

91/12

DEPARTMENT OF PLANNING & URBAN DEVELOPMENT
BUNBURY/WELLINGTON REGION

USHER-STRATHAM ENVIRONMENTAL STUDY

**Full document
available
on request**

ALAN TINGAY & ASSOCIATES

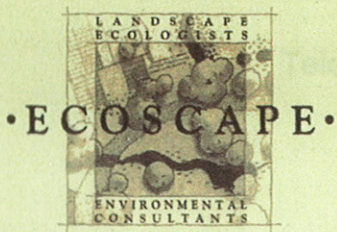
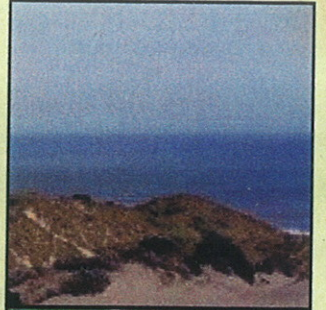
OCTOBER 1991

REPORT NO: 91/12

Usher Dalyellup Region Park
Management Plan
Department of Housing and Works

Usher Dalyellup Region Park Management Plan

**Full document
available
on request**





Usher Dalyellup Region Park consists of more than 400 hectares of land with important conservation, recreation, social, economic and tourism values. The area forms part of a larger Regional Open Space Network under the proposed Greater Bunbury Region Scheme. The park is bordered by the Indian Ocean, Bussell Highway, and the suburbs of Usher, Withers and Dalyellup.

Environmental consultants Ecoscape have prepared a draft Management Plan for the park. The aim of the management plan was to identify environmentally sustainable means to make the park accessible to the public, whilst enhancing the conservation values of the area. A Concept Plan was also prepared, showing a vision for management of the park.

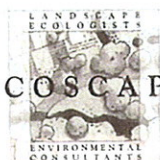


The draft Management Plan for Usher Dalyellup Region Park is available for viewing by the public as a separate document, and has been summarised in this leaflet. Comments from members of the public on the draft management plan are welcomed. Comments should be addressed to the contacts listed on the final page of this leaflet.

The proposed Vision Statement for Usher Dalyellup Region Park is:

"To develop a significant Regional Park in the Bunbury-Capel area for community enjoyment, which incorporates and protects the rich diversity of the natural environment and Aboriginal and European cultures."

• ECOSCAPE •



Natural Environment

Usher Dalyellup Region Park is an area of high regional conservation significance. The park forms a large area of remnant vegetation within the increasingly urbanised South Bunbury region. The park also forms part of a significant east-west "green corridor" from the coast to the Preston River, through Hay Park and Manea Park. The sequence of landforms and vegetation types represented along this green corridor are rarely found intact along the Swan Coastal Plain.

The park contains a diverse array of vegetation communities, including coastal dune heath in the west, interdunal woodland, Tuart forest, Banksia-Eucalypt woodland and paperbark woodland. Most of the vegetation within the park is in relatively good condition.



Usher Dalyellup Region Park Management Plan



Tuart woodlands in good condition are of significance due to their scarcity. Tuart woodland communities were once widespread along the coastal strip of the southern Swan Coastal Plain, but many of these communities have been destroyed or degraded by loss of the understorey, although the Tuart trees may remain. The Maidens area, in the northern section of the park, contains one of the last remnants of coastal Tuart woodland in good condition. Other common tree species within the park include Peppermint, Jarrah, Marri, Flooded Gum, Candle Banksia, Bull Banksia and Swamp Paperbark.

The park forms important habitat for an array of native vertebrate species, including some threatened marsupials such as the Quenda (or Southern Brown Bandicoot), Western Ringtail Possum and Brush-tailed Phascogale. A large number of bird species use the park for feeding, nesting and breeding. Threatened birds that could potentially visit the park include Short-billed and Long-billed Black Cockatoos, the Peregrine Falcon, the Masked Owl and the Square-tailed Kite.



The Maidens and the Sand Bowl are significant landforms within the park. The twin dune peaks of The Maidens are the highest dunes of their type in the region, and were once used as significant landmarks and navigation references by European explorers. The Sand Bowl is a dune blow out thought to have been created by natural processes, which is still moving inland.

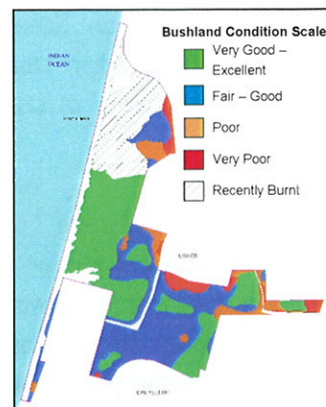
Environmental Management

Environmental degradation has occurred in some parts of Usher Dalyellup Region Park. The most important factors contributing to degradation are weed invasion, pests and diseases of the vegetation, illegal



access by people and vehicles, erosion and frequent fire. These issues must be addressed to ensure appropriate management of the park. Other management issues covered in the Management Plan include ecological restoration, feral animal control, recreation, education, interpretation and ecotourism.

Weed species are concentrated in degraded areas, but are also found in high numbers along the coastal dunes, and within some areas of the Tuart forest that have been disturbed. Over 20 of the weed species within the park are currently an



environmental problem, or have the potential to become a problem if they are not quickly controlled. A targeted weed control program, weed action plan and bushland restoration strategy

were developed to minimise the environmental impact of these weeds.

Pests and disease that could affect plants within the park include dieback, the fungus *Armillaria*, which could affect a wide range of species, and insect borers, which have been known to cause decline in Tuart trees elsewhere in the south-west. Under the management plan, surveys would be undertaken for all of these pests and diseases within the park, and strict hygiene measures implemented to avoid disease introductions.

Illegal and inappropriate human access is a major cause of degradation within the park. Although illegal except on the designated beach access track, trailbikes and four-wheel drives are able to

Invitation for Public Comment

gain access to some parts of the park, causing erosion of coastal dunes and tracks, spreading weeds and disturbing vegetation, fauna and local residents. Rubbish dumping and arson within bushland areas are associated with illegal vehicle access. To deter illegal vehicle access, secure perimeter fencing and prominent signage would be installed around the boundaries of the park, and tracks that are not required for pedestrian access would be blocked and rehabilitated.



Frequent fire within the park has led to vegetation damage, erosion and weed invasion, particularly in coastal heathland areas. Management strategies to reduce the frequency of bushfire ignition and minimise damage from bushfires include secure fencing to deter arsonists, weed control, fuel reduction, public education and rehabilitation following fire. Park managers will work closely with CALM to determine whether strictly controlled burns should be used in selected areas for Tuart regeneration and fuel reduction.

Some recreational pursuits that currently occur within the park are causing or have the potential to cause serious environmental harm. Sand boarding causes dune erosion and damage to vegetation, and will no longer be permitted within the park. Four-wheel driving will be banned on the beach and the existing beach access track will be sealed to prevent further erosion and vegetation damage. Horses will be excluded from the park, due to the potential to spread weeds, pests and diseases throughout the park along trails used for horse riding. Erosion control works, dune restoration and revegetation will occur in degraded areas.



The Concept Plan

A draft Concept Plan for the park has been developed, which provides a basis for the future development of the park. The plan incorporates four management zones for conservation, coastal areas, passive recreation and ecotourism. The use of management zones recognises that different areas of the park have different management priorities and requirements. Acceptable uses and developments were defined for each zone.

The theme for Usher Dalyellup Region Park's Concept Plan reflects the intent of the vision statement by conserving the environmental and landscape attributes of the park, providing for public enjoyment, and developing a framework that will assist in the management of these attributes. Activities planned for the park have an emphasis on passive recreation and appreciation of the natural and cultural attributes of the park through ecotourism, education and research.



One of the most important aspects of the Concept Plan is access, for both management and recreation. The plan incorporates existing infrastructure such as roads, tracks, firebreaks and car parks. The park will have a co-ordinated network of formal walking and cycle tracks suitable for all fitness and mobility levels. This network is based largely on existing tracks, with surplus existing tracks to be closed and rehabilitated. Management access tracks were also included. Links through the park between existing and future planned subdivisions adjacent to the park were incorporated, which will enable greater access by pedestrians and cyclists between residential areas, schools and commercial centres.

As part of the proposed structure plan for the Dalyellup residential subdivision to the south of the park, an area was set aside on the north-western corner of the subdivision as a potential site for





to establish an ecotourism centre within the park, providing people with the opportunity to experience and learn about the natural features of the area. This facility would be purpose designed using non-toxic material and sustainable technology. School groups and tour operators would be able to access the centre.

Implementation of the Management Plan

An important issue relating to implementation of the plan is the responsibility for management of the park, as there is currently no designated manager for the entire park. The proposed strategy is for the City of Bunbury to chair and facilitate the formation of the Usher Dalyellup Interim Management Committee.

In the long term, Usher Dalyellup Region Park may be included as part of a

short-stay chalet-style accommodation. This area is situated near the Tuart forest and the beach. This site presents the best opportunity

proposed Regional Park for the South Bunbury area that stretches on an east-west transect from the Indian Ocean to the Preston River.

We welcome your comments

You are invited to forward any suggestions or comments you have on the Draft Management Plan and Concept Plan for Usher Dalyellup Region Park to either of the contact points listed at the bottom of the page. The closing date for public comments is **Monday, April 22nd, 2002**. The complete Management Plan and Concept Plan is available for viewing at the City of Bunbury Library on Parkfield Street, Bunbury, and at the Shire of Capel Library in Forrest Road, Capel.

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Notes on the Vegetation of the South Bunbury Corridor – Coast to Bussell Highway

(BJ Keighery after 1997 and 1999 unpublished reports for the Department of Environmental Protection)

The following descriptions describe a transect through areas of vegetation in the Bunbury area from the coast to the Bussell Highway. This transect incorporates the following bushland areas: Maidens and adjacent bushland and the Hay Park Bushland. The information for these descriptions has come from Department of Environmental Protection (1996). Floristic community types¹ identified from 14 plots in the transect are listed in Table 1 and located on Maps 1 and 2.

Sand Dunes -

Quindalup Dunes Maidens and adjacent bushland.

Coastal Dunes - deep white sand, general condition is excellent with patches in good to degraded condition

Dune overlooking beach: Peppermint (*Agonis flexuosa*), *Scaevola crassifolia* and *Spyridium globulosum* Closed Low Heath *Senecio lautus* and *Conostylis aculeata* Very Open Herbland

Swale behind dune: Peppermint (*Agonis flexuosa*) Closed Shrub Mallee to Peppermint (*Agonis flexuosa*) Very Open Shrub Mallee over *Spyridium globulosum*, *Diplolaena dampieri* and *Exocarpos sparteus* Open Heath over *Jacksonia furcellata*, *Acacia rostellifera* and *Hemiandra pungens* Low Shrubland over *Bromus arenarius*² Open Grassland, mixed Herbland and *Lepidosperma angustatum* Very Open Sedgeland

Second dune, facing beach: *Jacksonia furcellata* and *Acacia cochlearis* Open Low Heath over *Stipa flavescens* and *Bromus arenarius* Open Grassland, mixed Herbland and *Lepidosperma angustatum* Very Open Sedgeland

Protected dune side, third dune back: Tuart (*Eucalyptus gomphocephala*) Woodland over Peppermint Low Woodland over *Templetonia retusa* and *Rhagodia baccata* Shrubland over *Lepidosperma gladiatum* Sedgeland to in the more protected and wetter spots there can be a layer at over 2m of *Templetonia retusa* and *Spyridium globulosum* Tall Shrubland.

Spearwood Dunes Maidens and adjacent bushland

Brown to yellow sand over yellow to orange sand

Undulating flats, behind the Quindalup Dunes: Tuart Tall Open Woodland over *Banksia attenuata* and Peppermint Low Open Forest over *Hakea prostrata* Tall Shrubland over *Jacksonia furcellata* Open Shrubland over *Synaphea spinulosa* and *Macrozamia riedlei* Low Shrubland over exotic Grassland, mixed herbland and *Lepidosperma angustatum* Very Open Sedgeland.

Undulating flats: From west to east, the transect within the undulating

¹ Floristic community types are listed in Bush Forever Volume 2 and are after Gibson *et al.* (1994) and DEP (1996).

² *Bromus arenarius* is a native grass that is confused at times with the weedy *Bromus* species. Care should be taken to distinguish them in weed control.

flats of the Spearwood Dunes, is vegetated with Tuart Woodlands to Tuart Open Forest (similar to the above description) to *Banksia attenuata* Woodlands with scattered to dominant Tuart then Jarrah and Jarrah/Marri. (*Banksia attenuata* Low Open Forest over *Macrozamia riedlei* Shrubland over *Hibbertia hypericoides* Low Shrubland over exotic Very Open grassland, mixed Herbland and *Schoenus grandiflora* Open Sedgeland).

The Tuart occurs over a variety of tree layers ranging from Peppermints to the west to combinations of Peppermints, Jarrah, *Banksia grandis* and *Banksia attenuata* to the east. To the east there is a corresponding change in some shrub/herb/sedge /grass species. For example to the west where the Tuart Woodlands merge in to the Tuart Woodlands of the Quindalup Dunes *Austrostipa flavescens* is a dominant grass and this gradually declines to the east and is absent in the *Banksia attenuata* Woodlands.

Marine and Estuarine Deposits (wetland floristic community types typical of Pinjarra Plain) Hay Park³

Calcareous clay flat: *Melaleuca raphiophylla* Shrubland over mixed Herbland and *Gahnia trifida* and *Lepidosperma longitudinale* Sedgeland.

Undulating dune waterlogged to inundated flat, sand over clay: *Melaleuca preissiana* Low Woodland over and *Acacia pulchella* Low Shrubland over *Pericalymma ellipticum* Open Low Heath over *Patersonia occidentalis* Very Open Herbland and *Lepidosperma longitudinale* Sedgeland. Also overstorey of *Banksia littoralis*

References

DEP 1996 *System 6 and Part System 1 Update Programme*. Unpublished bushland plot and area records and analysis. Department of Environmental Protection, Perth, Western Australia.

Gibson N, Keighery BJ, Keighery GJ, Burbidge AH and Lyons MN 1994 *A Floristic Survey of the Southern Swan Coastal Plain*. Unpublished Report for the Australian Heritage Commission prepared by the Department of Conservation and Land Management and the Conservation Council of Western Australia (Inc.).

English V and Blyth J 1997 *Identifying and Conserving Threatened Ecological Communities in the South West Botanical Province*. Unpublished report for the Department of Conservation and Land Management to Environment Australia

³ A small vegetated area of the broad wetland area, of which Hay Park is part, is located north of Centenary Road. This area contains units of the same plant community mosaic present on the Hay Park Bushland.

Table 1: Floristic Community Types in the Maidens and adjacent bushland and Hay Park (identified in Gibson *et al.*, 1994, and in the System 6 and Part 1 Update DEP, 1996)

Key

Column 1: Plot Codes

Column 2: Floristic Community Type Codes

The numbers of the types additional to Gibson *et al.* (1994) are italicised if they are subsets of an existing group (in types 19, 20, 23 and 30) and italicised and preceded by an S if they are supplementary groups. Types in bold are threatened ecological communities (English and Blyth 1996).

Column 3: Source of plot data

SYS6ENV1 / SYS6ENV2 DEP (1996)

Column 4: Bushland Area

Supergroup 2 - Seasonal Wetlands			
Hay01	08	SYS6ENV2	Hay Park, Bunbury
Hay02	17	SYS6ENV2	Hay Park, Bunbury
Hay05	18	SYS6ENV2	Hay Park, Bunbury
Hay03	<i>s05</i>	SYS6ENV2	Hay Park, Bunbury
Hay04	<i>s05</i>	SYS6ENV2	Hay Park, Bunbury
Supergroup 4 - Uplands centred on Spearwood and Quindalup Dunes			
Spearwood Dunes			
Gmaid01#	25	SYS6ENV2	C70 South Bunbury coastal land (The Maidens) and adj bushland
Gmaid02#	25	SYS6ENV2	C70 South Bunbury coastal land (The Maidens) and adj bushland
Gmaid03	25	SYS6ENV2	C70 South Bunbury coastal land (The Maidens) and adj bushland
Gmaid04	25	SYS6ENV2	C70 South Bunbury coastal land (The Maidens) and adj bushland
Nmaid05	25	SYS6ENV2	C70 South Bunbury coastal land (The Maidens) and adj bushland
Quindalup Dunes			
BMaid02	29a	SYS6ENV2	C70 South Bunbury coastal land (The Maidens) and adj bushland
Nmaid01	29a	SYS6ENV2	C70 South Bunbury coastal land (The Maidens) and adj bushland
Nmaid03	29a	SYS6ENV2	C70 South Bunbury coastal land (The Maidens) and adj bushland
Nmaid04	30b	SYS6ENV2	C70 South Bunbury coastal land (The Maidens) and adj bushland

These plots are to the west of the 'Ocean Drive track'. Gmaid O2 is in one of the wet patches but has not, on analysis, been allocated to a wetland group. However, this is the only plot of this type sampled and soils, from the plot data, to be Quindalup Sands rather than Spearwood Sands.

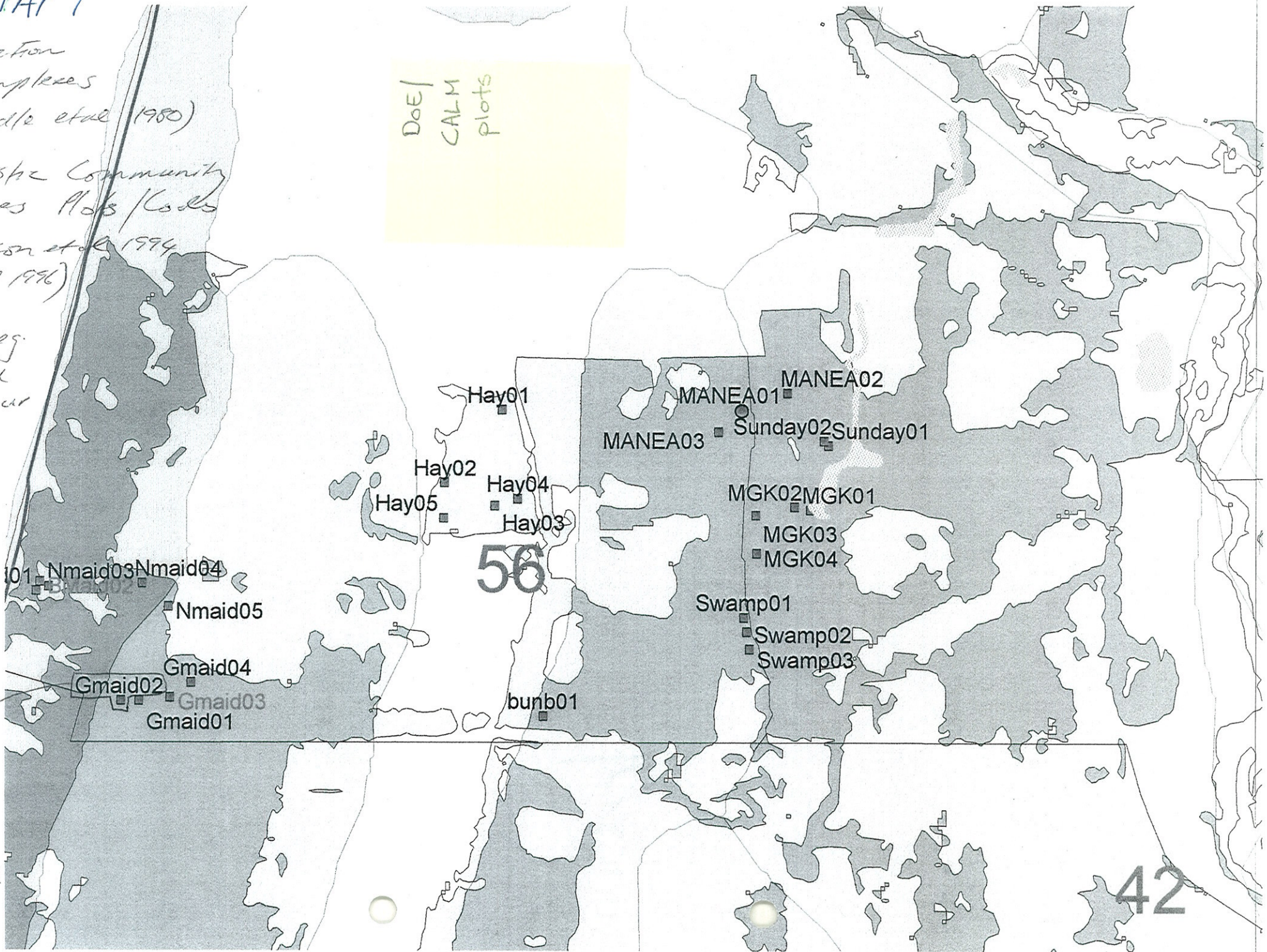
MAP 1

Vegetation complexes
(Hedde et al 1980)

Floristic Community types Plots/Calls
(Cibson et al 1994
DEP 1996)

Rem. veg.
= solid colour

DoE/
CALM
plots



Heart
over
Gahwa
in today
Lepid. glid.



Environmental Protection Authority

EPA Service Unit
Environmental Impact Assessment Division

MEMO

Westralia Square, 141, St Georges Terrace, Perth, 6000.
Facsimile: (08) 9322 1598 Telephone: (08) 9222 7000
E-mail: info@environ.wa.gov.au www.epa.wa.gov.au

TO: EPA MEMBERS

DATE: 24 NOVEMBER 2003

FROM: ANDREW MACK

SUBJECT: PUBLIC ENVIRONMENTAL REVIEW - SOUTHERN EXTENSION OF LOT 2 CALINUP ROAD SANDPIT,
GELORUP, PIONEER CONSTRUCTION MATERIALS PTY LTD

1. Please find attached a copy of the Public Environmental Review Document for the above project, for your comment.
2. This document is to be made available for an 8 week review period.

This stakeholder review period commenced on 24 November 2003 and the closing date for submissions is 19 January 2004.

3. Please provide any comments you may wish to make to the project officer by the end of the public review period. The EPA Service Unit's contact officer for this project is:

Tim Gentle
Manager – Mining and Petroleum Assessments
Environmental Protection Authority Service Unit

Extension: 7085

Andrew Mack

South Bunbury Bushland Corridor

**An Assessment of the
Regional value of the South Bunbury Bushland Corridor*
with special reference to the area of Spearwood Dunes
vegetation and the area of Spearwood Dunes vegetation
in the TPS 6 Amendment 179 within the Corridor**

BJ Keighery Department of Environmental Protection

and

GJ Keighery Department of Conservation and Land Management

January 1999

* includes proposed Bunbury Ocean-Preston River Regional Park and may be also called South Bunbury Open Space Link

Introduction

A series of studies on vegetation, plant community patterning and floristics are referred to in this treatment of regional value. These are Heddle *et al.* (1980), Gibson *et al.* (1994) and Department of Environmental Protection (1996). These studies have been used in the determination of regional conservation values in Perth's Bushplan (Government of WA 1998), the update of the recommendations for regional conservation areas in the Swan Coastal Plain portion of the Perth Metropolitan Region. . A similar review of the remainder of the Swan Coastal Plain south of the Moore River and the Darling Plateau portion of the System 6 area (Department of Conservation and Environment 1983) will be completed during the next few years.

Specific area information included in this report is incorporated in the Department of Environmental Protection (1996) data and report. Additional information was collected in a field visit made on 7th January 1999 by the authors. Information collected by Dr B. Bischoff from his continuing studies of the Corridor has also been referred to.

General information on the Landforms and Soils of the South Bunbury Bushland Corridor (Corridor or transect) are described to place the Spearwood Dunes section of the transect in context. In the subsequent sections on vegetation and flora the focus is on the Spearwood Dunes. Four areas of bushland are described in the area of the Spearwood Dunes these are

Area A - the Spearwood Dunes (Areas C, D and E)

Area B - the western portion of the Spearwood Dunes west of the Hay Park wetlands* (Areas C and D)

Area C - the area of TPS 6 Amendment 179 within the Spearwood Dunes

Area D - the portion of the Spearwood Dunes immediately west of the Hay Park wetlands

Area E - the eastern portion of the Spearwood Dunes east of the Hay Park wetlands, in the College Grove area.

* Hay Park wetlands refers to the wetlands extending from Hay Park south. These wetlands contain plant communities not found elsewhere on the Plain and have regional affinities with a rare regional floristic plant community group.

Landforms and Soils

The Bunbury area lies entirely on the Swan Coastal Plain. The Corridor traverses four of the five major landform elements of the Plain found in the area (Anon 1981, Curchward and Macarthur 1980), namely the:

Quindalup Dunes The white calcareous sands which form the dunes of the coastal ridge of the Maidens area. These dunes are of Holocene age and are the youngest of the dunes.

Spearwood Dunes Sands associated with limestone. In the Bunbury area this limestone occurs at depth the surface pale grey or cream sands of the Spearwood Dunes overlying yellow sands and then limestone. This limestone is closest to the surface on the crest of the dunes.

Bassendean Dunes These are the oldest of the dunes, being pale grey leached sands. In the Bunbury area these are low relief sheets of sand that merge with the Spearwood sands to the west and overly the Pinjarra Plain to the east. These sands are found in Manea Park.

Pinjarra Plain The clays and loams of the Pinjarra Plain are the oldest of the soils of the Plain and have been deposited on the east of the Plain and along the rivers. The wetlands of Manea Park and the Airfield lands contain areas of vegetation on these soils. A closely related unit associated with the Hay Park wetlands is composed of alluvial soils which appear to be of estuarine and riverine origin containing calcareous clays.

The fifth major landform element, Foothills, is not vegetated in the Bunbury area and is separated from the Corridor by cleared Pinjarra Plain.

The sequence of vegetated landform elements encompassed in the Corridor is unusual on the Plain. On a few occasions vegetated transects occur elsewhere on the Plain, these are:

- Quindalup/Spearwood/Bassendean Dunes but not through to the Pinjarra Plain. Such an example occurs from Yalgorup National Park through to the state forest in the east. Other examples are well to the north of Perth.

- Spearwood Dunes/Bassendean Dunes/Pinjarra Plain. Such a transect occurs in the Kemerton area but again other examples are to the north of Perth.

The area of Spearwood Dunes in the Corridor is also unusual on the Plain. Typically the Spearwood Dunes have two elements; an area of shallow soil over limestone (Cottesloe soils) and deeper sands with limestone at depth (Karrakatta soils). The Spearwood Dunes in the Bunbury area are represented by the Karrakatta soils. The limestone unit occurs in its southern most extent to the north of Bunbury in the area of Yalgorup National Park. Limestone comes closest to the surface at three points in the Corridor, in two small rises in Area C and a larger rise in Area E. As a consequence Area A is an extensive area of transition between the deep soils of the Spearwood Dunes and the Quindalups to the east and the Bassendean Dunes to the east. In addition this section of the Corridor contains the interface of the Spearwood Dunes and the Hay Park wetlands between Areas D and E. Area B (combination of Areas C and D) is vital in this link as there is no other area of vegetated Spearwood Dunes adjacent to the Hay Park wetlands.

Summary

The sequence of vegetated landform elements (Quindalup/Spearwood/Bassendean Dunes - Pinjarra Plain) encompassed in the Corridor is unusual on the Plain and does not appear to occur elsewhere. The area of Spearwood Dunes in the transect is also unusual on the Plain, being entirely composed of deep Karrakatta sands.

Vegetation and Flora

Vegetation

Plant Communities

Plant communities identified in the Corridor are typical of the Quindalup/Spearwood/Bassendean Dunes - Pinjarra Plain units of the Corridor.

From west to east, the transect within the Area A of the Spearwood Dunes, is vegetated with Tuart Woodlands to Tuart Open Forest to *Banksia attenuata* Woodlands with scattered to dominant Tuart then Jarrah and Jarrah/Marri. The *Banksia attenuata* Woodlands are largely absent from Area C.

The Tuart occurs over a variety of tree layers ranging from Peppermints to the west to combinations of Peppermints, Jarrah, *Banksia grandis* and *Banksia attenuata* to the east. To the east there is a corresponding change in some shrub/herb/sedge /grass species. For example to the west where the Tuart Woodlands merge in to the Tuart Woodlands of the Quindalup Dunes *Austrostipa flavescens* is a dominant grass and this gradually declines to the east and is absent in the *Banksia attenuata* Woodlands.

Vegetation Complexes (Hedde *et al.* 1980)

Plant communities identified are typical of the Quindalup/Spearwood/Bassendean Dunes - Pinjarra Plain units of the transect. being - Quindalup, Karrakatta Central and South, Yoongarillup, Karrakatta Central and South, Bassendean Central and South, and /or Southern River Complex (contains vegetation associations typical of the Bassendean Dunes and Pinjarra Plain).

Areas B (Areas C and D) and E are mapped as Karrakatta Complex Central and South vegetation complex (Hedde *et al.* 1983) and plant communities present in the areas are typical of the southern representations of this vegetation complex.

The Karrakatta Complex Central and South Complex has been selectively cleared for housing, horticulture and plantations across its range. Within the Perth Metropolitan Region 18% remains vegetated (Government of WA 1998), outside the PMR between 20 and 30% remains (Burbidge and Rolfe 1986 and Government of WA 1998 respectively). Within the PMR less than 10% (the target for protection in the PMR) of this complex was able to be recognised in Perth's Bushplan (Government of WA 1998) and the intention is to locate alternative areas beyond the PMR for protection. Outside the PMR 10 - 20% of each major landform element is expected to be recognised for protection.

Floristic Community Types (Gibson *et al.* 1994 and DEP 1996)

Floristic studies have located a series of study plots in the area of the transect. The analysis of these plots have identified regional floristic groups typical of a southern transect of the Quindalup/Spearwood/Bassendean Dunes - Pinjarra Plain units of the transect.

On the Spearwood Dunes floristic community type 25 - Southern *Eucalyptus gomphocephala* - *Agonis flexuosa* woodlands is identified. This regional grouping is predominantly a southern group. Several atypical occurrences occur to the north of Perth but the grouping is most common between Mandurah and Minninup. While this is a relatively widespread unit it is currently not well represented in National Parks or Nature Reserves so is considered poorly reserved.

Area B with its variety of plant communities is an excellent example of the sequence of communities contained within this regional floristic grouping. In addition Area C contains combinations of plant communities, related to the low limestone rises developed in this area, not evident in the flatter Tuart Woodland/Forest area to the south.

Flora

Various studies have already listed nearly 300 species of native plants in the area (Bischoff 1999, Gibson *et al.* 1994, DEP 1996). The diversity of species in the area of the transect would easily exceed 300 species. The plant communities in the transect show high species diversity for Spearwood units some 10X10 metre plots containing 50 -60 taxa (Bischoff 1999). The average species richness of floristic community type 15 over its range is 53 taxa (less taxa found in only one plot, Gibson *et al.* 1994)

Several species of Priority taxa have been identified in Area B, *Jacksonia sparsa* ms and *Lasiopetalum membranaceum*.

Summary

The bushland in Area B contains

- an excellent example of the of the southern Spearwood Dunes plant communities (at the both the vegetation complex and floristic community type level)
- contain excellent examples of the variation within this type
- good examples of the transitional communities between Quindalup

Dunes/Spearwood Dunes to the west and Spearwood Dunes/ Marine- Estuarine- Pinjarra Plain to the east.

- contains significant populations of two priority taxa.

Regionally the plant communities in Area B (Karrakatta Central and South Vegetation Complex) are not adequately protected (Government of WA 1998).

Importance of Area B in the Corridor

All of Area B has high conservation value, as

- a good representation of the southern Spearwood Dunes plant communities
- it contains good examples of the variation within this type
- representation interface Quindalups/Spearwoods and Spearwoods/Estuarine and is worthy of preservation.

Any reduction in areas will weaken linkage in the corridor and reduce the area of the interface.

Area B is centrally in Very Good to Excellent condition . Towards edges of tracks and roads in Area B, where there as been long term disturbance, weed invasion is significant and the condition of the vegetation is degraded. Presently these degraded edges protect the core, to reduce the area will further degrade the intact core area.

Importance of Area C in the Corridor

Area C is a very significant section of the Corridor as it

- contains a combination of plant communities and their variation not evident elsewhere in the Corridor
- provides a direct link between the Quindalup Dunes and Area D (then through to the Hay Park wetlands and Area E).

As discussed in the previous section Area C (part of Area B) is centrally in Very Good to Excellent condition . Towards edges of tracks and roads in Area C, where there as been long term disturbance, weed invasion is significant and the condition of the vegetation is degraded. Presently these degraded edges protect the core, to reduce the area to a small area adjacent to the disturbed track and its edges on the southern boundary will not effectively conserve the values of this land.

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