THE VEGETATION OF LOT 217 HOUGHAM ROAD

BARRAGUP

SHIRE OF MURRAY

Prepared for

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SUMMARY

A botanical survey of Lot 217 Hougham Road, Barragup was carried out on 7 and 15 December 1993 to describe the nature, extent and condition of the property's native vegetation south-east of Goegrup Lake and to ascertain its suitability as habitat for rare species of flora.

More than half of the vegetated portion of Lot 217 lying south-east of Goegrup Lake has been cleared of its original woodland and open-forest vegetation and is now in *Kunzea ericifolia* thickets, pastured woodlands, clearings, earthworks, ponds and sheds. The rest of the lot still has banksia low open-forest in the north-eastern part of the property and, on lower-lying land next to Goegrup Lake, fringing vegetation characterised by species of *Melaleuca*, *Astartea*, *Pericalymma*, sedges, *Juncus* and *Sarcocornia*, individually, in various combinations and in sequences.

The banksia low open-forest is, though somewhat degraded by tracks, tree-felling and disease attack, still considered significant, mainly for the three following reasons:

- A large proportion of this type of vegetation on the Swan Coastal Plain has been completely or partially cleared.

- The Lot 217 banksia open-forest differs from banksia woodlands described by Beard (1979) and Heddle *et al.* (1980) in not having any low-lying swampy areas and in occurring not on sand dunes, low ridges or other undulating terrain but on an almost level plain.

- The Lot 217 banksia open-forest has *Banksia menziesii*, a species which here is at or close to the southern end of its range of distribution.

During the vegetation survey an emphasis was placed on finding or identifying habitats where any of the declared rare flora (DRF) and priority species listed for the Swan CALM region would be likely to occur. A large proportion, if not most, of the rare species sought during the survey occur in a limited range of wetland and semi-wetland habitats which have restricted occurrences. Consequently, from the point of view of rare species, the strip of fringing vegetation dominated by trees and tall shrubs is judged to be the most important native vegetation in the surveyed area.

No listed species was found during the December surveys. However, most DRF and priority species which might occur in the area are not in flower at the time of the surveys and therefore could easily be missed.

An apparently unnamed, shrubby species of *Scholtzia* was found in Type K1 *Kunzea ericifolia* thickets at Vegetation Survey Sites 5 and 18, in the Type K2 cleared strip next to the Goegrup Lake fringing vegetation and in the Hougham Road road reserve. The species was found only in disturbed areas. It is a summer-flowering species and apparently poorly collected.

CONTENTS

THE VEGETATION OF LOT 217 HOUGHAM ROAD, BARRAGUP

1.0 INTRODUCTION

Lot 217 Hougham Road, Barragup, is a property six kilometres east of Mandurah on the south side of Goegrup Lake.

The property is covered in vegetation ranging from pastured woodlands to largely undisturbed native tree, shrub and herbaceous plant communities. It also includes part of non-vegetated, seasonally inundated Goegrup Lake itself and fringing vegetation on the north-western side of the lake.

This report presents the results of vegetation surveys of the vegetated part of the property on the south-eastern side of the lake undertaken on 7 and 15 December 1993. It incorporates interpretation of a 1:2,500 scale colour aerial photograph of the lot flown probably in late November or early December 1992 and reference to the ***Perth Regional Flora*** (Marchant *et al.* 1987) and reports referred to below. During the December vegetation surveys, plant communities were photographed and described in terms of condition, species composition and height and density of dominant species. Declared rare flora and priority flora plants and likely habitats for them were searched for.

Figure 1 shows the Vegetation Survey Sites (VSS), at which photographs were taken, Appendix 1 lists and describes the Vegetation Survey Sites, and selected photographs are reproduced and described in Plates 1 and 2 (Photographs A to K).

2.0 PHYSICAL ENVIRONMENT

The climate of the Mandurah area is Mediterranean, with wet winters and dry summers, a mean annual rainfall of about 890mm, average mean daily winter minimum temperatures of around 9 degrees and average mean daily summer maximum temperatures of 28 to 29 degrees (Wells 1989). Summer winds are predominately hot, dry easterlies, while winter winds tend to be cooler, wetter south-westerlies.

According to Wells (1989), Lot 217 is mainly on a Bassendean sand plain (mapping unit B2) of deep, well-drained, bleached grey sand, a geomorphic element which is wide-spread on the Swan Coastal Plain. Fringing Goegrup Lake and extending into it there are, according to Wells (1989), saline tidal flats (mapping unit V1). West of the Serpentine River and Goegrup Lake Wells shows deep, pale Spearwood plain system sands (mapping unit S4a). A few limestone rocks were found on the surface in the south-western part of the area surveyed for vegetation.

3.0 VEGETATION

3.1 Regional Vegetation

Beard (1979) and Heddle *et al.* (1980) map the native vegetation potential (i.e. what native vegetation would be there if it had not been cleared) of the region including Lot 217 at a scale of 1:250,000. Beard (1980) also maps it a scale of 1:1,000,000. A large proportion of the region has, however, been cleared and no longer supports unaltered native vegetation.

Waterways Commission Report No. 38 (Siemon *et al.* 1993) describes vegetation of types fringing Goegrup Lake and occurring elsewhere on the lot, and it maps fringing vegetation of the Serpentine River, but not so far south as Goegrup Lake.

Heddle *et al.* (1980) show the vegetation potential of most of the area as Bassendean Complex - Central and South (mapping unit 44) and, around the Serpentine River and its lakes, Herdsman Complex (mapping unit 53). Herdsman Complex vegetation comprises fringing woodlands of flooded gum (*Eucalyptus rudis*) and *Melaleuca* species and sedgelands, while Bassendean Complex - Central and South is a mosaic or complex of vegetation ranging from jarrah, marri and banksia woodlands on sand dunes to sedgelands and low paperbark woodlands on low-lying depressions and swamps. A large proportion of the Bassendean Complex - Central and South has, however, been cleared of its original vegetation, and Hopper and Burbidge (1989) conclude from their studies that little remains of the once extensive *Banksia* woodland between Perth and Busselton.

Heddle *et al.* (1980) map the area west of the Serpentine River and its lakes as Yoongarillup Complex (mapping unit 56), which comprise tuart-dominated tall woodlands, woodlands and open forests.

Beard's 1:250,000 scale map shows the native vegetation potential of Lot 217 and the area to the east, west and south of it as being a plain with a vegetation mosaic (mapping unit eMi/bLi/mLc) of jarrah (*Eucalyptus marginata*) and marri (*Eucalyptus calophylla*) woodland, banksia (*Banksia attenuata* and *B. menziesii*) low woodland, paperbark (*Melaleuca rhaphiophylla* and *M.cuticularis*) low forest and swamps. Goegrup Lake is shown as a freshwater lake. The mosaic vegetation has a patchy distribution on the Swan Coastal Plain east of the Spearwood System between the Serpentine River area in the north and the Busselton area in the south.

Beard and Sprenger (1984, p.21) have calculated that there is very little of the original banksia woodland left.

The native vegetation north and west of Goegrup Lake is shown by Beard as mixed jarrah and tuart (*Eucalyptus gomphocephala*) woodland.

3.2 Vegetation of Lot 217

During the December vegetation surveys it was found that the vegetation of Lot 217 is of four types: (B) Banksia low open-forest and woodland, (K) *Kunzea ericifolia* thicket, (P) Jarrah pastured woodland, mainly of jarrah trees, and (F) Vegetation of lower-lying land fringing the lake and characterised by species of *Melaleuca, Astartea, Pericalymma,* sedges, *Juncus* and *Sarcocornia* individually, in various combinations and in sequences.

These types, variations of them, a mosaic of two of them, their dominant and principal native species, their map symbols and photographs of them are listed and described below.

Banksia Low Open-forest (Type B1) and Low Woodland (Type B2)

Type B1:	**Vegetation Survey Sites 17 and 19**	**Plate 1 Photograph A**
Type B2:	**Vegetation Survey Sites 1, 2 and 3**	**Plate 2 Photograph B**

Type B1 vegetation, banksia low open-forest and woodland in generally good condition and with occasional jarrah and she-oak trees and understories of 2m to 4m tall *Kunzea ericifolia* shrubs and heath and sedges under 50cm tall, covers a large proportion of the north-eastern quarter of the lot. The dominants of the low open-forest are *Banksia attenuata* and *B. menziesii,* with *Allocasuarina fraseriana* (she-oak) and *Banksia ilicifolia* being less common and with jarrah trees, *Banksia grandis, Nuytsia floribunda* and *Xylomelum occidentale* (woody pear) occasional. The principal understorey heath species is *Hibbertia hypericoides,* which is very abundant. Other, less common understorey species, all under 50cm tall, include *Bossiaea eriocarpa, Dasypogon bromeliifolius, Patersonia occidentalis, Conostylis* sp., *Lepidosperma* sp. and species of Restionaceae. *Melaleuca thymoides, Adenathos cygnorum, Jacksonia sternbergiana* and *Jacksonia furcellata* shrubs 1m to 2.5m tall are occasional.

The condition of some small areas in the Type B1 banksia low open-forest (and woodland) is low due to deaths of banksia and jarrah trees caused by cutting for firewood (Plate 2 Photograph I) and, probably, by a dieback fungus, *Phytophthora* sp. (Plate 2 Photograph H). Parts have been damaged by vehicles which have been driven through them. A large proportion of the open-forest is, however, in good or better condition, especially where it is away from its boundaries, firebreaks and tracks.

Type B2 vegetation is banksia low open-forest and low woodland which is partially cleared. It has understories which vary from many native species and plants to ones in which the natives have been totally replaced by *Lotus* sp. and other small annual forbs and grasses.

***Kunzea ericifolia* Thickets (Type K1 and K2)**

Type K1:	**Vegetation Survey Sites 4, 5 and 18**	**Plate 1 Photograph D**
Type K2:	**Vegetation Survey Sites 12 and 14**	**Plate 2 Photograph K**

Type K1 vegetation occurs in the west-central part of the surveyed area, where most of the banksias and other trees have been cleared, leaving what is essentially *Kunzea ericifolia* thicket vegetation. The *Kunzea* has expanded and become denser since the trees were removed, but the understorey native species are essentially the same as in the banksia open-forest. The proportions of native shrubs and other perennials in the understorey, on the one hand, to alien grasses and forbs, on the other hand, vary widely. The natives are, however, much less common and provide less cover than in the banksia open-forest.

In the north-western quarter and along the north-eastern boundary of the area surveyed there are mosaics of *Kunzea ericifolia* thicket and banksia low woodland vegetation (K1/B2). The north-western corner of this Type K1/B2 vegetation has one relatively large tuart tree and a few smaller ones (Vegetation Survey Site 5 - Plate 2 Photograph G). An apparently undescribed species of *Scholtziaa* (*S.* aff. *involucrata*) between 0.5m and 3m tall was also noted at Vegetation Survey Sites 5 and 18.

The fringing vegetation adjacent to the lake is separated from banksia woodlands and *Kunzea ericifolia* thicket vegetation by a band of sand which has been cleared of vegetation. It is now regenerating *Kunzea ericifolia* thicket with young flooded gums, patches of *Carpobrotus edulis*, *Scholtzia* sp.and other species. This band is shown on Figure 1 as Type K2 vegetation. The *Carpobrotus* is most common east of the ponds, and the *Scholtzia* shares dominance with the *Kunzea* west of the ponds. There are tuart trees at the extreme western end.

Pastured Woodlands (Types P1 and P2)

Type P1:	**Vegetation Survey Site 22**	**Plate 1 Photograph E**
Type P2:	**Vegetation Survey Sites 20 and 21**	**Plate 1 Photograph F**

Pastures of alien grasses and forbs and scattered jarrah, banksia and woody pear (*Xylomelum occidentale*) trees and *Hibbertia hypericoides* and other native shrubs occupy the eastern half of the surveyed area. The eastern half of the pastured woodlands, mapped as Type P1, has a higher density of trees and other native species than the western half, mapped as Type P2.

The eastern corner of the pastured woodlands is on redder, heavier soil, and in this area there are a few large moonah paperbark trees (*Melaleuca preissiana*) near the edge of the property.

Fringing Vegetation (Types F, F1 and F2)

Type F (F1 & F2):	**Vegetation Survey Sites 7, 9, 10, 11 and 15**	**Plate 1 Photograph C**
Type F1:	**Vegetation Survey Sites 8 and 16**	**Plate 2 Photograph J**
Type F2:	**Vegetation Survey Sites 6 and 13**	

Stands and complexes of dense low sedge, *Juncus kraussii* and *Sarcocornia* species (F1), sometimes with *Sueda australis*, *Atriplex prostrata*, *Atriplex hypoleuca* and *Halosarcia lepidosperma*, and shrub and tree vegetation (F2) fringing the lake are mapped together as Type F vegetation. Although the *Bolboshoenus caldwellii* and *Juncus kraussii* closed sedgelands and *Sarcocornia* species samphire communities are often discrete, they are often too narrow to map separately. Where they are large enough and are separated from the Type F2 shrub and tree vegetation by bare ground or water, they are mapped as Type F1 vegetation.

The dominant tree and shrub species in the Type F2 vegetation are flooded gum (*Eucalyptus rudis*), swamp paperbark (*Melaleuca rhaphiophylla*), saltwater paperbark (*Melaleuca cuticularis*), *Casuarina obesa*, *Melaleuca ? viminea*, *Acacia saligna*, *Regelia ciliata*, *Pericalymma ellipticum*, *Astartea* aff. *fascicularis*, *Calothamnus lateralis*, *Hakea varia* and *Jacksonia sternbergiana*. Herbaceous plants include *Lepidosperma ? longitudinale*, *Baumea juncea* and *Cotula coronopifolia*.

4.0 RARE FLORA

The plants searched for during the vegetation survey of Lot 217 are those on two sets of lists. The first set was printed in the Government Gazette and includes currently gazetted rare flora taxa known to be extant and taxa presumed to be extinct. The second set is a printout from the Department of Conservation and Land Management computer data base of declared rare flora and priority taxa. Specifically, these sets of lists are:

- Wildlife Conservation (Rare Flora) Notice 1993 (Government Gazette, WA of 12 November 1993) Parts 1 and 2 and

- Declared Rare and Priority Flora for Western Australia (current master list: 28.10.92).

Five declared rare flora have ranges which include the general area. These are *Verticordia plumosa* var. *ananeotes*, *Aponogeton hexatepalus* and three orchids: *Caladenia huegelii*, *Drakaea elastica* and *Drakaea micrantha*. The *Verticordia* and the three orchids have been recorded in banksia woodlands, but apparently of different types than those on Lot 217.

All except the *Verticordia* are herbaceous plants which have finished flowering by December and would be virtually impossible to find or identify then. The *Verticordia* is a small shrub which flowers in November and December. It has been recorded on loamy, low-lying, seasonally inundated soils and in sandy-soiled open forest of jarrah in the Busselton, Blackwood, Murray, Serpentine and Cockburn Sound areas.

There are illustrations and descriptions of most of the declared rare flora and priority taxa which might occur in the area in Kelly *et al.* (1990, 1993), Hopper *et al.* (1990), Brooker and Kleinig (1990) and Hoffman and Brown (1992).

During the vegetation survey an emphasis was placed on finding or identifying habitats where any of the rare and priority taxa listed for the Swan CALM region would be likely to occur, particularly on taxa such as *Verticordia plumosa* var. *ananeotes*, *Parsonsia diaphanophleba*, *Jacksonia sericea* and *Cartonema philydroides*, which would be identifiable at the time of the survey. The first of these taxa is a declared rare flora plant. The other three are priority species.

No listed species was found during the December survey, nor were probable habitats for them, except, possibly, fringing shrub and tree vegetation, identified.

Two other species of interest were, however, recorded. The first, *Banksia menziesii*, is common in Type B1 banksia low open-forest and other banksia-dominated vegetation. The second, *Scholtzia* sp., was found at Vegetation Survey Sites 5 and 18 in Type K1 *Kunzea ericifolia* thicket and in the Type K2 strip of regenerating thicket vegetation next to the Goegrup Lake fringing vegetation.

Banksia menziesii is, in Lot 217, apparently at or near the southern end of its distribution. According to Marchant *et al.* and George (1984) the range of the species is from the Murchison River to Pinjarra. The *Banksia* is common on Lot 217.

The *Scholtzia* is, apparently, an undescribed species related to *Scholtzia involucrata* (Trudgen pers. comm.). It was found only in disturbed areas and was most abundant in the Hougham Road road reserve and west of the ponds in the strip of Type K2 disturbed vegetation, where it was one of the dominant species It appears to flower in late December and January and to be, like a number of other summer-flowering species, poorly collected.

5.0 DISCUSSION

No declared rare flora nor priority flora plant was found in the surveyed area, nor was any habitat likely to have any identified, with one possible exception. That exception is the strip of fringing vegetation dominated by trees and tall shrubs, a type of fringing wetland vegetation. At least part of this fringing vegetation is within System Six Area M108, Goegrup Lakes (Environmental Protection Authority 1983).

A large proportion, if not most, of the rare species sought during the survey occur in a limited range of wetland and semi-wetland habitats which have a restricted occurrence.

The only wetland vegetation or standing water seen during the survey was in Goegrup Lake, its fringing vegetation, the series of bulldozed ponds in mapping unit K2 and water supplies for livestock. Consequently, from the point of view of rare species, the strip of fringing vegetation dominated by trees and tall shrubs is judged to be the most significant native vegetation in the surveyed area.

The Type B1 banksia low open-forest (to woodland) is also considered to be significant, although it has already been damaged by *Phytophthora* fungus attack and cutting for firewood and is likely to suffer more damage from them. The paucity of other shrubs in the predominantly *Hibbertia hypericoides* understorey is an indication of past burning or grazing or both. Furthermore, the banksia vegetation is less likely than the fringing vegetation to have rare and priority flora plants; e.g., Hopper and Burbidge (1989) noted that "*Banksia* woodlands appear to contain few rare localized endemic species". They also noted that the king spider orchid (*Caladenia huegelii*) and two hammer orchids, *Drakaea elastica* and *D. micrantha*, are the only declared rare flora plants which occur mainly in *Banksia* woodlands on the Swan Coastal Plain. However, the banksia woodland habitats of the orchids are believed to be of different types than any found in Lot 217.

The Type B1 banksia open-forest is considered significant mainly for the three following reasons:

- A large proportion of this type of Bassendean Complex - Central and South vegetation on the Swan Coastal Plain has been completely or partially cleared.

- The Lot 217 banksia open-forest differs from banksia woodlands described by Beard (1979) and Heddle *et al.* (1980) in not having any low-lying swampy areas and in occurring not on sand dunes, low ridges or other undulating terrain but on an almost level plain.

- The Lot 217 banksia open-forest has *Banksia menziesii* at or close to the southern end of its range of distribution.

The apparently unnamed species of *Scholtzia* related to *S. involucrata* found in Lot 217 *Kunzea erifolia* thicket in the Type K2 strip and at Vegetation Survey Sites 5 and 18 was found only in disturbed areas which had probably been banksia open-forest prior to disturbance. The best-developed and tallest groves of the *Scholtzia* were found in the south-western side of the Hougham Road road reserve across the road from Vegetation Survey Site 5.

6.0 ACKNOWLEDGEMENTS

The assistance of Malcolm Trudgen, Paul Wilson, Stan Webster and staff of the Western Australian Herbarium is gratefully acknowledged.

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Table 1

Declared Rare Flora
with
Distributions and Habitats
which may include the Surveyed Area

Flowering Species and Family	Localities and Distribution	Habitat	Times
Caladenia huegelii ORCHIDACEAE	11: Gnangara-Yallingup	Sandy soils in banksia and eucalypt woodlands, often with *Allocasuarina fraseriana* -Margaret River and usually low on the landscape	Sept-Oct
Diuris purdiei ORCHIDACEAE	9: Perth area-Harvey	Seasonal semi-swamp on sand-over-clay soils, usually in *Regelia* and *Pericalymma* shrublands; flowers in habitats which were burnt the previous dry season	Sept-Nov
Drakaea elastica (jeanensis) ORCHIDACEAE	8: Canning Vale-Busselton	soils, often firm and very white, *ericifolia* tall shrubland and banksia woodland, low on the landscape	Sept-Nov Sandy in *Kunzea*
Drakaea sp. (south west) S. D. Hopper 3566 ORCHIDACEAE	5: Canning Vale, Yarloop, Mowen, Bakers Junction	Sandy soils in scrub and woodlands low in the landscape, often near swamps	Sept-Oct

The information in this table was compiled from Rye and Hopper (1981), Hoffman and Andrews (1984), Marchant *et al.* (1987), information provided by L. Mutter and botanists of the Western Australian Herbarium and the WAWRC, and field work by A. S. Weston during 1989 and 1990. There may be a few more localities for some of the orchids than the number given in the table, but some of the species are no longer found in some of the localities where they were previously recorded

CAPTIONS - PLATES 1 and 2

Vegetation of Lot 217 Hougham Road, Barragup

(December 1993)

(More information on photographs is given in Appendix 1;
Vegetation Survey [V. S.] Site locations are shown in Figure 1)

PLATE 1

Photograph

A	B1	Banksia low open-forest	V. S. Site 19	Photograph 19
B	B2	Banksia low woodland	V. S. Site 3	Photograph 1
C	F	Fringing vegetation complex	V. S. Site 15	Photograph 13
D	K1	*Kunzea ericifolia* thicket	V. S. Site 4	Photograph 2
E	P1	Pastured woodland, higher density	V. S. Site 22	Photograph 22
F	P2	Pastured woodland, lower density	V. S. Site 21	Photograph 21

PLATE 2

Photographs

G	K1 (in background)	*Kunzea* thicket showing tuart tree and location of *Scholtzia* sp.	V. S. Site 5	Photograph 3
H	K1	*Kunzea ericifolia* thicket showing recently killed *Banksia*, probably by dieback (*Phytophthora* sp.), and, in right foreground, *Scholtzia* sp.	V. S. Site 18	Photograph 18
I	B1	Banksia low open-forest showing trees felled and sawn into lengths for firewood	V. S. Site 19	Photograph 20
J	F1	Fringing sedge and *Sarcocornia* communities showing line of posts in Goegrup Lake and, in centre of photo, damage to salline soil done by horses and, possibly, motorcycles	V. S. Site 16	Photograph 14
K	K2	Regenerating *Kunzea ericifolia* and *Scholtzia* sp. thicket	V. S. Site 14	Photograph 12

APPENDIX 1

VEGETATION SURVEY SITES (VSS)
LOT 217 HOUGHAM ROAD, BARRAGUP

VSS	Photo	Veg.	Comments
1	00	B2	Track, near gate; *Banksia attenuata* 5-6m, jarrah >6m, *Kunzea ericifolia* to >4m mainly on right (N), *Hibbertia hypericoides* 50cm, veldt grass; also *Banksia ilicifolia, Allocasuarina fraseriana, Macrozamia riedlei, Conostylis* sp., *Loxocarya* sp., annual weeds; some banksias are dead, some still with dead leaves.
2	0	B2	Track, pens, buildings, large jarrah stump in centre; flowering *Nuytsia*; jarrah, *B. attenuata, Allocasuarina fraseriana, Hibbertia hypericoides*, veldt grass.
3	1	B2	*B. att.*, jarrah, *Kunzea*, ground cover of *Lotus* sp., *Hypochoeris glabra*, small grasses; also jarrah stumps, fallen banksias, rubbish, alien eucalypt.
4	2	K1	Next to fence; *Kunzea ericifolia* <4m, *B. att., B. menziesii, B. ilicifolia, Jacksonia sternbergiana, Hibb. hyp., Bossiaea eriocarpa, Nemcia capitatum, Gompholobium* sp., *Dasypogon bromeliifolius, Stylidium* sp., *Conostylis* sp., *Lepidosperma ? angustatum, ?Leptocarpus* sp., *Restio* sp.
5	3	K1 (in background)	Tuart trees to >15m; *Kunzea* thicket in background: *Kunzea eric., Acacia saligna, Jacksonia sternbergiana, J. furcellata, Scholtzia* sp., *Adenanthos cygnorum, Carpobrotus edulis, Lomandra* sp., *Schoenus grandiflorus, Patersonia* sp.
6	4	F2	Thicket complex to 3m of *Regelia ciliata, Pericalymma ellipticum, Calothamnus lateralis, Kunzea eric., Melaleuca rhaphiophylla, Mel. cuticularis, Mel.* sp., *Acacia saligna, Casuarina obesa* <5m, *Leptocarpus* sp.
7	5	F	Sequence: (1) sometimes inundated bare saline soil, (2) *Sarcocornia* sp., (3) VSS6 thicket.
8	6	F1	Lake; bare saline soil; herbland of discrete (but somewhat overlapping) communities of *Bolboschoenus caldwellii, Juncus kraussii, Sarcocornia* sp.
9	7	F	Showing zonation and layers: (1) herbs, (2) shrubs, mainly *Melaleuca ? viminea*, (3) trees - *Casuarina* overtopped by *Eucalyptus rudis*.
10	8	F	*Sarcocornia* sp., *Junc. kraussi. Mel. ? viminea, Mel. cutic., Casuarina obesa.*
11	9	F	Sequence in from F1: (1) *Cotula coronopifolia, Lotus* sp., *Lythrum hyssopifolia,* other herbaceous weeds, (2) *Mel. rhaph., Mel. cutic., Halosarcia lepidosperma, Baumea juncea, Lepidosperma ? longitudinale*, (3 - Photo 9) *Mel. rhaph., Euc. rudis* to > 6m, *Astartea* aff. *fascicularis* <2m, *Juncus* sp.
12	10	K2	Looking over ponds (& building) from SW end of chain; *Euc. rudis, Casuarina obesa, Jacksonia sternbergiana* and *Astartea* on banks.
13	11	F2	*Euc. rudis, Mel. rhaph., Mel. cutic., Hakea varia, Jacksonia* spp., *Acacia saligna, Regelia ciliaris, Baumea juncea, Cassytha* sp., Goegrup Lake.
14	12	K2	Strip of bare sand regenerating in small annual weeds, *Carpobrotus edulis, Kunzea* (mainly), *Scholtzia* sp., *Hibb. hyp.*; also *Macrozamia , Euc. rudis, Acacia saligna, Stirlingia latifolia*, sedges, *Restio* sp. and other Restionaceae.
15	13	F	Sequence from Goegrup Lake: (1) saline 'beach', (2) *Sarcocornia* sp., (3) *Bolboschoenus caldwellii*, (4) *Juncus kraussii*, (5) *Melaleuca cuticularis*.
16	14, 15	F1	Looking west; damage caused by horses and, possibly, motorcycles; mainly *Sarcocornia* sp. and *Bolboschoenus caldwellii* sedge, with fringing strip of trees and tall shrubs in background.
-	16	-	Black Lake, grove of *Casuarina obesa* and F1 type vegetation.
17	17	B1	*Banksia att.* and *B. menziessii* to >6m, many dead and fallen, *Kunzea eric.* ca. 4m, *Hibb. hyp.* ca. 50%; also *B. ilic., Bossiaea eriocarpa, Dasypogon brom.*
18	18	K1	*Kunzea eric.* 2-4m, *Hibb. hyp., Loxocarya* sp.; also *Allocas. fr., Scholtzia* sp., *Conostylis, Lepidosperma ? angustatum, Patersonia occidentalis*; recently dead small banksia, from *Phytophthora*?, and young banksia plants.
19	19, 20	B1	*Banksia att., B. menziesii* 5-6m, *Hibb. hyp.*; also *B. ilic., B. grandis*, jarrah, *Allocas. fr., Nuytsia, Xylomelum occidentale, Kunzea eric., Bossiaea eriocarpa, Isopogon* sp., *Dianella, Dasypogon brom., Conostylis* sp.; some trees have been cut down; some patches of forest are in better condition, some are in worse.
20	-	P2	Opened banksia low woodland and jarrah and *Allocas. fr.*; windmill, water in trough, horses.
21	21	P2	Jarrah to >10m, few banksia and *Allocas. fr.* trees.
22	22	P1	Similar to VSS21 but denser, esp. jarrah, 10-15m; also in photo: *Xylomelum, Allocas. fr., Banksia att., Hibb. hyp.*