Mining Tenement M70/1172 Lake Clifton

Flora and Vegetation Assessment

October 2005

Report for Eclipse Resources Pty Ltd

Regeneration Technology Pty Ltd

TABLE OF CONTENTS

INTRODUCTION

Eclipse Resources have applied for a mining tenement over land known as Lake Clifton townsite in the Shire of Waroona. The entire application covers land that is currently unallocated crown land however as the land has been considered by the Department of Conservation and Land Management (CALM) for inclusion in the adjacent Yalgourp National Park, the application was referred by the Department of Industries and Resources (DIR) to CALM who recommended the application should be refused on the following grounds:

- That the subject land (M70/1172) contains a Threatened Ecological Community (TEC);
- Has a known population of and priority 4 listed flora species;
- Has been recommended for inclusion in the Yalgorup National Park; and
- Is an area under consideration for inclusion in CALM's conservation estate.

The Yalgorup National Park Management Plan 1995 – 2005 (CALM, 2004) lists the Lake Clifton Townsite as an area for consideration for inclusion in the National Park (Table 2, page 18) however this area is not included in the map of proposed additions to the park and is not included for inclusion in the park in the list of actions (page 22) for land acquisitions for the park.

The Peel Regional Scheme (2003) has zoned the entire area of the application as Rural (Appendix 1). Which is defined in the Peel Regional Scheme text as;

"Rural – To provide for the sustainable use of land for agriculture, assist in the conservation and wise use of natural resources including water flora, fauna and minerals, provide a distinctive rural landscape setting for urban areas and accommodate carefully planned rural living development"

With respect to the information contained in The Yalgorup National Park Management Plan 1995 – 2005 and the zoning of the land in the Peel Regional scheme (2003), the proponents (Eclipse Resources), of the mining tenement M70/1172 are keen to pursue the application. Regeneration Technology have been commissioned by the proponents to undertake an independent assessment of flora of the tenement in order to ascertain the extent of the conservation values referred to by CALM (see above).

SITE DESCRIPTION

LOCATION

Lake Clifton Townsite (M70/1172) (Figure 1) is within the Shire of Waroona. The the area covered by the mining application is 85.7ha. It lies on the south eastern side of the intersection of the Old Bunbury Rd and the Old Coast Rd approximates 70km

to the north of Bunbury. M70/1172 is unallocated crown land; along the eastern and southern boundary of the lot is State Forest 16. The northern boundary is the Old Bunbury Rd; to the north of the Old Bunbury Rd is a semi rural residential subdivision. The western boundary is the Old Coast Rd. To the west of the Old Coast Rd is a semi rural residential subdivision. Further to the west beyond the residential subdivision is Yalgorup National Park. The current eastern boundary of the Yalgorup National Park is the hightide mark of Lake Clifton.

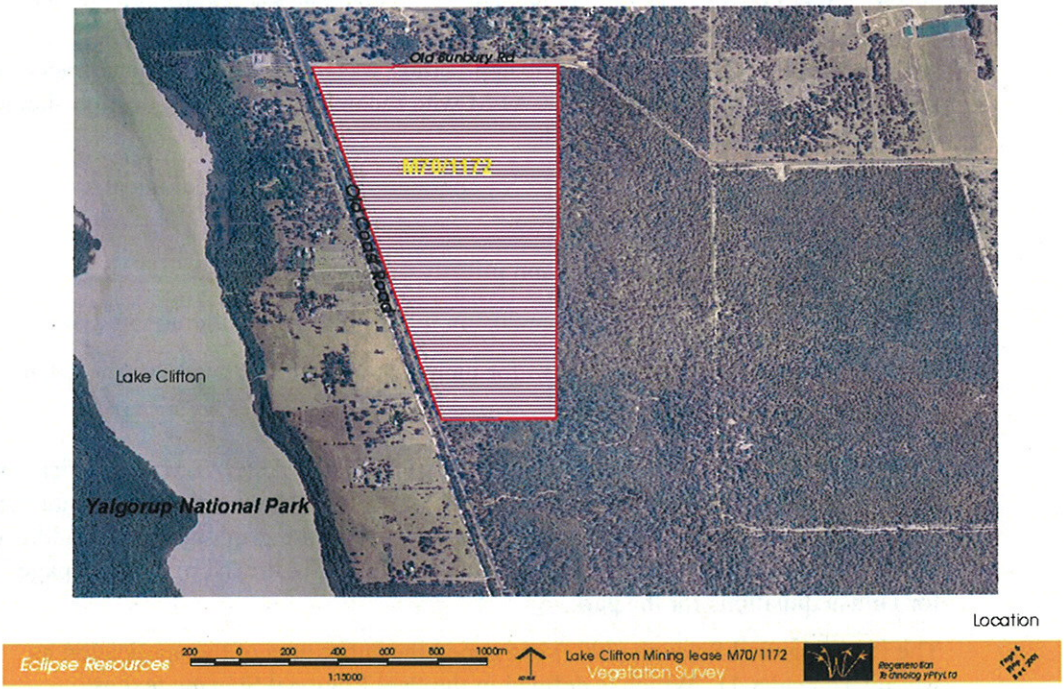

Figure 1. Location – Lake Clifton Mining Lease M70/1172 Crn of Old Coast Rd and Old Bunbury Road, Lake Clifton

CLIMATE

Lake Clifton lies on the Swan Coastal Plain and has a warm Mediterranean climate characterized by having 5-6 dry summer months per year and winter precipitation.

INTERIM BIOGEOGRAPHIC REGION (IBRA)

Biogeogrpahic Regions for Australia is a framework for conservation based on a bioregional context. Eighty-five bioregions within Australia have been recognized of which 26 occur within Western Australia. Mining tenement M70/1172 is in the southern portion of ***SWA – Swan Coastal Plain Bioregion,*** which is described as

"Low lying coastal plain, mainly covered with woodlands. It is dominated by Banksia or Tuart on sandy soils, Allocasuarina obesa *on outwash plains, and paperbark in swampy areas. In the east, the plain rises to duricrusted Mesozoic sediments dominated by Jarrah woodland. Warm Mediterranean. Three phases of marine sand dune development provide relief. The outwash plains, once dominated*

by A. obesa-*marri woodlands and Melaleuca shrublands, are extensive only in the south"*

SOILS

The underlying geology of the area is Tamala Limestone, which is formed from calcareous beach sands. Calcrete can occur on ridges with the re-precipitation of calcium carbonate, this can result in minor pinnacle formation. Sands derived from the Tamala limestone make up the geomorphological system known as Spearwood Dunes (after McArthur and Bettenay 1960). This system typically occurs beyond the primary coastal dune system (Quindalup dunes).

The soils of M70/1172 were not mapped as part of this study but were recorded as; limestone pinnacles beneath deep white sand. The limestone pinnacles were only obvious in a couple of areas along the northern boundary of the site where excavation for road works has resulted in minor erosion and the exposure of the underlying limestone.

VEGETATION

The importance of the soils with regard to the vegetation is that vegetation units often closely approximate the distribution of particular soil types. Vegetation complexes have been arranged by Heddle et al (1980) in accordance with the major geomorphic units. The Geomorphic unit of M70/1172, as per Heddle et al (1980) is the Cottesloe complex of the Spearwood Dunes. Typical vegetation complexes associated with this geomorphical type in the southern areas of the Swan Coastal Plain is a "Mosaic of woodland of Eucalyptus *gomphocephala and* open forest of *E.gomphocephala – Emarginata – E. calophylla*; closed heath on limestone outcrops.

FLORISTIC COMMUNITY TYPES

Floristic Community Types (FTC's) of the Swan Coastal Plain have been determined as a result of a study by Gibson et al (1994). This study considered patterning of plant distribution based on analysis of species occurrence in 509 100m^2 plots and used multi-variant analysis to group the occurrence of species. The grouping of the species has been used to assign FTC's to vegetation complexes on the Swan Coastal Plain.

Three FTC's as described in Gibson et al (1994) are inferred as occurring on M70/1172, they are:

1. FTC 25 - Southern *Eucalyptus gomphocephala – Agonis flexuosa* woodlands;
2. FTC 26a – *Melaleuca huegellii – Melaleuca systena* shrublands on limestone ridges;
3. FTC 28 – Spearwood *Banksia attenuata* or *Banksia attenuata – Eucalyptus* Woodlands.

These FTC's occur on the southern Spearwood dune system.

THREATENED ECOLOGICAL COMMUNITIES

M70/1172 is the location of two Lake Clifton plots used in the Gibson et al (1994) study and have been assigned FTC 26a. FTC 26a is listed as an endangered Ecological Community with CALM. An ecological community is descibes as naturally occurring biological assemblages that occur in a particular type of habitat. FTC 26a is not listed as a TEC under the Commonwealth *Environment Protection and Biodiversity Conservation Act 1999* (EPBC Act).

An endangered community has been defined by English and Blyth (1999) as:

"*An ecologcial community which has been adequately surveyed and found to have been subject to a major contraction in area and/or was orinignally of limited distribution and is in danger of significant modification throughout it's range or severe modification or destruction over most of it's range in the near future*"

(See Appendix 1 for explanation of all categories of communities)

DECLARED RARE AND PRIORITY LISTED FLORA SPECIES

A database search of the Department of Conservation and Land Management' Declared Rare and Priority Flora records indicated there are possibly five priority taxa (see appendix 2 for explanation of Conservation Codes for Rare and Priority Listed Flora) that may be present on the site. They are listed in Table 1. CALM records show that one of the species *Lepidium pseudotasmanicum* is present on the site.

Species	Conservation Status Code
Jacksonia sparsa	4
Lepidium pseudotasmanicum	4
Carex tereticaulis	1
Hibbertia spicata subsp. leptotheca	3
Lasiopetalum membranaceum	3

Table 1. Results of rare and priority listed flora search for M70/1172.

SURVEY METHOD

RARE AND PRIORITY LISTED FLORA

Species identified by the CALM's data base search were studied prior to ground truthing the property to ensure familiarization with the species that may be present.

FIELD SURVEY

A recent aerial photo was examined before visiting the site to determine the context of the property in the regional setting and to identify major structural units present. A grid system of waypoints was set up over the aerial photo and downloaded into a GPS to ensure a thorough coverage of the site during ground truthing. The site was visited on 3 separate occasions in September and October 2005.

The survey area was traversed by foot. Flora was systematically collected from across the property ensuring that all structural units identified from aerial photography were sampled.

The following information was recorded;

- waypoint number;
- photo number;
- plant species;
- vegetation condition;
- aspect, landform and soil.

Dominant species and vegetation structure were recorded and referenced using a GPS at numerous locations across the property in order to map the vegetation units.

In addition 5 10x10m quadrats were set up and examined in detail using the Gibson et al (1994) methodology. Each of these quadrats was marked in the north western corner with a 10 inch steel nail for future reference if required. The locations of Gibson et al's Lake Clifton plots were loaded into the GPS so these quadrats could be resampled, however the locations did not match up on the ground.

Species were recorded directly onto field sheets. Where they could not be readily identified a sample was collected for further identification.

Vegetation condition was scored using Keighery's scale (Bush Forever, Vol 2, 1994), which assigns the following scales;

Scale		**Description**
1	Pristine	No obvious sign of disturbance
2	Excellent	Vegetation structure intact, disturbance affecting individual species and are no aggressive weed species.
3	Very Good	Vegetation structure altered, obvious signs of disturbance.
4	Good	Vegetation structure significantly altered by obvious signs of multiple disturbances. Retains basic vegetation structure or ability to regenerate it.
5	Degraded	Basic vegetation structure severely impacted by disturbance. Scope for

		regeneration but not to a state approaching good condition without intensive management.
6	Completely Degraded	The structure of the vegetation is no longer intact and the area is completely or almost without native species. These areas are often described as parkland cleared with the flora comprising of weed or crop species with isolated native trees or shrubs.

WETLANDS

The *Geomorphic Wetlands of the Swan Coastal Plains* dataset was used to identify the location and proximity of wetlands to the site.

MAPPING

All mapping was undertaken in Arcview over an aerial photo base at a scale of 1:2000. Field data collected and referenced using a GPS was used as an aid to identify the boundaries of the vegetation units and bushland condition.

RESULTS

FLORA

A total of 33 families and 85 plant taxa (appendix 3) were recorded in the study area. Of these 13 taxa were recorded as weed species.

DECLARED RARE AND PRIOIRTY LISTED FLORA

Lepidium pseudotasmanicum a priority 4 species recorded by CALM as being present on the site was not located. However another priority 4 species *Grevillea thelmanniana* not previously recorded as being present was found to be common throughout the woodland.

A check of the species descriptions, locations and associations using Flora Base (www.florabase.calm.wa.gov.au), Marchant etal (1987) and Wheeler et al (2002) indicated that 2 of the listed species *Hibbertia spicata subsp. leptotheca* and *Lasiopetalum membranaceum* may be present and are know to occur in the Yalgorup National Park however they were not collected during this survey.

According to Florabase *Jacksonia sparsa* is not current and is a taxonomic synonym of *Jacksonia horrida,* which has no priority listing.

Carex tereticaulis, occurs on black peaty sand which was not present on the site.

VEGETATION UNITS

Three vegetation units were defined and mapped within the survey area (Figure 2). They are:

1. **Shrubland** Tall open shrubland of *Dryandra sessilis, Melaleuca huegellii* subsp *huegelii* over *Hibbertia hypericoides,* and weed species.
2. **Woodland** *Eucalyptus gomphocelala* and *Agonis flexuosa* woodland over *Hibbertia hypericoides, Acacia pulchella* and weed species; and
3. **Woodland** *Eucalyptus marginata* and Banksia *attenutata* woodland over *Hibbertia hypericoides, Acacia pulchella* and weed species;

The largest of the vegetation units is the *Eucalyptus gomphocelala* and *Agonis flexuosa* woodland (Photo 1) which covers 7.6 ha or approximately 42% of the site. The second largest is the *Eucalyptus marginata* and Banksia *attenutata* woodland, which covers 5.9ha or approximately 33% of the site. The smallest vegetation unit is the *Dryandra sessilis, Melaleuca huegellii* subsp *huegelii* (Photo 2), which has 2 separate occurrences along the northern boundary one covering 0.4ha and the other covering 4.1ha.

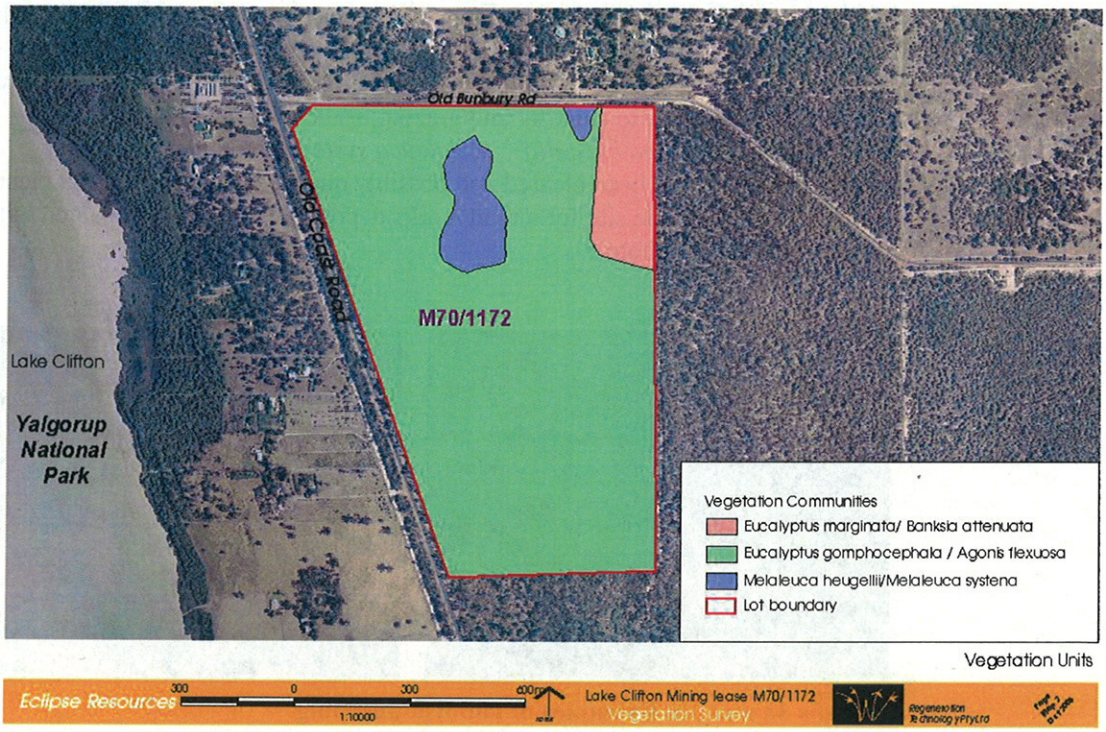

Figure 2 Vegetation units - Lake Clifton Mining Lease M70/1172 Crn of Old Coast Rd and Old Bunbury Road, Lake Clifton

Photo 1. ***Eucalyptus gomphocepala/ Agonis flexuosa*** **woodland**

Photo 2. ***Dryandra sessilis/ Melaleuca huegellii*** **shrubland**

BUSHLAND CONDITION

The bushland across the site has been impacted by multiple disturbance factors including, logging, grazing, rubbish dumping (Photo 3a and 3b) and clearing. There was evidence of the old townsite in the presence of abandoned fencing and a raised bund that ran across the site that most likely would have been either a road or rail. There were large sections of the site especially in the *Eucalytptus gomphocephala – Agonis flexuosa* woodland where the Eucalyptus tree layer was either missing, dying or in very poor health (Photo 4). Weeds predominated in the understorey across the site resulting in a limited herbabceous layer of native species. The presence of weeds is most likely to be due to clearing and grazing of the land in the past. A large section of the *Meleleuca huegellii – Melaleuca systena* community along the northern boundary has been cleared and possibly quarried in the past. This cleared section was possibly the site for a road works depot and has been compacted with road base materials (Photo 5).

Photo's 3a and 3b. Examples of rubbish dumping.

Photo 4. Bushland missing the overstorey as a result of tree deaths

Photo 5. Cleared compacted area

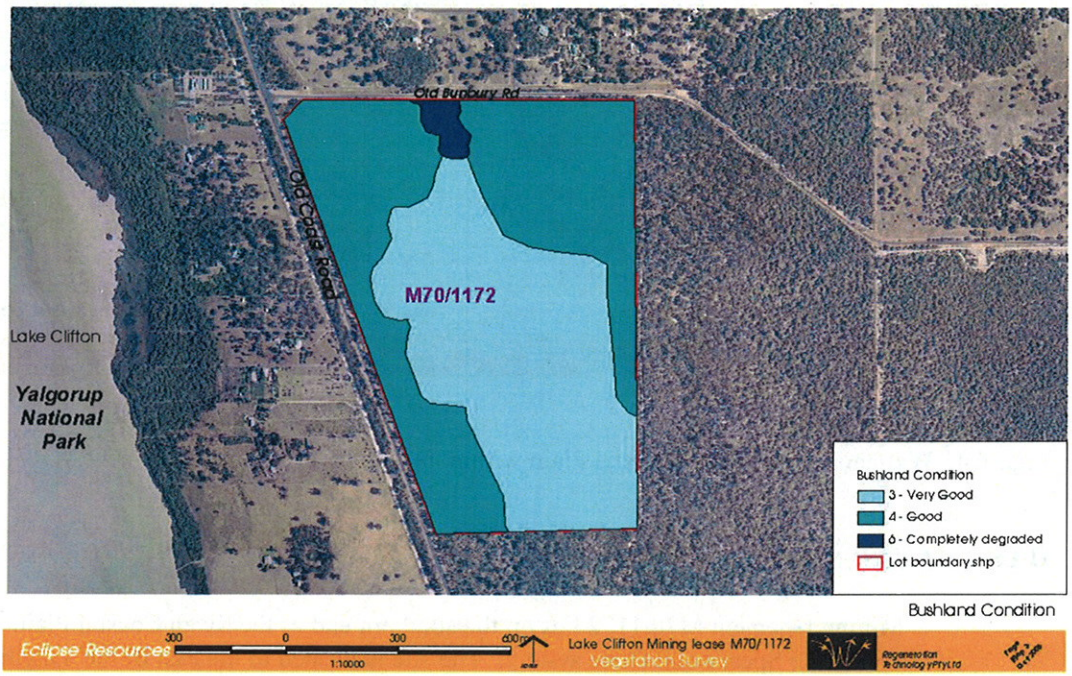

Figure 3 Bushland Condition - Lake Clifton Mining Lease M70/1172 Crn of Old Coast Rd and Old Bunbury Road, Lake Clifton

WETLANDS

No wetlands were identified on the site during ground truthing. No vegetation indicative of wetlands or damplands was found on the site. Figure 4 shows the location and wetland classifications from the *Geomorphic Wetlands of the Swan Coastal Plains* dataset within proximity of the site. This map shows that there is a

wetland classified as a lake to the west (ie Lake Clifton), wetlands classified as estuary and shore line periphery to the north (i.e. Harvey Estuary the southern section of the Peel/Harvey Estuary) and wetlands to the east classified as palusplain. Palusplain wetlands are seasonally waterlogged plains that may or may not have any free surface water.

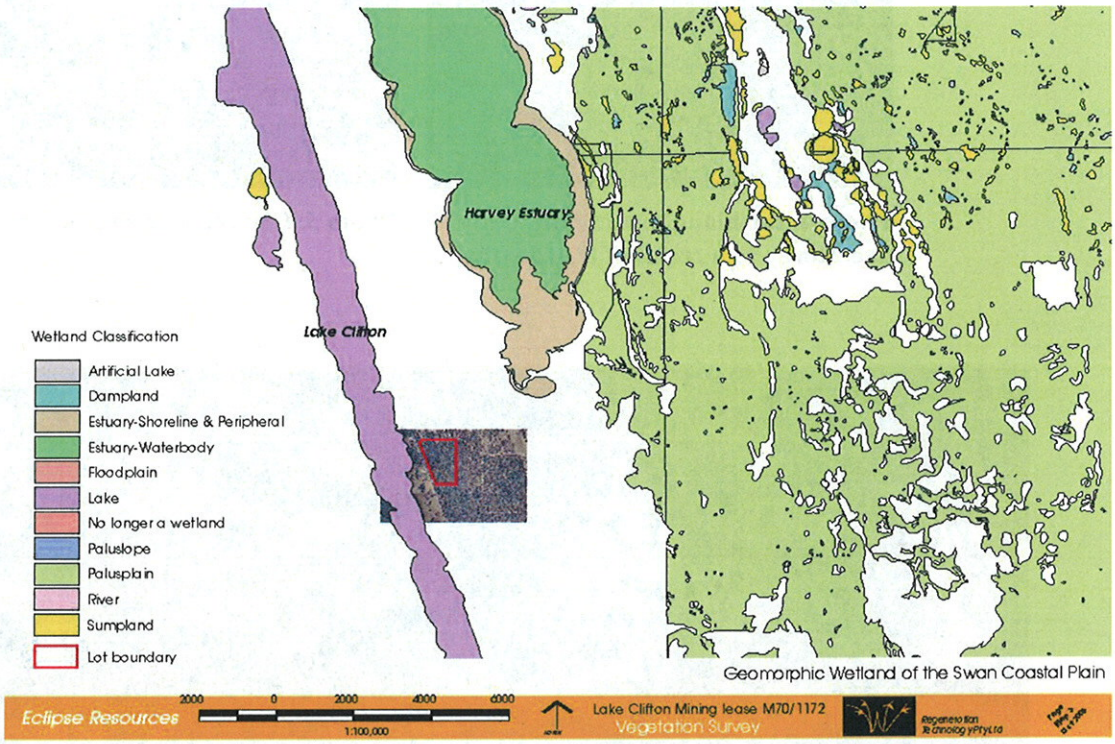

Figure 4. Wetlands of the Swan Coastal Plain within proximity of Mining Tenement M70/1172

DISCUSSION

Mining tenement M70/1172 lies on the southern end of the Swan Coastal Plain within the Spearwood Dune system. The site is located to the east of the Yalgorup National Park and is separated from the Park by partially cleared rural residential lots. The site is currently unallocated crown land having originally been set aside for the now abandoned townsite of Lake Clifton. CALM recommended in the Yalgorup National Park Management Plan (1995) that this area be considered for inclusion into the Yalgorup National Park "*upon completion of rehabilitation following mining*" (CALM 1995). The Lake Clifton Townsite was not included in the actions recommending land acquisition in the Yalgorup National Park Management Plan (1995)

FLORA

No Declared Rare Flora species were located during this survey. One priority 4 species *Grevillea thelmannniana* was located within the survey area. This species occurs on sand, sandy clay flats and winter wet low lying flats. It has been recorded

predominantly in the Swan Coastal Plain region though it's distribution may extend to Geraldton.

CALM has listed priority 4 species *Lepidium pseudotasmanicum* as being present on the site however this species was not recorded as being present during this survey.

VEGETATION COMMUNITIES

Three vegetation communities were recorded from the study area (Figure 2). They are:

1. **Shrubland** Tall open shrubland of *Dryandra sessilis, Melaleuca huegellii* subsp *huegelii* over *Hibbertia hypericoides,* and weed species.
2. **Woodland** *Eucalyptus gomphocelala* and *Agonis flexuosa* woodland over *Hibbertia hypericoides, Acacia pulchella* and weed species; and
3. **Woodland** *Eucalyptus marginata* and Banksia *attenutata* woodland over *Hibbertia hypericoides, Acacia pulchella* and weed species;

The vegetation communities of M70/1172 followed the structural unit identified by Heddle et al (1980) as likely to occur on the southern geomorphical unit of the Spearwood dunes. The delineation of the vegetation communities was based on a thorough system of ground truthing the site using a grid set up over an aerial photo. A distinct boundary was obvious between the *Dryandra sessilis/ Melaleuca huegellii* subsp *huegelii* shrubland and the *Eucalyptus gomphocelala* and *Agonis flexuosa* woodland. This could be identified by a change in the soils from occasional limetone outcropping in the sand on the higher areas which supports the *Dryandra sessilis/ Melaleuca huegellii* subsp *huegelii* shrubland community to deep sand in the lower lying zone which supports the *Eucalyptus gomphocelala* and *Agonis flexuosa* woodland. The structural unit changed distinctly from shrubland to woodland with the change in the soils. The delineation between the *Eucalyptus gomphocelala / Agonis flexuosa* woodland and the *Eucalyptus marginata /Banksia attenutata* woodland was more subtle with the understorey gradually changing to included a larger variety of herbs and shrubs and the tree layer no longer including the *E.gomphocephala.*

The vegetation communities identified most closely approximate the following vegetation communities as described by Gibson et al (1994).

1. **FTC – 26a** *Melaleuca huegelii – M acerosa* shrublands of limestone ridges;
2. **FTC – 25** Southern *Eucalyptus gomphocephala – Agonis flexuosa* woodlands; and
3. **FTC – 28** Spearwood *Banksia attenuata – Eucalyptus* woodlands.

FTC 26a is considered by CALM to be an endangered community. This community is common on the limestone ridges of the Swan Coastal Plain and is under pressure due to limestone extraction on ridges where limestone is exposed. This community is currently not sufficiently protected in CALM's conservation estate. FTC 26a is not listed as a TEC under the Commonwealth *Environment Protection and Biodiversity Conservation Act 1999* (EPBC Act).

This community exists in two locations along the northern boundary of M70/1172. The extent of the community has been contracted as a result of; land clearing for a

residential subdivision to the immediate north of the site, cut through to level the Old Bunbury Rd and quarried, cleared and leveled for a (MRD?) road camp.

BUSHLAND CONDITION

Bushland condition across the site ranged from 3 (Very Good) to 6 (Completely degraded (Figure 3). The understorey across the site was degraded with weed species being continuously present across the site. Uncontrolled access firewood collection and illegal rubbish dumping has negatively impacted on bushland condition. There was evidence across the site of tree deaths, mainly *Eucalyptus gomphocelala* especially on the western side of the site and in some areas there was virtually no overstorey. Vegetation condition was best (3) through the middle of the site most likely as a consequence of limited access from either the Old Coast Road and fire breaks along the eastern boundary.

There was no evidence of fire or the impact of successive fires on the site in recent years.

FRAGMENTATION

M70/1172 is a bushland site that borders on state forest to the east and south. The land to the north and west of the site is dissected by two major roads, the Old Coast Rd, which is one of the major access routes from Perth to Bunbury and is soon to be upgraded as the Perth to Bunbury Hwy and the Old Bunbury Rd to the north. The land to the north and west of M70/1172 is semi rural with residential lots, while there is still some scattered remnant vegetation on these lots the remnants are discontinuous and not directly linked to M70/1172. The Yalgorup National Park is to the west of the semi rural residential land to the west of the site.

WETLANDS

There are no wetlands (Geomorphic wetlands of the Swan Coastal Plan dataset) on M70/1172. Lake Clifton lies at it's closest point approximately 500m to the east of M70/1172. There are no surface drainage lines from the site to Lake Clifton however local drainage from the site should be addressed to ensure any excess water or nutrients are disposed of on site.

RECOMMENDATIONS/GUIDELINES

It is recommended that if a license for an extractive industry be granted for this site that:

- Unnecessary clearing of vegetation beyond that which is strictly required be avoided;
- Clearing and site layout design should ensure the minimization of edge effects and should where possible utilise areas that are already cleared or degraded;
- Topsoil, logs, and plant material cleared from the site should be directly replaced elsewhere on the site in disturbed areas, where this is not possible they should be stockpiled and used for rehabilitation works on the site within a year.

- The site should be rehabilitated using species listed for each community in appendix 3;
- Seed collection and plant propagules for rehabilitation works should be collected from the site or bushland within the surrounding area to ensure local provenance of species replanted.;
- A vegetated buffer should be maintained where practical along the northern and western boundaries of the site to reduce noise and dust effects on neighbours.

REFERENCES

Department of Conservation and Land Management (1994) Yalgorup National Park Management Plan 1995 – 2005. CALM Perth.

Department of Environmental Protection (2000) Bush Forever Volume 2. Department of Environmental Protection. Perth Western Australia.

Environment Australia (2000) *Revision of Interim Biogeographic Rationalisation for Australia (IBRA) and Development of Version 5.1. Summary Report.*

Gibson, N., Keighery, B., Keighery, G., Burbidge, A., and Lyons, M. (1994) A Floristic Survey of the Swan Coastal Plan. Unpublished Report for the Australian Heritage Commission.

Heddle, E.M., Loneragan, O.W., and Havel, J.J., (1980) Vegetation Complexes of the Darling System, Western Australia. Atlas of Natural Resources Darling System Western Australia. Department of Conservation and Environment.

Marchant, N.G., Wheeler, J.R., Rye, B.L., Bennett, E.M., Lander, N.S., and McFarland, T.D. (1987) Flora of the Perth Region Parts 1 and 2. Western Australian Herbarium, Department of Agriculture Western Australia.

Wheeler, J., Marchant, N. and Lewington, M. (2002) Flora of the South West, Volumes 1 and 2. University of Western Australia Press.

APPENDIX 1

The Department of Conservation and Land Management's conservation codes for Flora in Western Australia

CONSERVATION CODES

R: Declared Rare Flora - Extant Taxa

Taxa which have been adequately searched for and are deemed to be in the wild either rare, in danger of extinction, or otherwise in need of special protection, and have been gazetted as such.

X: Declared Rare Flora - Presumed Extinct Taxa

Taxa which have not been collected, or otherwise verified, over the past 50 years despite thorough searching, or of which all known wild populations have been destroyed more recently, and have been gazetted as such.

1: Priority One - Poorly known Taxa

Taxa which are known from one or a few (generally <5) populations which are under threat, either due to small population size, or being on lands under immediate threat, e.g. road verges, urban areas, farmland, active mineral leases, etc., or the plants are under threat, e.g. from disease, grazing by feral animals, etc. May include taxa with threatened populations on protected lands. Such taxa are under consideration for declaration as 'rare flora', but are in urgent need of further survey.

2: Priority Two - Poorly Known Taxa

Taxa which are known from one or a few (generally <5) populations, at least some of which are not believed to be under immediate threat (i.e. not currently endangered). Such taxa are under consideration for declaration as 'rare flora', but are in urgent need of further survey.

3: Priority Three - Poorly Known Taxa

Taxa which are known from several populations, and the taxa are not believed to be under immediate threat (i.e. not currently endangered), either due to the number of known populations (generally >5), or known populations being large, and either widespread or protected. Such taxa are under consideration for declaration as 'rare flora' but are in need of further survey.

4: Priority Four - Rare Taxa

Taxa which are considered to have been adequately surveyed and which, whilst being rare (in Australia), are not currently threatened by any identifiable factors. These taxa require monitoring every 5-10 years.

APPENDIX 2

Definitions of the status of the threat to ecological communities (English and Blyth 1999) in Bush Forever (2000)

Category	Definition
1 – Presumed Totally Destroyed	*"An ecological communit,y which has been adequately searched for but for which no representative occurrences have been located. The community has been found to be totally destroyed or so extensively modified throughout it's range that no occurrence of it is likely to recover it's species composition and/or structure in the foreseeable future"*
2 - Critically Endangered	*"An ecological community which has been adequately surveyed and found to have been subject to a major contraction and/or was originally of limited distribution and is facing severe modification or destruction throughout it's range in the immediate future, or is already severely degraded throughout it's range but capable of being substantially restored or rehabilitated"*
3 - Endangered	*" An ecological community which has been adequately surveyed and found to have been subject to a major contraction in area and/or was originally of limited distribution and is in danger of significant modification throughout it's range or severe modification or destruction over most of it's range in the near future.*
4 - Vulnerable	*"An ecological community which has been adequately surveyed and found to be declining and/or has declined in the distribution and/or condition ands whose ultimate security has not been assured and/or a community which is still widespread but is believed to move into a category of higher threat in the near future if threatening processes continue or begin operating throughout it's range."*
5 – Data Deficient	*"An ecological community for which there is an inadequate data to assign it to one of the above categories and/or which is not yet evaluated. (Usually an ecological community with poorly known distribution or biology that is suspected to belong to any of the above categories. These ecological communities have a priority for survey and/or research.)"*
6 – Lower Risk	*"A community which has been adequately surveyed and evaluated and available information suggests that it does not qualify"*

APPENDIX 3

Species list for Lake Clifton Mining Lease M70/1172 Crn of Old Coast Rd and Old Bunbury Road, Lake Clifton

*Denotes a weed species

			Community		
Family	**Species**	**Common Name**	**M.huegelii**	**Agonis**	**Banksia**
ANTHERICACEAE	Sowerbaea laxifora	Purple Tassels			
ANTHERICACEAE	Thysanotus dichotomus				
APIACEAE	Daucus glochidiatus	Native Carrot			
ASTERACEAE	*Arotheca calenula	Capeweed			
ASTERACEAE	*Tolpis barbarta	Salsify			
ASTERACEAE	Lagenifera huegelii				
ASTERACEAE	Olearia paucidentata				
ASTERACEAE	Ozothamnus cordatus				
ASTERACEAE	Podolepis gracilis	Slender Podolepis			
ASTERACEAE	Podotheca chrysantha	Yellow Podotheca			
ASTERACEAE	Trachymene pilosa	Native Parsnip			
ASTERACEAE	Trichocline spthulata	Native Gerbera			
ASTERACEAE	Rhodanthe citrina				
BRASSICACEAE	*Heliophila pusilla				
CARYOPHYLLACEAE	*Petrorhagia dubia	Velvet Pink			
CASUARINACEAE	Allocasuarina fraseriana	Sheoak			
CHENOPODACEAE	Rhagodia baccata	Berry Salbush			
CYPERACEAE	Lepidosperma squamatum				
DASYPOGONACEAE	Lomandra hermaphrodita				

			Community		
Family	**Species**	**Common Name**	**M.huegelii**	**Agonis**	**Banksia**
DASYPOGONACEAE	Lomandra micrantha				
DILLENIACEAE	Hibbertia hypericodes	Yelolw Buttercup			
DILLENIACEAE	Hibbertia racemosa	Stalked Guinea Flower			
DROSERACEAE	Drosera erthrorhiza				
DROSERACEAE	Drosera macrantha				
DROSERACEAE	Drosera stolonifera				
EPACRIDACEAE	Leucopogon propinquus				
EUPHORBIACEAE	*Euphorbia peplus	Petty Spurge			
EUPHORBIACEAE	Phyllanthus calycinus	False Boronia			
GERANIACEAE	Geranium solanderi	Native Geranium			
GERANIACEAE	Gernaium retrorsum				
GERANIACEAE	Pelargonium littorale				
HAEMODORACEAE	Conostylis aculeata subsp aculeata	Prickly Conostylis			
HAEMODORACEAE	Conostylis candicans	White Conostylis			
IRIDACEAE	*Freesia afin leichtlini	Freesia			
IRIDACEAE	Patersonia occidentalis	Purple Falgs			
LOGANIACEAE	Phyllangium paradoxum				
MIMOSACEAE	Acacia applenata				
MIMOSACEAE	Acacia pulchella var pulchella	Pickley Moses			
MIMOSACEAE	Acacia truncata				
MYRTACEAE	Agonis flexuosa	Peppermint			
MYRTACEAE	Eucalyptus gomphocephala	Tuart			
MYRTACEAE	Eucalyptus marginata	Jarrah			
MYRTACEAE	Hypocalymma augustifolia	Swan River Myrtle			
MYRTACEAE	Melaleauca heugellii	Chenille Honeymyrtle			

			Community		
Family	**Species**	**Common Name**	**M.huegelii**	**Agonis**	**Banksia**
MYRTACEAE	Melaleauca systena	Coastal Honey Myrtle			
ORCHIDACEAE	Caladenia flava	Cowslip Orchid			
ORCHIDACEAE	Caladenia latiflora	Pink Fairy Orchid			
ORCHIDACEAE	Caladenia longocauda	Common White Spider Orchid			
ORCHIDACEAE	Leptoceras menziesii	Beak Orchid			
OXALIDACEAE	*Oxalis pes-caprae	Soursob			
PAPILLIONACEAE	*Trifolium compestri	Hop Clover			
PAPILLIONACEAE	*Trifolium hirtum	Rose Clover			
PAPILLIONACEAE	Bossiaea eriocarpa	Common Brown Pea			
PAPILLIONACEAE	Gompholobium tomentosum	Hairy Yellow Pea			
PAPILLIONACEAE	Hardenbergia comptoniana	Native Wisteria			
PAPILLIONACEAE	Isotropis cuneifolia subsp cunefolium	Granny Bonnets			
PAPILLIONACEAE	Jacksonia furcellata				
PAPILLIONACEAE	Kennedia prostrata	Running Post man			
PAPILLIONACEAE	Templetonia retusa	Cockies Tongues			
PHORMIACEAE	Dianella revoluta	Flax Lily			
PITTOSPORACEAE	Billardiera heterophylla	Australian Blue Bell			
POACEAE	*Briza maxima	Blow Fly Grass			
POACEAE	*Briza minor	Quiver Grass			
POACEAE	*Bromus catharticus	Prairie Grass			
POACEAE	*Erhrarta longifolia	Annual Veld Grass			
POACEAE	*Vulpia fasciculata	Fescue			
POACEAE	Austrostipa semibarbarta	Beade Speargrass			
PROTECEAE	Banksia attenuata	Slender Banksia			

			Community		
Family	**Species**	**Common Name**	**M.huegelii**	**Agonis**	**Banksia**
PROTECEAE	Dryandra nivea	Couch Honey Pot			
PROTECEAE	Dryandra sessilis	Parrot Bush			
PROTECEAE	Grevillea thelemanniana (P4)	Spider net Grevillea			
PROTECEAE	Hakea prostrata	Harsh Hakea			
PROTECEAE	Hakea trifurncata	Two Leaved Hakea			
PROTECEAE	Persoonia longifolia				
RANUNCULACEAE	Clematis pubescens	Old Mans Beard			
RESTIONACEAE	Desmocladis flexuosus				
RHAMNACEAE	Spyridium globulosum	Basket Bush			
STACKHOUSIACEAE	Stackhousia monogyna				
STYLIDACEAE	Stylidum calcaratum				
STYLIDACEAE	Stylidum junceum subsp junceum				
THYMELACEAE	Pimelia lehmanniana				
VIOLACEAE	Hybanthus calycinus	Wild Violet			
ZAMIACEAE	Macrozamia riedlei	Zamia Palm			