Hepburn Park, Landsdale

Detailed Flora and Vegetation Survey

Prepared for the City of Wanneroo

MARCH 2025

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1. EXECUTIVE SUMMARY

Hepburn Park (the study area) is 10.21ha of natural remnant vegetation, located at 357 Alexander Drive Landsdale, in the City of Wanneroo (CoW) in the northern suburbs of Perth Western Australia (Figure 1).

Under the State Metropolitan Region Scheme (MRS) the study area is zoned Urban. The study area is zoned as an Environmental Conservation Reserve (Number 34683) under local CoW District Planning Scheme No. 2.

The CoW Natural Area Asset Management Plan (NAAMP) recommends that baseline survey data be obtained for natural area parks, to inform maintenance and capital works. To obtain this baseline survey data, CoW commissioned a Targeted and Detailed Flora and Vegetation Survey in line with Environmental Protection Authority (EPA) (EPA, 2016) guidelines. This report documents the findings of this survey.

1.1 FLORA

A total of 267 taxa were recorded during the survey, of which 196 or 73.4% were natives. The 267 taxa represented 58 different plant families and 180 plant genera (Section 6.1.1).

A Department of Biodiversity, Conservation and Attractions (DBCA) database search did not identify any previous records of state listed Priority Flora (PF) or Threatened Flora (TF) as being known from within the study area boundary. No TF species listed under the Commonwealth *Environmental Protection Biodiversity Conservation (EPBC) Act 1999* or the Western Australian *Biodiversity Conservation (BC) Act 2016* were recorded during the survey.

Two Priority 2 (P2) Flora species were recorded during the survey, small Forbs *Millotia tenuifolia* var. *laevis* and *Poranthera moorokatta* (Section 6.1.2).

Fifty-four native species of 'other' conservation significance were recorded, which is a high number for a relatively well surveyed region. These were mostly species with range implications, mostly species at the western extent of their known range (Section 6.1.2).

Seventy-one introduced flora species (weeds) were recorded in the study area (Section 6.1.3). Of those, 26 had a High Ecological Impact rating (DBCA, 2023a). Of those 26 species rated High, 23 were also rated as having Rapid Invasiveness. The cover and diversity of naturalised weeds in intact vegetation was generally low. Localised historically disturbed patches and firebreaks, particularly at the western boundary, accounted for much of the diversity of weeds recorded.

1.2 VEGETATION

Five vegetation types were described for the study area (Figure 3).

A: DRY UPLANDS

A1: Consolidated dune westerly aspect midslope. Low Open Woodland to Woodland of *Eucalyptus todtiana* (Pricklybark), *Banksia attenuata* and *B. menziesii* over species-rich Shrub, Forb, Grass, Sedge and Rush strata. Isolated Trees of *Nuytsia floribunda* and *Allocasuarina fraseriana*.

A2: Consolidated dune easterly aspect midslope. Low to Mid Open Woodland to Woodland *Eucalyptus marginata* subsp. *marginata* (Jarrah), *Banksia attenuata* and *B. menziesii* over species-rich Shrub, Forb, Grass, Sedge and Rush strata. Isolated Trees of *Nuytsia floribunda*.

B: INTERGRADE

B1: Consolidated dune lower slopes. Low Woodland to Woodland of *Banksia attenuata, B. ilicifolia* and *B. menziesii* over Shrub, Forb, Grass, Sedge and Rush strata. Isolated Trees of *Eucalyptus todtiana and Melaleuca preissiana*.

C: DAMPLAND BASIN

C1: Outer dampland basin (drier). Mid Open Forest *Banksia ilicifolia, B. attenuata* and *B. menziesii* over Low Open Woodland *Melaleuca preissiana* over Isolated Clumps to Tall Shrubland *Adenanthos cygnorum* subsp. *cygnorum* and Low to Mid Open to Closed Shrubland *Hypocalymma balbakiae* and *Platytheca galioides* over Sparse Rushland *Lyginia imberbis, Hypolaena exsulca* and Sparse Sedgeland *Schoenus caespititius* and Open Forbland *Phlebocarya ciliata.*

C2: Inner dampland basin (wetter). Low Woodland to Open Forest *Banksia ilicifolia, B. attenuata, B. menziesii* and *Melaleuca preissiana* over Tall Isolated Clumps of Shrubs *Adenanthos cygnorum* subsp. *cygnorum* and Low to Mid Open to Closed Shrubland *Hypocalymma balbakiae* and *Platytheca galioides* over Open Sedgeland dominated by *Schoenus caespititius*, Open Rushland *Hypolaena exsulca* and Open Forbland *Phlebocarya ciliata*. Also including wetter species Mid Shrubs *Pericalymma ellipticum* var. f*loridum*, *Astartea affinis* and Sedge *Machaerina arthrophylla.*

The study area contains vegetation of high conservation significance. Except for Vegetation Type C2, each Vegetation Type described in the study area represents both a Commonwealth Threatened Ecological Community (TEC) and two or three Western Australian Priority Ecological Communities (PECs) and/or TECs.

This included:

- *'Banksia Dominated Woodlands of the Swan Coastal Plain (SCP) IBRA Region'* (Endangered) TEC under Commonwealth *EPBC Act 1999*.
- *'Banksia Dominated Woodlands of the SCP IBRA Region'* PEC Priority 3 (P3) (Western Australian equivalent of above).
- *'SCP20a: Banksia attenuata woodlands over species rich dense shrublands (SCP Community type 20a – Gibson et al. 1994)'* TEC (Critically Endangered) listed in Western Australia under the *BC Act, 2016*. Floristic Community Type (FCT) 20a. (FCT20a).
- SCP22: *'Banksia ilicifolia* woodlands' PEC (P3) in Western Australia. (FCT22).

Of the total 10.21ha, 9.88ha of vegetation was in Good or better condition. Including 6.25ha in Excellent condition, 3.26ha in Very Good condition and 0.38ha in Good condition (Figure 5).

Additionally the study area is located on the transition of the Bassendean and Spearwood Dunes. This means that at some level all vegetation types recorded in the study area, were at the easterly or westerly extent of their known ranges. Due to this there were likely to be rare variants present (Section 6.2.4).

1.3 THREATS AND MANAGEMENT IMPLICATIONS

Several Western Australian and Commonwealth publications and guidance documents, outlined the threats to remnant vegetation in the region. Summarised these threats were:

- Clearing and fragmentation.
- Urban degradation and disturbance.
- Lack of recruitment and decline in pollinating and dispersing fauna.
- Feral and problem animals (rabbits, kangaroos, pigs).
- Weeds.
- Diseases (*Phytophthora, Armillaria*).
- Fire regimes (increased frequency and inappropriate timing).
- Groundwater changes.
- Climate change (decline in amount and timing of rain).
- Lack of adequate protection.

All of which are legitimate general threats to the study area.

However there were some specific threats identified during the surveys:

- Recreational access by the public at the western boundary, including dogs on and off lead. Soil crust and litter disturbance by dogs at vegetation edges likely contributing to weed and disease introduction and establishment. Recommendation: if practical, a low barrier be installed between the western firebreak and vegetation, and that any weeds or disturbance already present be rehabilitated.
- Evidence of recreational use in the dampland in the form of two camps, where soil disturbance is leading to weed invasion. Recommendation: to rehabilitate localised disturbed areas to suppress weeds and to eradicate localised outbreaks of the most problematic weed species.
- Despite low weed invasion in intact vegetation, there were a high number of potentially invasive weeds in small localised disturbed areas and at edges. Recommendation: to rehabilitate localised disturbed areas to suppress weeds and to eradicate localised outbreaks of the most problematic weed species.
- There was evidence of rabbits seen in the study area, in the form of their communal latrines and minor grazing of native grasses. Rabbits can introduce and spread weeds. Recommendation: control methods should be implemented where practical.

Acronyms and Abbreviations

AMG	Australian Map Grid
AVH	Australian Virtual Herbarium
BAM Act	*Biosecurity and Agriculture Management Act 2007* (Western Australia)
BC Act	*Biodiversity Conservation Act 2016* (Western Australia)
BGPA	Botanic Parks and Gardens Authority
BoM	Bureau of Meteorology
CCW	Conservation Category Wetland
CoW	City of Wanneroo
DAFWA	Department of Agriculture and Food Western Australia
DBCA	Department of Biodiversity Conservation and Attractions
DCCEEW	Department of Climate Change, Energy, the Environment and Water
DCLM	Department of Conservation and Land Management
DPI	Department for Planning and Infrastructure
DPIRD	Department of Primary Industries and Regional Development
DMIRS	Department of Mines, Industry Regulation and Safety
DoEE	Department of Environment and Energy
DPW	Department of Parks and Wildlife
DWER	Department of Water and Environmental Regulation
EIA	Environmental Impact Assessment
EPA	Environmental Protection Authority
EPBC Act	*Environmental Protection Biodiversity Conservation Act 1999 (Commonwealth)*
ESCAVI	Executive Steering Committee for Australian Vegetation Information
FCT	Floristic Community Type
FCT20a/SCP20a	Synonymous depending on context (scientific context FCT20a, legal SCP20a).
forma.	Form (taxonomy/nomenclature conventions)
GDA94	Geocentric datum of Australia 1994
GDA2020	Geocentric datum of Australia 2020
GPS	Global Positioning System
IBSA	Index of Biodiversity Surveys for Assessments
IBRA	Interim Biogeographical Regionalisation of Australia
IUCN	International Union for Conservation of Nature
LGA	Local Government Area
MNES	Matters of National Environmental Significance
MRS	Metropolitan Region Scheme
NAAMP	Natural Area Asset Management Plan
NVIS	National Vegetation Information System
OTB	One Tree Botanical
PEC	Priority Ecological Community
pers. obs.	Personal observations
pers. comm.	Personal communications
PF	Priority Flora
P1, P2 etc.	Priority 1 to Priority 5. DBCA rating for flora species and ecological communities (See Section 4).
PMR	Perth Metropolitan Region
SCP	Swan Coastal Plain
sens. lat.	Latin: broad sense (taxonomy). Species complex (often with taxonomic work split into different species).
spp.	Botanical naming convention indicating multiple species
ssp. and subsp.	Subspecies (taxonomy/nomenclature conventions)
SSI	Single Site Insertion (statistical analysis)
TEC	Threatened Ecological Community
TF	Threatened Flora
var.	Variety (taxonomy/nomenclature conventions)
WAH	Western Australian Herbarium
WAOL	Western Australian Organism List
WAEWS	Western Australian Environmental Weed Strategy
WONS	Weeds of National Significance

2. PROJECT

2.1 BACKGROUND

Hepburn Park (the study area) is located at 357 Alexander Drive, Landsdale. It is a 10.21ha site in the northern suburbs of Perth Western Australia (Figure 1). It is in the LGA of the CoW.

The study area consists of intact remnant natural vegetation. It is enclosed in low wire fencing on northern, eastern and southern boundaries, with a tall limestone retaining wall on the western boundary. Crushed limestone-based firebreaks are present on northern, western and southern edges. The eastern firebreak is natural sand. A part of the northern boundary has no firebreak and vegetation extends to the boundary fence. There is pedestrian access from Landsdale Road, at the north-west corner, Darling Park on the western boundary, and at the south-east corner near the corner of Alexander Drive and Hepburn Avenue. There are vehicle gates (locked) at the north-west and south-east corners, and the central northern boundary.

2.2 PLANNING FRAMEWORK

Under the MRS the study area is zoned Urban.

The study area is zoned as an Environmental Conservation Reserve (Number 34683) under the local CoW District Planning Scheme No. 2. Reserves in this category have the objectives:

- To identify areas with biodiversity and conservation value, and to protect those areas from development and subdivision.
- To identify and protect areas of biodiversity conservation significance within National Parks and State and other conservation reserves.

This differs from the more common Parks and Recreation zoning, which have multiple objectives:

- To set aside areas for public open space, particularly those established under the *Planning and Development Act 2005 s. 152*.
- To provide for a range of active and passive recreation uses such as recreation buildings and courts and associated car parking and drainage.

2.3 PURPOSE OF SURVEY

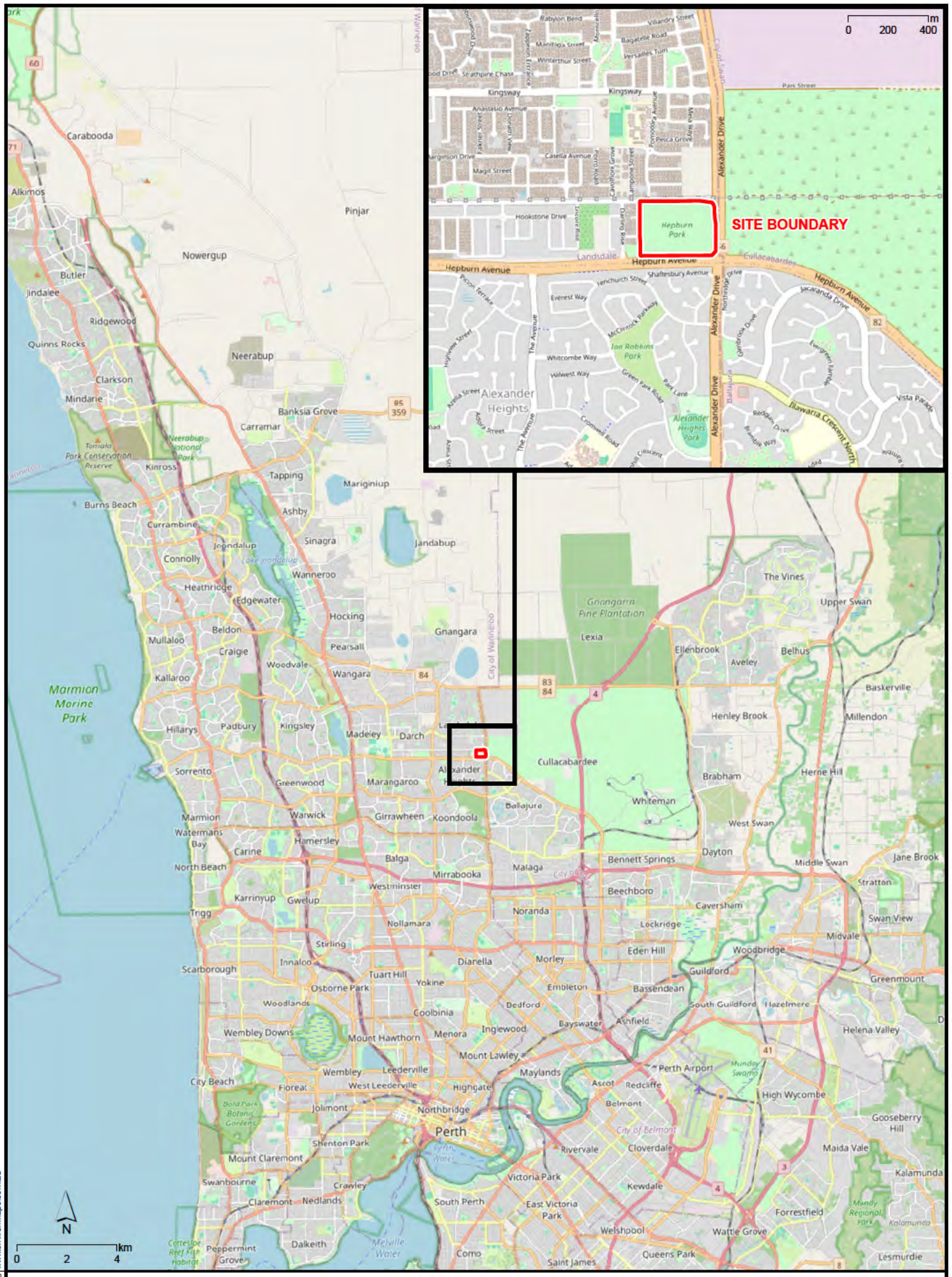
The CoW NAAMP recommends that baseline survey data be obtained for natural area parks, to inform maintenance and capital works. This report presents baseline data for flora and vegetation values in the study area.

2.4 SCOPE OF WORKS

To obtain baseline survey data, the CoW commissioned a Targeted and Detailed Flora and Vegetation Survey in line with EPA (EPA, 2016) guidelines and as outlined in CoW checklists (CoW, 2024 & 2024a).

The scope of works requested by the CoW consisted of:

- A Detailed and Targeted Flora and Vegetation Survey, with sampling techniques including Traverses, Quadrats, Relevés, Opportunistic Sampling and Vegetation Condition Rating (EPA, 2016 p. 7).
- A two-phase spring survey.
- A report including a desktop review of available literature, background, methods and survey results.
- An assessment against the Diagnostic Criteria of the Commonwealth-listed *'Banksia Woodland of the SCP'* TEC (Endangered) (*EPBC Act 1999*).
- Data including but not limited to electronic and hardcopy report, photographs and digital mapping including Index of Biodiversity Surveys for Assessments (IBSA) package and metadata statements.



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ONE TREE BOTANICAL

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FIGURE 1

HEPBURN PARK, LANDSDALE LOCALITY MAP

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3. CONTEXT

3.1 LAND USE HISTORY

The study area is an area of mostly intact native vegetation that has relatively recently been surrounded by urban development. Prior to this, the study area was largely semi-rural, with market gardens and small landholdings.

In the 1950's, historical aerial photography shows the region was almost entirely intact native vegetation. The first road in the area was Landsdale Road which appeared in the 1960's. In the 1970's, there was subdivision of the native vegetation into small landholdings. Broadscale clearing and urbanisation started in the 1980's and onwards.

In 2018 a controlled burn was completed, which affected a strip 70m wide along the western boundary, including a temporary firebreak. From historical aerial photography, it appeared that the study area had also been burnt in the late 1970's, and again in the early 1980's.

During surveys, evidence of disturbance from a legacy track through the south-west portion of the study area was observed. From historical aerial photography, this track and associated disturbance, appeared to have been established between 1990 and 2000.

3.2 CLIMATE AND SEASONAL CONDITIONS

The closest long-term and open Bureau of Meteorology (BoM) weather recording station was Wanneroo, approximately 10km to the NW of the study area (Site No. 009105) (Lat. 31.73°S, Long. 115.79°E).

While this is some distance from the study area, there are few long term continuously operating weather stations still open in the northern suburbs of Perth.

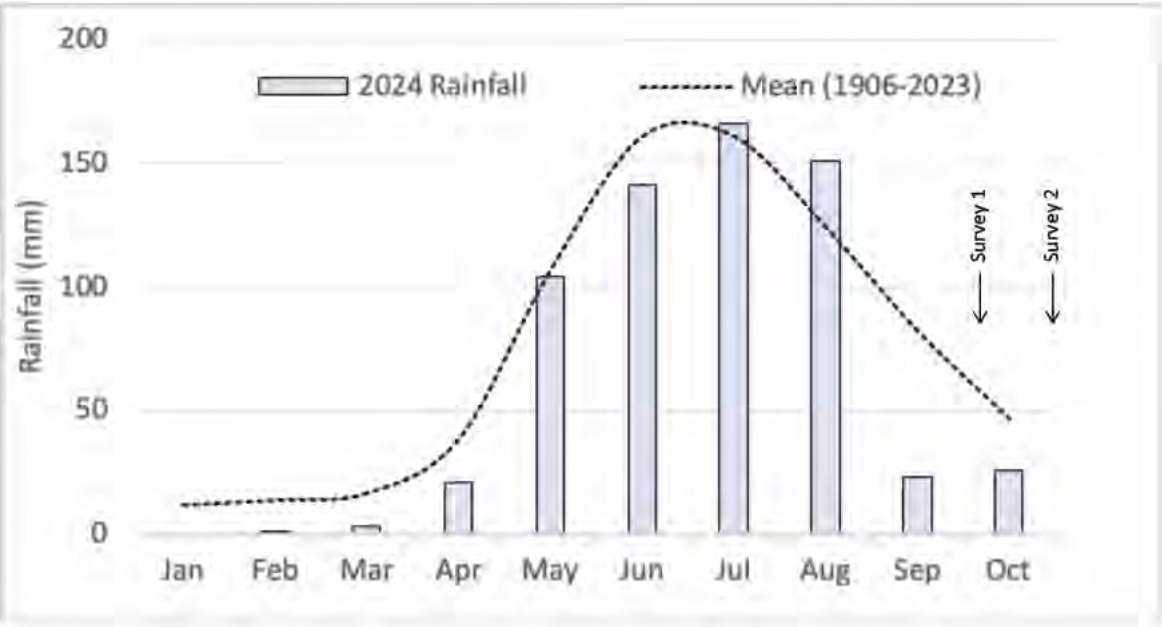

Figure 2: Rainfall Wanneroo (BoM Site No. 009105) between January and October 2024.

The mean annual rainfall between 1906 when records first began and 2024, was 786.4mm (BoM, 2024). The lowest annual rainfall for that period was 470.5mm in 1914, and highest 1,283.9mm in 1926. The mean annual rainfall between 1961 and 1990 was 761.0mm (BoM, 2024). The lowest for that period was 498.2mm in 1977 and highest 1142.7mm in 1964. Other shorter periods after 1960 have all had lower annual averages, varying from 730.78mm (1980-2022) to 695.4mm (2000-2022). This indicated declining rainfall over previous decades.

In the months leading up to the surveys (April to September 2024) 606.1mm of rain was recorded, compared to the long term mean for this period of 671.6mm (Figure 2).

The summer period preceding spring 2024, was extremely dry with only 18mm recorded between October 2023 and March 2024 (the long term mean for this period is 118mm). However rainfall between May and August 2024 was consistent, and without the dry spells that frequently occur during winter rains.

3.3 BIOREGIONAL AND BIOGEOGRAPHICAL

The following provides very broad contextual information only.

3.3.1 Soil

Digital soil landscape mapping was completed by Department of Primary Industries and Regional Development (DPIRD, 2019). This was based originally on the work of Schoknecht *et. al.* (2004).

DPIRD (2019) mapped the study area as a transition area between two major landscape systems, the 'Bassendean, Jandakot phase' and the 'Karrakatta Sand Yellow phase'.

'Bassendean, Jandakot phase' was described as *'Jandakot low dunes. Slopes <10% and generally more than 5m relief. Grey sand over pale yellow sands generally underlain by humic and iron podsols; Banksia spp. low open woodland with a dense shrub layer'*. This description roughly described the eastern portion of the study area.

'Karrakatta Sand Yellow phase' was described as *'Low hilly to gently undulating terrain. Yellow sand over limestone at 1-2 m. Banksia spp. woodland with scattered emergent E. gomphocephala and E. marginata and a dense shrub layer'*. This description roughly described the western portion of the study area.

Additionally, the wetland present in the study area was mapped as *'Bassendean, Joel phase'*. This was described as *'Poorly drained depressions. Humus podzols. Scattered M. preissiana, E. rudis and Banksia ilicifolia with a dense shrub layer'*.

3.3.2 Wetlands

The report Wetlands of the SCP (Hill *et al*., 1996) mapped and categorised wetlands across the SCP, between Wedge Island and Dunsborough. It includes mapping of wetland boundary extent, wetland classification type and management categories. The Geomorphic Wetlands SCP (DBCA, 2025) dataset is the digitised version of this study, and DBCA is now custodian of this dataset, including any changes. This dataset has been endorsed by the Wetlands Coordinating Committee, the EPA and the Department for Planning and Infrastructure (DPI).

Review of the Geomorphic Wetlands SCP dataset (DBCA, 2025) showed a Dampland Basin wetland approximately 2.5 hectares in size, identified as Unnamed Wetland 13917, located within the study area.

Unnamed Wetland 13917 has a conservation management category commonly referred to as a Conservation Category Wetland (CCW).

The original mapping was done in the early 1990's, when georeferencing was often problematic. Many of the wetlands in the dataset are still mapped with inaccuracies from that time. These appear to be consistently approximately 20-30m out. This includes the wetland in the study area, which based on vegetation, is displaced approximately 30m to the east of its actual location.

These errors are usually obvious from aerial photography. However the current custodians of the dataset, have a policy to leave the responsibility for remapping the boundaries to individuals. This is a form-based application process, which is managed by the data custodian in the DBCA Species and Communities Branch.

3.3.3 IBRA Regions and Sub-Regions

The survey area is in the Interim Biogeographical Regionalisation of Australia (IBRA) region of the SCP. It is within the sub-region SWA02: Perth (Thackway and Cresswell, 1995).

The Biodiversity Audit of Western Australia Bioregional Summary of SWA02: Perth (DCLM, 2002) describes the relevant section of the SCP as:

> *'a low lying coastal plain, mainly covered with woodlands. It is dominated by Banksia or Tuart on sandy soils, Casuarina obesa on outwash plains, and paperbark in swampy areas. Three phases of marine sand dune development provide relief. The Perth subregion is composed of colluvial and aeolian sands, alluvial river flats, coastal limestone. Heath and/or Tuart woodlands on limestone, Banksia and Jarrah- Banksia woodlands on Quaternary marine dunes of various ages, Marri on colluvial and alluvials. Includes a complex series of seasonal wetlands and includes Rottnest, Carnac and Garden Islands etc. Rainfall ranges between 600mm and 1000mm annually and the climate is Mediterranean. The subregional area is 1,333,901ha.'*

It is described as having a *'High Species and Ecosystem Diversity and a large number of rare and threatened species and Ecological Communities'*.

Acknowledging that this description is over 20 years old, the condition of the bioregion is described as:

> *'In many of the smaller reserves (<100ha) understorey species composition is often depauperate and in a degraded state resulting from grass and other weed invasion (however some small reserves, including those on the heavy soils of the eastern coastal plain are able to retain the majority of the original species), grazing impacts (including from kangaroos) and too frequent fires. Fire regimes based on biodiversity outcomes are generally absent, deliberately lit wildfires can and do occur frequently depending on the proximity of the reserve to urbanisation. Formalised biodiversity monitoring programs are absent.'* (DCLM, 2002).

3.3.4 Vegetation Survey of Western Australia (Beard, 1979)

While the study area is in the Bassendean System as mapped by DPIRD (2021), it is located adjacent to the boundary of the Spearwood System. The descriptions and status of both are included in Table 1.

Table 1: Vegetation Associations (Beard, 1979, as amended)

Veg. Assoc.	Name	Vegetation (Shepherd *et al*., 2002)	Vegetation (Beard, 1979)	Extent and Reservation (Govt. of WA, 2019)
6	SPEARWOOD_6.1	Medium Woodland; Tuart and Jarrah	**E2/4Mi** Mixed jarrah and tuart with sheoak and banksia.	Originally 54,427 ha with 13288 ha (24.41%) remaining. 1,860ha or 3.42% reserved.
1001	BASSENDEAN_1001	Medium very sparse woodland; Jarrah, with low woodland, Banksia and Casuarina.	**e2Mb.cbLi** Casuarina-Banksia low woodland with scattered jarrah.	53,284 ha with 11,394ha (21.38%) remaining. 1,603ha or 3.1% reserved.

The extent and reservation figures within Table 1 do not specify the condition of the vegetation within the remaining vegetation. It is likely that the proportion of vegetation in Very Good or better condition is significantly less than the total remaining area indicated. 'Vegetation Type' is a broad categorisation, which are made up of numerous rarer sub-types, few of which have detailed data on how much remains. Data was also approximately six years old at the time of publication.

Many plant groups described in the following section have undergone taxonomic reviews since 1979. The current names are provided in brackets where traceable. Some species are neither current or able to be traced backwards.

Bassendean System

Beard (1979) described the Bassendean System as a wide area naturally subject to natural variation across a large range, occurring between Cockleshell Gully in the north and Busselton in the south.

Four sections were defined for the Perth region. South of Lake Gnangara and including the study area, was the most southerly 'Perth section'. Described as *'an area of mostly subdued sandhills of leached siliceous sand and interdunal swamps'*. Compared to the Spearwood System, *Casuarina (Allocasuarina) fraseriana* becomes as important in the low woodland, as the *Banksia attenuata, B. menziesii* and *B. ilicifolia*.

Eucalyptus todtiana is described as typical of Bassendean Dunes. Beard describes the 'Perth Section' as a transition where *Eucalyptus todtiana* (Pricklybark) and *Eucalyptus marginata* (Jarrah) co-occur. He describes the understorey as unstudied (Gibson *et al*., 1994 subsequently studied these).

Spearwood System

Beard (1979) described the Spearwood System as *'ridges of calcarenite deposited parallel to the coast, yellow sand bleached at the surface, becoming less calcareous from west to east'*. However the study area was at the far eastern boundary of the Spearwood System, and there was likely to be little direct influence from coastal limestone.

Eucalyptus todtiana was described as declining in the Spearwood Dunes, where *'scattered trees of Eucalyptus marginata'* appear instead. These were described as *'shorter than normal for the species, spreading and branchy, but rise above the canopy of the low woodland'*.

Vegetation was described as mainly Eucalypt woodlands of *Eucalyptus marginata* (Jarrah) or *E. gomphocephala* (Tuart) interspersed with wetlands in depressions between ridges. With a 'lower layer of smaller trees' including *Banksia attenuata, B. menziesii* and *Casuarina (Allocasuarina) fraseriana*.

A shrub layer was described as including *Acacia cyanophylla (Acacia saligna), A. cyclops, Anthocercis littorea, Dodonaea aptera, Dryandra (Banksia) sessilis, Grevillea vestita, Hakea prostrata, Jacksonia furcellata, J. sternbergiana, Logania vaginalis, Melaleuca huegelii, Myoporum tetrandrum (M. insulare) and Templetonia retusa*. Low shrubs under one metre *Acacia dilatata* (possibly *A. huegelii), A. pulchella, Calothamnus quadrifidus, Casuarina (Allocasuarina) humilis, Diplopeltis huegelii, Dryandra nivea (Banksia dallanneyi) Grevillea crithmifolia, G. thelemanniana (G. preissii), Helichrysum cordatum (Pithocarpa cordata), Hibbertia hypericoides, H. racemosa, Leucopogon parviflorus, Melaleuca acerosa (M. systena), Petrophile serruriae, Phyllanthus (Lysiandra) calycina, Rhagodia baccata, Scaevola nitida, S. thesioides, Synaphea polymorpha (spinulosa).* Also a stratum including cycad *Macrozamia riedlei* (*M. fraseri)* and grasstree *Xanthorrhoea preissii*. Creepers including *Clematis microphylla, Kennedia prostrata, Hardenbergia comptoniana*.

Many of the species described above, including Tuart, are more typical of calcareous habitats further to the west, and did not reflect the vegetation in the study area. However Beard (1979) also described mixed stands with *Eucalyptus marginata* (Jarrah) including species such as *Banksia attenuata, B. menziesii, Allocasuarina fraseriana, Adenanthos cygnorum, Banksia grandis, Conospermum, Isopogon* and *Petrophile* spp. and *Stirlingia latifolia*, which was more descriptive of the study area.

Beard (1979) states that *'understoreys have not been studied*' (Gibson *et al.*, 1994 subsequently studied these).

3.3.5 Vegetation Complexes

Vegetation Complex 44: Bassendean Complex-Central and South

According to 1:250,000-scale vegetation mapping by Heddle *et al.* (1980), the study area is in the far western edge of the Bassendean Dunes in Vegetation Complex 44: Bassendean Complex-Central and South. It is at the boundary of the Spearwood Dunes in Vegetation Complex 49: Karrakatta Central and South.

Heddle *et al.* (1980) described Bassendean Complex - Central and South as ranging from *'woodland of jarrah-sheoak-banksia on the sand dunes, to a low woodland of Melaleuca spp. and sedgelands on the low-lying depressions and swamps'*. They also described it as an area of transition of *Eucalyptus todtiana* (Pricklybark) and *Eucalyptus marginata* (Jarrah). The tree species typical of dry uplands consisted of *Banksia attenuata, B. menziesii* and *B. grandis*, with *B. ilicifolia, B. littoralis* and *Melaleuca preissiana* being typical of low-lying moist soils.

The original total extent of Bassendean Complex - Central and South on the SCP was 87,476ha, of which 23,509ha or 26.9% remained (Govt. of WA, 2019). Of the original extent 2.15% was protected within reserves.

The original extent of Bassendean Complex - Central and South within the PMR (based on the MRS boundary) was 46,279ha of which 10,175ha or 22% remained. Of the original extent, 3.54% was protected in reserves.

The original extent of Bassendean Complex - Central and South within the CoW was 924.98ha, of which 208.60ha or 22.55% remained. Of the original extent of this vegetation complex, 19.9% was within the CoW. Approximately 1.06% of what remains of this complex in total, is located within the CoW.

These figures did not take into account the condition of the remaining areas. It is likely that the amount of vegetation in Very Good or better condition is significantly less than these figures indicate. A vegetation complex is a broad vegetation categorisation made up of many rarer sub-types, few of which have detailed data on how much remains. Extent data is also now more than six years old. Under the National Reserve System it was generally recommended that for a Comprehensive, Adequate and Representative (CAR) system, that 30% of each ecosystem is protected (10% in constrained areas). In that context these figures fall short even at a broad scale assessment of ecosystems. Additionally, the study area is on the transition of two broad bioregional systems, and is likely to have unique ecological characteristics due to this.

Spearwood Complex - Karrakatta Central and South

The study area was located at the boundary of the Spearwood Complex - Karrakatta Central and South. Heddle *et al.* (1980) described this an open forest of Tuart-Jarrah-Marri, with Tuart being more common in the drier western parts and Jarrah in the moister eastern parts. Common species are described as *Banksia attenuata, B. menziesii, Banksia grandis* and *Allocasuarina fraseriana* with some *Agonis flexuosa* and shrubs *Hibbertia hypericoides, Conospermum stoechadis, Hovea trisperma* and *Bossiaea eriocarpa*.

Govt. of WA (2019) describe Spearwood Complex - Karrakatta Central and South as *'Predominantly open forest of Eucalyptus gomphocephala (Tuart) - Eucalyptus marginata (Jarrah) - Corymbia calophylla (Marri) and woodland of Eucalyptus marginata (Jarrah) - Banksia species'*.

The original total extent of Spearwood Complex - Karrakatta Central and South on the SCP was 53,081ha, of which 12,467ha or 23.5% remains (Govt. of WA, 2019). Of the original extent, 4.61% was protected within reserves.

The original extent of Spearwood Complex - Karrakatta Central and South within the PMR (based on the MRS boundary) was 34,596ha of which 4,292ha or 12.40% remain. Of the original extent, 1.39% was protected within reserves.

The original extent of Spearwood Complex - Karrakatta Central and South within the CoW was 10,539ha, of which 1,359ha or 12.9% remains. Of the original extent of this complex, 19.9% was within the CoW. Approximately 31% of what remains of this complex in total, is located within the CoW.

3.3.6 Floristic Survey of the Southern Swan Coastal Plain (Gibson *et al.*, 1994)

Gibson *et al.* (1994) documented flora and vegetation surveys that were completed on the southern SCP in the early 1990's.

The study used scientific quadrat-based methodology, completing 509 quadrats between Seabird in the north and the Whicher Range near Busselton in the south. This data was then analysed to determine the types of vegetation present and the patterns of distribution across the region. They referred to their vegetation floristic units as FCTs.

The data analysis used by Gibson *et al.* (1994) was based on floristic composition alone rather than taking structure into account. The rationale for this was that using floristics is more appropriate for large datasets i.e. at a bioregional scale.

Since that time these FCTs have been used to define and inform Western Australian and Commonwealth listings of Priority (PEC) and Threatened (TEC) Ecological Communities on the SCP.

The authors themselves were aware that 509 quadrats over the large geographical area involved, was not comprehensive enough to adequately define the vegetation fully. The intention was to build on the dataset, however this did not happen.

Keighery *et al.* (2020) attempted to remedy this by increasing the dataset to 1,163 quadrats. This was an improvement but still inadequate for the area involved. Additionally, the authors themselves state that the updated dataset was not suitable for statistical analysis, due to complex reasons around their statistical analysis being constrained by existing legal listings of ecological communities. In the context of this study, while 11 additional FCT20a quadrats were added to Keighery *et al.* (2020), these were from the eastern cluster of this FCT. The western cluster relevant to the study area, still only consisted of two quadrats at Koondoola Open Space, and one each at Landsdale Park Darch and Marangaroo Conservation Reserve (all within 4km of the study area). DBCA Species and Communities Branch have more extensive, mapped records and data from TECs and PECs across the SCP, however this information is not shared at a bioregional scale.

While these datasets are useful for analysis and context, the lack of a comprehensive regional quadrat database has ongoing consequences for fully identifying and protecting poorly represented vegetation types.

4. LEGISLATION AND GUIDELINES

4.1 ENVIRONMENTAL PROTECTION ACT 1986 WESTERN AUSTRALIA

The *Environmental Protection (EP) Act 1986* is the guiding legislation for Environmental Impact Assessment (EIA) in Western Australia. Formal assessments for projects likely to have significant impacts are completed by the EPA under this legislation.

4.1.1 Environmental Protection (Clearing of Native Vegetation) Regulations 2004

The *EP Act* includes the *Clearance of Native Vegetation Regulations 2004* under which clearing permits are required to clear native vegetation. The permit system is administered by either the Western Australian Department of Water and Environmental Regulation (DWER), or for exploration activities, the Department of Mines, Industry Regulation and Safety (DMIRS).

4.1.2 Technical Guidance under the *EP Act 1986*

The EPA's Technical Guidance for Flora and Vegetation Surveys for EIA (EPA, 2016) outlines the supporting information required for botanical assessments under the *EP Act 1996*. While this study is not for EIA purposes, EPA (2016) still provides comprehensive general guidance on the methodology required to survey and document flora and vegetation in Western Australia.

4.2 *BIODIVERSITY CONSERVATION ACT 2016 - WESTERN AUSTRALIA*

As of January 1st 2019, the *Biodiversity Conservation (BC) Act 2016* replaced the *Wildlife Conservation Act 1950* in Western Australia.

All native flora species are protected under the *BC Act 2016*. Flora cannot be taken without a permit. There are substantially higher and broader ranging penalties under the new act, up to $500,000 for individuals and $2,500,000 for corporate entities for disturbing matters listed under the act, including Threatened species and communities. Additionally, there are substantial fines to individuals and organisations for failing to report matters of environmental significance.

4.2.1 Threatened Flora (TF) (Western Australia)

The *BC Act 2016* protects state listed TF. The TF list is regularly reviewed with updates published in the Government Gazette and is also published on Florabase (WAH, 1998). Each TF species is given a rank consistent with IUCN Red List criteria (Table 2).

Table 2: Definition of Threatened Flora Species (DBCA, 2019).

T: Threatened species	Listed by order of the Minister as Threatened in the category of critically endangered, endangered or vulnerable under section 19(1), or is a rediscovered species to be regarded as threatened species under section 26(2) of the *Biodiversity Conservation Act 2016* (BC Act). ***Threatened flora*** is that subset of 'Rare Flora' listed under schedules 1 to 3 of the *Wildlife Conservation (Rare Flora) Notice 2018* for Threatened Flora. The assessment of the conservation status of these species is based on their national extent and ranked according to their level of threat using IUCN Red List categories and criteria as detailed below: **CR: Critically Endangered** Threatened species considered to be "*facing an extremely high risk of extinction in the wild in the immediate future, as determined in accordance with criteria set out in the ministerial guidelines*".

	EN: Endangered Threatened species considered to be "*facing a very high risk of extinction in the wild in the near future, as determined in accordance with criteria set out in the ministerial guidelines*". **VU: Vulnerable** Threatened species considered to be "*facing a high risk of extinction in the wild in the medium-term future, as determined in accordance with criteria set out in the ministerial guidelines*".
X: Presumed extinct species	**EX Extinct species** Species where "*there is no reasonable doubt that the last member of the species has died*", and listing is otherwise in accordance with the ministerial guidelines (section 24 of the BC Act). Published as presumed extinct under schedule 4 of the *Wildlife Conservation (Specially Protected Fauna) Notice 2018* for extinct fauna or the *Wildlife Conservation (Rare Flora) Notice 2018* for extinct flora. **EW Extinct in the wild species** Species that *"is known only to survive in cultivation, in captivity or as a naturalised population well outside its past range; and it has not been recorded in its known habitat or expected habitat, at appropriate seasons, anywhere in its past range, despite surveys over a time frame appropriate to its life cycle and form*", and listing is otherwise in accordance with the ministerial guidelines (section 25 of the BC Act). Currently there are no threatened fauna or threatened flora species listed as extinct in the wild. If listing of a species as extinct in the wild occurs, then a schedule will be added to the applicable notice.

4.2.2 Priority Flora (PF) (Western Australia, DBCA)

The DBCA maintain a supplementary PF list.

Species on this list are not specifically protected under current legislation, however they are closely considered in EIA processes and also provide an indication of rarity outside TF listings. They are described in EPA (2016) as flora of 'other' conservation significance.

Priority 1 (P1) to P3 flora are species that are awaiting assessment for TF status but which do not currently have enough information to enable that assessment. The three categories represent the order of priority for assessment.

Priority 4 (P4) species are those species that are adequately known, rare but not threatened and which require regular monitoring.

Table 3 more comprehensively defines categories of PF. The status of PF are updated and published on the database of the Western Australian Herbarium (WAH) Florabase (WAH, 1998-).

Table 3: Priority Flora Conservation Codes and Definitions (DBCA, 2019).

P1: Priority One Poorly-known species	Species that are known from one or a few locations (generally five or less) which are potentially at risk. All occurrences are either: very small; or on lands not managed for conservation, e.g. agricultural or pastoral lands, urban areas, road and rail reserves, gravel reserves and active mineral leases; or otherwise under threat of habitat destruction or degradation. Species may be included if they are comparatively well known from one or more locations but do not meet adequacy of survey requirements and appear to be under immediate threat from known threatening processes. Such species are in urgent need of further survey.
P2: Priority Two Poorly-known species	Species that are known from one or a few locations (generally five or less), some of which are on lands managed primarily for nature conservation, e.g. national parks, conservation parks, nature reserves and other lands with secure tenure being managed for conservation. Species may be included if they are comparatively well known from one or more locations but do not meet

	adequacy of survey requirements and appear to be under threat from known threatening processes. Such species are in urgent need of further survey.
P3: Priority Three Poorly-known species	Species that are known from several locations, and the species does not appear to be under imminent threat, or from few but widespread locations with either large population size or significant remaining areas of apparently suitable habitat, much of it not under imminent threat. Species may be included if they are comparatively well known from several locations but do not meet adequacy of survey requirements and known threatening processes exist that could affect them. Such species are in need of further survey.
P4: Priority Four Rare, Near Threatened and other species in need of monitoring	(a) Rare. Species that are considered to have been adequately surveyed, or for which sufficient knowledge is available, and that are considered not currently threatened or in need of special protection but could be if present circumstances change. These species are usually represented on conservation lands. (b) Near Threatened. Species that are considered to have been adequately surveyed and that are close to qualifying for vulnerable but are not listed as Conservation Dependent. (c) Species that have been removed from the list of threatened species during the past five years for reasons other than taxonomy.

4.2.3 Threatened Ecological Communities (TECs) (Western Australia, *BC Act*)

Sixty-five TECs have been gazetted under the *BC Act 2016* as of 23 November 2023. Of which 45 are Critically Endangered, nine are Endangered and 11 are Vulnerable (DBCA, 2023). Table 4 defines these criteria.

Table 4: Criteria for Western Australian Threatened Ecological Communities (TECs) (*BC Act 2016*)

Collapsed (CO)	An ecological community is eligible for listing as a collapsed ecological community at a particular time if, at that time: (a) there is no reasonable doubt that the last occurrence of the ecological community has collapsed; or (b) the ecological community has been so extensively modified throughout its range that no occurrence of it is likely to recover: (i) its species composition or structure; or (ii) its species composition and structure.
Critically Endangered (CR)	An ecological community is eligible for listing in the category of critically endangered ecological community at a particular time if, at that time: (a) it is facing an extremely high risk of becoming eligible for listing as a collapsed ecological community in the immediate future, as determined in accordance with criteria set out in the ministerial guidelines; and (b) listing in that category is otherwise in accordance with the ministerial guidelines.
Endangered (EN)	An ecological community is eligible for listing in the category of endangered ecological community at a particular time if, at that time — (a) it is not a critically endangered ecological community; and (b) it is facing a very high risk of becoming eligible for listing as a collapsed ecological community in the near future, as determined in accordance with criteria set out in the ministerial guidelines; and (c) listing in that category is otherwise in accordance with the ministerial guidelines.
Vulnerable (VU)	An ecological community is eligible for listing in the category of vulnerable ecological community at a particular time if, at that time: (a) it is not a critically endangered ecological community or an endangered ecological community; and

	(b) it is facing a high risk of becoming eligible for listing as a collapsed ecological community in the medium-term future, as determined in accordance with criteria set out in the ministerial guidelines; and (c) listing in that category is otherwise in accordance with the ministerial guidelines.

Recovery plans and interim recovery plans have been developed by DBCA for state listed TECs. These plans are designed to identify the threatening processes most affecting the survival of TECs.

There is one recovery plan with relevance to the study area; Interim Recovery Plan No. 359: *Banksia attenuata* woodlands over species rich dense shrublands (SCP Community Type 20a – Gibson *et al.* 1994) (2016-2021) (DPW, 2016).

4.2.4 Priority Ecological Communities (PECs) (Western Australia, DBCA)

In Western Australia, potential TECs that do not meet criteria, are not adequately defined or do not have adequate information, are added to the PEC List as P1, P2 or P3 (Table 5). P4 are those ecological communities that are moderately well known and not under immediate threat. Priority 5 (P5) are conservation reliant ecological communities, that are likely to collapse without active management.

PECs are not specifically protected under current legislation however they are listed in EPA (2016) under 'significant vegetation'.

There are currently 390 PECs listed by the DBCA Threatened Species and Communities Branch (DBCA, 2023).

Table 5: Priority Ecological Communities (PECs) Definitions and Criteria (DBCA, 2023).

Priority One: Poorly-known ecological communities	Communities that are known from very few occurrences with a very restricted distribution (generally ≤5 occurrences or a total area of ≤100ha). Occurrences are believed to be under threat either due to limited extent, or being on lands under immediate threat or for which current threats exist. May include communities with occurrences on protected lands. Communities may be included if they are comparatively well-known from one or more localities but do not meet adequacy of survey requirements, and/or are not well defined, and appear to be under immediate threat from known threatening processes across their range.
Priority Two: Poorly-known ecological communities	Communities that are known from few occurrences with a restricted distribution (generally ≤10 occurrences or a total area of ≤200ha). At least some occurrences are not believed to be under immediate threat of destruction or degradation. Communities may be included if they are comparatively well known from one or more localities but do not meet adequacy of survey requirements, and/or are not well defined, and appear to be under threat from known threatening processes.
Priority Three: Poorly known ecological communities	i) Communities that are known from several to many occurrences, a significant number or area of which are not under threat of habitat destruction or degradation or: ii) Communities known from a few widespread occurrences, which are either large or with significant remaining areas of habitat in which other occurrences may occur, much of it not under imminent threat (within approx. 10 years), or; iii) Communities made up of large, and/or widespread occurrences, that may or may not be represented in the reserve system, but are under threat of modification across much of their range from processes such as grazing by domestic and/or feral stock, inappropriate fire regimes, clearing, hydrological change etc. Communities may be included if they are comparatively well known from several localities but do not meet adequacy of survey requirements and/or are not well defined, and known threatening processes exist that could affect them.
Priority Four: Ecological communities that are adequately known, rare but not threatened or meet criteria for Near Threatened, or that have been recently removed from the threatened list.	i) Rare. Ecological communities known from few occurrences that are considered to have been adequately surveyed, or for which sufficient knowledge is available, and that are considered not currently threatened or in need of special protection, but could be if present circumstances change. These communities are usually represented on conservation lands. ii) Near Threatened. Ecological communities that are considered to have been adequately surveyed and that do not qualify for Conservation Dependent, but that are close to qualifying for a higher threat category. iii) Ecological communities that have been removed from the list of threatened communities during the past five years.
Priority Five: Conservation Dependent ecological communities	Ecological communities that are not threatened but are subject to a specific conservation program, the cessation of which would result in the community becoming threatened within five years.

4.3 ENVIRONMENTAL PROTECTION BIODIVERSITY CONSERVATION ACT 1999

TF and TECs are considered Matters of National Environmental Significance (MNES) and are protected under the Commonwealth *EPBC Act 1999.*

4.3.1 Threatened Flora (TF) (Commonwealth, *EPBC Act*)

Commonwealth-listed TF are largely consistent with those species that are listed under the Western Australian *BC Act 2016*. There are six categories of TF under the Commonwealth *EPBC Act* (Table 6).

Table 6: Categories of Threatened Flora under the Commonwealth *EPBC Act 1999* (IUCN-Equivalent Status)

EX: Extinct	No reasonable doubt that the last member of the species has died.
EW: Extinct in the Wild	Species known only to survive in cultivation, in captivity or as a naturalised population well outside its past range or it has not been recorded in its known habitat in an appropriate season anywhere in its past range despite exhaustive surveys.
CR: Critically Endangered	Species is considered to be facing an extremely high risk of extinction in the wild.
EN: Endangered	Species is not critically endangered; and it is facing a very high risk of extinction in the wild in the near future.
VU: Vulnerable	Species is not critically endangered or endangered; and it is facing a high risk of extinction in the wild in the medium-term future.
CD: Conservation Dependent	Species is the focus of a specific conservation program the cessation of which would result in the species becoming vulnerable, endangered or critically endangered.

4.3.2 Threatened Ecological Communities (TECs) (Commonwealth *EPBC Act*)

The Commonwealth *EPBC Act 1999* provides legislative protection for TECs.

Table 7 outlines the criteria for listing of TECs under the *EPBC Act*.

Table 7: Threatened Ecological Communities (TECs) Definitions and Criteria (*EPBC Act* Regulations, 2013).

Critically Endangered (CR)	If, at that time, an ecological community is facing an extremely high risk of extinction in the wild in the immediate future (indicative timeframe being the next 10 years).
Endangered (EN)	If, at that time, an ecological community is not critically endangered but is facing a very high risk of extinction in the wild in the near future (indicative timeframe being the next 20 years).
Vulnerable (VU)	If, at that time, an ecological community is not critically endangered or endangered, but is facing a high risk of extinction in the wild in the medium–term future (indicative timeframe being the next 50 years).

The Commonwealth *EPBC Act 1999* provides not only listing of TF and TECs, but also conservation advice, recovery plans, identification of critical habitat and key threatening processes.

There is one Commonwealth *EPBC Act 1999* listed TEC that is relevant to the study area: *'Banksia Woodlands of the SCP ecological community'*. This TEC currently has no recovery plan, however the conservation advice (DoEE, 2016) is comprehensive, including identification of threats and key diagnostic criteria (see Table 21).

4.4 DATABASE SEARCH RESULTS

The following provides a summary of PF and TF listed under Western Australian and Commonwealth legislation and guidelines, previously known from within 10-20km of the study area.

4.4.1 Priority and Threatened Flora

The DBCA Species and Communities Branch species database search did not identify any records of PF or TF as being previously known from within the study area boundary. However it did identify two TF and 16 PF records within the broader search area.

A search of the Commonwealth *EPBC Act 1999* Protected Matters Search Tool (DCCEEW, 2025) identified 13 TF as potentially occurring in the region. None of these species have previously been recorded from the study area. The screening for this tool is not precise and most were unlikely to occur in the study area.

Table 8 summarises results from both the Commonwealth *EPBC Act 1999* Protected Matters Report and the Western Australian DBCA Species and Communities Branch flora database searches, and identifies the likelihood of each occurring within the study area.

Table 8: Threatened and Priority Flora Database Search Results (DBCA & *EPBC Act* Protected Matters Databases)

WESTERN AUSTRALIA	CONSERVATION STATUS*				OCCURRENCE (Known/Likely/Possible/Unlikely)
	Rating	DBCA	*BC Act*	*EPBC Act*	
Andersonia gracilis	TF		VU	EN	Possible. Wetland, dampland habitat.
Anigozanthos viridis ssp. *terraspectans*	TF		VU	VU	Unlikely. Wetland, dampland habitat further N.
Banksia mimica	TF		VU	EN	Possible. Known from lower lying areas eastern SCP. Looks very similar to *B. dallanneyi* (not recorded).
Caladenia huegelii	TF		CR	EN	Possible, habitat present (sand) Widespread on SCP between Gnangara and Yallingup.
Diuris micrantha	TF		VU	VU	Unlikely. Wetland, dampland habitat further S.
Diuris purdiei	TF		EN	EN	Unlikely. Wetland, dampland habitat further S.
Drakaea elastica	TF		CR	EN	Unlikely. Dampland transition habitat, further S.
Drakaea micrantha	TF		EN	VU	Unlikely. Distribution S of Perth.
Eleocharis keigheryi	TF		VU	VU	Unlikely. Requires standing water.
Eucalyptus argutifolia	TF		VU	VU	Unlikely. Distribution N of Perth, shallow limestone soil.
Macarthuria keigheryi	TF		EN	EN	Possible. Known from low lying *Banksia* woodland.
Synaphea sp. Fairbridge Farm (D. Papenfus 696)	TF		CR	CR	Unlikely. Distribution S of Perth. More commonly known from low lying *Banksia* woodland.
Thelymitra variegata	TF		CR	EN	Possible, habitat present (sand) Widespread on SCP between Gnangara and Yallingup.
Baeckea sp. Limestone (N. Gibson & M.N. Lyons 1425)	PF	P1			Possible. Dry sand, Banksia woodland, slopes. Perth to Reagans Ford.
Drosera patens	PF	P1			Possible. Wetlands. 8 records between Southern River and Gnangara.
Drosera x sidjamesii	PF	P1			Possible. Wetlands. 10 records Wanneroo to Midland.
Acacia benthamii	PF	P2			Possible. Known records nearby, to W.
Drosera x badgerupii	PF	P2			Possible. Wetlands. 8 records between Wanneroo, Ellenbrook and Midland.
Millotia tenuifolia var. *laevis*	PF	P2			Recorded.
Conostylis bracteata	PF	P3			Possible. Unresolved taxonomy, hybrid of *C. aculeata* and *C. candicans*. *C. aculeata* widely sampled during survey and found to be *C. aculeata* ssp. *cygnorum*.
Cyathochaeta teretifolia	PF	P3			Possible. Wetland, dampland species, known records to E (Whiteman Park) and N (Lake Gnangara).
Dampiera triloba	PF	P3			Unlikely. Lower lying heavier soils transition zone to wetland. 16 records scattered across SW WA.
Pimelea calcicola	PF	P3			Unlikely. 31 records, coastal limestone between Preston and Moore River NP.

WESTERN AUSTRALIA	CONSERVATION STATUS*				OCCURRENCE (Known/Likely/Possible/Unlikely)
	Rating	DBCA	*BC Act*	*EPBC Act*	
Styphelia filifolia	PF	P3			Possible. Sand. 37 records between Harvey-Eneabba inland to Mogumber.
Utricularia oppositiflora	PF	P3	P3		Unlikely. Wetlands. Scattered records Perth, Stirling Ranges, Esperance. Widespread EST and NZ.
Anigozanthos humilis subsp. *chrysanthus*	PF	P4	P4		Possible. Grey or yellow sand. Known from 64 records Midland-Toodyay-Cataby.
Drosera occidentalis	PF	P4	P4		Possible. Muchea to Dunsborough. Wetlands.
Jacksonia sericea	PF	P4	P4		Likely. 62 records between Mandurah and Gnangara. Common on disturbed edges, which means it can be latent in undisturbed vegetation.
Stylidium striatum	PF	P4	P4		Possible. Heavier soils, Brookton - Eneabba. S. 'brunonianum' group, extensively collected in survey, but identified as *S. brunonianum* and *S. neurophyllum*.

** See Section 4.2 and 4.3 for definitions of conservation status codes. Habitat preference information from AVH (Council of Heads of Australasian Herbaria, 2013), WAH (1998-) and DBCA database search results.*

4.4.2 Threatened and Priority Ecological Communities

The DBCA Threatened Species and Communities database search identified six PECs and/or TECs within approximately 10-20km of the study area. A search of the Commonwealth *EPBC Act* Protected Matters Search Tool (DCCEEW, 2025) listed three potential TECs. Table 9 summarises the results from both database searches and identifies the likelihood of each occurring within the study area.

Table 9: TEC and PEC Database Search Results (DBCA & EPBC Protected Matters Databases)

WESTERN AUSTRALIA	COMMONWEALTH *(EPBC Act 1999)*	CONSERVATION STATUS*			OCCURRENCE Known/Likely/Possible/Unlikely
		DBCA	*BC Act*	*EPBC Act*	
Banksia Dominated Woodlands of the SCP (SCP) IBRA Region.	Banksia Woodlands of the SCP.	P3	-	EN	Known. Study area is a known record.
SCP20a: *Banksia attenuata* woodlands over species rich dense shrublands.	Banksia Woodlands of the SCP (Rarer sub-type).		CR	EN	Known. Study area is a known record. Included as subtype of *Banksia* Dominated Woodlands of the SCP IBRA Region under *EPBC Act 1999*.
SCP21c: SCP *Banksia attenuata - Banksia menziesii* woodlands	Banksia Woodlands of the SCP (Rarer sub-type).	P3		EN	Possible. SCP21c and SCP22 mapped as same by DBCA. Cullacabardee. FCT21c described as 'Low Lying *Banksia attenuata* woodlands or shrublands' in Gibson *et al.* (1994).
SCP22: *Banksia ilicifolia* woodlands	Banksia Woodlands of the SCP (Rarer sub-type).	P3		EN	Possible. SCP21c and 22 mapped as same by DBCA. Cullacabardee. FCT22 described as *'Banksia ilicifolia* woodlands' in Gibson *et al.* (1994).
SCP23b: SCP *Banksia attenuata - Banksia menziesii* woodlands	Banksia Woodlands of the SCP (Rarer sub-type).	P3		EN	Possible. Two records Cullacabardee and Gnangara. FCT23b is '*Northern Banksia attenuata - B. menziesii woodlands*' in Gibson *et al.* (1994).
Tuart (*Eucalyptus gomphocephala*) woodlands and forests of the SCP.	Tuart (*Eucalyptus gomphocephala*) Woodlands and Forests of the SCP.	P3		CR	Unlikely. Tuart is uncommon this far away from the coast.

** See Section 4.2 and 4.3 for definitions of conservation status codes.*

4.5 WEEDS

4.5.1 Environmental Weeds

There is currently no coordinated approach to prioritising and managing environmental weeds in Western Australia. What information does exist is inadequate to the task.

The most constant guidance for some time has been the Western Australian Environmental Weed Strategy (WAEWS) (DCLM, 1999). However at the time of publication, the Swan Region Ecological Impact and Invasiveness Rating (DBCA, 2023a) had been republished on the DBCA website. While it is dated as 2023, this list has not substantially changed for some time. However as it is both more recent than the WAEWS list, and regionally focussed rather than state-wide, the decision was taken to use this rating system in this study. The background of both have been provided for context and for comparison across studies. Both rating systems are very similar.

Western Australian Environmental Weed Strategy (WAEWS) (DCLM, 1999)

Under the Western Australian *Conservation and Land Management Act 1984*, the state environmental agency, the DBCA is required to monitor and manage weeds. As a part of this responsibility, the state-wide Western Australian Environmental Weed Strategy (WAEWS) (DCLM, 1999) was developed. This report listed the environmental weeds known for the state at the time. Each was then given a rating (Table 11) depending on its invasiveness, distribution and environmental impact (Table 10).

The purpose of this publication was also to eventually tie into the Weeds of National Significance (WONS) project (DCLM, 1999 p58), providing a compatible rating system to be applied to Western Australian environmental weed species. The intent was to eventually provide a regionally based rating system, using the IBRA (Thackway and Cresswell, 1995) regions. None of this has been completed due to a lack of focus on environmental weeds at state and federal level in recent decades.

Table 10: Criteria of Weeds under WAEWS (DCLM, 1999)

Invasiveness	Ability to invade bushland in good to excellent condition or ability to invade waterways.
Distribution	Wide current or potential distribution including consideration of known history of widespread distribution elsewhere in the world.
Environmental Impact	Ability to change the structure, composition and function of ecosystems, in particular an ability to form a monoculture in a vegetation community.

Table 11: Rating of Weeds under WAEWS (DCLM, 1999)

H	**High**	A weed species that scores 'yes' for all three criteria. Rating a weed species as High would indicate prioritising this weed for control and/or research i.e. prioritising funding to it.
Mo	**Moderate**	A weed species would have to score 'yes' for two of the above criteria. Control or research effort should be directed to it if funds are available, however it should be monitored, possibly to a high level.
Mi	**Mild**	A weed species scoring 'yes' for one of the criteria. A Mild rating would indicate monitoring of the weed and control where appropriate.
L	**Low**	A weed species would score none of the criteria. A Low ranking would mean that this species would require a low level of monitoring.

Swan Region Ecological Impact and Invasiveness Rating

In the years subsequent to the WAEWS, a rating version concentrated on the DBCA Region of Swan was developed. This has been in draft form for many years and has not always been available. At the time of publication, the list was available on the DBCA website (DBCA, 2023a).

Ecological Impact rating ranges from Low Impact, which refers to a species that causes minimal disruption to ecological processes or loss of biodiversity, to High Impact, which causes acute disruption of ecological processes, alters vegetation structure, composition and function of ecosystems. Examples of impacts include but not limited to changed fire regime, changed nutrient conditions, changed hydrological patterns, changed soil erosion patterns, changed geomorphological processes, changed biomass distribution, changed light distribution, loss of biodiversity, substantially reduces regeneration opportunities of native plants, allelopathic effects.

The Ecological Impact of species within the Region includes four categories:

L Low
M Medium
H High
U Unknown

The Invasiveness Rating refers to the rate of spread of a weed in native vegetation, including factors of establishment, reproduction and long-distance dispersal (>100m). Factors affecting rate of spread include ability to outcompete (light, moisture, nutrients, rapid root growth), sexual or asexual reproduction, need for disturbance to establish. Reproduction factors include time to seeding, seed production, vegetative reproduction. Examples of long-distance dispersal mechanisms include, via wind, water, animals, human activity.

The Invasiveness of species within the Swan Region includes four categories:

S Slow
M Moderate
R Rapid
U Unknown

As the purpose of this study was to inform maintenance of the study area, all weeds recorded were scored on their impact and invasiveness, and this is presented in Table 18.

4.5.2 Biosecurity and Agriculture Management Act 2007

The Biosecurity and Agriculture Management (BAM) Act 2007 replaces amongst other related legislation, the *Agriculture and Related Resources Protection Act 1976*, which legislated for the control of Declared Plants in Western Australia (Sandy Lloyd DAFWA, pers. comm.). The *BAM Act* represents the only legally binding requirement for weed control and/or eradication in Western Australia.

Under the *BAM Act* the 'Declared Plants' list has been replaced by the Western Australian Organism List (WAOL). The WAOL is administered by DPIRD (2025). There are three categories of Declared Pest on the WAOL list (Table 12).

This list is more relevant to agricultural than environmental weeds.

Table 12: Categories of Declared Pest under the *BAM Act 2007* (DPIRD, 2023)

The C1 category (Exclusion)	Pests will be assigned to this category if they are not established in Western Australia and control measures are to be taken, including border checks, in order to prevent them entering and establishing in the State.
The C2 category (Eradication)	Pests will be assigned to this category if they are present in Western Australia in low enough numbers or in sufficiently limited areas that their eradication is still a possibility.
The C3 category (Management)	Pests will be assigned to this category if they are established in Western Australia but it is feasible, or desirable, to manage them in order to limit their damage. Control measures can prevent a C3 pest from increasing in population size or density or moving from an area in which it is established into an area, which currently is free of that pest.

4.5.3 Weeds of National Significance (WONS)

The Weeds of National Significance (WONS) (DoEE, 2019a) project was an initiative of the Commonwealth in collaboration with state governments, aimed at establishing a national prioritisation process for environmental weeds.

Thirty-two species of WONS have been prioritised to date, based on invasiveness, potential for spread and environmental, social and economic impacts. Their ability to be managed was also taken into account.

This programme was in the early stages of development and was a work in progress, before being abandoned by a subsequent government. The last addition was in 2012. It only includes an extremely limited subset of environmental weeds. It is not clear what the status of this project is. The existing WONS list has also been incorporated in to the WAOL (Section 4.4.2)

5. METHODS

5.1 DESKTOP STUDY

A desktop study was completed prior to field surveys, to identify any flora species or ecological communities to be targeted during surveys. Contextual information was also collated to assist with general site interpretation and vegetation mapping. This information is summarised in Section 3 and 4.

5.1.1 Flora

Searches were completed of species databases, for a broader area around the study area. This search area was approximately 10km east to west and 20km north to south. The search parameters were targeted, focussing on the relevant biogeographical features, in this case along the linear Spearwood and Bassendean Dunes of the SCP. The resources of the Australian Virtual Herbarium (AVH) (Council of Heads of Australasian Herbaria, 2013) and Florabase (WAH, 1998-) were used to assess the likelihood of PF and TF occurring, including species distribution and habitat information.

Results are summarised in Table 8. Table 8 also included an assessment of the likelihood of each species occurring in the study area, based on habitat preference and geographical proximity.

Familiarisation with any TF or PF identified as likely to occur in the study area, was completed prior to the field surveys.

5.1.2 Vegetation

Searches were completed of species databases, for a broader area around the study area. This search area was approximately 10km east to west and 20km north to south. The search parameters were targeted, focussing on the relevant biogeographical features, in this case along the linear Spearwood and Bassendean Dunes of the SCP. It included a search of the Western Australian DBCA Threatened Species and Communities database for PECs and TECs and the Commonwealth Matters of National Significance Protected Matters Search Tool (DCCEEW, 2025) for TECs listed under the Commonwealth *EPBC Act*.

Results are summarised in Table 3. Table 3 also included an assessment of the likelihood of each PEC and TEC occurring in the study area, based on habitat preference and geographical proximity.

Familiarisation with any PEC or TEC identified as likely to occur in the study area, was completed prior to the field surveys.

The Gibson *et al.* (1994) dataset was analysed to determine which FCTs were known in the proximity of the study area.

The review also included contextual information including land use history, climatic conditions, wetlands, soil and landforms studies as well as topographical mapping (Figure 3) was also reviewed, to provide context and to aid mapping and interpretation of vegetation types. Broadscale contextual information on vegetation at different biogeographical scales was also summarised, including IBRA region descriptions, Beard (1979) mapping and vegetation complexes (Heddle *et al.,* 1980) (Section 3).

5.2 FIELD SURVEY

The field survey consisted of a Detailed Survey and a Targeted Survey (EPA, 2016 p. 5). Sampling techniques consisted of Traverses, Quadrats, Relevés, Opportunistic Sampling and Vegetation Condition Rating (EPA, 2016 p. 7).

A mid-spring survey was completed on the 24-26th and 30th September 2024, with a follow up late spring survey on the 17-18th and 22nd October 2024.

5.2.1 Traverses

Traverses were conducted on foot at 10m intervals (Figure 15) across all vegetated areas to record:

- PF, TF and other flora of conservation significance (as defined by EPA, 2016).
- A comprehensive flora inventory.
- Weed species.
- Vegetation type and condition boundaries.
- Any matters of interest e.g. including but not limited to rubbish, vegetation, condition.

Half of the transects were walked during the September survey, and half during October (Figure 15).

Paths and firebreaks were also traversed. The purpose was to identify extra weed species to provide an opportunity to manage outbreaks before they spread into the bushland.

5.2.2 Quadrats

Twelve quadrats were established in representative vegetation across the study area.

Quadrat sizes were 10m x 10m in line with established methodology for the SCP. An area surrounding the quadrat approximately 30m x 30m was also surveyed to record other species typical of the vegetation type.

The information recorded for each quadrat included:

- AMG Coordinates in GDA94 datum (accuracy <3m but more typically <0.5m) for all four corners of quadrat (Appendix C & D).
- All flora species present and their height and foliar (EPA, 2016) cover (Appendix B). Species that overhung the quadrat were included.
- Documentation of vegetation structure based on National Vegetation Information System (NVIS) (ESCAVI, 2003) as required by EPA (2016);
- Photographs (taken from NW corner of quadrat, ground level and general vegetation) (Section 6.2 and Appendix C);
- Habitat information including but not limited to landform, aspect and soil and leaf litter; and
- A condition rating using condition scale(s) in Table 13.

Quadrats were permanently marked, with the NW and the NE corners pegged using fence droppers with yellow safety caps (Plate 1). Each were labelled as per Plate 1. Pegging both the NW and NE corners enables quadrats to be precisely re-established if future surveys are required e.g. long-term, or post-fire monitoring etc.

Plate 1 Quadrat marking method. 90cm steel droppers with yellow safety caps. NW and SE corners.

5.2.3 Relevés

Two relevés were recorded and the data from these is presented in Appendix B and C.

Relevés were used to aid in describing vegetation types. EPA (2016) describes a relevé is an unmarked area from which data is collected using a low intensity survey technique. It states that *'information collected within a relevé should include location, GPS coordinates and datum, list of species, vegetation structure, landform and soils, vegetation condition, period since the last fire, and description of disturbances'*.

As per EPA (2016) the following details were recorded for each Relevé:

- GPS coordinates (accuracy <3m) (datum GDA94).
- Vegetation structure (NVIS) (ESCAVI, 2003).
- Dominant flora species.
- Any other flora species that were typical, diagnostic, or not recorded elsewhere.
- Landform and soils.
- Vegetation condition rating.
- Disturbances.
- Fire history.
- Photographs of representative vegetation.

5.2.4 Opportunistic Sampling

Opportunistic sampling is any informal survey technique used to supplement sampling data (EPA, 2016).

Point data was taken along traverses to record vegetation type and condition. Opportunistic records of flora were also recorded this way, where a species had not been recorded elsewhere or it was of particular interest e.g. PF records.

5.2.5 Vegetation Condition Rating

As requested by the CoW the Bush Forever (Govt. of WA, 2000) condition scale was used. This was to ensure that condition mapping was consistent with historical mapping.

EPA (2016) provides a condition scale to be used in EIA. While it is not referenced, this condition scale originated in Bush Forever.

The two scales are virtually identical (Table 13). Condition scale will therefore still be consistent with the requirements of EPA (2016) and CoW.

Table 13: Vegetation Condition Scale (EPA, 2016) (Keighery, 1994 from Govt. of WA, 2000)

Condition		EPA (2016) Condition Scale	Bush Forever (Govt. of WA, 2000) Condition Scale
P	**Pristine**	Pristine or nearly so, no obvious signs of disturbance or damage caused by human activities since European settlement.	Pristine or nearly so, no obvious signs of disturbance.
E	**Excellent**	Vegetation structure intact, disturbance affecting individual species and weeds are non-aggressive species. Damage to trees caused by fire, the presence of non-aggressive weeds and occasional vehicle tracks.	Vegetation structure intact, disturbance affecting individual species; weeds are non-aggressive species.
VG	**Very Good**	Vegetation structure altered, obvious signs of disturbance. Disturbance to vegetation structure caused by repeated fires, the presence of some more aggressive weeds, dieback, logging and grazing.	Vegetation structure altered, obvious signs of disturbance. Disturbance to vegetation structure caused by repeated fires, the presence of some more aggressive weeds, dieback, logging and grazing.
G	**Good**	Vegetation structure significantly altered by very obvious signs of multiple disturbances. Retains basic vegetation structure or ability to regenerate it. Disturbance to vegetation structure caused by very frequent fires, the presence of very aggressive weeds, partial clearing, dieback and grazing.	Vegetation structure significantly altered by very obvious signs of multiple disturbance. Retains basic vegetation structure or ability to regenerate it. For example, disturbance to vegetation structure caused by very frequent fires, the presence of some very aggressive weeds at high density, partial clearing, dieback and grazing.
D	**Degraded**	Basic vegetation structure severely impacted by disturbance. Scope for regeneration but not to a state approaching good condition without intensive management. Disturbance to vegetation structure caused by very frequent fires, the presence of very aggressive weeds at high density, partial clearing, dieback and grazing.	Basic vegetation structure severely impacted by disturbance. Scope for regeneration but not to a state approaching good condition without intensive management. For example, disturbance to vegetation structure caused by very frequent fires, the presence of very aggressive weeds, partial clearing, dieback and grazing.
CD	**Completely Degraded**	The structure of the vegetation is no longer intact and the area is completely or almost completely without native species. These areas are often described as 'parkland cleared' with the flora comprising weed or crop species with isolated native trees and shrubs.	The structure of the vegetation is no longer intact and the area is completely or almost completely without native species. These areas are often described as 'parkland cleared' with the flora comprising weed or crop species with isolated native trees and shrubs.

The original scale was developed by Bronwen Keighery (Keighery, 1994) which was modified from a scale developed by Malcolm Trudgen (Trudgen, 1991).

5.2.6 Licencing

Botanist Kelli McCreery completed the survey under Flora Taking (Biological Assessment) Licence No. FB62000185-2 (valid 3 Mar 2022 to 30 Sep 2025) under Regulation 62 of *Biodiversity Conservation Regulations 2018*. And Permit to Take TF TFL 2223-0049 (valid 3 Aug 2022 to 25 Sept 2025) under Section 40 of the *Biodiversity Conservation Act 2016.* Permission to conduct a survey was granted by the CoW.

5.3 FLORA IDENTIFICATIONS, TAXONOMY AND NOMENCLATURE

Flora identifications were completed by a survey botanist with 28 years of experience on the SCP. Flora were identified using the taxonomic, reference material and other resources of the WAH.

Several conservation significant and/or difficult flora were confirmed by Michael Hislop, the duty botanist at the WA Herbarium.

Nomenclature was based on Florabase (WAH, 1998-). All taxa were cross-referenced against Florabase to ensure that names were current at the time of publication.

5.4 DATA ANALYSIS

Numerical analyses were conducted on quadrat data collected during the survey. Data was analysed using multivariate analysis run on the programme 'R' (R Development Core Team, 2007).

The most important stage of multivariate analysis was ensuring quality quadrat data was collected, consistently and with a comprehensive species inventory for each quadrat.

5.4.1 Floristic and Structural Analysis of Study Area Quadrats

Only data from the 12 quadrats collected from the study area were used at this stage. The purpose was as a tool to aid in defining and mapping the vegetation types present in the study area, based on both structure and floristics.

Different parameters were tested, presence-absence (floristics) data alone. Foliar cover percentage (floristics and structure). Foliar cover percentages were then converted to the Braun-Blanquet style cover class scale used in NVIS, which is an analysis of floristics and simplified structure.

Different agglomerative methods were used. Combinations of Kulczynski and Bray-Curtis ordination and Average and/or Ward linkage, cover weighted %, cover weighted against NVIS cover classes, or presence-absence. This was more than usually investigated, due to the floristic influences in the study area being on an area of biogeographical transition and quite complex.

All these methods returned similar results. Bray-Curtis, Ward and weighted with NVIS cover classes was presented in this report as a representative result (Figure 6).

5.4.2 Floristic Community Type (FCT) Analysis Against Gibson *et al.* (1994) Dataset

The 12 quadrats were also then compared to quadrats in A Floristic Survey of the Southern SCP (Gibson *et al.,* 1994).

As many TECs and PECs were originally based on the FCTs in Gibson *et al.* (1994), the purpose of recreating this methodology was to help confirm the presence or otherwise of TECs and PECs. It was also useful to

analyse the vegetation in the context of the broader SCP, as even within PECs and TECs there are rarer sub-types and other potential matters of conservation significance e.g. range implications.

To test for any methodological differences in the parameters set for the multivariate analysis, a test run was completed first, using only the Gibson *et al.* (1994) dataset to ensure that the results for the grouping were consistent with the original findings of that study. To aim to replicate findings is not the ideal way to use the science, however it becomes necessary due to a legacy of current TEC and PEC listings being based on the results of the original Gibson *et al.* (1994) findings.

Consistent with Gibson *et al.* (1994) methodology, this was a floristic analysis based on presence-absence data only, with no weighting for cover.

Each of the 12 quadrats recorded in this survey were then run one at a time against the Gibson et al. (1994) dataset. Referred to as the single site insertion (SSI) method, a term developed by local botanist Malcolm Trudgen. Adding multiple new quadrats to the Gibson *et al.* (1994) has a tendency to upset the original FCT groupings. This is again not ideal, but again necessary due to TEC and PEC listings being based on the results of the original Gibson *et al.* (1994) findings.

The agglomerative methods used were Kulczynski ordination and Average linkage. This is closer to the original Gibson *et al.* (1994) methodology (Czekanowski, Average) than the Bray-Curtis, Average that is more frequently used. However both methods were run and the results summarised in Table 20. The relevant sections of the dendrograms are presented with each quadrat in Appendix C. Full dendrograms were submitted separately with this report.

To ensure the dataset from this study was as compatible as possible with the original Gibson *et al.* (1994) dataset, the nomenclature and taxonomy of flora was reverted to what it would have been in 1994 (Table 14).

Table 14: Nomenclatural Reconciliations between the study area quadrats and Gibson *et al.* (1994).

Study Area Nomenclature (2025)	Gibson *et al.* (1994) Nomenclature
Acacia applanata	*Acacia willdenowiana*
Acacia pulchella var. *pulchella*	*Acacia pulchella*
Adenanthos cygnorum subsp. *cygnorum*	*Adenanthos cygnorum*
Anigozanthos humilis subsp. *humilis*	*Allocasuarina humilis*
Apectospermum spinescens	*Leptospermum spinescens*
Astartea scoparia	*Astartea* aff. *fascicularis* sthest
Austrostipa compressa	*Stipa compressa*
Burchardia congesta	*Burchardia umbellata*
Caladenia flava subsp. *flava*	*Caladenia flava*
Calectasia narragara	*Calectasia cyanea*
Chaetospora curvifolia	*Schoenus curvifolius*
Chamaescilla corymbosa var. *corymbosa*	*Chamaescilla corymbosa*
Conospermum stoechadis subsp. *stoechadis*	*Conospermum stoechadis*
Conostylis aculeata subsp. *cygnorum*	*Conostylis aculeata*
Conostylis setigera subsp. *setigera*	*Conostylis setigera*
Crassula colorata var. *colorata*	*Crassula colorata*
Cyanothamnus ramosus subsp. *anethifolius*	*Boronia ramosa*
Daviesia divaricata subsp. *divaricata*	*Daviesia divaricata*
Daviesia nudiflora subsp. *nudiflora*	*Daviesia nudiflora*
Desmocladus fascicularis	*Loxocarya fasciculata*
Desmocladus flexuosus	*Loxocarya flexuosa*
**Disa bracteata*	*Monadenia bracteata*

Study Area Nomenclature (2025)	Gibson *et al.* (1994) Nomenclature
Diuris magnifica	*Diuris longifolia*
Drosera drummondii	*Drosera menziesii* subsp. *penicillaris*
Eremaea pauciflora var. *pauciflora*	*Eremaea pauciflora*
Eucalyptus marginata subsp. *marginata*	*Eucalyptus marginata*
**Ficinia marginata*	*Isolepis marginata*
Gastrolobium capitatum	*Nemcia capitata*
Hemiandra linearis	*Hemiandra pungens*
Hibbertia hypericoides subsp. *hypericoides*	*Hibbertia hypericoides*
Hibbertia striata	*Hibbertia huegelii*
Hovea trisperma var. *trisperma*	*Hovea trisperma*
Hypocalymma balbakiae	*Hypocalymma angustifolium*
Isotropis cuneifolia subsp. *cuneifolia*	*Isotropis cuneifolia*
Jacksonia floribunda	*Jacksonia densiflora/floribunda* complex scps
Laxmannia ramosa subsp. *ramosa*	*Laxmannia ramosa*
Lepidobolus preissianus subsp. *preissianus*	*Lepidobolus preissianus*
Lepidosperma pubisquameum	*Lepidosperma angustatum*
Lyginia imberbis	*Lyginia barbata*
**Lysimachia arvensis*	*Anagallis arvensis*
Macrozamia fraseri	*Macrozamia riedlei*
Microtis media subsp. *media*	*Microtis media*
Millotia tenuifolia var. *laevis*	*Millotia tenuifolia*
Monotaxis grandiflora var. *grandiflora*	*Monotaxis grandiflora*
Patersonia occidentalis var. *occidentalis*	*Patersonia occidentalis*
**Pentameris pallida*	*Pentaschistis thunbergii*
Pericalymma ellipticum var. *floridum*	*Pericalymma ellipticum*
**Petrorhagia dubia*	*Petrorhagia velutina*
Philotheca spicata	*Eriostemon spicatus*
Phyllangium paradoxum	*Mitrasacme paradoxa*
Pyrorchis nigricans	*Lyperanthus nigricans*
Rytidosperma occidentale	*Danthonia occidentalis*
Senecio condylus	*Senecio lautus*
Stylidium androsaceum	*Stylidium calcaratum*
Stylidium neurophyllum	*Stylidium brunonianum*
Styphelia conostephioides	*Leucopogon conostephioides*
Styphelia pallida	*Astroloma pallidum*
Styphelia xerophila	*Astroloma xerophyllum*
Synaphea spinulosa subsp. *spinulosa*	*Synaphea spinulosa*
Thysanotus manglesianus	*Thysanotus* sp. *manglesianus/patersonii* scps
**Ursinia anthemoides* subsp. *anthemoides*	*Ursinia anthemoides*
**Vulpia myuros* forma. *megalura*	*Vulpia myuros*
Waitzia suaveolens var. *suaveolens*	*Waitzia suaveolens*
Xanthorrhoea brunonis subsp. *brunonis*	*Xanthorrhoea brunonis*
**Avena barbata* (deleted)	*Avena fatua*. Single record weed.
Cotula australis	Not in dataset. Analysis run with and without*.
Drosera minutiflora (deleted)	Not in dataset. Many pygmy Drosera described since 1994.
Platysace filiformis	Not in dataset. Analysis run with and without*.
Poranthera moorokatta (deleted)	Not in dataset. Likely to have been overlooked in 1994.
Thelymitra graminea	Not in dataset. Analysis run with and without*.

***** Adding or removing these species did not change results.*

5.5 VEGETATION MAPPING

Preliminary polygons were drawn around vegetation types during the field survey, using a combination of aerial photography interpretation and field observations as well as topographical mapping. Some boundaries were defined using GPS coordinates recorded during on-ground surveys and these were used to refine boundaries later. The results of the statistical analysis were also used later to refine vegetation mapping boundaries.

Vegetation type within each polygon was defined based on a wide range of information including but not limited to the statistical and generalised post-survey analysis of quadrat data and field observations. Both structural and floristic characteristics of the vegetation were taken into account.

Descriptions of vegetation types used NVIS (ESCAVI, 2003) structural formation terminology as per the requirements of the EPA (2016).

Simon Crofts from Environmaps produced the vegetation mapping presented in this report, and the supporting IBSA (EPA, 2021) package. Mapping was exported in both GDA94 and GDA2020 datums and shapefiles were provided separately to this report.

5.6 CONSERVATION SIGNIFICANCE ASSESSMENT

Conservation significance was assessed based on the following criteria.

5.6.1 Threatened Species and Communities

Assessment of the conservation significance of flora and vegetation recorded during the survey involved cross-referencing all taxa recorded against criteria for significance under Western Australian and Commonwealth legislation and guidelines (Section 4.0). This included TF and TECs under the Western Australian *BC Act 2016* and TF and TECs under the Commonwealth *EPBC Act 1999*.

5.6.2 Flora of 'Other' Conservation Significance (EPA, 2016)

Species other than those listed under legislation and guidelines e.g. TF, may have conservation significance. These are defined by the EPA (2016) as those species that may include but not be limited to those that have or are:

- PF.
- Locally endemic or associated with a restricted habitat type.
- New species or anomalous features that indicate a potential new species.
- Representation of a species range (extensions, edges of ranges or an outlier population).
- Unusual species including restricted sub-species, varieties or naturally occurring hybrids.
- Relictual status, representative of taxonomic groups no longer in the broader landscape.

For range implications, the geographic distributions of all flora species recorded were checked using the map-based resources of the AVH (Council of Heads of Australasian Herbaria, 2013) and Florabase (WAH, 1998-). The collection status and distribution of flora was based on WAH specimen records only. These results are presented in Table 17.

5.6.3 Vegetation of 'Other' Conservation Significance (EPA, 2016)

Vegetation other than that listed under Western Australian and Commonwealth legislation and guidelines e.g. TECs, may have conservation significance. Defined by the EPA (2016) as that which may include but not be limited to vegetation that:

- Represents a PEC.
- Has a restricted distribution.
- Has implications due to historical impacts.
- Has a role as a refuge.
- Provides a function required to maintain the ecological integrity of a significant ecosystem.

In this study, range implications of vegetation is also discussed.

6. RESULTS

6.1 FLORA

6.1.1 Statistics

A total of 267 taxa were recorded during the survey, of which 196 or 73.4% were natives. The 267 taxa represented 58 different plant families and 180 plant genera.

The families represented by the largest number of species are shown in Table 15. The genera represented by the largest number of species are shown in Table 16. See Appendix A and B for full lists of species recorded for the survey area.

Table 15: Dominant Vascular Plant Families Recorded in the Survey area

Family	Common Name	Native	Introduced	Total
FABACEAE	Peas, Wattles	21	8	**29**
ASTERACEAE	Daisies	11	13	**24**
MYRTACEAE	Myrtles, Eucalypts, Melaleuca etc.	20	1	**21**
POACEAE	Grasses	5	14	**19**
ORCHIDACEAE	Orchids	16	1	**17**
PROTEACEAE	Banksia, Grevillea, Hakea etc.	13	0	**13**
ASPARAGACEAE	Asparagus-Lily Family	12	0	**12**
CYPERACEAE	Sedges	9	1	**10**
STYLIDIACEAE	Triggerplants	9	0	**9**
HAEMODORUM	Kangaroo Paw, Bloodroot, Conostylis	8	0	**8**
ERICACEAE	Australian Heaths	8	0	**8**
HEMEROCALLIDACEAE	Lily-like plants	7	0	**7**

Table 16: Dominant Vascular Plant Genera Recorded in the Survey area

Genus	Common Name	Native	Introduced	Total
Stylidium	Triggerplants	8	0	**8**
Acacia	Wattles	5	0	**5**
Hibbertia	Guinea Flowers	5	0	**5**
Lomandra	Matrushes	5	0	**5**
Thelymitra	Sun Orchids	5	0	**5**
Banksia	Banksia	4	0	**4**
Conostylis	Cottonheads, Conostylis	4	0	**4**
Daviesia	Peas	4	0	**4**
Drosera	Sundews	4	0	**4**
Thysanotus	Fringe Lilies	4	0	**4**
Calytrix	Starflowers	3	0	**3**
Cassytha	Dodder	3	0	**3**
Conospermum	Smokebush	3	0	**3**
Conostephium	Australian Heaths	3	0	**3**
Jacksonia	Peas	3	0	**3**
Lepidosperma	Sedges	3	0	**3**
Schoenus	Sedges	3	0	**3**
Styphelia	Australian Heaths	3	0	**3**

6.1.2 Conservation Significant Flora

Threatened Flora

No TF species listed under the Western Australian *BC Act 2016* or Commonwealth *EPBC Act 1999* were recorded during the survey.

Other Flora of Conservation Significance

See Section 5.5 for a definition of species that have conservation significance (other than listed TF).

Two P2 Flora species were recorded during the survey, small forbs *Millotia tenuiflora* var. *laevis* and *Poranthera moorokatta*.

Millotia tenuifolia* var. *laevis **P2 Flora**

Millotia tenuifolia var. *laevis* is described on Florabase as a small herb to 10cm, from the daisy family (Asteraceae), that flowers from September to October (WAH, 1998-). Approximately 90 individuals were recorded from Banksia Woodland in the north-west of the study area (Figure 3).

It is difficult to distinguish between the common and rare variety of this taxa. *Millotia tenuifolia* var. *laevis* has pappus bristles shorter than the length of the rough fruit, while the more common *Millotia t. var tenuifolia* has smooth fruit and longer bristles (Short, 1995). The material collected in the study area had rough fruit and shorter bristles, however the study area is further west than this species usually occurs. WAH (1998-) also describe it as growing on laterite or granite soils, which do not occur the study area, however many habitat descriptions in Florabase are incomplete or out of date. Mike Hislop the Duty Botanist at the WAH provided confirmation of the identity of this taxa.

P2 flora are taxa that are poorly known, that are known from one or a few collections, some of which are on lands not under imminent threat of habitat destruction or degradation (DBCA, 2019) (Section 4.2.2).

There were 13 collections of this species in the WAH at the time of publication (Council of Heads of Australasian Herbaria, 2013). Its known range is from Goomalling to Chittering in the north, to the north - eastern suburbs of Perth, and then south along the SCP to Busselton. The closest known record to the study area for this species, was 2.5km to the north-east in Whiteman Park. This collection was made relatively recently in 2018, and was also recorded from grey sand on dunes in *Banksia* Woodland.

Plate 2 *Millotia tenuifolia* var. *laevis* (P2).

Poranthera moorokatta **P2 Flora**

An erect herb to 4.7cm (Barrett, 2012), although nearly always less than 1cm (McCreery pers. obs.). Likely to have been overlooked in the past, or mistaken for *Poranthera microphylla*. *P. moorokatta* has smaller and more finely patterned seeds and is generally smaller and more compact, and reddish in colour (Plate 3). *P. microphylla* by comparison is larger, more openly branched and a brighter green.

Approximately 215 individuals of this species was recorded from *Banksia* Woodland in the study area (Figure 3).

P2 flora are poorly known, that are known from one or a few collections (usually less than five), some of which are not under imminent threat of habitat destruction or degradation (DBCA, 2019) (Section 4.2.2).

There were 15 collections of this species in the WAH at the time of publication (Council of Heads of Australasian Herbaria, 2013) from between Cervantes and Armadale, with an outlier near Busselton. It is likely that it occurs more widely both in the study area, and across the SCP. Several collections have also been lodged with the WAH by One Tree Botanical Pty Ltd, from across the PMR, however these have not been processed and as yet do not yet appear in records.

Plate 3 *Poranthera moorokatta* (P2). September.

Unusual Species including restricted sub-species, varieties or naturally occurring hybrids.

Eucalyptus todtiana X Eucalyptus marginata

Natural hybrids between *Eucalyptus todtiana* and *Eucalyptus marginata* can occur, where the two species co-exist (Malcolm French, pers. comm.).

The overlap between these two species distributions according to current records, occurs mainly in the PMR and in a second area around Lesueur National Park. In the PMR *Eucalyptus todtiana* is mainly restricted to the Bassendean Dunes and into the foothills of the Darling Range. The *E. todtiana* in the study area is at the western extent of its documented range. *Eucalyptus marginata* is more widespread across the SCP and Darling Scarp, and in the bioregional context of the study area, more common in the Spearwood Dunes than in the Bassendean Dunes.

There can be numerous intergrading features and various combinations of features in the hybrids, however the easiest way to identify them is by the fruit. Pure *Eucalyptus todtiana* has a larger, semi-circular,

truncated fruit. It usually is sessile, with no peduncle (stalk) (Plate 4), though it can have a very short peduncle sometimes. Pure *Eucalyptus marginata* usually has a smaller fruit which has a more rounded profile, not truncated, with a sunken disk and obvious peduncles usually about 5mm or more long (Plate 6). The intermediaries can have any combination of these (Plate 5).

Other intermediary features can be seen in the trunks and the leaves.

Plate 4 Typical *Eucalyptus todtiana* fruits. Semi-circular, truncate fruit, sessile, large.

Plate 5 Intermediary fruit. Smaller than pure *E. todtiana* and more rounded, less truncated and with peduncles (not sessile).

Plate 6 Typical *Eucalyptus marginata* fruits. Smaller, round, barrel-shaped fruit, not truncated, longer, slender peduncle.

Range and Representation Implications

Fifty-four of the 196 native flora species recorded, had range implications (Table 17). This is relatively high, and likely due to the location of the study area being on the boundary of two biogeographical regions, the Bassendean and Spearwood Dunes. Most species at the extent of their known range, were at their western extent.

Table 17: Species of Conservation Significance - Range Implications (EPA, 2016)

Species	Significance
Acacia pulchella var. *pulchella*	NW extent known range at this latitude.
Astartea scoparia	W extent known range at this latitude.
Austrostipa hemipogon	W extent known range at this latitude.
Beaufortia elegans	W extent known range at this latitude. Poorly collected NW PMR.
Caladenia arenicola	NE extent known range.
Calytrix flavescens	W extent known range at this latitude.
Chamaescilla corymbosa	W extent known range at this latitude.
Conospermum acerosum ssp. *acerosum*	SW extent known range. Poorly collected Perth bioregion (3 records WAH).
Conostylis aculeata ssp. *cygnorum*	Short range endemic (range <100km, most of which is in PMR).
Cyanothamnus ramosus ssp. *anethifolius*	W extent known range at this latitude.
Desmocladus fasciculatus	W extent of known range. Poorly collected NW PMR (1 record WAH, Koondoola).
Diuris magnifica	NW extent of known range at this latitude.
Drosera minutiflora	W extent known range at this latitude.
Eucalyptus todtiana	Near W extent of known range.
Gonocarpus pithyoides	W extent known range at this latitude.

Species	Significance
Hensmania turbinata	W extent known range at this latitude.
Hibbertia subvaginata	W extent known range at this latitude.
Hyalosperma cotula	W extent known range at this latitude.
Hypocalymma balbakiae	W extent known range at this latitude.
Kunzea praestans	SW extent known range. 10km range extension. Poorly collected PMR (1 record WAH, from Gnangara).
Lagenophora huegelii	W extent of known range. Slight range extension ca. 5km from Whiteman Park.
Laxmannia ramosa ssp. *ramosa*	W extent of known range at this latitude.
Lepidobolus preissianus ssp. *preissianus*	W extent of known range at this latitude. Poorly collected NW PMR (2 records WAH, Koondoola and Dianella).
Levenhookia stipitata	W extent of known range at this latitude.
Macarthuria australis	W extent of known range at this latitude.
Machaerina arthrophylla	W extent of known range at this latitude.
Macrozamia fraseri	W extent of known range at this latitude.
Melaleuca preissiana	W extent of known range at this latitude.
Melaleuca seriata	W extent of known range at this latitude.
Millotia tenuifolia var. *laevis*	P2 Flora. W extent of known range.
Olearia axillaris	Uncommon away from coast.
Pericalymma ellipticum var. *floridum*	W extent of known range. Poorly collected NW PMR (3 records WAH).
Phyllangium paradoxum	W extent of known range at this latitude.
Pithocarpa pulchella	W extent of known range at this latitude.
Platysace filiformis	N extent known range. Slight range extension 3km (Koondoola).
Platytheca galioides	W extent of known range at this latitude.
Poranthera moorokatta	P2 Flora.
Prasophyllum parvifolium	W extent known range. Poorly collected NW PMR (2 records WAH).
Quinetia urvillei	W extent known range.
Regelia ciliata	W extent known range at this latitude.
Schoenus brevisetis	W extent known range. Poorly collected N PMR (1 record WAH, Landsdale)
Schoenus caespititius	W extent known range at this latitude. Poorly collected N PMR (1 record Midland)
Senecio condylus	N extent known range. Slight range extension 5km (Osborne Park).
Stylidium brunonianum	W extent known range at this latitude.
Stylidium carnosum	W extent known range at this latitude. Poorly collected NW PMR (3 records WAH, Yokine, Nollamara, Koondoola).
Stylidium neurophyllum	W extent known range at this latitude.
Stylidium piliferum	W extent known range at this latitude.
Thelymitra benthamiana	Poorly collected NW suburbs PMR (2 records WAH).
Thelymitra crinita	W extent known range at this latitude. Poorly collected NW PMR (0 records WAH, Ellenbrook and Midland closest).
Thelymitra graminea	W extent known range. Range extension. No collections NW PMR.
Thelymitra macrophylla	W extent known range. Range extension. Poorly collected N PMR (1 records WAH).
Thelymitra vulgaris	W extent of known range. Range extension ca. 5km. Poorly collected NW PMR (1 record WAH, from Bayswater).
Thysanotus arbuscula	W extent known range at this latitude.
Thysanotus thyrsoideus	W extent known range at this latitude.
Tricoryne tenella	W extent known range at this latitude.
Wahlenbergia preissii	W extent known range at this latitude.

Taxonomic Issues

Some problematic *Schoenus* specimens were lodged with the WA Herbarium for identification. The results were that upland specimens included *Schoenus caespititius* and *Schoenus brevisetis* sens. lat., while material from the dampland was *Schoenus caespititius*. Mike Hislop of the WAH, stated that these are two

very similar species, however *S. brevisetis* has smaller spikelets, with an involucral bract that is longer than the inflorescence.

A sterile and immature *Pterostylis* sp. was collected. It most likely represents *Pterostylis vittata* (also recorded), however it may also represent one of the snail orchids such as *Pterostylis pyramidalis*.

Two *Cassytha* specimens were lodged with the WA Herbarium. Mike Hislop of the WAH, stated that they were difficult to identify, due to a lack of mature reproductive material. They were identified by the WAH as *Cassytha ?pomiformis*. As better material had already been identified as *C. pomiformis*, all records were referred to as *C. pomiformis* in this report.

6.1.3 Weeds

Environmental Weeds

Seventy-one introduced flora species (weeds) were recorded in the study area (Table 18). Of those, 26 have a High Impact rating. Of those, 23 were also rated as having Rapid Invasiveness.

See Section 4.5.1 for more detail on these criteria.

Table 18: Swan Region Ecological Impact and Invasiveness (DBCA, 2023a) of Weed Species in Study Area.

SPECIES	COMMON NAME	IMPACT	INVASIVENESS
**Acacia longiflora* var. *sophorae*	Sydney Golden Wattle	High	Rapid
**Arctotheca calendula*	Capeweed	High	Rapid
**Avena barbata*	Bearded Oat	High	Rapid
**Brassica tournefortii*	Mediterranean Turnip	High	Rapid
**Bromus diandrus*	Great Brome	High	Rapid
**Carpobrotus edulis*	Hottentot Fig	High	Rapid
**Centranthus macrosiphon*	Pretty Betsy	High	Rapid
**Cynodon dactylon*	Couch	High	Rapid
**Ehrharta calycina*	Perennial Veldt Grass	High	Rapid
**Eragrostis curvula*	African Lovegrass	High	Rapid
**Euphorbia terracina*	Geraldton Carnation Weed	High	Rapid
**Freesia leichtlinii*	Freesia	High	Rapid
**Fumaria capreolata*	Climbing Fumitory	High	Rapid
**Fumaria muralis*	Wall Fumitory	High	Rapid
**Gazania linearis*	Gazania	High	Rapid
**Gladiolus caryophyllaceous*	Pink Gladiolus	High	Rapid
**Hesperantha falcata*	Hesperantha	High	Rapid
**Hypochaeris glabra*	Flatweed	High	Rapid
**Lactuca serriola*	Prickly Lettuce	High	Rapid
**Pelargonium capitatum*	Rose Pelargonium	High	Rapid
**Vulpia fasciculata*	Sand Fescue	High	Rapid
**Vulpia myuros* forma. *megalura*	Rat's Tail Fescue	High	Rapid
**Watsonia versfeldii*	Watsonia	High	Rapid
**Lupinus cosentinii*	Sandplain Lupin	High	Moderate
**Oxalis pes-caprae*	Soursob	High	Slow
**Pentameris pallida*	Perennial False Hairgrass	High	Unknown
**Ehrharta longiflora*	Annual Veldt Grass	Medium	Rapid
**Monoculus monstrosus*	Stinking Roger	Medium	Rapid
**Petrorhagia dubia*	Velvet Pink	Medium	Rapid
**Polycarpon tetraphyllum*	Fourleaf Allseed	Medium	Rapid
**Solanum nigrum*	Black Berry Nightshade	Medium	Rapid
**Trachyandra divaricata*	Dune Onion Weed	Medium	Rapid
**Urospermum picroides*	False Hawkbit	Medium	Rapid
**Chamelaucium uncinatum*	Geraldton Wax	Medium	Slow
**Galium murale*	Small Goosegrass	Low	Rapid
**Poa annua*	Winter Grass	Low	Rapid
**Sagina apetala*	Common Pearlwort	Low	Rapid

SPECIES	COMMON NAME	IMPACT	INVASIVENESS
**Stellaria media*	Chickweed	Low	Rapid
**Conyza bonariensis*	Fleabane	Low	Moderate
**Leontodon rhagadioloides*	Lesser Hawkbit	Low	Moderate
**Crassula t.* var. *thunbergiana*	Stonecrop	Low	Slow
**Oenothera laciniata*	Evening Primrose	Low	Slow
**Malva parviflora*	Marshmallow	Low	Unknown
**Briza maxima*	Blowfly Grass	Unknown	Rapid
**Briza minor*	Shivery Grass	Unknown	Rapid
**Centaurium pulchellum*	Lesser Centaury	Unknown	Rapid
**Cerastium glomeratum*	Mouse Ear Chickweed	Unknown	Rapid
**Crassula glomerata*	Stonecrop	Unknown	Rapid
**Disa bracteata*	South African Orchid	Unknown	Rapid
**Dischisma arenaria*	Dischisma	Unknown	Rapid
**Lysimachia arvensis*	Blue Pimpernel	Unknown	Rapid
**Medicago polymorpha*	Burr Medic	Unknown	Rapid
**Melilotus indicus*	Common Melilot	Unknown	Rapid
**Sonchus asper*	Rough Sowthistle	Unknown	Rapid
**Sonchus oleraceus*	Common Sowthistle	Unknown	Rapid
**Ursinia a.* subsp. *anthemoides*	Ursinia	Unknown	Rapid
**Wahlenbergia capensis*	Cape Bluebell	Unknown	Rapid
**Aira caryophyllea*	Silvery Hairgrass	Unknown	Unknown
**Crepis f.* subsp. *foetida*	Foetid Hawksbeard	Unknown	Moderate
**Erodium botrys*	Long Storksbill	Unknown	Moderate
**Erodium cicutarium*	Common Storksbill	Unknown	Moderate
**Euphorbia peplus*	Petty Spurge	Unknown	Moderate
**Ficinia marginata*	Coarse Clubrush	Unknown	Unknown
**Osteospermum ecklonis*	Veldt Daisy	Unknown	Moderate
**Rostraria cristata*	Annual Cat's Tail	Unknown	Unknown
**Sisymbrium irio*	London Rocket	Unknown	Unknown
**Trifolium c.* var. *campestre*	Hop Clover	Unknown	Unknown
**Trifolium scabrum*	Rough Clover	Unknown	Unknown
**Vicia hirsuta*	Hairy Vetch	Unknown	Unknown
**Vicia sativa*	Common Vetch	Unknown	Unknown
**Solanum lycopersicum*	Tomato	NA	NA

Declared Pest Plants (BAM Act 2007)

None of the weeds recorded were Declared Pests under the *BAM Act* 2007. See Section 4.5.2 for an explanation of Declared Pests.

Weeds of National Significance

None of the species listed as WONS (Section 4.5.3) were recorded in the survey area.

6.2 VEGETATION

6.2.1 Vegetation Types

Five vegetation types, as defined by both structure and floristics, were described for the study area.

A: DRY UPLANDS

A1: Consolidated dune westerly aspect midslope. Low Open Woodland to Woodland of *Eucalyptus todtiana* (Pricklybark), *Banksia attenuata* and *B. menziesii* over species-rich Shrub, Forb, Grass, Sedge and Rush strata. Isolated Trees of *Nuytsia floribunda and Allocasuarina fraseriana*. (FCT23a: 'Central *Banksia attenuata - B. menziesii* woodlands' transitioning in the south to FCT20a: *'Banksia attenuata* woodlands over species rich dense shrublands'). Condition >90% Excellent to Very Good.

A2: Consolidated dune easterly aspect midslope. Low to Mid Open Woodland to Woodland *Eucalyptus marginata* subsp. *marginata* (Jarrah), *Banksia attenuata* and *B. menziesii* over species-rich Shrub, Forb, Grass, Sedge and Rush strata. Isolated Trees of *Nuytsia floribunda*. (FCT20a: *'Banksia attenuata* woodlands over species rich dense shrublands'). Condition >90% Excellent to Very Good, some localised disturbance.

B: INTERGRADE

B1: Consolidated dune lower slopes. Low Woodland to Woodland of *Banksia attenuata, B. ilicifolia* and *B. menziesii* over Shrub, Forb, Grass, Sedge and Rush strata (FCT23a). Isolated Trees of *Eucalyptus todtiana and Melaleuca preissiana*. (FCT23a: 'Central *Banksia attenuata - B. menziesii* woodlands'). Condition >90% Excellent to Very Good to Excellent, some localised disturbance.

C: DAMPLAND BASIN

C1: Outer dampland basin (drier). Mid Open Forest *Banksia ilicifolia, B. attenuata* and *B. menziesii* over Low Open Woodland *Melaleuca preissiana* over Isolated Clumps to Tall Shrubland *Adenanthos cygnorum* subsp. *cygnorum* and Low to Mid Open to Closed Shrubland *Hypocalymma balbakiae* and *Platytheca galioides* over Sparse Rushland *Lyginia imberbis, Hypolaena exsulca* and Sparse Sedgeland *Schoenus caespititius* and Open Forbland *Phlebocarya ciliata.* (FCT22: *'Banksia ilicifolia* woodlands'). Condition >90% Excellent.

C2: Inner dampland basin (wetter). Low Woodland to Open Forest *Banksia ilicifolia, B. attenuata, B. menziesii* and *Melaleuca preissiana* over Tall Isolated Clumps of Shrubs *Adenanthos cygnorum* subsp. *cygnorum* and Low to Mid Open to Closed Shrubland *Hypocalymma balbakiae* and *Platytheca galioides* over Open Sedgeland dominated by *Schoenus caespititius, Open Rushland Hypolaena exsulca* and Open Forbland *Phlebocarya ciliata*. Also including wetter species Mid Shrubs *Pericalymma ellipticum* var. f*loridum*, *Astartea affinis* and Sedge *Machaerina arthrophylla.* (FCT4: *'Melaleuca preissiana* damplands'). Condition >90% Excellent, some localised disturbance.

D DEGRADED

D1: Walking paths, firebreaks. Localised patches of weeds and/or cleared areas. Degraded to Completely Degraded.

A: DRY UPLANDS

A1: Dune crest and slopes westerly aspect. Low Open Woodland to Woodland of *Eucalyptus todtiana* (Pricklybark), *Banksia attenuata* and *B. menziesii* over species-rich Shrub, Forb, Grass, Sedge and Rush strata. Isolated Trees of *Nuytsia floribunda* and *Allocasuarina fraseriana*. (FCT23a: 'Central *Banksia attenuata* - *B. menziesii* woodlands' transitioning in the south to FCT20a: *'Banksia attenuata* woodlands over species rich dense shrublands'). Plates 7-10.

Low Woodland dominated by Trees *Eucalyptus todtiana*, *Banksia attenuata* and *B. menziesii* with isolated Trees *Nuytsia floribunda* or *Allocasuarina fraseriana*.

Mid Sparse to Open Shrubland of *Allocasuarina humilis* and *Jacksonia floribunda and* unusually low cover of Isolated Grasstrees *Xanthorrhoea preissii* and *Xanthorrhoea brunonis*.

Species-rich Low Shrubland dominated by *Eremaea pauciflora* subsp. *pauciflora, Hibbertia hypericoides* subsp. *hypericoides* and *Daviesia triflora* but also typically *Bossiaea eriocarpa, Calytrix flavescens, Conostephium pendulum, Cyanothamnus ramosus* subsp*. anethifolius, Dampiera linearis, Hibbertia aurea, Hibbertia striata, Hovea trisperma, Hypocalymma robusta, Leucopogon conostephioides, Leucopogon polymorphus, Philotheca spicata, Scaevola repens* subsp*. repens, Stirlingia latifolia.*

Low Open Rushland of *Alexgeorgea nitens, Desmocladus flexuosus, Hypolaena exsulca, Lyginia barbata, Lyginia imberbis.*

Low Sparse Sedgeland dominated by *Mesomelaena pseudostygia* but also typically *Chaetospora curvifolia, Schoenus clandestinus, Lepidosperma pubisquameum, L. striatum*.

Species-rich Low Forbland dominated by *Dasypogon bromeliifolius, Patersonia occidentalis* subsp. *occidentalis* but also typically *Anigozanthos humilis* subsp*. humilis, Arnocrinum preissii, Burchardia congesta, Caladenia flava* subsp*. flava, Centrolepis drummondiana, C. aurea, C. setigera* subsp*. setigera, Diuris magnifica, Drosera drummondii, D. erythrorhiza, Elythranthera brunonis, Eriochilus dilatatus, Haemodorum spicatum, Laxmannia ramosa* subsp*. ramosa, Lomandra caespitosa, Lomandra hermaphrodita, Lomandra preissii, Lomandra suaveolens, Phlebocarya ciliata, Phyllangium paradoxum, Poranthera moorokatta* (P2)*, Prasophyllum parvifolium, Pterostylis recurva, P. vittata, Pyrorchis nigricans, Stylidium androsaceum, S. brunonianum, S. piliferum, Thysanotus sparteus, T. thyrsoideus, Trachymene pilosa, Tricoryne tenella, Wahlenbergia preissii* and weeds **Gladiolus caryophyllaceous, *Ursinia anthemoides* subsp*. anthemoides*.

Low Sparse Grassland *Amphipogon turbinata, Austrostipa compressa, Rytidosperma occidentale* and weeds **Briza maxima, *Ehrharta calycina*.

Weed cover was generally very low (<0.1% to 1%). The higher values were due to localised disturbed patches, around tracks and edges and sometimes at the base of trees. In general in intact vegetation, weeds were <0.3% and often <0.1%. The weedy Grass **Ehrharta calycina* and Forbs **Gladiolus caryophyllaceus* and **Ursinia anthemoides* subsp. *anthemoides* were present in all three quadrats at very low covers (0.1%). Annual Grass weeds **Aira caryophyllea* and **Briza maxima* were recorded at minimum cover scores in two of the three quadrats.

In the statistical analysis, Quadrats HP01 and HP08 represented FCT23a: 'Central *Banksia attenuata* - *B. menziesii* woodlands'. However HP03 represented FCT20a: *'Banksia attenuata* woodlands over species rich

dense shrublands'. HP03 was in the far southern extremity of this vegetation type in the study area, and may have represented a transitional area.

The three quadrats (HP01, HP03 and HP08) in this vegetation had a mean species richness of 88.3 ± 5.1 species with a weed frequency of 7.3 ± 5.9 species per quadrat.

For FCT23a, Gibson *et al.* (1994) recorded a mean species richness of 62.8 (n = 19) per quadrat, with a mean weed frequency of 5.2 species. Therefore species richness is significantly higher in the study area. This may be due to this vegetation possibly being a transitional area to FCT20a. However in Gibson *et al.* (1994) FCT20a also only had a mean species richness of 67.4 (n = 7) per quadrat, with a mean weed frequency of 1 species. There are likely to be a number of reasons for why species richness is so high in the study area, although *Banksia* Woodland in the central to eastern areas of the SCP around Perth, do commonly support a species richness between 70-100 per quadrat.

Plate 7 Vegetation Type A1: Near HP08 September 2024. Low Woodland *Eucalyptus todtiana, Banksia attenuata, B. menziesii*.

Plate 8 Vegetation Type A1: Near HP01 October 2024. Low Woodland *Eucalyptus todtiana, Banksia attenuata, B. menziesii*.

Plate 9 Vegetation Type A1: Near HP03 October 2024. Open area in Low Woodland *Eucalyptus todtiana, Banksia attenuata, B. menziesii*.

Plate 10 Vegetation Type A1: Vegetation Type A1: Near HP03 October 2024. Low Woodland *Eucalyptus todtiana, Banksia attenuata, B. menziesii*.

A2: Dune crest and slopes easterly aspect. Low to Mid Open Woodland to Woodland *Eucalyptus marginata* subsp. *marginata* (Jarrah), *Banksia attenuata* and *B. menziesii* over species-rich Shrub, Forb, Grass, Sedge and Rush strata. Isolated Trees of *Nuytsia floribunda*. (FCT20a: *'Banksia attenuata* woodlands over species rich dense shrublands'). Plates 11-15.

Low Woodland dominated by Trees *Eucalyptus marginata* subsp. *marginata*, *Banksia attenuata* and *B. menziesii* with isolated Trees *Nuytsia floribunda*.

Mid Open Shrubland dominated by Grasstrees *Xanthorrhoea preissii*, which was present at much higher covers than Vegetation Type A1. Other Mid Shrubs included *Acacia p.* var. *pulchella*, *Daviesia d.* subsp. *divaricata, Jacksonia floribunda* and *Allocasuarina humilis*.

Low Shrubland species-rich typically dominated by *Hibbertia hypericoides* subsp. *hypericoides, Daviesia triflora, Stirlingia latifolia* but also typically *Acacia applanata, A. sessilis, Bossiaea eriocarpa, Calectasia narragara, Calytrix flavescens, Comesperma calymega, Conostephium pendulum, Dampiera linearis, Daviesia nudiflora* subsp. *nudiflora, Gastrolobium capitatum, Gompholobium tomentosum, Hemiandra linearis, Hibbertia striata, Hovea trisperma, Hypocalymma robusta, Leucopogon polymorphus, Petrophile linearis, Philotheca spicata, Hybanthus calycina, Scaevola repens* subsp*. repens*.

Sparse to Open Rushland typically *Alexgeorgea nitens, Desmocladus flexuosus, Hypolaena exsulca, Lyginia barbata* and/or *Lyginia imberbis*. *Lepidobolus preissianus* subsp. *preissianus* also occurred in this vegetation type, distinguishing it from Vegetation Type A1.

Sparse to Open Sedgeland dominated by *Mesomelaena pseudostygia* but also typically *Chaetospora curvifolia, Lepidosperma pubisquameum, L. striatum, Schoenus clandestinus*.

Forbland, species-rich dominated by *Patersonia occidentalis* var. *occidentalis, Dasypogon bromeliifolius, Phlebocarya ciliata* but also typically *Anigozanthos humilis* subsp. *humilis, Burchardia congesta, Caesia micrantha, Caladenia flava* subsp. *flava, Centrolepis drummondiana, Chamaescilla corymbosa, Conostylis aculeata* subsp. *cygnorum, C. aurea, C. setigera* subsp. *setigera, Crassula colorata* var. *colorata, Drosera erythrorhiza, Elythranthera brunonis, Eriochilus dilatatus, Haemodorum laxum, H. spicatum, Lomandra caespitosa, L. hermaphrodita, L. preissii, L. suaveolens, Phyllangium paradoxum, Pterostylis recurva, Stylidium androsaceum, S. carnosum, Thysanotus sparteus, Trachymene pilosa, Tricoryne tenella Wahlenbergia preissii* and weeds **Gladiolus caryophyllaceous, *Hypochaeris glabra, *Sonchus oleraceus *Ursinia a.* subsp*. anthemoides.*

Low Sparse Grassland *Amphipogon turbinata, Austrostipa compressa, Rytidosperma occidentale* and weeds **Briza maxima, *Ehrharta calycina, *Pentameris pallida, *Aira caryophyllea*.

Weed cover was generally very low (<0.1% to 1%). Some higher values were recorded in localised disturbed patches. The weedy Forbs **Hypochaeris glabra*, **Gladiolus caryophyllaceus* and **Ursinia a.* subsp. *anthemoides* (0.1% to 3% cover) were present in all four quadrats. Grasses **Ehrharta calycina, *Briza maxima, *Aira caryophyllea* and **Pentameris pallida* were present at low cover in 75% of quadrats.

In the statistical analysis all four quadrats in this vegetation represented FCT20a: *'Banksia attenuata* woodlands over species rich dense shrublands'.

The four quadrats (HP06, HP07, HP09, HP12) in this vegetation had a mean species richness of 83.5 $\pm$ 3.1 species with a weed frequency of 10 $\pm$ 2.2 species per quadrat.

For FCT20a, Gibson *et al.* (1994) recorded a mean species richness of 67.4 per quadrat, with a mean weed frequency of 1, which is lower than the study area. There may be a number of reasons for this, however Banksia Woodland on the SCP around Perth, commonly supports a species richness of 80-100 species.

Plate 11 Vegetation Type A2. Near HP07 Oct 2024. Low Woodland *Banksia attenuata, B. menziesii*.

Plate 12 Vegetation Type A2. Near HP06. Low Woodland *Banksia attenuata, B. menziesii* with low 'shrubby' *Eucalyptus marginata*.

Plate 13 Vegetation Type A2. Near HP06. Low Woodland *Banksia attenuata, B. menziesii*.

Plate 14 Vegetation Type A2. Near HP12. *Xanthorrhoea preissii* dominant here.

Plate 15 Vegetation Type A2. Near HP06. Large old *Eucalyptus marginata* and Open Woodland *Banksia attenuata* and *B. menziesii*.

B: INTERGRADE

B1: Dune lower slopes. Low Woodland to Woodland of *Banksia attenuata, B. ilicifolia* and *B. menziesii* over Shrub, Forb, Grass, Sedge and Rush strata. Isolated Trees of *Eucalyptus todtiana* and *Melaleuca preissiana*. (FCT23a: 'Central *Banksia attenuata* - *B. menziesii* woodlands'). Plates 16-19.

Low Woodland dominated by *Banksia attenuata, B. ilicifolia* and *B. menziesii* with also *Eucalyptus todtiana* and *Melaleuca preissiana* frequently present.

Low Open Shrubland dominated by *Acacia pulchella* var. *pulchella, Bossiaea eriocarpa, Calytrix flavescens, Gompholobium tomentosum, Hibbertia subvaginata, Hovea pungens, Leucopogon conostephioides, Scholtzia involucrata* but also typically *Calytrix fraseri, Cyanothamnus ramosus* subsp*. anethifolius, Dampiera linearis, Eremaea pauciflora* var*. pauciflora, Hibbertia aurea, Jacksonia floribunda, Lechenaultia floribunda, Melaleuca seriata, Petrophile linearis, Verticordia nitens, Xanthorrhoea preissii.*

Low Open Rushland of *Alexgeorgea nitens, Desmocladus flexuosus, Hypolaena exsulca, Lyginia barbata, L. imberbis.*

Open Forbland to Forbland, species-rich, dominated by *Burchardia congesta, Dasypogon bromeliifolius, Patersonia occidentalis* var. *occidentalis, Phlebocarya ciliata, Stylidium repens, Trachymene pilosa* but also typically *Arnocrinum preissii, Caladenia flava* subsp. *flava, Centrolepis drummondiana, Conostylis juncea, Diuris magnifica, Drosera erythrorhiza, Elythranthera brunonis, Eriochilus dilatatus, Haemodorum spicatum, Hensmania turbinata, Lomandra caespitosa, L. hermaphrodita, L. preissii, L. suaveolens, Microtis media* subsp. *media, Phyllangium paradoxum, Prasophyllum parvifolium, Stylidium brunonianum, Thysanotus thyrsoideus*, and weeds **Disa bracteata, *Gladiolus caryophyllaceous, *Hypochaeris glabra, *Ursinia anthemoides* subsp*. anthemoides*.

As this is a relatively narrow area that is an intergrade between damplands and uplands, species from adjacent vegetation types also appeared in this vegetation.

Weed cover was low (1-2%) in intact vegetation. The cover in intact vegetation in quadrats was dominated by Grass weeds **Briza maxima* and **Ehrharta calycina but also typically* Forbs *at low cover (0.1%) *Disa bracteata, *Gladiolus caryophyllaceus, *Hypochaeris glabra* and **Ursinia anthemoides* subsp. *anthemoides.* There were small localised disturbed patches, particularly in the western portion of this vegetation type, that had a higher cover of weeds. Figure 5 demonstrates the distribution of these patches as points that are in G to D condition, amongst vegetation otherwise in Very Good to Excellent condition. Sometimes the weedy patches were underneath trees, with small localised patches of **Ehrharta longiflora* and other shade loving weeds.

The two quadrats (HP10, HP11) in this vegetation represented FCT23a: 'Central *Banksia attenuata* - *B. menziesii* woodlands'.

The two quadrats (HP10, HP11) in this vegetation had a mean species richness of 67 $\pm$ 2.8 species with a weed frequency of 8 $\pm$ 1.4 species per quadrat.

For FCT23a, Gibson *et al.* (1994) recorded a mean species richness of 62.8 (n = 19) per quadrat, with a mean weed frequency of 5.2 species.

Plate 16 Vegetation Type B1. Near HP11. Woodland *Banksia* spp. and Isolated Clumps of *Melaleuca preissiana* over low Shrubs and Forbs.

Plate 17 Vegetation Type B1. Near HP10 Woodland *Eucalyptus todtiana, Banksia* spp. and Isolated Clumps of *Melaleuca preissiana* over low Shrubs and Forbs.

Plate 18 Vegetation Type B1. Near HP11. Low Open Woodland *Banksia* spp. and Isolated Clumps of *Melaleuca preissiana* over low Shrubs and Forbs.

Plate 19 Vegetation Type B1. Near HP11. Low Woodland *Banksia* spp. and Isolated Clumps of *Melaleuca preissiana* over low Shrubs and Forbs.

C: DAMPLAND BASIN

C1: Outer dampland basin. Mid Open Forest *Banksia ilicifolia, B. attenuata* and *B. menziesii* over Low Open Woodland *Melaleuca preissiana* over Isolated Clumps to Tall Shrubland *Adenanthos cygnorum* subsp. *cygnorum* and Low to Mid Open to Closed Shrubland *Hypocalymma balbakiae* and *Platytheca galioides* over Sparse to Open Rushland *Lyginia imberbis, Hypolaena exsulca* and Sparse Sedgeland *Schoenus caespititius* and Open Forbland *Phlebocarya ciliata.* (FCT22: *'Banksia ilicifolia* woodlands'). Plates 20-25.

Mid Open Forest *Banksia ilicifolia, B. attenuata* and *B. menziesii* over Low Open Woodland *Melaleuca preissiana*. Canopy cover overall and for each species, varied across this vegetation. Other Isolated Trees included *Nuytsia floribunda*.

Very large old clumps of *Adenanthos cygnorum* subsp. *cygnorum* (Woollybush) (Plate 24) occurred throughout this vegetation. It varied in cover from Isolated Clumps to Shrubland, increasing towards the eastern boundary of this vegetation type. Clumps were frequently up to 4m tall and over 10m across in places. Very little grew underneath these large clumps.

Mid Open Shrubland to Shrubland dominated by *Hypocalymma balbakiae* (previously *H. angustifolium*) with other species typically *Beaufortia elegans,* with occasional *Jacksonia floribunda* and *Xanthorrhoea preissii*.

Low Shrubland to Open Shrubland dominated by *Euchilopsis linearis* and *Platytheca galioides* but also typically *Dampiera linearis, Gompholobium tomentosum, Hibbertia subvaginata, Hovea pungens, Platysace filiformis, Styphelia conostephioides*.

Sparse Sedgeland *Schoenus caespititius* with *Chaetospora curvifolia* also typical. Increasing in cover to Open Sedgeland in localised places.

Sparse Rushland *Lyginia imberbis* and *Hypolaena exsulca.* Increasing in cover to Open Rushland in localised places.

Open Forbland dominated by *Phlebocarya ciliata* but also typically *Stylidium repens, Trachymene pilosa* and *Thysanotus thyrsoideus.* Other Isolated Forbs typically included *Burchardia congesta, Dasypogon bromeliifolius, Drosera erythrorhiza, Microtis media* subsp. *media, Patersonia occidentalis* var. *occidentalis*.

Weed cover was very low (<0.1%) in intact vegetation. There were only occasional random species seen in quadrats, typically Grass weeds **Briza maxima* and **Ehrharta calycina* and Forbs **Sonchus oleraceus, *Disa bracteata, *Euphorbia peplus* and **Galium murale.* There were small localised disturbed patches towards the south-western boundary of this vegetation that had a higher cover of weeds. Underneath some trees near the south-west extent of this vegetation, there were small localised patches of **Ehrharta longiflora* and other shade loving weeds. See Figure 5 for an indication of the distribution of these patches (points that are in G to D condition amongst vegetation otherwise in Excellent condition).

In the statistical analysis Quadrats HP04 and HP05 represented FCT22: *'Banksia ilicifolia* woodlands'.

The two quadrats (HP04, HP05) in this vegetation had a mean species richness of 36.5 $\pm$ 2.1 species with a weed frequency of 3 $\pm$ 2.8 species per quadrat.

For FCT22 Gibson *et al.* (1994) recorded a mean species richness of 32.5 (n = 11) per quadrat, with a mean weed frequency of 0.6 species.

Plate 20 Vegetation Type C1. Near HP04. Towards western side of C1, more open canopy, more diverse understorey.

Plate 21 Vegetation Type C1. Near HP05. Towards western side of C1, more open canopy, more diverse understorey.

Plate 22 Vegetation Type C1. Near HP04. Forest of *Banksia* spp. and Melaleuca preissiana over Shrubland *Hypocalymma balbakiae*.

Plate 23 Vegetation Type C1. HP05. Forest of *Banksia* spp. and *Melaleuca preissiana*, shaded, relatively sparse understorey.

Plate 24 Vegetation Type C1 East of HP05. Large old *Adenanthos cygno*rum subsp. *cygnorum* more dominant at eastern boundary of C1.

Plate 25 Vegetation Type C1. Near HP04 September 2024. Localised patches of *Melaleuca preissiana* in places.

C2: Inner dampland basin (wetter). Low Woodland to Open Forest *Banksia ilicifolia, B. attenuata, B. menziesii* and *Melaleuca preissiana* over Tall Isolated Clumps of Shrubs *Adenanthos cygnorum* subsp. *cygnorum* and Low to Mid Open to Closed Shrubland *Hypocalymma balbakiae* over Low Open Shrubland dominated by *Platytheca galioides* over Open Sedgeland *Hypolaena exsulca* and *Schoenus caespititius* and Open Forbland *Phlebocarya ciliata*. Also including wetter species Mid Shrubs *Pericalymma ellipticum* var. f*loridum*, *Astartea affinis* and Sedge *Machaerina arthrophylla.* (FCT4: *'Melaleuca preissiana* damplands'). Plates 26-29.

Similar to Vegetation Type C1, however with additional species more typical of wetter habitats.

On average there was a Low Woodland to Open Forest of *Banksia ilicifolia, B. attenuata, B. menziesii* and *Melaleuca preissiana.* However, these varied in height, composition and cover across this vegetation type. Some areas had an open tree canopy (Plate 26) with other areas having a closed canopy (Plate 28). There were some very large and old individual trees, some of which were taller than 'Low' i.e. over 10m in height. Localised wetter pockets were dominated by *Melaleuca preissiana* largely to the exclusion of *Banksia* spp.

Very large old clumps of *Adenanthos cygnorum* subsp. *cygnorum* (Woollybush) occur throughout this vegetation, however less frequently than Vegetation Type C1, and absent from the wettest pockets.

The Mid Closed Shrubland to Open Shrubland was dominated by *Hypocalymma balbakiae* and *Regelia ciliata,* but also typically included wetland species *Pericalymma ellipticum* var*. floridum* and *Astartea scoparia* in places.

The Low Open Shrubland was dominated by *Platytheca galioides* and also *Euchilopsis linearis, Hibbertia subvaginata* and *Styphelia conostephioides,* but also typically *Lechenaultia floribunda, Gompholobium tomentosum, Dampiera linearis.*

Open Sedgeland dominated by *Schoenus caespititius* with *Chaetospora curvifolia* also typical*.*

Open Rushland dominated by *Hypolaena exsulca* but with *Lyginia imberbis* and *Machaerina arthrophylla* also typical*.*

Open Forbland dominated by *Phlebocarya ciliata* but also typically *Stylidium repens, Pterostylis recurva, Trachymene pilosa.* Forb diversity was low, with occasional random species present. Species like *Patersonia occidentalis* var. *occidentalis* became more frequent towards the edge of this vegetation type.

The ground layer in this vegetation was relatively bare of vegetation, especially compared to Vegetation Types A and B. The soil was sandy but peaty, moist, with humus and leaf litter and shaded from the dense canopy. It was naturally not conducive to the high diversity of Sedges, Rushes, Forbs and Low Shrubs found in adjacent vegetation.

Weed cover was generally very low, with most of this vegetation recording no weed species. Near the SW edge of this vegetation however, there were some small localised patches of historical disturbance, where weed cover and diversity was higher. These were often patches of a few metres square and included Forbs **Euphorbia peplus, *Fumaria capreolata, *Hypochaeris glabra, *Oxalis pes-caprae, *Ursinia anthemoides* subsp*. anthemoides* and Grasses **Briza maxima, *Ehrharta longiflora, *Vulpia myuros* subsp*. megalura*. Often weeds were highest cover in the shade of trees in this area (Plate 32). Figure 5 demonstrates the distribution of these patches as points that are in G to D condition, amongst vegetation otherwise in Very Good to Excellent condition.

In the statistical analysis the one quadrat (HP02) in this vegetation represented FCT04: *'Melaleuca preissiana* damplands'.

HP02 had a mean species richness of 26 species with no weeds recorded. The releve in this vegetation (HPR02) recorded 31 species, none of which were weeds.

For FCT04, Gibson *et al.* (1994) recorded a mean species richness of 36.9 (n = 16) per quadrat, with a mean weed frequency of 3.3 species.

Plate 26 Vegetation Type C2. Near HP02. *Banksia ilicifolia* and *Melaleuca preissiana* over *Hypocalymma balbakiae*. September 2024.

Plate 27 Vegetation Type C2. Near HP02. *Banksia ilicifolia* and *Melaleuca preissiana* over *Hypocalymma balbakiae*. October 2024.

Plate 28 Vegetation Type C2. Releve HPR02 September 2024. Wettest part of basin with *Melaleuca preissiana* over *Machaerina arthrophylla* in localised patches.

Plate 29 Vegetation Type C2. Releve HPR02 September 2024. Wettest part of basin with *Melaleuca preissiana* over *Machaerina arthrophylla* in localised patches. Note large *Melaleuca preissiana*.

D DEGRADED

D1: Walking paths, firebreaks. Localised patches of weeds and/or cleared areas. (Plates 30 to 34).

Areas in Degraded to Completely Degraded condition consisted mainly of firebreaks around the edge (Plates 30 and 31) (Figure 5). There were many species of weeds present on or adjacent to these areas that were not recorded elsewhere within the vegetation.

In particular, the firebreak along the western side of the study area appeared to have a suite of weeds not seen elsewhere. Some of these were impacting the edges of the adjacent vegetation, with the first 1-3m varying from Degraded to Good in vegetation otherwise in Very Good to Excellent condition (Plate 30). This section was observed to be used more by pedestrians, cutting through from Landsdale Road to Darling Park. These were often dog walkers, using the area as an off-lead area. Some potentially problematic weeds included but were not limited to **Arctotheca calendula, *Brassica tournefortii, *Bromus diandrus, *Freesia leichtlinii, *Lactuca serriola, *Petrorhagia dubia, *Urospermum clandestinum*. Dogs in particular may be introducing weeds (or diseases), from home gardens, but also road verges and parks. When they are allowed into vegetation, their claws also disturb the natural soil crusts and leaf litter that otherwise can protect soils from weeds establishing.

Other firebreaks along the northern (Plate 31), eastern and southern boundaries had scattered weedy outbreaks, but adjacent vegetation was comparitively weed free, apart from localised weed outbreaks and patches (Figure 5, Appendix D).

There were localised disturbed patches (see Localised Condition Points, Figure 5) within otherwise intact vegetation (Very Good to Excellent). These appeared to be the legacy of a historical remnant of a track that once traversed the study area. The track itself and associated disturbance can more clearly be seen in historical aerial imagery, however its impact area roughly coincides with the area that has been mapped Very Good (as opposed to Excellent)(Figure 5). It ran from the western boundary eastwards through the southern boundary of the dampland and out of the study area at the south-east corner.

Where this track remnant and associated disturbed patches intersected the drier upland vegetation, the weed species typically included Grasses **Ehrharta calycinus, *Briza maxima, *Vulpia myuros* forma. *megalura* and weedy Forbs **Hypochaeris glabra* and **Ursinia anthemoides* subsp. *anthemoides* (Plate 33).

Where this track remnant intersected with the dampland vegetation, there were localised weedy patches, with a suite of weeds more typical of wetter, shadier areas. Most commonly weedy Grasses **Ehrharta longiflora* and weedy Forbs **Oxalis pes-caprae* and **Fumaria capreolata* (Plate 32). These weedy patches were frequently localised at the base of trees (Plate 32). This pattern of disturbance at the base of trees and shrubs is often seen when there has been herbivore activity. Either historically with livestock, or too high numbers of kangaroos, however they may have other unknown causes. Apart from the bones of what appeared to be a Kangaroo, there was no evidence of Kangaroo being present in the study area. There was however evidence of rabbits.

Two relatively recent 'camps' was present in the dampland, with chairs and a firepit and some rubbish (Plate 34). These appeared to be used as a meeting place by locals, rather than by rough sleepers. It may be that a history of recreational use in this area, has also contributed to the weedy patches at the base of trees.

Plate 30 Vegetation Type D1. Completely Degraded along western firebreak. Degraded to Good 1-3m in from edge. Edge effects likely due to increased traffic from pedestrians and dogs.

Plate 31 Vegetation Type D1. Completely Degraded along northern firebreak. Only minimal weed invasion in adjacent bushland, minimal edge effects.

Plate 32 Vegetation Type D1. Localised disturbance in damplands which are otherwise intact. In this example, at the base of *Melaleuca preissiana with* Grass weeds **Ehrharta longiflora* and **Vulpia* spp. and Forb weeds **Oxalis pes-caprae, *Fumaria capreolata.*

Plate 33 Vegetation Type D1. Localised disturbance in drier *Banksia* Woodland, which is otherwise intact (VG). Grass weeds **Ehrharta calycina, *Briza maxima *Vulpia myuros* forma. *megaleura* and Forbs **Hypochaeris glabra, *Ursinia anthemoides.*

Plate 34 Vegetation Type D1. Camp with rubbish, but more significantly a localised weedy patch.

6.2.2 Vegetation Condition

Please see the previous section for a description of the localised disturbed areas and firebreaks.

Of the total 10.21ha that constitutes the study area, 9.88ha were in Good or better condition. Including 6.25ha in Excellent condition, 3.26ha in Very Good condition and 0.38ha in Good condition. Table 19 provides a breakdown of the condition ratings by FCT. This meant that more than 93% of the vegetation was mapped as Excellent or Very Good condition.

However as discussed, within these areas there were very localised patches in Degraded to Good condition (Figure 5). These were too small and localised to map at the scale of this study. In taking these into account however, it is estimated that >90% of the vegetation is in Excellent to Very Good condition.

Table 19: Floristic Community Type (FCT) Area Calculations by Vegetation Condition (Hectares).

FCT	CONDITION		HECTARES
FCT04: *'Melaleuca preissiana* damplands'.	**EX**	Excellent	0.566056157
		TOTAL:	**0.566056157**
FCT20a: *'Banksia attenuata* woodlands over species rich dense shrublands'.	**EX**	Excellent	1.823972181
	VG	Very Good	1.348690069
	G	Good	0.099219508
		TOTAL:	**3.271881757**
FCT22: *'Banksia ilicifolia* woodlands'.	**EX**	Excellent	2.149320524
	VG	Very Good	0.079383844
	G	Good	0.057834069
		TOTAL:	**2.286538437**
FCT23a: 'Central *Banksia attenuata* - *B. menziesii* woodlands'.	**EX**	Excellent	1.706718263
	VG	Very Good	1.832637245
	G	Good	0.218610466
		TOTAL:	**3.757965974**

Excluding the localised disturbed weedy patches, vegetation in Excellent condition had approximately <0.1% to 0.2% weed cover.

Vegetation in Very Good condition was more patchy and variable, with weeds varying from approximately 0.1% to 3% cover, with disturbed patches with higher cover again, but in small localised areas only.

Dampland areas were mostly weed free. Even when seen, weeds were mostly small annuals, often a single individual and often lacking vigour. The exception was some localised disturbed patches mainly towards the south-west extremity of Vegetation Types C1 and C2 (Figure 3). These can be seen on Figure 5 as Good to Degraded condition points, in vegetation otherwise in Very Good to Excellent condition.

Uplands had low cover values of mainly common naturalised species, with some random extra species usually but not always associated with localised disturbance. The common naturalised species present in most of the nine upland and transition quadrats were Grasses **Ehrharta calycina* (eight quadrats), **Briza maxima* (seven quadrats), **Aira caryophyllea* (five quadrats) and **Pentameris pallida* and **Vulpia myuros* forma. *megaleura* (four quadrats each), Sedge **Ficinia marginata* (5 quadrats) and Forbs **Gladiolus caryophyllaceous*, **Ursinia anthemoides* subsp. *anthemoides* (eight 8 quadrats each) and **Hypochaeris glabra* (seven quadrats).

The quadrats with the highest number of weed species were HP03 (14 species, <1% cover) and HP07 (12 species, ca. 3% cover) (Figure 5) had. Both of these quadrats had small localised disturbance patches in

them, in otherwise intact vegetation, that elevated the weed species count. The quadrats with the lowest number of weed species were HP02 (0 species) and HP04 (1 species) in the dampland, and HP12 (0 species) in the uplands. Recording no weeds in a quadrat on the SCP is unusual.

Gibson *et al.* (1994) state that of the seven quadrats they surveyed in FCT20a, the mean weed frequency per quadrat was one species out of a total mean species richness of 67.4. The quadrats surveyed in the study area from FCT20a had a mean weed frequency of 10 species (total mean species richness 83.5).

Some dead *Banksia* were observed, particularly in the western third of the study area. However it is not possible to tell from casual observation what caused this. The most likely causes may be a combination of natural deaths and/or a legacy of fire, changes in hydrology and/or disease. Some of the deaths looked more recent, and these may have been the consequence of the extreme drought conditions over the preceding summer. A single recently dead *Banksia grandis* was seen in the dampland, and this species can be sensitive to extreme heat. However tree deaths did not appear to be an extensive problem.

Figure 3: Vegetation Types and Priority Flora Locations Map.

Figure 4: Floristic Community Type Map.

Figure 5: Vegetation Condition Map.

6.2.3 Statistical Analysis

Initially an analysis was run, using only the quadrat data collected during this survey. The purpose of this was as a tool to assist in defining and mapping the vegetation in the study area (Figure 3), based on both structure and floristics.

A number of different methods were used, however these all returned similar results. Bray-Curtis ordination with Ward clustering, weighted by NVIS cover classes has been presented in Figure 6, as a typical result.

The first split was between low lying dampland basin, and upland and transition quadrats (Figure 6).

Of the dampland quadrats, HP04 and HP05 (Vegetation Type C1, Figure 3) came out slightly separately to HP02 (Vegetation Type C2, Figure 3), which was the wettest site in the study area. These were quadrats dominated by Woodlands to Forest of *Banksia ilicifolia, B. attenuata and Melaleuca preissiana*.

The next split was between the transition quadrats and the uplands.

The transition vegetation came out in between the dampland and upland quadrats (Figure 6), but closer to the uplands. HP10 and HP11 (Vegetation Type B1, Figure 3) were Low Woodlands dominated by *Banksia attenuata* and *B. menziesii*, but also had occasional trees of both *B. ilicifolia* and *Melaleuca preissiana* typical of damplands, and *Eucalyptus todtiana* which was otherwise more typical of drier uplands.

The largest cluster were of the uplands (Figure 6). These had a Low to Mid Open Woodland dominated by *Banksia attenuata* and *B. menziesii* with emergent *Eucalyptus* species. The clustering mainly split based on the emergent Eucalypt species present, apart from HP03.

Quadrats HP01, HP08 and HP03 (Vegetation Type A1, Figure 3) on the eastern side of the study area had emergent Tree *Eucalyptus todtiana*. HP03 however while it had *Eucalyptus todtiana* dominant in the overstorey, it clustered with the *Eucalyptus marginata* quadrats (Figure 6). HP03 was likely to be transitional and this was also supported by other statistics discussed in the next section.

Quadrats HP06, HP07, HP09 and HP12 (Vegetation Type B2, Figure 3) all clustered together (along with HP03 as discussed above) (Figure 6). These quadrats apart from HP03, were on the western side of the study area and had *Eucalyptus marginata* as the emergent Eucalypt species (Figure 3).

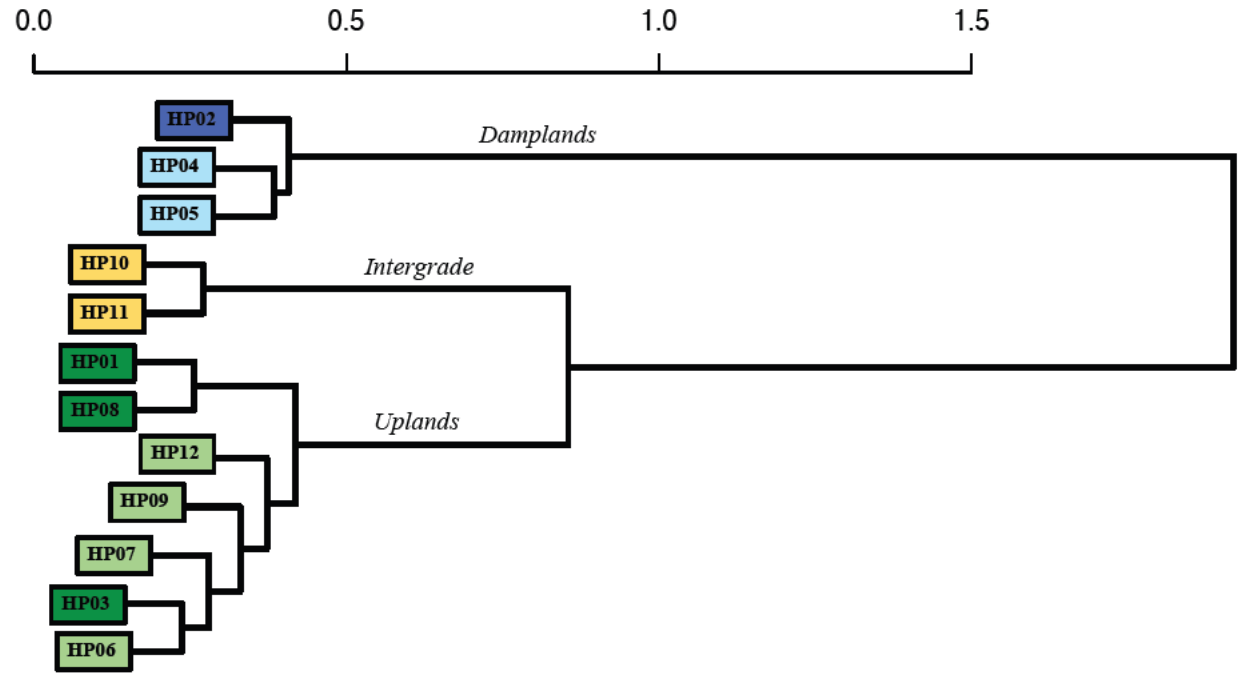

Figure 6: Multivariate Analysis of 12 Study Area Quadrats. (Bray Curtis, Ward, NVIS cover class weighting).

Similarity Measure

While these are not fully diagnostic and only the first stage in completing numerical analyses, the similarity measures provide some contextual information about the relationships of quadrats to each other.

Table 20 shows which quadrats from the Gibson *et al.* (1994) dataset, share the highest number of species to those quadrats in the study area. Most of these show a relatively low similarity compared to similar studies e.g. in Landsdale Park (OTB, 2024), where they were often over 65%. This may be due to the study area being on the transition between two biogeographical features, the Spearwood and Bassendean Dunes. It also may be related to the quadrats in the study area having a very high species richness, substantially higher than the original Gibson *et al.* (1994). And also higher than Landsdale Park.

Multivariate Analysis - Single Site Insertion Against Gibson et al., 1994 Dataset

Table 20 also presents the findings of the SSI results as interpreted from dendrogram results (Appendix C).

There were two main geographical patterns. The quadrats in the eastern part of the study area (except HP03) and including the dampland, were most closely aligned with Gibson *et al.* (1994) quadrats from near Melaleuca and Jandabup, 10-20km north of the study area, as well as a few directly south e.g. Casuarina, Oakford, Banjup. These were Gibson *et al.* (1994) FCTs FCT23a 'Central *Banksia attenuata - B. menziesii* woodlands' on the uplands (Vegetation Type A1) and transition (Vegetation Type B1). And FCT22: *'Banksia ilicifolia* woodlands' (Vegetation Type C1) and FCT04: *'Melaleuca preissiana* damplands' (Vegetation Type C2) in the damplands. These FCTs are mainly associated with the Bassendean Dunes.

The quadrats in the western part of the study area, and including HP03, were unambiguously aligned with the original Gibson *et al.* (1994) quadrats that defined FCT20a. In particular the four western quadrats at Marangaroo Conservation Reserve (GOLF1), Landsdale Park (LAND1) and Koondoola Open Space (KOON1, KOON2). These are all within four kilometres of the study area.

FCT20a appears to have two separate sub-types. A western sub-type associated with the oldest Spearwood Dunes as discussed above, and a eastern sub-type associated with the eastern SCP. While the FCT20a quadrats in the study area clustered closest with the western sub-type, they were next closest to the three remaining Gibson *et al.* (1994) FCT20a quadrats from the eastern sub-type (APBF-1, APBF-2 and M53), near the Perth Airport.

Keighery *et al* (2020) added 11 more FCT20a quadrats to the seven in Gibson *et al.* (1994), however these were all from the eastern sub-type of FCT20a.

In the quadrats that aligned with FCT23a, there was a secondary influence from FCT23b: *'Northern Banksia attenuata - B. menziesii woodlands'* (HP01, HP10 and HP11). FCT23a and FCT23b are closely related FCTs. The geographical distribution of the FCT23b quadrats that clustered closely to quadrats in the study area were from Melaleuca and Pinjar, which are within 10-20km of the study area. FCT23b is known from 80 quadrats between Ellenbrook and the Moore River, which would represent a range extension of 10km in the study area. It is likely that this influence is due to the study area being on a biogeographical transition zone. FCT23b is listed as a PEC in Western Australia, however at most, these results suggest an secondary influence, rather than actually representing FCT23b.

Table 20: Similarity Matrix Comparing Study Area to Regional Quadrat Data (Gibson *et al.*, 1994).

Quadrat 2024	Similarity Measure				Kulczynski Average			Bray-Curtis Average			Conclusion
	Gibson	FC	Locality	%	Gibson	FC	Locality	Gibson	FC	Locality	
HP01	WIRR1	23a	Jandabup	62.75	SINT1	23b	Pinjar	MELA9	23b	Melaleuca	**FCT 23a** Some affiliation with FCT23b, may be transitional. Closest related Gibson sites between 10 and 20km to north.
	HURST03	23a	Leeming	60.01	MELA9	23b	Melaleuca	WARB3	23a	Melaleuca	
	SINT1	23b	Pinjar	59.31	BULL3	23a	Bullsbrook	WIRR2	23a	Jandabup	
	MELA6	23b	Melaleuca	59.03	WHITE1	23a	Whiteman Park	WIRR1	23a	Jandabup	
	YULE2	23a	Kenwick	58.01	HURST03	23a	Leeming	WARB2	23a	Melaleuca	
					MODO4	23a	Oakford				
HP02	BANK1	22	Casuarina	47.05	MELA1	4	Melaleuca	MELA1	4	Melaleuca	**FCT04** Closest related Gibson sites between Melaleuca 20km to north, south to Waroona
	WARB4	22	Melaleuca	45.31	KOOLJ1	4	Birchmont	KOOLJ1	4	Birchmont	
	MELA1	4	Melaleuca	41.74	MODO1	4	Oakford	MODO1	4	Oakford	
	MELA5	22	Melaleuca	39.79	MODO6	4	Oakford	MODO6	4	Oakford	
	MODO4	23a	Oakford	39.29	C581	4	Waroona	C581	4	Waroona	
HP03	LAND1	20a	Darch	56.87	GOLF1	20a	Marangaroo	GOLF1	20a	Marangaroo	**FCT20a**. Closest FCT20a Gibson quadrats are all the western examples at Darch, Koondoola and Marangaroo, then examples at Kewdale near Perth Airport.
	WIRR2	23a	Jandabup	56.87	LAND1	20a	Darch	LAND1	20a	Darch	
	GOLF1	20a	Marangaroo	55.44	KOON1	20a	Koondoola	KOON1	20a	Koondoola	
	SINT1	23b	Pinjar	55.44	KOON2	20a	Koondoola	KOON2	20a	Koondoola	
	HURST03	23a	Leeming	54.71	M53	20a	Kewdale	M53	20a	Kewdale	
HP04	WAND1	23a	Wandi	49.52	MELA5	22	Melaleuca	BANK1	22	Casuarina	**FCT22**. Closest Gibson quadrats mainly 20km to north in Melaleuca, with some in southern suburbs at Banjup, Casuarina.
	YAN19	23b	Yanchep	47.22	MELA10	22	Melaleuca	DEJONGA	22	Banjup	
	HARRY4	23a	Wattleup	46.43	WARB2	22	Melaleuca	MELA10	22	Melaleuca	
	BANK3	23a	Melaleuca	44.61	WARB4	22	Melaleuca	MELA5	22	Melaleuca	
	MILT8	23b	Wilbinga	44.34				MPK02	22	Melaleuca	
HP05	WARB4	22	Melaleuca	52.98	WARB2	22	Melaleuca	MELA10	22	Melaleuca	**FCT22**. Closest Gibson quadrats mainly 20km to north in Melaleuca, with some in southern suburbs at Banjup, Casuarina.
	MODO2	21c	Oakford	43.57	WARB4	22	Melaleuca	MPK02	22	Melaleuca	
	HARRY4	23a	Wattleup	40.48	BANK1	22	Casuarina	MELA5	22	Melaleuca	
	BANK1	22	Melaleuca	39.77	DEJONGA	22	Banjup	WARB2	22	Melaleuca	
	WARB2	22	Melaleuca	39.74				WARB4	22	Melaleuca	
HP06	HURST03	23a	Leeming	60.34	GOLF1	20a	Marangaroo	GOLF1	20a	Marangaroo	**FCT20a**. Closest Gibson quadrats are all the western examples at Darch, Koondoola and Marangaroo, then examples from Kewdale near Perth Airport.
	WIRR2	23a	Jandabup	59.82	LAND1	20a	Darch	LAND1	20a	Darch	
	GOLF1	20a	Marangaroo	58.33	KOON1	20a	Koondoola	KOON1	20a	Koondoola	
	SINT1	23b	Pinjar	56.88	KOON2	20a	Koondoola	KOON2	20a	Koondoola	
	WIRR1	23a	Jandabup	56.45	M53	20a	Kewdale	M53	20a	Kewdale	

Quadrat 2024	Similarity Measure				Kulczynski Average			Bray-Curtis Average			Conclusion
	Gibson	FC	Locality	%	Gibson	FC	Locality	Gibson	FC	Locality	
HP07	LAND1	20a	Darch	59.19	GOLF1	20a	Marangaroo	GOLF1	20a	Marangaroo	**FCT20a** Closest Gibson quadrats are all the western examples at Darch, Koondoola and Marangaroo, then examples from Kewdale near Perth Airport.
	KOON2	20a	Koondoola	55.95	LAND1	20a	Darch	LAND1	20a	Darch	
	SINT1	23b	Pinjar	54.55	KOON1	20a	Koondoola	KOON1	20a	Koondoola	
	BULL3	23a	Bullsbrook	54.21	KOON2	20a	Koondoola	KOON2	20a	Koondoola	
	MILT4	28	Wilbinga	54.11	M53	20a	Kewdale	M53	20a	Kewdale	
HP08	BULL3	23a	Bullsbrook	61.61	BULL3	23a	Bullsbrook	BULL3	23a	Bullsbrook	**FCT 23a** Closest related Gibson sites between 10 and 20km to north at Jandabup and Melaleuca.
	WIRR1	23a	Jandabup	60.30	WHITE1	23a	Whiteman Park	WHITE1	23a	Whiteman Park	
	HURST03	23a	Leeming	58.96	HURST03	23a	Leeming	HURST03	23a	Leeming	
	WIRR2	23a	Jandabup	58.49	MODO4	23a	Oakford	MODO4	23a	Oakford	
	SINT1	23b	Pinjar	58.33							
HP09	LAND1	20a	Darch	58.83	GOLF1	20a	Marangaroo	GOLF1	20a	Marangaroo	**FCT20a** Closest Gibson quadrats are all the western examples at Darch, Koondoola and Marangaroo, then examples from Kewdale near Perth Airport.
	SINT1	23b	Pinjar	58.65	LAND1	20a	Darch	LAND1	20a	Darch	
	KOON1	20a	Koondoola	57.49	KOON1	20a	Koondoola	KOON1	20a	Koondoola	
	MILT4	28	Wilbinga	56.26	KOON2	20a	Koondoola	KOON2	20a	Koondoola	
	YAN20	23b	Yanchep	55.62	M53	20a	Kewdale	M53	20a	Kewdale	
HP10	WARB1	23a	Melaleuca	55.79	WIRR1	23a	Jandabup	WIRR1	23a	Jandabup	**FCT 23a** Closest related Gibson sites between 10 and 20km to north at Jandabup and Melaleuca.
	HURST03	23a	Leeming	55.44	WARB1	23a	Melaleuca	WARB1	23a	Melaleuca	
	MELA9	23b	Melaleuca	55.14	WIRR2	23a	Jandabup	WIRR2	23a	Jandabup	
	WIRR1	23a	Jandabup	53.71	WARB3	23a	Melaleuca	WARB3	23a	Melaleuca	
	ELDO1	23b	Yeal	53.31	MELA9	23b	Melaleuca	MELA9	23b	Melaleuca	
HP11	WARB1	23a	Melaleuca	53.63	MELA9	23b	Melaleuca	BANK2	23a	Casuarina	**FCT 23a** Closest related Gibson sites between 10 and 20km to north at Jandabup and Melaleuca.
	HURST03	23a	Leeming	50.37	MELA5	22	Melaleuca	LOW13B	23a	Lowlands	
	MELA9	23b	Melaleuca	49.99	WARB1	23a	Melaleuca	HURST03	23a	Leeming	
	NINE2	21a	Dianella	49.84	WIRR1	23a	Jandabup	MODO4	23a	Oakford	
	WHITE1	23a	Whiteman Park	49.07	WIRR2	23a	Jandabup				
					WARB3	23a	Melaleuca				
HP12	GOLF1	20a	Marangaroo	53.67	GOLF1	20a	Marangaroo	GOLF1	20a	Marangaroo	**FCT20a** Closest Gibson quadrats are all the western examples at Darch, Koondoola and Marangaroo, then examples from Kewdale near Perth Airport.
	WARI2	28	Warwick	53.17	LAND1	20a	Darch	LAND1	20a	Darch	
	LAND1	20a	Darch	52.86	KOON1	20a	Koondoola	KOON1	20a	Koondoola	
	SINT1	23b	Pinjar	52.22	KOON2	20a	Koondoola	KOON2	20a	Koondoola	
	HARRY2	28	Wattleup	50.79	M53 20A	20a	Kewdale	M53	20a	Kewdale	

6.2.4 Conservation Significant Vegetation

Excluding Vegetation Type C2 (Figure 3), the vegetation represents known occurences of Western Australian and/or Commonwealth-listed PECs and/or TECs. Additionally a PEC not previously known for the study area was also recorded.

Listings are unfortunately unavoidably confusing, with overlapping state and Commonwealth listings, and cross-listings between TECs and PECs. With the exception of Vegetation Type C2, each Vegetation Type described in the study area represents both a Commonwealth TEC and two or three Western Australian PECs and/or TECs.

'Banksia Dominated Woodlands of the Swan Coastal Plain (SCP) IBRA Region'

The study area is a previously known record of the Commonwealth *'Banksia Dominated Woodlands of the SCP IBRA Region'* TEC (Endangered), protected under the *EPBC Act 1999*. To confirm this and as requested by CoW, the vegetation in the study area was analysed against the Diagnostic Criteria for *'Banksia Woodlands of the SCP'* TEC (Table 21). This TEC also has an equivalent listing in in Western Australia; *'Banksia Dominated Woodlands of the SCP IBRA Region'* PEC (P3).

Most of the study area apart from Vegetation Type C2 (Figures 3 & 4) represented this PEC/TEC.

Most remnant *Banksia* Woodland on the SCP has been mapped as this PEC/TEC. It is a broad ecological community, containing many documented and undocumented rarer subtypes, some of which were recorded in the study area.

SCP20a: 'Banksia attenuata woodlands over species rich dense shrublands'

DBCA's Species and Community Branch had previously mapped the entire study area as FCT20a: *'Banksia attenuata over species rich dense shrublands'*.

This is protected as a TEC under the *BC Act 2016,* and is listed as Critically Endangered. SCP20a is also a rarer sub-type of the Commonwealth *'Banksia Dominated Woodlands of the SCP IBRA Region'* TEC (Endangered). Which is in turn, listed as *'Banksia Dominated Woodlands of the SCP IBRA Region'* PEC (P3) in Western Australia.

The statistical analysis completed during this study, confirmed that FCT20a occurs in the study area, but only in part. It was recorded from the western side of the study area, and a smaller area in the south-east corner (Figure 4).

SCP22: 'Banksia ilicifolia woodlands'

From the statistical analysis, Vegetation Type C1 (Figure 3) came out as FCT22. This represents SCP22: *'Banksia ilicifolia* woodlands', which is a PEC (P3) in Western Australia.

According to the Keighery *et al.* (2020) dataset, there are 23 records of FCT22 on the SCP, between Pinjarra in the south and Gnangara in the north. It occurs on a narrow band roughly coinciding with the central SCP. The example of FCT22 in the study area is at the western extent of its known range at that latitude, and represents a slight range extension. The closest known record according to Keighery *et al.* (2020) is at Whiteman Park, 7km to the east. Other nearest occurrences are from Ellenbrook (10km to the north-east), near Wanneroo Golf Course (16km to the north), and Bibra Lake (30km to the south).

SCP22 is also considered a rarer sub-type of the Commonwealth *'Banksia Dominated Woodlands of the SCP IBRA Region'* TEC (Endangered). Which again, is concurrently listed as the *'Banksia Dominated Woodlands of the SCP IBRA Region'* PEC (P3) in WA.

FCT23a: 'Central Banksia attenuata - B. menziesii woodlands'

While not listed as a specific PEC or TEC in Western Australia, FCT23a represents a rarer subtype of both the Commonwealth *EPBC Act 1999* listed *'Banksia Dominated Woodlands of the SCP IBRA Region'* TEC (Endangered) and the equivalent Western Australian listed *'Banksia Dominated Woodlands of the SCP IBRA Region'* PEC (P3).

According to the Keighery *et al.* (2020) dataset, FCT23a is also at the western extent of its known range in the study area.

FCT04 'Melaleuca preissiana damplands'

FCT04 *'Melaleuca preissiana damplands'* (Figure 3 & 4) is not currently listed as a PEC or TEC. However the example in the study area is at the western extent of its known range, and a slight range extension, and a small patch surrounded by TECs and PECs. It is also an example in Excellent condition.

Range Implications and Other Conservation Significance

Apart from TEC and PEC listings, the study area is also significant for being representative of the transition between two major local biogeographical features, the Bassendean and Spearwood Dunes.

Related to this, and based on the Keighery *et al*., (2020) dataset, the study area represents a number of FCTs at the extent of their known range. The western examples of FCT20a are at their easterly extent in the study area, while FCT04, FCT22 and FCT23a are at their most westerly known extent. Supporting this observation was that many component species in the vegetation, were also at the extent of their known range (mostly westerly extent).

Additionally, there was an intergrade between FCT20a and FCT23a in the study area. This also coincided with a transition from *Eucalyptus marginata* (Jarrah) being the dominant emergent Eucalypt in the western half of the study area (FCT20a), and *Eucalyptus todtiana* (Pricklybark) in the eastern third (FCT23a).

This included an area of transition where the dominant Tree *was Eucalyptus todtiana*, but the floristic analysis identified the quadrat in this section as FCT20a. Quadrat HP03 (Figures 3 & 4) in the study area, potentially represents an even rarer subtype again of FCT20a, as it had an overstorey of *Eucalyptus todtiana*. The Keighery *et al.* (2020) dataset includes a total of 18 FCT20a quadrats. Of those 13 had *Eucalyptus marginata* as the emergent Eucalypt. None had *Eucalyptus todtiana*. This is likely to be due again to the study area being on the transition of biogeographical boundaries, the Bassendean and Spearwood Dunes. *Eucalyptus todtiana* is more typical of the former, and *Eucalyptus marginata* the latter.

For a small reserve, the vegetation is remarkably intact, the majority of it in Very Good to Excellent Condition (Figure 5), which in a highly fragmented and disturbed landscape, also increases its conservation significance.

Table 21: Diagnostic Criteria 'Banksia Woodlands of the SCP' TEC (Commonwealth *EPBC Act 1999*) (DoEE 2016 & 2019; CoW, 2023a)

KEY DIAGNOSTIC CRITERIA	INFORMATION	KEY DIAGNOSTIC QUESTIONS Refer to relevant sections of DoEE (2016, 2019)	HEPBURN PARK, LANDSDALE (Explanatory Notes see: DoEE, 2016 p. 18-29)
Location and physical environments	Regional distribution and quality	Primarily in the SCP IBRA bioregion. On well drained, low nutrient soils on sandplain landforms, particularly deep Bassendean and Spearwood sands, occasionally on Quindalup sands. Also on sandy colluvium and aeolian sands of Ridge Hill Shelf, Whicher Scarp and Dandaragan Plateau.	**IBRA Region:** SCP. **Landform:** Study area within deep sands, on the transition between the Bassendean and Spearwood Dunes.
Structure		Low Woodland to Forest. Upper sclerophyllous layer of low trees typically *Banksia* with emergent Eucalypt or *Allocasuarina*. Highly species-rich understorey that consists of a layer of sclerophyllous shrubs, a herbaceous ground layer of cord rushes, sedges and perennial and ephemeral forbs, that sometimes includes grasses.	**Structural Parameters:** Falls within the Low Woodland to Forest structural composition parameters, however the structure of the overstorey varied greatly across *Banksia* woodland, there were localised open areas that might have had an Open Low Woodland for example. Typically dominated or co-dominated by one or more *Banksia* species (*Banksia attenuata, B. menziesii* and *B. ilicifolia* present). Other emergent trees included *Eucalyptus marginata* subsp. *marginata, Eucalyptus todtiana, Allocasuarina fraseriana* and/or *Nuytsia floribunda*. Study area had species-rich understorey of shrubs, sedges, rushes, forbs, grasses (Section 6.2).
Composition	Dominant/Co-Dominant Species	**Dominant Species:** *Banksia attenuata* *Banksia ilicifolia* *Banksia menziesii* *Banksia prionotes* **Co-dominant Species:** *Banksia burdettii* *Banksia littoralis*	*Banksia attenuata, B. ilicifolia* and/or *B. menziesii* were present in the study area. (Vegetation Type A1, A2, B1, C1, C2, Figure 3) (Section 6.2).

KEY DIAGNOSTIC CRITERIA	INFORMATION	KEY DIAGNOSTIC QUESTIONS Refer to relevant sections of DoEE (2016, 2019)	HEPBURN PARK, LANDSDALE (Explanatory Notes see: DoEE, 2016 p. 18-29)
	Composition (Widespread Canopy Species)	*Allocasuarina fraseriana* *Callitris arenarius* *Callitris pyramidalis* *Corymbia calophylla* *Eucalyptus gomphocephala* *Eucalyptus marginata* *Eucalyptus todtiana* *Nuytsia floribunda* *Xylomelum occidentale*	*Allocasuarina fraseriana, Eucalyptus marginata* subsp. *marginata, Eucalyptus todtiana* and *Nuytsia floribunda* typical canopy species in the study area (Vegetation Type A1, A2, and B1, Figure 3).
	Composition (Widespread Sclerophyllous Shrub Layer Species).	*Adenanthos cygnorum* *Allocasuarina humilis* *Bossiaea eriocarpa* *Conostephium pendulum* *Daviesia* spp. *Eremaea pauciflora* *Gompholobium tomentosum* *Hibbertia hypericoides* *Hypolaena exsulca* *Jacksonia* spp. *Kunzea glabrescens* *Petrophile linearis* *Philotheca spicata* *Phlebocarya ciliata* *Stirlingia latifolia* *Xanthorrhoea preissii*	All these flora species were common in upland and transition parts of the study area.
	Composition (Widespread Herbaceous Ground Layer Species)	*Amphipogon turbinatus* *Burchardia congesta* *Caladenia* spp. *Dasypogon bromeliifolius* *Desmocladus flexuosus* *Drosera erythrorhiza* *Lepidosperma squamatum*† *Lomandra hermaphrodita* *Lyginia barbata*	All of these species were present in study area. † *Lepidosperma squamatum* has frequently confused with other *Lepidosperma* spp. in the datasets, this genus has ongoing taxonomic issues. There is more than one narrow flat leaf/stemmed *Lepidosperma* present in Banksia Woodland, *L. calcicola* and *L. pubisquameum* were recorded in the study area. These species was not described at the time of the original Gibson *et al.* (1994) study (no *Lepidosperma* species were recorded in the original LAND1 quadrat (OTB, 2024) for example, even though two species were present). A problematic group. †† It has been assumed that *Podotheca* spp. was meant rather than *Podolepis*.

KEY DIAGNOSTIC CRITERIA	INFORMATION	KEY DIAGNOSTIC QUESTIONS Refer to relevant sections of DoEE (2016, 2019)	HEPBURN PARK, LANDSDALE (Explanatory Notes see: DoEE, 2016 p. 18-29)
		Lyginia imberbis *Mesomelaena pseudostygia* *Patersonia occidentalis* *Podolepis* spp.†† *Stylidium brunonianum** *Stylidium piliferum* *Trachymene pilosa* *Xanthosia huegelii*	* *Stylidium brunonianum* was a species complex that since the original Gibson *et al.* (1994) study, has been split into many species (*S. neurophyllum* and *S. brunonianum* were the species present in the study area).
Patch condition	Condition thresholds	What is the patch condition using the condition categories outlined in DoEE (2016, 2019). Note: A patch could vary in quality over the range of the patch.	Note that condition definitions are different to EPA (2016) and Bush Forever (Govt. of WA, 2000) (Table 13) scales used in this study. 'Excellent' condition is defined in these criteria as 'high native plant species diversity' and less than 10% weed cover. This is a very high threshold for weed cover. This covers vegetation in the study area mapped Excellent and Very Good condition (Figure 5), as these areas are all well under 10% weed cover (mostly under 1%, up to 3% in localised patches). Therefore under these criteria the study area consists of approximately 9.51ha vegetation in 'Excellent' condition. Minimum patch size for vegetation in 'Excellent' condition for inclusion as a TEC under these criteria is 0.5 hectares. The study area with approximately 9.51ha in 'Excellent' condition, meets these criteria.
Patch Size	Patch size in hectares	Is the patch size large enough to meet criteria in DoEE (2016)? (Patch boundaries are not limited to the proposal site)	Yes. Approximately 9.51ha in the study area is in 'Excellent' condition (the threshold patch size for 'Excellent' condition vegetation is 0.5 hectares). The study area is surrounded by suburban development, housing, road reserves with little direct connectivity. There are small high-quality reserves through urban areas, particularly to the west of the study area at Landsdale Park, Highview Park, Koondoola Open Space, Marangaroo Conservation Reserve etc. Hepburn Avenue to the south and Alexander Drive to the east, are both four lane arterial roads (impact between a vehicle and a Carnaby's Cockatoo, was witnessed during surveys). Lot 374 Alexander Drive to the immediate east of the study area is Degraded vegetation (parkland cleared) currently zoned Parks and Reserves under the MRS but is under Urban Investigation (DPLH, 2025). To the north of this lot is Bush Forever (BF) Site 196: Gnangara Road Bushland, then to the north of that again BF193: Gnangara Lake and Adjacent Vegetation. To the east of Lot 374 is BF198: Beechboro Road Bushland Ballajura, which is adjoined to the east and north by BF304 Whiteman Park. In combination, this is a substantial area of interlinked natural vegetation to the east of the study area. Even in Degraded condition, Lot 374 could potentially provide some linkage between Hepburn Park to these substantial natural areas. It is noted that it also contains a
	Surrounding buffer	What is the size and vegetation community of the surrounding buffer? What is the connectivity to the surrounding vegetation?	

KEY DIAGNOSTIC CRITERIA	INFORMATION	KEY DIAGNOSTIC QUESTIONS Refer to relevant sections of DoEE (2016, 2019)	HEPBURN PARK, LANDSDALE (Explanatory Notes see: DoEE, 2016 p. 18-29)
			site on the Aboriginal Cultural Heritage Register (ID: 4044, artefact scatter). East of Alexander Drive represents a different local government authority (City of Swan).
Other condition considerations	Presence/absence and spread of *Phytophthora cinnamomi* (dieback)	If present, how much dieback exists and is the proposed action likely to spread dieback further? If not present, can its introduction be prevented?	Unknown. Floristic diversity intact, a few dead trees observed (Banksia), cause of death unknown (may have been caused by dieback or other diseases, the 2023-2024 drought, groundwater, fire or natural deaths). A major source of *Phytophthora* (and weeds) is home gardens. Dogs and pedestrians frequent the edges of the reserve. The potential for introduction is high over time. Particularly as dogs were observed off-lead.
	Presence/absence weeds	Does the patch contain weeds? Which species are present and how can they be managed? Appendix D6 (DoEE, 2016) states: The most common perennial weeds include: **Ehrharta calycina*, **Freesia* sp., **Carpobrotus edulis*, **Gladiolus caryophyllaceus*, **Pelargonium capitatum*, **Zantedeschia aethiopica*, **Romulea rosea* and **Moraea flaccida*. The main annual weeds are: **Hypochaeris glabra*, **Ursinia anthemoides*, **Briza maxima*, **Aira caryophyllea* and **Sonchus oleraceus*. The weed species with the greatest effect on community composition are African perennial grasses (e.g. **Ehrharta calycina*), and bulbous weeds such as **Gladiolus caryophyllaceus*, as they transform the ecological character of the community and reduce the diversity of the native shrubs and herbs.	The vegetation had a relatively low level of weed invasion, however there were small weedy patches, the result of localised historical disturbance. See Appendix A, B and D, and Table 18 for weeds recorded in the study area vegetation. Weed cover was generally very low (<0.1-0.3%) in intact vegetation in Excellent (Govt. of WA, 2000) condition, however increased slightly near edges. Typical and widespread weeds naturalised in otherwise intact vegetation included the Forbs **Gladiolus caryophyllaceus, *Hypochaeris glabra, *Sonchus oleraceus, *Ursinia anthemoides* subsp. *anthemoides, *Disa bracteata* and Grass weeds **Ehrharta calycina, *Aira caryophyllea, *Briza maxima, *Pentameris pallida* and/or **Vulpia myuros* forma. *megalura* and small annual Sedge **Ficinia marginata*. Apart from these, there were only single records of a few other species found within intact vegetation. Of the remaining species mentioned in the Diagnostic Criteria, **Carpobrotus edulis* was recorded within vegetation, however **Zantedeschia aethiopica* was not. Localised weedy patches occurred within intact vegetation, and these areas were mapped as Very Good (Govt. of WA, 2000) (Figure 5). Weed cover increased to 3% in some of these areas, though it was generally lower, due to patchy disturbance. Extra weed species were also recorded from these patches. See Figure 5 for an indication where localised weedy patches occurred (Good to Degraded points in otherwise Very Good vegetation). Most weed species recorded were associated with tracks and disturbed edges and patches. Some potentially problematic weeds were present in low numbers and/or as localised outbreaks that are currently controllable. These included the perennial woody Shrubs **Acacia longiflora* var. *sophorae* (one plant seen) and **Chamelaucium uncinatum* (three small plants) and **Pelargonium capitatum,* Forbs **Centranthus macrosiphon* and bulbaceous species **Freesia leichtlinii, *Hesperantha falcata* and **Watsonia versfeldii*. Several potentially invasive Grass and Forb weeds were also recorded along the western path where there is a higher use by pedestrians and dogs,

KEY DIAGNOSTIC CRITERIA	INFORMATION	KEY DIAGNOSTIC QUESTIONS Refer to relevant sections of DoEE (2016, 2019)	HEPBURN PARK, LANDSDALE (Explanatory Notes see: DoEE, 2016 p. 18-29)
			including but not limited to **Lysimachia arvensis, *Petrorhagia dubia, *Trifolium* spp., *Asteraceae spp., Poaceae spp. All locations of weeds recorded are presented in Appendix D. Favourable conditions including burns may result in mass germination of some of these species currently only present at low cover and frequency. Weed management in *Banksia* Woodland on the SCP is difficult at scale. Once weeds are introduced and naturalised, there is very little that can be done to control them. The only feasible management action is to prevent the introduction of them in the first place and to avoid disturbance of fragile soil crusts and litter layers, and inappropriate fire regimes that encourage sleeper weeds to proliferate.
	Any other notable disturbance to the site where relevant (i.e. fragmentation, fire regimes, bare patches, erosion, feral animals)	What disturbance is present which may degrade the quality of the community or species? Is there evidence of recruitment of key native plant species following disturbance?	Weed introduction and spread and soil disturbance, too frequent fire. Dogs being allowed off-leash to run through the vegetation, disturbing protective soil crusts and leaf litter layers and introducing weeds and diseases from home gardens on particularly western edge. Over time this will result in the degradation of approximately the first 10m of vegetation, as has occurred in other reserves, and the study area is too small to buffer this type of damage. There is evidence of Rabbits. It is unclear the extent of their impacts. Vegetation appears to have recovered well from a previous burn in the western third in 2018. This is likely due to the relatively low diversity of weed species and cover in areas of intact soil and vegetation.
	Patch isolation	Is the patch connected to other areas of *Banksia* Woodland or is it isolated?	The patch is isolated and surrounded by roads and suburban development to the north, west and south. To the east is Degraded vegetation and pasture which would have been dampland and Banksia Woodland mosaic similar to the study area, but now only native remnant overstorey (Parkland Cleared). As discussed however, it does provide some habitat and is adjacent to several Bush Forever sites, which have intact vegetation. There are similar reserves in the surrounding areas, at Koondoola, Darch, Marangaroo, so some interaction may occur e.g. birds and insects moving between reserves, cross pollinating.
Sub-community and vegetation unit	Broad scale structural unit (Beard vegetation associations)	Provide the best corresponding Beard vegetation association(s) (DoEE, 2016 - Appendix C1)	Beard (1979) mapped the project area as **'e2Mb.cbLi** *Casuarina-Banksia* low woodland with scattered jarrah.*'* later defined by Shepherd *et al.* (2002) as Vegetation Association 1001: *'*Medium very sparse woodland; Jarrah, with low woodland, *Banksia* and *Casuarina*.*'* (Bassendean). Described in Govt. of WA (2019) as having an original extent of 53,284ha with 11,394ha (21.38%) remaining, and 1,603ha or 3.1% reserved.

KEY DIAGNOSTIC CRITERIA	INFORMATION	KEY DIAGNOSTIC QUESTIONS Refer to relevant sections of DoEE (2016, 2019)	HEPBURN PARK, LANDSDALE (Explanatory Notes see: DoEE, 2016 p. 18-29)
	Floristic community types (Gibson *et al.*, 1994; Keighery *et al.*, 2020)	Provide the closest resemblance of FCTs with reference to those discussed in Appendix C2 of the BWSCP Conservation advice (DoEE, 2016 - Appendix C2 and Section 1.3.2).	A floristic analysis of the 12 quadrats from the study area demonstrated that: Five represented FCT20a: *'Banksia attenuata* Woodlands over Species-rich Dense Shrublands' (Gibson *et al.*, 1994). (HP03, HP06, HP07, HP09, HP12) (Figure 4). Four represented FCT23a: 'Central *Banksia attenuata - B. menziesii* woodlands' (HP01, HP08, HP10, HP11). Two represented FCT22: *'Banksia ilicifolia* woodlands' (HP04, HP05). The remaining quadrat represented FCT04: *'Melaleuca preissiana* damplands' (HP02).
	Western Australian ecological community listing	Is this ecological community listed in Western Australia? Note: Ecological communities, which are also listed as threatened, or PECS in Western Australia have higher significance than sub-types known to be more common and should be provided specific or additional protection.	Yes. Within the broader Commonwealth *EPBC Act 1999* listed *'Banksia Woodlands of the SCP'* TEC (Endangered) present in the survey area, there are three state-listed TECs and/or PECs. *'Banksia Dominated Woodlands of the SCP IBRA Region'* PEC Priority 3 (P3) (Western Australian equivalent of above). *'SCP20a: Banksia attenuata woodlands over species rich dense shrublands (SCP Community Type 20a – Gibson et al. 1994)',* which is listed as a TEC (Critically Endangered) under the *BC Act 2016* (See Section 4.2.3). SCP20a is a much rarer sub-type (Section 6.2). Additionally, even within SCP20a, the study area is representative of rarer sub-types (Section 6.2). DPW (2016) states that 585ha of SCP20a is known to occur, and within that vegetation condition varies, and there are also rarer sub-types. Vegetation Type A2 and part-A1 (Figure 3 & 4). SCP22: *'Banksia ilicifolia* woodlands' which is a PEC (P3) (Section 4.2.4) in WA. This is also a rarer subtype (Section 6.2). Vegetation Type C1 (Figure 3 & 4).
Surveying	Timing of the surveying	Ideally surveys should be undertaken in spring with two surveys to capture early and late flowering species. When was sampling undertaken? Is there any reason why the vegetation community could not be readily identified (due to recent disturbance e.g. fire)?	A mid-spring survey was completed 24-26th and 30th September 2024, with a follow up late spring survey on the 17-18th and 22nd October 2024. The timing was optimal in terms of peak flowering for the central SCP, and the seasonal conditions (rainfall) were good (Figure 2) leading up to the survey.

7. DISCUSSION

7.1 FLORA

A total of 196 native flora species were recorded within approximately 10.21ha. This indicates that the study area has a very high species richness.

By comparison Landsdale Park, Darch, approximately 2km to the west, which is also species-rich, recorded 169 species from 16ha (OTB, 2024). Marangaroo Conservation Reserve 7km to the west, recorded 179 native species from approximately 25ha (OTB, 2018).

Landsdale Park, Darch and Marangaroo Conservation Reserve however had more uniform vegetation, with *Eucalyptus marginata-Banksia* drier upland vegetation only. The study area had more variety of habitats, due to the presence of a dampland in the study area. Although the dampland vegetation was far less species rich than the surrounding *Eucalyptus marginata-Banksia* drier upland vegetation, it provided a suite of extra species not found in adjacent reserves. Additionally the study area supported Banksia Woodland with both emergent *Eucalyptus todtiana* and *Eucalyptus marginata* variants, while only the latter was present in adjacent reserves.

Ecoscape (2008) stated that Koondoola Regional Bushland, which is 137 hectares in size, had at the time recorded 274 native plant species. Koondoola supports similar *Eucalyptus marginata -Banksia* drier upland vegetation to the study area, but also includes wetland communities.

These four reserves all support the known western occurrences of FCT20a: *'Banksia attenuata* woodlands over species rich dense shrublands', which is known for its species richness.

For comparison Kings Park is 270 hectares of native vegetation with 327 species of native flora recorded (BGPA, 2021). This is the result of intensive and ongoing survey work over many years. Kings Park also has a greater variety of habitats and vegetation types including Tuart, Eucalypt-*Banksia* and limestone communities. Kings Park is representative of FCT28: *'Spearwood Banksia attenuata or Banksia attenuata-Eucalyptus woodlands'*, which is closely related to FCT20a, but is more widespread and with a lower species richness.

A closer example of FCT28 occurs at Warwick Open Space, approximately 10km to the south-west. This bushland is 60ha in size with 250 native flora species recorded (City of Joondalup, 2013). Both Tuart and Eucalypt-*Banksia* communities are also present in this reserve.

Of the total 196 native flora species recorded, there were 54 flora species of flora of 'other' conservation significance. These were mostly range representations, and most of those were species at the western extent of their known range. This is a high number for vegetation in the Perth area, which is ostensibly well studied. Such a high number is more typical of poorly surveyed regions of the state and/or areas near the boundary of major biogeographical regions. The high number of range implications is likely to be partly due to the study area being on the transition between the Bassendean and Spearwood Dune systems.

It also appears to be a feature of the western occurrences of FCT20a, that many of the species present are more typical of the eastern SCP or inland. This includes in the case of the study area, species such as *Desmocladus fasciculatus, Stylidium carnosum, Hensmania turbinata* and a number of others.

Another reason for the high number of range implications may be because collections from the inner northern suburbs of Perth, including within CoW boundaries, appear to be underrepresented in the WAH. Not only is native vegetation being lost in these areas, no verifiable records of what used to occur exist.

There were also very few collections of flora from western occurrences of FCT20a in the WAH, with Koondoola Regional Bushland the one exception to this. There were no flora collections from the study area in the WAH. Specimens from a survey of Landsdale Park, Darch in 2023 (OTB, 2024) have been lodged with the WAH, however these records have not yet been processed. There appear to be no collections from FCT20a vegetation more broadly across the CoW either. Even the most conservation significant vegetation in the northern suburbs is lacking verifiable records of its constituent flora.

In the context of the last point, it is recommended that the CoW establish guidelines and requirements for consultants completing flora surveys, to lodge at least the most poorly collected species with the WAH. These do not need to be extensive, if every consultant for example lodged an average of five specimens per project, this would quickly improve collections while not overwhelming the limited resources of the WAH. This is already a requirement of DBCA Flora Collecting Licences, however it appears that there are few submissions being made by consultants in the northern PMR. It is unfortunate also, that the WAH through staff shortages, is years behind in processing specimens, even after they have been lodged.

Neither DPW (2016) or DoEE (2016) list *Millotia tenuifolia* var. *laevis* or *Poranthera moorokatta* as PF known to occur in the Western Australian *BC Act 2016* listed TEC *'SCP20a: Banksia attenuata woodlands over species rich dense shrublands'* (Critically Endangered) or Commonwealth *EPBC Act 1999* listed *'Banksia Woodlands of the SCP'* TEC (Endangered). Both species are P2 Flora in WA, which means they are poorly known. This is an indication of how poorly understood and documented flora species and ecological communities generally still are, even in the PMR.

7.2 VEGETATION

The study area supports highly conservation significant vegetation.

The vegetation was intact and mostly in Excellent and Very Good condition (Figure 5). It had a high species richness. Approximately a quarter of the component species were representative of range extremities (mainly westerly).

With the exception of Vegetation Type C2, the vegetation all represents what is a previously known occurrence of *'Banksia Dominated Woodlands of the SCP IBRA Region'* TEC (Endangered) (Figure 3 & 4), under the Commonwealth *EPBC Act 1999* and Western Australian equivalent *'Banksia Dominated Woodlands of the SCP IBRA Region'* PEC (P3). These are both very broad ecological communities, containing many documented and undocumented rarer subtypes.

More significantly, two Western Australian listed rarer subtypes of this were also recorded. SCP20a: *'Banksia attenuata woodlands over species rich dense shrublands'* is listed as a TEC (Critically Endangered) under the Western Australian *BC Act, 2016*. And SCP22: *'Banksia ilicifolia woodlands'* PEC (P3) which is listed by the Western Australian DBCA Species and Community Branch.

Both of these have additional conservation significance based on their range representations.

SCP22 *'Banksia ilicifolia woodlands'* is at the western extent of its known range according to Keighery *et al.* (2020) records, and even represents a slight range extension.

The record of SCP20a: *'Banksia attenuata woodlands over species rich dense shrublands'* in the study area is a part of the westerly cluster of FCT20a, known from Marangaroo, Koondoola and Darch by Gibson *et al.* (1994). While FCT20a does occur elsewhere in the westerly cluster, there is no floristic database to be able to verify and quantify this. The easterly cluster of SCP20a is located along the eastern side of the SCP, and the quadrats there are slightly different floristically. Therefore each of these two clusters represent a rarer subtype of SCP20a. The study area record of SCP20a also has additional significance, as it represents the eastern extremity of the western cluster. The study area also includes a transition zone from FCT20a to FCTs more typical of the Bassendean Dunes. FCT20a does tend to occur on transition areas, including near the interface of the Spearwood and Bassendean Dunes, however known records are mostly in the former.

Broadly speaking, within the western cluster of FCT20a, there is natural variation. There are two variants based on structure and slight floristic differences. One appears to be more widespread and has *Banksia attenuata* and *B. menziesii* with little to no Eucalypt overstorey. The other variant, has a *Eucalyptus marginata* (Jarrah) overstorey and a lower cover of *Banksia* spp. The *Eucalyptus marginata* trees appear to have a microhabitat underneath them, with a different suite of species, that appears to account for slight floristic differences. Both variants usually co-occur as a fine scale mosaic together. These two variants are each effectively also rarer sub-types of FCT20a. Both were present in the study area, however they were less well defined than in other nearby reserves at Darch and Marangaroo. Because of this, they were mapped as one Vegetation Type (A2, Figure 3). In Landsdale Park, Darch (OTB, 2024), the two subtypes were mapped separately, as the difference was more pronounced there. There were both larger individual *Eucalyptus marginata* present, and also clumps of multiple trees growing together. In the study area, apart from a couple of exceptions, *Eucalyptus marginata* were small and stunted scattered individuals, with low overall cover values. The microhabitats underneath *Eucalyptus marginata* in other reserves, were only weakly present in the study area. The species that is most obviously indicative of this microhabitat, is *Kennedia prostrata*, which was only recorded once at the base of a *Eucalyptus marginata* in HP12 (Figure 3).

The statistical analysis (Table 20) clustered FCT20a quadrats from the study area closest to the Gibson *et al.,* (1994) FCT20a quadrat in Marangaroo Conservation Reserve (GOLF1). Of the western cluster of FCT20a, GOLF1 is the most geographically distant record, at 3.6km to the WSW of the study area. Vegetation in Marangaroo Conservation Reserve was structurally more dominated by *Eucalyptus marginata* in the overstorey than the study area, however evidently they were floristically similar.

Next closest in the statistical analysis was LAND1 at Landsdale Park, Darch, 2km to the west, and geographically the closest FCT20a record to the study area. Followed by Koondoola Open Space (KOON1 KOON2) and often M53 from the eastern cluster of FCT20a in Kewdale.

The vegetation around Quadrat HP03 (Figures 3 & 4) in the study area, potentially represents an even rarer subtype of FCT20a, as it had an overstorey of *Eucalyptus todtiana*. The Keighery *et al.* (2020) dataset includes a total of 18 FCT20a quadrats. Of those 13 had *Eucalyptus marginata* as the emergent Eucalypt. None had *Eucalyptus todtiana*. This is likely to be due to the study area being on the transition of bioregional boundaries, the transition between the Bassendean and Spearwood Dunes. The study area appeared to represent a transitioning from FCT20a to FCT23a: 'Central *Banksia attenuata* - *B. menziesii* woodlands', which is a FCT more typical of Bassendean Dunes.

Generally speaking and to summarise, at least parts of the SCP20a in the study area are likely to be a very rare localised variant of this already rare ecological community.

There was a lot of natural variation within Vegetation Types A1 and A2 (Figure 3) across the study area, mostly in the Low Shrub and Forb strata. Many species were often either dominant or absent at a localised scale, adding to the complexity of the vegetation.

Very large old trees of *Allocasuarina fraseriana* occurred sporadically on the lower slopes of Vegetation Types A1 and A2 (Figure 3). These areas were not mapped as a separate vegetation type, but were described as a part of the natural variation within Vegetation Types A1 and A2. Many small plant species were considered part of this natural variation also, however as a large tree *Allocasuarina fraseriana* was a very obvious feature in places. It was also observed in Landsdale Park, Darch (OTB, 2024) to inhabit the lower slopes of Banksia Woodland. Where *Allocasuarina fraseriana* was dominant in *Banksia* Woodland in Koondoola Open Space, Ecoscape (2008) mapped it as a separate vegetation type. However it was determined that in the study area, it wasn't a large enough or distinct enough vegetation type to map separately.

While FCT04 *'Melaleuca preissiana damplands'* (Figure 4) is not currently listed as a PEC or TEC, it has conservation significance. It is in Excellent condition and is a small area surrounded by TECs and PECs. The Keighery *et al.* (2020) dataset has 40 quadrats from FCT04, between Margaret River in the south and Muckenburra in the north. There would be significant variation across this range. The example in the study area is at the western extent of its known range. There are few records in the northern PMR (Dianella Regional Open Space, Lightning Swamp and Whiteman Park), some or all of which are likely to be in poorer condition than the study area.

While not specifically listed as a TEC or PEC in its own right in Western Australia, FCT23a: 'Central *Banksia attenuata - B. menziesii* woodlands' represents a rarer subtype of both the Commonwealth *EPBC Act 1999* listed *'Banksia Dominated Woodlands of the SCP IBRA Region'* TEC (Endangered) and the equivalent Western Australian listed *'Banksia Dominated Woodlands of the SCP IBRA Region'* PEC (P3) (Figure 3 & 4). According to the Keighery *et al.* (2020) dataset, FCT23a is also at the western extent of its known range in the study area.

To summarise, all the vegetation in the study area has a high conservation significance, across a range of measures.

7.3 THREATS

The purpose of this study was to provide the CoW with baseline survey data, in order to support future management of this conservation area.

Over and above baseline data provided in this report, this section offers some observations on what some of the threatening processes might be in the study area, as they relate to flora and vegetation. This is a combination of both a review of existing literature and field observations.

7.3.1 Existing Advice

Most of the following is specific to TECs listed under Western Australian and Commonwealth legislation. However the advice is also generally relevant to most ecosystems on the SCP.

Conservation advice for 'Banksia Woodlands of the Swan Coastal Plain' TEC

Approved Conservation Advice (incorporating listing advice) for the *'Banksia Woodlands of the SCP'* TEC under the *EPBC Act 1999* (DoEE, 2016) state that the main threats to the broader ecological community include:

- Clearing and fragmentation and associated urban degradation/disturbance.
- Diseases (especially those caused by Phytophthora species).
- Invasive species.
- Fire regime change.
- Hydrological degradation (groundwater abstraction, eutrophication, soil acidification).
- Climate change (increasing temperatures, declining rainfall, changing rainfall timing).
- Grazing (including overabundance of kangaroos particularly in peri-urban reserves).
- Decline in pollinating and seed dispersing fauna.
- Loss of keystone species.

Interim Recovery Plan SCP20a 'Banksia attenuata woodlands over species rich dense shrublands'

In the recovery plan for SCP20a *'Banksia attenuata woodlands over species rich dense shrublands (SCP Community type 20a – Gibson et al. 1994)'* DPW (2016) states that the most significant threats to this community are *'land clearing for roads, housing and related infrastructure, too frequent fire, weeds, sand quarrying and hydrological change'.* And that these can lead to *'degradation of vegetation and alteration of structure, species composition or loss of component taxa'*. They also state that for occurrences within the PMR, the frequency of fires, impact of recreational users, weed invasion and rubbish-dumping are all increased.

Biodiversity Audit of Western Australia

The study area is in the SWA2 - SCP Subregion (DCLM, 2002). At the time of publication of this audit, the PMR was described as representing 20% of the SCP, however this would be higher in 2025 as the PMR has expanded. Generally speaking DCLM (2002) cites clearing, weeds, diseases (phytophthora and armillaria), pest animals (kangaroo, rabbit and pigs), hydrological change and inappropriate and too frequent burns. In an administrative context they cite many threats that can be summarised as an inadequate reservation of ecosystems and a lack of active land management.

More specifically, they state that the threats to *'Banksia attenuata woodlands over species rich dense shrublands (SCP Community type 20a – Gibson et al. 1994)'* are:

- Clearing.
- Fragmentation, loss of remnants and lack of recruitment.
- Feral animals (rabbits).
- Exotic weeds (grasses).
- Changed fire regimes.
- Pathogens.

They also state that *'in many of the smaller reserves understorey species composition is often depauperate and in a degraded state resulting from grass and other weed invasion...grazing impacts (including from kangaroos) and too frequent fires'.*

On a positive note, they state that heavier soils at the eastern side of the SCP, are more resilient to weed invasion. The eastern examples of FCT20a around Forrestfield, the Perth Airport etc. fall into this category. It appears that the western examples of FCT20a also tend to have a higher resilience to weed invasion, than other adjacent *Banksia* Woodland types (K. McCreery pers. obs.). While most of the Spearwood Dunes are deep white sands, FCT20a is found on white over orange ('brickies') sand at depth. Whether this resilience is due to a higher clay content in these soils, or their chemistry, it is unknown. However this is mainly

relevant to weeds that have the capacity to naturalise in intact soil and vegetation. Disturbance of soil crusts and leaf litter in FCT20a, will still lead to weed invasion.

7.3.2 Threats Identified in Study Area

Soil disturbance

Intact soil crusts and leaf litter are currently providing an important ecological service in the study area, by keeping the vegetation resilient to weed invasion. The edge effects in the study area were low compared to many urban reserves. Many weed species typical only at the edges, disappeared less than a metre into the vegetation. Again this resilience could be partly due to these Banksia Woodlands being more weed resistant than others, perhaps due to a higher clay content in the soil.

The exception to this is the western boundary, where soil disturbance had enabled weeds to encroach in the first two to three metres. This was likely due to pedestrians more heavily using this path, including people walking their dogs on and off lead, and allowing their dogs to run through the vegetation.

Weeds and Diseases

As discussed throughout the report, there were a suite of environmental weeds present (See Sections 6.1 and 6.2, Appendix A, B, D).

Naturalised environmental weeds were present, throughout vegetation that was otherwise in Very Good to Excellent condition. However these had a relatively low cover and species diversity compared to many other urban reserves.

Of the naturalised species present, both **Gladiolus caryophyllaceous* (Pink Gladiolus) and **Ehrharta calycina* (Perennial Veldt Grass) were listed in DBCA (2016) as species that should be prioritised for control in *'Banksia attenuata woodlands over species rich dense shrublands (SCP Community type 20a – Gibson et al. 1994)'* TECs. Naturalised weeds including these species are difficult to eradicate however, and the most efficient management approach is to first prevent the introduction of new species.

Some of the weed species recorded are potentially very problematic, but were observed during the surveys to currently be present in very low numbers. It is recommended that these are targeted for eradication before they spread, as a priority over already naturalised species.

These are the bulbous weeds **Watsonia versfeldii* (five locations, five individuals), **Freesia leichtlinii* (three locations, low numbers) and **Hesperantha falcata* (two locations, low numbers).

The woody weeds **Acacia longiflora* var. *sophorae* (one individual seen) and **Chamelaucium uncinatum* (three small individuals).

Annual Forb **Centranthus macrosiphon* was present in a patch around the south-east corner of the study area. Commonly known as Pretty Betsy, this species is a major problem in bushland reserves in the western suburbs, Claremont, Floreat etc. It was unexpected to encounter it in the north-eastern suburbs.

Locations for each species are presented in Appendix D.

If resources are available, it is generally recommended next that weeds with a High and Medium Impact and Rapid Invasiveness (Table 19) (locations in Appendix D) are prioritised for control.

There are some recommended exceptions to this. While **Oxalis pes-caprae* has been categorised as slow spreading, it is relentless and difficult to control once established, due to its bulbous reproductive methods.

At the time of the surveys, it was only recorded in four locations (Appendix D). Annual Forb **Fumaria capreolata* and annual Grass **Ehrharta longiflora* were recorded in similar locations. These areas were the result of some form of localised historical disturbance, concentrated at the base of trees, near the transition between uplands and damplands (Vegetation Types B1 and C2) (Figure 3) (Plate 32). These areas may be difficult to rehabilitate, however successful weed control may prevent these localised weedy patches from spreading.

This localised disturbance was a part of a larger section of the study area, that had been impacted by a bush track. This track started at the western boundary, wound along the southern third of the study area, and exited near the south-east corner gate. The broad impact from this track and associated activity is indicated by the area mapped as Very Good (Figure 5). Within that broad category, there were localised areas of higher disturbance, which are mapped as Localised Vegetation Condition Points (Good to Degraded condition) (Figure 5).

It appeared from historical imagery, that this track was possibly constructed between 1990 and 2000. For what purpose it is unclear. Associated with it were small cleared patches to the side of it at regular intervals. These were mostly small, between $1m^2$ and $2m^2$, occasionally larger to $5m^2$ (Plate 33). These are now small localised weedy patches. Also associated with the track was a clearing in the dampland that at the time of the survey was a 'camp' (Plate 34). It did not appear as if it were a rough sleeping camp, rather that it was for recreational purposes. It seems most likely also, that the track was originally for recreational purposes. It is recommended that these localised weedy patches be rehabilitated, even if it consists of mulching or otherwise suppressing weed growth and spread. Weeds in these areas are mostly annual Forbs and Grasses.

There were a suite of environmental weeds recorded from paths and firebreaks that were otherwise rare or absent in intact vegetation. It is possible that these will become naturalised given the right conditions. This was most problematic along the western firebreak, where there were a large diversity of weed species present, including some serious environmental weeds. Some of these potentially problematic weeds included but were not limited to **Arctotheca calendula, *Brassica tournefortii, *Bromus diandrus, *Freesia leichtlinii, *Lactuca serriola, *Petrorhagia dubia, *Urospermum clandestinum*.

The western firebreak was observed to be the most frequented by pedestrians, cutting through from Landsdale Road to Darling Park. These were also often dog walkers.

Dogs

Dogs in particular introduce weeds and diseases. Directly from home gardens, but also road verges and parks. Home gardens are the worst potential source, they contain not only many species of weeds that dogs coats become a vector for, but numerous species of *Phytophthora* and other plant diseases.

Additionally when they are left to run through vegetation, their claws disturb delicate soil crusts and litter, providing an ideal medium for those weeds to take hold. Even on-lead, the first few metres of vegetation are vulnerable. Dogs were observed being walked both on and off-lead in this area.

Permanent damage can be seen in other reserves where the first 10m of vegetation has been churned e.g. Hepburn Heights and parts of Neerabup National Park. Rehabilitation never recovers the ecological value of the original vegetation. And even where rehabilitation works have been undertaken, dogs continue to churn rehabilitated areas.

Fortunately the vegetation was relatively thick along the western edge, which has prevented some access into the vegetation in places, however this is not likely to always remain this way.

Dogs off and on leads were also identified as an issue in the Koondoola Regional Bushland Management Plan (Ecoscape, 2008). They stated that issues included nutrient enrichment from faeces, disturbance to fauna and introduction of weeds. Koondoola is a far larger reserve (137 hectares) and the relative impacts will be higher in a smaller reserve, due to proportional edge effects.

It is recommended that a low barrier of some description, be placed along the edge of the vegetation on the western firebreak. And on the vegetated side of it, that any bare and/or weedy patches already present, be rehabilitated.

Rabbits

There was evidence of rabbits seen in the study area, in the form of their communal latrines. However the impact from these to flora and vegetation is unknown. Some minor grazing was seen e.g. annual native Grass *Austrostipa compressa* grazed to stumps. However there appeared to be currently no discernible impact to species richness for example.

Rabbits can introduce and spread weeds however, with their latrines often having species of weeds germinating in them, not seen elsewhere. Presumably like Kangaroos, they graze on weedy verges and gardens, then the seeds are brought back to the vegetation in their faeces and fur.

Any specific recommendations to do with rabbit control are outside the scope of this study. However considering that guidance (Section 7.3.1) specifically mentions rabbits being a threat, control is recommended where practical.

7.3.3 Fire

Too frequent fire is listed as a threat across all the guidance material. A key issue is ensuring that all plants can reach reproductive maturity in the intervals between fires. And that too frequent burns do not enable weeds to spread, taking advantage of disturbance as they often do (to the point weeds themselves become a yearly fire hazard). And that prescribed burns are done at an appropriate time of the year.

The fire response is not known for all species in *Banksia* Woodlands of the SCP. However, DBCA (2016) state that for example the shrub *Petrophile macrostachya* is killed by fire, and requires up to 20 years to reach reproductive maturity after a burn.

(DoEE, 2016) states that changed fire regimes are a threat. Specifically, increased frequency and prescribed burning during late autumn to late spring, when plants are actively growing, flowering and before setting viable seed, and birds and animals are active and/or breeding.

While the vegetation appears to have mostly recovered, after extreme drought conditions over the 2023-2024 spring and summer season, it may take a number of normal seasons to fully recover. It is recommended that any planned burning is delayed as long as possible, to enable this recovery.

7.4 LIMITATIONS

EPA (2016) provides a framework for identifying the limitations that may apply to a survey. Additionally, guidance on limitations has been supplied in and CoW (2024). The two guidance are similar and both have been consolidated and discussed in Table 22.

Figure 7 provides an indication of the spatial and seasonal coverage of the surveys.

Table 22: Limitations of the Assessment (modified from EPA, 2016 & CoW, 2024)

Limitation	Comment
Competency/experience of the consultant carrying out the survey e.g. degree of expertise in plant identification to taxon level and experience in bioregion.	Kelli McCreery has been involved in baseline botanical surveys for EIA on the SCP since 1996 including flora identifications. The Duty Botanist Michael Hislop at the WAH confirmed identifications of some problematic flora specimens (pending). Due to the extreme complexity of the WA flora, high speciation for example, and the lack of resources dedicated to taxonomy, flora identifications are not always completely accurate. Many groups are understudied, while some are overstudied. It is difficult to know however it is estimated that flora identifications were >90% accurate, based on current knowledge.
Scope (what flora groups were sampled and were some sampling methods not able to be employed because of constraints).	The survey was a Detailed Survey (EPA, 2016) including quadrats, relevés, opportunistic collections, condition rating and traverses (10m), across a two season (mid and late-spring). All vascular flora seen were sampled and/or recorded.
Proportion of flora collected and identified (based on sampling, timing and intensity).	A total of 267 (196 or 73.4% native) taxa were recorded from approximately 10.21 hectares. Difficult to estimate however it is likely that this represents >70% of the expected flora. Dark diversity in *Banksia* Woodland is not something that has been studied, however it has been observed that a species turnover of approximately 5% does occur with repeated surveys of quadrats for instance (K. McCreery pers. obs.). These are dynamic systems with flux and flow of species over time e.g. some species would be seasonally responsive, either across the seasons, or between years. Others would be fire responsive, coming up after fire but dormant at other times.
Mapping reliability.	Moderate. Vegetation type and condition is always more complex and fine scale than can feasibly be mapped. Mapping boundaries are indicative of the broad values present, with some natural localised variation occurring within each mapping polygon.
The proportion of the task achieved and further work which might be needed.	This report satisfies the requirements of a two-season Detailed Flora and Vegetation Survey. Long term monitoring of quadrats is valuable, however there is little point in doing this more frequently than 5-10 year intervals, unless some major event occurs such as a very hot fire. Quadrats have been marked in a way that enables them to be re-established. Periodic weed inventories and mapping may be valuable, however informed weed control may be a better use of resources.
Timing/weather/season/cycle.	The surveys were completed at optimal times for the location (September and October 2024). The seasonal conditions in the four months prior to the surveys were good. The spring and summer season of 2023-2024 preceding it however was a very harsh drought period, and it is unclear if this had an impact on survey results.
Disturbances affecting results.	None that appeared to affect survey results.

Limitation	Comment
Completeness of survey. Remoteness or access issues, intensity of survey.	The intensity was appropriate to the task. Study area was covered on foot over early and late spring (Figure 7). No access issues.
Availability of contextual (e.g. biogeographic) information on the region.	Contextual information is high level and patchy across WA, particularly for vegetation. This affects all botanical studies. What contextual information was available has been incorporated into Section 3.0 and throughout this report where appropriate.
Other (e.g. problems with data and analysis etc).	Data quality e.g. quadrats was very high. Species richness in quadrats exceeded benchmarks set by Gibson *et al.* (1994). Statistical analysis results were strong.

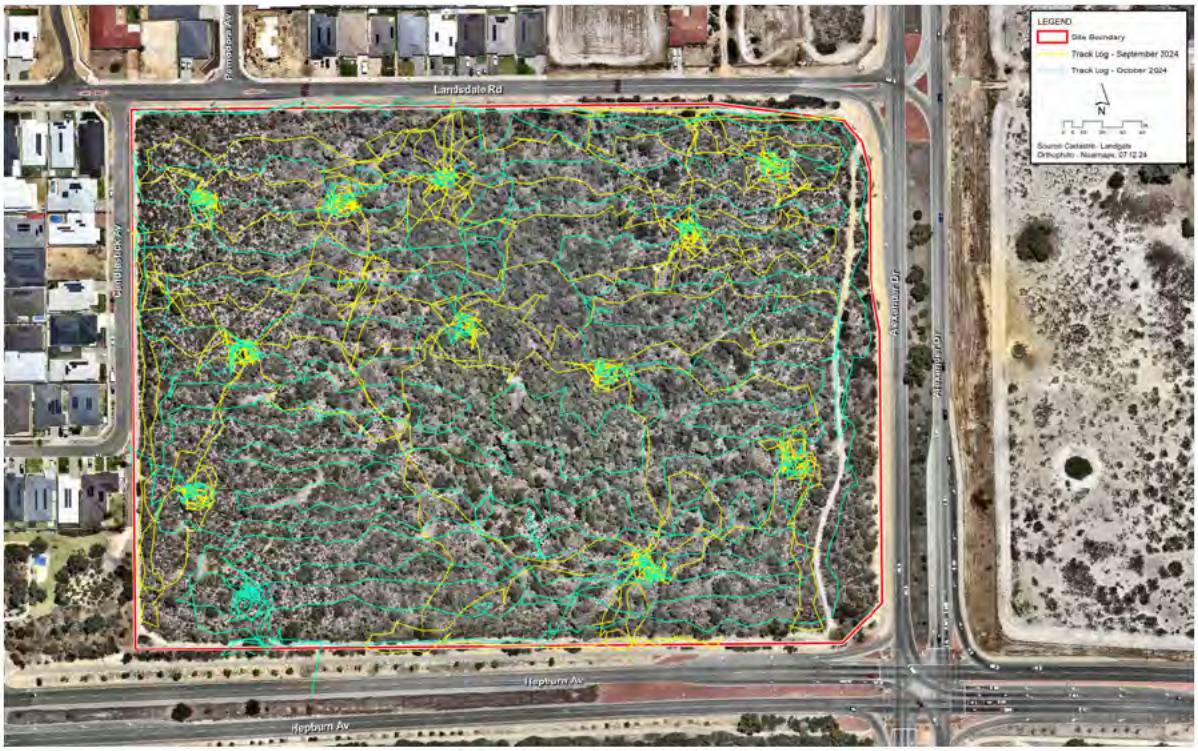

Figure 7: Survey Effort (GPS tracks of traverses and quadrats by foot).

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Appendix A: Flora Species List by Family

* = Indicates weed flora.

Family	Species
AIZOACEAE	**Carpobrotus edulis*
ANARTHRIACEAE	*Lyginia barbata*
	Lyginia imberbis
APIACEAE	*Homalosciadium homalocarpum*
	Platysace filiformis
	Xanthosia huegelii
ARALIACEAE	*Trachymene pilosa*
ASPARAGACEAE	*Laxmannia ramosa* subsp. *ramosa*
	Laxmannia squarrosa
	Lomandra caespitosa
	Lomandra hermaphrodita
	Lomandra nigricans
	Lomandra preissii
	Lomandra suaveolens
	Sowerbaea laxiflora
	Thysanotus arbuscula
	Thysanotus manglesianus
	Thysanotus sparteus
	Thysanotus thyrsoideus
ASPHODELACEAE	**Trachyandra divaricata*
ASTERACEAE	**Arctotheca calendula*
	**Conyza bonariensis*
	Cotula australis
	**Crepis foetida* subsp. *foetida*
	**Gazania linearis*
	Hyalosperma cotula
	**Hypochaeris glabra*
	**Lactuca serriola*
	Lagenophora huegelii
	**Leontodon rhagadioloides*
	Millotia tenuifolia var. *laevis* P2
	**Monoculus monstrosus*
	Olearia axillaris
	**Osteospermum ecklonis*
	Pithocarpa pulchella
	Podotheca angustifolia

Family	Species
ASTERACEAE cont.	*Podotheca gnaphalioides*
	Quinetia urvillei
	Senecio condylus
	**Sonchus asper*
	**Sonchus oleraceus*
	**Urospermum picroides*
	**Ursinia anthemoides* subsp. *anthemoides*
	Waitzia suaveolens var. *suaveolens*
BRASSICACEAE	**Brassica tournefortii*
	**Sisymbrium irio*
CAMPANULACEAE	**Wahlenbergia capensis*
	Wahlenbergia preissii
CAPRIFOLIACEAE	**Centranthus macrosiphon*
CARYOPHYLLACEAE	**Cerastium glomeratum*
	**Petrorhagia velutina*
	**Polycarpon tetraphyllum*
	**Sagina apetala*
	**Stellaria media*
CASUARINACEAE	*Allocasuarina fraseriana*
	Allocasuarina humilis
CENTROLEPIDACEAE	*Centrolepis drummondiana*
COLCHICACEAE	*Burchardia congesta*
CRASSULACEAE	*Crassula colorata* var. *colorata*
	**Crassula glomerata*
	**Crassula thunbergiana* var. *thunbergiana*
CUPRESSACEAE	*Callitris preissii*
CYPERACEAE	*Chaetospora curvifolia*
	**Ficinia marginata*
	Lepidosperma calcicola
	Lepidosperma pubisquameum
	Lepidosperma striatum
	Machaerina arthrophylla
	Mesomelaena pseudostygia
	Schoenus brevisetis sens. lat.
	Schoenus caespititius
	Schoenus clandestinus
DASYPOGONACEAE	*Calectasia narragara*
	Dasypogon bromeliifolius
DILLENIACEAE	*Hibbertia aurea*

Family	Species
DILLENIACEAE cont.	*Hibbertia hypericoides* subsp. *hypericoides*
	Hibbertia racemosa
	Hibbertia striata
	Hibbertia subvaginata
DROSERACEAE	*Drosera drummondii*
	Drosera erythrorhiza
	Drosera minutiflora
	Drosera pallida
ELAEOCARPACEAE	*Platytheca galioides*
ERICACEAE	*Conostephium minus*
	Conostephium pendulum
	Conostephium preissii
	Leucopogon polymorphus
	Lysinema pentapetalum
	Styphelia conostephioides
	Styphelia pallida
	Styphelia xerophila
EUPHORBIACEAE	**Euphorbia peplus*
	**Euphorbia terracina*
	Monotaxis grandiflora var. *grandiflora*
FABACEAE	*Acacia applanata*
	Acacia huegelii
	**Acacia longifolia* var. *sophorae*
	Acacia pulchella var. *pulchella*
	Acacia saligna
	Acacia sessilis
	Bossiaea eriocarpa
	Daviesia divaricata subsp. *divaricata*
	Daviesia nudiflora subsp. *nudiflora*
	Daviesia physodes
	Daviesia triflora
	Euchilopsis linearis
	Gastrolobium capitatum
	Gompholobium confertum
	Gompholobium tomentosum
	Hovea pungens
	Hovea trisperma
	Isotropis cuneifolia subsp. *cuneifolia*
	Jacksonia floribunda

Family	Species
FABACEAE cont.	*Jacksonia furcellata*
	Jacksonia sternbergiana
	Kennedia prostrata
	**Lupinus cosentinii*
	**Medicago polymorpha*
	**Melilotus indicus*
	**Trifolium campestre* var. *campestre*
	**Trifolium scabrum*
	**Vicia hirsuta*
	**Vicia sativa*
GENTIANACEAE	**Centaurium pulchellum*
GERANIACEAE	**Erodium botrys*
	**Erodium cicutarium*
	**Pelargonium capitatum*
GOODENIACEAE	*Dampiera linearis*
	Lechenaultia floribunda
	Scaevola repens subsp. *repens*
HAEMODORACEAE	*Anigozanthos humilis* subsp. *humilis*
	Anigozanthos manglesii
	Conostylis aculeata subsp. *cygnorum*
	Conostylis aurea
	Conostylis juncea
	Conostylis setigera subsp. *setigera*
	Haemodorum laxum
	Haemodorum spicatum
	Phlebocarya ciliata
HALORAGACEAE	*Gonocarpus pithyoides*
HEMEROCALLIDACEAE	*Arnocrinum preissii*
	Caesia micrantha
	Chamaescilla corymbosa
	Corynotheca micrantha
	Hensmania turbinata
	Tricoryne elatior
	Tricoryne tenella
IRIDACEAE	**Freesia leichtlinii*
	**Gladiolus caryophyllaceous*
	**Hesperantha falcata*
	Patersonia occidentalis var. *occidentalis*
	**Watsonia versfeldii*

Family	Species
LAMIACEAE	*Hemiandra linearis*
LAURACEAE	*Cassytha flava*
	Cassytha pomiformis
	Cassytha racemosa
LOGANIACEAE	*Phyllangium paradoxum*
LORANTHACEAE	*Nuytsia floribunda*
MACARTHURACEAE	*Macarthuria australis*
MALVACEAE	**Malva parviflora*
MONTIACEAE	*Calandrinia corrigioloides*
MYRTACEAE	*Apectospermum spinescens*
	Astartea scoparia
	Beaufortia elegans
	Calothamnus sanguineus
	Calytrix angulata
	Calytrix flavescens
	Calytrix fraseri
	**Chamelaucium uncinatum*
	Eremaea pauciflora var. *pauciflora*
	Eucalyptus marginata subsp. *marginata*
	Eucalyptus todtiana
	Eucalyptus todtiana X marginata
	Hypocalymma balbakiae
	Hypocalymma robusta
	Kunzea glabrescens
	Kunzea praestans
	Melaleuca preissiana
	Melaleuca seriata
	Pericalymma ellipticum var. *floridum*
	Regelia ciliata
	Scholtzia involucrata
	Verticordia nitens
ONAGRACEAE	**Oenothera laciniata*
ORCHIDACEAE	*Caladenia arenicola*
	Caladenia flava subsp. *flava*
	**Disa bracteata*
	Diuris magnifica
	Elythranthera brunonis
	Eriochilus dilatatus
	Leporella fimbriata

Family	Species
ORCHIDACEAE cont.	*Microtis media* subsp. *media*
	Prasophyllum parvifolium
	Pterostylis recurva
	Pterostylis sp. (sterile)(most likely *P. vittata*)
	Pterostylis vittata
	Pyrorchis nigricans
	Thelymitra benthamiana
	Thelymitra crinita
	Thelymitra graminea
	Thelymitra macrophylla
	Thelymitra vulgaris
OXALIDACEAE	**Oxalis pes-caprae*
PAPAVERACEAE	**Fumaria capreolata*
	**Fumaria muralis*
PHORMIACEAE	*Dianella revoluta* var. *divaricata*
PHYLLANTHACEAE	*Poranthera microphylla*
	Poranthera moorokatta P2
POACEAE	**Aira caryophyllea*
	Amphipogon turbinata
	Austrostipa compressa
	Austrostipa hemipogon
	**Avena barbata*
	**Briza maxima*
	**Briza minor*
	**Bromus diandrus*
	**Cynodon dactylon*
	**Ehrharta calycina*
	**Ehrharta longiflora*
	**Eragrostis curvula*
	Microlaena stipoides
	**Pentameris pallida*
	**Poa annua*
	**Rostraria cristata*
	Rytidosperma occidentale
	**Vulpia fasciculata*
	**Vulpia myuros* forma. *megalura*
POLYGALACEAE	*Comesperma calymega*
PRIMULACEAE	**Lysimachia arvensis*

PROTEACEAE	*Adenanthos cygnorum* subsp. *cygnorum*
	Banksia attenuata
	Banksia grandis
	Banksia ilicifolia
	Banksia menziesii
	Conospermum acerosum subsp. *acerosum*
	Conospermum incurvum
	Conospermum stoechadis subsp. *stoechadis*
	Persoonia saccata
	Petrophile linearis
	Petrophile macrostachya
	Stirlingia latifolia
	Synaphea spinulosa subsp. *spinulosa*
RESTIONACEAE	*Alexgeorgea nitens*
	Desmocladus fascicularis
	Desmocladus flexuosus
	Hypolaena exsulca
	Lepidobolus preissianus subsp. *preissianus*
RUBIACEAE	**Dischisma arenaria*
	**Galium murale*
	Opercularia vaginata
RUTACEAE	*Cyanothamnus ramosus* subsp. *anethifolius*
	Philotheca spicata
SOLANACEAE	**Solanum lycopersicum*
	**Solanum nigrum*
STYLIDIACEAE	*Levenhookia stipitata*
	Stylidium androsaceum
	Stylidium brunonianum
	Stylidium carnosum
	Stylidium cygnorum
	Stylidium neurophyllum
	Stylidium piliferum
	Stylidium repens
	Stylidium schoenoides
THYMELAEACEAE	*Pimelea sulphurea*
VIOLACEAE	*Pigea calycina*
XANTHORRHOEACEAE	*Xanthorrhoea brunonis* subsp. *brunonis*
	Xanthorrhoea preissii
ZAMIACEAE	*Macrozamia fraseri*

Appendix B: Species by Site Table

CODES:	
subsp.	Subspecies
var.	Variety
forma.	Form
H	Height (cm)
C	Cover (% in quadrat area of 100m2)
X	Outside quadrat, within 30m x 30m area.
NVIS Lifeforms:	
CR	Creeper
FO	Forbs
RU	Rush
SE	Sedge
SH	Shrubs
TR	Tree

An MS Excel version of this table was provided separately to this report.

Weed	Species	NVIS Lifeform	HP01		HP02		HP03		HP04		HP05		HP06		HP07		HP08		HP09	
			H	C	H	C	H	C	H	C	H	C	H	C	H	C	H	C	H	C
	Acacia applanata	SH											20	0.1	40	0.1			30	0.1
	Acacia huegelii	SH																		
*	*Acacia longiflora* var. *sophorae*	SH																		
	Acacia pulchella var. *pulchella*	SH	X	X			50	0.5	X	X			150	4	100	3	60	2	70	0.5
	Acacia saligna	SH																		
	Acacia sessilis	SH					40	0.1							60	0.1			70	1
	Adenanthos cygnorum subsp. *cygnorum*	SH	3	0.1	400	0.5			350	12	X	1-5								
*	*Aira caryophyllea*	GR	10	0.1			5	0.1					10	0.1					10	0.1
	Alexgeorgea nitens	RU	15	1			10	0.2	20	0.1			10	1	10	5	10	0.2	15	0.3
	Allocasuarina fraseriana	TR																		
	Allocasuarina humilis	SH	120	6			170	1					120	2	100	2	100	0.5	170	5
	Amphipogon turbinata	GR	30	2			20	0.5					20	0.1	30	0.2	30	1	30	1
	Anigozanthos humilis subsp. *humilis*	FO	10	0.1									20	0.1	10	0.1	20	0.1	20	0.1
	Anigozanthos manglesii subsp. *manglesii*	FO																		
	Apectospermum spinescens	SH													60	1	40	0.1		
*	*Arctotheca calendula*	FO					3	0.1												
	Arnocrinum preissii	FO	45	0.1			20	0.1							40	0.1	40	0.1	30	0.1
	Astartea scoparia	SH			80	0.3														
	Austrostipa compressa	GR	30	0.1			20	0.1					20	0.2	20	0.2	30	0.1	20	0.1
	Austrostipa hemipogon	GR																		
*	*Avena barbata*	GR													60	0.1				
	Banksia attenuata	TR	250	4	800	20	600	1	1200	12	1400	30	X	X	300	1	300	3	500	9
	Banksia grandis	TR																		
	Banksia ilicifolia	TR			800	5			1200	6	1500	30								
	Banksia menziesii	TR	600	12	800	5	800	8	160	0.5	X	X	300	0.5	600	7	350	4	300	12
	Beaufortia elegans	SH			X	X			X	X	150	4								
	Bossiaea eriocarpa	SH	20	0.5			30	0.2					50	1	30	1	40	0.5	50	0.3
*	*Brassica tournefortii*	FO													60	0.3				
*	*Briza maxima*	GR	20	0.1			15	0.1			10	0.1	10	2	15	0.1				
*	*Briza minor*	GR																		
*	*Bromus diandrus*	GR																		
	Burchardia congesta	FO	60	0.5			50	0.3	40	0.1			50	0.2	50	0.2	50	0.2	50	1
	Caesia micrantha	FO													X	X			40	0.1

Weed	Species	NVIS Lifeform	HP01		HP02		HP03		HP04		HP05		HP06		HP07		HP08		HP09	
			H	C	H	C	H	C	H	C	H	C	H	C	H	C	H	C	H	C
	Caladenia arenicola	FO																		
	Caladenia flava subsp. *flava*	FO	10	0.1			10	0.1					15	0.1	10	0.1	15	0.1	10	0.1
	Calandrinia corrigioloides	FO											1	0.2					3	0.1
	Calectasia narragara	SH					40	0.1							40	0.1			40	0.1
	Callitris preissii	SH																		
	Calothamnus sanguineus	SH																		
	Calytrix angulata	SH	30	1															X	X
	Calytrix flavescens	SH	30	1			20	0.5					30	1	20	1	20	1	30	1
	Calytrix fraseri	SH																		
*	*Carpobrotus edulis*	FO																	3	0.1
	Cassytha flava	CR															50	0.5		
	Cassytha pomiformis	CR	40	0.2			60	3			10	0.1					40	0.3		
	Cassytha racemosa	CR							60	0.1										
*	*Centaurium pulchellum*	FO																		
*	*Centranthus macrosiphon*	FO																		
	Centrolepis drummondiana	FO	1	0.1			3	0.1					3	0.2	5	0.2	2	0.1	5	0.1
*	*Cerastium glomeratum*	FO			X	X														
	Chaetospora curvifolia	SE	25	0.3	20	0.2			25	0.1	30	0.5			30	0.1	20	0.1	20	0.1
	Chamaescilla corymbosa var. *corymbosa*	FO					30	0.1					10	0.1	20	12			15	0.1
*	*Chamelaucium uncinatum*	SH																		
	Comesperma calymega	SH																	40	0.1
	Conospermum acerosum subsp. *acerosum*	SH															X	X		
	Conospermum incurvum	SH	X	X																
	Conospermum stoechadis subsp. *stoechadis*	SH	X	X									X	X	X	X	X	X	40	0.1
	Conostephium minus	SH																		
	Conostephium pendulum	SH	20	1			40	0.5			40	0.1			40	0.1	30	0.5	10	0.1
	Conostephium preissii	SH	X	X																
	Conostylis aculeata subsp. *cygnorum*	FO											50	3	40	2				
	Conostylis aurea	FO	20	0.5			20	0.2					X	X			30	1	30	1
	Conostylis juncea	FO															30	0.1		
	Conostylis setigera subsp. *setigera*	FO	10	0.3			20	0.1					20	0.1	20	0.3	15	0.2	20	1
*	*Conyza bonariensis*	FO																		
	Corynotheca micrantha	FO	X	X																

Weed	Species	NVIS Lifeform	HP01		HP02		HP03		HP04		HP05		HP06		HP07		HP08		HP09	
			H	C	H	C	H	C	H	C	H	C	H	C	H	C	H	C	H	C
	Cotula australis	FO					5	0.1												
	Crassula colorata var. *colorata*	FO					5	0.1					40	0.1	3	0.1			3	0.2
*	*Crassula glomerata*	FO																		
*	*Crassula thunbergiana* var. *thunbergiana*	FO																		
*	*Crepis foetida* subsp. *foetida*	FO																		
	Cyanothamnus ramosus subsp. *anethifolius*	SH	30	0.1			40	0.1									30	0.1		
*	*Cynodon dactylon*	GR																		
	Dampiera linearis	SH	20	0.3	15	0.3	20	0.2	10	0.2	20	0.2	20	0.5	30	0.5	30	0.3	20	0.1
	Dasypogon bromeliifolius	FO	20	1	X	X	30	0.2	X	X			30	1	40	1	40	2		
	Daviesia divaricata subsp. *divaricata*	SH											120	2	150	2			X	X
	Daviesia nudiflora subsp. *nudiflora*	SH																	90	2
	Daviesia physodes	SH			X	X														
	Daviesia triflora	SH	70	4			60	2					80	6	70	3	60	4	80	4
	Desmocladus fascicularis	RU																		
	Desmocladus flexuosus	RU	20	1			20	0.2					20	0.1	30	0.1	20	1	20	0.3
	Dianella revoluta var. *divaricata*	FO																		
*	*Disa bracteata*	FO					10	0.1			10	0.1								
*	*Dischisma arenaria*	FO																		
	Diuris magnifica	FO	X	X			X	X									40	0.1		
	Drosera drummondii	FO	20	0.1			30	0.1					20	0.1	20	0.1	40	0.1		
	Drosera erythrorhiza	FO	1	0.2	X	X	1	0.2	1	1			1	0.1	1	0.1	1	0.1	1	0.2
	Drosera minutiflora	FO	1	0.1													1	0.1		
	Drosera pallida	FO																	40	0.1
*	*Ehrharta calycina*	GR	50	0.1			100	0.5			60	0.1	90	1	50	0.1	40	0.1		
*	*Ehrharta longiflora*	GR													10	0.1				
	Elythranthera brunonis	FO	5	0.1	X	X	30	0.1					10	0.1	10	0.1	30	0.1		
*	*Eragrostis curvula*	GR																		
	Eremaea pauciflora var. *pauciflora*	SH	70	6			80	6					100	2	40	2	70	4	80	6
	Eriochilus dilatatus	FO	5	0.1									10	0.1	10	0.1	10	0.1	10	0.1
*	*Erodium botrys*	FO																		
*	*Erodium cicutarium*	FO																		
	Eucalyptus marginata subsp. *marginata*	TR											1500	20	X	X			X	0-1
	Eucalyptus todtiana	TR	X	1			900	30									1000	30		

Weed	Species	NVIS Lifeform	HP01		HP02		HP03		HP04		HP05		HP06		HP07		HP08		HP09	
			H	C	H	C	H	C	H	C	H	C	H	C	H	C	H	C	H	C
	Eucalyptus todtiana X marginata	TR																		
	Euchilopsis linearis	SH			60	4			50	4	50	0.5								
*	*Euphorbia peplus*	FO									3	0.1								
*	*Euphorbia terracina*	FO																		
*	*Ficinia marginata*	SE											3	0.1	5	0.1			4	0.1
*	*Freesia leichtlinii*	FO																		
*	*Fumaria capreolata*	FO																		
*	*Fumaria muralis*	FO																		
*	*Galium murale*	FO									3	0.1								
	Gastrolobium capitatum	SH	X	X			X	X							40	0.1	30	0.1	50	0.5
*	*Gazania linearis*	FO																		
*	*Gladiolus caryophyllaceous*	FO	40	0.1			100	0.2					90	0.2	80	0.1	80	0.1	70	0.1
	Gompholobium confertum	SH													30	0.1				
	Gompholobium tomentosum	SH	50	2	X	X	90	0.5	50	1	40	0.1	70	1			50	1	50	0.3
	Gonocarpus pithyoides	SH			X	X														
	Haemodorum laxum	FO					40	2					70	0.1	40	0.1			50	1
	Haemodorum spicatum	FO	60	0.1	60	0.1	80	0.1					70	0.1	X	X	80	0.1		
	Hemiandra linearis	SH					15	1					30	2	40	3				
	Hensmania turbinata	FO	35	0.5																
*	*Hesperantha falcata*	FO																		
	Hibbertia aurea	SH					40	0.1							X	X	30	0.1		
	Hibbertia hypericoides subsp. *hypericoides*	SH	50	3			70	10					50	8	50	5	60	12	60	1
	Hibbertia racemosa	SH													30	0.1	40	0.3		
	Hibbertia striata	SH	30	1			40	0.5					40	0.1	30	1	40	1	40	0.3
	Hibbertia subvaginata	SH			60	2			25	1	20	0.2								
	Homalosciadium homalocarpum	FO					3	0.1					3	0.1						
	Hovea pungens	SH					60	0.5	X	X	40	0.1								
	Hovea trisperma	SH	40	0.1					20	0.1	30	0.1	40	0.1	40	0.2	30	0.1	40	0.3
	Hyalosperma cotula	FO																		
	Hypocalymma balbakiae	SH			170	85			120	35	120	18								
	Hypocalymma robusta	SH					60	0.3					60	1	40	2	60	0.5		
*	*Hypochaeris glabra*	FO					1	0.1					10	0.5	10	1			1	0.1
	Hypolaena exsulca	RU	50	0.1	50	12	50	1	50	8	50	0.2	50	1	50	5	50	6		

Weed	Species	NVIS Lifeform	HP01		HP02		HP03		HP04		HP05		HP06		HP07		HP08		HP09	
			H	C	H	C	H	C	H	C	H	C	H	C	H	C	H	C	H	C
	Isotropis cuneifolia subsp. *cuneifolia*	SH																		
	Jacksonia floribunda	SH	120	1			120	1	180	1			130	1	X	X	120	1	200	1
	Jacksonia furcellata	SH											X	X						
	Jacksonia sternbergiana	SH											180	1						
	Kennedia prostrata	SH																		
	Kunzea glabrescens	SH																		
	Kunzea praestans	SH																		
*	*Lactuca serriola*	FO																		
	Lagenophora huegelii	FO																		
	Laxmannia ramosa subsp. *ramosa*	FO	10	0.1	10	0.1	20	0.1	10	0.1							10	0.1		
	Laxmannia squarrosa	FO																	X	X
	Lechenaultia floribunda	SH			20	1			35	0.1										
*	*Leontodon rhagadioloides*	FO																		
	Lepidobolus preissianus subsp. *preissianus*	RU																	40	1
	Lepidosperma calcicola	SE																		
	Lepidosperma pubisquameum	SE					40	0.1					30	0.5	30	0.3	40	2	40	0.3
	Lepidosperma striatum	SE	50	0.5			40	0.1									50	0.1	40	0.3
	Leporella fimbriata	FO			X	X														
	Leucopogon polymorphus	SH	2	0.1			3	0.2					5	0.1	3	0.1	3	0.1	3	0.1
	Levenhookia stipitata	FO																		
	Lomandra caespitosa	FO	30	0.2			30	0.2					30	0.3	30	0.1			30	0.1
	Lomandra hermaphrodita	FO	20	0.5			20	0.2	20	0.1			20	0.2	20	0.5	15	0.5	25	0.3
	Lomandra nigricans	FO	40	0.1																
	Lomandra preissii	FO	50	0.1			50	0.1					40	0.1	50	0.1	40	0.1	35	0.1
	Lomandra suaveolens	FO					20	0.1					25	0.1	20	0.1	20	0.1		
*	*Lupinus cosentinii*	FO																		
	Lyginia barbata	RU	50	12			50	8					50	4	50	0.5	50	3	40	1
	Lyginia imberbis	RU	50	2	X	X	50	2	50	2	60	0.5	50	1			50	0.2		
*	*Lysimachia arvensis*	FO																		
	Lysinema pentapetalum	SH																		
	Macarthuria australis	SH	40	0.5																
	Machaerina arthrophylla	SE			X	X														
	Macrozamia fraseri	SH	X	X									X	X			40	0.1		

Weed	Species	NVIS Lifeform	HP01		HP02		HP03		HP04		HP05		HP06		HP07		HP08		HP09	
			H	C	H	C	H	C	H	C	H	C	H	C	H	C	H	C	H	C
*	*Malva parviflora*	SH																		
*	*Medicago polymorpha*	FO					20	0.1												
	Melaleuca preissiana	TR			500	3			500	6	500	5								
	Melaleuca seriata	SH															40	0.1		
*	*Melilotus indicus*	FO																		
	Mesomelaena pseudostygia	SE	50	1			50	3					50	1	50	2	50	2	50	8
	Microlaena stipoides	GR																		
	Microtis media subsp. *media*	FO									30	0.1			20	0.1	20	0.1		
	Millotia tenuifolia var. *laevis*	FO											5	0.1					5	0.1
*	*Monoculus monstrosus*	FO																		
	Monotaxis grandiflora var. *grandiflora*	SH					10	0.1												
	Nuytsia floribunda	TR	X	X			600	0.1	300	2					200	1			X	0-1
*	*Oenothera laciniata*	SH																		
	Olearia axillaris	SH																		
	Opercularia vaginata	FO	X	X																
*	*Osteospermum ecklonis*	SH					60	0.1												
*	*Oxalis pes-caprae*	FO																		
	Patersonia occidentalis var. *occidentalis*	FO	60	3			50	8			60	0.1	50	3	50	2	50	10	50	6
*	*Pelargonium capitatum*	SH					10	0.1												
*	*Pentameris pallida*	GR					10	0.1					10	0.1	10	0.1			10	0.2
	Pericalymma ellipticum var. *floridum*	SH			150	1														
	Persoonia saccata	SH							X	X										
	Petrophile linearis	SH	30	0.5			50	0.1	25	0.3			30	0.3	30	0.3	40	0.5	50	0.3
	Petrophile macrostachya	SH																		
*	*Petrorhagia dubia*	FO																		
	Philotheca spicata	SH	50	0.1			50	0.1					40	0.1			50	0.2	40	0.1
	Phlebocarya ciliata	FO	X	X	30	1	40	0.3	50	12	50	5	50	1	40	4	40	0.5		
	Phyllangium paradoxum	FO	5	0.2	5	0.1	6	0.3					5	0.2	10	0.2	6	0.1	5	0.3
	Pigea calycina	SH													40	0.1			50	1
	Pimelea sulphurea	SH	40	0.1															50	0.3
	Pithocarpa pulchella	SH																		
	Platysace filiformis	SH							40	0.1	5	0.1								
	Platytheca galioides	SH			60	1			80	5	50	0.1								

Weed	Species	NVIS Lifeform	HP01		HP02		HP03		HP04		HP05		HP06		HP07		HP08		HP09	
			H	C	H	C	H	C	H	C	H	C	H	C	H	C	H	C	H	C
*	*Poa annua*	GR																		
	Podotheca angustifolia	FO					3	0.1							3	0.1				
	Podotheca gnaphalioides	FO	10	0.1											20	0.1				
*	*Polycarpon tetraphyllum*	FO					3	0.1												
	Poranthera microphylla	FO											5	0.1			5	0.2		
	Poranthera moorokatta P2	FO	1	0.1			1	0.1					2	0.1			1	0.1	2	0.1
	Prasophyllum parvifolium	FO	30	0.1			30	0.1												
	Pterostylis recurva	FO	30	0.1	30	0.1	40	0.1					40	0.1	40	0.1				
	Pterostylis sp. (sterile)	FO							1	0.1										
	Pterostylis vittata	FO					X	X									30	0.1		
	Pyrorchis nigricans	FO	1	0.1			X	X			1	0.1			1	0.1				
	Quinetia urvillei	FO	3	0.1											5	0.1				
	Regelia ciliata	SH			180	5					150	4								
*	*Rostraria cristata*	GR																		
	Rytidosperma occidentale	GR	60	0.1			60	0.1					50	0.1	60	0.2	40	0.1	40	0.1
*	*Sagina apetala*	FO																		
	Scaevola repens subsp. *repens*	SH	15	0.5			15	1					10	0.1	10	1	10	0.5	10	1
	Schoenus brevisetis sens. lat.	SE	40	0.1																
	Schoenus clandestinus	SE	2	0.1			2	0.1							X	X			3	0.3
	Schoenus caespititius	SE	40	0.1	50	2			50	5	50	7								
	Scholtzia involucrata	SH	60	2					50	2										
	Senecio condylus	FO							20	0.1			15	0.1	40	0.3				
*	*Sisymbrium irio*	FO																		
*	*Solanum lycopersicum*	FO																		
*	*Solanum nigrum*	FO																		
*	*Sonchus asper*	FO																		
*	*Sonchus oleraceus*	FO							3	0.1					3	0.1			5	0.1
	Sowerbaea laxiflora	FO							20	0.1										
*	*Stellaria media*	FO																		
	Stirlingia latifolia	SH	40	0.3									70	0.5	70	1	80	2	70	1
	Stylidium androsaceum	FO	X	X			10	0.1					5	0.3	10	0.3			10	0.2
	Stylidium brunonianum	FO	20	0.2			X	X									1	0.1		
	Stylidium carnosum	FO																		

Weed	Species	NVIS Lifeform	HP01		HP02		HP03		HP04		HP05		HP06		HP07		HP08		HP09	
			H	C	H	C	H	C	H	C	H	C	H	C	H	C	H	C	H	C
	Stylidium cygnorum	FO	5	0.1											X	X			5	2
	Stylidium neurophyllum	FO																	20	0.2
	Stylidium piliferum	FO	30	0.1			30	0.1					30	0.1			1	0.1	5	0.1
	Stylidium repens	FO			10	1			5	2	10	0.2					3	0.2		
	Stylidium schoenoides	FO	X	X									X	X	40	0.1	30	0.1		
	Styphelia conostephioides	SH	20	2	30	3	50	0.5	30	0.3	40	0.1	30	0.1			50	1		
	Styphelia pallida	SH					5	0.1												
	Styphelia xerophila	SH	60	4			60	0.5									70	0.2		
	Synaphea spinulosa subsp. *spinulosa*	SH															60	1		
	Thelymitra benthamiana	FO																		
	Thelymitra crinita	FO																		
	Thelymitra graminea	FO																		
	Thelymitra macrophylla	FO			X	X	X	X												
	Thelymitra vulgaris	FO																		
	Thysanotus arbuscula	FO									50	0.1			40	0.1				
	Thysanotus manglesianus	FO	40	0.1									40	0.1	40	0.1				
	Thysanotus sparteus	FO	70	0.1			80	0.1					60	0.1	70	0.1	X	X	70	0.1
	Thysanotus thyrsoideus	FO	20	0.1			30	0.1	X	X	10	0.1	40	0.1			40	0.1		
*	*Trachyandra divaricata*	FO																		
	Trachymene pilosa	FO	10	0.3	3	0.1	10	0.3	3	0.1	5	0.1	5	0.5	10	0.3	4	0.2	10	0.2
	Tricoryne elatior	FO							40	0.1										
	Tricoryne tenella	FO	30	0.1			30	1					20	0.1	X	X	20	1	50	0.1
*	*Trifolium campestre* var. *campestre*	FO																		
*	*Trifolium scabrum*	FO																		
*	*Urospermum picroides*	FO																		
*	*Ursinia anthemoides* subsp. *anthemoides*	FO	20	0.3			20	0.1					20	1	20	1	30	0.1	25	0.1
	Verticordia nitens	SH			X	X														
*	*Vicia hirsuta*	FO																		
*	*Vicia sativa*	FO																		
*	*Vulpia fasciculata*	GR																		
*	*Vulpia myuros* forma. *megalura*	GR					10	0.1							30	0.1			25	0.1
*	*Wahlenbergia capensis*	FO																		
	Wahlenbergia preissii	FO	15	0.1			10	0.1					5	0.1	10	0.1			20	0.1

Weed	Species	NVIS Lifeform	HP01		HP02		HP03		HP04		HP05		HP06		HP07		HP08		HP09	
			H	C	H	C	H	C	H	C	H	C	H	C	H	C	H	C	H	C
	Waitzia suaveolens var. *suaveolens*	FO											5	0.1						
*	*Watsonia versfeldii*	FO																		
	Xanthorrhoea brunonis subsp. *brunonis*	SH					120	0.1									90	0.2		
	Xanthorrhoea preissii	SH	X	X			X	X	90	0.1	80	0.1	120	5	120	4	X	X	X	X
	Xanthosia huegelii	FO	20	0.2	10	0.1													10	0.3

Weeds	Species	NVIS Lifeform	HP10		HP11		HP12		HPR01		HPR02		Opportunistic Records
			H	C	H	C	H	C	H	C	H	C	
	Acacia applanata	SH					40	0.3					
	Acacia huegelii	SH											393413 6479119, 393590 6478953, 393395 6479020
*	*Acacia longiflora* var. *sophorae*	SH											393506 6479075
	Acacia pulchella var. *pulchella*	SH	50	0.5	80	2			100	3			
	Acacia saligna	SH											393433 6479137
	Acacia sessilis	SH					50	2					
	Adenanthos cygnorum subsp. *cygnorum*	SH									500	0.1	See App D.
*	*Aira caryophyllea*	GR					10	0.1					
	Alexgeorgea nitens	RU	20	1	20	0.5	15	0.3	10	0.1			393484 6478906, 393490 6479160
	Allocasuarina fraseriana	TR											See App D.
	Allocasuarina humilis	SH					70	2	100	1			
	Amphipogon turbinata	GR	30	0.2			40	1	40	1			
	Anigozanthos humilis subsp. *humilis*	FO					X	X					
	Anigozanthos manglesii subsp. *manglesii*	FO											393342 6479140
	Apectospermum spinescens	SH											
*	*Arctotheca calendula*	FO											393323 6479059, 393404 6478960
	Arnocrinum preissii	FO	40	0.1	50	0.1							393440 6478928
	Astartea scoparia	SH									150	0.1	393564 6478999
	Austrostipa compressa	GR	20	0.1	30	0.1	40	0.2	20	0.1			
	Austrostipa hemipogon	GR											393387 6478967
*	*Avena barbata*	GR											See App D.
	Banksia attenuata	TR	300	1	900	12?	700	8	100	1	1000	10	
	Banksia grandis	TR											393563 6478975
	Banksia ilicifolia	TR	X	0-5	1000	0.5					1000	20	393432 6479068
	Banksia menziesii	TR	1000	30	800	12?	600	3	1200	15	1000	10	
	Beaufortia elegans	SH											
	Bossiaea eriocarpa	SH	110	1	60	1	X	X	20	1			
*	*Brassica tournefortii*	FO											See App D.
*	*Briza maxima*	GR	20	0.6	20	1	40	0.1					
*	*Briza minor*	GR					X	X					
*	*Bromus diandrus*	GR											See App D.
	Burchardia congesta	FO	40	0.5	40	1	50	0.1	40	0.1			
	Caesia micrantha	FO					X	X					

Weeds	Species	NVIS Lifeform	HP10		HP11		HP12		HPR01		HPR02		Opportunistic Records
			H	C	H	C	H	C	H	C	H	C	
	Caladenia arenicola	FO											393577 6478891, 393583 6478946
	Caladenia flava subsp. *flava*	FO	10	0.1	20	0.1	3	0.1					393677 6479090
	Calandrinia corrigioloides	FO											393694 6479058, 393490 6479160
	Calectasia narragara	SH											393471 6478918
	Callitris preissii	SH											393689 6479068
	Calothamnus sanguineus	SH											393342 6479126
	Calytrix angulata	SH	X	X									393513 6478932, 393348 6479116
	Calytrix flavescens	SH	40	5	40	0.5			30	0.1			393484 6478906
	Calytrix fraseri	SH	70	0.5	60	0.1							393570 6478929
*	*Carpobrotus edulis*	FO					10	0.1					393400 6479037, 393382 6478950
	Cassytha flava	CR											
	Cassytha pomiformis	CR											
	Cassytha racemosa	CR											
*	*Centaurium pulchellum*	FO											393326 6479049, 393490 6479160
*	*Centranthus macrosiphon*	FO											See App D.
	Centrolepis drummondiana	FO	5	0.1	3	0.1	30	0.1					
*	*Cerastium glomeratum*	FO											
	Chaetospora curvifolia	SE	30	0.5	X	X			30	0.1			
	Chamaescilla corymbosa var. *corymbosa*	FO			10	0.1	10	0.1	10	0.1			
*	*Chamelaucium uncinatum*	SH											393648 6479136, 393490 6479160
	Comesperma calymega	SH					40	0.2					393664 6478959
	Conospermum acerosum subsp. *acerosum*	SH											393546 6479140, 393645 6479055, 393646 6479068
	Conospermum incurvum	SH											
	Conospermum stoechadis subsp. *stoechadis*	SH					90	1					
	Conostephium minus	SH	50	0.5									
	Conostephium pendulum	SH											
	Conostephium preissii	SH											393642 6479137
	Conostylis aculeata subsp. *cygnorum*	FO					50	0.5					
	Conostylis aurea	FO					X	X					
	Conostylis juncea	FO	30	0.3	30	0.1							393647 6478990, 393514 6478913
	Conostylis setigera subsp. *setigera*	FO					15	0.1					
*	*Conyza bonariensis*	FO											393404 6478960
	Corynotheca micrantha	FO					20	0.5					393663 6479090

Weeds	Species	NVIS Lifeform	HP10		HP11		HP12		HPR01		HPR02		Opportunistic Records
			H	C	H	C	H	C	H	C	H	C	
	Cotula australis	FO											
	Crassula colorata var. *colorata*	FO											393490 6479160
*	*Crassula glomerata*	FO											393577 6478889
*	*Crassula thunbergiana* var. *thunbergiana*	FO											393577 6478889
*	*Crepis foetida* subsp. *foetida*	FO											393326 6479049
	Cyanothamnus ramosus subsp. *anethifolius*	SH	80	0.5	50	0.3							
*	*Cynodon dactylon*	GR											393327 6479157
	Dampiera linearis	SH	30	0.1	30	0.2	20	0.1	20	1	30	0.1	393564 6478999
	Dasypogon bromeliifolius	FO	30	1	30	2	20	1	30	0.1			
	Daviesia divaricata subsp. *divaricata*	SH					X	X					
	Daviesia nudiflora subsp. *nudiflora*	SH					X	X					393381 6479122
	Daviesia physodes	SH											393489 6479098, 393512 6479022, 393572 6479110
	Daviesia triflora	SH					50	2					
	Desmocladus fascicularis	RU					10	0.1	20	0.1			
	Desmocladus flexuosus	RU	30	4			15	0.1	20	0.1			
	Dianella revoluta var. *divaricata*	FO											393514 6478913, 393530 6478909
*	*Disa bracteata*	FO	10	0.1	10	0.1							393473 6478904, 393593 6478961
*	*Dischisma arenaria*	FO											393407 6479158
	Diuris magnifica	FO	X	X	40	0.1	50	0.1	40	0.1			393677 6479090, 393484 6478906
	Drosera drummondii	FO			X	X							
	Drosera erythrorhiza	FO	1	0.2	1	1	1	0.5	1	0.1			
	Drosera minutiflora	FO											
	Drosera pallida	FO											
*	*Ehrharta calycina*	GR	80	1	60	0.1	90	0.1					See App D.
*	*Ehrharta longiflora*	GR			30	0.1							See App D.
	Elythranthera brunonis	FO	20	0.1	30	0.1	10	0.1					
*	*Eragrostis curvula*	GR											393335 6479158
	Eremaea pauciflora var. *pauciflora*	SH	80	2	X	X	X	X	100	20			
	Eriochilus dilatatus	FO	10	0.1	10	0.1							
*	*Erodium botrys*	FO											393577 6478889
*	*Erodium cicutarium*	FO											393326 6479049
	Eucalyptus marginata subsp. *marginata*	TR					400	0.5					
	Eucalyptus todtiana	TR	400	2			X	X	600	0.5			

Weeds	Species	NVIS Lifeform	HP10		HP11		HP12		HPR01		HPR02		Opportunistic Records
			H	C	H	C	H	C	H	C	H	C	
	Eucalyptus todtiana X marginata	TR											393648 6479102, 393517 6478906
	Euchilopsis linearis	SH									50	0.1	393564 6478999
*	*Euphorbia peplus*	FO											See App D.
*	*Euphorbia terracina*	FO											See App D.
*	*Ficinia marginata*	SE			3	0.1	5	0.1					393490 6479160
*	*Freesia leichtlinii*	FO											See App D.
*	*Fumaria capreolata*	FO											See App D.
*	*Fumaria muralis*	FO											See App D.
*	*Galium murale*	FO											393327 6479124, 393323 6479059, 393577 6478889
	Gastrolobium capitatum	SH					50	0.5					
*	*Gazania linearis*	FO											393361 6479157
*	*Gladiolus caryophyllaceous*	FO	70	0.1	50	0.1	90	0.1	50	0.1			
	Gompholobium confertum	SH											
	Gompholobium tomentosum	SH	90	2	50	1	50	1	30	1	30	0.1	393564 6478999
	Gonocarpus pithyoides	SH											
	Haemodorum laxum	FO					80	0.3	100	0.1			
	Haemodorum spicatum	FO	80	0.1	80	0.1	90	0.2	100	0.1			
	Hemiandra linearis	SH					X	X					
	Hensmania turbinata	FO	30	0.1	25	0.1							393463 6479035, 393646 6479068
*	*Hesperantha falcata*	FO	35	0.1									393565 6478901
	Hibbertia aurea	SH	40	0.1	30	1							
	Hibbertia hypericoides subsp. *hypericoides*	SH			30	0.1	30	0.5	50	0.1			
	Hibbertia racemosa	SH											393471 6478918
	Hibbertia striata	SH					30	0.1	40	0.1	40	0.1	393484 6478906
	Hibbertia subvaginata	SH	30	1	40	1					30	1	393564 6478999
	Homalosciadium homalocarpum	FO			3	0.2	1	0.1					
	Hovea pungens	SH	45	1	40	0.3							393643 6478893, 393432 6479068
	Hovea trisperma	SH					40	0.1	30	0.1	30	0.1	393564 6478999, 393484 6478906
	Hyalosperma cotula	FO			10	0.1	15	0.3					
	Hypocalymma balbakiae	SH									150	60	
	Hypocalymma robusta	SH							100	0.1			
*	*Hypochaeris glabra*	FO	1	0.1	1	0.1	10	0.1					
	Hypolaena exsulca	RU			50	1	50	0.2	50	0.1	50	3	

Weeds	Species	NVIS Lifeform	HP10		HP11		HP12		HPR01		HPR02		Opportunistic Records
			H	C	H	C	H	C	H	C	H	C	
	Isotropis cuneifolia subsp. *cuneifolia*	SH					20	0.1					393334 6478907, 393615 6479156
	Jacksonia floribunda	SH	150	1	50	0.1	70	1	100	1			
	Jacksonia furcellata	SH	X	X									393635 6478961, 393605 6479033
	Jacksonia sternbergiana	SH					X	X					
	Kennedia prostrata	SH					20	0.1					
	Kunzea glabrescens	SH											393653 6479082
	Kunzea praestans	SH											393440 6478885
*	*Lactuca serriola*	FO											393326 6479049
	Lagenophora huegelii	FO					10	0.1					
	Laxmannia ramosa subsp. *ramosa*	FO	10	0.1									
	Laxmannia squarrosa	FO											393385 6478941, 393344 6479110
	Lechenaultia floribunda	SH	X	X	20	0.3			40	0.1			393484 6478906, 393441 6479142, 393611 6478919
*	*Leontodon rhagadioloides*	FO											393577 6478889, 393490 6479160
	Lepidobolus preissianus subsp. *preissianus*	RU					40	0.1					393348 6479124
	Lepidosperma calcicola	SE					40	0.1					
	Lepidosperma pubisquameum	SE											
	Lepidosperma striatum	SE					50	1					
	Leporella fimbriata	FO			1	0.1							
	Leucopogon polymorphus	SH			50	1	3	0.1					
	Levenhookia stipitata	FO							1	0.1			393484 6478906
	Lomandra caespitosa	FO	30	0.1	40	0.1	30	0.1					
	Lomandra hermaphrodita	FO	35	0.3	40	0.2	20	0.1	30	0.1	30	0.1	
	Lomandra nigricans	FO											
	Lomandra preissii	FO	40	0.1	50	0.1	40	0.1					
	Lomandra suaveolens	FO	25	0.1	25	0.1	20	0.2			30	0.1	
*	*Lupinus cosentinii*	FO											393339 6479141
	Lyginia barbata	RU	50	8	50	8							
	Lyginia imberbis	RU	60	1	X	X	50	0.5	50	0.1	50	0.1	
*	*Lysimachia arvensis*	FO											393430 6479036, 393490 6479160
	Lysinema pentapetalum	SH											393583 6479116, 393391 6479105
	Macarthuria australis	SH					40	0.5					
	Machaerina arthrophylla	SE									50	0.1	
	Macrozamia fraseri	SH	X	0-1			10	0.1					

Weeds	Species	NVIS Lifeform	HP10		HP11		HP12		HPR01		HPR02		Opportunistic Records
			H	C	H	C	H	C	H	C	H	C	
*	*Malva parviflora*	SH											393577 6478889
*	*Medicago polymorpha*	FO											
	Melaleuca preissiana	TR	X	0-1	700	4					800	40	
	Melaleuca seriata	SH	50	1	50	0.3							393404 6479100, 393432 6479068, 393471 6478918
*	*Melilotus indicus*	FO											393326 6479049, 393326 6479049
	Mesomelaena pseudostygia	SE					50	2					
	Microlaena stipoides	GR	10	0.1									
	Microtis media subsp. *media*	FO	50	0.1	20	0.1	30	0.1			20	0.1	
	Millotia tenuifolia var. *laevis*	FO											393348 6479124
*	*Monoculus monstrosus*	FO											393327 6479124, 393679 6479055
	Monotaxis grandiflora var. *grandiflora*	SH					10	0.1					
	Nuytsia floribunda	TR	800	5	800	2			500	0.1			
*	*Oenothera laciniata*	SH											See App D.
	Olearia axillaris	SH											393351 6478947, 393693 6479083
	Opercularia vaginata	FO	20	0.1									
*	*Osteospermum ecklonis*	SH											
*	*Oxalis pes-caprae*	FO											See App D.
	Patersonia occidentalis var. *occidentalis*	FO	50	5	50	3	50	3	70	3	50	0.1	
*	*Pelargonium capitatum*	SH											See App D.
*	*Pentameris pallida*	GR											
	Pericalymma ellipticum var. *floridum*	SH											393555 6479051, 393586 6479014
	Persoonia saccata	SH	80	0.5									393404 6479100
	Petrophile linearis	SH	40	0.5	X	X	50	1	20	0.1			
	Petrophile macrostachya	SH											393603 6479140, 393369 6479063
*	*Petrorhagia dubia*	FO											393339 6479141, 393323 6479059
	Philotheca spicata	SH											
	Phlebocarya ciliata	FO	50	2	50	10	50	2	30	3	50	2	
	Phyllangium paradoxum	FO	5	0.1	10	0.1	10	0.3	10	0.1			
	Pigea calycina	SH					50	0.3					
	Pimelea sulphurea	SH											393593 6479135
	Pithocarpa pulchella	SH											393658 6478950, 393655 6478952
	Platysace filiformis	SH									50	0.1	393512 6479022, 393564 6478999
	Platytheca galioides	SH			15	0.1					50	1	

Weeds	Species	NVIS Lifeform	HP10		HP11		HP12		HPR01		HPR02		Opportunistic Records
			H	C	H	C	H	C	H	C	H	C	
*	*Poa annua*	GR											393323 6479059
	Podotheca angustifolia	FO											
	Podotheca gnaphalioides	FO			20	0.1	X	X					
*	*Polycarpon tetraphyllum*	FO											
	Poranthera microphylla	FO					3	0.1					
	Poranthera moorokatta P2	FO											See App D.
	Prasophyllum parvifolium	FO	40	0.1	20	0.1							
	Pterostylis recurva	FO	30	0.1			30	0.1			20	0.1	
	Pterostylis sp. (sterile)	FO											
	Pterostylis vittata	FO											
	Pyrorchis nigricans	FO					1	0.1	1	0.1			
	Quinetia urvillei	FO											
	Regelia ciliata	SH									150	10	
*	*Rostraria cristata*	GR											393326 6479049
	Rytidosperma occidentale	GR					50	0.2					
*	*Sagina apetala*	FO											393326 6479049, 393490 6479160
	Scaevola repens subsp. *repens*	SH					15	2					
	Schoenus brevisetis sens. lat.	SE											
	Schoenus clandestinus	SE					2	0.2					
	Schoenus caespititius	SE									50	2	
	Scholtzia involucrata	SH	40	1	50	4							
	Senecio condylus	FO											
*	*Sisymbrium irio*	FO											393323 6479059
*	*Solanum lycopersicum*	FO											393613 6478894
*	*Solanum nigrum*	FO											393345 6479158
*	*Sonchus asper*	FO											393323 6479059
*	*Sonchus oleraceus*	FO					20	0.1					
	Sowerbaea laxiflora	FO											393328 6478962
*	*Stellaria media*	FO											393323 6479059
	Stirlingia latifolia	SH					60	1	100	0.1			
	Stylidium androsaceum	FO			X	X	10	0.2	10	0.1			
	Stylidium brunonianum	FO	20	0.1	X	X							
	Stylidium carnosum	FO											393448 6478926, 393664 6478959

Weeds	Species	NVIS Lifeform	HP10		HP11		HP12		HPR01		HPR02		Opportunistic Records
			H	C	H	C	H	C	H	C	H	C	
	Stylidium cygnorum	FO											
	Stylidium neurophyllum	FO											
	Stylidium piliferum	FO					X	X	20	0.1			
	Stylidium repens	FO	10	5	10	4					10	0.1	
	Stylidium schoenoides	FO											393369 6479063, 393448 6478926
	Styphelia conostephioides	SH	50	3	50	4					50	1	393564 6478999
	Styphelia pallida	SH					10	0.1					
	Styphelia xerophila	SH											
	Synaphea spinulosa subsp. *spinulosa*	SH											393591 6479103
	Thelymitra benthamiana	FO											393596 6478942
	Thelymitra crinita	FO							30	0.1			393643 6478893, 393658 6478950, 393625 6479078
	Thelymitra graminea	FO			30	0.1					20	0.1	
	Thelymitra macrophylla	FO											393332 6478905, 393454 6479061
	Thelymitra vulgaris	FO											393514 6479141, 393454 6479061, 393540 6479044
	Thysanotus arbuscula	FO	40	0.1					30	0.1			393415 6478985, 393613 6478983
	Thysanotus manglesianus	FO											
	Thysanotus sparteus	FO					50	0.1					
	Thysanotus thyrsoideus	FO	40	0.1	30	0.2	30	0.1			20	0.1	
*	*Trachyandra divaricata*	FO											See App D.
	Trachymene pilosa	FO	10	0.3	10	1	10	0.3	10	0.1	10	0.1	
	Tricoryne elatior	FO							30	0.1			
	Tricoryne tenella	FO											
*	*Trifolium campestre* var. *campestre*	FO											393327 6479124
*	*Trifolium scabrum*	FO											393326 6479049
*	*Urospermum picroides*	FO											393613 6478894, 393438 6479160
*	*Ursinia anthemoides* subsp. *anthemoides*	FO	20	0.1	20	0.1	30	0.2	30	0.1			
	Verticordia nitens	SH	X	0-1	X	X							393482 6479114, 393404 6479100, 393432 6479068, 393543 6478959
*	*Vicia hirsuta*	FO											393577 6478889
*	*Vicia sativa*	FO											393323 6479059
*	*Vulpia fasciculata*	GR											393577 6478889
*	*Vulpia myuros* forma. *megalura*	GR			30	0.1							
*	*Wahlenbergia capensis*	FO											393490 6479160

Weeds	Species	NVIS Lifeform	HP10		HP11		HP12		HPR01		HPR02		Opportunistic Records
			H	C	H	C	H	C	H	C	H	C	
	Wahlenbergia preissii	FO					5	0.1					
	Waitzia suaveolens var. *suaveolens*	FO			15	0.1	20	0.1					
*	*Watsonia versfeldii*	FO											See App D.
	Xanthorrhoea brunonis subsp. *brunonis*	SH											393545 6478897, 393571 6479097
	Xanthorrhoea preissii	SH	X	0-5	90	0.3	150	15	250	15			
	Xanthosia huegelii	FO			10	0.1							

Appendix C: Quadrat Data

Quadrat HP01

Survey Date	24 September 2024	**Condition:**	Excellent
Survey Date	22 October 2024	**Details:**	Weeds <0.3% cover.
Area:	10m x 10m (100m$^{2)}$	**Fire History:**	>10 years
Surveyor:	Kelli McCreery	**Leaf Litter:**	70% cover; <1-10cm depth.
Location	50J 393642 6479131	**Landform:**	Consolidated dune crest/upper slope.
Datum:	GDA94	**Soil Type:**	Sand, white-grey.
Accuracy:	3m (0.5m)	**Aspect:**	SE
Other:		**Altitude:**	60m

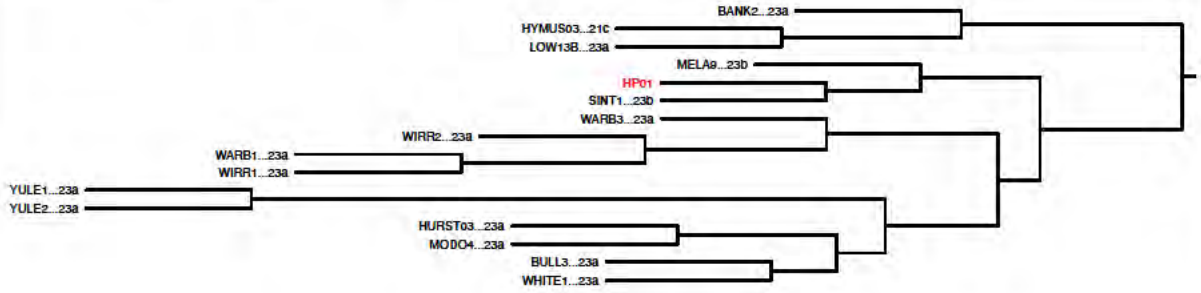
Vegetation NVIS:	**Stratum**	**Form**	**Cover**	**Dominant Species**
	U1	Tree <10m	10-30%	*Banksia attenuata, Banksia menziesii*
	M1	Shrub 1-2m	0.25-5%	*Allocasuarina humilis, Jacksonia floribunda*
	G1	Shrub 0.5-1m	30-70%	*Eremaea pauciflora* var. *pauciflora, Daviesia triflora, Scholtzia involucrata.*
	G2	Shrub <0.5m	30-70%	*Hibbertia hypericoides* subsp. *hypericoides, Calytrix flavescens, Conostephium pendulum, Gompholobium tomentosum, Hibbertia striata, Styphelia conostephioides, Styphelia xerophila.*
	G3	Sedge <0.5m	5-10%	*Mesomelaena pseudostygia.*
	G3	Rush <0.5m	5-10%	*Lyginia barbata, Alexgeorgea nitens.*
	G4	Grass <0.5m	0.25-5%	*Amphipogon turbinata.*
	G5	Forbs <0.5m	10-30%	*Patersonia occidentalis* var. *occidentalis, Conostylis aurea, Conostylis setigera* ssp. *setigera, Dasypogon bromeliifolius, Lomandra hermaphrodita,* mixed diverse.

Species: *Adenanthos cygnorum* subsp. *cygnorum, *Aira caryophyllea, Alexgeorgea nitens, Allocasuarina humilis, Amphipogon turbinata, Anigozanthos humilis* subsp. *humilis, Arnocrinum preissii, Austrostipa compressa, Banksia attenuata, Banksia menziesii, Bossiaea eriocarpa, *Briza maxima, Burchardia congesta, Caladenia flava* subsp. *flava, Calytrix angulata, Calytrix flavescens, Cassytha pomiformis, Centrolepis drummondiana, Chaetospora curvifolia, Conostephium pendulum, Conostylis aurea, Conostylis setigera* subsp. *setigera, Cyanothamnus ramosus* subsp. *anethifolius, Dampiera linearis, Dasypogon bromeliifolius, Daviesia triflora, Desmocladus flexuosus, Drosera drummondii, Drosera erythrorhiza, Drosera minutiflora, *Ehrharta calycina, Elythranthera brunonis, Eremaea pauciflora* var. *pauciflora, Eriochilus dilatatus, *Gladiolus caryophyllaceous, Gompholobium tomentosum, Haemodorum spicatum, Hensmania turbinata, Hibbertia hypericoides* subsp. *hypericoides, Hibbertia striata, Hovea trisperma, Hypolaena exsulca, Jacksonia floribunda, Laxmannia ramosa* subsp. *ramosa, Lepidosperma striatum, Leucopogon polymorphus, Lomandra caespitosa, Lomandra hermaphrodita, Lomandra nigricans, Lomandra preissii, Lyginia barbata, Lyginia imberbis, Macarthuria australis, Mesomelaena pseudostygia, Patersonia occidentalis* var. *occidentalis, Petrophile linearis, Philotheca spicata, Phyllangium paradoxum, Pimelea sulphurea, Podotheca gnaphalioides, Poranthera moorokatta P2, Prasophyllum parvifolium, Pterostylis recurva, Pyrorchis nigricans, Quinetia urvillei, Rytidosperma occidentale, Scaevola repens* subsp. *repens, Schoenus caespititius, Schoenus clandestinus, Scholtzia involucrata, Stirlingia latifolia, Stylidium brunonianum, Stylidium cygnorum, Stylidium piliferum, Styphelia conostephioides, Styphelia xerophila, Thysanotus manglesianus, Thysanotus sparteus, Thysanotus thyrsoideus, Trachymene pilosa, Tricoryne tenella, *Ursinia anthemoides* subsp. *anthemoides, Wahlenbergia preissii, Xanthosia huegelii.*

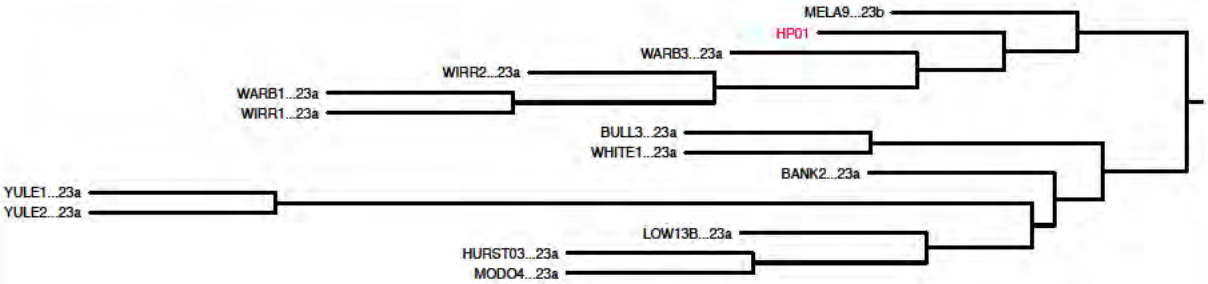
Outside quadrat (30m x 30m): *Acacia pulchella* var. *pulchella, Conospermum incurvum, Conospermum stoechadis* subsp. *stoechadis, Conostephium preissii, Corynotheca micrantha, Diuris magnifica, Eucalyptus todtiana, Gastrolobium capitatum, Macrozamia fraseri, Nuytsia floribunda, Opercularia vaginata, Phlebocarya ciliata, Stylidium androsaceum, Stylidium schoenoides, Xanthorrhoea preissii.*

Photo NW Corner:	
Photo Ground Layer:	

Statistical Analysis: Kulczynski Average



Statistical Analysis: Bray Average



Quadrat HP02

Survey Date	24 September 2024	**Condition:**	Excellent
Survey Date	22 October 2024	**Details:**	Weeds <0.1% cover.
Area:	10m x 10m (100m$^{2)}$	**Fire History:**	>10 years
Surveyor:	Kelli McCreery	**Leaf Litter:**	80% cover; <1-10cm depth.
Location	50J 393556 6479029	**Landform:**	Dampland basin
Datum:	GDA94	**Soil Type:**	Sand, peaty grey.
Accuracy:	3m (0.5m)	**Aspect:**	Flat
Other:		**Altitude:**	46m

Vegetation NVIS:

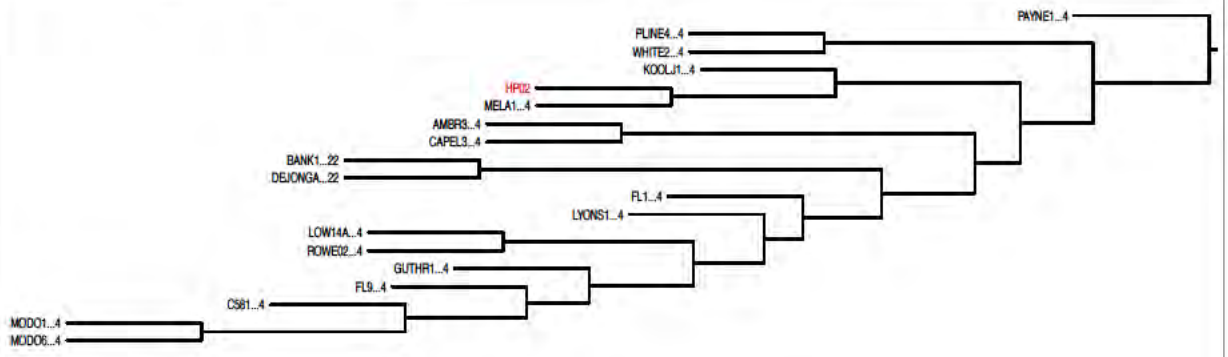
Stratum	Form	Cover	Dominant Species
U1	Tree <10m	30-70%	*Banksia ilicifolia, Banksia attenuata, Banksia menziesii, Melaleuca preissiana.*
M1	Shrub 1-2m	30-70%	*Hypocalymma balbakiae, Regelia ciliata, Pericalymma elliptica* var. *floridum.*
G1	Shrub 0.5-1m	10-30%	*Hibbertia subvaginata, Euchilopsis linearis, Platytheca galioides, Styphelia conostephioides.*
G2	Rush <0.5m	10-30%	*Hypolaena exsulca.*
G3	Sedge <0.5m	0.25-5%	*Schoenus caespititius, Chaetospora curvifolia.*
G4	Forbs <0.5m	0.25-5%	*Stylidium repens.*

Species: *Adenanthos cygnorum* subsp. *cygnorum, Astartea scoparia, Banksia attenuata, Banksia ilicifolia, Banksia menziesii, Chaetospora curvifolia, Dampiera linearis, Euchilopsis linearis, Haemodorum spicatum, Hibbertia subvaginata, Hypocalymma balbakiae, Hypolaena exsulca, Laxmannia ramosa* subsp. *ramosa, Lechenaultia floribunda, Leucopogon conostephioides, Melaleuca preissiana, Pericalymma ellipticum* var. *floridum, Phlebocarya ciliata, Phyllangium paradoxum, Platytheca galioides, Pterostylis recurva, Regelia ciliata, Schoenus caespititius, Stylidium repens, Trachymene pilosa, Xanthosia huegelii.*

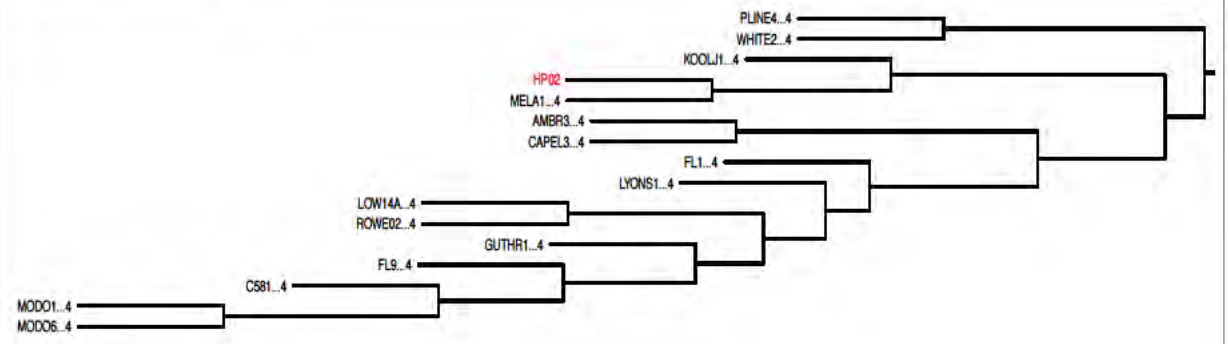
Outside quadrat (30m x 30m): *Beaufortia elegans, *Cerastium glomeratum, Dasypogon bromeliifolius, Daviesia physodes, Drosera erythrorhiza, Elythranthera brunonis, Gompholobium tomentosum, Gonocarpus pithyoides, Leporella fimbriata, Lyginia imberbis, Machaerina arthrophylla, Thelymitra macrophylla, Verticordia nitens.*

Photo NW Corner:	
Photo Ground Layer:	

Statistical Analysis: Kulczynski Average



Statistical Analysis: Bray Average



Quadrat HP03

Survey Date	24 September 2024	**Condition:**	Excellent
Survey Date	22 October 2024	**Details:**	Weeds 1% (has weedy patch, otherwise <1%)
Area:	10m x 10m (100m$^{2)}$	**Fire History:**	>10 years
Surveyor:	Kelli McCreery	**Leaf Litter:**	80% cover; <1-20cm depth.
Location	50J 393653 6478983	**Landform:**	Consolidated dune mid- slope.
Datum:	GDA94	**Soil Type:**	Sand, white-grey.
Accuracy:	3m (0.5m)	**Aspect:**	WSW
Other:		**Altitude:**	57m

Vegetation NVIS:

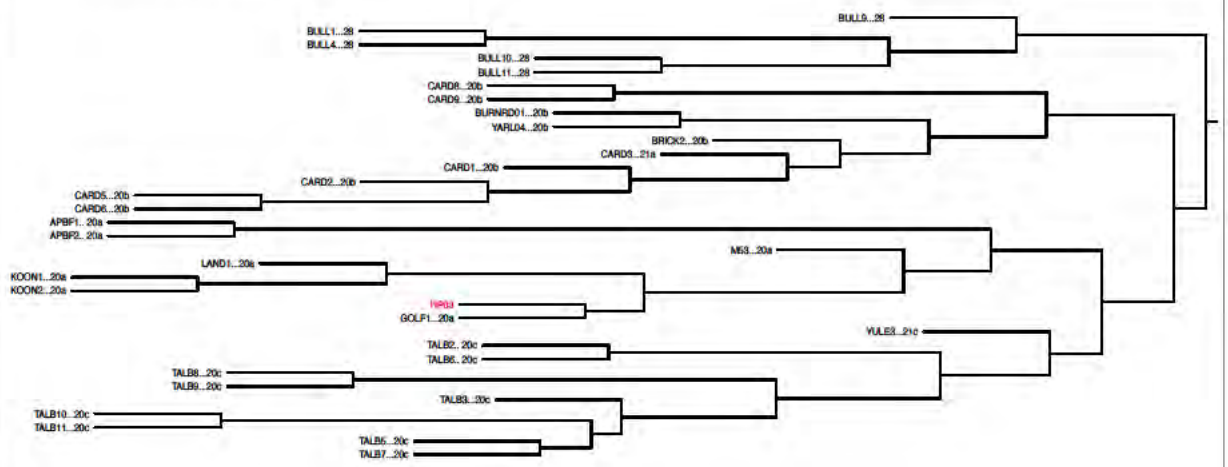
Stratum	Form	Cover	Dominant Species
U1	Tree <10m	30-70%	*Eucalyptus todtiana, Banksia attenuata, Banksia menziesii.*
M1	Shrub 1-2m	0.25-5%	*Allocasuarina humilis, Jacksonia floribunda.*
G1	Shrub 0.5-1m	30-70%	*Eremaea pauciflora* var. *pauciflora, Hibbertia hypericoides* subsp. *hypericoides, Daviesia triflora,* mixed diverse.
G2	Shrub <0.5m	10-30%	Mixed diverse.
G5	Sedge <0.5m	0.25-5%	*Mesomelaena pseudostygia.*
G4	Rush <0.5m	10-30%	*Lyginia barbata, Lyginia imberbis, Hypolaena exsulca.*
G3	Forbs <0.5m	10-30%	*Patersonia occidentalis* var. *occidentalis, , Tricoryne tenella, Haemodorum laxum,* Mixed diverse.

Species: *Acacia pulchella* var. *pulchella, Acacia sessilis, *Aira caryophyllea, Alexgeorgea nitens, Allocasuarina humilis, Amphipogon turbinata, *Arctotheca calendula, Arnocrinum preissii, Austrostipa compressa, Banksia attenuata, Banksia menziesii, Bossiaea eriocarpa, *Briza maxima, Burchardia congesta, Caladenia flava* subsp. *flava, Calectasia narragara, Calytrix flavescens, Cassytha pomiformis, Centrolepis drummondiana, Chamaescilla corymbosa, Conostephium pendulum, Conostylis aurea, Conostylis setigera* subsp. *setigera, Cotula australis, Crassula colorata* var. *colorata, Cyanothamnus ramosus* subsp. *anethifolius, Dampiera linearis, Dasypogon bromeliifolius, Daviesia triflora, Desmocladus flexuosus, *Disa bracteata, Drosera drummondii, Drosera erythrorhiza, *Ehrharta calycina, Elythranthera brunonis, Eremaea pauciflora* var. *pauciflora, Eucalyptus todtiana, *Gladiolus caryophyllaceous, Gompholobium tomentosum, Haemodorum laxum, Haemodorum spicatum, Hemiandra linearis, Hibbertia aurea, Hibbertia hypericoides* subsp. *hypericoides, Hibbertia striata, Homalosciadium homalocarpum, Hovea pungens, Hypocalymma robusta, *Hypochaeris glabra, Hypolaena exsulca, Jacksonia floribunda, Laxmannia ramosa* subsp. *ramosa, Lepidosperma pubisquameum, Lepidosperma striatum, Leucopogon conostephioides, Leucopogon polymorphus, Lomandra caespitosa, Lomandra hermaphrodita, Lomandra preissii, Lomandra suaveolens, Lyginia barbata, Lyginia imberbis, *Medicago polymorpha, Mesomelaena pseudostygia, Monotaxis grandiflora* var. *grandiflora, Nuytsia floribunda, *Osteospermum ecklonis, Patersonia occidentalis* var. *occidentalis, *Pelargonium capitatum, *Pentameris pallida, Petrophile linearis, Philotheca spicata, Phlebocarya ciliata, Phyllangium paradoxum, Podotheca angustifolia, *Polycarpon tetraphyllum, Poranthera moorokatta P2, Prasophyllum parvifolium, Pterostylis recurva, Rytidosperma occidentale, Scaevola repens* subsp. *repens, Schoenus clandestinus, Stylidium androsaceum, Stylidium piliferum, Styphelia pallida, Styphelia xerophila, Thysanotus sparteus, Thysanotus thyrsoideus, Trachymene pilosa, Tricoryne tenella, *Ursinia anthemoides* subsp. *anthemoides, *Vulpia myuros* forma. *megalura, Wahlenbergia preissii, Xanthorrhoea brunonis* ssp. *brunonis.*

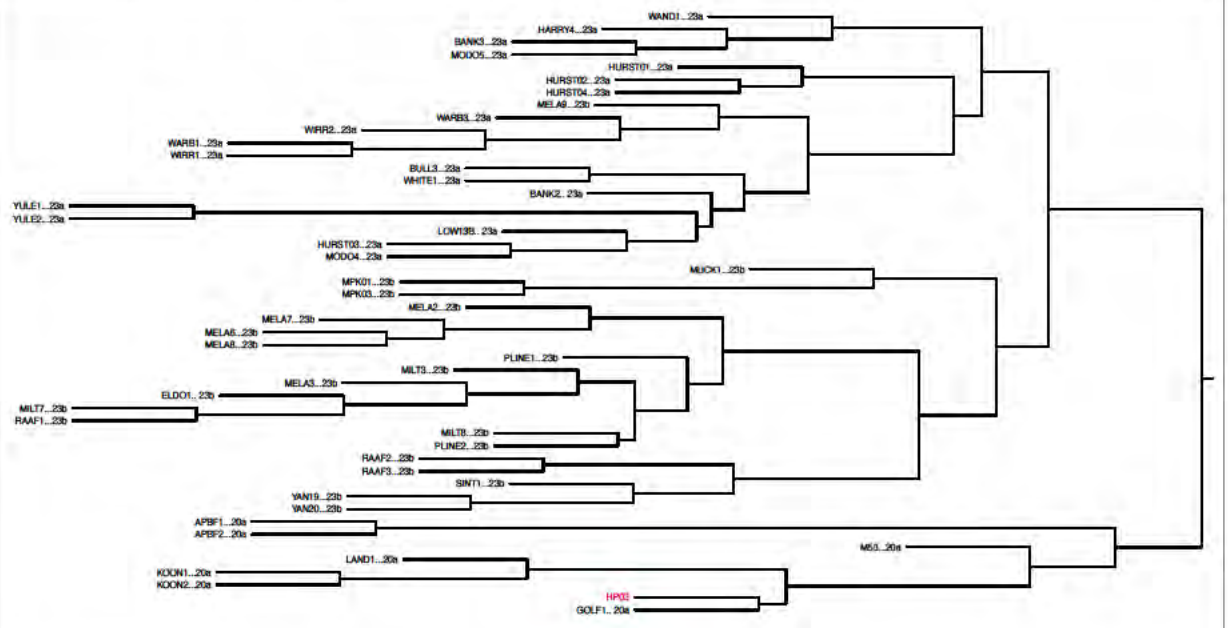
Outside quadrat (30m x 30m): *Diuris magnifica, Gastrolobium capitatum, Pterostylis vittata, Pyrorchis nigricans, Stylidium brunonianum, Thelymitra macrophylla, Xanthorrhoea preissii.*

Photo NW Corner:	
Photo Ground Layer:	

Statistical Analysis: Kulczynski Average



Statistical Analysis: Bray Average



Quadrat HP04

Survey Date	25 September 2024	**Condition:**	Excellent
Survey Date	18 October 2024	**Details:**	Weeds <0.1% cover.
Area:	10m x 10m (100m$^{2)}$	**Fire History:**	>10 years
Surveyor:	Kelli McCreery	**Leaf Litter:**	85% cover; <1-20cm depth.
Location	50J 393477 6479126	**Landform:**	Drainage basin.
Datum:	GDA94	**Soil Type:**	Sand, peaty, white-grey.
Accuracy:	3m (0.5m)	**Aspect:**	SE
Other:		**Altitude:**	48m

Vegetation NVIS:

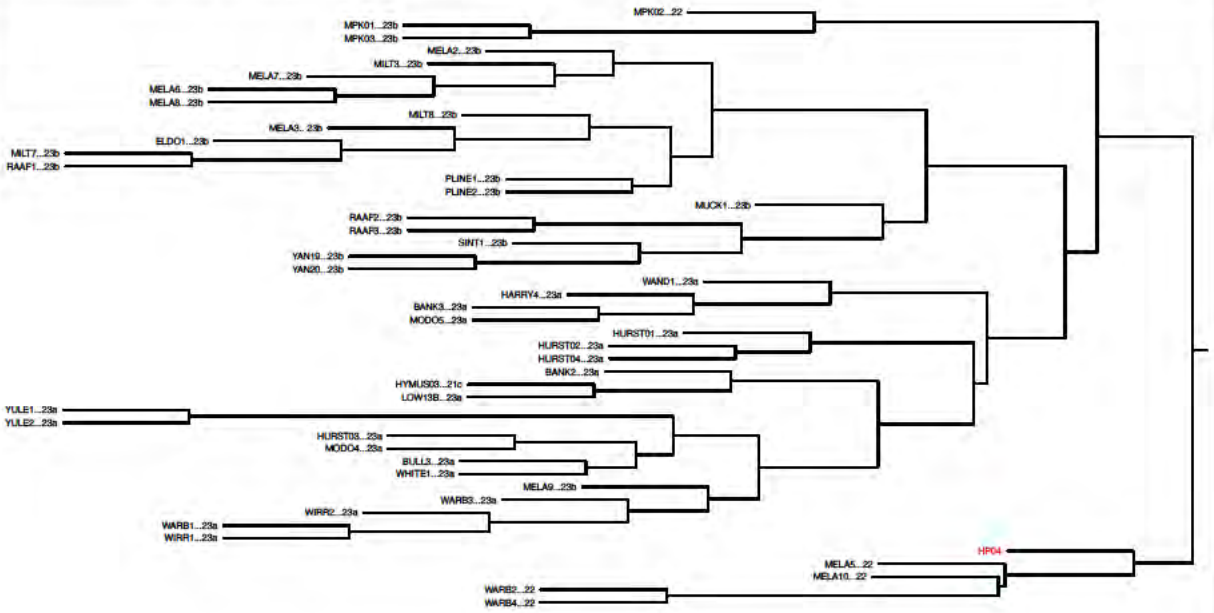
Stratum	Form	Cover	Dominant Species
U1	Tree 10-30m	30-70%	*Banksia attenuata, Banksia ilicifolia, Banksia menziesii, Nuytsia floribunda..*
U2	Tree <10m	5-1%	*Melaleuca preissiana.*
M1	Shrub >2m	5-10%	*Adenanthos cygnorum* subsp. *cygnorum.*
M2	Shrub 1-2m	30-70%	*Hypocalymma balbakiae*
G1	Shrub 0.5-1m	30-70%	*Platytheca galioides, Gompholobium tomentosum, Scholtzia involucrata*
G3	Sedge <0.5m	10-30%	*Schoenus caespititius.*
G3	Rush <0.5m	10-30%	*Hypolaena exsulca, Lyginia imberbis..*
G4	Forbs <0.5m	10-30%	*Phlebocarya ciliata, Stylidium repens.*

Species: *Adenanthos cygnorum* subsp. *cygnorum, Alexgeorgea nitens, Banksia attenuata, Banksia ilicifolia, Banksia menziesii, Burchardia congesta, Cassytha racemosa, Chaetospora curvifolia, Dampiera linearis, Drosera erythrorhiza, Euchilopsis linearis, Gompholobium tomentosum, Hibbertia subvaginata, Hovea trisperma, Hypocalymma balbakiae, Hypolaena exsulca, Jacksonia floribunda, Laxmannia ramosa* subsp. *ramosa, Lechenaultia floribunda, Leucopogon conostephioides, Lomandra hermaphrodita, Lyginia imberbis, Melaleuca preissiana, Nuytsia floribunda, Petrophile linearis, Phlebocarya ciliata, Platysace filiformis, Platytheca galioides, Pterostylis sp., Schoenus caespititius, Scholtzia involucrata, Senecio condylus, *Sonchus oleraceus, Sowerbaea laxiflora, Stylidium repens, Trachymene pilosa, Tricoryne elatior.*

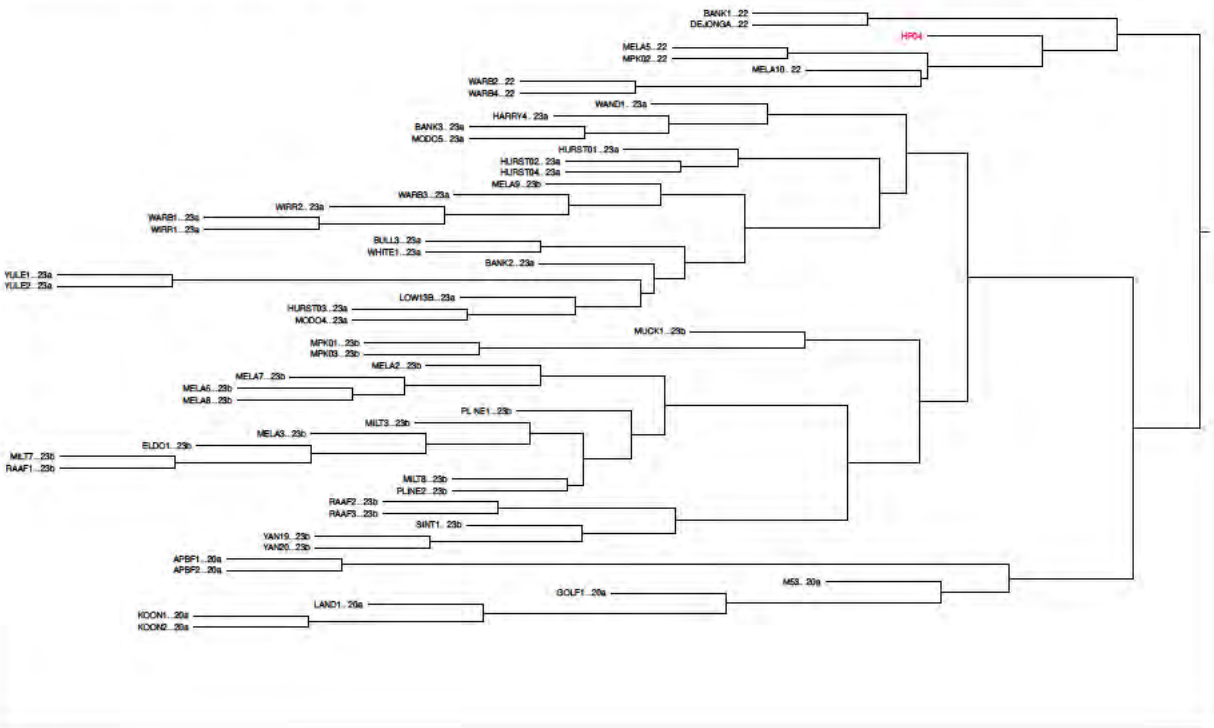
Outside quadrat (30m x 30m): *Xanthorrhoea preissii, Acacia pulchella* var. *pulchella, Beaufortia elegans, Dasypogon bromeliifolius, Hovea pungens, Persoonia saccata, Thysanotus thyrsoideus.*

Photo NW Corner:	
Photo Ground Layer:	

Statistical Analysis: Kulczynski Average



Statistical Analysis: Bray Average



Quadrat HP05

Survey Date 1:	25 September 2024	**Condition:**	Excellent
Survey Date 2:	18 October 2024	**Details:**	Weeds 0.1% cover.
Area:	10m x 10m (100m$^{2)}$	**Fire History:**	>10 years
Surveyor:	Kelli McCreery	**Leaf Litter:**	90% cover; <1-30cm depth.
Location NW:	50J 393487 6479050	**Landform:**	Dampland basin.
Datum:	GDA94	**Soil Type:**	Sand, peaty, white-grey.
Accuracy:	3m (0.5m)	**Aspect:**	SE
Other:		**Altitude:**	49m

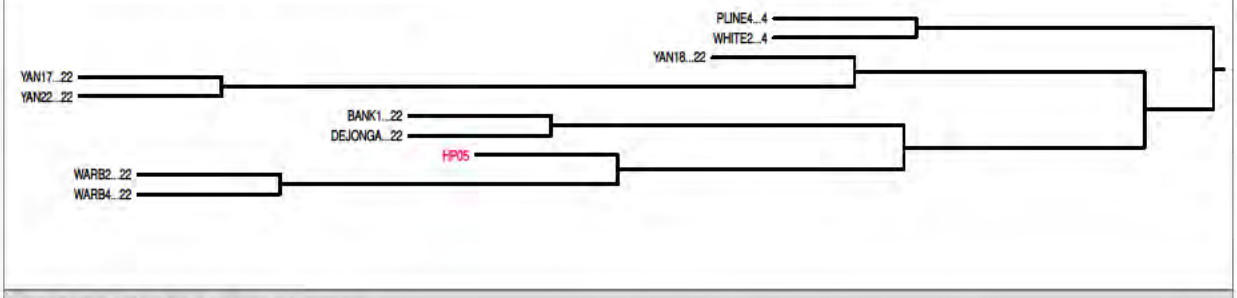
Vegetation NVIS:	**Stratu**	**Form**	**Cover**	**Dominant Species**
	U1	Tree 10-30m	70-100%	*Banksia ilicifolia, Banksia attenuata.*
	U2	Tree <10m	5-10%	*Melaleuca preissiana*
	M1	Shrub 1-2m	30-70%	*Hypolaena balbakiae, Regelia ciliata.*
	G1	Shrub <0.5m	0.25-5%	*Euchilopsis linearis.*
	G2	Sedge <0.5m	5-10%	*Schoenus caespititius, Chaetospora curvifolia.*
	G3	Rush <0.5m	0.25-5%	*Hypolaena exsulca, Lyginia imberbis.*
	G4	Forbs <0.5m	5-10%	*Phlebocarya ciliata, Stylidium repens.*

Species: *Banksia attenuata, Banksia ilicifolia, Beaufortia elegans, *Briza maxima, Cassytha pomiformis, Chaetospora curvifolia, Conostephium pendulum, Dampiera linearis, *Disa bracteata, *Ehrharta calycina, Euchilopsis linearis, *Euphorbia peplus, *Galium murale, Gompholobium tomentosum, Hibbertia subvaginata, Hovea pungens, Hovea trisperma, Hypocalymma balbakiae, Hypolaena exsulca, Leucopogon conostephioides, Lyginia imberbis, Melaleuca preissiana, Microtis media* subsp. *media, Patersonia occidentalis* var. *occidentalis, Phlebocarya ciliata, Platysace filiformis, Platytheca galioides, Pyrorchis nigricans, Regelia ciliata, Schoenus caespititius, Stylidium repens, Thysanotus arbuscula, Thysanotus thyrsoideus, Trachymene pilosa, Xanthorrhoea preissii.*

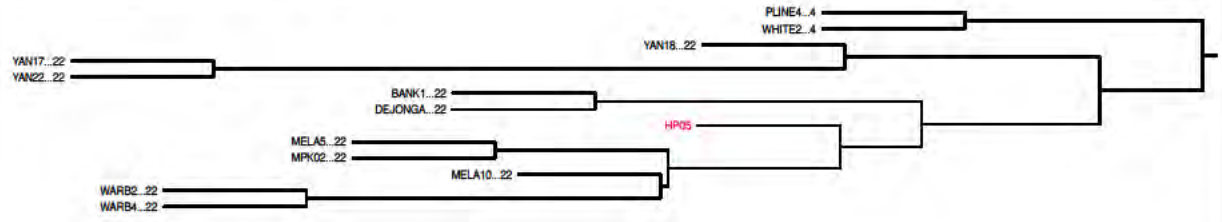
Outside quadrat (30m x 30m): *Adenanthos cygnorum* subsp. *cygnorum, Banksia menziesii.*

Photo NW Corner:	
Photo Ground Layer:	

Statistical Analysis: Kulczynski Average



Statistical Analysis: Bray Average



Quadrat HP06

Survey Date 1:	25 September 2024	**Condition:**	Very Good
Survey Date 2:	18 October 2024	**Details:**	Weeds 2-3% cover.
Area:	10m x 10m (100m$^{2)}$	**Fire History:**	~5 years.
Surveyor:	Kelli McCreery	**Leaf Litter:**	80% cover; <1-20cm depth.
Location NW:	50J 393374 6479037	**Landform:**	Consolidated dune mid-upper slope.
Datum:	GDA94	**Soil Type:**	Sand, white-grey.
Accuracy:	3m (0.5m)	**Aspect:**	SE
Other:		**Altitude:**	56m

Vegetation NVIS:

Stratu	Form	Cover	Dominant Species
U1	Tree 10-30m	10-30%	*Eucalyptus marginata* subsp. *marginata*
U2	Tree <10m	0.25-5%	*Banksia menziesii (Banksia attenuata).*
M1	Shrub 1-2m	5-10%	*Acacia pulchella* var. *pulchella, Allocasuarina humilis, Eremaea pauciflora* var. *pauciflora Jacksonia floribunda.*
M2	Grasstree 1-2m	0.25-5%	*Xanthorrhoea preissii*
G1	Shrub 0.5-1m	30-70%	*Hibbertia hypericoides* subsp. *hypericoides, Hypocalymma robusta, Daviesia triflora Bossiaea eriocarpa, Gompholobium tomentosum,* diverse mixed.
G2	Shrub <0.5m	30-70%	*Calytrix flavescens, Hemiandra linearis, Petrophile linearis*, diverse mixed.
G3	Sedge <0.5m	5-10%	*Mesomelaena pseudostygia.*
G4	Rush <0.5m	5-10%	*Alexgeorgea nitens, Hypolaena exsulca, Lyginia barbata, Lyginia imberbis.*
G5	Forbs <0.5m	10-30%	*Patersonia occidentalis* var. *occidentalis, Conostylis aculeata* subsp. *cygnorum, Dasypogon bromeliifolius, Phlebocarya ciliata*, diverse mixed.

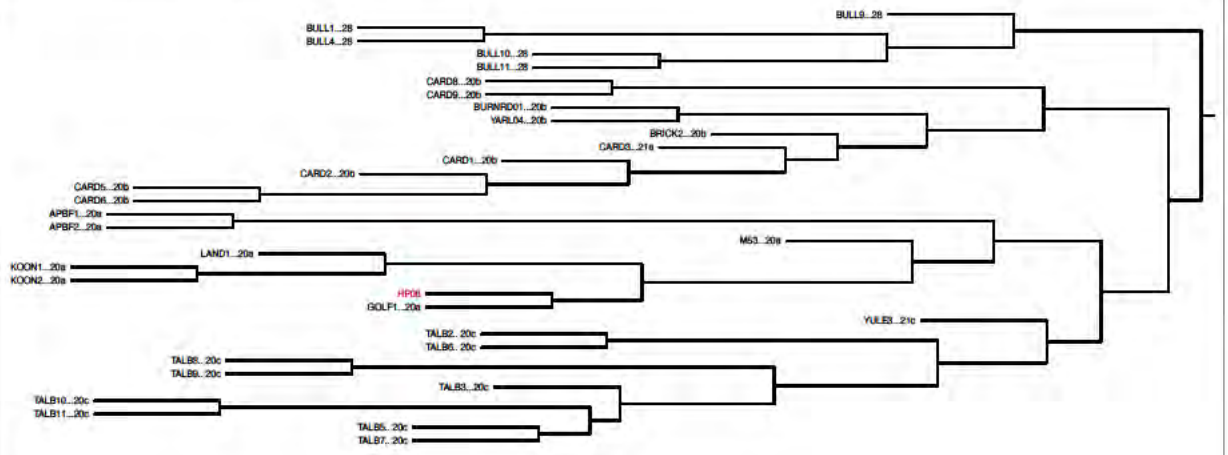
Species:

Acacia applanata, Acacia pulchella var. *pulchella, *Aira caryophyllea, Alexgeorgea nitens, Allocasuarina humilis, Amphipogon turbinata, Anigozanthos humilis* subsp. *humilis, Austrostipa compressa, Banksia menziesii, Bossiaea eriocarpa, *Briza maxima, Burchardia congesta, Caladenia flava* subsp. *flava, Calandrinia corrigioloides, Calytrix flavescens, Centrolepis drummondiana, Chamaescilla corymbosa, Conostylis aculeata* subsp. *cygnorum, Conostylis setigera* subsp. *setigera, Crassula colorata* var. *colorata, Dampiera linearis, Dasypogon bromeliifolius, Daviesia divaricata* subsp. *divaricata, Daviesia triflora, Desmocladus flexuosus, Drosera drummondii, Drosera erythrorhiza, *Ehrharta calycina, Elythranthera brunonis, Eremaea pauciflora* var. *pauciflora, Eriochilus dilatatus, Eucalyptus marginata* subsp. *marginata, *Ficinia marginata, *Gladiolus caryophyllaceous, Gompholobium tomentosum, Haemodorum laxum, Haemodorum spicatum, Hemiandra linearis, Hibbertia hypericoides* subsp. *hypericoides, Hibbertia striata, Homalosciadium homalocarpum, Hovea trisperma, Hypocalymma robusta, *Hypochaeris glabra, Hypolaena exsulca, Jacksonia floribunda, Jacksonia sternbergiana, Lepidosperma pubisquameum, Leucopogon conostephioides, Leucopogon polymorphus, Lomandra caespitosa, Lomandra hermaphrodita, Lomandra preissii, Lomandra suaveolens, Lyginia barbata, Lyginia imberbis, Mesomelaena pseudostygia, Millotia tenuifolia* var. *laevis, Patersonia occidentalis* var. *occidentalis, *Pentameris pallida, Petrophile linearis, Philotheca spicata, Phlebocarya ciliata, Phyllangium paradoxum, Poranthera microphylla, Poranthera moorokatta P2, Pterostylis recurva, Rytidosperma occidentale, Scaevola repens* subsp. *repens, Senecio condylus, Stirlingia latifolia, Stylidium androsaceum, Stylidium piliferum, Thysanotus manglesianus, Thysanotus sparteus, Thysanotus thyrsoideus, Trachymene pilosa, Tricoryne tenella, *Ursinia anthemoides* subsp. *anthemoides, Wahlenbergia preissii, Waitzia suaveolens* var. *suaveolens, Xanthorrhoea preissii.*

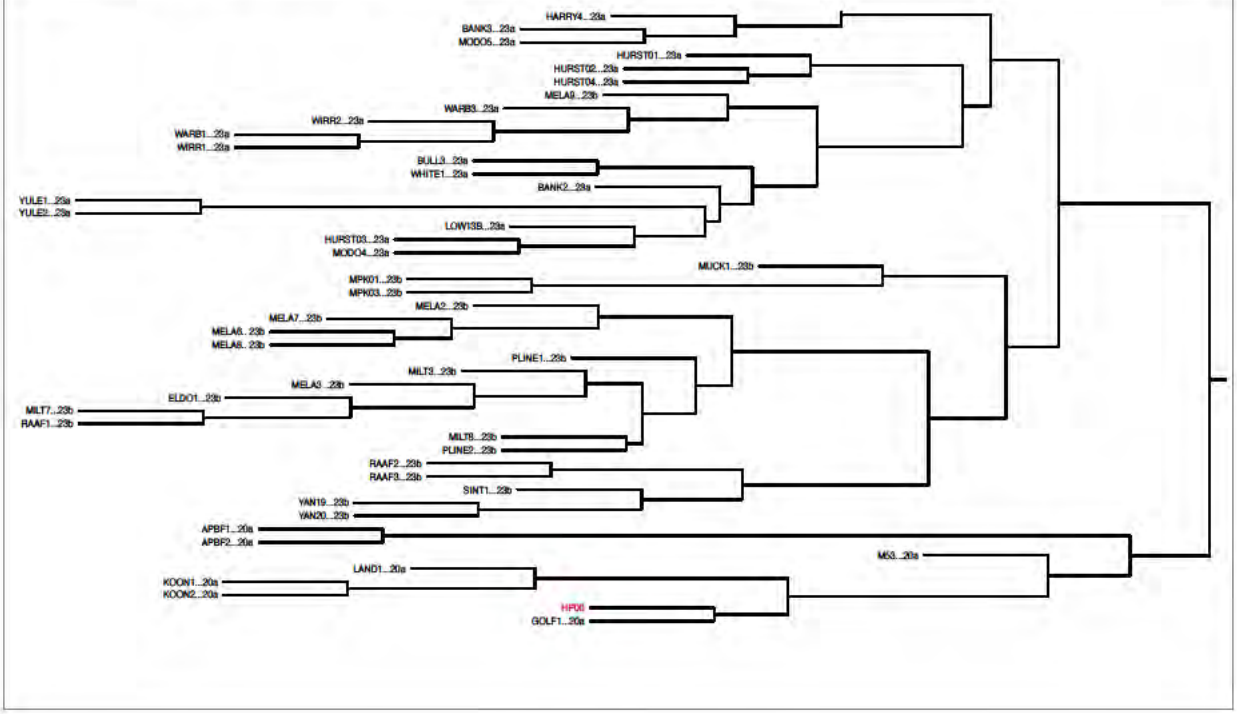
Outside quadrat (30m x 30m): *Banksia attenuata, Conospermum stoechadis* subsp. *stoechadis, Conostylis aurea, Jacksonia furcellata, Macrozamia fraseri, Stylidium schoenoides.*

Photo NW Corner:	
Photo Ground Layer:	

Statistical Analysis: Kulczynski Average



Statistical Analysis: Bray Average



Quadrat HP07

Survey Date 1:	25 September 2024	**Condition:**	Excellent
Survey Date 2:	17 October 2024	**Details:**	Weeds 3% (only due to local disturbed patch in site, otherwise <1%).
Area:	10m x 10m (100m$^{2)}$	**Fire History:**	~5 years.
Surveyor:	Kelli McCreery	**Leaf Litter:**	60% cover; <1-15cm depth.
Location NW:	50J 393350 6478966	**Landform:**	Consolidated dune crest/upper slope.
Datum:	GDA94	**Soil Type:**	Sand, white-grey but yellow at depth.
Accuracy:	3m (0.5m)	**Aspect:**	SE
Other:		**Altitude:**	58m

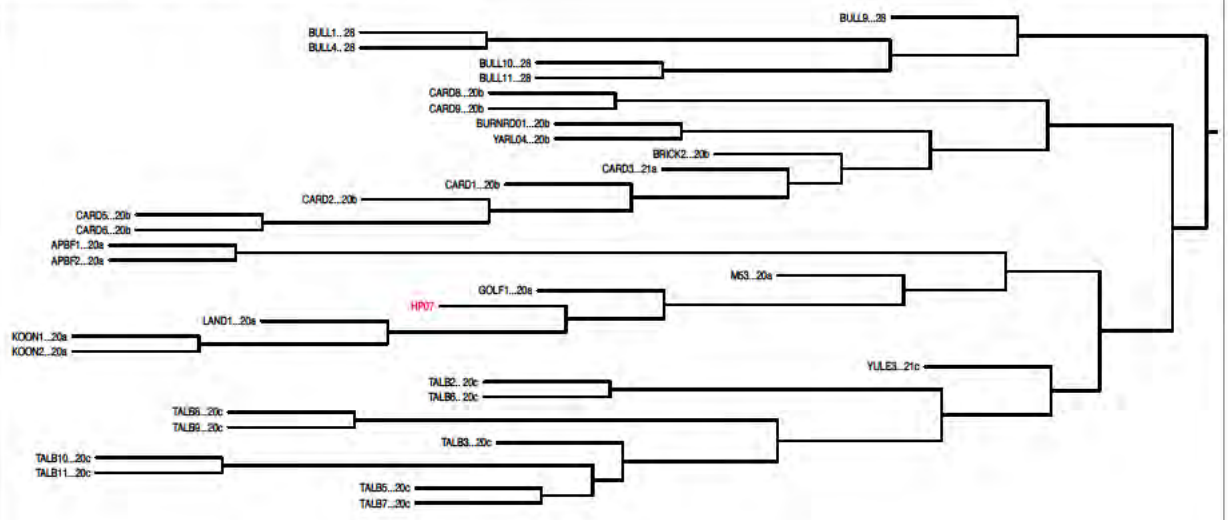
Vegetation NVIS:	**Stratu**	**Form**	**Cover**	**Dominant Species**
	U1	Tree <10m	10-30%	*Banksia attenuata, Banksia menziesii, Nuytsia floribunda.*
	M1	Grasstree 1-2m	0.25-5%	*Xanthorrhoea preissii.*
		Shrub 1-2m	5-10%	*Acacia pulchella* var. *pulchella, Allocasuarina humilis, Jacksonia floribunda Daviesia divaricata* subsp. *divaricata.*
	G1	Shrub 0.5-1m	30-70%	*Eremaea pauciflora* var. *pauciflora, Hibbertia hypericoides* subsp. *hypericoides, Daviesia triflora, , Stirlingia latifolia.*
	G2	Shrub <0.5m	10-30%	*Apectospermum spinescens, Bossiaea eriocarpa, Calytrix flavescens, Hemiandra linearis, Hibbertia striata, Hypocalymma robusta,* mixed diverse.
	G3	Sedge <0.5m	0.25-5%	*Mesomelaena pseudostygia.*
	G4	Rush <0.5m	5-10%	*Alexgeorgea nitens, Hypolaena exsulca, Lyginia barbata.*
	G5	Forbs <0.5m	10-30%	*Patersonia occidentalis* var. *occidentalis, Conostylis aculeata* subsp. *cygnorum, Dasypogon bromeliifolius, Phlebocarya ciliata*, diverse mixed.

Species: *Acacia applanata, Acacia pulchella* var. *pulchella, Acacia sessilis, Alexgeorgea nitens, Allocasuarina humilis, Amphipogon turbinata, Anigozanthos humilis* subsp. *humilis, Apectospermum spinescens, Arnocrinum preissii, Austrostipa compressa, *Avena barbata, Banksia attenuata, Banksia menziesii, Bossiaea eriocarpa, *Brassica tournefortii, *Briza maxima, Burchardia congesta, Caladenia flava* subsp. *flava, Calectasia narragara, Calytrix flavescens, Centrolepis drummondiana, Chaetospora curvifolia, Chamaescilla corymbosa, Conostephium pendulum, Conostylis aculeata* subsp. *cygnorum, Conostylis setigera* subsp. *setigera, Crassula colorata* var. *colorata, Dampiera linearis, Dasypogon bromeliifolius, Daviesia divaricata* subsp. *divaricata, Daviesia triflora, Desmocladus flexuosus, Drosera drummondii, Drosera erythrorhiza, *Ehrharta calycina, *Ehrharta longiflora, Elythranthera brunonis, Eremaea pauciflora* var. *pauciflora, Eriochilus dilatatus, *Ficinia marginata, Gastrolobium capitatum, *Gladiolus caryophyllaceous, Gompholobium confertum, Haemodorum laxum, Hemiandra linearis, Hibbertia hypericoides* subsp. *hypericoides, Hibbertia racemosa, Hibbertia striata, Hovea trisperma, Hybanthus calycinus, Hypocalymma robusta, *Hypochaeris glabra, Hypolaena exsulca, Lepidosperma pubisquameum, Leucopogon polymorphus, Lomandra caespitosa, Lomandra hermaphrodita, Lomandra preissii, Lomandra suaveolens, Lyginia barbata, Mesomelaena pseudostygia, Microtis media* subsp. *media, Nuytsia floribunda, Patersonia occidentalis* var. *occidentalis, *Pentameris pallida, Petrophile linearis, Phlebocarya ciliata, Phyllangium paradoxum, Podotheca angustifolia, Podotheca gnaphalioides, Pterostylis recurva, Pyrorchis nigricans, Quinetia urvillei, Rytidosperma occidentale, Scaevola repens* subsp. *repens, Senecio condylus, *Sonchus oleraceus, Stirlingia latifolia, Stylidium androsaceum, Stylidium schoenoides, Thysanotus arbuscula, Thysanotus manglesianus, Thysanotus sparteus, Trachymene pilosa, *Ursinia anthemoides* subsp. *anthemoides, *Vulpia myuros* forma. *megalura, Wahlenbergia preissii, Xanthorrhoea preissii.*

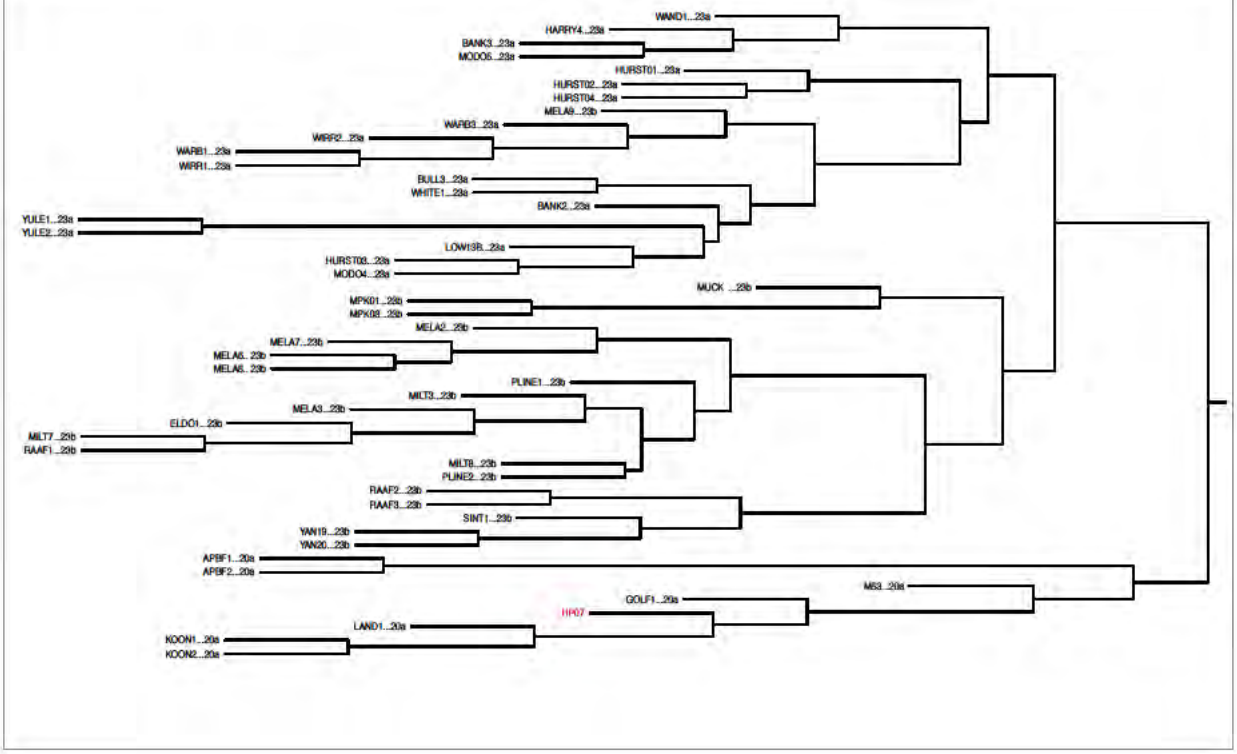
Outside quadrat (30m x 30m): *Caesia micrantha, Conospermum stoechadis* subsp. *stoechadis, Eucalyptus marginata* subsp. *marginata, Haemodorum spicatum, Hibbertia aurea, Jacksonia floribunda, Schoenus clandestinus, Stylidium cygnorum, Tricoryne tenella.*

Photo NW Corner:	
Photo Ground Layer:	

Statistical Analysis: Kulczynski Average



Statistical Analysis: Bray Average



Quadrat HP08

Survey Date 1:	26 September 2024	**Condition:**	Excellent
Survey Date 2:	22 October 2024	**Details:**	Weeds <0.1% cover.
Area:	10m x 10m (100m$^{2)}$	**Fire History:**	>10 years
Surveyor:	Kelli McCreery	**Leaf Litter:**	90% cover; <1-30cm depth.
Location NW:	50J 393600 6479099	**Landform:**	Consolidated dune mid slope.
Datum:	GDA94	**Soil Type:**	Sand, white-grey.
Accuracy:	3m (0.5m)	**Aspect:**	SW
Other:		**Altitude:**	52m

Vegetation NVIS:

Stratum	Form	Cover	Dominant Species
U1	Tree <10m	30-70%	*Banksia attenuata, Banksia menziesii, Eucalyptus todtiana.*
M1	Shrub 1-2m	0.25-5%	*Acacia pulchella* var. *pulchella, Allocasuarina humilis, Jacksonia floribunda.*
G1	Shrub 0.5-1m	10-30%	*Daviesia triflora, Eremaea pauciflora* var. *pauciflora, Hibbertia hypericoides* subsp. *hypericoides, Stirlingia latifolia*, mixed diverse.
G2	Shrub <0.5m	10-30%	*Calytrix flavescens, Hibbertia striata, Bossiaea eriocarpa*, mixed diverse.
G3	Sedge <0.5m	5-10%	*Mesomelaena pseudostygia, Lepidosperma pubisquameum.*
G4	Rush <0.5m	10-30%	*Lyginia barbata, Hypolaena exsulca, Desmocladus flexuosus.*
G5	Forbs <0.5m	10-30%	*Patersonia occidentalis* var. *occidentalis, Conostylis aurea, Dasypogon bromeliifolius, Phlebocarya ciliata, Tricoryne tenella*, diverse mixed.

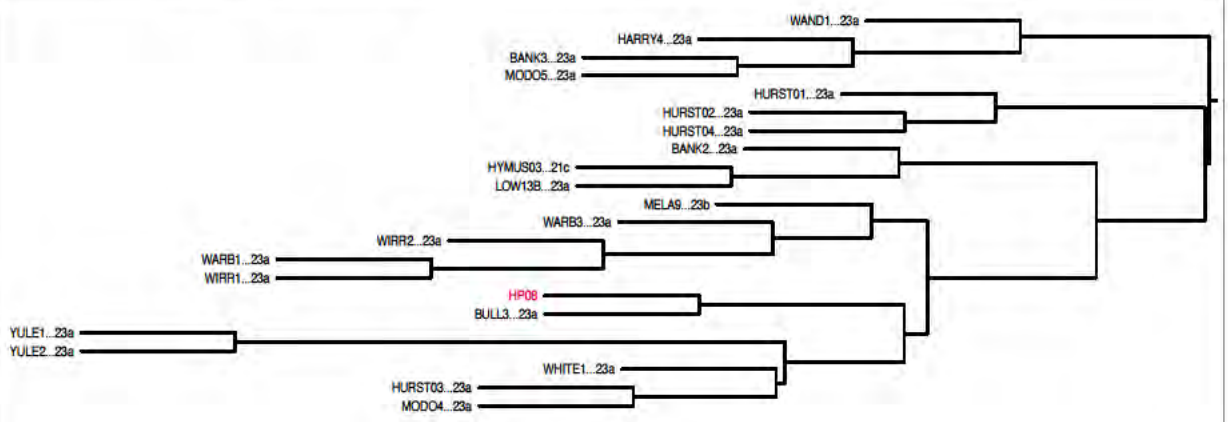
Species:

Acacia pulchella var. *pulchella, Alexgeorgea nitens, Allocasuarina humilis, Amphipogon turbinata, Anigozanthos humilis* subsp. *humilis, Apectospermum spinescens, Arnocrinum preissii, Austrostipa compressa, Banksia attenuata, Banksia menziesii, Bossiaea eriocarpa, Burchardia congesta, Caladenia flava* subsp. *flava, Calytrix flavescens, Cassytha flava, Cassytha pomiformis, Centrolepis drummondiana, Chaetospora curvifolia, Conostephium pendulum, Conostylis aurea, Conostylis juncea, Conostylis setigera* subsp. *setigera, Cyanothamnus ramosus* subsp. *anethifolius, Dampiera linearis, Dasypogon bromeliifolius, Daviesia triflora, Desmocladus flexuosus, Diuris magnifica, Drosera drummondii, Drosera erythrorhiza, Drosera minutiflora, *Ehrharta calycina, Elythranthera brunonis, Eremaea pauciflora* var. *pauciflora, Eriochilus dilatatus, Eucalyptus todtiana, Gastrolobium capitatum, *Gladiolus caryophyllaceous, Gompholobium tomentosum, Haemodorum spicatum, Hibbertia aurea, Hibbertia hypericoides* subsp. *hypericoides, Hibbertia racemosa, Hibbertia striata, Hovea trisperma, Hypocalymma robusta, Hypolaena exsulca, Jacksonia floribunda, Laxmannia ramosa* subsp. *ramosa, Lepidosperma pubisquameum, Lepidosperma striatum, Leucopogon conostephioides, Leucopogon polymorphus, Lomandra hermaphrodita, Lomandra preissii, Lomandra suaveolens, Lyginia barbata, Lyginia imberbis, Macrozamia fraseri, Melaleuca seriata, Mesomelaena pseudostygia, Microtis media* subsp. *media, Patersonia occidentalis* var. *occidentalis, Petrophile linearis, Philotheca spicata, Phlebocarya ciliata, Phyllangium paradoxum, Poranthera microphylla, Poranthera moorokatta P2, Pterostylis vittata, Rytidosperma occidentale, Scaevola repens* subsp. *repens, Stirlingia latifolia, Stylidium brunonianum, Stylidium piliferum, Stylidium repens, Stylidium schoenoides, Styphelia xerophila, Synaphea spinulosa* subsp. *spinulosa, Thysanotus thyrsoideus, Trachymene pilosa, Tricoryne tenella, *Ursinia anthemoides* subsp. *anthemoides, Xanthorrhoea brunonis* subsp. *brunonis.*

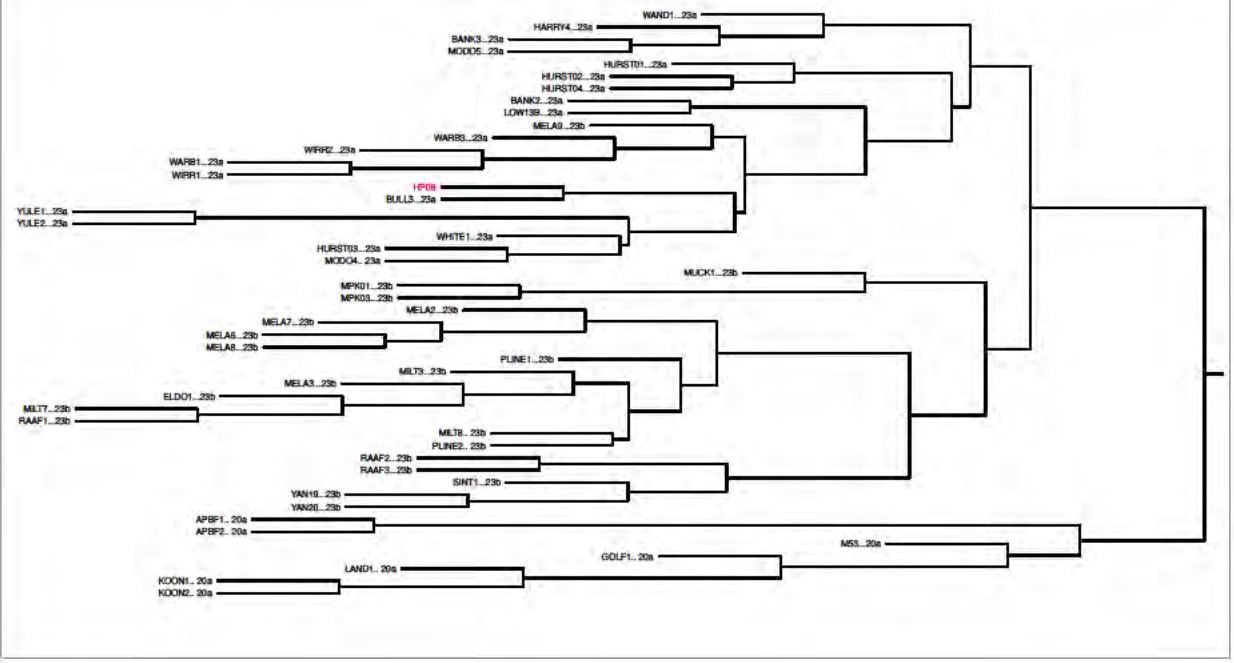
Outside quadrat (30m x 30m): *Conospermum acerosum* subsp. *acerosum, Conospermum stoechadis* subsp. *stoechadis, Thysanotus sparteus, Xanthorrhoea preissii.*

Photo NW Corner:	
Photo Ground Layer:	

Statistical Analysis: Kulczynski Average



Statistical Analysis: Bray Average



Quadrat HP09

Survey Date 1:	26 September 2024	**Condition:**	Very Good
Survey Date 2:	18 October 2024	**Details:**	Weeds <0.5% cover, patchy. Rabbits.
Area:	10m x 10m (100m$^{2)}$	**Fire History:**	~5 years.
Surveyor:	Kelli McCreery	**Leaf Litter:**	40% cover; <1-15cm depth.
Location NW:	50J 393353 6479117	**Landform:**	Consolidated dune upper slope.
Datum:	GDA94	**Soil Type:**	Sand, white-beige, yellow at depth.
Accuracy:	3m (0.5m)	**Aspect:**	ESE
Other:		**Altitude:**	50m

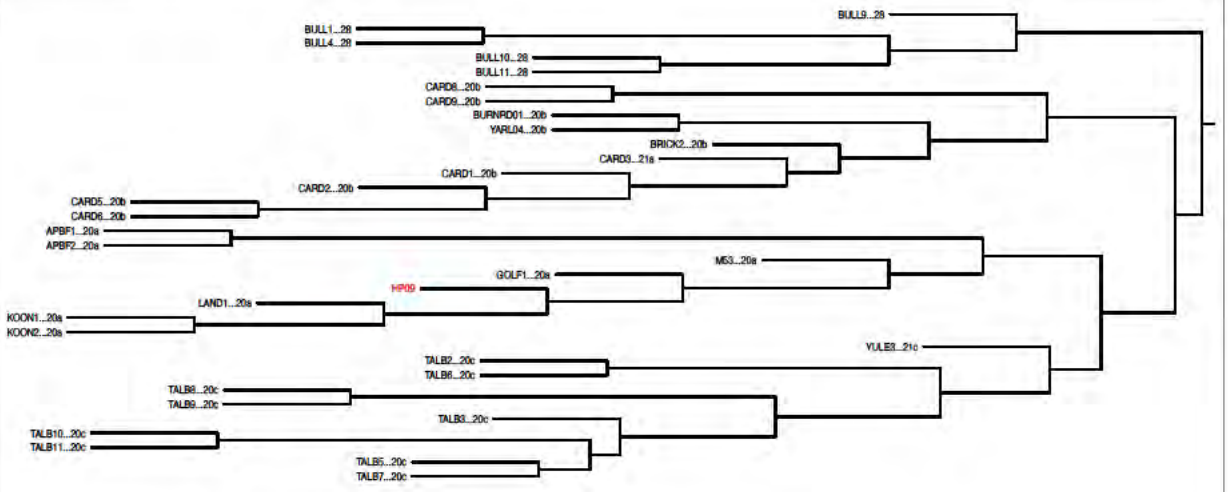
Vegetation NVIS:	**Stratu**	**Form**	**Cover**	**Dominant Species**
	U1	Tree <10m	10-30%	*Banksia attenuata, Banksia menziesii.*
	M1	Shrub 1-2m	5-10%	*Allocasuarina humilis, Jacksonia floribunda.*
	G1	Shrub 0.5-1m	10-30%	*Acacia sessilis, Daviesia nudiflora* subsp. *nudiflora, Daviesia triflora, Eremaea pauciflora* var. *pauciflora, Hibbertia hypericoides* subsp. *hypericoides, Daviesia triflora, Stirlingia latifolia*, mixed diverse.
	G2	Shrub <0.5m	10-30%	*Calytrix flavescens, Pigea calycinus, Hibbertia striata, Bossiaea eriocarpa, Scaevola repens* subsp. *repens,* mixed diverse.
	G3	Sedge <0.5m	10-30%	*Mesomelaena pseudostygia, Schoenus clandestinus.*
	G4	Rush <0.5m	0.25-5%	*Lyginia barbata, Lepidobolus preissianus* subsp. *preissianus.*
	G5	Forbs <0.5m	10-30%	*Patersonia occidentalis* var. *occidentalis, Burchardia congesta, Conostylis aurea, Conostylis setigera* subsp. *setigera, Haemodorum laxum, Stylidium cygnorum,* mixed diverse.

Species: *Acacia applanata, Acacia pulchella* var. *pulchella, Acacia sessilis, *Aira caryophyllea, Alexgeorgea nitens, Allocasuarina humilis, Amphipogon turbinata, Anigozanthos humilis* subsp. *humilis, Arnocrinum preissii, Austrostipa compressa, Banksia attenuata, Banksia menziesii, Bossiaea eriocarpa, Burchardia congesta, Caesia micrantha, Caladenia flava* subsp. *flava, Calandrinia corrigioloides, Calectasia narragara, Calytrix flavescens, *Carpobrotus edulis, Centrolepis drummondiana, Chaetospora curvifolia, Chamaescilla corymbosa, Comesperma calymega, Conospermum stoechadis* subsp. *stoechadis, Conostephium pendulum, Conostylis aurea, Conostylis setigera* subsp. *setigera, Crassula colorata* var. *colorata, Dampiera linearis, Daviesia nudiflora* subsp. *nudiflora, Daviesia triflora, Desmocladus flexuosus, Drosera erythrorhiza, Drosera pallida, Eremaea pauciflora* var. *pauciflora, Eriochilus dilatatus, *Ficinia marginata, Gastrolobium capitatum, *Gladiolus caryophyllaceous, Gompholobium tomentosum, Haemodorum laxum, Hibbertia hypericoides* subsp. *hypericoides, Hibbertia striata, Hovea trisperma, Pigea calycina, *Hypochaeris glabra, Jacksonia floribunda, Lepidobolus preissianus* subsp. *preissianus, Lepidosperma pubisquameum, Lepidosperma striatum, Leucopogon polymorphus, Lomandra caespitosa, Lomandra hermaphrodita, Lomandra preissii, Lyginia barbata, Mesomelaena pseudostygia, Millotia tenuifolia* var. *laevis, Patersonia occidentalis* var. *occidentalis, *Pentameris pallida, Petrophile linearis, Philotheca spicata, Phyllangium paradoxum, Pimelea sulphurea, Poranthera moorokatta P2, Rytidosperma occidentale, Scaevola repens* subsp. *repens, Schoenus clandestinus, *Sonchus oleraceus, Stirlingia latifolia, Stylidium androsaceum, Stylidium cygnorum, Stylidium neurophyllum, Stylidium piliferum, Thysanotus sparteus, Trachymene pilosa, Tricoryne tenella, *Ursinia anthemoides* subsp. *anthemoides, *Vulpia myuros* forma. *megalura, Wahlenbergia preissii, Xanthosia huegelii.*

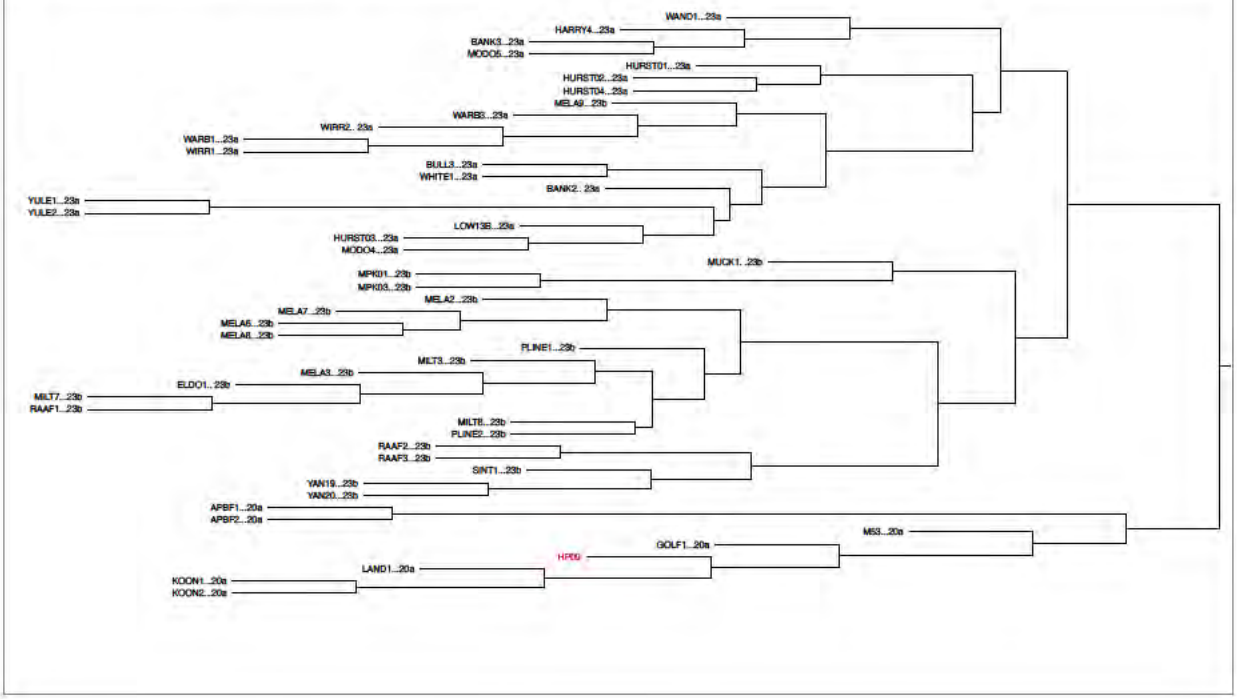
Outside quadrat (30m x 30m): *Calytrix angulata, Daviesia divaricata* subsp. *divaricata, Eucalyptus marginata* subsp. *marginata, Laxmannia squarrosa, Nuytsia floribunda, Xanthorrhoea preissii.*

Photo NW Corner:	
Photo Ground Layer:	

Statistical Analysis: Kulczynski Average



Statistical Analysis: Bray Average



Quadrat HP10

Survey Date 1:	30 September 2024	**Condition:**	Excellent (Very Good in patches)
Survey Date 2:	18 October 2024	**Details:**	Weeds <0.3% cover.
Area:	10m x 10m (100m$^{2)}$	**Fire History:**	>10 years
Surveyor:	Kelli McCreery	**Leaf Litter:**	95% cover; <1-20cm depth.
Location NW:	50J 393420 6479116	**Landform:**	Consolidated dune lower slope.
Datum:	GDA94	**Soil Type:**	Sand, grey.
Accuracy:	3m (0.5m)	**Aspect:**	SE
Other:		**Altitude:**	46m

Vegetation NVIS:

Stratu	Form	Cover	Dominant Species
U1	Tree <10m	30-70%	*Banksia attenuata, Banksia menziesii, Eucalyptus todtiana, Nuytsia floribunda, (Banksia ilicifolia, Melaleuca preissiana).*
M1	Shrub 1-2m	0.25-5%	*Jacksonia floribunda*
G1	Shrub 0.5-1m	0.25-5%	*Bossiaea eriocarpa, Eremaea pauciflora* var. *pauciflora, Gompholobium tomentosum.*
G2	Shrub <0.5m	30-70%	*Calytrix flavescens,, Hibbertia subvaginata, Hovea pungens, Melaleuca seriata, Styphelia conostephioides, Scholtzia involucrata,* mixed diverse.
G3	Rush <0.5m	5-10%	*Alexgeorgea nitens, Desmocladus flexuosus, Lyginia barbata, Lyginia imberbis.*
G4	Forbs <0.5m	10-30%	*Patersonia occidentalis* var. *occidentalis, Phlebocarya ciliata, Conostylis aurea, Dasypogon bromeliifolius, Stylidium repens.*

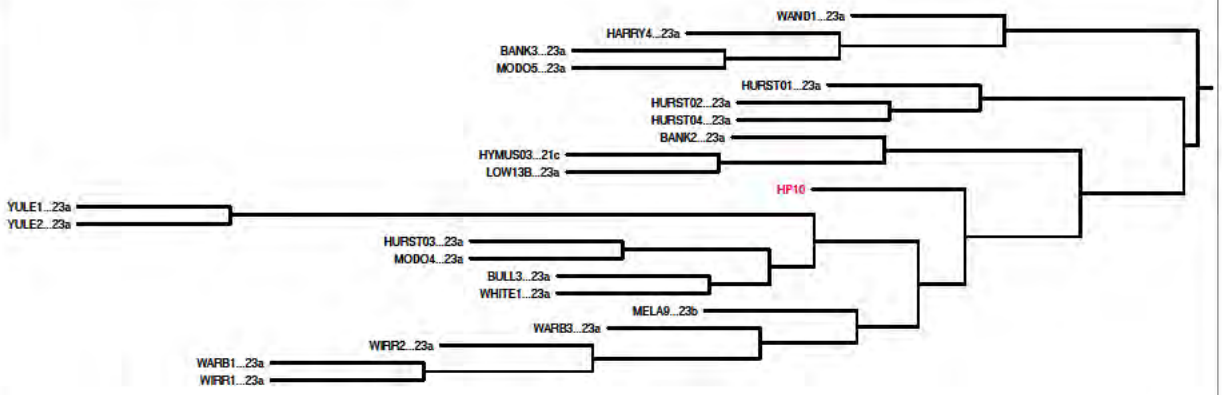
Species:

Acacia pulchella var. *pulchella, Alexgeorgea nitens, Amphipogon turbinata, Arnocrinum preissii, Austrostipa compressa, Banksia attenuata, Banksia menziesii, Bossiaea eriocarpa, *Briza maxima, Burchardia congesta, Caladenia flava* subsp. *flava, Calytrix flavescens, Calytrix fraseri, Centrolepis drummondiana, Chaetospora curvifolia, Conostephium minus, Conostylis juncea, Cyanothamnus ramosus* subsp. *anethifolius, Dampiera linearis, Dasypogon bromeliifolius, Desmocladus flexuosus, *Disa bracteata, Drosera erythrorhiza, *Ehrharta calycina, Elythranthera brunonis, Eremaea pauciflora* var. *pauciflora, Eriochilus dilatatus, Eucalyptus todtiana, *Gladiolus caryophyllaceous, Gompholobium tomentosum, Haemodorum spicatum, Hensmania turbinata, *Hesperantha falcata, Hibbertia aurea, Hibbertia subvaginata, Hovea pungens, *Hypochaeris glabra, Jacksonia floribunda, Laxmannia ramosa* subsp. *ramosa, Lomandra caespitosa, Lomandra hermaphrodita, Lomandra preissii, Lomandra suaveolens, Lyginia barbata, Lyginia imberbis, Melaleuca seriata, Microlaena stipoides, Microtis media* subsp. *media, Nuytsia floribunda, Opercularia vaginata, Patersonia occidentalis* var. *occidentalis, Persoonia saccata, Petrophile linearis, Phlebocarya ciliata, Phyllangium paradoxum, Prasophyllum parvifolium, Pterostylis recurva, Scholtzia involucrata, Stylidium brunonianum, Stylidium repens, Styphelia conostephioides, Thysanotus arbuscula, Thysanotus thyrsoideus, Trachymene pilosa, *Ursinia anthemoides* subsp. *anthemoides.*

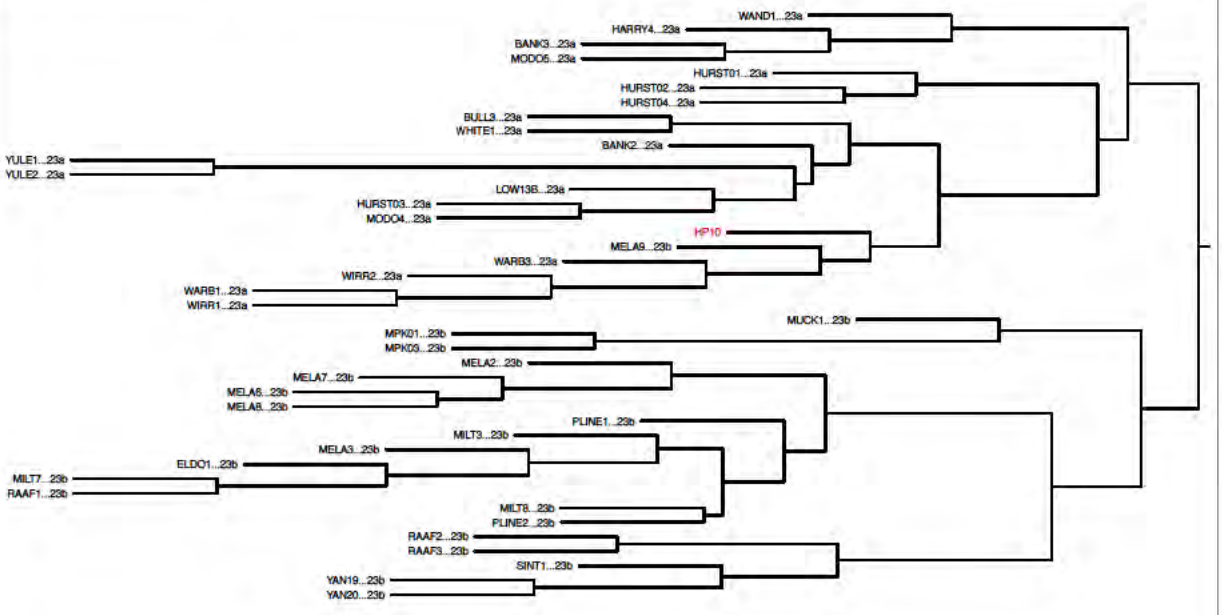
Outside quadrat (30m x 30m): *Banksia ilicifolia, Calytrix angulata, Diuris magnifica, Jacksonia furcellata, Lechenaultia floribunda, Macrozamia fraseri, Melaleuca preissiana, Verticordia nitens, Xanthorrhoea preissii.*

Photo NW Corner:	
Photo Ground Layer:	

Statistical Analysis: Kulczynski Average



Statistical Analysis: Bray Average



Quadrat HP11

Survey Date 1:	24 September 2024	**Condition:**	Very Good
Survey Date 2:	22 October 2024	**Details:**	Weeds 2% cover.
Area:	10m x 10m (100m$^{2)}$	**Fire History:**	>10 years
Surveyor:	Kelli McCreery	**Leaf Litter:**	70% cover; <1-10cm depth.
Location NW:	50J 393581 6478929	**Landform:**	Consolidated dune, lower slope.
Datum:	GDA94	**Soil Type:**	Sand, white-grey.
Accuracy:	3m (0.5m)	**Aspect:**	NE
Other:		**Altitude:**	44m

Vegetation NVIS:

Stratu	Form	Cover	Dominant Species
U1	Tree <10m	30-70%	*Banksia attenuata, Banksia ilicifolia, Banksia menziesii, Melaleuca preissiana.*
G1	Shrub 0.5-1m	0.25-5%	*Acacia pulchella* var. *pulchella, Bossiaea eriocarpa, Gompholobium tomentosum.*
G2	Shrub <0.5m	30-70%	*Hibbertia subvaginata, Scholtzia involucrata, Styphelia conostephioides, Styphelia polymorphus.*
G3	Rush <0.5m	5-10%	*Lyginia barbata.*
G4	Forbs <0.5m	30-70%	*Dasypogon bromeliifolius, Patersonia occidentalis* var. *occidentalis, Phlebocarya ciliata, Stylidium repens, Trachymene pilosa.*

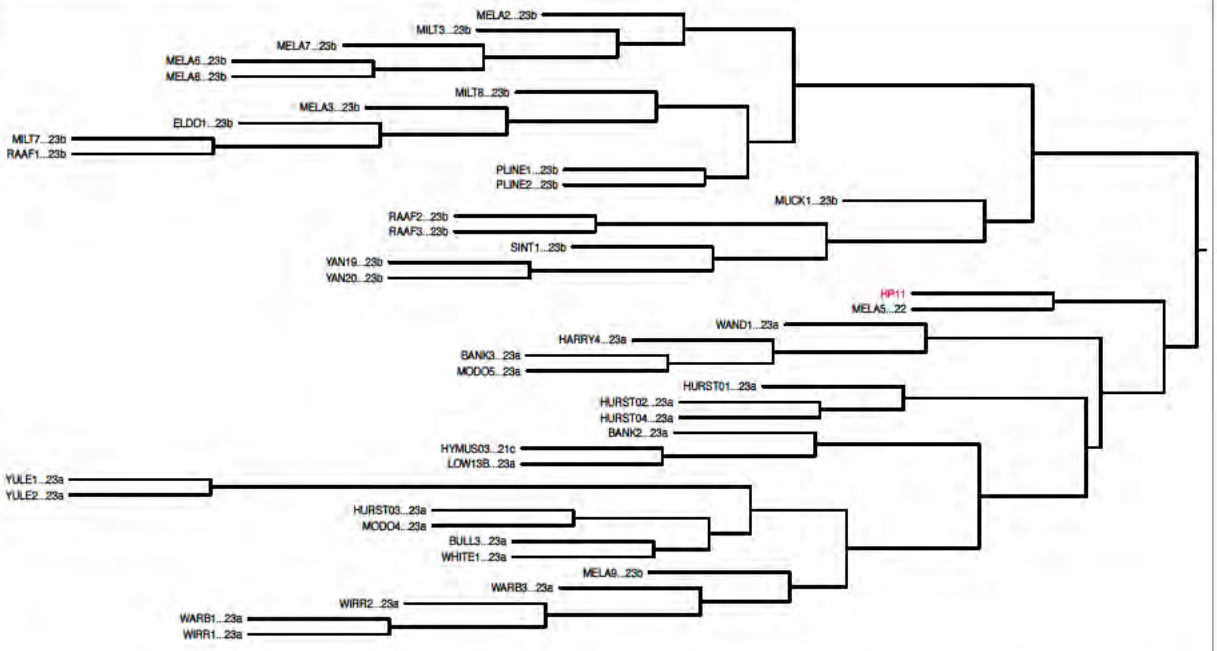
Species:

Acacia pulchella var. *pulchella, Alexgeorgea nitens, Arnocrinum preissii, Austrostipa compressa, Banksia attenuata, Banksia ilicifolia, Banksia menziesii, Bossiaea eriocarpa, *Briza maxima, Burchardia congesta, Caladenia flava* subsp. *flava, Calytrix flavescens, Calytrix fraseri, Centrolepis drummondiana, Chamaescilla corymbosa, Conostylis juncea, Cyanothamnus ramosus* subsp. *anethifolius, Dampiera linearis, Dasypogon bromeliifolius, *Disa bracteata, Diuris magnifica, Drosera erythrorhiza, *Ehrharta calycina, *Ehrharta longiflora, Elythranthera brunonis, Eriochilus dilatatus, *Ficinia marginata, *Gladiolus caryophyllaceous, Gompholobium tomentosum, Haemodorum spicatum, Hensmania turbinata, Hibbertia aurea, Hibbertia hypericoides* subsp. *hypericoides, Hibbertia subvaginata, Homalosciadium homalocarpum, Hovea pungens, Hyalosperma cotula, *Hypochaeris glabra, Hypolaena exsulca, Jacksonia floribunda, Lechenaultia floribunda, Leporella fimbriata, Styphelia conostephioides, Styphelia polymorphus, Lomandra caespitosa, Lomandra hermaphrodita, Lomandra preissii, Lomandra suaveolens, Lyginia barbata, Melaleuca preissiana, Melaleuca seriata, Microtis media* subsp. *media, Nuytsia floribunda, Patersonia occidentalis* var. *occidentalis, Phlebocarya ciliata, Phyllangium paradoxum, Platytheca galioides, Podotheca gnaphalioides, Prasophyllum parvifolium, Scholtzia involucrata, Stylidium repens, Styphelia conostephioides, Styphelia polymorphus, Thelymitra graminea, Thysanotus thyrsoideus, Trachymene pilosa, *Ursinia anthemoides* subsp. *anthemoides, *Vulpia myuros* forma. *megalura, Waitzia suaveolens* var. *suaveolens, Xanthorrhoea preissii, Xanthosia huegelii.*

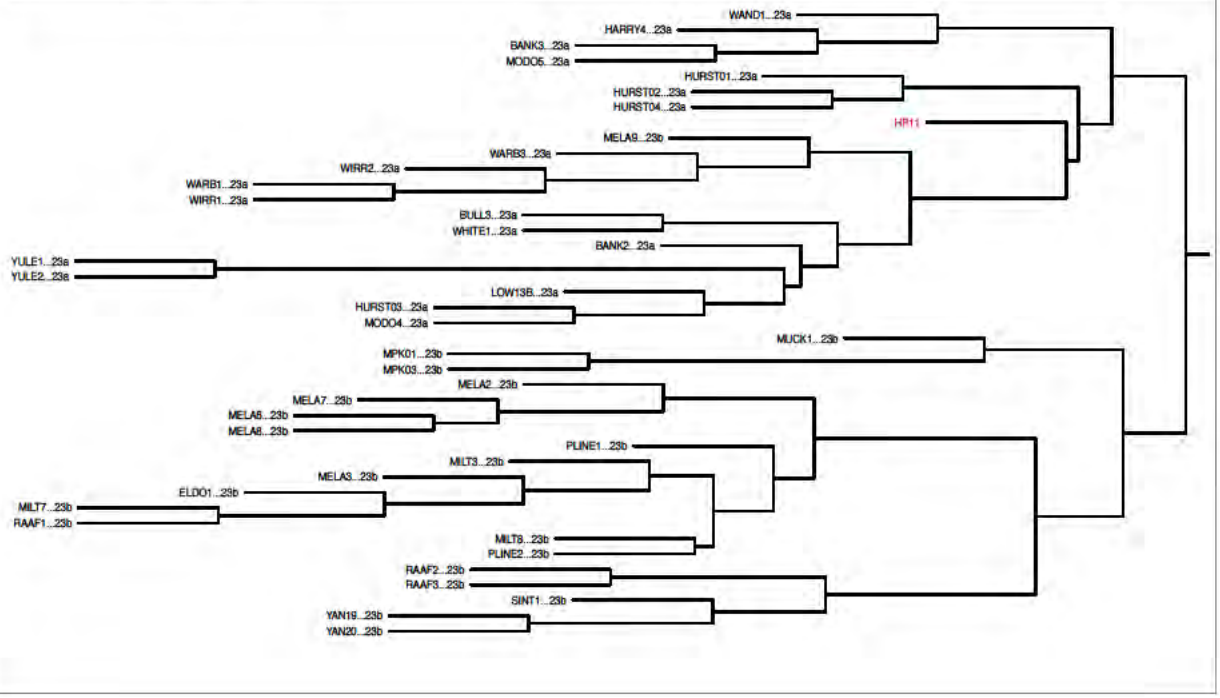
Outside quadrat (30m x 30m): *Chaetospora curvifolia, Drosera drummondii, Eremaea pauciflora* var. *pauciflora, Lyginia imberbis, Petrophile linearis, Stylidium androsaceum, Stylidium brunonianum, Verticordia nitens.*

Photo NW Corner:	
Photo Ground Layer:	

Statistical Analysis: Kulczynski Average



Statistical Analysis: Bray Average



Quadrat HP12

Survey Date 1:	17 October 2024	**Condition:**	Excellent
Survey Date 2:	-	**Details:**	Weeds <1% cover.
Area:	10m x 10m (100m$^{2)}$	**Fire History:**	~5 years.
Surveyor:	Kelli McCreery	**Leaf Litter:**	80% cover; <1-20cm depth.
Location NW:	50J 393375 6478912	**Landform:**	Consolidated dune mid-slope.
Datum:	GDA94	**Soil Type:**	Sand, grey, orange at depth.
Accuracy:	3m (0.5m)	**Aspect:**	SE
Other:		**Altitude:**	46m

Vegetation NVIS:

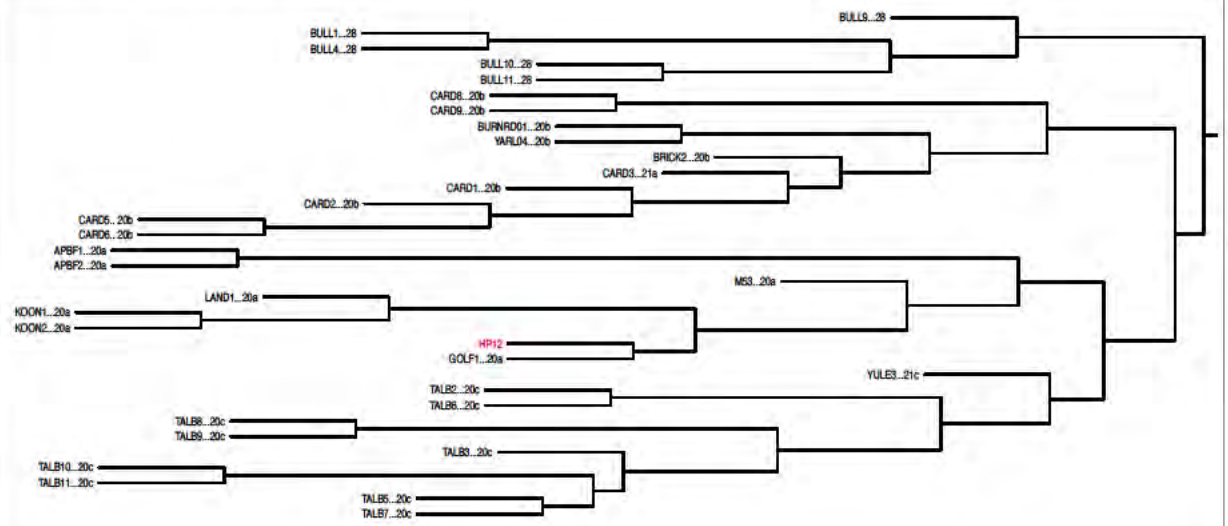
Stratu	Form	Cover	Dominant Species
U1	Tree <10m	10-30%	*Banksia attenuata, Banksia menziesii, Eucalyptus marginata* subsp. *marginata.*
M1	Grasstree 1-2m	10-30%	*Xanthorrhoea preissii.*
G1	Shrub 0.5-1m	10-30%	*Allocasuarina humilis, Conospermum stoechadis* subsp. *stoechadis, Jacksonia floribunda, Stirlingia latifolia.*
G2	Shrub <0.5m	10-30%	*Acacia sessilis, Daviesia triflora, Gompholobium tomentosum, Petrophile linearis, Scaevola repens* subsp. *repens.*
G3	Sedge <0.5m	0.25-5%	*Mesomelaena pseudostygia.*
G4	Rush <0.5m	0.25-5%	*Lyginia barbata.*
G5	Grass <0.5m	0.25-5%	*Amphipogon turbinata.*
G5	Forbs <0.5m	10-30%	*Dasypogon bromeliifolius, Patersonia occidentalis* var. *occidentalis, Phlebocarya ciliata*, mixed diverse.

Species: *Acacia applanata, Acacia sessilis, *Aira caryophyllea, Alexgeorgea nitens, Allocasuarina humilis, Amphipogon turbinata, Austrostipa compressa, Banksia attenuata, Banksia menziesii, *Briza maxima, Burchardia congesta, Caladenia flava* subsp. *flava, *Carpobrotus edulis, Centrolepis drummondiana, Chamaescilla corymbosa, Comesperma calymega, Conospermum stoechadis* subsp. *stoechadis, Conostylis aculeata* subsp. *cygnorum, Conostylis setigera* subsp. *setigera, Corynotheca micrantha, Dampiera linearis, Dasypogon bromeliifolius, Daviesia triflora, Desmocladus fascicularis, Desmocladus flexuosus, Diuris magnifica, Drosera erythrorhiza, *Ehrharta calycina, Elythranthera brunonis, Eucalyptus marginata* subsp. *marginata, *Ficinia marginata, Gastrolobium capitatum, *Gladiolus caryophyllaceous, Gompholobium tomentosum, Haemodorum laxum, Haemodorum spicatum, Hibbertia hypericoides* subsp. *hypericoides, Hibbertia striata, Homalosciadium homalocarpum, Hovea trisperma, Hyalosperma cotula, Hybanthus calycinus, *Hypochaeris glabra, Hypolaena exsulca, Isotropis cuneifolia* subsp. *cuneifolia, Jacksonia floribunda, Kennedia prostrata, Lagenophora huegelii, Lepidobolus preissianus* subsp. *preissianus, Lepidosperma calcicola, Lepidosperma striatum, Leucopogon polymorphus, Lomandra caespitosa, Lomandra hermaphrodita, Lomandra preissii, Lomandra suaveolens, Lyginia imberbis, Macarthuria australis, Macrozamia fraseri, Mesomelaena pseudostygia, Microtis media* subsp. *media, Monotaxis grandiflora* var. *grandiflora, Patersonia occidentalis* var. *occidentalis, Petrophile linearis, Phlebocarya ciliata, Phyllangium paradoxum, Poranthera microphylla, Pterostylis recurva, Pyrorchis nigricans, Rytidosperma occidentale, Scaevola repens* subsp. *repens, Schoenus clandestinus, *Sonchus oleraceus, Stirlingia latifolia, Stylidium androsaceum, Styphelia pallida, Thysanotus sparteus, Thysanotus thyrsoideus, Trachymene pilosa, *Ursinia anthemoides* subsp. *anthemoides, Wahlenbergia preissii, Waitzia suaveolens* var. *suaveolens, Xanthorrhoea preissii.*

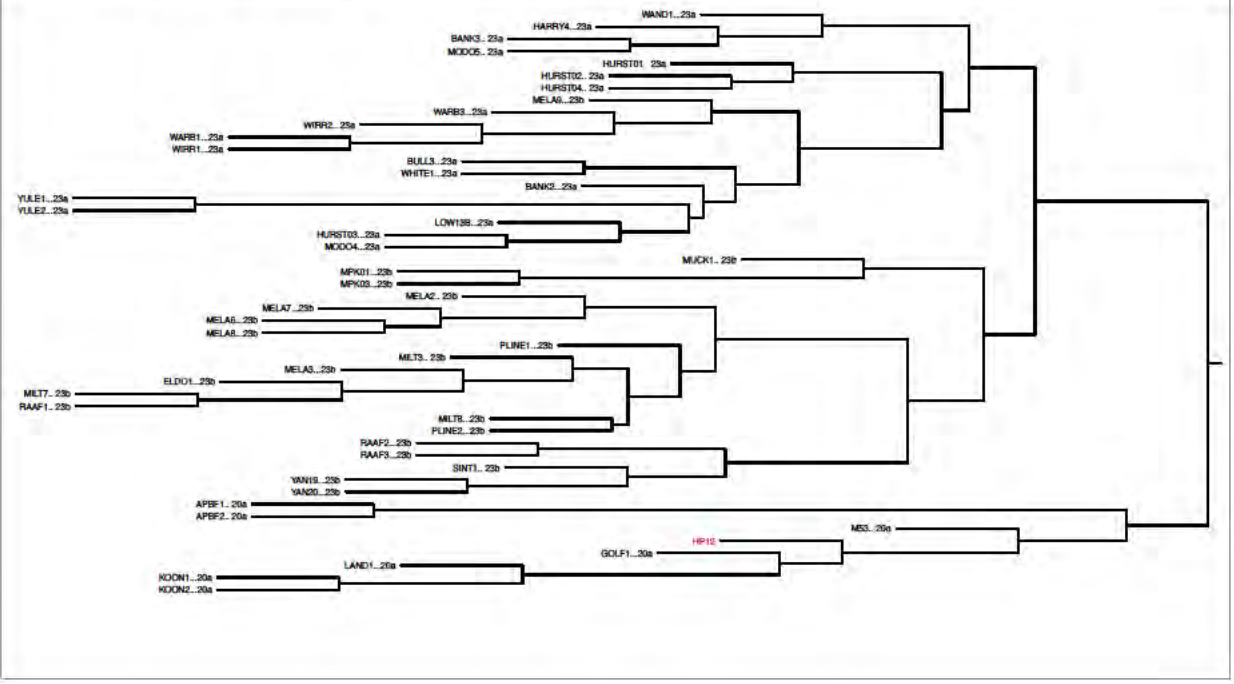
Outside quadrat (30m x 30m): *Anigozanthos humilis* subsp. *humilis, Bossiaea eriocarpa, *Briza minor, Caesia micrantha, Conostylis aurea, Daviesia divaricata* subsp. *divaricata, Daviesia nudiflora* subsp. *nudiflora, Eremaea pauciflora* var. *pauciflora, Eucalyptus todtiana, Hemiandra linearis, Jacksonia sternbergiana, Podotheca gnaphalioides, Stylidium piliferum.*

Photo NW Corner:	
Photo Ground Layer:	

Statistical Analysis: Kulczynski Average



Statistical Analysis: Bray Average



RELEVE HPR01

Survey Date:	17 October 2024	**Condition:**	Excellent
Surveyor:	Kelli McCreery	**Details:**	Weeds <0.5% cover.
Location:	50J 393484 6478906	**Fire History:**	>10
Datum:	GDA94	**Landform:**	Consolidated dune mid slope.
Accuracy:	3m (0.5m)	**Soil Type:**	Sand, white-grey over orange.

Vegetation NVIS:

Stratum	Form	Cover	Dominant Species
U1	Tree <10m	10-30%	*Banksia attenuata, B. menziesii, Eucalyptus m.* ssp. *marginata, Eucalyptus todtiana.*
M1	Grasstree 1-2m	10-30%	*Xanthorrhoea preissii*
M2	Shrub 1-2m	0.25-5%	*Acacia p.* var. *pulchella, Allocasuarina humilis, Jacksonia floribunda*
G1	Shrub 0.5-1m	10-30%	*Eremaea pauciflora* var. *pauciflora, Hibbertia h.* subsp. *hypericoides*
G2	Shrub <0.5m	10-30%	*Gompholobium tomentosum, Bossiaea eriocarpa*, mixed diverse.
G3	Sedge <0.5m	0.25-5%	*Mesomelaena pseudostygia.*
G4	Grass <0.5m	0.25-5%	*Amphipogon turbinatus*
G5	Forbs <0.5m	10-30%	*Patersonia occidentalis* var. *occidentalis.*

Species: *Acacia p.* var. *pulchella, Alexgeorgea nitens, Allocasuarina humilis, Amphipogon turbinata, Austrostipa compressa, Banksia attenuata, Banksia menziesii, Bossiaea eriocarpa, Burchardia congesta, Calytrix flavescens, Chaetospora curvifolia, Chamaescilla corymbosa, Dampiera linearis, Dasypogon bromeliifolius, Desmocladus fascicularis, Desmocladus flexuosus, Diuris magnifica, Drosera erythrorhiza, Eremaea p.* var. *pauciflora, Eucalyptus todtiana, *Gladiolus caryophyllaceous, Gompholobium tomentosum, Haemodorum laxum, Haemodorum spicatum, Hibbertia h.* subsp. *hypericoides, Hibbertia striata, Hovea trisperma, Hypocalymma robusta, Hypolaena exsulca, Jacksonia floribunda, Lechenaultia floribunda, Levenhookia stipitata, Lomandra hermaphrodita, Lyginia imberbis, Nuytsia floribunda, Patersonia o.* var. *occidentalis, Petrophile linearis, Phlebocarya ciliata, Phyllangium paradoxum, Pyrorchis nigricans, Stirlingia latifolia, Stylidium androsaceum, Stylidium piliferum, Thelymitra crinita, Thysanotus arbuscula, Trachymene pilosa, Tricoryne elatior, *Ursinia a.* subsp. *anthemoides, Xanthorrhoea preissii.*

Photo:

RELEVE HPR02

Survey Date:	17 October 2024			**Condition:**	Excellent
Surveyor:	Kelli McCreery			**Details:**	<0.1% cover weeds, localised disturbance.
Location:	50J 393571 6478975			**Fire History:**	>10 years.
Datum:	GDA94			**Landform:**	Dampland basin, wettest point.
Accuracy:	3m (0.5m)			**Soil Type:**	Sand, white-grey peaty damp.
Vegetation NVIS:	**Stratu**	**Form**	**Cover**	**Dominant Species**	
	U1	Tree <10m	70-100%	*Banksia attenuata, Banksia ilicifolia, Banksia menziesii, Melaleuca preissiana*	
	M1	Shrub >2m	0.25-5%	*Adenanthos cygnorum* var. *cygnorum*	
	M2	Shrub 1-2m	30-70%	*Astartea affinis, Regelia ciliata, Hypocalymma balbakiae.*	
	G1	Shrub <0.5m	0.25-5%	*Euchilopsis linearis, Hibbertia subvaginata, Platytheca galioides, Styphelia conostephioides.*	
	G2	Sedge <0.5m	0.25-5%	*Baumea arthrophylla, Schoenus caespititius.*	
	G3	Rush <0.5m	0.25-5%	*Hypolaena exsulca, Lyginia imberbis.*	
	G4	Forbs <0.5m	0.25-5%	*Mixed as collected.*	

Species: *Adenanthos cygnorum* subsp. *cygnorum, Astartea scoparia, Banksia attenuata, Banksia ilicifolia, Banksia menziesii, Dampiera linearis, Euchilopsis linearis, Gompholobium tomentosum, Hibbertia striata, Hibbertia subvaginata, Hovea trisperma, Hypocalymma balbakiae, Hypolaena exsulca, Leucopogon conostephioides, Lomandra hermaphrodita, Lomandra suaveolens, Lyginia imberbis, Machaerina arthrophylla, Melaleuca preissiana, Microtis media* subsp. *media, Patersonia occidentalis* var. *occidentalis, Phlebocarya ciliata, Platysace filiformis, Platytheca galioides, Pterostylis recurva, Regelia ciliata, Schoenus caespititius, Stylidium repens, Thelymitra graminea, Thysanotus thyrsoideus, Trachymene pilosa.*

Photo:

Appendix D: Points of Interest

Item	Species	Location	No.
Condition (spot)	Completely Degraded (CD)	50J 393615 6479156	
Condition (spot)	Completely Degraded (CD)	50J 393496 6479158	
Condition (spot)	Degraded (D)	50J 393686 6478998	
Condition (spot)	Degraded (D)	50J 393686 6479022	
Condition (spot)	Degraded (D)	50J 393404 6478960	
Condition (spot)	Degraded (D)	50J 393470 6478941	
Condition (spot)	Degraded (D)	50J 393505 6478960	
Condition (spot)	Degraded (D)	50J 393684 6478975	
Condition (spot)	Degraded (D)	50J 393517 6479154	
Condition (spot)	Degraded (D)	50J 393421 6479022	
Condition (spot)	Degraded (D)	50J 393386 6479015	
Condition (spot)	Degraded (D)	50J 393329 6478919	
Condition (spot)	Degraded (D)	50J 393323 6479059	
Condition (spot)	Degraded (D)	50J 393326 6479099	
Condition (spot)	Degraded (D)	50J 393326 6479049	
Condition (spot)	Degraded (D)	50J 393427 6479137	
Condition (spot)	Degraded (D)	50J 393455 6479013	
Condition (spot)	Degraded (D)	50J 393348 6479027	
Condition (spot)	Degraded (D)	50J 393348 6478946	
Condition (spot)	Degraded (D)	50J 393356 6478924	
Condition (spot)	Degraded (D)	50J 393389 6479011	
Condition (spot)	Degraded (D)	50J 393580 6478974	
Condition (spot)	Degraded (D)	50J 393334 6479012	
Condition (spot)	Degraded (D)	50J 393382 6478982	
Condition (spot)	Degraded (D)	50J 393512 6478960	
Condition (spot)	Degraded (D)	50J 393347 6478921	
Condition (spot)	Degraded (D)	50J 393415 6478969	
Condition (spot)	Degraded (D)	50J 393361 6479157	
Condition (spot)	Degraded (D)	50J 393396 6478957	
Condition (spot)	Degraded (D)	50J 393362 6478946	
Condition (spot)	Degraded (D)	50J 393346 6478945	
Condition (spot)	Degraded (D)	50J 393336 6479012	
Condition (spot)	Degraded (D)	50J 393325 6479113	
Condition (spot)	Degraded (D)	50J 393518 6479019	
Condition (spot)	Degraded (D)	50J 393449 6479022	
Condition (spot)	Degraded (D)	50J 393418 6479015	
Condition (spot)	Degraded (D)	50J 393686 6478998	
Condition (spot)	Degraded (D)	50J 393470 6478941	
Condition (spot)	Degraded (D)	50J 393505 6478960	
Condition (spot)	Degraded (D)	50J 393329 6478919	
Condition (spot)	Degraded (D)	50J 393323 6479059	
Condition (spot)	Degraded (D)	50J 393326 6479099	
Condition (spot)	Excellent (EX)	50J 393522 6479077	
Condition (spot)	Excellent (EX)	50J 393531 6479065	
Condition (spot)	Excellent (EX)	50J 393570 6479098	
Condition (spot)	Excellent (EX)	50J 393671 6479129	
Condition (spot)	Excellent (EX)	50J 393441 6479142	
Condition (spot)	Excellent (EX)	50J 393542 6479113	
Condition (spot)	Excellent (EX)	50J 393526 6479132	
Condition (spot)	Excellent (EX)	50J 393348 6479116	
Condition (spot)	Excellent (EX)	50J 393645 6479055	
Condition (spot)	Excellent (EX)	50J 393564 6478999	
Condition (spot)	Excellent (EX)	50J 393441 6479120	

Item	Species	Location	No.
Condition (spot)	Excellent (EX)	50J 393614 6479028	
Condition (spot)	Excellent (EX)	50J 393622 6478974	
Condition (spot)	Excellent (EX)	50J 393648 6479102	
Condition (spot)	Excellent (EX)	50J 393520 6479141	
Condition (spot)	Excellent (EX)	50J 393642 6479131	
Condition (spot)	Excellent (EX)	50J 393556 6479029	
Condition (spot)	Excellent (EX)	50J 393653 6478983	
Condition (spot)	Excellent (EX)	50J 393477 6479126	
Condition (spot)	Excellent (EX)	50J 393487 6479050	
Condition (spot)	Excellent (EX)	50J 393600 6479099	
Condition (spot)	Excellent (EX)	50J 393353 6479117	
Condition (spot)	Excellent (EX)	50J 393420 6479116	
Condition (spot)	Excellent (EX)	50J 393375 6478912	
Condition (spot)	Excellent (EX)	50J 393484 6478906	
Condition (spot)	Excellent (EX)	50J 393504 6479000	
Condition (spot)	Excellent (EX)	50J 393531 6479065	
Condition (spot)	Excellent (EX)	50J 393344 6479110	
Condition (spot)	Excellent (EX)	50J 393632 6478998	
Condition (spot)	Excellent (EX)	50J 393605 6478958	
Condition (spot)	Excellent (EX)	50J 393626 6478971	
Condition (spot)	Excellent (EX)	50J 393555 6479091	
Condition (spot)	Excellent (EX)	50J 393672 6479148	
Condition (spot)	Excellent (EX)	50J 393468 6479126	
Condition (spot)	Excellent (EX)	50J 393543 6478959	
Condition (spot)	Excellent (EX)	50J 393516 6479112	
Condition (spot)	Excellent (EX)	50J 393593 6479135	
Condition (spot)	Excellent (EX)	50J 393575 6479109	
Condition (spot)	Excellent (EX)	50J 393636 6479102	
Condition (spot)	Excellent (EX)	50J 393646 6479096	
Condition (spot)	Excellent (EX)	50J 393626 6479109	
Condition (spot)	Excellent (EX)	50J 393616 6479116	
Condition (spot)	Excellent (EX)	50J 393604 6479128	
Condition (spot)	Excellent (EX)	50J 393540 6479044	
Condition (spot)	Excellent (EX)	50J 393528 6479060	
Condition (spot)	Excellent (EX)	50J 393531 6479065	
Condition (spot)	Excellent (EX)	50J 393591 6479103	
Condition (spot)	Excellent (EX)	50J 393577 6479033	
Condition (spot)	Excellent (EX)	50J 393540 6479044	
Condition (spot)	Excellent (EX)	50J 393597 6479026	
Condition (spot)	Excellent (EX)	50J 393645 6479055	
Condition (spot)	Excellent (EX)	50J 393646 6479068	
Condition (spot)	Excellent (EX)	50J 393610 6479057	
Condition (spot)	Excellent (EX)	50J 393593 6478961	
Condition (spot)	Excellent (EX)	50J 393655 6478952	
Condition (spot)	Excellent (EX)	50J 393649 6478959	
Condition (spot)	Excellent (EX)	50J 393635 6478961	
Condition (spot)	Excellent (EX)	50J 393606 6479064	
Condition (spot)	Excellent (EX)	50J 393665 6479066	
Condition (spot)	Excellent (EX)	50J 393500 6479068	
Condition (spot)	Excellent (EX)	50J 393621 6479059	
Condition (spot)	Excellent (EX)	50J 393400 6478908	
Condition (spot)	Excellent (EX)	50J 393473 6479042	
Condition (spot)	Excellent (EX)	50J 393335 6478897	

Item	Species	Location	No.
Condition (spot)	Excellent (EX)	50J 393594 6478958	
Condition (spot)	Excellent (EX)	50J 393410 6479101	
Condition (spot)	Excellent (EX)	50J 393462 6479104	
Condition (spot)	Excellent (EX)	50J 393609 6479135	
Condition (spot)	Excellent (EX)	50J 393626 6479121	
Condition (spot)	Excellent (EX)	50J 393395 6479107	
Condition (spot)	Excellent (EX)	50J 393670 6479056	
Condition (spot)	Excellent (EX)	50J 393519 6479100	
Condition (spot)	Excellent (EX)	50J 393388 6479070	
Condition (spot)	Excellent (EX)	50J 393549 6479036	
Condition (spot)	Excellent (EX)	50J 393364 6478907	
Condition (spot)	Excellent (EX)	50J 393449 6478906	
Condition (spot)	Excellent (EX)	50J 393645 6479099	
Condition (spot)	Excellent (EX)	50J 393373 6478977	
Condition (spot)	Excellent (EX)	50J 393589 6478968	
Condition (spot)	Excellent (EX)	50J 393408 6478916	
Condition (spot)	Excellent (EX)	50J 393600 6479076	
Condition (spot)	Excellent (EX)	50J 393431 6478966	
Condition (spot)	Excellent (EX)	50J 393554 6478958	
Condition (spot)	Excellent (EX)	50J 393397 6478924	
Condition (spot)	Excellent (EX)	50J 393557 6479075	
Condition (spot)	Excellent (EX)	50J 393401 6479143	
Condition (spot)	Excellent (EX)	50J 393415 6478957	
Condition (spot)	Excellent (EX)	50J 393535 6479082	
Condition (spot)	Excellent (EX)	50J 393416 6478940	
Condition (spot)	Excellent (EX)	50J 393459 6479146	
Condition (spot)	Excellent (EX)	50J 393534 6479081	
Condition (spot)	Excellent (EX)	50J 393459 6478950	
Condition (spot)	Excellent (EX)	50J 393510 6479124	
Condition (spot)	Excellent (EX)	50J 393486 6479134	
Condition (spot)	Excellent (EX)	50J 393482 6479083	
Condition (spot)	Excellent (EX)	50J 393436 6478950	
Condition (spot)	Excellent (EX)	50J 393563 6479148	
Condition (spot)	Excellent (EX)	50J 393563 6479136	
Condition (spot)	Excellent (EX)	50J 393387 6479063	
Condition (spot)	Excellent (EX)	50J 393422 6478948	
Condition (spot)	Excellent (EX)	50J 393522 6479064	
Condition (spot)	Excellent (EX)	50J 393585 6479046	
Condition (spot)	Excellent (EX)	50J 393497 6479124	
Condition (spot)	Excellent (EX)	50J 393370 6479128	
Condition (spot)	Excellent (EX)	50J 393346 6479126	
Condition (spot)	Excellent (EX)	50J 393484 6478906	
Condition (spot)	Excellent (EX)	50J 393341 6479032	
Condition (spot)	Excellent (EX)	50J 393441 6479142	
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Condition (spot)	Excellent (EX)	50J 393520 6479141	
Condition (spot)	Excellent (EX)	50J 393642 6479131	
Condition (spot)	Excellent (EX)	50J 393556 6479029	
Condition (spot)	Excellent (EX)	50J 393653 6478983	
Condition (spot)	Excellent (EX)	50J 393477 6479126	
Condition (spot)	Excellent (EX)	50J 393487 6479050	
Condition (spot)	Excellent (EX)	50J 393600 6479099	
Condition (spot)	Excellent (EX)	50J 393353 6479117	

Item	Species	Location	No.
Condition (spot)	Excellent (EX)	50J 393420 6479116	
Condition (spot)	Excellent (EX)	50J 393375 6478912	
Condition (spot)	Excellent (EX)	50J 393484 6478906	
Condition (spot)	Excellent (EX)	50J 393504 6479000	
Condition (spot)	Excellent (EX)	50J 393468 6479126	
Condition (spot)	Excellent (EX)	50J 393543 6478959	
Condition (spot)	Excellent (EX)	50J 393516 6479112	
Condition (spot)	Excellent (EX)	50J 393577 6479033	
Condition (spot)	Excellent (EX)	50J 393597 6479026	
Condition (spot)	Good (G)	50J 393435 6479040	
Condition (spot)	Good (G)	50J 393613 6478894	
Condition (spot)	Good (G)	50J 393693 6479083	
Condition (spot)	Good (G)	50J 393425 6479018	
Condition (spot)	Good (G)	50J 393383 6479011	
Condition (spot)	Good (G)	50J 393434 6479040	
Condition (spot)	Good (G)	50J 393322 6479045	
Condition (spot)	Good (G)	50J 393561 6478909	
Condition (spot)	Good (G)	50J 393527 6478936	
Condition (spot)	Good (G)	50J 393442 6479071	
Condition (spot)	Good (G)	50J 393438 6479026	
Condition (spot)	Good (G)	50J 393419 6479130	
Condition (spot)	Good (G)	50J 393525 6479150	
Condition (spot)	Good (G)	50J 393443 6479035	
Condition (spot)	Good (G)	50J 393335 6479156	
Condition (spot)	Good (G)	50J 393349 6478933	
Condition (spot)	Good (G)	50J 393326 6479112	
Condition (spot)	Good (G)	50J 393646 6478896	
Condition (spot)	Good (G)	50J 393655 6478898	
Condition (spot)	Good (G)	50J 393559 6478909	
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Condition (spot)	Good (G)	50J 393498 6479145	
Condition (spot)	Good (G)	50J 393425 6479021	
Condition (spot)	Good (G)	50J 393687 6478988	
Condition (spot)	Good (G)	50J 393453 6479079	
Condition (spot)	Good (G)	50J 393449 6479010	
Condition (spot)	Good (G)	50J 393684 6479002	
Condition (spot)	Good (G)	50J 393411 6479012	
Condition (spot)	Good (G)	50J 393398 6479005	
Condition (spot)	Good (G)	50J 393684 6479031	
Condition (spot)	Good (G)	50J 393456 6479000	
Condition (spot)	Good (G)	50J 393676 6479054	
Condition (spot)	Good (G)	50J 393402 6478968	
Condition (spot)	Good (G)	50J 393389 6478885	
Condition (spot)	Good (G)	50J 393383 6478954	
Condition (spot)	Good (G)	50J 393691 6479129	
Condition (spot)	Good (G)	50J 393334 6478959	
Condition (spot)	Good (G)	50J 393694 6479040	
Condition (spot)	Good (G)	50J 393333 6478966	
Condition (spot)	Good (G)	50J 393680 6479068	
Condition (spot)	Good (G)	50J 393446 6479019	
Condition (spot)	Good (G)	50J 393414 6479012	
Condition (spot)	Good (G)	50J 393485 6478945	
Condition (spot)	Good (G)	50J 393430 6479009	

Item	Species	Location	No.
Condition (spot)	Good (G)	50J 393554 6478930	
Condition (spot)	Good (G)	50J 393613 6478894	
Condition (spot)	Very Good (VG)	50J 393345 6479035	
Condition (spot)	Very Good (VG)	50J 393635 6479031	
Condition (spot)	Very Good (VG)	50J 393440 6478928	
Condition (spot)	Very Good (VG)	50J 393430 6479036	
Condition (spot)	Very Good (VG)	50J 393611 6478919	
Condition (spot)	Very Good (VG)	50J 393513 6478932	
Condition (spot)	Very Good (VG)	50J 393374 6479037	
Condition (spot)	Very Good (VG)	50J 393350 6478966	
Condition (spot)	Very Good (VG)	50J 393581 6478929	
Condition (spot)	Very Good (VG)	50J 393385 6478941	
Condition (spot)	Very Good (VG)	50J 393622 6479015	
Condition (spot)	Very Good (VG)	50J 393683 6479007	
Condition (spot)	Very Good (VG)	50J 393430 6479036	
Condition (spot)	Very Good (VG)	50J 393565 6478912	
Condition (spot)	Very Good (VG)	50J 393524 6478933	
Condition (spot)	Very Good (VG)	50J 393482 6478942	
Condition (spot)	Very Good (VG)	50J 393694 6479058	
Condition (spot)	Very Good (VG)	50J 393523 6479143	
Condition (spot)	Very Good (VG)	50J 393396 6479018	
Condition (spot)	Very Good (VG)	50J 393445 6479076	
Condition (spot)	Very Good (VG)	50J 393449 6479039	
Condition (spot)	Very Good (VG)	50J 393336 6478988	
Condition (spot)	Very Good (VG)	50J 393332 6478996	
Condition (spot)	Very Good (VG)	50J 393446 6478985	
Condition (spot)	Very Good (VG)	50J 393694 6479093	
Condition (spot)	Very Good (VG)	50J 393602 6479155	
Condition (spot)	Very Good (VG)	50J 393412 6479041	
Condition (spot)	Very Good (VG)	50J 393377 6479001	
Condition (spot)	Very Good (VG)	50J 393516 6478924	
Condition (spot)	Very Good (VG)	50J 393393 6479040	
Condition (spot)	Very Good (VG)	50J 393337 6479110	
Condition (spot)	Very Good (VG)	50J 393394 6478997	
Condition (spot)	Very Good (VG)	50J 393643 6478899	
Condition (spot)	Very Good (VG)	50J 393410 6478895	
Condition (spot)	Very Good (VG)	50J 393536 6478909	
Condition (spot)	Very Good (VG)	50J 393334 6479040	
Condition (spot)	Very Good (VG)	50J 393427 6478997	
Condition (spot)	Very Good (VG)	50J 393352 6478896	
Condition (spot)	Very Good (VG)	50J 393333 6478925	
Condition (spot)	Very Good (VG)	50J 393399 6478984	
Condition (spot)	Very Good (VG)	50J 393688 6479137	
Condition (spot)	Very Good (VG)	50J 393425 6479100	
Condition (spot)	Very Good (VG)	50J 393374 6478985	
Condition (spot)	Very Good (VG)	50J 393689 6479077	
Condition (spot)	Very Good (VG)	50J 393593 6479081	
Condition (spot)	Very Good (VG)	50J 393424 6478968	
Condition (spot)	Very Good (VG)	50J 393671 6479108	
Condition (spot)	Very Good (VG)	50J 393374 6478964	
Condition (spot)	Very Good (VG)	50J 393376 6479154	
Condition (spot)	Very Good (VG)	50J 393409 6478951	
Condition (spot)	Very Good (VG)	50J 393355 6479153	

Item	Species	Location	No.
Condition (spot)	Very Good (VG)	50J 393334 6478954	
Condition (spot)	Very Good (VG)	50J 393342 6479001	
Condition (spot)	Very Good (VG)	50J 393402 6479133	
Condition (spot)	Very Good (VG)	50J 393415 6479080	
Condition (spot)	Very Good (VG)	50J 393340 6479072	
Condition (spot)	Very Good (VG)	50J 393550 6478897	
Condition (spot)	Very Good (VG)	50J 393678 6478915	
Condition (spot)	Very Good (VG)	50J 393353 6478918	
Condition (spot)	Very Good (VG)	50J 393556 6478910	
Condition (spot)	Very Good (VG)	50J 393329 6479062	
Condition (spot)	Very Good (VG)	50J 393449 6479051	
Condition (spot)	Very Good (VG)	50J 393684 6478965	
Condition (spot)	Very Good (VG)	50J 393570 6478909	
Condition (spot)	Very Good (VG)	50J 393356 6479059	
Condition (spot)	Very Good (VG)	50J 393352 6479139	
Condition (spot)	Very Good (VG)	50J 393355 6479027	
Condition (spot)	Very Good (VG)	50J 393661 6479027	
Condition (spot)	Very Good (VG)	50J 393615 6478911	
Condition (spot)	Very Good (VG)	50J 393358 6479059	
Condition (spot)	Very Good (VG)	50J 393410 6479141	
Condition (spot)	Very Good (VG)	50J 393355 6479019	
Condition (spot)	Very Good (VG)	50J 393672 6478992	
Condition (spot)	Very Good (VG)	50J 393633 6478923	
Condition (spot)	Very Good (VG)	50J 393415 6479067	
Condition (spot)	Very Good (VG)	50J 393466 6479151	
Condition (spot)	Very Good (VG)	50J 393398 6479020	
Condition (spot)	Very Good (VG)	50J 393638 6478975	
Condition (spot)	Very Good (VG)	50J 393550 6478920	
Condition (spot)	Very Good (VG)	50J 393443 6479061	
Condition (spot)	Very Good (VG)	50J 393518 6478951	
Condition (spot)	Very Good (VG)	50J 393499 6479142	
Condition (spot)	Very Good (VG)	50J 393455 6479022	
Condition (spot)	Very Good (VG)	50J 393641 6478947	
Condition (spot)	Very Good (VG)	50J 393658 6478929	
Condition (spot)	Very Good (VG)	50J 393678 6479066	
Condition (spot)	Very Good (VG)	50J 393510 6479138	
Condition (spot)	Very Good (VG)	50J 393362 6479007	
Condition (spot)	Very Good (VG)	50J 393536 6478950	
Condition (spot)	Very Good (VG)	50J 393362 6478936	
Condition (spot)	Very Good (VG)	50J 393537 6479146	
Condition (spot)	Very Good (VG)	50J 393466 6479038	
Condition (spot)	Very Good (VG)	50J 393343 6479010	
Condition (spot)	Very Good (VG)	50J 393495 6478952	
Condition (spot)	Very Good (VG)	50J 393407 6479121	
Condition (spot)	Very Good (VG)	50J 393429 6479122	
Condition (spot)	Very Good (VG)	50J 393335 6479121	
Condition (spot)	Very Good (VG)	50J 393332 6479139	
Condition (spot)	Very Good (VG)	50J 393427 6479006	
Condition (spot)	Very Good (VG)	50J 393557 6478933	
Condition (spot)	Very Good (VG)	50J 393374 6479037	
Condition (spot)	Very Good (VG)	50J 393350 6478966	
Condition (spot)	Very Good (VG)	50J 393581 6478929	
Condition (spot)	Very Good (VG)	50J 393524 6478933	

Item	Species	Location	No.
Condition (spot)	Very Good (VG)	50J 393430 6479036	
P2 Flora	*Millotia tenuifolia* var. *laevis*	50J 393353 6479117	30
P2 Flora	*Millotia tenuifolia* var. *laevis*	50J 393374 6479037	30
P2 Flora	*Millotia tenuifolia* var. *laevis*	50J 393348 6479124	30
P2 Flora	*Poranthera moorokatta*	50J 393353 6479117	1
P2 Flora	*Poranthera moorokatta*	50J 393363 6479110	1
P2 Flora	*Poranthera moorokatta*	50J 393374 6479037	1
P2 Flora	*Poranthera moorokatta*	50J 393381 6479030	1
P2 Flora	*Poranthera moorokatta*	50J 393575 6479109	1
P2 Flora	*Poranthera moorokatta*	50J 393592 6479092	7
P2 Flora	*Poranthera moorokatta*	50J 393600 6479099	1
P2 Flora	*Poranthera moorokatta*	50J 393602 6479095	40
P2 Flora	*Poranthera moorokatta*	50J 393604 6479128	30
P2 Flora	*Poranthera moorokatta*	50J 393609 6479104	7
P2 Flora	*Poranthera moorokatta*	50J 393616 6479116	20
P2 Flora	*Poranthera moorokatta*	50J 393626 6479109	5
P2 Flora	*Poranthera moorokatta*	50J 393636 6479102	20
P2 Flora	*Poranthera moorokatta*	50J 393642 6479131	1
P2 Flora	*Poranthera moorokatta*	50J 393646 6479096	15
P2 Flora	*Poranthera moorokatta*	50J 393646 6479125	50
P2 Flora	*Poranthera moorokatta*	50J 393649 6478959	3
P2 Flora	*Poranthera moorokatta*	50J 393653 6478983	1
P2 Flora	*Poranthera moorokatta*	50J 393663 6478978	10
Quadrat	HP01 NE	50J 393653 6479131	
Quadrat	HP01 NW	50J 393642 6479131	
Quadrat	HP01 SE	50J 393653 6479123	
Quadrat	HP01 SW	50J 393643 6479122	
Quadrat	HP02 NE	50J 393566 6479028	
Quadrat	HP02 NW	50J 393556 6479029	
Quadrat	HP02 SE	50J 393567 6479017	
Quadrat	HP02 SW	50J 393557 6479018	
Quadrat	HP03 NE	50J 393663 6478983	
Quadrat	HP03 NW	50J 393653 6478983	
Quadrat	HP03 SE	50J 393663 6478973	
Quadrat	HP03 SW	50J 393652 6478973	
Quadrat	HP04 NE	50J 393487 6479126	
Quadrat	HP04 NW	50J 393477 6479126	
Quadrat	HP04 SE	50J 393487 6479117	
Quadrat	HP04 SW	50J 393477 6479116	
Quadrat	HP05 NE	50J 393497 6479050	
Quadrat	HP05 NW	50J 393487 6479050	
Quadrat	HP05 SE	50J 393497 6479041	
Quadrat	HP05 SW	50J 393487 6479041	
Quadrat	HP06 NE	50J 393383 6479040	
Quadrat	HP06 NW	50J 393374 6479037	
Quadrat	HP06 SE	50J 393386 6479029	
Quadrat	HP06 SW	50J 393375 6479028	
Quadrat	HP07 NE	50J 393359 6478967	
Quadrat	HP07 NW	50J 393350 6478966	
Quadrat	HP07 SE	50J 393359 6478956	
Quadrat	HP07 SW	50J 393350 6478956	
Quadrat	HP08 NE	50J 393608 6479100	
Quadrat	HP08 NW	50J 393600 6479099	

Item	Species	Location	No.
Quadrat	HP08 SE	50J 393608 6479091	
Quadrat	HP08 SW	50J 393600 6479091	
Quadrat	HP09 NE	50J 393364 6479117	
Quadrat	HP09 NW	50J 393353 6479117	
Quadrat	HP09 SE	50J 393365 6479107	
Quadrat	HP09 SW	50J 393353 6479107	
Quadrat	HP10 NE	50J 393433 6479117	
Quadrat	HP10 NW	50J 393420 6479116	
Quadrat	HP10 SE	50J 393431 6479106	
Quadrat	HP10 SW	50J 393420 6479107	
Quadrat	HP11 NE	50J 393589 6478929	
Quadrat	HP11 NW	50J 393581 6478929	
Quadrat	HP11 SE	50J 393592 6478920	
Quadrat	HP11 SW	50J 393580 6478920	
Quadrat	HP12 NE	50J 393386 6478913	
Quadrat	HP12 NW	50J 393375 6478912	
Quadrat	HP12 SE	50J 393386 6478903	
Quadrat	HP12 SW	50J 393376 6478903	
Releve	HPR01	50J 393484 6478906	
Releve	HPR02	50J 393571 6478975	
Rubbish	Camp with rubbish and weedy Degraded patch.	50J 393511 6479022	
Rubbish	Asbestos-like material ca. 1kg	50J 393663 6478962	
Rubbish	Asbestos-like material ca. 5kg	50 J 393605 6478983	
Rubbish	Bottles	50J 393620 6479148	
Rubbish	Concrete	50J 393655 6479114	
Rubbish	Old car	50J 393613 6479013	
Weeds	**Acacia longiflora* var. *sophorae*	50J 393506 6479075	
Weeds	**Aira caryophyllea*	50J 393375 6478912	
Weeds	**Aira caryophyllea*	50J 393353 6479117	
Weeds	**Aira caryophyllea*	50J 393374 6479037	
Weeds	**Aira caryophyllea*	50J 393653 6478983	
Weeds	**Aira caryophyllea*	50J 393642 6479131	
Weeds	**Arctotheca calendula*	50J 393653 6478983	
Weeds	**Arctotheca calendula*	50J 393323 6479059	
Weeds	**Arctotheca calendula*	50J 393404 6478960	
Weeds	**Avena barbata*	50J 393350 6478966	
Weeds	**Avena barbata*	50J 393327 6479124	
Weeds	**Avena barbata*	50J 393502 6479140	
Weeds	**Avena barbata*	50J 393323 6479059	
Weeds	**Avena barbata*	50J 393404 6478960	
Weeds	**Avena barbata*	50J 393326 6479049	
Weeds	**Avena barbata*	50J 393490 6479160	
Weeds	**Brassica tournefortii*	50J 393615 6479156	20
Weeds	**Brassica tournefortii*	50J 393350 6478966	
Weeds	**Brassica tournefortii*	50J 393327 6479124	
Weeds	**Brassica tournefortii*	50J 393323 6479059	
Weeds	**Brassica tournefortii*	50J 393577 6478889	
Weeds	**Brassica tournefortii*	50J 393387 6478950	1
Weeds	**Brassica tournefortii*	50J 393326 6479049	
Weeds	**Brassica tournefortii*	50J 393438 6479160	
Weeds	**Brassica tournefortii*	50J 393416 6479158	
Weeds	**Brassica tournefortii*	50J 393345 6479158	
Weeds	**Briza maxima*	50J 393430 6479036	

Item	Species	Location	No.
Weeds	**Briza maxima*	50J 393611 6478919	
Weeds	**Briza maxima*	50J 393375 6478912	
Weeds	**Briza maxima*	50J 393581 6478929	
Weeds	**Briza maxima*	50J 393420 6479116	
Weeds	**Briza maxima*	50J 393350 6478966	
Weeds	**Briza maxima*	50J 393374 6479037	
Weeds	**Briza maxima*	50J 393487 6479050	
Weeds	**Briza maxima*	50J 393653 6478983	
Weeds	**Briza maxima*	50J 393642 6479131	
Weeds	**Briza maxima*	50J 393327 6479124	
Weeds	**Briza maxima*	50J 393502 6479140	
Weeds	**Briza maxima*	50J 393323 6479059	
Weeds	**Briza maxima*	50J 393561 6478909	
Weeds	**Briza maxima*	50J 393404 6478960	
Weeds	**Briza maxima*	50J 393326 6479049	
Weeds	**Briza maxima*	50J 393686 6479022	
Weeds	**Briza maxima*	50J 393490 6479160	
Weeds	**Briza minor*	50J 393375 6478912	
Weeds	**Bromus diandrus*	50J 393323 6479059	
Weeds	**Bromus diandrus*	50J 393329 6478973	
Weeds	**Bromus diandrus*	50J 393444 6478959	
Weeds	**Carpobrotus edulis*	50J 393375 6478912	
Weeds	**Carpobrotus edulis*	50J 393353 6479117	
Weeds	**Carpobrotus edulis*	50J 393400 6479037	
Weeds	**Carpobrotus edulis*	50J 393382 6478950	
Weeds	**Centranthus macrosiphon*	50J 393679 6478894	
Weeds	**Centranthus macrosiphon*	50J 393678 6478889	
Weeds	**Centranthus macrosiphon*	50J 393681 6478889	
Weeds	**Centranthus macrosiphon*	50J 393695 6478921	
Weeds	**Centranthus macrosiphon*	50J 393685 6478893	
Weeds	**Centranthus macrosiphon*	50J 393685 6478897	
Weeds	**Centranthus macrosiphon*	50J 393684 6478894	
Weeds	**Cerastium glomeratum*	50J 393556 6479029	
Weeds	**Chamelaucium uncinatum*	50J 393642 6479131	
Weeds	**Chamelaucium uncinatum*	50J 393648 6479136	
Weeds	**Chamelaucium uncinatum*	50J 393490 6479160	
Weeds	**Conyza bonariensis*	50J 393404 6478960	
Weeds	**Crassula glomerata*	50J 393577 6478889	
Weeds	**Crassula thunbergiana* var. *thunbergiana*	50J 393577 6478889	
Weeds	**Crepis foetida* subsp. *foetida*	50J 393326 6479049	
Weeds	**Cynodon dactylon*	50J 393327 6479157	
Weeds	**Disa bracteata*	50J 393581 6478929	
Weeds	**Disa bracteata*	50J 393420 6479116	
Weeds	**Disa bracteata*	50J 393487 6479050	
Weeds	**Disa bracteata*	50J 393653 6478983	
Weeds	**Disa bracteata*	50J 393473 6478904	
Weeds	**Disa bracteata*	50J 393593 6478961	
Weeds	**Dischisma arenaria*	50J 393407 6479158	
Weeds	**Ehrharta calycina*	50J 393684 6478975	10
Weeds	**Ehrharta calycina*	50J 393430 6479036	
Weeds	**Ehrharta calycina*	50J 393375 6478912	
Weeds	**Ehrharta calycina*	50J 393581 6478929	
Weeds	**Ehrharta calycina*	50J 393420 6479116	

Item	Species	Location	No.
Weeds	**Ehrharta calycina*	50J 393600 6479099	
Weeds	**Ehrharta calycina*	50J 393350 6478966	
Weeds	**Ehrharta calycina*	50J 393374 6479037	
Weeds	**Ehrharta calycina*	50J 393487 6479050	
Weeds	**Ehrharta calycina*	50J 393487 6479050	
Weeds	**Ehrharta calycina*	50J 393653 6478983	
Weeds	**Ehrharta calycina*	50J 393642 6479131	
Weeds	**Ehrharta calycina*	50J 393327 6479124	
Weeds	**Ehrharta calycina*	50J 393359 6479139	
Weeds	**Ehrharta calycina*	50J 393502 6479140	
Weeds	**Ehrharta calycina*	50J 393512 6479022	
Weeds	**Ehrharta calycina*	50J 393382 6478950	1-5%
Weeds	**Ehrharta calycina*	50J 393686 6478998	
Weeds	**Ehrharta calycina*	50J 393686 6479022	
Weeds	**Ehrharta calycina*	50J 393642 6479098	
Weeds	**Ehrharta calycina*	50J 393403 6479064	
Weeds	**Ehrharta calycina*	50J 393660 6479065	
Weeds	**Ehrharta calycina*	50J 393490 6479160	
Weeds	**Ehrharta longiflora*	50J 393430 6479036	
Weeds	**Ehrharta longiflora*	50J 393581 6478929	
Weeds	**Ehrharta longiflora*	50J 393350 6478966	
Weeds	**Ehrharta longiflora*	50J 393427 6479137	
Weeds	**Ehrharta longiflora*	50J 393502 6479140	
Weeds	**Ehrharta longiflora*	50J 393323 6479059	
Weeds	**Ehrharta longiflora*	50J 393512 6479022	
Weeds	**Ehrharta longiflora*	50J 393505 6478960	
Weeds	**Ehrharta longiflora*	50J 393326 6479049	
Weeds	**Ehrharta longiflora*	50J 393686 6478998	
Weeds	**Eragrostis curvula*	50J 393335 6479158	
Weeds	**Erodium botrys*	50J 393577 6478889	
Weeds	**Erodium cicutarium*	50J 393326 6479049	
Weeds	**Euphorbia peplus*	50J 393430 6479036	
Weeds	**Euphorbia peplus*	50J 393487 6479050	
Weeds	**Euphorbia peplus*	50J 393502 6479140	
Weeds	**Euphorbia peplus*	50J 393323 6479059	
Weeds	**Euphorbia peplus*	50J 393577 6478889	
Weeds	**Euphorbia prostrata*	50J 393326 6479049	
Weeds	**Euphorbia terracina*	50J 393517 6479154	
Weeds	**Euphorbia terracina*	50J 393427 6479137	
Weeds	**Euphorbia terracina*	50J 393577 6478889	
Weeds	**Ficinia marginata*	50J 393375 6478912	
Weeds	**Ficinia marginata*	50J 393581 6478929	
Weeds	**Ficinia marginata*	50J 393353 6479117	
Weeds	**Ficinia marginata*	50J 393350 6478966	
Weeds	**Ficinia marginata*	50J 393374 6479037	
Weeds	**Ficinia marginata*	50J 393490 6479160	
Weeds	**Freesia leichtlinii*	50J 393327 6479124	
Weeds	**Freesia leichtlinii*	50J 393343 6479145	
Weeds	**Freesia leichtlinii*	50J 393346 6479145	
Weeds	**Freesia leichtlinii*	50J 393435 6478979	20
Weeds	**Fumaria capreolata*	50J 393355 6479143	
Weeds	**Fumaria capreolata*	50J 393419 6479141	
Weeds	**Fumaria capreolata*	50J 393427 6479137	

Item	Species	Location	No.
Weeds	**Fumaria capreolata*	50J 393502 6479140	
Weeds	**Fumaria capreolata*	50J 393505 6478960	
Weeds	**Fumaria muralis*	50J 393577 6478889	
Weeds	**Fumaria muralis*	50J 393613 6478894	
Weeds	**Galium murale*	50J 393487 6479050	
Weeds	**Galium murale*	50J 393327 6479124	
Weeds	**Galium murale*	50J 393323 6479059	
Weeds	**Galium murale*	50J 393577 6478889	
Weeds	**Galium murale*	50J 393326 6479049	
Weeds	**Gazania linearis*	50J 393361 6479157	
Weeds	**Gladiolus caryophyllaceous*	50J 393484 6478906	
Weeds	**Gladiolus caryophyllaceous*	50J 393375 6478912	
Weeds	**Gladiolus caryophyllaceous*	50J 393581 6478929	
Weeds	**Gladiolus caryophyllaceous*	50J 393420 6479116	
Weeds	**Gladiolus caryophyllaceous*	50J 393353 6479117	
Weeds	**Gladiolus caryophyllaceous*	50J 393600 6479099	
Weeds	**Gladiolus caryophyllaceous*	50J 393350 6478966	
Weeds	**Gladiolus caryophyllaceous*	50J 393374 6479037	
Weeds	**Gladiolus caryophyllaceous*	50J 393653 6478983	
Weeds	**Gladiolus caryophyllaceous*	50J 393642 6479131	
Weeds	**Gladiolus caryophyllaceous*	50J 393327 6479124	
Weeds	**Gladiolus caryophyllaceous*	50J 393323 6479059	
Weeds	**Hesperantha falcata*	50J 393420 6479116	
Weeds	**Hesperantha falcata*	50J 393565 6478901	
Weeds	**Hypochaeris glabra*	50J 393375 6478912	
Weeds	**Hypochaeris glabra*	50J 393581 6478929	
Weeds	**Hypochaeris glabra*	50J 393420 6479116	
Weeds	**Hypochaeris glabra*	50J 393353 6479117	
Weeds	**Hypochaeris glabra*	50J 393350 6478966	
Weeds	**Hypochaeris glabra*	50J 393374 6479037	
Weeds	**Hypochaeris glabra*	50J 393653 6478983	
Weeds	**Hypochaeris glabra*	50J 393327 6479124	
Weeds	**Hypochaeris glabra*	50J 393323 6479059	
Weeds	**Hypochaeris glabra*	50J 393512 6479022	
Weeds	**Hypochaeris glabra*	50J 393611 6478919	
Weeds	**Hypochaeris glabra*	50J 393613 6478894	
Weeds	**Hypochaeris glabra*	50J 393686 6479022	
Weeds	**Lactuca serriola*	50J 393326 6479049	
Weeds	**Leontodon rhagadioloides*	50J 393577 6478889	
Weeds	**Leontodon rhagadioloides*	50J 393490 6479160	
Weeds	**Lupinus cosentinii*	50J 393339 6479141	
Weeds	**Lysimachia arvensis*	50J 393430 6479036	
Weeds	**Lysimachia arvensis*	50J 393490 6479160	
Weeds	**Malva parviflora*	50J 393577 6478889	
Weeds	**Medicago polymorpha*	50J 393653 6478983	
Weeds	**Melilotus indicus*	50J 393326 6479049	
Weeds	**Melilotus indicus*	50J 393326 6479049	
Weeds	**Monoculus monstrosus*	50J 393327 6479124	
Weeds	**Monoculus monstrosus*	50J 393679 6479055	
Weeds	**Oenothera laciniata*	50J 393577 6478889	
Weeds	**Oenothera laciniata*	50J 393326 6479049	
Weeds	**Oenothera laciniata*	50J 393345 6479158	
Weeds	**Osteospermum ecklonis*	50J 393653 6478983	

Item	Species	Location	No.
Weeds	**Oxalis pes-caprae*	50J 393427 6479137	
Weeds	**Oxalis pes-caprae*	50J 393323 6479059	
Weeds	**Oxalis pes-caprae*	50J 393505 6478960	
Weeds	**Oxalis pes-caprae*	50J 393686 6478998	
Weeds	**Pelargonium capitatum*	50J 393672 6479148	5
Weeds	**Pelargonium capitatum*	50J 393683 6479007	5
Weeds	**Pelargonium capitatum*	50J 393653 6478983	
Weeds	**Pelargonium capitatum*	50J 393679 6479055	
Weeds	**Pelargonium capitatum*	50J 393410 6479021	20
Weeds	**Pelargonium capitatum*	50J 393686 6478979	50
Weeds	**Pelargonium capitatum*	50J 393686 6479022	
Weeds	**Pelargonium capitatum*	50J 393694 6479058	1%
Weeds	**Pelargonium capitatum*	50J 393490 6479160	
Weeds	**Pentameris pallida*	50J 393353 6479117	
Weeds	**Pentameris pallida*	50J 393350 6478966	
Weeds	**Pentameris pallida*	50J 393374 6479037	
Weeds	**Pentameris pallida*	50J 393653 6478983	
Weeds	**Pentameris pallida*	50J 393490 6479160	
Weeds	**Pentameris pallida*	50J 393326 6479049	
Weeds	**Petrorhagia velutina*	50J 393339 6479141	
Weeds	**Petrorhagia velutina*	50J 393323 6479059	
Weeds	**Poa annua*	50J 393323 6479059	
Weeds	**Polycarpon tetraphyllum*	50J 393653 6478983	
Weeds	**Rostraria cristata*	50J 393326 6479049	
Weeds	**Sagina apetala*	50J 393326 6479049	
Weeds	**Sagina apetala*	50J 393490 6479160	
Weeds	**Sisymbrium irio*	50J 393323 6479059	
Weeds	**Solanum lycopersicum*	50J 393613 6478894	
Weeds	**Solanum nigrum*	50J 393345 6479158	
Weeds	**Sonchus asper*	50J 393323 6479059	
Weeds	**Sonchus oleraceus*	50J 393375 6478912	
Weeds	**Sonchus oleraceus*	50J 393353 6479117	
Weeds	**Sonchus oleraceus*	50J 393350 6478966	
Weeds	**Sonchus oleraceus*	50J 393477 6479126	
Weeds	**Sonchus oleraceus*	50J 393490 6479160	
Weeds	**Stellaria media*	50J 393323 6479059	
Weeds	**Trachyandra divaricata*	50J 393453 6478884	
Weeds	**Trachyandra divaricata*	50J 393577 6478889	
Weeds	**Trachyandra divaricata*	50J 393355 6479157	
Weeds	**Trifolium campestre* var. *campestre*	50J 393327 6479124	
Weeds	**Trifolium scabrum*	50J 393326 6479049	
Weeds	**Urospermum picroides*	50J 393330 6478976	
Weeds	**Urospermum picroides*	50J 393613 6478894	
Weeds	**Urospermum picroides*	50J 393438 6479160	
Weeds	**Ursinia anthemoides* subsp. *anthemoides*	50J 393430 6479036	
Weeds	**Ursinia anthemoides* subsp. *anthemoides*	50J 393484 6478906	
Weeds	**Ursinia anthemoides* subsp. *anthemoides*	50J 393375 6478912	
Weeds	**Ursinia anthemoides* subsp. *anthemoides*	50J 393581 6478929	
Weeds	**Ursinia anthemoides* subsp. *anthemoides*	50J 393420 6479116	
Weeds	**Ursinia anthemoides* subsp. *anthemoides*	50J 393353 6479117	
Weeds	**Ursinia anthemoides* subsp. *anthemoides*	50J 393600 6479099	
Weeds	**Ursinia anthemoides* subsp. *anthemoides*	50J 393350 6478966	
Weeds	**Ursinia anthemoides* subsp. *anthemoides*	50J 393374 6479037	

Item	Species	Location	No.
Weeds	**Ursinia anthemoides* subsp. *anthemoides*	50J 393653 6478983	
Weeds	**Ursinia anthemoides* subsp. *anthemoides*	50J 393642 6479131	
Weeds	**Ursinia anthemoides* subsp. *anthemoides*	50J 393327 6479124	
Weeds	**Ursinia anthemoides* subsp. *anthemoides*	50J 393327 6479124	
Weeds	**Ursinia anthemoides* subsp. *anthemoides*	50J 393323 6479059	
Weeds	**Ursinia anthemoides* subsp. *anthemoides*	50J 393512 6479022	
Weeds	**Ursinia anthemoides* subsp. *anthemoides*	50J 393561 6478909	
Weeds	**Ursinia anthemoides* subsp. *anthemoides*	50J 393611 6478919	
Weeds	**Ursinia anthemoides* subsp. *anthemoides*	50J 393404 6478960	
Weeds	**Ursinia anthemoides* subsp. *anthemoides*	50J 393613 6478894	
Weeds	**Ursinia anthemoides* subsp. *anthemoides*	50J 393686 6479022	
Weeds	**Ursinia anthemoides* subsp. *anthemoides*	50J 393490 6479160	
Weeds	**Vicia hirsuta*	50J 393577 6478889	
Weeds	**Vicia sativa*	50J 393323 6479059	
Weeds	**Vulpia fasciculata*	50J 393577 6478889	
Weeds	**Vulpia myuros* forma. *megalura*	50J 393581 6478929	
Weeds	**Vulpia myuros* forma. *megalura*	50J 393353 6479117	
Weeds	**Vulpia myuros* forma. *megalura*	50J 393350 6478966	
Weeds	**Vulpia myuros* forma. *megalura*	50J 393653 6478983	
Weeds	**Vulpia myuros* forma. *megalura*	50J 393323 6479059	
Weeds	**Vulpia myuros* forma. *megalura*	50J 393404 6478960	
Weeds	**Vulpia myuros* forma. *megalura*	50J 393505 6478960	
Weeds	**Vulpia myuros* forma. *megalura*	50J 393326 6479049	
Weeds	**Vulpia myuros* forma. *megalura*	50J 393490 6479160	
Weeds	**Wahlenbergia capensis*	50J 393490 6479160	
Weeds	**Watsonia versfeldii*	50J 393374 6478894	1
Weeds	**Watsonia versfeldii*	50J 393415 6478985	1
Weeds	**Watsonia versfeldii*	50J 393652 6479068	1
Weeds	**Watsonia versfeldii*	50J 393610 6479057	1
Weeds	**Watsonia versfeldii*	50J 393694 6479058	1