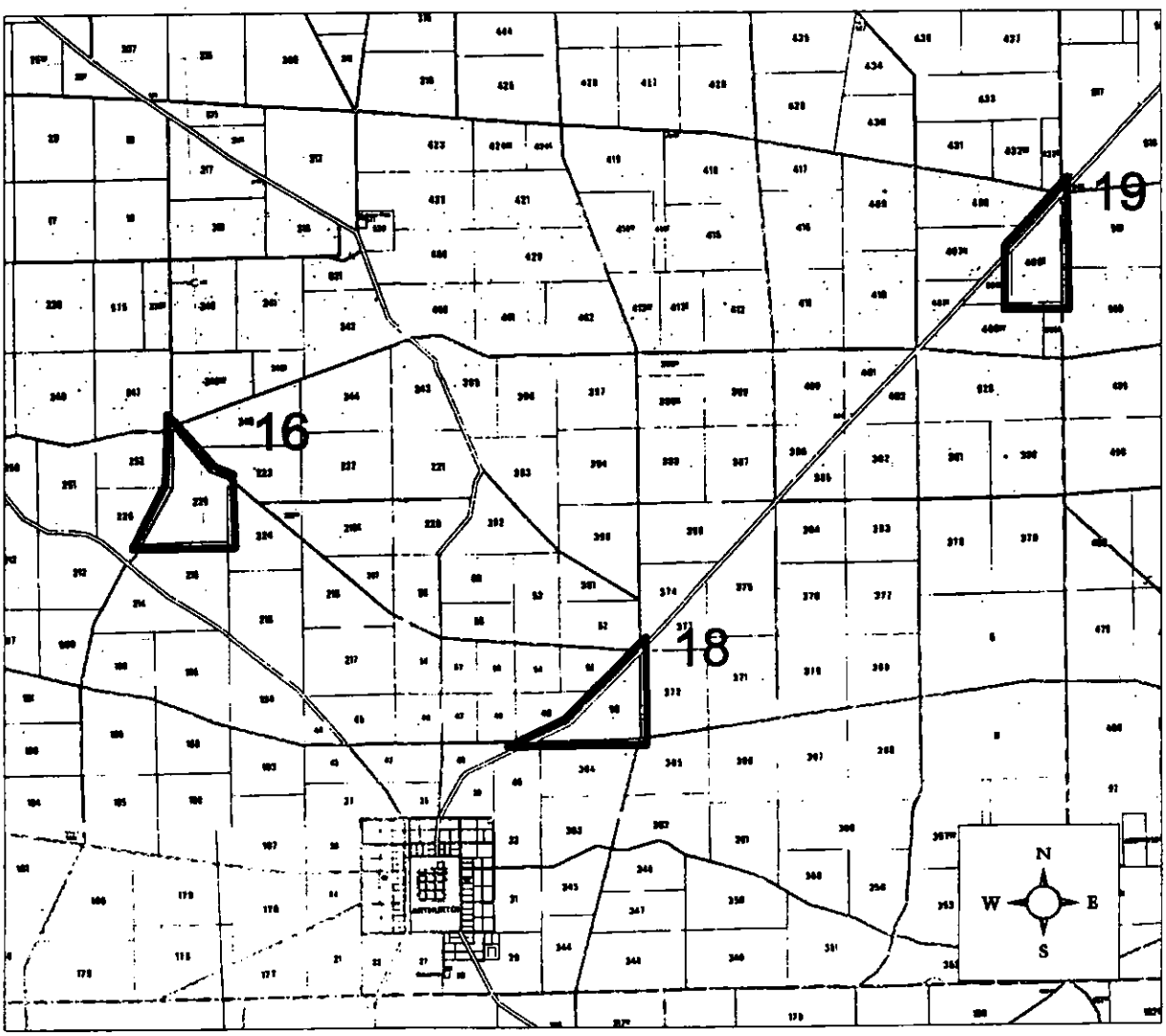
There are vehicle tracks in places, and some car bodies have been dumped.

33 native plants were recorded during site inspections, indicating a moderate level of plant species diversity. Given the size and local remnancy value of this and the adjoining patches, this area is considered to be of **High** conservation significance, which will improve once stock have been removed and understorey allowed to regenerate.

Management Recommendations

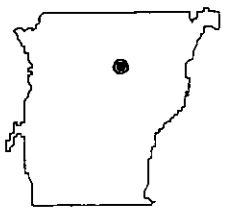
- Fence and exclude stock.
- Remove Boxthorn.
- Undertake some corridor direct seeding of local species to join these patches more completely with those on other properties nearby.

Plate 18 *Jones-Rockwood's Scrub*



Map 8

18 Colliver's Scrub



Section Pt 50

Hd. Tiparra

Map 8 Plate 19

General Description

This area of 15 ha consists of *Eucalyptus porosa* open tree mallee with *E. 'anceps'* and *E. dumosa* over a shrub layer dominated by *Melaleuca acuminata*, *M. lanceolata*, and *Cassinia arcuata*. The low shrub layer contains *Pimelea serpyllifolia*, *Beyeria lechenaultii* and *Acacia* spp. over grasses.

Conditional consent to selectively clear some parts of this scrub was given in 1992 to address the increasing senescence, and moderate levels of mistletoe infestation.

Conservation Significance

All the vegetation layers are well represented, with very high levels of litter cover and moderate moss and lichen crust. Numerous old and dead trees, some lying on the ground are available for nesting hollows, and significant dieback is occurring on many of the older trees. Regeneration of *Acacia* sp. seedlings is common, and many of the adult eucalypts are displaying vigorous new growth.

Bridal creeper has infested the roadside margin, Boxthorn occurs mainly on the edge, and wild oats is common throughout. Minor infestations of horehound occur in isolated patches.

One rabbit warren was observed and rabbit scratchings and buck-heaps are common.

There are many active ant nests and a large variety of birds. This habitat is suitable for the following bird species of conservation significance, all of which were recorded within 25 km in the R.A.O.U. Bird Atlas during 1977-81.

Australian Owlet-Nightjar (U)	nest/roost in hollows
Blue Bonnet (U)	nest in hollows
Jacky Winter (U)	
Mulga Parrot (V)	nest in hollows
Restless Flycatcher (U)	
Southern Whiteface (E)	nest in hollows
Striped Honeyeater (E)	
Yellow plumed Honeyeater (V)	

Evidence of prior human impact is extensive with galvanised iron and other rubbish dumped in the clearing and piles of stone indicating some historical earthworks.

Eucalyptus porosa low open woodland is poorly conserved in South Australia (Davies 1982), and this patch, whilst being very small does currently support a good diversity of wildlife. It is therefore considered to be of **Moderate** conservation significance.

Management Recommendations

- Fence and exclude stock.
- Remove dead wood and some of the senescent trees as set out in the conditions of clearance provided by the Native Vegetation Management Branch.

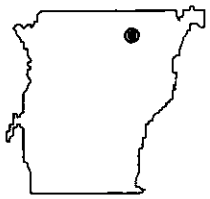
Plate 19 Colliver's Scrub

19 Gardner's Scrub

Section Pt 406E

Hd. Tiparra

Map 8 Plate 20



General Description

This area of about 50 ha is dominated by *Eucalyptus porosa* very open tree mallee over a depleted understorey of *Melaleuca lanceolata*, sedges and grasses (Plate 20)(list in Appendices) reflecting the long history of grazing in the area. Significant levels of dieback and mistletoe (*Amyema miquelii*) prompted an application by the landholder for a selective lopping program in 1989. This application was successful, and has begun under supervision of the Native Vegetation Management Branch. Trees have been cut at their base where dieback or mistletoe has affected more than 70% of the canopy, and limbs lopped from less affected trees. This program is expected to promote regrowth and extend the life of the mature trees.

Conservation Significance

Tree and ground layers are reasonably complete with moderate litter cover and a low level of moss and lichen crust. A few old dead trees with trunks up to 200mm in diameter exist, and the fallen timber from the lopping program provides abundant low level protection for wildlife. Regeneration from seed of *E. porosa* is very common, but there is little evidence of understorey regeneration.

Wild oats and other introduced grasses are common throughout with occasional patches of Salvation Jane around the edges.

Accelerated soil erosion is minimal throughout this area due to the good coverage of sedges, grasses, litter and lichen. Grazing pressure, particularly from sheep, is quite high. There is evidence also of a significant kangaroo population, and cattle occasionally graze the area.

The lopping program has introduced extensive vehicular movement and habitat modification in much of this scrub.

One of the two remaining populations of Hairy-nosed Wombats on Yorke Peninsula exists in this area (St John and Saunders 1989). The future of these colonies is uncertain, but viewed as a whole, the Yorke Peninsula population appears in danger of extinction.

Given the size of this piece of scrub, the current level of regeneration, and the presence of the wombat population, this area is of **High** conservation significance.

Management Recommendations

- Fence and exclude stock.
- Continue the current lopping program.
- Maintain the size and integrity of the block.

- Revegetate the open areas using direct seeding techniques and locally collected seed.

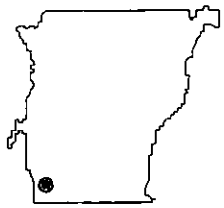
Plate 20 *Gardner's Scrub*

20 *Liebelt's Scrub*

Sections Pt 15, Pt 19W

Hd. Wauraltee

Map 9



General Description

Two distinct vegetation associations exist in this area.

Woodland species include both trees and shrubs with *Eucalyptus porosa* the dominant tree species. Other tree species present are *E. gracilis* and *Allocasuarina verticillata*. The shrub layer is variable in density, with *Melaleuca lanceolata* nearly always present. *Geijera linearifolia*, *Acacia paradoxa* and *Bursaria spinosa* were variable features with *Acrotriche patula* and *Pimelea serpyllifolia* as small under shrubs. *Lomandra dura*, *L. effusa*, *Gahnia lanigera*, *Lepidosperma congestum* and *L. viscidum* characterised the ground cover both under the trees and in the open.

The vegetation on Section 15 has little conservation value comprising small blocks of degraded vegetation.

The vegetation on Section 19W provides landscapes representative of those once found over much of the drier portions of the peninsula.

Conservation Significance

Section 19W shows little evidence of accelerated soil erosion and has low potential to erode.

44 species of bird (see list) were recorded in approproximately four hours of observation time indicating a highly diverse bird community for this area. This diversity reflects the importance of this patch as habitat for these birds.

Bird list for Section 19W

Australian Kestrel
Australian Magpie
Australian Magpie-lark
Banded Lapwing
Black-faced Cuckoo-shrike
Bluebonnet
Brown-headed Honeyeater
Common Starling
Crested Pigeon
Dusky Woodswallow
Galah
Grey Butcherbird*
Grey Currawong*
Grey Fantail
Grey Shrike-thrush
Hooded Robin
Horsefield's Bronze-Cuckoo
Inland Thornbill
Jacky Winter
Little Raven
Mulga Parrot*
Pallid Cuckoo
Purple-crowned Lorikeet
Purple-gaped Honeyeater*
Red-capped Robin
Restless Flychatcher
Richard's Pipitt
Rufous Whistler
Silvereye
Singing Honeyeater
Skylark
Southern Whiteface*
Spiny-cheeked Honeyeater
Striated Pardalote
Striped Honeyeater*
Varied Sittella
Weebill
Welcome Swallow

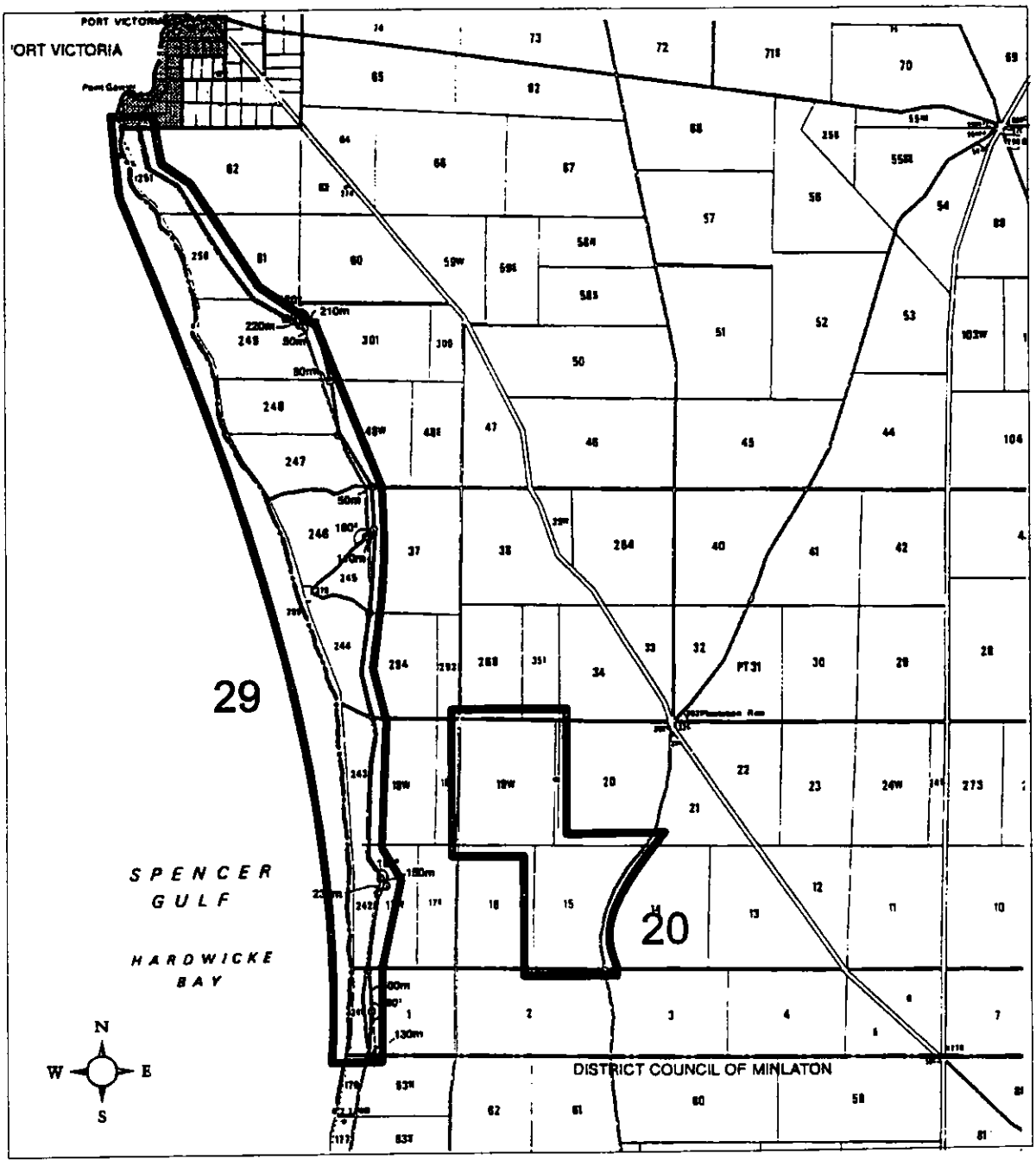
White-browed Babbler*
White-fronted Chat
Willie Wagtail
Yellow-rumped Pardalote
Yellow-rumped Thornbill
Yellow-throated Miner

Those species indicated with * are regionally threatened through habitat destruction. Further native vegetation clearance could jeopardarise their survival, particularly the Striped Honeyeater and Southern Whiteface.

This patch of vegetation forms part of a large sparse area of remnant in the flats behind the coastal dune system. It forms an integral part of this larger habitat area and is consequently considered to be of **High** conservation significance.

Management Recommendations

- Disallow any subdivision which would decrease the size or integrity of this area.
- Fence and exclude stock.
- Enter into a Heritage Agreement to protect this section in perpetuity (clearance application in l984 was refused consent).


PORT VICTORIA
29
20
SPENCER
GULF
HARDWICKE
BAY
N
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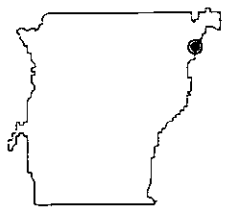
S
DISTRICT COUNCIL OF MINLATON

Map 9

21 Pt Clinton Foreshore



Lots 8, 5, 51

Hd. Cunningham / Town of Port Clinton

Map 10 Plates 21 & 22

General Description

Lots 5 and 51 are small building allotments, currently undeveloped, privately owned by freehold title. Lot 8 is a Council Reserve. The upper part of the narrow beach appears to encroach onto Lots 5 an 51, so that at high tide, parts may be under water. These areas are currently well covered by shrubby salt marsh species, *Threlkeldia diffusa*, *Nitraria billardierei*, *Olearia axillaris*, and *Atriplex paludosa* and Mangroves (*Avicennia marina* var. *resinifera*) in reasonable condition (Plates 21,22) growing on a substrate of sandy shellgrit. Parts of these allotments are permanently under water, and other parts are regularly inundated by the tidal fluctuations.

Conservation Significance

This area is a transitional zone of occasionally inundated land between the Mangroves and the higher ground. Activity in this area can put pressure on the Mangroves, potentially degrading them and bringing about their decline. Ecologically, the Mangrove system is extremely productive, and critical for the reproduction of some of the commercial fish species. This area is therefore, of **High** conservation significance.

Management Recommendations

- Resurvey to clarify where section boundaries lie with respect to High Water Mark.
- Prohibit any development which would degrade the existing vegetation in any way.
- Extend the Conservation Park boundary to include Lots 1, 2, 3, 4, 5, and 51, (all areas of low-lying salt marsh) as a buffer to help protect the Mangroves.
- Erect an interpretive trail/boardwalk (similar to St. Kilda, possibly, but shorter), so that people can walk over this area and into the fringes of the Mangroves in the space of 200 - 300m without damaging the vegetation.

Plate 21 Pt Clinton, looking northwest from Lot 5

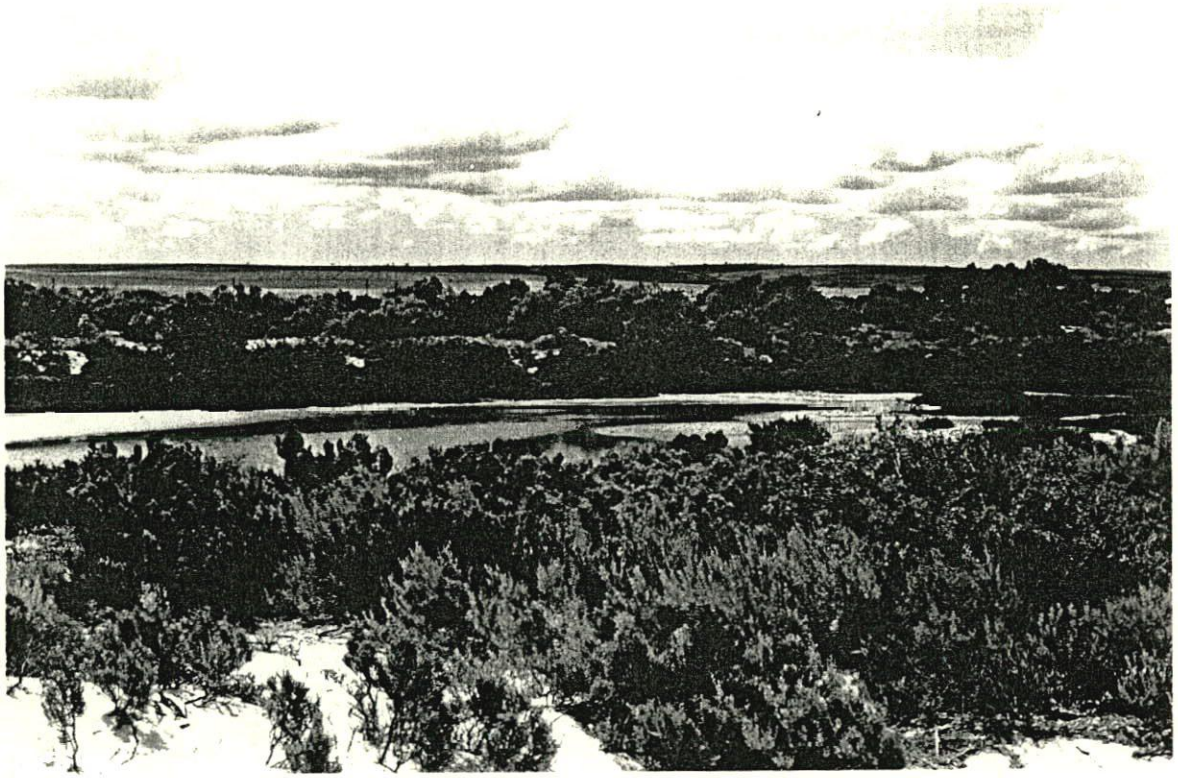


Plate 22 Pt Clinton, looking north from Lot5

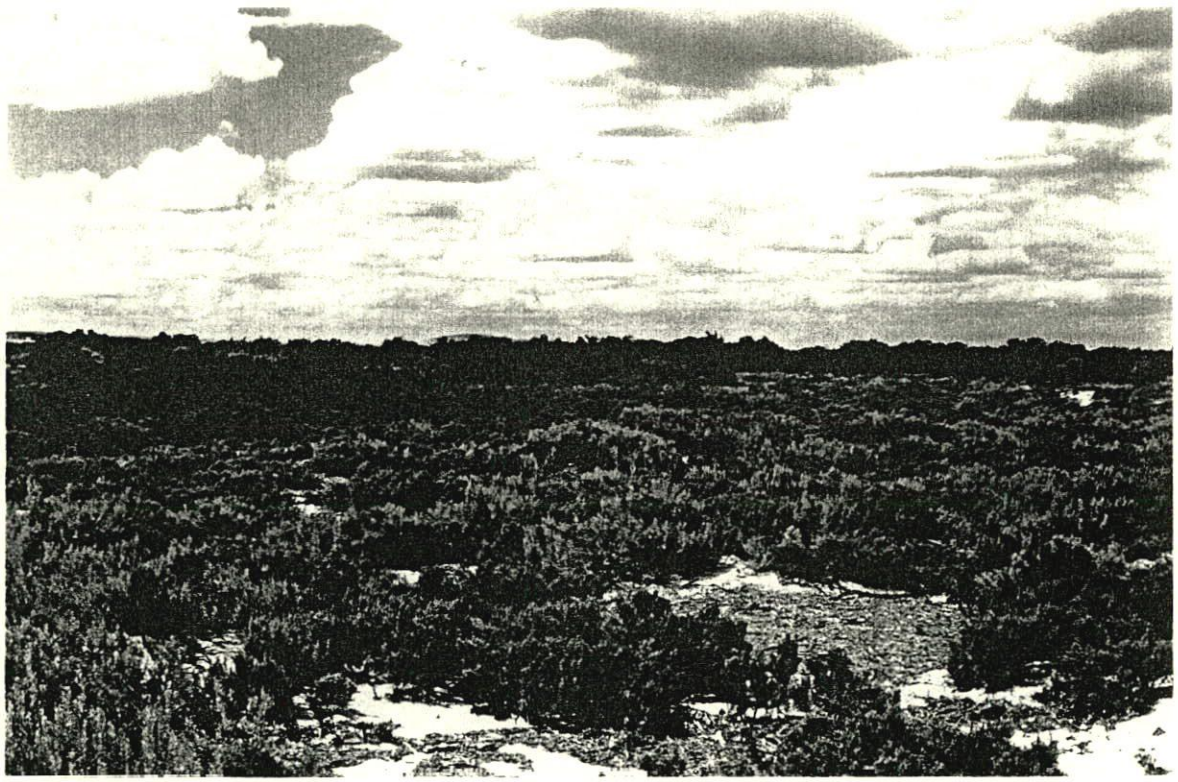
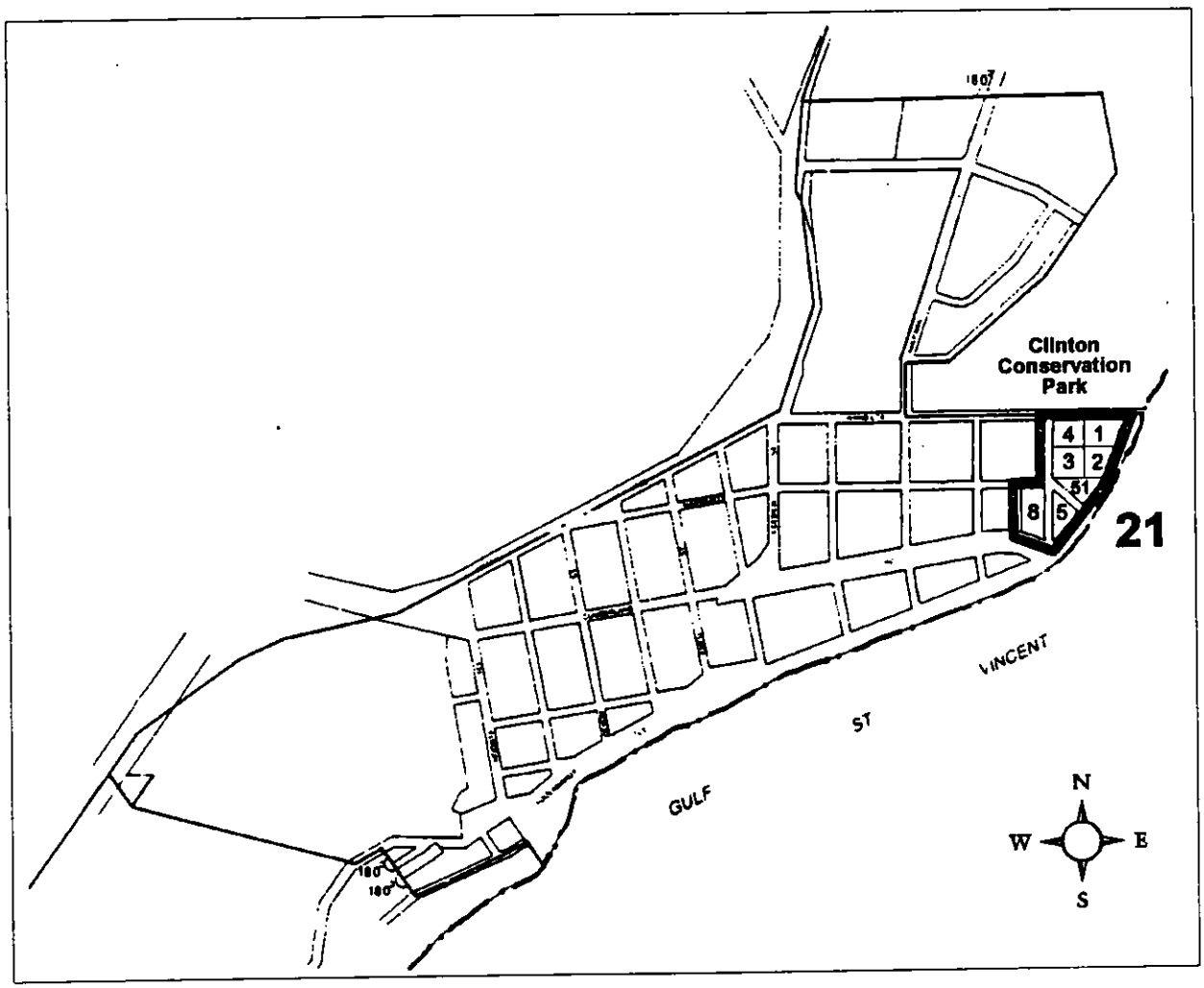


Plate 23 *Mangroves near Mangrove Point, from Will's Creek wharf*

Plate 24 *Mangrove / samphire transition along the causeway from Price*


Clinton
Conservation
Park
4
1
3
2
51
8
5
21
VINCENT
ST
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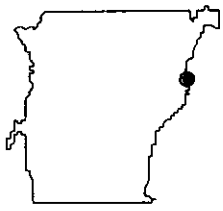
Map 10

Coastal Systems

22 *Mangrove Point*



Section Pt 408

Hd. Cunningham

Section Pt 580

Hd. Clinton

Map 11 Plates 23 & 24

General Description

This area of the coast, currently Crown Land, contains one of the most extensive areas of mangroves (*Avicennia marina* var. *resinifera*) in the study area. It is backed in the north near Pt. Clinton by a low cliff, and to the north and south of Price by samphire flats. Extensive areas of both mangroves and samphire, including Wills Creek, the major tidal inlet, are still in pristine condition (Plate 23).

South of Price, the community diversity is high, with stands of mangroves, tidal samphire flats, raised shellgrit ridges and tidal creeks. Tidal inlets mosaic the closed-scrub formation of the mangroves (Plate 24).

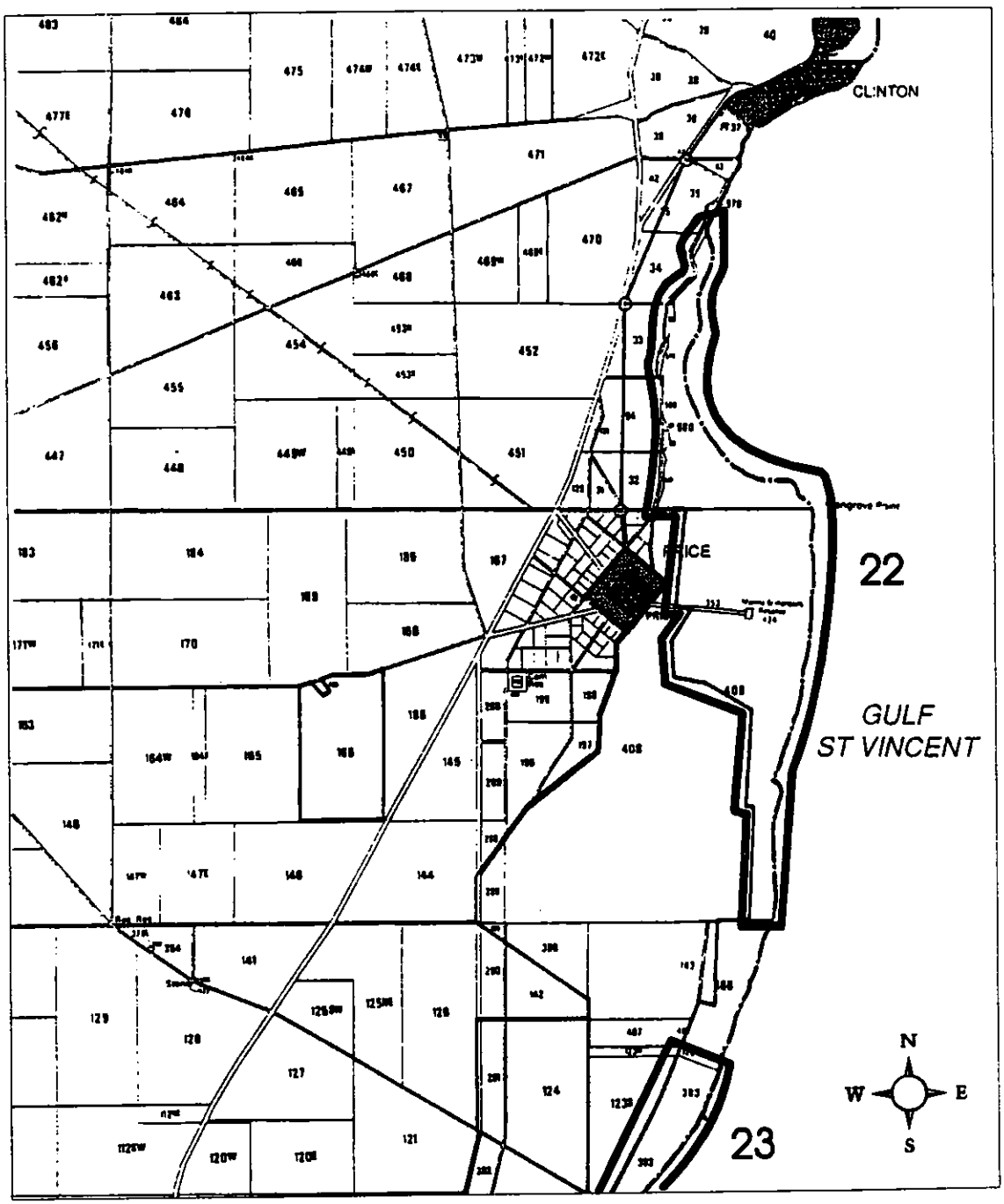
The backing samphire flats, where not converted to salt pans, have isolated, stranded shellgrit ridges supporting *Myoporum insulare, Alyxia buxifolia, Adriana klotzschii, Atriplex paludosa, Frankenia pauciflora, Maireana oppositifolia* and the pig-faces *Carpobrotus edulis* and *Disphyma crassifolium* ssp. *clavellatum.*

Conservation Significance

Mangroves in South Australian waters are associated with prawn and whiting nurseries, and provide unique and vital habitat for many aquatic species. The almost total lack of degradation in this particular area of vegetation, and the fact that it is a remnant of extremely high ecological importance makes this area of **Very High** conservation significance.

Management Recommendations

- Maintain current management practices.
- Include in the NPWS Reserves system as a Conservation Park.
- Prohibit any subdivision of these sections or any further encroachment into the tidal flats for salt harvesting.



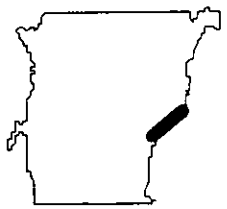
Map 11

23 *Tiddy Widdy Beach*

Sections 383, 385 - 388, 410 - 412, 464

Hd. Cunningham

Maps 3, 11 Plate 25



General Description

The coastline running north from Tiddy Widdy Beach (s. 387) to Mac's Beach (s. 383) consists of a narrow low dune system behind shallow sandy beaches. All of these Sections are either Crown Land or Crown Lease. *Olearia axillaris* and *Acacia ligulata* are the dominant native shrubs with a usually sparse understorey including *Atriplex paludosa*, *Rhagodia crassifolia* and *Acrotriche patula* over sedges and grasses. Vegetation density decreases to the north, and exotic species become much more dominant.

Conservation Significance

Shrub and groundcover layers are well represented in the southern part of this section of coast, with high levels of litter cover and a minimal moss and lichen crust. *Olearia axillaris* is the only native plant species obviously regenerating.

Onion weed and Hare's tail grass are common, and Boxthorn and Bridal creeper occasional. The dunes have become unstable in isolated places mainly due to indiscriminate vehicular traffic and uncontrolled camping.

There is no evidence of feral animal damage, and bird life is dominated by gulls and other water birds.

A significant population of Death Adders, a regionally rare reptile is known to inhabit the dunes around the Tiddy Widdy Beach area.

Two Aboriginal campsites are registered on Section 412, and an Aboriginal burial site exists on Section 386. Current surveys are likely to locate more sites of Aboriginal significance in this area.

SEDRS (1975) and Foale (1977) describe the majority of this area as being either cleared, or in poor condition, with severely altered community structure, severely reduced native species diversity, and major exotic invasions due to severe past impacts.

Ecologically, this length of coastline has very low habitat value due to the high levels of disturbance and exotic plant invasions and deserving overall, a conservation significance rating of **Moderate**. However, the presence of sites of Aboriginal significance must make those particular sections **High** in conservation value.

Management Recommendations

- Prohibit any development which may degrade sites of Aboriginal geological significance.
- Undertake a comprehensive weed control program over the entire length of this section of coast.

- Restrict vehicular access throughout this coastal strip to single tracks with fenced parking areas at designated locations behind the foredunes.
- Control pedestrian access from parking areas with fenced, stabilised walking tracks to the beaches.
- Restrict camping to designated areas.
- Monitor extent and movement of unstable dune areas.

Plate 25 *Tiddy Widdy Beach on Section 388 (southern end)*

24 Cliffs between Ardrossan and Black Point

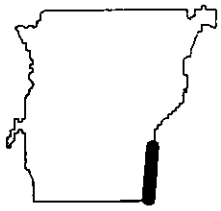
Sections 176, I88, I89, I93 - 200, 411, 414

Hd. Muloowurtie

Sections 457 - 459

Hd. Cunningham

Map 3 Plates 26 & 27



General Description

The discontinuous cliffs along this entire stretch of coastline sometimes rise up to 20 m above rocks or sandy beaches. There is no clifftop dune system associated with them and agricultural practices often extend right to the cliff edge (Plate 27). All Sections except 188 and 189 form the very narrow coastal Reserve, which is Crown Land controlled by the Coast Protection Board. These 2 Sections are privately owned under freehold title. Before clearance a tall shrubland of *Allocasuarina verticillata*, *Melaleuca lanceolata, Eucalyptus gracilis, Acacia ligulata*, and *Acrotriche patula* abutted the cliff (Foale 1977). This clifftop now mainly supports grassland with occasional sedges and scattered remnant shrubs of *Myoporum insulare*, *Acacia ligulata*, and *Acrotriche patula* (Plate 26). Small sections of this coastline where the cliffs disappear consist of low dunes above a very shallow beach. In these areas *Olearia axillaris* dominates over very sparse shrubs, sedges and grasses, many of which are exotics.

Conservation Significance

Five sites of geological significance occur in this coastal strip:

- the cliffs at Ardrossan (YK 2, p.20)
- Horse Gully, on Pavy Creek which meets the coast in Section 459 (YK 3, p.22)
- Muloowurtie Point (YK 4, p.22)
- Pine Point (YK 6, p.22)
- Hart's Mine on Section 196 (YK 5, p.22)

Shack developments at James Wells, Rogues Point, Pine Point, and Black Point have brought about substantial degradation of the low dunes upon which they are situated, and high levels of human activity in the unsettled low dunes areas has created an environment typified by the area at Parara (s. 458) (Plate 26). Here the dunes are unstable, vehicle tracks indiscriminate, and overnight campers have left rubbish dumped and campfires. Exotic plant species including Boxthorn, Brome grass, Onion weed, Wild oats, Horehound and Hares tail grass are very common.

One registered Aboriginal quarry/workshop site occurs on Sections 188 and 189, Hd. Muloowurtie. This site, at Pine Point, is a source of ochre, chert and quartzite in the coastal cliffs that was extensively mined by Aboriginal people. A large workshop area, where stone tools were manufactured from the raw materials obtained from the quarry, extends over the cultivated paddocks

inland from the cliffs. There is a high likelihood that other archaeological sites exist along the coastline between Ardrossan and Black Point.

Three campsites, consisting of scattered stone artefacts, faunal remains and burnt ovenstones, have been recorded in the coastal dunes on Section 414 at Black Point.

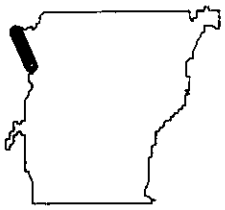
SEDRS (1975) and Foale (1977) describe the majority of this area as being either cleared, or in poor condition, with severely altered community structure, severely reduced native species diversity, and major exotic invasions due to severe past impacts.

In biological terms this area has very low habitat value, and low wildlife activity. However, the presence of a number of sites of Aboriginal and geological significance makes this area of **High** conservation significance overall.

Management Recommendations

- Prohibit any development which may degrade the areas of high geological significance, including controlled access, building and marina developments.
- Prohibit any development which may degrade sites of Aboriginal geological significance.
- Undertake a comprehensive weed control program over the entire length of this section of coast.

25 Cape Elizabeth Dunes



Sections 547, 548, 553, C, Pt D

Hd. Tiparra

Maps 12 & 13 Plates 28 - 31

General Description

This dune system covers an area of approximately 1,000 ha, and extends from The Gap to the tip of Cape Elizabeth (approx. 11 km), varying in width from 400 m to 2 km at its widest.

Three distinct vegetation associations occur within these dunes, the parallel dune vegetation (s.C), the low lying areas between dune ridges (s.553), and the irregular dune system vegetation in the north (s.D)(Earth Sanctuaries 1993).

Parallel dune vegetation

From the beach, the vegetation progresses through a zone dominated by *Myoporum insulare*, *Atriplex cinerea*, *Cakile maritima*, and *Spinifex sericeus*. The foredune is dominated by *Olearia axillaris*, *Leucophyta brownii*, *Isolepis nodosa* and *Acacia ligulata*. The next series of dunes inland commonly have an overstorey of *Allocasuarina verticillata* with an understorey of *Acacia ligulata* and *Olearia axillaris*. The swales and open areas are covered mainly by sedges and grasses.

Low lying areas

The vegetation in this area is quite dense, because of the springs and the presence of groundwater close to the surface. *Acacia cyclops* dominates, and *Myoporum insulare* is common.

Irregular dune system vegetation

There are extensive areas where dunes are mobile, and consequently lacking in vegetative cover. The vegetated areas are commonly dominated by *Olearia axillaris* and *Acacia ligulata* over a sparse variety of low shrubs, sedges and grasses. The coastline in this northern section often consists of low calcereous cliffs backed by small dunes.

Stock grazing has always been light, with both sheep and cattle periodically moving through the dunes from the adjacent pastures. Grazing ceased when the Coastal Management Branch bought the land containing the dunes in 1989, and management responsibility currently rests with the District Council. At this time, the area was fenced to exclude stock, and a regular rabbit control program begun. Currently, entry is by permission only. Prior to this, no rabbit control measures have ever been undertaken in the area, apart from some occasional trapping (pers. comm. K. Chapman).

Conservation Significance

The condition of the vegetation over most of the dunes is quite good, with a high diversity of native plant species. Litter, moss, and lichen cover is minimal

with *Olearia axillaris* and *Acacia ligulata* being the main litter providers. There is also minor regeneration of these shrub dominants.

Boxthorn is common, and False caper and Onion weed often dominate the flat areas in the swales. Large areas of the dunes are unvegetated, but these blowouts have not significantly increased in size since European occupation.

There are high levels of rabbit activity, both in the dunes and in the exposed limestone substrate and a significant population of foxes.

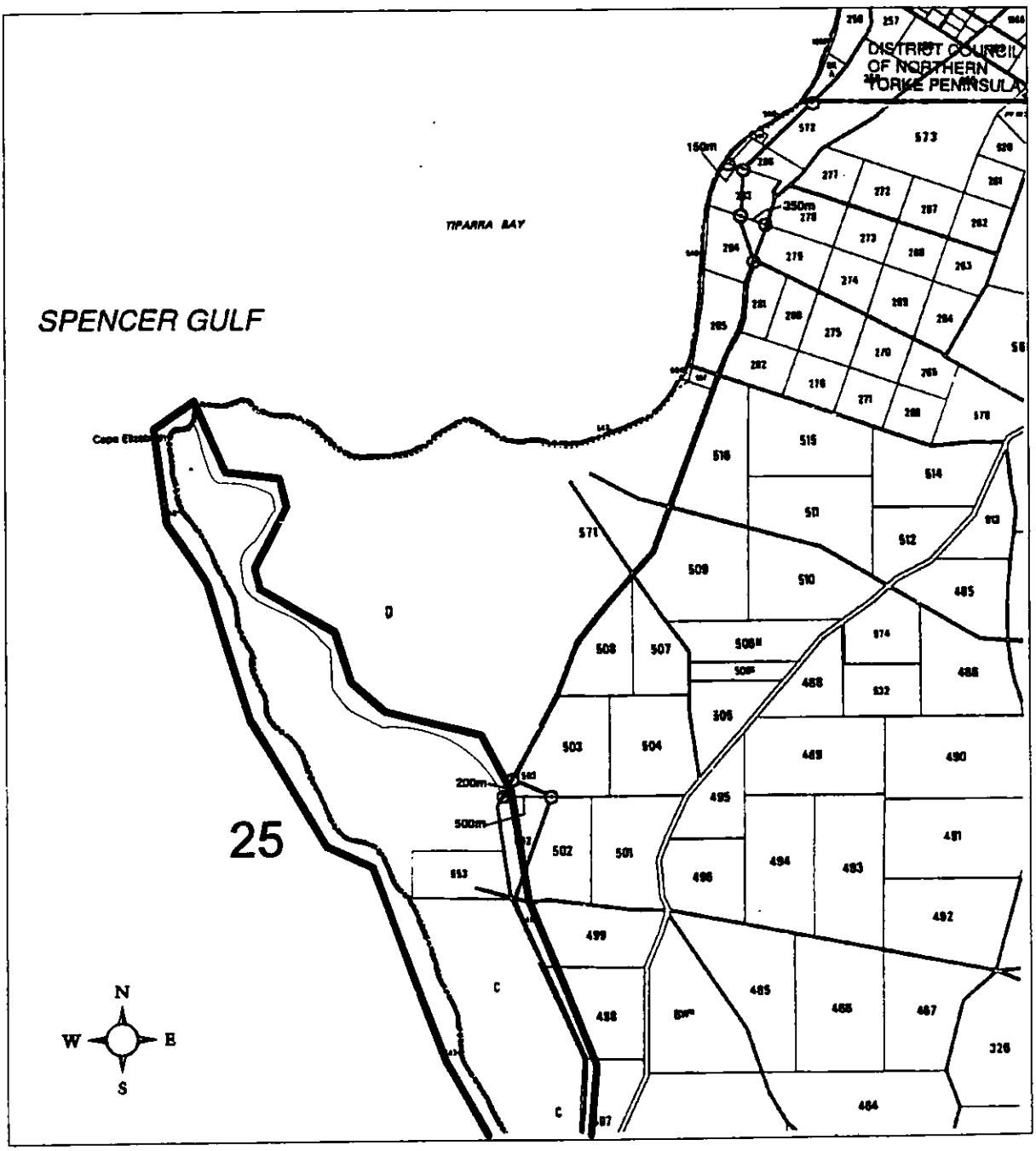
Bird diversity is moderate and insect diversity appears low.

Twelve Aboriginal campsites have been registered in this area, 3 at Cape Elizabeth and 9 in the vicinity of Tiparra Springs. These sites consist of extensive scatters of stone artifacts, burnt ovenstones, shellfish and other faunal remains in deflated areas of the coastal sandhills. 5 of these sites are on Section D and 7 on Section C (pers. comm. T Gara).

SEDRS (1975) and Foale (1977) describe this area as good condition, with minor alterations to community structure, slightly reduced native species diversity through minor past impacts with a few exotic infestations. This habitat quality, along with the presence of significant Aboriginal cultural sites makes this area of **Very High** conservation significance.

Management Recommendations

- Control rabbits.
- Control Boxthorn.
- Consider the option of opening a small part of the dunes to the public as an educational resource with interpretive information and day visit facilities.
- Maintain the current policy of excluding unauthorised visitors until the management recommendations above have been addressed.


DISTRICT COUNCIL
OF NORTHERN
YORKE PENINSULA
TIPARRA BAY
SPENCER GULF
25
N
W
E
S

Map 12

26 *Balgowan - The Gap Coastal Strip*

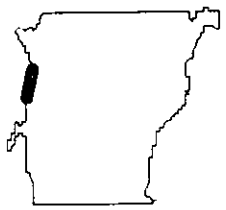
Sections 304, 305, 306

Hd. Kilkerran

Sections AN, 546, 557, 560

Hd. Tiparra

Map 13 Plates 32 - 37



General Description

This 10 km section of coastline consists of low cliffs with small clifftop dune systems. These dunes are generally narrow, lacking in tree species, and in many places are dominated by exotic weed species including Nitre bush, Boxthorn, Onion weed, and introduced grasses. Where this clifftop dune system becomes deeper and broader (s.A,559, A3), the vegetation becomes a *Eucalyptus 'anceps'* very open tree mallee over *Acacia ligulata* and *Melaleuca lanceolata*, with a very sparse ground cover of shrubby weeds and some grasses.

Sections 261 - 263 are Crown Lease, 304 - 306 Coastal Reserve, and the rest of this area is under freehold title.

A number of sections along this coastal strip (see Appendix 3) have recently become subject to Land Management Agreements under the Development Act. These agreements control development and management in these areas with respect to building construction, landscaping, access, fencing, and flora and fauna conservation. Some sections have already been fenced (south of Section 163), restricting vehicular access to some parts. Fencing at Tiparra Rocks is damaged and motorcycles and vehicles are destabilising the dunes.

Conservation Significance

Human impact in the form of historical stock grazing, and current indiscriminate vehicle traffic has left much of this section of the coast in highly degraded condition. SEDRS (I975) describe this area as being in fair to poor condition, with community structure being severely altered, native species diversity being severely reduced, and major exotic invasions due to severe past impacts.

The narrow strips (less than 200 m) of shallow clifftop dunes between Balgowan and Tiparra Rocks (s.A), are adjacent to cleared agricultural cropping land and are dominated by Nitre bush, Boxthorn, Roly-poly, Wild oats and Brome grass (Plates 32,33). These exotics have displaced the *Acacias*, *Myoporum insulare*, and *Leucophyta brownii* which would have originally covered these areas.

The clifftop soils between the small dunes are very fine, and highly susceptible to disturbance. The uncontrolled vehicle and pedestrian access has brought about extensive sheet erosion between the sparse shrubs (Plates 34,35,36).

The mallee area north of Tiparra Rocks has been fenced, and there is evidence of camping and household rubbish within the scrub (Plate 37). Old vehicular tracks within this scrub are stabilising very slowly, and there is some low level rabbit activity. Some of the dune tops are unstable and the moss crust very fragile. Litter, moss, and lichen cover are low, and regeneration of any vegetation is insignificant.

Despite the level of degradation, bird diversity is high, and numerous snails and insects, including ants, butterflies and dragonflies inhabit this scrub.

A 1 km section of cliffs immediately north of the Balgowan township has been recommended as a Geological Monument (YK21, p.21).

There are currently no registered Aboriginal heritage sites along this coast, although there is a high likelihood of campsites and other archaeological features occurring there.

The effect of the Land Management Agreements in this area is not yet apparent in terms of habitat regeneration, but the mallee area in particular has the potential to provide high quality and diverse habitat. This area, therefore is of **High** conservation significance.

Management Recommendations

- Totally exclude stock from grazing in any areas.
- Restrict vehicular access throughout this coastal strip to a single track with fenced parking areas at designated locations.
- Control pedestrian access from parking areas with fenced, stabilised walking tracks to the beaches.
- Repair fencing in the Tiparra Rocks area.
- Restrict camping to designated areas.
- Control Boxthorn and Nitre bush occurrences.
- Monitor extent and movement of unstable dune areas.

Plate 26 *Clifftop just south of Parara, looking north towards Ardrossan*

Plate 27 *Muloowurtie Point, looking south*

Plate 28 *Typical Cape Elizabeth coastline, looking north from The Gap*

Plate 29 *Dune vegetation above rocky shore, south end of Section C*

Plate 30 *Near Cape Elizabeth, in clifftop dunes*

Plate 31 *Dune erosion through human traffic destabilising the areas between shrubs*

Plate 32 Clifftop vegetation 500 m north of Balgowan

Plate 33 Clifftop vegetation and coast jsut south of The Gap

Plate 34 *Vehicle damage in the clifftop near Tiparra Rocks*

Plate 35 *Deflation between shrubs on clifftop area south of The Gap*

Plate 36 *Area between the cliff edge and the dune near Tiparra Rocks*

Plate 37 *Tree mallee area just south of The Gap*

27 *Balgowan - Chinaman Wells Coast*

Sections 261 - 263, 293, 300, 301, 54, 57 - 59, 545

Hd. Kilkerran

Maps 4,13 Plates 38 - 41

General Description

This privately owned section of coast immediately south of Balgowan consists of a small dune system with a shallow sandy beach, leading up to a narrow series of low dunes between 100m and 700m wide. The area immediately above high water mark is dominated by *Cakile maritima*, *Atriplex cinerea* and *Spinifex sericeus* (Plate 40). Once into the steeper foredunes, the larger shrubs of *Acacia ligulata* and *Olearia axillaris* take over, with a variable understorey of sparse low shrubs, pigface, sedges and grasses (Plate 38) (list in Appendices). In the broader part of these dunes around Sections 262, 261, 58 and 59, *O. axillaris* dominates and *A. ligulata* becomes sparser with a less diverse low shrub and ground layer.

Conservation Significance

This area generally has moderate litter, moss, and lichen cover, decreasing in the southern broader part, with insignificant signs of any plant regeneration.

In the stable open areas, there are heavy infestations of False caper and Onion Weed, with occasional patches of Brome grass, Wild sage, and Variable groundsel. Some large areas (particularly on Sections 262, 59, and 58) of the dunes are completely devoid of vegetation, as is most of the eastern margin where the flats meet the dunes. Some old tracks have been partially stabilised.

Most commonly, close to the inland margins, rabbit diggings and buckheaps are frequent, and warrens in inaccessible places, making control difficult. Foxes also inhabit this area.

The bird population appears quite large and diverse, with numerous tracks and nests observed. There are occasional ant nests, numerous snails, and frequent kangaroo, lizard and snake tracks.

Evidence of recent human impact is limited to a few infrequently used vehicle tracks, except in and around Chinaman Wells and the coastal access track to the shacks, where rubbish has been indiscriminately dumped.

SEDRS (1975) and Foale (1977) describe this area as being in fair condition, with major alterations to the vegetation community structure, considerably reduced native species diversity due to severe past impacts and invasions by many exotic species. This assessment is still valid, however because of the regional paucity of good quality coastal vegetation and the fact that this area is in substantially better condition than the areas immediately to the north and the south, it is of **High** conservation significance.

Management Recommendations

- Exclude all stock.

- Control rabbits.
- Restrict vehiclular access.
- Undertake stabilisation plantings of suitable species to prevent the currently unstable areas from moving inland or increasing in size.
- Formulate Land Management Agreements or Heritage Agreements which will maintain a high level of conservation management in the future.
- Prohibit any form of building development.

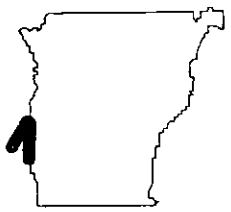
Plate 38 *Slowly stabilising vehicular tracks into dunes from the east, about 2 km south of Balgowan*

Plate 39 *Unstable landward edge of dunes, 2 km south of Balgowan*

Plate 40 *Beach and foredunes, just south of the shacks at Balgowan*

Plate 41 *Vegetation 500 m south of Balgowan, in swale behind foredunes*

28 *Chinaman Wells - Port Victoria Coast*



Section 294, 295, 296

Hd. Kilkerran

Map 4 Plates 42, 43, 44

General Description

This area, the majority of which is controlled by Point Pearce Community, begins as a continuation of that to the north (27) with very low dunes and shallow sandy beaches all along the west coast. This gives way to large areas of tidal samphire flats, with a very shallow beach to the south. These flats are seasonally inundated areas with some low stranded shellgrit ridges in places. The vegetation is characterised by *Halosarcia halocnemoides*, *Sclerostegia arbuscula*, and *Sarcicornia quinqueflora*, with *Leucophyta brownii* on the shellgrit rises.

An access track isolates this tidal flat from the low dune system behind. The dunes vegetation is very variable, but mainly dominated by *Olearia axillaris* and *Acacia ligulata*, with the reed *Isolepis nodosa* common near the tidal flats. The vegetation just south of Chinaman Wells (list in Appendices) on Section 294 is fairly representative of the community structure in reasonable condition.

Conservation Significance

Section 294 and the coast to Reef Point has a moderate coverage of high and low shrubs, and low amounts of moss, lichen and litter cover. There are extensive weed invasions of False caper and Onion weed in particular. Most previously disturbed parts are now partially stabilised.

There is little evidence of either native wildlife or feral animals, and vehicles often use the beach above high water mark.

Rubbish, ranging from small household items to car bodies has been dumped in some areas.

Further south on the Point Pearce peninsula, on the flatter area behind the low dunes system, very little native vegetation remains, with high levels of degradation through cattle grazing and uncontrolled vehicle use.

Vegetation is dominated by exotics, particularly Boxthorn, Onion weed, Wild oats, False caper, introduced grasses and Nitre bush (*Nitraria billiardierei*), a common indicator of degradation in pastoral areas.

The low dunes along the coast immediately north of Port Victoria are also heavily degraded, most recently by indiscriminate vehicle traffic, with numerous tracks destroying the vegetation and destabilising the area and high levels of exotic plant infestations.

There are 4 sites of historical Aboriginal significance on Section 295. These sites about 3 km north-west of the Point Pearce Mission, are all former native soaks which were developed early this century to provide water for the mission. A mythological site, Budera's Rock is located on coastal rocks, also on Section 295. This rock represents a club thrown by Budera, a being who figures prominently in Narungga mythology. The former Point Pearce Mission complex itself is an important historical site, not yet registered, and there are

probably many other historical and archaeological sites on Point Pearce lands not yet listed and described (pers. comm. T Gara).

SIEDRS (1975) and Foale (1977) describe this coast as in poor condition, and it may have been further degraded in the subsequent years. The community structure in most places has been severely altered, native species diversity severely reduced through severe past impacts leading to major invasions by exotic species.

A 2 km section of coastline close to Port Victoria is of high geological interest and has been recommended as a Geological Monument (YK20, p.23).

In biological terms, due to the high levels of degradation over most of this area, the majority has very **Low** conservation value. However, the presence of Aboriginal sites on Section 295 makes these and their surrounding area of **High** significance.

Section 294 and the coast to Reef Point is less degraded and more diverse, and is considered to be of **Moderate** conservation significance, mainly on the grounds of its remnancy value, and as a seed source for regeneration of adjacent areas. Although nothing is currently registered, there is also a high probability that Aboriginal sites of archaeological, and perhaps historical and mythological significance exist in this area (pers. comm. T Gara).

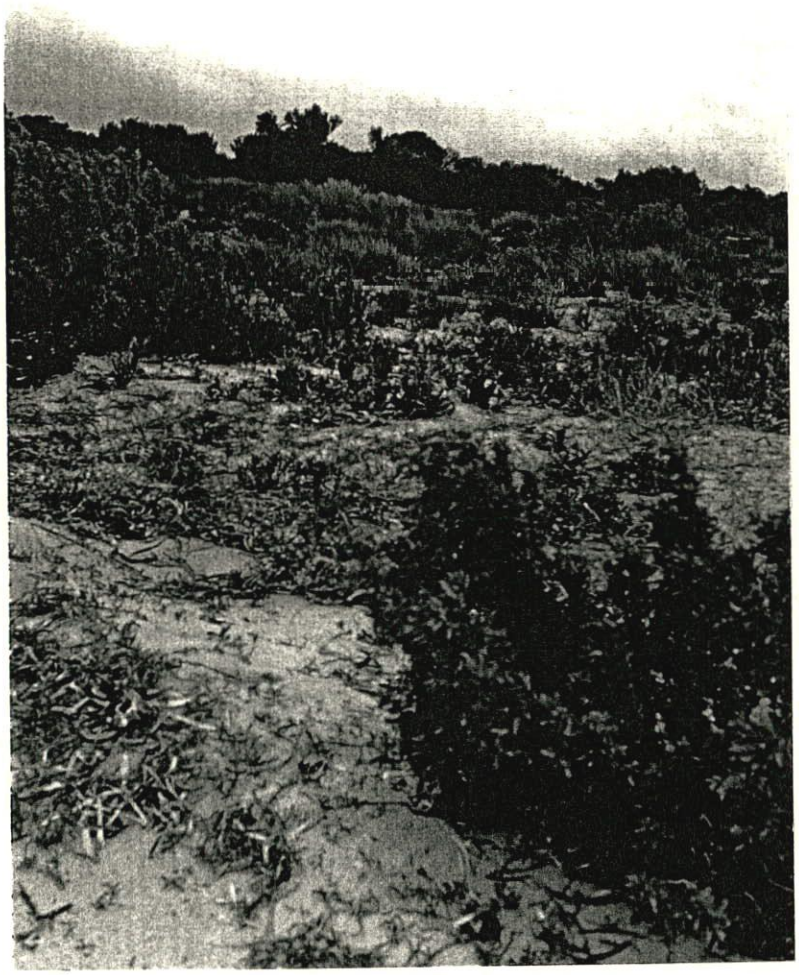
Management Recommendations

- Exclude all stock.
- Control rabbits.
- Restrict vehiclular access by closing most of the tracks and fencing off some areas.
- Undertake stabilisation plantings of suitable species to compete out the exotic weed invasions and rehabilitate degraded areas.
- Prohibit any form of building development.

Plate 42 *Shallow beach and low dune vegetation, looking from Section 294 towards Reef point*

Plate 43 *Low dunes and beach, looking north from Section 294 to Chinaman Wells*

Plate 44 *Zonation of vegetation from the top of the beach to the low dunes, on Section 294*



29 Coast South of Port Victoria

Sections 241-251, 278, 288

Hd. Wauraltee

Map 6 9 Plates 45 - 52

General Description

This entire section has been severely altered through heavy grazing in the past. Distinct zonation in the vegetation occurs from the high water mark inland. The first zone is dominated by *Cakile maritima*, succeeded by *Atriplex cinerea* and *Spinifex sericeus* (Plates 45,46), which gives way in the foredunes to sparse open shrublands of *Olearia axillaris*, *Acacia nematophylla* and *Acacia ligulata* (Plate 47). Areas between these shrubs usually have a good litter and moss cover, however some dune crests are bare and mobile.

North of Section 249, the shallow sandy beach changes to rocks and the dunes only extend a couple of hundred metres inland (Plate 48). Behind the rocky shore of Second Beach *Leucophyta brownii* is very common along with the same suite of species evident further south (Plate 49). The rocks on Rifle Butts Beach are overgrown by *Myoporum insulare*, *Atriplex cinerea*, *Enchylaena tomentosa* (Plate 50), and give way to partially unstable dunes in otherwise quite good condition, covered by *Stipa* spp. grasses, *Avena barbata* and chenopods.

Swales are frequently large, flat stable areas dominated by *Lagurus ovatus*, *Eurphorbia terracina*, *E. paralias*, *Avena barbata* and native grasses (Plate51). Large patches of *Isolepis nodosa* and *Gahnia lanigera* also often occur.

A number of sections along this coastal strip (see Appendix 3) are subject to Land Management Agreements under the Development Act. These agreements control development and management in these areas with respect to building construction, landscaping, access, fencing, and flora and fauna conservation.

Conservation Significance

The majority of this coastal dune system is reasonably well covered with sparse shrubland over grasses and herbs. Moss, lichen and litter cover is complete in many areas, though some dune crests are unstable and mobile. Since the recent fencing of much of this area, access has been restricted, and old vehicle tracks have begun to overgrow and stabilise (Plate 52).

Boxthorn is common throughout, and the swales have high densities of False caper, Wild oats, Nitre bush and Horehound. Previous attempts to control Boxthorn infestations have not been followed up, and bushes are regenerating.

Human impact increases from south to north in this area, with occasional tracks through the dunes in the south (s.241-243), and evidence of motor cycle destabilisation in the central part (s.245,246). High densities of *Euphorbia terracina* and *Lagurus ovatus* adjacent to the access track on Section 248, indicating historical degradation possibly through stock grazing. There is evidence of more vehicular traffic and rubbish dumping in the area behind Renowden Rocks (s.248,249). At Second Beach (s.250), regeneration is

occurring where people have been excluded. There is some evidence of erosion between shrubs in the dunes from pedestrian traffic, and some instability on the access track.

Bird populations do not appear to be very diverse, and a wide variety of insects, snails and ants inhabit the area.

There are currently no registered Aboriginal heritage sites along this coast, although there is a high likelihood of campsites and other archaeological features occurring there.

SEDRS (1975) and Foale (1977) described this area as being in fair condition with major alterations to community structure, considerably reduced species diversity, major past impacts, and infestations by many exotic species. Since this assessment, management of the area has altered, and some of the factors previously causing degradation have been addressed. The quality and diversity of habitats, and the evidence of decreasing recent degradation through human interference makes this section of the coast of **Very High** conservation significance.

Management Recommendations

- Exclude stock from grazing in any areas.
- Maintain current restrictions on vehicular access, and upgrade fencing in the northern sections.
- Control pedestrian access from parking areas with fenced, stabilised walking tracks to the beaches.
- Control Boxthorn and Nitre bush occurrences.
- Monitor extent and movement of unstable dune areas.

Plate 45 *Foredunes Section 242, looking south*

Plate 46 *Foredunes Section 242, looking north*

Plate 47 *Dune crest vegetation, Section 242*

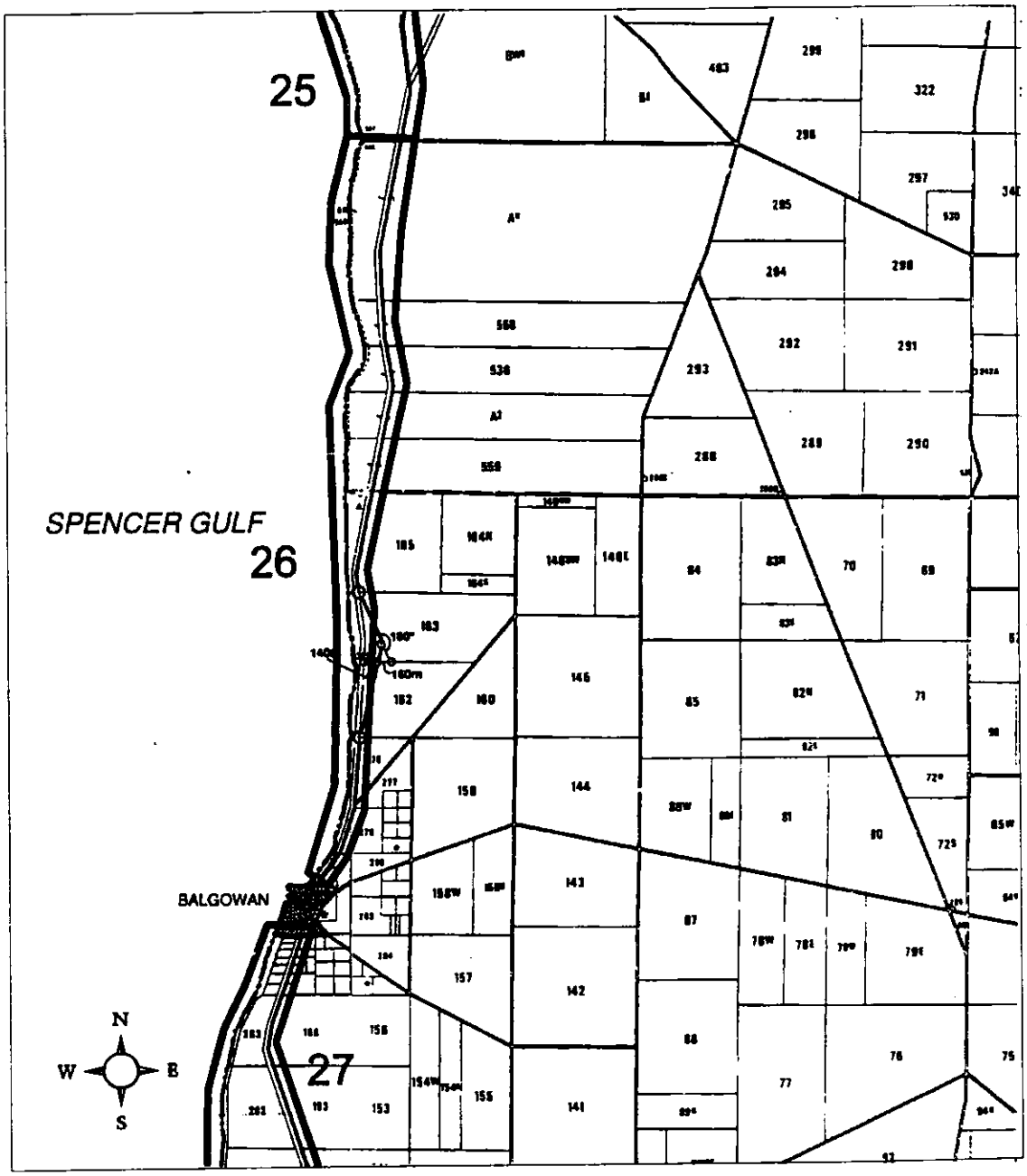
Plate 48 *Second Beach, looking south to Renowden Rocks*

Plate 49 *Instability between shrubs on landward side of dunes behind Second Beach*

Plate 50 *Myoporum insulare on the rocks at Rifle Butts Beach*

Plate 51 *Typical exotic invasions in the swales on Sections 247 - 249*

Plate 52 *Regeneration of historical vehicle tracks in the dunes behind Second Beach*



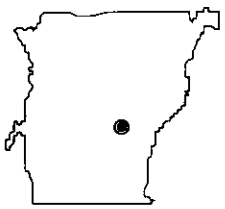
Map 13

Roadsides

30 Maitland - Ardrossan roadside

Hd. Maitland

Map 14 Plate 53



General Description

This patch is fairly typical of the roadside vegetation along this stretch between Maitland and Ardrossan. It consists of a mixed species tree mallee over low shrubs and grasses (list in Appendices). The main canopy species are *Eucalyptus leptophylla*, *E. oleosa*, *E. socialis*, and *E. yalatensis*. The middle shrub layer contains occasional *Melaleuca lanceolata*, *M. acuminata*, and *M. uncinata*. The ground layer is mainly *Stipa* spp. grasses and occasional *Rhagodia* spp.

Conservation Significance

The tree layer dominates, with plant densities beneath the canopy being quite low, with a very high litter density, and minimal moss and lichen crust. There are some fallen large old trees providing some habitat for small mammals, and no evidence of any dieback or regeneration.

Bridal creeper has infested the roadside boundary, and Boxthorn bushes occur occasionally. There is no evidence of any accelerated soil erosion, some old inactive rabbit warrens, but no evidence of current rabbit activity.

Wildlife diversity indications were low, with few birds being observed, though there are significant numbers of nests in the mallee trees.

Recent human impact appears minimal, except for roadworks disturbance and wind-blown and discarded small rubbish (cans, bottles, packaging etc.) being common along the roadside edge.

Due to its high remnancy value, and potential to provide diverse wildlife habitat, this area is of **High** conservation significance.

Management Recommendations

- Control Bridal creeper and Boxthorn.
- Minimise disturbance during roadside verge maintenance activities.
- Implement integrated management recommendations as detailed in Wigan & Malcolm (1989).

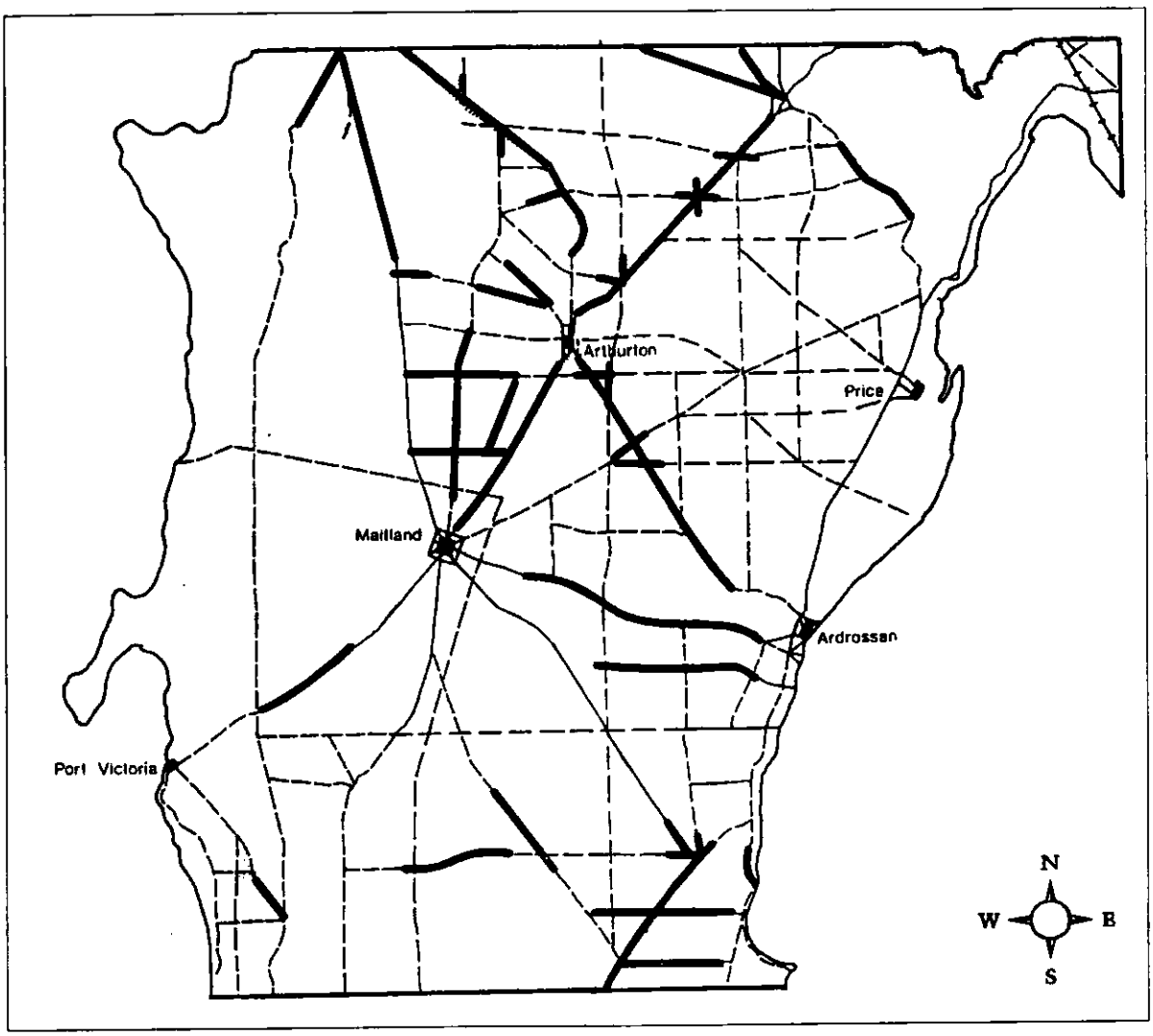
Other Roadsides

There are many other roadside verges in the study area worthy of some conservation effort. They are described in Wigan & Malcolm (1989). Given the high levels of destruction of native vegetation in areas other than roadsides, it is ecologically imperative to maintain and enhance the value of the remaining roadside vegetation.

Map 14 has been adapted from Foale (1977) and Wigan & Malcolm (1989), and Palmer & Lewis (1987), and shows the location of roadside vegetation of high conservation significance.

Comprehensive management recommendations regarding Mistletoe, Eucalypt dieback, weed control and revegtation are given by Wigan & Malcolm (1989), and these should be incorporated into strategies and actions in a District-wide roadside vegetation management plan.

Plate 53 *Roadside vegetation adjacent to Section 284, Hd of Maitland*



Map 14

MONITORING

What is monitoring?

All natural systems are constantly changing and adapting to the pressures which are exerted upon them, and they have inbuilt checks and balances which respond to these pressures. Human activity is one of the more significant agents of change in natural systems, and in order to maintain habitat diversity in areas of conservation significance, some monitoring of the effects of these activities is necessary. Monitoring has been defined as "a system of continual observation, measurement and evaluation for a defined purpose" (DEP 1990). In this situation, the defined purpose would be to **ensure that the conservation value of areas of significance is maintained or enhanced**. This means that the monitoring procedure would have to detect **any** degrading effect on **any** of the criteria by which these conservation values are determined.

A suitable monitoring system must:

- be able to distinguish between changes resulting from natural variability and those due to human activity
- show whether a change in conservation value is positive or negative
- be based on an objective measurement of some indicator of conservation value
- be sensitive enough to detect changes and trends in sufficient time to address the causal factors before permanent irreversible damage has occurred
- be simple and low cost

Satellite Imagery

Analysis of satellite imagery can provide valuable indications of gross environmental changes at a regional scale. Landsat TM imagery, for example, is captured every 16 days, and can therefore, potentially provide timely information, depending on the prevailing weather conditions. This imagery however, is limited by its spectral and spatial resolution, and difficulties with accounting for atmospheric differences at the time of capture can introduce inaccuracies and uncertainties into comparisons over time. Changes in size or density of native vegetation and salinisation can be readily detected through image analysis, but the more subtle indications necessary for monitoring of other conservation criteria are unlikely to be detectable.

Aerial Photography

Aerial surveys using colour film and producing photographs at a scale 1:40,000 (enlargeable to 1:10,000) are flown about every 5 years, usually in the summer months around the middle of the day when weather and lighting conditions are most favourable. As with satellite imagery, the scale of these assessments, and the fact that vertical photography only shows certain characteristics of the land, would limit the capability of the aerial photographic interpretation. Gross changes would be discernable, but finer details and

assessment of some of the more subtle indicators would require ground level survey. Specific low altitude aerial photographic surveys over certain areas may provide valuable information, and can be timed to best determine certain land or vegetation features. Comparisons over time using this method would be costly, and still require substantial ground surveys to verify the photographic interpretations.

Photopoints

A series of photographs taken using standard colour film in a standard camera, at regular time intervals from precisely the same location, looking in precisely the same direction can be a very inexpensive and accurate way of detecting changes in selected indicators. The location of these photopoints must be carefully chosen to best show these indications, and the frequency and time of rephotographing these points must minimise seasonal variations which confuse the comparisons.

Some indicators which may be easy to assess annually, or at least biennially using photopoints may be:

- regeneration or growth of a particular perennial plant
- size or movement of a bare sand area in a dune system
- density of a particular weed species
- plant species composition

A quick field assessment, noted on a standard form using consistent guidelines, done by an experienced person at the time of rephotographing photopoints, can also account for other indicators of change (eg. reopened rabbit burrows, number of seedlings per unit area of a certain species etc.), and assist with photo interpretation. With these notes and the photographs, clear trends can be discerned, and management adjusted accordingly.

A monitoring program using a combination of 5 yearly aerial photography and a series of carefully selected photopoints would be adequate, and inexpensive for picking up trends in conservation value criteria. The ability to respond quickly to these indications with alterations in management is also necessary for the monitoring program to be of any real value. Costs associated with such management options will need to be considered at the time of undertaking a monitoring commitment.

REGIONAL MANAGEMENT RECOMMENDATIONS

The following recommendations apply to areas or sites of **High** or **Very High** Conservation Significance rating.

1. Maintain existing remnant vegetation as large contiguous blocks wherever possible. Subdivision of large areas without adequate control over the ongoing integrated management of the smaller allotments will increase edge effects and inevitably lead to habitat degradation.
2. Restrict access of all types to areas of unstable or fragile coastal dunes.
3. Minimise disturbance to all areas of conservation significance by:
   - controlling vehicular access.
   - controlling pedestrian access.
   - controlling development within areas of high conservation significance and in adjoining properties, where such development is likely to degrade the area. Some level of environmental impact assessment may be appropriate as part of development applications.
   - controlling rabbits in all areas.
   - Using low impact weed control techniques to minimise off-target damage, recolonisation by other weeds and increased soil erosion.
   - Ensuring a Fire Prevention Plan is prepared for the District and a commitment is made to adhere to it.
4. Take advantage of the Heritage Agreement system where remnant vegetation is of sufficient size and conservation value to be eligible.
5. Encourage the formulation of Land Management Agreements for conservation areas with clauses covering:
   - building type, aesthetics and construction methods.
   - landscaping, access tracks, rubbish dumping, excavation and flora and fauna conservation.
   - fencing construction and maintenance

   (Agreements of this type are already in place for some sections of the Hundreds of Wauraltee and Kilkerran, see Appendix 3)
6. Link existing remnant vegetation with corridor plantings of appropriate species and maintain these links for wildlife habitat.
7. Prepare a regional revegetation strategy including a comprehensive ongoing program of direct seeding along roadsides to enhance the linkages between patches of viable habitat.
8. In areas of high geological significance, development which degrades the area in any way should be prohibited. This includes preservation of certain cliff tops and prevention of marina and other building developments in certain areas.
9. Promote the involvement of school and other community groups to assist landholders and/or Council with seed collection, seedling propagation, hand direct-seeding and seedling planting.

10. Promote the formation of community groups to assist with management of conservation areas (eg. Friends groups).

11. Assist and support research into:

    - Eucalypt Dieback - causes and management
    - Mistletoe - physiology, long term management and perception

12. Institute a monitoring program to establish trends in conservation value of significant areas.

FURTHER WORK

In late 1994, the Biological Conservation Section of the Department of Environment and Natural Resources in conjunction with the GIS section of the Department of Housing and Urban Development will be conducting a comprehensive survey of native vegetation remnants in the Yorke Peninsula region. The information gained from that work will be a valuable addition to that contained in this report, and may identify more areas worthy of some increased conservation effort.

An archaeological consultant is currently undertaking a systematic survey of sites of Aboriginal significance over the whole of Yorke Peninsula with the assistance of members of the Pt. Pearce community. This survey will provide baseline data on site distribution, preservation and significance, and permit more appropriate measures to be introduced for site conservation and management.

With the extra information, when it becomes available from the above work, more areas should be appended to this report, so that a thorough, consistent and comprehensive approach has ultimately been taken to the assessment of all potentially significant conservation areas within the District Council boundaries.

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APPENDICES

1. Plant Species Lists for surveyed areas
2. The Heritage Agreement Scheme
3. Land Management Agreements
4. Threatened Plant Species on Yorke Peninsula
5. Sample Site Data Collection Sheets

1 PLANT SPECIES LISTS

Plants with an asterisk (*) preceding them are listed as regionally threatened at some level. The AMG co-ordinates and 1:50 000 topographic mapsheet of the actual location of the photographs and most of the species lists is also listed.

2 *Young's Scrub*

Mapsheet Ardrossan (760600, 6184600)
Hundred Cunningham
Section 37

Plant List

Acacia hakeoides
Acacia notabilis
Acacia spinescens
Acrotriche cordata
Acrotriche patula
Actinobole uliginosum
Alyxia buxifolia
Anagallis arvensis
Astroloma humifusum
Baeckea crassifolia
Billardiera sericophora
Brachycome ciliaris var. ciliaris
Brassica tournefortii
Caladenia deformis
Callitris preissii
Cassytha peninsularis
Chenopodium desertorum
Chrysocephalum bilobum
Clematis microphylla
Correa reflexa var. coriacea
Crassula sieberana ssp. tetramera
Critesion murinum var. glaucum
Cryptandra amara var. amara
Cryptandra leucophracta
Dampiera rosmarinifolia
Danthonia sp.
Daucus glochidiatus
Dianella revoluta
Dodonaea bursariifolia
Dodonaea hexandra
Drosera macrantha ssp. planchonii
Einadia nutans ssp. nutans
Enchylaena tomentosa var. tomentosa
Eucalyptus 'anceps'
Eucalyptus brachycalyx
Eucalyptus dumosa
Eucalyptus leptophylla
Eucalyptus oleosa
Eucalyptus socialis
Eutaxia microphylla
Exocarpos aphyllus
Exocarpos sparteus
Gahnia filum
Gahnia lanigera
Goodenia affinis
Goodenia geniculata
Grevillea ilicifolia
Helichrysum leucopsideum
Hibbertia riparia
Lasiopetalum baueri
Lasiopetalum behrii
Lepidosperma laterale
Lepidosperma viscidum
Lycium ferocissimum
Melaleuca acuminata
Melaleuca lanceolata
Melaleuca uncinata
Myrsiphyllum asparagoides
Neurachne alopecuroidea
Ozothamnus retusus
Pelargonium littorale
Pimelea glauca
Pittosporum phylliraeoides var. microcarpa
Pterostylis mutica
Rhagodia candolleana
Rhagodia crassifolia
Rhagodia parabolica
Santalum acuminatum
Schoenus breviculmis
Senecio glossanthus
Spyridium phylicoides

Stipa elegantissima
Stipa sp.
* *Swainsona lessertifolia*
Thelymitra sp.
Thysanotus patersonii
Trifolium sp.
Vittadinia sp.
Westringia rigida
Wurmbea dioica

3 Brown's Scrub

Mapsheet Ardrossan (763600, 6184600)
Hundred Cunningham
Section 35S

Plant List

Acacia anceps
Acacia hakeoides
Acacia spinescens
Acrotriche patula
Allocasuarina verticillata
Amyema melaleucae
Beyeria lechenaultii
Brachycome ciliaris var. ciliaris
Brassica tournefortii
Bursaria spinosa
* *Caesia calliantha*
Caladenia deformis
Callitris canescens
Chenopodium desertorum ssp. microphyllum
Clematis microphylla
Comesperma volubile
* *Cryptandra amara var. floribunda*
Cyrtostylis robusta
Danthonia sp.
Dianella revoluta
Dodonaea hexandra
Drosera macrantha ssp. planchonii
Einadia nutans ssp. nutans
Enchylaena tomentosa var. tomentosa
Eucalyptus leptophylla
Eucalyptus porosa
Eucalyptus socialis
Gahnia deusta
Gahnia lanigera
Gonocarpus mezianus
Goodenia affinis
Hypoxis glabella
Lasiopetalum baueri
Lasiopetalum behrii
Lepidosperma viscidum
Lomandra collina
Lomandra effusa
Lycium ferocissimum
Lysiana exocarpi ssp.exocarpi
Medicago minima var. minima
Melaleuca acuminata
Melaleuca lanceolata
Melaleuca uncinata
Opercularia turpis
Parietaria debilis
Pittosporum phylliraeoides var microcarpa
Pomaderris paniculosa
Santalum acuminatum
Schoenus breviculmis
Senecio glossanthus
Stackhousia monogyna
Stipa sp.
Thysanotus patersonii
* *Vittadinia megacephala*
Wahlenbergia sp.
Wurmbea dioica ssp. dioica

4 Heinrich's Scrub

Mapsheet Maitland
Hundred Kilkerran
Section 138

Plant List

Acacia ligulata
Avena barbata
Bromus rubens
Enchylaena tomentosa

Eucalyptus gracilis
Eucalyptus sp.
Lasiopetalum discolor
Lycium ferocissimum
Pimelea serpyllifolia
Rhagodia crassifolia
Salsola kali
Salvia verbenaca
Stipa sp.
Triodia irritans

5 Gershwitz' / Moody's Scrub

Mapsheet Maitland (729500, 6191300)
Hundred Kilkerran
Section 137

Plant List

Acacia spinescens
Acrotriche patula
Allocasuarina verticillata
Arthropodium fimbriatum
Avena barbata
Bromus rubens
Bursaria spinosa
Cassytha pubescens
Clematis microphylla
Correa reflexa
Chrysocephalum apiculatum
Dianella revoluta
Enchylaena tomentosa
Eucalyptus gracilis
Eucalyptus 'anceps'
Euphorbia terracina
Exocarpos syrticola
Gahnia lanigera
Goodenia willisiana
Lagurus ovatus
Lasiopetalum behrii
Lepidosperma concavum
Lycium ferocissimum
Melaleuca acuminata
Melaleuca lanceolata
Pimelea serpyllifolia
Pittosporum phylliraeoides
Pomaderris paniculosa ssp. paniculosa
Rhagodia crassifolia
Stipa spp.

6 Adams' Scrub

Mapsheet Maitland (743700, 6200300)
Hundred Maitland
Section 298

Plant List

Acacia spinescens
Acrotriche cordata
Acrotriche patula
Alyxia buxifolia
Astroloma humifusum
Brachycome ciliaris
Clematis microphylla
Comesperma volubile
Correa reflexa
Dianella revoluta
Dodonaea hexandra
Enchylaena tomentosa
Eucalyptus gracilis
Eucalyptus incrassata
Eucalyptus leptophylla
Exocarpos cupressiformis
Gahnia lanigera
Genocarpus teucrioides
Goodenia willisiana
Grevillea ilicifolia
Lasiopetalum behrii
Lasiopetalum discolor
Melaleuca uncinata
Myrsiphyllum asparagoides
Pimelea glauca
Vittadinia spp.

7 Lodge's Scrub

Mapsheet Maitland (750000, 6192000)

Hundred Maitland
Section 213NW

Plant List

Acacia hakeoides
Acacia paradoxa
Acacia pycnantha
Acrotriche patula
Allocasuarina verticillata
Alyxia buxifolia
Amyema miquelii
Atriplex semibaccata
Beyeria lechenaultii
Briza maxima
* *Cassinia arcuata*
Cassytha melantha
Cassytha peninsularis
Choretrum glomeratum
Clematis microphylla
Dampiera rosmarinifolia
Dianella revoluta
Dodonaea baueri
Dodonaea viscosa ssp. spatulata
Enchylaena tomentosa var. tomentosa
Eucalyptus cladocalyx
Eucalyptus porosa
Exocarpos sparteus
Grevillea ilicifolia var. ilicifolia
Halgania cyanea
Helichrysum leucopsideum
Lasiopetalum baueri
Lepidium africanum
Lepidosperma viscidum
Linum strictum ssp. strictum
Lomandra multiflora ssp. dura
Lysiana exocarpi ssp. exocarpi
Melaleuca uncinata
Myrsiphyllum asparagoides
Olea europaea ssp. europaea
Ozothamnus retusus
Pittosporum phylliraeoides var microcarpa
Rhagodia parabolica
Rhagodia preissii ssp. preissii
Stipa sp.
Vittadinia cervicularis var. cervicularis

8 *Hill's Scrub*

Mapsheet Maitland (749800, 6195700)
Hundred Maitland
Section 221

Plant List

Acacia hakeoides
Acacia notabilis
Acacia spinescens
Alyxia buxifolia
Amyema miquelii
Atriplex campanulata
Atriplex eardleyae
Atriplex semibaccata
Bromus rubens
Bursaria spinosa
Callitris preissii
* *Calocephalus citreus*
Calostemma purpureum
Cassinia arcuata
Allocasuarina verticillata
Chenopodium microphyllum
Clematis microphylla
Dianella revoluta
Dodonaea baueri
Einadia nutans
Enchylaena tomentosa
Eucalyptus brachycalyx
Eucalyptus camaldulensis
Eucalyptus odorata
Eucalyptus porosa
* *Eutaxia microphylla var. diffusa*
Exocarpos aphyllus
Exocarpos cupressiformis
Exocarpos sparteus
Lepidium africanum
Lycium ferocissimum
Lysiana exocarpi
Maireana enchylaenoides
Melaleuca lanceolata
Myrsiphyllum asparagoides

Clearia pannosa
Pittosporum phylliraeoides
Santalum acuminatum
Solanum aviculare
Stipa elegantissima
Vittadinia dissecta var. hirta

9 Aldersyde

Mapsheet Maitland (743250, 6183800)
Hundred Maitland
Section 16

Plant List

Acacia spinescens
Acrotriche patula
Avena barbata
Bursaria spinosa
Clematis microphylla
Dianella revoluta
Enchylaena tomentosa
Eucalyptus gracilis
Gahnia lanigera
Lepidium africanum
Lepidosperma concavum
Lycium ferocissimum
Melaleuca acuminata
Myoporum platycarpum
Ozothamnus scaber
Ptilotus spathulatus
Stipa spp.

10 Thomas's Scrub

Mapsheet Ardrossan (753200, 6193750)
Hundred Maitland
Section 372

Plant List

Acrotriche patula
Alyxia buxifolia
Bromus rubens
Cassytha pubescens
Clematis microphylla
Correa reflexa
Dianella revoluta
Eucalyptus leptophylla
Eucalyptus socialis
Exocarpos aphyllus
Gahnia lanigera
Goodenia willisiana
Halgania cyanea
Hibbertia riparia
Melaleuca uncinata
Myrsiphyllum asparagoides
Stipa elegantissima
Stipa sp.

11 Rogues Gully

Mapsheet Ardrossan (763500, 6179300)
Hundred Cunningham
Section 61

Plant List

Acacia notabilis
Allocasuarina verticillata
Beyeria lechenaultii
Bromus rubens
Dodonaea stenozyga
Eucalyptus porosa
Eucalyptus leptophylla
Eucalyptus rugosa
Gahnia lanigera
Melaleuca acuminata
Melaleuca lanceolata
Pimelia serpyllifolia
Poa poiformis
Stipa sp.
Westringia rigida

12 Crown Scrub, Section 202 - Hundred of Muloowurtie

Mapsheet Port Julia
Hundred Muloowurtie
Section 202

Plant List

Acacia hakeoides
* *Acacia rhetinocarpa*
Acacia spinescens
Acrotriche cordata
Acrotriche patula
Anagallis arvensis
Avena barbata
Beyeria lechenaultii
Carpobrotus modestus
Cassinia arcuata
Cassytha glabella
Cassytha melantha
Correa reflexa
Dianella revoluta
Enchylaena tomentosa
Eucalyptus leptophylla
Eucalyptus 'anceps'
Eucalyptus brachycalyx
Exocarpos aphyllus
Gahnia deusta
Hibbertia riparia
Lasiopetalum behrii
Lasiopetalum x tepperi
Lycium ferocissimum
Melaleuca acuminata
Melaleuca lanceolata
Melaleuca uncinata
Myrsiphyllum asparagoides
Olearia brachyphylla
Pittosporum phylliraeoides
Rhagodia candolleana
Stipa acrociliata
Stipa elegantissima
Stipa sp.
Vittadinia sp.

13 Rogues Point Reserve

Mapsheet Ardrossan (765800, 6179600)
Hundred Cunningham
Section 193

Plant List

Acacia notabilis
Asphodelus fistulosus
Carpobrotus rossii
Dianella revoluta
Enchylaena tomentosa
Isolepis nodosa
Lagurus ovatus
Olearia axillaris
Rhagodia candolleana
Stipa spp.

14 Joraslafsky / Watters Scrub

Mapsheet Port Julia (757250, 6168200)
Hundred Cunningham
Section 22

Plant List (association 1)

Acacia spinescens
Acrotriche patula
Allocasuarina verticillata
Baeckea crassifolia
* *Billardiera versicolor*
Brachycome ciliaris
Bursaria spinosa
Calytrix tetragona
Cassytha glabella
Chrysocephalum apiculatum
Helichrysum leucopsideum
Correa reflexa
Cryptandra amara
Dampiera rosmarinifolia

Dianella revoluta
Dodonaea hexandra
Einadia nutans
Eucalyptus leptophylla
Eucalyptus socialis
Eutaxia microphylla
Exocarpos sparteus
Gahnia deusta
Gahnia lanigera
Gonocarpus tetragynus
Goodenia willisia
Goodenia varia
Grevillea ilicifolia
Hibbertia riparia
Lasiopetalum baueri
Lasiopetalum behrii
* *Lasiopetalum schulzenii*
Lepidosperma congestum
Lepidosperma viscidum
Logania crassifolia
Lomandra dura
Lomandra effusa
Lomandra glauca
Melaleuca acuminata
Melaleuca lanceolata
Melaleuca uncinata
Neurachne alopecuroidea
Olearia ramulosa
Opercularia varia
Pelargonium sp.
Pimelea glauca
Prasophyllum nigricans
Pomaderris oraria
Schoenus breviculmis
Schoenus deformis
Spyridium phylicoides
Stipa sp.
Thysanotus patersonii
Trifolium sp
Vittadinia sp.

Plant List (association 2)

Acacia hakeoides
* *Acacia lineata*
Acacia microcarpa
Acacia notabilis
Acacia rigens
Acacia sclerophylla
Acrotriche cordata
* *Boronia inornata*
Bursaria spinosa
Callitris canescens
Clematis microphylla
Correa reflexa
Dampiera rosmarinifolia
Danthonia sp.
Dianella revoluta
Dodonaea bursariifolia
Dodonaea hexandra
Enchylaena tomentosa
* *Eucalyptus conglobata*
Eucalyptus leptophylla
Eucalyptus gracilis
Eucalyptus rugosa
Eucalyptus socialis
Exocarpos aphyllus
Exocarpos sparteus
Gahnia deusta
Goodenia willisia
Lasiopetalum behrii
Lepidosperma viscidum
Logania ovata
Melaleuca acuminata
Melaleuca lanceolata
Melaleuca uncinata
Microcybe pauciflora
Myoporum platycarpum
Prasophyllum nigricans
Prostanthera serpyllifolia ssp. microphylla
Rhagodia candolleana
Santalum acuminatum
* *Santalum murrayanum*
Schoenus breviculmis
Stipa sp.
Thysanotus patersonii

Plant List (association 3)

Acacia sclerophylla
Acacia spinescens
Acrotriche cordata
Acrotriche patula
Baeckea crassifolia
Calytrix tetragona
Cassytha glabella
Cassytha peninsularis
Correa reflexa
Cryptandra leucophracta
Danthonia sp.
Dodonaea hexandra

Exocarpos aphyllus
Gahnia lanigera
Goodenia willisia
Grevillea ilicifolia
Lasiopetalum baueri
Lepidosperma congestum
Lepidosperma viscidum
Leucopogon cordifolius
Lomandra glauca
Melaleuca acuminata
Melaleuca lanceolata
Melaleuca uncinata
Neurachne alopecuroidea
Prasophyllum nigricans
Thelymitra nuda

Plant List (association 4)

Cassinia arcuata
Danthonia sp.
Eucalyptus leptophylla
Eucalyptus incrassata
Stipa sp.

15 Rocky Bend National Trust Reserve

Mapsheet Moonta (740400, 6221000)
Hundred Tiparra
Section 554

Plant List

Acacia spinescens
Acrotriche patula
Allocasuarina verticillata
Alyxia buxifolia
Asphodelus fistulosus
Avena barbata
Baeckea crassifolia
Bursaria spinosa
Calytrix tetragona
Chrysocephalum apiculatum
Helichrysum leucopsideum
Clematis microphylla
Correa reflexa
Danthonia sp.
Dianella revoluta
Dodonaea hexandra
Enchylaena tomentosa var. tomentosa
Eucalyptus dumosa
Eucalyptus leptophylla
Eucalyptus oleosa
* *Eutaxia microphylla var. diffusa*
Exocarpos cupressiformis
Goodenia willisiana
Halgania cyanea
Lasiopetalum behrii
Lepidosperma congestum
Lobelia gibbosa
Lomandra effusa
Lycium ferocissimum
Melaleuca acuminata
Melaleuca lanceolata
Melaleuca uncinata
Myrsiphyllum asparagoides
Olearia axillaris
Pimelea serpyllifolia
Pittosporum phylliraeoides
Podolepis rugata
Pomaderris obcordata
Rhagodia crassifolia
Sagina apetala
Santalum acuminatum
Stipa elegantissima
Stipa spp.
Thysanotus patersonii
Triodia irritans
Westringia rigida

16 Agery National Trust Reserve

Mapsheet Moonta (749500, 6113500)
Hundred Tiparra
Section 225

Plant List

Acacia spinescens
Acrotriche cordata

Acrotriche patula
Alyxia buxifolia
Baeckea crassifolia
Billardiera scricophora
Chrysocephalum apiculatum
Clematis microphylla
Correa reflexa
Dampiera rosmarinifolia
Danthonia sp.
Dianella revoluta
Dodonaea hexandra
Einadia nutans ssp. nutans
Enchylaena tomentosa
Eucalyptus dumosa
Eucalyptus incrassata
Eucalyptus leptophylla
* *Eutaxia microphylla var. diffusa*
Exocarpos aphyllus
Gahnia deusta
Gonocarpus mezianus
Goodenia varia
Grevillea ilicifolia
Halgania cyanea
Helichrysum leucopsideum
Hibbertia riparia
Lasiopetalum baueri
Lepidosperma congestum
Leucopogon cordifolius
Lycium ferocissimum
Melaleuca acuminata
Melaleuca lanceolata
Melaleuca uncinata
Microcybe pauciflora
Myrsiphyllum asparagoides
Pimelea serpyllifolia
Pittosporum phylliraeoides
Podolepis rugata
Pterostylis sp.
Rhagodia crassifolia
Santalum acuminatum
Spyridium sp.
Stipa elegantissima
Thelymitra sp.
Vittadinia sp.

17 Jones - Rockwood's Scrub

Mapsheet Moonta (740000, 6220400)
Hundred Tiparra
Section F4

Plant List

Acacia nyssophylla
Acacia spinescens
Acrotriche patula
Asphodelus fistulosus
Bursaria spinosa
Carthamus lanatus
Cassytha sp.
Centaurium sp.
Clematis microphylla
Crassula sp.
Danthonia sp.
Dianella revoluta
Einadia nutans
Enchylaena tomentosa
Eucalyptus dumosa
Eucalyptus leptophylla
Eucalyptus gracilis
Eucalyptus oleosa
Eutaxia microphylla
Exocarpos cupressiformis
Gahnia lanigera
Goodenia sp.
Halgania cyanea
Helichrysum leucopsideum
Lepidosperma carphoides
Leptospermum congestum
Lolium sp.
Lomandra effusa
Lycium ferocissimum
Marrubium vulgare
Melaleuca acuminata
Melaleuca lanceolata
Melaleuca uncinata
Pittosporum phylliraeoides
Ptilotus sp.
Sonchus asper ssp. glaucescens
Stipa elegantissima
Stipa sp.
Thysanotus patersonii
Vittadinia sp.
Wahlenbergia sp.

18 Colliver's Scrub

Mapsheet Kainton (756000, 6208100)
Hundred Tippara
Section 50

Plant List

Acacia hakeoides
Acacia notabilis
Acacia spinescens
Acrotriche patula
Allocasuarina verticillata
Alyxia buxifolia
Amyema miquelii
Avena barbata
Beyeria lechenaultii
Bursaria spinosa
* *Cassinia arcuata*
Cassytha melantha
Clematis microphylla
Dianella revoluta
Enchylaena tomentosa
Eucalyptus 'anceps'
Eucalyptus dumosa
Eucalyptus porosa
Lycium ferocissimum
Lysiana exocarpi
Marrubium vulgare
Melaleuca acuminata
Melaleuca lanceolata
Myrsiphyllum asparagoides
Pimelea serpyllifolia ssp. serpyllifolia
Pittosporum phylliraeoides var. microcarpa
Rhagodia candolleana
Senna artemisioides ssp. artemisioides
Stipa nitida

19 Gardner's Scrub

Mapsheet Kainton (764500, 6215500)
Hundred Tiparra
Section 406E

Plant List

Acacia ligulata
Amyema miquelii
Avena fatua
Bursaria spinosa
Chrysocephalum semipapposum
Clematis microphylla
Dianella revoluta
Dodonaea bursariifolia
Echium plantagineum
Enchylaena tomentosa
Eucalyptus porosa
Goodenia sp.
Helichrysum leucopsideum
Lepidosperma viscidum
Melaleuca lanceolata
Pittosporum phylliraeoides
Stipa nitida
Themeda triandra

20 Liebelt's Scrub

Mapsheet Curramulka (732000, 6169000)
Hundred Wauraltee
Sections 15 & 19W

Plant List

Acacia ligulata
Acacia paradoxa
Acrotriche patula
Allocasuarina verticillata
Alyxia buxifolia
Bursaria spinosa
Clematis microphylla
Dianella revoluta

Enchylaena tomentosa
Eucalyptus gracilis
Eucalyptus leptophylla
Eucalyptus oleosa
Eucalyptus porosa
Eucalyptus socialis
Exocarpos aphyllus
Gahnia lanigera
Geijera linearifolia
Goodenia affinis
Helichrysum leucopsideum
Lepidosperma congestum
Lepidosperma viscidum
Lomandra multiflora ssp. dura
Lomandra effusa
Lomandra glauca
Lysiana exocarpi
Melaleuca acuminata
Melaleuca lanceolata
Pimelea serpyllifolia
Pittosporum phylliraeoides
Senna artemisioides ssp. artemisioides
Stipa sp.
Westringia rigida
Zygophyllum billardierei

23 Tiddy Widdy Beach

Mapsheet Ardrossan (770800, 6189500)
Hundred Cunningham
Section 412

Plant List

Acacia ligulata
Acrotriche patula
Asphodelus fistulosus
Atriplex paludosa
Cakile maritima ssp. maritima
Carpobrotus rossii
Dianella revoluta
Enchylaena tomentosa
Isolepis nodosa
Lagurus ovatus
Lycium ferocissimum
Myrsiphyllum asparagoides
Nitraria billardierei
Olearia axillaris
Rhagodia crassifolia
Stipa sp.
Tetragonia implexicoma

25 Cape Elizabeth Dunes

Mapsheet Moonta
Hundred Tiparra
Section D

Plant List

* *Acacia cyclops*
Acacia ligulata
Allocasuarina verticillata
Alyxia buxifolia
Atriplex cinerea
Atriplex paludosa ssp. cordata
Cakile maritima ssp. maritima
Leucophyta brownii
Carpobrotus rossii
Cassytha peninsularis
Clematis microphylla
Comesperma volubile
Dianella revoluta
Enchylaena tomentosa var. tomentosa
Euphorbia paralias
Euphorbia terracina
Exocarpos syrticola
Frankenia foliosa
* *Gahnia ancistrophylla*
Halosarcia sp.
Helichrysum leucopsideum
Isolepis nodosa
Lagurus ovatus
Lasiopetalum discolor
Lepidosperma concavum
Lepidosperma gladiatum
Leucopogon parviflorus
Lomandra effusa
Lotus australis
Lycium australe
Lycium ferocissimum

Maireana erioclada
Muehlenbeckia adpressa
Myoporum insulare
Nitraria billardierei
Olearia axillaris
Pimelea serpyllifolia
Pittosporum phylliraeoides
Poa sp.
Rhagodia candolleana
Santalum acuminatum
Senecio lautus
Spinifex sericeus
Stipa flavescens
Tetragonia implexicoma
Threlkeldia diffusa
Zygophyllum ammophilum

26 Balgowan - The Gap Coastal Strip

Mapsheet Maitland (730300, 6206600)
Hundred Kilkerran
Section AN

Plant List

Acacia ligulata
Atriplex paludosa
Beyeria lechenaultii
Brassica tournefortii
Carpobrotus rossii
Dianella revoluta
Enchylaena tomentosa
Eucalyptus 'anceps'
Exocarpos syrticola
Kunzea pomifera
Lagurus ovatus
Lycium ferocissimum
Melaleuca lanceolata
Muehlenbeckia gunnii
Myoporum platycarpum
Myrsiphyllum asparagoides
Olearia axillaris
Salsola kali
Tetragonia implexicoma

27 Balgowan - Chinaman Wells

Mapsheet Wardang (729200, 6198100)
Hundred Kilkerran
Section 263

Plant List

Acacia ligulata
Asphodelus fistulosus
Avena barbata
Carpobrotus rossii
Clematis microphylla
Danthonia caespitosa
Dianella revoluta
Enchylaena tomentosa
Euphorbia paralias
Lagurus ovatus
Lepidosperma sp.
Lotus australis
Olearia axillaris
Pimelea serpyllifolia
Rhagodia candolleana
Senecio lautus
Stipa acrociliata
Stipa sp.
Vittadinia sp.
Westringia rigida

28 Chinaman Wells to Port Victoria

Mapsheet Wardang (727200, 6190700)
Hundred Kilkerran
Section 294

Plant List

Acacia ligulata
Asphodelus fistulosus
Atriplex cinerea
Avena barbata

Cakile maritima ssp. maritima
Carpobrotus rossii
Euphorbia paralias
Exocarpos syrticola
Frankenia serpyllifolia
Isolepis nodosa
Leucophyta brownii
Lycium ferocissimum
Maireana oppositifolia
Olearia axillaris
Reichardia tingitana
Rhagodia candolleana

29 Coast South of Pt Victoria

Mapsheet Curramulka (730200, 6166700)
Hundred Wauraltee
Section 242

Plant List

Acacia ligulata
Acrotriche patula
Atriplex cinerea
Bromus rubens
Cakile maritima ssp. maritima
Carpobrotus rossii
Dianella revoluta
Exocarpos syrticola
Frankenia serpyllifolia
Isolepis nodosa
Lagurus ovatus
Lepidosperma gladiatum
Limonium companyonis
Lycium ferocissimum
Olearia axillaris
Pimelea serpyllifolia
Poa poiformis
Reichardia tingitana
Rhagodia candolleana
Senecio lautus
Tetragonia implexicoma
Threlkeldia diffusa

30 Maitland - Ardrossan Roadside

Mapsheet Ardrossan
Hundred Maitland
Section adjacent 284

Plant List

Alyxia buxifolia
Cassytha glabella
Cassytha pubescens
Dianella revoluta
Enchylaena tomentosa
Eucalyptus leptophylla
Eucalyptus oleosa
Eucalyptus socialis
Eucalyptus yalatensis
Exocarpos syrticola
Melaleuca acuminata
Melaleuca lanceolata
Rhagodia candolleana
Rhagodia crassifolia
Rhagodia parabolica
Lycium ferocissimum
Melaleuca uncinata
Myrsiphyllum asparagoides
Pittosporum phylliraeoides
Stipa elegantissima
Stipa sp.
Threlkeldia diffusa

2 THE HERITAGE AGREEMENT SCHEME

This information is reprinted with the authors' permission from Barratt et al. (1991) *How to Manage Native Vegetation in th Murray Mallee - A Conservation Handbook.*

Prior to the introduction of clearance controls in 1983, concern had been expressed over the level of vegetation clearance in South Australia's agricultural districts. This concern, together with a growing community awareness of the importance of conserving our wildlife heritage, saw the then Department of Environment and Planning establish the Heritage Agreement Scheme in 1980.

Heritage Agreements

A Heritage Agreement is a contract pertaining to areas of native vegetation, between the Minister of Environment and Natural Resources and the owner(s) of the subject land. It signifies agreement between the parties that the principal land use for these areas will be wildlife conservation. Although clauses vary between individual Agreements, all state that vegetation clearance is prohibited. Most areas are fenced to exclude domestic stock grazing. Written consent is required from the Minister before any clearance (including clearance by fire) takes place.

Heritage Agreements are contracts in perpetuity and can only be rescinded by mutual agreement of both parties. The Heritage Agreement is registered on the title of the subject land and the Agreement transfers to the new owners if the property changes hands.

The Development of the Scheme

The Heritage Agreement Scheme has undergone several changes since its establishment and such changes have often accompanied new State Government legislation or regulations dealing with native vegetation.

In the early days of the Scheme, agreements were instigated by landholders who recognised the importance of retaining areas of native vegetation on their properties. Agreements signed before 1983 are today known as Voluntary Heritage Agreements. Landowners who chose to place Agreements over areas of their properties did so at their own cost - that is they received no financial compensation for any drop in land value of the property resulting from the creation of the Agreement. Most Agreement areas were fenced at Government cost and landowners received relief from Council rates covering fenced Heritage Agreements on their properties.

In 1983 the State Government introduced Regulations under the Planning Act to control native vegetation clearance. Under the Regulations, the clearance of native vegetation was defined as a "development" and landholders had to gain consent from the State Planning Commission prior to clearing vegetation on their property.

The Native Vegetation Management Act was passed in 1985. Under this Act, the Native Vegetation Authority was established and became the decision making body for applications to clear native vegetation. The Act also provided for compensation to be paid to landholders who were refused clearance

consent and who agreed to enter a Heritage Agreement over the subject area. The amount of compensation, known as 'Financial Assistance' in the Act, is equivalent to the drop in property value resulting from the refusal of consent to clear. The Act also provides for discretionary payments to be made to landholders to compensate for capital improvements such as fences and bores that are made redundant when an Agreement is placed over an area.

The introduction of Financial Assistance payments and the high rate of refusal for clearance applications, (over 95% of areas are refused consent for broad acre clearance by the N.V.A.), has seen a steady increase in the number of Heritage Agreement areas. As of March 1990, over 400 Heritage Agreements have been created covering almost 200,000 hectares of native vegetation.

The Role Of Heritage Agreements

Heritage Agreement areas fill a variety of roles from being important areas for wildlife conservation to just a great place to get away from the pressures of the farm. They will mean different things to different people. Some of their roles are outlined below.

Species Conservation

Many Heritage Agreement areas contain populations of rare plant and animal species or rare plant associations. Often these are inadequately protected within the National Parks System and on-farm conservation plays a vital role in their continuing survival.

Cleared land acts as a barrier to the movement of many species of wildlife. Heritage Agreement areas may act as wildlife corridors which link areas of native vegetation together and allow for wildlife movement.

An example of the importance of off-park conservation was seen after a fire burnt more than 80% of Billiat Conservation Park in 1987. The fire burnt out almost all areas of the porcupine (Triodia irritans) hummock grassland that is the habitat of the Mallee Emu-wren, a vulnerable bird species. Small areas of this habitat which retain populations of emu-wrens are found in adjacent farming properties that escaped the fire. It is anticipated that birds from these areas will recolonize the Park when the vegetation regrows.

Maintenance of Genetic Diversity

Many species of plants and animals display variation in their morphology (life form) from district to district. These differences result from many factors including soil type, climatic conditions and competition that occur in any given district. By conserving local populations of species Heritage Agreement areas protect the genetic diversity or 'gene pool' of wildlife that is characteristic of the district. It is important to maintain genetic diversity for many reasons. For instance, when considering revegetating an area or even ornamental planting, local seed stock should be sought from within the district. This is because the local plants are adapted to the local conditions and are thus more likely to establish successfully.

It is important that a high genetic diversity is maintained over the entire range of a species when the ecosystems in which they live are subjected to changes in external influences. Such changes are forecast in the 'Greenhouse Effect' scenario. Communities of species with high genetic variability will be better

able to adapt to the predicted climatic changes than those with a small gene pool.

Benefits And Costs Of Heritage Agreement Areas

Management implications of entering into a Heritage Agreement are that because the area is to be protected for wildlife and soil conservation purposes, any activities which degrade the conservation value of the area are not allowed. Because the land is still owned by the landholder, management responsibilities remain with the landholder. Obligations under the Animal and Plant Control Act, National Parks and Wildlife Act and the Country Fires Act remain the same as non-Heritage land. This also affects such things as:

- fuel reduction / habitat improvement burning
- fire-breaks and access tracks
- brush cutting
- fence-post and firewood collection
- seed collection
- building
- bee-keeping

Advice should be sought from the Native Vegetation Management Branch of DENR for clarification about any of these issues.

Cultural and Environmental Heritage

Areas of native vegetation are truly 'heritage' areas because they give us an insight into the environment that the early European settlers encountered a little over a century ago. Areas of remnant vegetation often contain artifacts and other evidence of aboriginal and early European culture. Aboriginal cultural remnants include camp sites, rock holes and 'workshop' areas where stone implements were fashioned. Woodcutters camps, shepherd's huts, and old wells are among the cultural heritage items of the early white settlers found in Heritage Agreements.

Land Management Benefits and Costs

Heritage Agreement areas usually do not contribute directly to the productivity of the farm enterprise as they are ungrazed. There are, however, many indirect benefits to be derived from retaining large areas of native vegetation and these include:

- Windbreaks - Wide strips of vegetation maximise the wind reduction effect in adjacent cleared land. This leads to increased crop and pasture yields in these areas and reduces erosion hazards.
- Buffer Zones (Barriers) - Areas of native vegetation, particularly those in good condition, are effective barriers to vermin such as foxes and rabbits. They also allow for the separation of stock which can be important for disease control and animal husbandry such as breeding programs, weaning and flock/herd segregation.

- Salinity Mitigation - On a broader front, native vegetation uses far more water from rainfall than most crops or pastures; and, therefore, allows less 'recharge' of salt-laden water to enter the water table. Areas where the water table is close to the soil surface are at risk of land salinization. The presence of native vegetation assists in keeping the water table levels down.

Aesthetic and Landscape Values

Native vegetation areas have aesthetic appeal to most people and Heritage Agreement areas are ideal spots for the family and friends of landholders to get away from the rigours of farming life on picnics or camping breaks.

Fencing

Grazing is in conflict with the preservation of all native vegetation because it keeps many species of trees, shrubs, grasses and ground covers from regenerating, disturbs the soil and creates weed problems. Grazing of domestic stock is not permitted in Heritage Agreement ageas because they have been set aside to conserve native plants and animals. The erecting and maintenance of stockproof fencing around Heritage Agreement areas and other areas of native vegetation that we wish to conserve is, therefore, an important management consideration.

Whose responsibility is it to keep stock from grazing Heritage Agreement areas?

- Heritage Agreements are a legal recognition between the Minister for Environment and Natural Resources and the landowner that an area will be used for conservation. This agreement requires the landowner to keep stock out of the Heritage Agreement area. The minister is not legally bound to provide fencing for Heritage Agreement areas but it is the policy of the Department of Environment and Natural Resources to provide funding for fencing. The large number of Heritage Agreements and the high cost of fencing has placed a heavy demand on funds and this has resulted in a waiting list for fencing.

Who erects fences around Heritage Agreement areas?

- The initial arrangements to fence Heritage Agreement areas can be made by either the Native Vegetation Management Branch or the landowner. The project will proceed more quickly if the landowner makes the arrangements for the fences because resources to complete fencing projects are limited and the branch has a growing list of Heritage Agreement areas to fence. A landowner may choose to have a contractor build the fence or to build it personally. If a landowner wishes to do all or part of the fencing personally, he/she will b e reimbursed for the lab our at a standard contractor's rate.

How do you get financial assistance to fence Heritage Agreement areas?

- Generally, Heritage Agreement areas with a high conservation value or with special farm management requirements will be given priority for fencing. There is a large demand for fencing assistance, so landowners will benefit if they carefully consider the design of

their fence, since the most cost-effective fences are given priority. Requests for non-standard fences can lead to delays in the arrangement of financial assistance.

- An application for assistance should include as much detail as possible. If the landowner chooses to do the work personally or if a contractor wishes to have the materials supplied, the landowner should provide the branch with at least two quotes for the materials needed. If the landowner wants a contractor to do the job, he/she should provide the branch with the lowest quote he/she obtains from contractors for the work.

How much will the department pay for an Heritage Agreement area to be fenced?

- The availability of funds to fence Heritage Agreement areas changes each year. This means that the amount that landowners can be given for fences also changes each year. Currently, the branch uses the following guidelines to decide how much to spend on a fence.
- Road and railway reserves that border an Heritage Agreement area are not fenced unless it is necessary to keep stock, off-road vehicles or other intrusions from the Heritage Agreement area. If a neighbour benefits from a fence along a reserve, they are responsible for half the cost of the fence.
- When a fence is located along the property boundary, the neighbour is responsible for half the cost of the fence as under the Fences Act (1975). The branch may sometimes represent the Heritage Agreement landowner to negotiate a fencing agreement between neighbours. There are two ways that the branch can settle payment of common boundary fences:
  1. the branch can pay half the cost of the fence, including the preparation of the fence line
  2. the branch can pay the full cost of the materials for the fence and half the cost of preparing the fence line if the neighbour erects the fence and pays to clear the rest of the fence line.
- When an Heritage Agreement area adjoins another Heritage Agreement area or a National Park, the boundary is not fenced.
- The branch will pay the full cost to prepare the fence line and erect all internal boundary fences that have been approved.

How is payment made?

- A Land Management Grant is paid to the landowner on the basis of the fence design and location, which must be agreed to by the branch. The amount of the grant is based on the lowest of the quotes for erection and materials and is usually paid in three parts. Payment for the quoted cost of materials is made before the program begins, then a payment is made to prepare the fence line. The final payment is made on the outstanding costs of the program. This is paid when the branch receives a letter from the landowner that indicates that the fence has been completed as stated in the agreement.

What type of fences should be built around Heritage Agreement areas?

- The type of fence that is chosen for an Heritage Agreement area should be determined primarily by the type of livestock that graze on the property because the purpose of fencing is to keep stock and other disturbances off the Heritage Agreement area.
- The second important consideration is the movement of native fauna from one scrub block to another. In most circumstances, an Heritage Agreement fence should allow native animals to move in and out of scrub blocks with minimal damage to the fence. Fences that restrict the movement of ground-dwelling animals, such as echidnas, reptiles and small marsupials, are at odds with the aim of conserving the plants and animals that live in Heritage Agreement areas. Some of these small animals need to move from one area of native vegetation to another in order to breed. Restriction of their movements may compromise the survival of some animals in small scrub blocks. For this reason, netting fences are not recommended in most cases for Heritage Agreement areas.
- The third consideration in choice of a fence design is maintenance. Fences should be designed to need little regular maintenance. The branch expects a new fence to last at least 25 years. This requirement makes netting and prefabricated fences undesirable.
- In the Murray Mallee where sheep and cattle are the main livestock, plain and barbed wire fencing best meet all of these requirements. The location of the fence should minimise corners and therefore the number of strainers required.
- If a landowner has a special case for a non-standard type of fence, the branch will consider the argument. If a landowner would like a more expensive fence than is normally erected in a district, the branch may agree to contribute the cost of a standard fence and the landowner must pay the difference.

Where should Heritage Agreement fences be located?

- The location of the fence is decided by the landowner and the branch. Fences usually follow Heritage Agreement area boundaries but this is not always practical. For instance, where the boundary is adjacent to a cleared sand-dune, soil drift can provent the erection of a fence along the edge of the scrub. In these situations, the fence may be placed inside the scrub. Native vegetation should be cleared only where it is necessary to construct the fence or to help with access for maintenance.

How should fence lines be prepared?

- In most cases, fences surrounding Heritiage Agreement areas will be located in cleared land. The fence line should be at least four metres from the edge of the vegetation. This will minimise fence maintenance problems such as branches falling on the fence or vegetation growing on the fence line. If the fence is to be located in scrub, four metres on each side of the fence should be cleared to allow vehicle access in order that the fence be maintained and to help with farm management. Vegetation can be removed by

bulldozing, grading or poisoning. The vegetation that is removed should be disposed of in heaps and later burnt. Blade ploughing and deep ripping of the fence line are encouraged to help remove stumps and reduce regrowth. It may also be necessary to grade or roll the fence line to allow reasonable vehicle access along the new fence.

Who is responsible for maintaining an Heritage Agreement fence?

- Once a new fence is erected, the landowner is responsible for maintaining it and keeping it stockproof.

Can damage to fences by kangaroos and wombats be reduced?

- Fences can be designed to minimise damage from wildlife moving between scrub blocks. A well-built fence can usually withstand kangaroo and wombat novements but keep in stock. High-tensile plain wire fences are the best design in the Murray Malle where kangaroos and wombats are likely to damage fences. It is often suggested that ringlock or hinge-joint fences can solve problems where high numbers of kangaroos live in scrub blocks. But these fences deteriorate rapidly from kangaroos moving thrugh them or burrowing underneath, and they become difficult to maintain. Kangaroo and wombat gates can reduce maintenance problems where fence damage continues to be a problem.

What are kangaroo and wombat gates?

- The erection of a gate for kangaroos and wombats avoids damage to fences and provents sheep getting into scrub blocks and crops. These gates are small structural openings that are placed in the fence where kangaroos and wombats habitually push through. There are many ways of building a kangaroo gate. The basic design is to remove the middle section of the fence and construct an opening that is wide enough for kangaroos to pass through but narrow enough to discourage sneet. Openings of 30 to 50 centimetres are large enough. Strainer posts can be placed on either side of the opening but a simpler solution is to build a frame that will fit in the hole. Old pipe is a standard material for a frame but large car or truck tyres have also proven effective frames. The fence is secured to the frame and is restrained. The frame design works especially well with cyclone fences.
- Wombat gates should be narrower than kangaroo gates and should be placed in the bottom part of the fence. A gap of 30 square centimetres is large enough for a wombat to get through. A piece of metal is then secured to the top of the opening so that it can swing in both directions in the hole to keep other small animals from getting through the gate. Heavy weights attached to the gate will permit only wombats to pass through.
- The cost of these gates is minimal. The savings to fence maintenance and in time spent mustering sheep from scrub paddocks make the investment in kangaroo and wombat fences very economical. Financial assistance for erecting these gates in Heritage Agreement fences is available through the Native Vegetation Management Branch.

3 LAND MANAGEMENT AGREEMENTS

Land Management Agreements (LMAs) are entered into under Section 57 of the Development Act 1993, and are agreements between the relevant Council or the Minister, and the landowner. They relate to the management, preservation or conservation of land. A LMA is particularly relevant to the preservation or conservation of indigenous vegetation cover which may be of scientific or historical significance, or for walking trails or other public interest issues applying to the management of private land.

A LMA is not related to the regulation of development, such as the division of land or the construction of buildings. Development control is able to be addressed through the assessment of individual development proposals, as well as by amendments to the relevant Development Plan.

LMAs are legally binding once they have been noted on the certificate of title, and these encumrances are passed on to all subsequent owners of the land under that title.

Currently (March 1994) Land Management Agreements exist over the following areas in the Central Yorke Peninsula District Council Area:

Hundred of Kilkerran

Lot 15	Deposit Plan 31718
Lot 2	File Plan 634
Lot 13	Deposit Plan 31876
Portion B	Section 558 Crown Lease 565/124
Piece 8	Deposit Plan 31831
Piece 10	Deposit Plan 31831
Portion A	Section 599 Crown Lease 565/125 (pending)
Lot 5	File Plan 31653
Lot 6	File Plan 31653

Hundred of Wauraltee

Section 241
Section 242

Lot 1	Deposit Plan 31664
Lot 2	Deposit Plan 31664
Lot 3	Deposit Plan 31664
Lot 4	Deposit Plan 31665
Lot 5	Deposit Plan 31665
Lot 6	Deposit Plan 31836

4 THREATENED PLANT SPECIES ON YORKE PENINSULA

The following list was produced by the Native Vegetation Management Branch of the Department of Environment and Natural Resources on 25 August 1993, and is only valid for a very short time. Botanists, some of whom are specifically searching for occurrences of threatened plants are adding to collections all the time, and as more information comes to hand, ratings can alter. Some plants are listed as being regionallly rare for example, because there have been very few collections in an area, however when more effort is put into looking for them, they can actually be found to be quite common. The converse is also true, particularly in view of the rate at which European settlemenmt altered the natural landscape. Historical collections of some species may indicate that they are regionally abundant, however more information, when it becomes available through recent botanical collections may indicate that land management practices and development have made some species much less common.

Published in 1993, "Threatened Plants of Yorke Peninsula" by P. S. Green focussed on seven species, one of which, *Acacia rhetinocarpa* was found in the Central Yorke Peninsula District Council area. It contains precise locations and detailed management recommendations.

UPDATE: 25/08/93 REGIONAL STATUS (PROVISIONAL LIST: NOT TO BE USED AFTER SEPTEMBER 1993)

TAXON	AREA	STAT	DISTRIBUTION/RESERVES
Acacia argyrophylla	YP	R	NP4
Acacia dodonaeifolia	YP	K	CP38
Acacia enterocarpa	YP	E	n
Acacia lineata	YP	V	n
Acacia merrallii	YP	V	n
Acacia myrtifolia var. myrtifolia	YP	V	n
Acacia notabilis	YP	V	n
Acacia rhetinocarpa	YP	E	n
Acacia salicina	YP	K	n
Acaena novae-zelandiae	YP	K	n
Acrotriche affinis	YP	R	CP38
Adiantum capillus-veneris	YP	E	
Ajuga australis form A	YP	X	n
Alectryon oleifolius var. canescens	YP	E	n
Allocasuarina pusilla	YP	R	NP4
Alyogyne huegelii	YP	X	n
Amphipogon caricinus	YP	X	n
Aotus subspinescens	YP	R	n
Aristida behriana	YP	R	n
Aristida holathera var. holathera	YP	V	n
Arthropodium fimbriatum	YP	T	n
Arthropodium minus	YP	R	CP38
Arthropodium strictum	YP	T	n
Astroloma conostephioides	YP	E	n
Astroloma humifusum	YP	R	HA502
Atriplex australasica	YP	E	n
Atriplex eardleyae	YP	K	n
Atriplex lindleyi ssp. inflata	YP	K	n
Atriplex lindleyi ssp. lindleyi	YP	K	n
Baeckea ericaea	YP	E	n
Baumea juncea	YP	V	n
Bertya mitchellii	YP	K	n
Beyeria opaca	YP	E	n
Billardiera lehmanniana	YP	E	n
Billardiera versicolor	YP	E	n
Boronia coerulescens	YP	V	n
Boronia inornata ssp. leptophylla	YP	R	CP38
Brachycome ciliaris var. lanuginosa	YP	K	n
Brachycome goniocarpa	YP	R	NP4
Brachycome leptocarpa	YP	R	n
Burchardia umbellata	YP	X	n
Caesia calliantha	YP	E	n
Caladenia aff. filamentosa	YP	K	n
Caladenia bicalliata	YP	R	CP38 CP193 NP4
Caladenia brumalis	YP	E	n
Caladenia conferta	YP	V	n
Caladenia fragrantissima ssp. fragrantissima	YP	R	NP4
Caladenia macroclavia	YP	E	n

UPDATE: 15/08/93 REGIONAL STATUS (PROVISIONAL LIST: NOT TO BE USED AFTER SEPTEMBER 1993)

TAXON	AREA	STAT	DISTRIBUTION/RESERVES
Caladenia stricta	YP		
Calandrinia calyptrata	YP	K	CP187
Calandrinia corrigioloides	YP	X	n
Callistemon rugulosus var. rugulosus	YP	R	n
Callitris verrucosa	YP	K	n
Calocephalus citreus	YP	K	HA028i
Calostemma purpureum	YP	V	n
Calytrix involucrata	YP	V	n
Centrolepis aristata	YP	E	n
Centrolepis cephaloformis ssp. cephaloformis	YP	E	n
Chamaescilla corymbosa var. corymbosa	YP	V	n
Cheilanthes sieberi	YP	K	n
Cheiranthera alternifolia	YP	K	n
Chenopodium erosum	YP	K	n
Choretrum chrysanthum	YP	E	n
Chorizandra enodis	YP	E	n
Comesperma scoparium	YP	T	n
Convolvulus eyreanus	YP	K	n
Cratystylis conocephala	YP	E	n
Cressa cretica	YP	E	n
Cymbonotus preissianus	YP	K	n
Cynoglossum australe	YP	K	n
Cynoglossum suaveolens	YP	K	n
Cyperus gymnocaulos	YP	K	n
Danthonia geniculata	YP	K	n
Danthonia semiannularis	YP	R	CP187
Daviesia benthamii ssp. humilis	YP	K	NP4
Dichelachne longiseta	YP	E	n
Dillwynia sericea	YP	E	n
Diplachne fusca	YP	E	n
Dissocarpus biflorus var. biflorus	YP	K	n
Distichlis distichophylla	YP	K	n
Diuris behrii	YP	X	n
Diuris corymbosa	YP	R	CP38
Dodonaea lobulata	YP	X	n
Dodonaea stenozyga	YP	K	n
Dodonaea subglandulifera	YP	E	n
Dodonaea tepperi	YP	X	n
Drosera auriculata	YP	K	n
Drosera glanduligera	YP	K	n
Drosera peltata	YP	R	n
Elachanthus pusillus	YP	E	n
Eleocharis acuta	YP	T	n
Elymus scabrus	YP	E	n
Enneapogon nigricans	YP	R	n
Epilobium billardierianum ssp. x intermedium	YP	V	NP4
Eragrostis dielsii	YP	E	n
Eremophila behriana	YP	E	n
Eremophila crassifolia	YP	V	n

UPDATE: 25/08/93 REGIONAL STATUS (PROVISIONAL LIST: NOT TO BE USED AFTER SEPTEMBER 1993)

TAXON	AREA	STAT	DISTRIBUTION/RESERVES
Eremophila longifolia	YP	K	n
Eremophila subfloccosa ssp. 'glandulosa'	YP	V	n
Eremophila subfloccosa ssp. 'imbricata'	YP	E	n
Eremophila weldii	YP	X	n
Eriochiton sclerolaenoides	YP	K	n
Eriochlamys behrii	YP	R	CP187 NP4
Eriostemon angustifolius ssp. angustifolius	YP	K	n
Eucalyptus calycogona	YP	V	n
Eucalyptus camaldulensis var. camaldulensis	YP	V	n
Eucalyptus dumosa	YP	V	n
Eucalyptus odorata	YP	E	n
Eucalyptus yalatensis	YP	V	n
Euphorbia tannensis ssp. eremophila	YP	K	n
Euphrasia collina ssp. osbornii	YP	E	n
Eutaxia microphylla var. diffusa	YP	R	HA028
Festuca littoralis	YP	K	n
Goodenia albiflora	YP	E	
Goodenia pusilliflora	YP		
Goodia lotifolia var. lotifolia	YP		
Grammosolen dixonii	YP	R	n
Grevillea huegelii	YP		
Grevillea pauciflora	YP	V	n
Gypsophila australis	YP	X	
Gyrostemon thesioides	YP	R	CP38 NP4
Haegiela tatei	YP	R	NP4a
Hakea leucoptera	YP		
Hakea muelleriana	YP	V	n
Halgania andromedifolia	YP	E	
Halosarcia lepidosperma	YP		
Halosarcia syncarpa	YP		
Harmsiodoxa brevipes var. brevipes	YP	E	
Helichrysum baxteri	YP	E	HA499
Helichrysum bilobum ssp. bilobum	YP	K	n
Helichrysum bracteatum	YP	R	
Helipterum corymbiflorum	YP	K	n
Hemichroa diandra	YP	R	
Hemichroa pentandra	YP	V	n
Hibbertia empetrifolia	YP	K	n
Hydrocotyle medicaginoides	YP	V	
Hydrocotyle pilifera var. glabrata	YP	R	HA499
Indigofera australis	YP	X	n
Isolepis australiensis	YP	K	n
Isolepis cernua	YP	K	NP4
Isolepis platycarpa	YP	R	CP38 NP4

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TAXON	AREA	STAT	DISTRIBUTION/RESERVES
Isotoma scapigera	YP	R	NP4a
Juncus flavidus	YP	X	n
Kippistia suaedifolia	YP	X	n
Lagenifera huegelii	YP	E	n
Lasiopetalum schulzenii	YP		CP38
Lavatera plebeia	YP		
Lawrencia berthae	YP	X	n
Lawrencia spicata	YP	R	NP4-
Laxmannia orientalis	YP	E	n
Lepidium fasciculatum	YP		
Lepidium foliosum	YP	K	CP124
Lepidium papillosum	YP		
Lepidium rotundum	YP	X	n
Lepidobolus drapetocoleus	YP		
Leptoceras menziesii	YP	E	n
Leptorhynchos elongatus	YP	E	n
Leptorhynchos scabrus	YP	R	NP4
Leptorhynchos tetrachaetus	YP	T	HA499
Leucopogon clelandii	YP	K	CP38
Leucopogon cordifolius	YP	K	HA502
Leucopogon virgatus	YP	E	n
Leucopogon woodsii	YP	X	n
Levenhookia dubia	YP	V	n
Limosella australis	YP	R	CP38
Lobelia alata	YP	K	n
Lobelia rhombifolia	YP	K	n
Lomandra densiflora	YP	T	n
Lomandra leucocephala ssp. robusta	YP	T	n
Lycium australe	YP		
Maireana aphylla	YP	K	n
Maireana appressa	YP	X	
Maireana radiata	YP		
Maireana rohrlachii	YP	K	n
Maireana sedifolia	YP		
Maireana triptera	YP		
Marsilea drummondii	YP	E	n
Melaleuca pauperiflora	YP	V	n
Mentha satureioides	YP	E	n
Microlepidium pilosulum	YP		
Muehlenbeckia cunninghamii	YP	K	n
Myoporum acuminatum	YP		
Myoporum parvifolium	YP	R	CP187 NP4
Olearia lanuginosa	YP	V	
Olearia magniflora	YP		
Olearia pannosa ssp. pannosa	YP	V	HA028i
Olearia passerinoides ssp. glutescens	YP	R	CP193
Olearia picridifolia	YP	V	
Ophioglossum lusitanicum	YP	K	n
Orobanche cernua var. australiana	YP	R	NP4
Orthoceras strictum	YP	E	
Pachymitus cardaminoides	YP	X	
Persicaria decipiens	YP	T	n

UPDATE: 25/08/93 REGIONAL STATUS (PROVISIONAL LIST: NOT TO BE USED AFTER SEPTEMBER 1993)

TAXON	AREA	STAT	DISTRIBUTION/RESERVES
Phebalium brachyphyllum	YP	V	CP38
Phebalium glandulosum	YP	E	
Phlegmatospermum eremaeum	YP	X	
Phyllanthus australis	YP	V	HA499
Phyllanthus calycinus	YP	R	CP38
Pimelea curviflora var. gracilis	YP		
Pimelea curviflora var. sericea	YP		
Plantago gaudichaudii	YP	K	NP4
Pleuropappus phyllocalymmeus	YP	V	n
Poa crassicaudex	YP	T	n
Poa drummondiana	YP	K	NP4
Poa fax	YP	R	CP187 NP4
Pogonolepis muelleriana	YP	R	
Poranthera triandra	YP	R	
Prasophyllum elatum	YP	E	
Prasophyllum fitzgeraldii	YP		
Prasophyllum goldsackii	YP		CP38
Prasophyllum macrostachyum	YP	V	CP38
Prasophyllum truncatum	YP		NP4
Prostanthera aspalathoides	YP	E	n
Prostanthera serpyllifolia ssp. microphylla	YP	V	NP4
Prostanthera serpyllifolia ssp. serpyllifolia	YP	R	CP102- NP4a
Pteris tremula	YP	V	CP38
Pterostylis boormanii	YP	E	
Pterostylis cycnocephala	YP	E	
Pterostylis dolichochila	YP	R	
Ptilotus obovatus var. obovatus	YP		
Ptilotus polystachyus var. polystachyus	YP		
Ptilotus seminudus	YP	V	
Pultenaea densifolia	YP	R	n
Pultenaea vestita	YP	R	NP4
Radyera farragei	YP	E	n
Ranunculus pumilio var. pumilio	YP	R	NP4
Ranunculus sessiliflorus var. pilulifer	YP	K	NP4
Rumex brownii	YP	R	NP4
Santalum murrayanum	YP	T	n
Sarcostemma australe	YP		
Sarcozona bicarinata	YP		n
Scaevola angustata	YP	R	CP38 NP6?
Scaevola linearis var. confertifolia	YP	E	n
Scaevola linearis var. linearis	YP		
Schoenus apogon	YP	T	n
Schoenus nanus	YP		
Schoenus racemosus	YP	V	
Sclerolaena limbata	YP	X	

UPDATE: 25/08/93 REGIONAL STATUS (PROVISIONAL LIST: NOT TO BE USED AFTER SEPTEMBER 1993)

TAXON	AREA	STAT	DISTRIBUTION/RESERVES
Sebaea albidiflora	YP	X	
Senecio cunninghamii var. cunninghamii	YP	T	n
Senecio macrocarpus	YP	E	n
Senecio picridioides	YP	R	NP4
Senecio quadridentatus	YP	R	NP4
Sida petrophila	YP	T	n
Solanum capsiciforme	YP	R	
Solanum symonii	YP		
Spyridium leucopogon	YP	K	NP4
Stackhousia annua	YP	V	CP38a HA634a
Stackhousia aspericocca ssp. A	YP	X	n
Stackhousia spathulata	YP	K	n
Stellaria filiformis	YP		
Stenopetalum sphaerocarpum	YP		
Stipa curticoma	YP		
Stipa echinata	YP	R	NP4
Stipa exilis	YP	R	NP4
Stipa multispiculis	YP	R	NP4
Stipa mundula	YP		CP38
Stipa puberula	YP		
Stipa stipoides	YP	R	NP4
Stipa tenuifolia	YP		
Stylidium calcaratum	YP	R	NP4
Swainsona lessertiifolia	YP	X	
Swainsona pyrophila	YP	E	n
Templetonia sulcata	YP	V	n
Tetratheca pilosa ssp. pilosa	YP	E	
Thelymitra azurea	YP	E	
Thomasia petalocalyx	YP	K	n
Thryptomene micrantha	YP		
Thysanotus baueri	YP	K	n
Thysanotus tenellus	YP	X	n
Trachymene cyanopetala	YP	T	n
Tragus australianus	YP		
Triglochin striatum	YP	T	n
Triglochin trichophorum	YP		
Veronica plebeia	YP	K	
Verticordia wilhelmii	YP	R	n
Vittadinia australasica var. subglabra	YP		
Vittadinia blackii	YP		
Vittadinia condyloides	YP		
Westringia eremicola	YP	R	CP38 NP4
Wilsonia backhousei	YP	R	
Wilsonia rotundifolia	YP	E	
Xanthorrhoea semiplana ssp. semiplana	YP	E	
Xanthorrhoea semiplana ssp. tateana	YP	E	n

5 SAMPLE SITE DATA COLLECTION SHEETS

Plant Checklist

Section 70 Hd Warrenben

Inspections A: Peter Lang / Johan Reid 8/11/1984

B. Darrell Kraehenbuehl / Keith Bellchambers 19/7/1985

APOCYNACEAE
Alyxia buxifolia A

CASUARINACEAE
Allocasuarina fusilla A
Allocasuarina verticillata B

CHENOPODIACEAE
Rhagodia baccata B

COMPOSITAE
Craspedia uniflora A, B.
Helichrysum apiculatum B
Helichrysum leucopsidium B
Leptorrhynchas squamatus A, B
Vittadinia sp A, B.

CRASSULACEAE
Crassula sp B.

CYPERACEAE
Gahnia lanigera A, B.

DILLENIACEAE
Hibbertia aspera A, B.
Hibbertia riparia A, B.
Hibbertia virgata A, B.

EPACRIDACEAE
Acrotriche affinis A
Acrotriche cordata A, B.
Acrotriche patula B.
Leucopogon parviflorum A, B

EUPHORBIACEAE
Beyeria lechenaultii A, B

GERANIACEAE
Geranium potentilloides B
Pelargonium sp. B

GRAMINAE
Triodia irritans. A

LAURACEAE
Cassytha glabella A
Cassytha peninsularis var peninsularis

LEGUMINOSAE
Acacia brachybotrya B
Acacia calamifolia B
Acacia leiophylla A, B.
Acacia rupicola A, B.
Hardenbergia violacea A
Kennedia prostrata A
Pultenaea prostrata? A
Templetonia retusa B

LILIACEAE
Lomandra effusa A
Lomandra glauca A

LOGANIACEAE
Logania ovata A, B

MYRTACEAE
Eucalyptus diversifolia A, B
Eucalyptus oleosa A
Eucalyptus porosa A, B.
Melaleuca acuminata A, B
Melaleuca lanceolata A, B.

ORCHIDACEAE
Acianthus reniformis B
Corybas despectans B
Microtis unifolia A

RANUNCULACEAE
Clematis microphylla B.

RHAMNACEAE
Pomaderris paniculosa B.
Pomaderris obcordata A, B
Spyridium eriocephalum B.
Spyridium phylliocoides A.

ROSACEAE
Acaena sp. A, B.

RUBIACEAE
Opercularia varia A.

RUTACEAE
Correa pulchella A

SANTALACEAE A, B.
Choretrum glomeratum

SAPINDACEAE A, B.
Dodonaea humilis

STERCULIACEAE B.
Lasiopetalum schulzenii

THYMELAEACEAE
Pimelea flava ssp dichotoma A, B.
Pimelea glauca A.

UMBELLIFERAE
Hydrocotyle sp.

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Going to be put under Heritage

Section 284 Hd. Koolywurtie
profesed H.A. area Minlaton Coun

Acacia brachybotrya
Acacia ligulata
Acacia oswaldii
Acacia spinescens
Acrotriche affinis
Acrotriche patula
Allocasuarina verticillata
Alyxia buxifolia
Amphipogon
Astroloma humifusum
Arthropodium strictum

Bulbine bulbosa
Bursaria spinosa

Calostemma purpureum
Calytrix involucrata
Cassytha melantha
Carpobrotus rossii
Chamaescilla corymbosa
Clematis microphylla
Comesperma volubile
Cryptandra amara var. amara

Dampiera rosmarinifolia
Dianella revoluta var. revoluta
Dodonaea hexandra
Dodonaea viscosa ssp spatulata
Drosera glanduligera
Drosera macrantha ssp. planchonii

Enchylaena tomentosa
Eremophila deserti
Eucalyptus porosa

Gahnia lanigera
Geranium sp.
Geijera linearifolia
Gonocarpus mezianus
Goodenia willisiana

Halgania cyanea
Helichrysum semipapposum = (Chrysocephalum semipapposum)
Hypoxis glabella

Lasiopetalum baueri
Lefidosperma congestum
Lefidosperma viscidum
Lomandra densiflora
Lomandra effusa
Lomandra mierantha
Lomandra multiflora ssp. dura
Lysiana exocarpi ssp. exocarpi

Melaleuca lanceolata
Muehlenbeckia adpressa

Neurachne alopecuroidea

Olearia ramulosa
Ophioglossum polyphyllum
Oxalis perennans

Pimelea glauca
Pittosporum rhyllireoides var. microcarpa
Pomaderris paniculosa

Santalum accuminatum
Schoenus breviculmis
Stackhousia monogyna
Stipa elegantissima
Stipa sp. ①.
Stipa sp. ②.
↓
Tetragonia implexicoma
Themeda triandra

Vittadinia cervicularis.