A Floristic Survey of the Whicher Scarp

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Cover photographs (clockwise from the top left)
Cover photograph 1: Mountain Marri and Jarrah woodland over *Xanthorrhoea acanthostachya* on sandy laterite
Cover photograph 2: Mountain Marri and Jarrah woodland on deep white sand
Cover photograph 3: Mountain Marri, Jarrah, *Banksia grandis* and *Banksia attenuata* woodland on deep coloured sands
Cover photograph 4: Gale Road Ironstones
Cover photograph 5: *Actinotus whicheranus*

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SUMMARY

The Whicher Scarp forms a sickle shaped landform unit that extends from near Burekup in the north where it meets the Darling Scarp, to the south-west of Dunsborough where it meets the granites of the Leeuwin-Naturaliste ridge.

A survey of the Whicher Scarp was undertaken by the Departments of Environmental Protection and Conservation and Land Management together with the Wildflower Society of Western Australia (Inc.) over a period of more than 10 years. This work was completed as part of the Swan Bioplan Project to provide a more detailed knowledge of the conservation status of species and communities that occur in this area.

Work for the study has involved remnant vegetation mapping of the Whicher Scarp, analysis of a set of 124 quadrats of which 80 have not been analysed previously, detailed flora survey of three forest blocks (Dardanup, Boyanup and Whicher Forest Blocks) and general flora survey of the Whicher Scarp. The sets of data prepared for this study are presented in the report and Appendices in a written and/or digital format.

The natural values of the Whicher Scarp in relation to landforms, vegetation and flora are diverse and varied. These can be summarised as follows.

- A distinct landform
  Three major subdivisions are evident in the Whicher Scarp, these being the West, Central and North Whicher Scarp; these subdivisions are reflected in the flora.

- A naturally restricted landform
  - 0.7% (approx 21,000 ha) of the Southern Jarrah Forest Biogeographic Sub-region.
  - 46% (approx 9,200 ha) remains naturally vegetated.
  - Over 50% the public lands are DEC lands located in nine forest areas.

- Ecological linkages maintained
  Within the Central and North Whicher Scarp effective ecological linkage is maintained; however, the West Whicher is mainly private land and is heavily cleared.

- Six unique vegetation complexes, of which two are highly restricted and three have in effect less than 30% of their area remaining.

- A diverse suite of woodland floristic assemblages
  - Four strong regional floristic community patterns are distinguished in the Whicher Scarp.
  - The communities are distinct from the communities of the Darling Scarp.
  - A set of communities centred on sands of the Whicher Scarp slopes are effectively confined to the Whicher Scarp.
  - A group of communities associated with laterites that are shared with and/or intergrade with those of the adjacent Blackwood Plateau
  - A group of communities on grey sands that are shared with those of the Swan Coastal Plain.
  - A highly restricted floristic community is found in the Dardanup Forest Block.

- Restricted and rare wetland communities
  The Whicher Scarp is associated with a series of distinctive wetlands including occurrences of the Busselton Ironstone communities which are a threatened ecological community.

- A diverse and rich flora
  More than 900 native species reflecting flora of the Jarrah Forest, south coast sands and wetlands and Swan Coastal Plain sands as well as a large number of Whicher Scarp centred species. The Whicher Scarp is a local centre of species richness in the species rich south-west.

- A centre of speciation
  More than 40 species having been recently described in the Whicher Scarp and about a further 25 species are expected to be able to be differentiated genetically and/or morphologically.

- A highly endemic flora
  The Whicher Scarp flora shows high levels of endemism at a national, regional and local scale. The Whicher Scarp is a local centre of species endemism in the species rich South-West.

- More than 60 rare species
  More than 60 species are State listed species, eight being Declared Rare and 53 Priority Species. Nine species are Commonwealth Listed. Based on this study it is recommended that ten species be listed as Priority 1 and two currently listed species be listed as Declared Rare Flora.

- Ninety species at the end of their range
  Of these, 49 species are at the northern end of their range and 32 species at the southern end of their range.

- More than 100 species with disjunct populations
  More than 100 species have population/s in the Whicher Scarp representing disjunctions from other populations of the taxon. Some of these species illustrate remarkable disjunctions.

- A diversity of unusual and possibly relictual habitats

- High degree of intactness of native vegetation
  Large areas of native vegetation on the Whicher Scarp are in Excellent condition and less than 8% of the flora of the Whicher Scarp is weeds.

- A biodiversity hotspot
  Based on these studies (species richness, endemism, geographically distinct species), the Whicher Scarp deserves recognition as a local biodiversity hotspot in the species rich south-west.

A series of recommendations are made in regard to better protecting the exceptional values of the Whicher Scarp landforms, vegetation and flora.

RECOMMENDATIONS

Whicher Scarp Vegetation and Flora Protection Recommendations

General Protection
The Whicher Scarp landform, vegetation and flora have exceptional value. As a consequence, , the area of State Forest and Timber Reserve in the Whicher Reference Areas outside the current forest 'Informal Reserve' area should be included in this category in recognition of the Whicher Scarp's very 'significant flora values' (Conservation Commission of Western Australia 2004).

Conservation Areas
The Yelverton National Park is a very significant conservation area. However, the boundaries of the Park should be expanded to include the full extent of the Whicher Scarp Yelverton forest, thus encompassing significant areas of the upland and wetland communities associated with the West Whicher Scarp as well as populations and habitat of a series of significant species.

The Haag Nature Reserve is a small but significant West Whicher Scarp conservation area. The ecological linkage opportunities, west to the Yelverton forest, and north east to the Chambers Road Ironstones, should be investigated.

The Nature Reserve (Gale Road Ironstones) is a small but significant West Whicher Scarp conservation area. Ecological linkage opportunities south to the Whicher Scarp Treeton forest should be investigated.

The Whicher National Park is a very significant Central Whicher Scarp conservation area. The boundaries of the Park should be expanded to include the full extent of the Whicher Scarp slopes on public lands. This boundary would encompass significant additional areas of the communities associated with these slopes north of Sabina Road and populations and habitat of a number of significant species including *Lambertia rariflora* subsp. *rariflora* (P4), *Actinotus whicheranus* (P2, but recommended for listing as DRF) and *Platytheca* sp. Sabina (G.J. & B.J. Keighery 295) (recommended for listing as P1).

The Dardanup Conservation Park is a very significant North Whicher Scarp conservation area. The boundaries of the Park should be expanded to include the full extent of the Dardanup public lands (State Forest and Nature Reserve), thus encompassing significant additional areas of the communities associated with the Blackwood Plateau and Darling Scarp. Consideration should be given to making this a National Park.

The Gwindinup Reserve is a significant North Whicher Scarp conservation area which should continue to be managed by the Capel Land Conservation District Committee for this purpose. The ecological linkage opportunities, west, and south to the Whicher Scarp Argyle forest, should be investigated.

Proposed Conservation Areas
A Central Whicher Scarp conservation area should be established in the Whicher Scarp Treeton forest to protect the specific Whicher Scarp values identified.

A North Whicher Scarp conservation area should be established in the Whicher Scarp Argyle forest to protect the specific Whicher Scarp values identified as well as the adjacent areas of the Blackwood Plateau.

A North Whicher Scarp conservation area should be established in the Whicher Scarp Abba forest to protect the specific Whicher Scarp values identified.

Whicher Scarp Flora Species Conservation Recommendations

The Priority listed species *Actinotus whicheranus* and *Franklandia triaristata* be listed as Declared Rare Flora.

Twelve taxa are recommended for listing as Priority 1 being: *Cyathochaeta* sp. Carbunup (G.J. Keighery 14123), *Lomandra whicherensis, Hypolaena grandiuscula, Loxocarya stricta* subsp. *implexa* MS, *Andersonia barbata, Ricinocarpos* aff. *cyanescens* (A. Webb sn 27 October 2003), *Dillwynia* sp. Capel (P.A. Jurjevich 1771), *Grevillea bronwenae, Grevillea pulchella* subsp. *ascendens* Whicher Scarp Form (G.J. Keighery & B.J. Keighery 938), *Synaphea polypodioides, Platytheca* sp. Argyle (G.J. & B.J. Keighery 281) and *Platytheca* sp. Sabina (G.J. & B.J. Keighery 295).

The taxonomic and/or genetic status of the following Whicher Scarp taxa form/s or populations should be investigated: *Johnsonia acaulis, Johnsonia inconspicua, Laxmannia jamesii, Lepidosperma obtusum, Schoenus* sp. Whicher (G.J. Keighery & B.J. Keighery 901), *Hypolaena exsulca, Xanthorrhoea acanthostachya, Xanthosia tasmanica, Hibbertia aurea, Hibbertia lasiopus, Leucopogon oliganthus, Ricinocarpos* aff. *cyanescens* (A. Webb sn 27 October 2003), *Pityrodia bartlingii, Beaufortia squarrosa, Eremaea asterocarpa, Daviesia major, Daviesia nudiflora, Dryandra baxteri, Dryandra formosa, Dryandra mimica, Franklandia fucifolia, Hakea oldfieldii, Petrophile serruriae* and *Crowea angustifolia* subsp. *angustifolia.*

Comprehensive autumn survey is required to locate any extant populations of *Boronia purdieana* subsp. *purdieana.*

1 INTRODUCTION

1.1 Location, Geology, Landforms and Soils

The southern margin of the Swan Costal Plain between Burekup and Dunsborough is formed by a sickle shaped band of low hills, the Whicher Scarp (Map 1, Photograph 1). The Whicher Scarp is thought to have formed as a result of marine erosion of the Perth Sedimentary Basin around two million years ago in the early Pleistocene or late Tertiary period (Playford *et al.* 1976). A further set of low hills are associated with the northern and central sections of the Whicher Scarp. These are related to the Yoganup Formation (Playford *et al.* 1976), an old shoreline which is rich in mineral sands.

Broadly, the surfaces of the Whicher Scarp fall into three groups, the widespread sands and laterites and the restricted ironstones[1]. Granites are absent from the Whicher Scarp and the remainder of the Blackwood Plateau. Laterite capped rises and slopes are a feature of the Whicher Scarp, but exposed laterite is not common to the west of Ironstone Gully. Deep colluvial sands ranging from white to orange occur throughout the area forming shallow rises, slopes and swales between rises (Anon 1981 and 1982, Belford 1987a and b, Jordan 1986, Leonard 1991). These deep sands are the predominate feature of the Whicher Scarp slopes (i.e. the Swan Coastal Plain facing slopes). These sands are often associated with underlying and outcropping laterite. The areas of underlying and outcropping ironstones are associated with perched wetlands and/or drainage lines.

The Whicher Scarp covers about 21,000 ha and rises to over 100 m (AHD) in places but has an average height of 50 m (AHD). A series of rivers and creeks incise the Whicher Scarp. The principal drainage lines from Burekup in the north to Dunsborough in the south-west are: Ferguson River, Crooked Brook, Joshua Brook, Preston River, Camp Gully/Capel River, Tiger Gully, Ludlow River, Abba River, Sabina River, Ironstone Gully, Vasse River, Carbunup River, Mary Brook, Annie Brook and Station Gully (See Map 1). The valleys associated with these rivers vary in profile. The nature of the valleys incised by the drainage lines depends on the slope and height of the Scarp face and the substrate. The drainage lines of the western Whicher Scarp (Carbunup River, Mary Brook, Annie Brook and Station Gully) lie in broad valleys associated with some extensive wetland areas and freshwater seepages.

The general extent of the Whicher Scarp is outlined in the soil-landscape systems mapping as the Whicher Scarp soil-landscape system (unit 214Ws) which covers an area of 20,709 ha (Maps 1 and 2 after DAFWA 2007). The Whicher Scarp soil-landscape system is briefly described as follows – 'Low scarp and raised platform, on the northern edge of the Donnybrook Sunklands (sic Blackwood Plateau). Sandy gravel and pale deep sands, loamy gravel and non-saline wet soils. Jarrah-marri forest and woodland'. Within this system the soils encountered are principally duplex sandy gravels and yellow deep sands and sandy earths, loamy gravels and wet and semi-wet soils, and less commonly grey deep sandy duplexes, pale deep sands, shallow gravels, gravely pale deep sands, brown loamy earths and brown deep sands (DAFWA 2007).

Two sub-systems are distinguished in the Whicher Scarp soil-landscape system (DAFWA 2007).

- The Whicher sub-system that is described as 'Gentle (3-10%) smooth lateritic slopes (relief 20-60 m). Soils are sandy gravels with some deep sands'. Two phases are mapped within this subsystem.
- Yelverton sub-system that is described as 'A raised shelf with a level to gently undulating surface, 10-40 m above the Swan Coastal Plain. Soils are sandy gravels, loamy gravels, sandy earths and deep sands'. Ten phases are mapped within this subsystem.

The foot slopes of the Whicher Scarp are described as the Forrestfield soil-landscape system (unit 213Fo, DAFWA 2007), which is described as follows – 'Undulating foot slopes of the Darling and Whicher Scarps. Duplex sandy gravels, pale deep sands and grey deep sandy duplexes. Woodland of *E. marginata*, *calophylla* and *wandoo* and some *B. grandis*'.

[1] Also referred to as sheet laterite or bog iron ore (DAFWA 2007).

The Forrestfield system forms the eastern margin of the Swan Coastal Plain from Perth to south-west of Capel. This System has also been referred to as the Foothills (Government of WA 2000). The Yoganup Formation is a component of this system and the adjacent Whicher Scarp system.

For this study the Whicher Scarp has been divided into three sectors as outlined below and shown in Maps 1 and 2. Table 1 lists the key areas and wetlands in the three sectors.

- West Whicher Scarp – Gentle north-east facing slopes, few areas of exposed laterite, predominantly grey sands at times with gravel (laterite at depth), silt and clay components, broad drainage lines, permanent/near permanent wetlands associated with broad valleys, ironstone surfaces on adjacent Swan Coastal Plain, no associated Foothills of the Plain. Includes: Carbunup River; Yelverton forest[2]. Little public land, native vegetation in scattered remnants.
- Central Whicher Scarp – Moderate north facing slopes, areas of laterite capped rises, soils ranging from deep sands to combinations with sand, gravel, silt and clay, ironstone surfaces; no associated Foothills. Includes: Sabina River (Abba River lies at the boundary of the Central and North Whicher Scarp sectors); Treeton and Whicher forests[2]. Substantial areas of public land centred on the two forest areas.
- North Whicher Scarp – North-west facing slopes, steepest slopes, laterite capping lowest in landscape, large area associated Foothills, ironstone surfaces on adjacent Swan Coastal Plain. Includes: Abba, Capel, Preston and Ferguson Rivers; Abba, Happy Valley, Argyle, Donnybrook, Boyanup and Dardanup forests [2]. Large areas of public land centred on the five forest areas (Photograph 1).

1.2 Natural Regions

Three Bioregions (Warren, Jarrah Forest and Swan Coastal Plain) are found in the Busselton to Augusta area (Map 3). The Whicher Scarp is part of the Jarrah Forest Bioregion (Department of Environment and Water Resources 2007) and the Southern Jarrah Forest subregion, forming a very small percent, 0.7%, of the subregion[3]. However, the nature of the geology, landform and soils explains why the Whicher Scarp has affinities with the Swan Coastal Plain.

A number of units distinguished in the various soil, vegetation and flora studies can be used to partition these Bioregions. Those of particular interest in the study area are listed below and shown in Map 3. Abbreviations are given for the areas often referred to in this report.

- Whicher Scarp (WHS) – The Whicher Scarp (and the adjacent portion of the Blackwood Plateau) is also referred to as the Whicher Range (CTRC 1974, DCE 1976, Atkins 2006, Hearne *et al.* 2003a and b).
- Blackwood Plateau (BP) – The Whicher Scarp is here distinguished from the Blackwood Plateau; however, in Mattiske and Havel (1998a) it is considered to be part of the Blackwood Plateau (see section 1.3.1.3 below). The Whicher Scarp and Blackwood Plateau have also been referred to as the Donnybrook Sunklands (Forest Department of Western Australia 1975, DAFWA 2007).
- Margaret River Plateau (MP).
- Leeuwin-Naturaliste Coast.
- Scott Coastal Plain (SC).
- Busselton Swan Coastal Plain (SWA(B)) – This area is not shown on Map 3 but is the area of the Swan Coastal Plain south-west of the Capel River.

[2] See section 2.2 for a description of the Whicher Scarp forest study areas.
[3] The area of the Whicher Scarp is rounded to 21,000 ha in the Southern Jarrah Forest subregion of 3,160,122 ha (Hearn *et al.* 2003a) i.e. 0.665% of the subregion.

1.3 Vegetation and Flora

Since the 1970s there have been a series of studies and reports that have described aspects of the flora and vegetation of the Whicher Scarp. Some of these studies and reports have pointed to some striking and unusual features of the vegetation and flora of the Whicher Scarp.

1.3.1 *Vegetation*

The vegetation of the entire extent of the Whicher Scarp has been considered in three studies as outlined below. All of these studies identify Mountain Marri (*Eucalyptus* or *Corymbia haematoxylon*, Photograph 2) woodland as a distinguishing feature of the Whicher Scarp vegetation.

1.3.1.1 Remaining Native Vegetation in the Busselton Area

Smith (1973 and 1974) mapped the remaining native vegetation in the Busselton area (from late 1960s photography). Woodland and forest dominated by combinations of Jarrah (*Eucalyptus marginata*), Marri and Mountain Marri (Cover photographs 1 to 3) are mapped in the area of the Whicher Scarp. Interestingly, Mountain Marri dominated units are restricted to the Central and North Whicher Scarp while a scattering of patches of *Melaleuca* dominated shrublands are restricted to the western areas of the Whicher Scarp. The boundaries of the various landforms, including the Whicher Scarp, are not distinguished in this study.

1.3.1.2 Pre-European Vegetation

This Pre-European vegetation study (DAFWA 2005) principally maps woodlands dominated by Jarrah and Mountain Marri for the area of the Whicher Scarp. The extent of the Whicher Scarp is distinguished in this study by the extent of the Jarrah and Mountain Marri unit which is sub-captioned the 'Whicher Scarp'.

1.3.1.3 Vegetation Complexes

Work for the Regional Forest Assessment (CALM 1998a, Mattiske and Havel 1998) mapped the full extent of the Whicher Scarp, identifying seven vegetation complexes in the area. Together Table 2 and Figures 1a-d (Havel and Mattiske 2000) illustrate and describe the extent, basic landform, soils and vegetation complexes of the Whicher Scarp. Figure 1d from the West Whicher Scarp well illustrates the difference in relief between this and the Central and North Whicher Scarp shown in Figures 1a-c. While the dominants mapped in the previous two studies remain significant components of the vegetation, a series of other trees are distinguished in the vegetation complex descriptions (Table 2). This recognition of an increased diversity in the vegetation is also reflected in the changes in vegetation complex mapping between this and previous vegetation complex mapping for a portion of the North Whicher Scarp (Heddle *et al.* 1980). The single vegetation complex (Cartis vegetation complex) mapped for the Whicher Scarp by Heddle *et al.* (1980) is divided into three in this later mapping (CALM 1998a, Mattiske and Havel 1998).

The extent of the Whicher Scarp is much the same in both this vegetation complex study and the soil-landscape systems mapping (DAFWA 2007); however, there is a different approach to the Foothills. Mattiske and Havel (1998) designate the Foothills (i.e. the Forrestfield System of DAFWA 2007) as the Cartis vegetation complex and place it as part of the Whicher Scarp. However, this study considers the Cartis vegetation complex to be part of the Foothills and places this complex as part of the Swan Coastal Plain Biogeographic Region.

1.3.1.4 Swan Coastal Plain Floristic Studies – Floristic Community Types

A set of studies have looked at the floristic patterning on the Swan Coastal Plain. In 1994 a series of regional floristic community types were described from over 500 10m x 10m quadrats and analysis for the Swan Coastal Plain and 'Whicher foothills' (Gibson *et al.* 1994). Three floristic community types (SWAFCT) were described for the Whicher Scarp: two upland types, SWAFCT 1a and 21b; and one wetland type, SWAFCT 10b (Table 3, Cover photographs 1, 2 and 4 respectively). All three floristic community types occur south of Perth: SWAFCT 1a is virtually confined to the Whicher Scarp; SWAFCT 21b is predominantly in the Dunsborough to Bunbury areas and SWAFCT 10b in the Busselton area.

Since 1994 additional locations have been identified for these three floristic community types. Additional locations for SWAFCT 1a and 21b were identified in the analysis of additional quadrats located and sampled as part of the System 6 and part System 1 Update (DEP 1996, Government of WA 2000). The distribution of these SWAFCTs is shown in Maps 4a and 4b. Ongoing work by CALM in the Busselton area (South West Region, TEC group, Science Division and others) has identified further locations of SWAFCT 10b. The most significant of these are patches on Oats and Chambers Roads, an extension of the Tutunup Road area and a patch in 'Taylor's Nature Reserve' (Maps 2b, c, d and e[4]).

The Swan Coastal Plain floristic community type 10b: Shrublands on southern ironstones is listed by the State as a threatened ecological community (TEC) under Category 2: Critically Endangered and by the Commonwealth as Endangered (*Environment Protection and Biodiversity Conservation Act 1999*).

1.3.1.5 Dardanup Forest Block Study

A study into the flora and vegetation of the Dardanup Forest Block (Map 2g) in 1995 to 1996, by CALM, DEP and the Wildflower Society (GJ Keighery *et al*. 1996c and 2008) as part of the System 6 and part System 1 Update (DEP 1996) identified high vegetation values, especially in representing the communities of the North Whicher Scarp and the juxtaposition of the Whicher Scarp/Blackwood Plateau/Darling Scarp.

This report also commented on an apparently restricted community.
'A very distinctive form of this community [SWAFCT 1a] occurs on outcropping quartzite ridges along the Darling Scarp. Here *Eucalyptus marginata* and *E. haematoxylon* open low woodland occurs over tall heath of *Xanthorrhoea acanthostachya, Gastrolobium whicherensis, Lambertia multiflora* var. *darlingensis, Dryandra armata, Hakea cyclocarpa* and *Hibbertia hypericoides* over herbs of *Lomandra* sp. nov. and *Patersonia limbata*. It is likely with further studies along the southern Darling Scarp and adjacent Whicher Scarp this may prove to be a separate floristic community that is rare and restricted'.

1.3.2 *Flora*

While there have not been a large number of studies of the flora of the Whicher Scarp, a series of studies have made reference to the high flora values, as well as some unusual features of the flora of the area. It is apparent from these few sources that the Whicher Scarp has a diverse flora and supports a significant number of taxa disjunct from their normal range, at the northern or southern limit of their range and/or of restricted distribution and centred on the Whicher Scarp. Some key features, reports and studies are outlined below.

1.3.2.1 *Dampiera linearis* Study

A 1970's study of *Dampiera linearis* on the Whicher Scarp (Bousfield 1970), recognised the presence of two chromosomal races, a diploid race on the old lateritic soils and a tetraploid race on the lower younger units (Figure 2). Also some populations of diploid plants contain from one to five B chromosomes and plants with these have a range extending beyond that of normal diploids.

1.3.2.2 Identification of a Diverse flora, including a Large Number of Endemic and Disjunct Flora

From the mid 1970s to the present an increasing number of flora species have been identified that are endemic to the Scarp, or have populations of flora that were disjunct from their normal range or at the northern or southern limit of their range. These additions have come from general survey of individual plant taxa, bushland area survey and regional survey such as Gibson *et al.* (1994). Using information from these studies the Regional Forest Agreement recognised the West and Central Whicher in a centre important for flora endemism (CALM 1998b and Figure 3 this report) and species richness (CALM 1998c). Work by Hearn *et al.* (2003a and b) for the Forest Management Plan 2004-2015 (Conservation Commission of Western Australia 2004) also listed a series of taxa in these categories.

[4] The areas shown on Map 2 are the buffered locations of the communities.

1.3.2.3 Ancient Links

Taxonomic studies on the Whicher Scarp endemic species, *Actinotus whicheranus* (Cover photograph 5); have shown that its closest known relative, *A. minor*, is found in eastern Australia near Sydney (Henwood *et al.* 1999).

1.3.2.4 Dardanup Forest Block Study

A study into the flora and vegetation of the Dardanup Forest Block (Map 2g) identified high flora diversity, populations of new endemic species and further populations of disjunct and/or range ends of flora (GJ Keighery *et al*. 1996 and 2008). The Dardanup Forest Block contains a vascular flora of 497 taxa of which 457 are natives and 40 weeds. Five priority taxa (*Acacia flagelliformis, Acacia semitrullata, Caladenia longicauda* subsp. *clivicola, Chamelaucium erythrochlorum* and *Gastrolobium whicherensis*) and three newly discovered taxa worthy of listing (*Logania* sp. nov., *Lomandra* sp. nov. and *Synaphea polypodioides*) were found in the area. That is, the Dardanup Forest Block was found to have high flora values, especially in representing the North Whicher Scarp and the juxtaposition of the Whicher Scarp/Blackwood Plateau/Darling Scarp.

1.4 Conservation Reserves

Two areas on the Whicher Scarp were the subject of recommendations in the Conservation Through Reserves Committee (CTRC) System 1 (DCE 1976) and System 6 (DCE 1983a and b) reports. These recommendations are of particular interest as they are based on the recognition of the important flora and vegetation values of the Whicher Scarp.

The draft System 1 report (CTRC 1974) recognised the need for a 'Whicher Range reserve' (Map 2d and Figure 4 this report after Figure 5 CTRC 1974) to be established and that 'on the coastal plain between Jalbarragup Road and Wonnerup Rd (now Tutunup Road), road verges still carrying natural vegetation be protected'. These recommendations were based on the recognition that the area has a rich flora allied with that of the Jarrah forest, but having a number of taxa that 'indicate that the area has a special significance in the floristics of the South-West'. Values that contributed to this statement included the presence of 'relict populations' of a series of species both from the south (e.g. *Dryandra baxteri* and *D. formosa*) and the north (*Actinostrobus acuminatus*). A significant number of new taxa were also recognized as occurring in the area. The report recognized the significance of the *Dampiera linearis* study (see section 1.3.2.1) as it shows the importance of the area in the study of the process of speciation. This report concluded that the area 'is scenically attractive and biologically important'. The final System 1 report shows a reduced area (Figure 5 this report after Figure 1.5 DCE 1976). The recommendations and associated notes give some guidance as to the rationale for these changes.

The EPA recommends that:

(1) the Conservator of Forests manages Whicher and part of Bovell forest blocks in State Forest 33, as shown in figure 1.5, as a multiple purpose 'forest park' primarily for recreation and flora and fauna conservation. The EPA has been informed of the potential coal deposits in this area and believes that this recommendation will preclude the granting of rights to mine in the forest;

(2) should finance become available, the WA Herbarium carry out a more complete survey to determine whether several rare or new species of plants occur in State Forest 33 or elsewhere in nearby crown land.

The EPA excludes McGregor block from recommendations (1) because of advice received that due to the incidence of dieback disease (Phytophthora cinnamomi) *the block will not prove useful.*

As the EPA is of the opinion that all natural vegetation on road verges should be protected, it sees no reason to single out the road verges on the coastal plain road between Jalbarragup Road and Wonnerup Rd, as recommended by the CTRC.

In 1978 an area similar to the proposed Whicher Range reserve (DCE 1976) was placed on the register of the National Estate (DEWHA 2008). In 2004 the Forest Management Plan 2004-2013 (Conservation Commission of Western Australia 2004) identified an area similar to that identified in the System 1 report (DCE 1976) but the majority of the Whicher Scarp slopes to the west of the Sabina River have been omitted. On the 8th December 2004 a similar area was vested as the Whicher National Park (Map 2d).

A further area containing Whicher Scarp vegetation was subject to recommendation C86 (Dardanup Management Priority Area) in the System 6 report (Map 2g, after DCE 1983b). The System 6 report comments that the

> Dardanup MPA conserves a range of vegetation associated with the northern extension of the Donnybrook Sunkland [Whicher Scarp and Blackwood Plateau]. Some of these stands are unique. Open forest of jarrah and marri, woodland of banksia and paperbark are dominant, with some yarri [*Eucalyptus patens*], bullich [*E. megacarpa*] and swamp banksia occurring in moister areas. The MPA also contains the only extensive stands of mountain gum in System 6.

A further feature of this area was the recognition that it 'contributes to open space of regional significance extending along the Darling Scarp because of its value for conservation and recreation (see Figure 1 Chapter 4 [DCE 1983a])' (DCE1983b). Recommendation C86 has also been partially implemented (Map 2d) with the vesting of the Dardanup Conservation Park at the same time as the Whicher National Park.

While these are the largest Whicher Scarp conservation areas there are some additional conservation areas on the Whicher Scarp, including: Haag Nature Reserve (Map 2b), Nature Reserve (Gale Road Ironstones, Map 2b) and the Gwindinup Reserve (Map 2g, Reserves 2307 and 25509)[5]. There are also a series of forest conservation areas proposed in the Forest Management Plan 2004-2013 (Conservation Commission of Western Australia 2004), for example in state forest areas adjacent to Yelverton National Park (Map 2b) and Whicher National Park (Map 2d).

Given the early recommendations in the system reports and the findings outlined in section 1.3 it is curious that, while the majority of the vegetated area of the Whicher Scarp is state forest, the need to expand on these reserves has not been further investigated.

1.5 Purpose of the Survey

A survey of remnant vegetation of the Whicher Scarp was undertaken to provide a more detailed knowledge of the conservation status of species and communities that occur in this area. Previous studies on the Whicher Scarp have established that the vegetation of the Whicher Scarp can be distinguished and mapped as distinct units and/or combination of units. In addition, the flora is diverse with a significant number of endemic species, species disjunctions and populations at the ends of a species range. Given the high species richness there was a need to assess conservation significance of vegetation and flora at a finer scale than the present data allowed. To support existing quadrat data, supplementary quadrat based survey was undertaken with the aim of better delimiting the floristic associations on the Whicher Scarp. Survey for this quadrat work and additional survey and investigation allowed for a more detailed look at species' distributions.

[5] Managed by the Capel Land Conservation District Committee (LCDC).

2 METHODS AND LIMITATIONS

2.1 General Methods, Terminology and Definitions

The basic methodology used in this report for selecting, researching, collating and describing natural values follows that established in the System 6 and part System 1 Update (DEP 1996) and applied in Bush Forever (Government of WA 2000). Volume 2 of Bush Forever (Government of Western Australia 2000) and EPA Guidance Statement No. 10 (EPA 2006) should be consulted for methodology, explanations of each dataset, terminology and definitions. Appendix 1 contains a series of standard vegetation, flora and ecological community codes. Specific methodology for this project is outlined below as required.

2.2 Boundaries of the Whicher Scarp

A boundary of the Whicher Scarp is delineated in a series of studies. While these boundaries are generally similar in defining the shape and extent of the landform, they are not entirely consistent with each other. For the purposes of this study three boundaries were referenced to determine a boundary of the Whicher Scarp: soil-landscape mapping (see section 1.1 and Maps 1 and 2 this report, after DAFWA 2007), Pre-European vegetation (see section 1.4.1.2, DAFWA 2005) and vegetation complex mapping (see section 1.4.1.3, CALM 1998a).

For the general boundary of the Whicher Scarp, the Whicher Scarp soil-landscape system (Maps 1 and 2 this report, after DAFWA 2007) was the preferred base boundary but the vegetation was considered to extend beyond these boundaries to both take into account what was considered Whicher Scarp vegetation and the transition with the adjacent areas (Blackwood Plateau and Swan Coastal Plain). As a consequence, while the soil-landscape systems mapping boundaries are used as the base boundary of the Whicher Scarp, to allow for the scale of this mapping, observations on the ground and vegetation transitions, the Whicher Scarp boundary is generally extended 0.5 km onto the Swan Coastal Plain and 1 km onto the Blackwood Plateau in upland areas and 2 km along the drainage lines. For the purposes of this study, nine Whicher Scarp study reference areas have been delineated in contiguous areas of DEC managed land (National Park, Nature Reserve, Conservation Park, State Forest, Timber Reserve) and other public lands considered to lie within the Whicher Scarp[6]. Each of these areas is shown on Map 2 with the following names: Yelverton, Treeton, Whicher, Abba, Happy Valley, Argyle, Donnybrook, Boyanup and Dardanup. The names were selected to reflect the principle forest block located in the area. For brevity in the text, these Whicher Scarp study reference areas are referred to as 'forest' areas, i.e. the 'Yelverton forest' etc.

2.3 Extent of Native Vegetation

The extent of remnant native vegetation has been mapped in the Swan Bioplan study area south of Perth (incorporating Swan Coastal Plain Bioregion and the Darling Scarp and Whicher Scarp portions of the Jarrah Forest Bioregion). For the area of the Whicher Scarp this involved the interpretation of Busselton 2004 and Busselton–Donnybrook 2003 digital ortho-photographs, information searches and ground truthing. Information has been recorded on specific attributes of each remnant from regional and specific dataset interpretation, ortho photographs and roadside field assessment. The mapping of remnants within the Whicher Scarp was completed in late 2006. This report uses the intersection of Swan Bioplan remnant vegetation mapping with that by the DAFWA native vegetation extent mapping done by the DAFWA for the South West Biodiversity Project (SWBP). The DAFWA's native vegetation extent mapping was created by desktop interpretation of digital ortho-photos acquired between April 2000 and December 2004 (SWBP 2006). The Swan Bioplan mapping was stitched into the Department of Agriculture's native vegetation extent mapping dataset by the Department of Agriculture. The scales in which the data were captured are 1:5,000 on the Swan Coastal Plain and 1:20,000 in the remainder of the SWBP area.

[6] That is the area of public land lying within the Whicher Scarp soil-landscape system extended 1 km on to the adjacent Blackwood Plateau (where this boundary was close to a cadastral boundary, the boundary follows cadastre).

2.4 Vegetation and Flora Data Sources

Information from a series of sources was referenced for this study. The primary and secondary sources are outlined below.

Primary sources: Survey data collected specifically for this or related studies.

- General survey of the Whicher Scarp area from 1990 to 2007. Much of this general survey was associated with the specific studies outlined below and additional work by A Webb in his time working with CALM, DoE and DEC in the Busselton area.
- Quadrat data from Gibson *et al.* (1994), DEP (1996), Wildflower Society of WA (Inc) CALM and DoE (2005) and DEC (2006a). A brief outline of this data is given below under section 2.5.1.
- Updated lists by GJ Keighery compiled over the last 20 years:
    - Whicher National Park (GJ Keighery 2006);
    - Dardanup Forest Block (GJ Keighery *et al.* 2008);
    - Boyanup Forest Block (GJ Keighery 2007); and
    - Yelverton Forest Block (GJ Keighery *et al.* 2007).
- GJ Keighery (1996 and 1999) and subsequent follow ups – Survey and herbarium records for a study of the conservation status of species on the Swan Coastal Plain south of the Gingin Brook.
- BJ Keighery *et al.* (2006) – Species listings for the Swan Coastal Plain and discussion and conservation status of significant flora.
- Swan Bioplan Mapping (see above).
- A variety of voucher specimens have been collected for each of these studies. While general collections are made, the majority of vouchers are of significant flora. These have been, or are to be, lodged at the WA Herbarium.

Secondary Sources: Herbarium material and project orientated survey, including the following.

- FloraBase (Western Australian Herbarium 1998 ongoing).
- Atkins (2006).
- Hearn *et al.* 2003a and b.
- Unpublished specific area reports – A series of unpublished reports have been reviewed and referenced. These provided varying levels of information.
- Quadrat data from the Argyle forest area (Environmental Survey and Management Pty. Ltd. 1999 and Bennett Environmental Consulting Pty Ltd and Onshore Environmental Consulting Pty Ltd 2006), Boyanup forest area (Halpern Glick Maunsell Pty Ltd 2002).

2.5 Floristic Associations

2.5.1 *Quadrat data*

A set of 124 10m x 10m quadrats was used in the study. Appendix 2 contains all the quadrat data in a series of sub-appendices. There is a large amount of data in the sub-appendices hence the information is presented in a variety of manners (MS Word tables, Excel Spreadsheets and/or MS Access database) generally in an electronic format (on disc). Electronic data is presented as this format facilitates searching for individual quadrats, studies, floristic groups etc. The file type and format (text or electronic) is described in each appendix heading.

The sources of these 124 10m x 10m quadrats and rationale for their inclusion in the study are outlined below.

- 44 quadrats were selected from those established in Gibson *et al.* (1994) and the System 6 and Part System 1 Update (DEP 1996). These quadrats were from SWAFCTs 1a, 21b and 10b (see section 1.3.1) or were located in woodlands on or near the boundaries of the Whicher Scarp.

- 70 quadrats from a series of studies between 1995 and 2006 (Wildflower Society of WA (Inc.) CALM and DoE 2005 and DEC 2006a) established to:
    - sample a set of transects from the Swan Coastal Plain across the Whicher Scarp to the Blackwood Plateau;
    - sample vegetation across drainage lines through the Whicher Scarp; and
    - supplement the 44 quadrats from Gibson *et al.* (1994) and DEP (1996).

  Due to limits on both time and resources these quadrats were generally restricted to remnant bushland areas on public lands with only a small number of quadrats from private property.

- 10 quadrats established in a bushland area located to the north of the Whicher Scarp near Harvey on a transitional area between the Foothills of the Swan Coastal Plain, the Darling Scarp and the Darling Plateau (Korijekup Conservation Park). This area lies in a similar position to the Swan Coastal Plain as the Whicher Scarp area, contains a suites of sands, laterites and combinations of these and it supports significant areas of Mountain Marri dominated vegetation.

Field observations indicated that the Swan Coastal Plain and Whicher Scarp vegetation extended beyond mapped regional boundaries along drainage lines and on some upland landscapes. As a consequence, quadrats were located outside the mapped regional boundaries of the Whicher Scarp. Data collected at each quadrat was interpreted to determine if the quadrat was considered to be located on the Whicher Scarp (Appendix 2a – MLU field).

These quadrats were established and described using similar methods. Care was taken to locate quadrats in the least disturbed vegetation available in the area being sampled. All were permanently marked with four steel fence droppers and their position was recorded using a GPS unit. More than two thirds of the quadrats (70%) were visited at least twice.

Slope, aspect, surface and subsurface soil and any rock substrate was described from each quadrat (Appendix 2a). This information was used to determine a general landscape position on the Whicher Scarp, that is lower slopes, mid-slopes or upper slopes and to describe broad soil and rock substrate categories (Appendix 2a – TOPO_POS, SOIL_UNCON, SOIL_CON, SOIL_COL and ROCKS_SURF/SUBSURF fields). Vegetation condition was scored on a six point scale with a score of one indicating native vegetation in near pristine condition and six indicating completely degraded vegetation (after BJ Keighery 1994, Appendix 1, Table 2 and see Appendix 2a for data).

Vegetation structure and dominants were recorded after the Muir (1977) and/or BJ Keighery (1994) classifications and have been reconciled for this study to follow Keighery (after Appendix 1, Table 1). Appendix 2b contains this information and Appendix 2c the descriptions of each of the vegetation units at each quadrat.

Within each quadrat all vascular plants were recorded (Appendix 2d). Species nomenclature was periodically updated to reflect taxonomic changes and an increased understanding of the flora of the Swan Coastal Plain and the Whicher Scarp. Species nomenclature follows current usage at the Western Australian Herbarium except where otherwise indicated (negative numbers in NAME_ID field).

The regional mapping themes (soil-landscape, vegetation complexes and surface geology) are a useful framework for interpretation. To assist with this, the map unit (from each theme) in which each quadrat occurred was determined by a GIS analysis. The results of this are provided in Appendix 2a (fields Subsystem MAPPING_UN (DAFWA 2007), rfaVEGCOMP (CALM 1998a), HeddleVEGTYPE (DCE 1990) and EnvGeol CODE (Anon 1981 and 1982, Belford 1987a and b, Jordan 1986, Leonard 1991)).

2.5.2 *Analysis*

Appendices 2a and 3 contain various outputs generated for, or by the analysis. The information in these appendices is presented in a variety of manners (MS Word tables, Excel Spreadsheets and/or MS Access

database). Electronic (on disc) data is presented as the datasets are large and this format facilitates searching for individual quadrats, floristic groups, species and species groups. The format and location (text or electronic) is described in each appendix heading.

Survey related patterns that appear to be inconsistent with geographic patterns are frequently evident in the results of the numerical analysis of data from surveys conducted by different people and/or in different years or seasons. It is interpreted that these are the result of differences, often systematic, in either seasonal expression, survey effort, experience or application of plant nomenclature. Thus it is critical that such possibilities are reviewed before analysis, or at least an iterative process of analysis, review and reconciliation is undertaken.

The floristic data for the 124 quadrats was compared at a survey level and it was interpreted that the data from the various incorporated studies were reasonably compatible. A series of species reconciliations were made (Appendix 3a) to account for nomenclature differences and for taxa groups known to have been confused or potentially confused in the field and between studies.

While it is recognised that singletons have been omitted in some studies (e.g. Gibson *et al.* 1994, 2004), this was not done in this study. Such omissions are based on the hypothesis that singletons contribute 'noise' to the data. However, eliminating singletons can have a major impact on the species used in the analysis if there is a clustering of singletons in some sites. In the present study this was the case. Seven sites had 5 or more singletons. For 8 sites, these represented more than 10% of their species complement.

A number of studies have included weed species (e.g. Gibson *et al.* 1994, 2004). While there are arguments for and against including these, the potential of influencing the classification based on differential disturbance history is real. In general, the quadrats from the smaller remnants on the Swan Coastal Plain (or near the Swan Coastal Plain) had a larger proportion of weeds than did those from the larger bushland areas on the Whicher Scarp. Thus, to reduce the impact of land use history, it was decided to exclude weeds in the analysis.

A variety of PATN modules (Belbin 1987) were used with several variants of these data during the process of examining the data. The modules used to produce the results reported here were ASO (calculation of similarity matrix), FUSE (classification based on the results of ASO), DEND (representation of classification) and GDEF (group definition). These were applied where the 124 quadrats were being classified and the transposed data when the 742 species were classified. No ordination was generated. In all cases the default options were used.

For the purpose of exploring the data, the grouping of quadrats was made at the 10, 20 and 40 group levels. The groupings for species were made at the 30, 60, 120 and 240 group levels.

The results from PATN were imported into a MS Access database through which a range of summaries were made. These summaries are presented in Appendix 3b in both MS Access database and MS Excel formats.

2.6 Flora

2.6.1 *Total Flora*

Using the sources outlined above, a series of locations, areas (Whicher National Park, Dardanup Forest Block, Boyanup Forest Block and part Yelverton Forest Block) and 88 quadrats were determined to lie on or near the Whicher Scarp (Appendix 2a and 5c) and the records combined to give a listing of the flora for Whicher Scarp. It is expected that the flora list records about 90% of the expected flora of the Whicher Scarp.

2.6.2 *Significant Flora*

A large number of the taxa from the Whicher Scarp are allocated to a series of categories related to conservation significance. The significance categories follow those developed through a series of reports on the flora of the Swan Coastal Plain and other bushland areas in the south-west of WA (GJ Keighery 1990, Trudgen 1991, Gibson *et al.* 1994 and BJ Keighery *et al.* 1996a). A preliminary set of these categories was applied in *Bush Forever* (Government of WA 2000).

The categories of significance used in assessing bushland areas for regional conservation value are detailed below. The 'regional' context of the area being assessed for significant flora is pivotal in the determination of the significant taxa in a specific area of bushland. The regional context must be defined when determining significant flora. In this report the regional context is the Whicher Scarp. When considering the categories of significance the following should be noted.

- All taxa on the State's and Commonwealth's listings of threatened flora are included. The State's listing is based on the State's boundary. However, not all significant taxa have features that are relevant under this process (for example range ends).
- New taxa and/or significant morphological or genetic variants (known or suspected) were regularly identified in the survey. Some of these taxa will eventually be listed as threatened flora but the timing of the listing is necessarily lengthy and not always conducive to conservation planning.
- There is a considerable amount of overlap between the various categories of significance. Taxa may be listed under one or more categories of significance. For example, all listed threatened flora will generally be listed under at least three categories.

2.6.2.1 Western Australian Listed Species

The Department of Environment and Conservation has statutory responsibility for flora conservation and particular responsibility for threatened flora. Section 23F of the *Wildlife Conservation Act 1950* prohibits the 'taking' of Declared Rare Flora (generally referred to as threatened flora) by any person on any land throughout the State without the consent in writing of the Minister for the Environment.

A number of criteria are used to identify Declared Rare Flora (DRF or R and X after Appendix 1, Table 3). These are related to the taxon being well defined and readily identifiable and the extent to which the taxon's distribution in the wild has been recently determined by competent botanists. The status of a threatened plant in cultivation has no bearing on the matter as the legislation only refers to the status of the plant in the wild. Declared Rare Flora are also allocated an IUCN code (see Appendix 1, Table 4) and are generally gazetted once each year.

Taxa under consideration for listing as Declared Rare Flora and taxa considered rare but not threatened are allocated priority codes (P1 to 4) as outlined in Appendix 1, Table 3. These can be listed at any time.

2.6.2.2 Commonwealth Listed Species

The Commonwealth *Environment Protection and Biodiversity Conservation Act 1999* (EPBC Act) came into effect on 16 July 2000. The EPBC Act provides protection for matters of 'national environmental significance', these being World Heritage properties, Ramsar wetlands of international importance, nationally threatened animal and plant species and ecological communities, internationally protected migratory species, Commonwealth marine areas, and nuclear actions (including uranium mining). The most threatened categories of plant species listed by the State are also protected under the EPBC Act (Appendix 1, Table 4). However, it should be noted that there is a time delay of up to several years between updating of the lists of species protected at the State level and updating of those in the Commonwealth Act. The EPBC Act also makes reference to the 'habitat' of listed species of flora.

2.6.2.3 Geographic Variation

Individual species occur over a geographic area in a series of populations. The distance between these populations is dependant on the habitat requirements for each species and the extent of the habitat. The

distance between populations has ramifications for the amount of genetic dispersal within the species. Generally, the greater the isolation of the populations the more genetically distinct they can be expected to be. However, the effectiveness of this geographic separation, resulting in genetic differences, is related to each individual taxon's breeding system and its pollen and seed dispersal mechanisms.

An understanding of the patterning of variation within a species is of significance when designing a protected area system as sufficient representations of each species are required from each identified variant to aim to ensure that the variation within the species is encompassed within the protected area system. Hence sufficient representations of each species are required from different areas to ensure that:

- connectivity between contiguous/semi-contiguous populations is maintained; and
- populations from widely separated locations are maintained.

Particular attention should be given to the following features of the population/s of the species.

2.6.2.3.1 Taxa Range Ends (r[7])

This applies to populations, or groups of populations, at the ends of the plant's geographic range. At times, it may be applied on a regional or sub-regional basis. For example, on the Swan Coastal Plain Wandoo (*Eucalyptus wandoo*) is restricted to particular landforms, the Foothills and Pinjarra Plain, and its most southern location (range end) on the Plain is in the Boyanup area.

2.6.2.3.2 Disjunct Taxa (d)

This is generally applied to populations that are outside the main geographic range of the species. Isolation of populations from the main populations indicates that they may represent variation not encompassed in the main range. Also included under this category are taxa only known from disjunct populations or groups of disjunct populations. When a population of a species shows a significant disjunction, and/or a distinctive habitat preference, from the typical range and/or habitat the taxonomic and genetic status of the populations should be investigated.

2.6.2.3.3 Population Status

A series of categories are applied to all State listed flora as well as other taxa with populations in the study area that fall into these categories. These categories are listed below.

- Poorly reserved taxa (p) – A taxon is considered poorly reserved when it is known from only a few populations in reserves and/or is not known to be reserved in the study area. This applies to all State listed flora.
- Significant population/s (s) – This refers to aspects of the size, age and health structure of the population/s. That is, the population/s represent a significant number of the known individuals of the taxon in the region and/or a population in good condition (that is, a mixture of different-aged healthy individuals).
- Uncommon taxa (u) – Populations in a specific area/region that are uncommon in that particular region/area. The region/area should be defined. This will generally apply to disjunct populations.

2.6.2.4 Taxa with Regional and/or Ecological Preferences

This covers taxa that are confined to a particular habitat and/or region/area.

2.6.2.4.1 Endemic Taxa (e)

The term endemic is here used for taxa restricted to a defined region/sub-region and/or major landform element. This approach is generally preferred to the terms 'broad', 'narrow' or 'local' endemic as the definition of these terms is very variable, hence confusing. Also, when the aim of conservation planning is to protect the characteristics of a region/area, the relationship between that region/area and the distribution of a particular species is of interest. Maps 1, 2 and 3 and Table 1 show the regions/areas used in this study. At times there is some degree of uncertainty about this character. This relates to distributions being poorly

[7] A series of codes have been allocated to the different significance categories.

know, misallocations of taxa and the non-specific nature of many localities on herbarium labels. In the determination of this character we have been guided by the authors' knowledge of each taxon and its habitat requirements.

2.6.2.4.2 Taxa with Ecological Preferences (h)

Every species has particular habitat requirements. This category refers to taxa that are confined to a particular habitat in a particular major landform element in the study area. An individual taxon with several distinctive habitat preferences is also of interest. If a taxon occurs in two distinctive habitats it is likely that two distinct taxa could well be recognised, on morphological and/or genetic criteria, with further study. Many endemic and listed taxa have specific habitat requirements and are listed under this category.

2.6.2.5 Taxa with Morphological and/or Genetic Variation

This category refers to populations of a species that are significant local variants on morphological and/or genetic grounds. Recent work is distinguishing such variants as taxonomically distinct. For example, *Diplopeltis huegelii* now has two subspecies, one within the Spearwood Dunes (on the Tamala Limestones) and another on the Darling Scarp (GJ Keighery 1998).

3 RESULTS AND DISCUSSION

3.1 Current Extent of Native Vegetation and Vegetation Complexes

For the purposes of considering the remaining native vegetation on the Whicher Scarp, the areas of the vegetation complexes (after CALM 1998a and Mattiske and Havel 1998) are used (Table 4). The intersections of the native vegetation remaining (DAFWA 2006) with the vegetation complex mapping and land tenure/category was done by DEC for the SWBP (DEC 2007b).

It is important to keep in mind when considering information on the native vegetation remaining that the remnant native vegetation mapping used is necessarily derived from dated aerial photography and that the scale of capture is relatively small (1:5,000 to 1:20,000). As a consequence, it is generally considered that the percentages of native vegetation remaining are an overestimate of the native vegetation remaining at present, and at the date these figures were determined. The principal factors contributing to this overestimation are:

- the preferential mapping of treed landscapes, leading to some mapping of areas that are parkland cleared or completely degraded;
- the inclusion of areas that are approved for clearing through development approvals and/or clearing permits; and
- the clearing of some areas since the time of the aerial photography.

It is, therefore, important to bear these issues in mind when the percentages of the vegetation complexes remaining are approaching 10% or 30%, critical thresholds used in the determination of regional significance of vegetation (EPA 2006). Here 15% and 40% respectively are seen as allowing for these considerations.

Three of the Yelverton vegetation complexes (Y, Yf and Yw) have less than 30% of their original extent remaining on the Whicher Scarp, within the error margins applied to these statistics. However, of the remaining three vegetation complexes one has only 327 ha (Wcv) remaining and the other two (Wc and Yd) have relatively small areas remaining (1254 ha and 3035 ha respectively).

3.2 Floristic Associations

A dendrogram describing the classification of the 124 quadrats was produced (Appendix 3b: Dendrogram). This shows the 10, 20 and 40 group level of classification. Whether these represent ‘real’ communities is subject to analysis and interpretation. Both the dendrogram (Appendix 3b: Dendrogram) and the association matrix (Figures 6 to 9 and Appendix 3b: Association matrix) provide evidence in this regard. The association matrices show that at the 10 and 20 group levels (Figures 6 and 7 respectively), groups are both distinct from each other and others are heterogeneous. At the 40 group level (Figure 8) most groups are reasonably uniform. Most are distinct but there is some overlap. The matrix with individual sites (Figure 9 and Appendix 3b: Association matrix) shows more clearly the degree of overlap.

It is concluded that a little less than 40 groups is probably a reasonable representation of this data set.

A major difficulty for this study is the significantly uneven number of quadrats per group (Table 5). In particular, it is difficult to evaluate the significance of groups with only one or two quadrats. At the 10 group level there are 2 groups with one quadrat, at the 20 group level there are 6 and at the 40 group level there are 15 (or more than a third of the groups). These tend to be clustered in the ‘lower’ part of the classification (it will be shown later that these are largely wetland communities). That is, there are a range of distinct units which have more in common with each other than the bulk of the sites.

These groupings were considered against the species groups (Appendix 3b: Two way table of species and sites (quadrats)) together with other data related to the quadrats (Appendix 2a, 2b and 2c) and individual taxa.

It was concluded that a traditional ‘cut’ of the dendrogram at a particular association level (0.8466) be used to determine eight floristic groups (Groups A to H). The right hand side of Table 5 outlines how these groupings were made. These codes are included in the presentation of the dendrogram (Appendix 3b).

Below this eight floristic group level it was concluded that a traditional 'cut' of the dendrogram at a particular association level was not easy to substantiate from the amount of data (eg. quadrats) available. Five of the floristic groups (A, B, C, F and G) were further subdivided at different levels of the classification to distinguish a total of 20 subgroups or floristic community types (also referred to as community types or WHSFCT). The right hand side of Table 5 outlines how these groupings were made. These codes are included in the presentation of the dendrogram (Appendix 3b).

A simplified classification dendrogram is presented in Figure 10 (dendrogram has been adjusted to represent the classification of floristic community types) and the floristic groups are listed in Table 6.

The cohesiveness of these 20 floristic community types (subgroups) is variable. Some are well defined and distinct while others are considered poorly defined and, at times, represent a single quadrat. These floristic community types have been presented and described as they are indicative of the floristic patterning of the vegetation in the Whicher Scarp. As previously noted, the Whicher Scarp is an interzone between two Biogeographic regions hence this patterning is gradational which is reflected in the weak definition of some of the groups.

There is modest accord between the present classification and that of previous studies on the Swan Coastal Plain (Table 7). This table also shows that there are a number of distinct units that were not sampled in previous studies.

The classification generally reflected the upland or wetland location of the quadrats and the major landforms and soils of the study area (Table 8 and 9). There is a slight relationship with the soil-landscape zones. However, there is a closer relationship to the landform and soils of the units. This basic division into upland (floristic groups A, B, C and D) and wetland (floristic groups E, F, G and H) groups in the study area has been documented in a series of studies (Gibson *et al.* 1994, Griffin and Keighery 1989) and as seen in the previous studies this can transgress the major landform units in the study at different levels of the classification.

There are six quadrats described as wetlands in the field that are not in the wetland groups. All but one of these is located on a creek or river, either straddling the river or on the banks of the river (Table 9 and Appendix 2a UP_OR_WET field). These quadrats contain a significant number of taxa (5 to 21) found in between 1 and 4 quadrats. For these particular locations it was considered that the quadrat shape was not appropriate as it straddled the interface between several communities. As a consequence few wetland species from the narrow channel were sampled and most of which are uncommon taxa. As a consequence the upland taxa sampled on the channel banks were sufficient in number to place these quadrats in upland groups. This is reflected in the total number of taxa in these quadrats (56 to 81) while wetland groups have significantly less taxa (7 to 64 in floristic groups E, F and G, and 28 to 66 in floristic group H).

The eight floristic groups, A to H, and their corresponding floristic community types (subgroups A1, A2 etc.), are described and discussed below. Appendix 4 contains maps of floristic groups A to H, and standard descriptions and maps of the floristic community types.

In the discussion reference is made to the species groups associated with the floristic groups and community types. In each case the taxa in each species group are listed. Appendix 3b: Two way table of species and sites lists all taxa from the analysis ordered in species group at the 30, 60 and 120 group levels. To aid reference to the particular species group in Appendix 3b each species group listing in the text is followed by a code to indicate the relevant species. For example, species group 24/50/93 refers to species group 24 at the 30 group level, 50 at the 60 group level, and 93 at the 120 group level. When the group at the 30/60 group or 60/120 group are the same, the second level group is given brackets. For example, species group 25/52 (101) refers to group 25 at the 30 group level, group 52 at the 60 group level which is a single group (101) at the 120 group level.

3.2.1 *Floristic group A: Whicher Scarp woodlands of grey/white sands*

Photographs 3 to 8

Group A encompasses 23 plots from very species diverse woodlands with average native taxa per plot of 70 (R[8]49-97) and very few weeds 2 (R0-7). *Eucalyptus haematoxylon* is typically associated with group A as are Jarrah, Woody Pear (*Xylomelum occidentale*) and Candlestick Banksia (*Banksia attenuata*).

Group A is virtually confined to the grey/white sands on the midslopes of the Whicher Scarp (Table 9). It is rarely associated with laterites. This group has the highest mean species richness and the quadrat with the highest number of taxa recorded for a single quadrat (97 taxa in quadrat UCL06) in the study area.

The distribution of group A indicates a significant vegetation change occurs in the Central Whicher Scarp, this group being found in the Central and North Whicher Scarp between the Whicher and Dardanup forest areas. This distribution almost matches that of *Eucalyptus haematoxylon* as a component of the Whicher Scarp and the adjacent Swan Coastal Plain. Of particular interest in this group are two quadrats (quadrats ACTN01 and OATES-1) that are mapped on the Swan Coastal Plain in all regional mapping. However, these two quadrats are located within the distribution of *Eucalyptus haematoxylon* woodland on the Plain, indicating that the communities in this area are closely allied with those of the Whicher Scarp.

Group A is distinguished by:

- the presence of a group of common taxa of leached sands especially: *Amphipogon turbinatus, Leporella fimbriata, Drosera menziesii* subsp. *penicillaris, Hypolaena exsulca, Dasypogon bromeliifolius, Stirlingia latifolia, Petrophile linearis, Melaleuca thymoides, Adenanthos meisneri, Trachymene pilosa, Pyrorchis nigricans, Lyginia barbata, Phlebocarya ciliata, Banksia attenuata, Conostephium pendulum, Hibbertia vaginata, Bossiaea eriocarpa,* and *Jacksonia* sp. Whicher (species group 24/50/92; Appendix 3b);
- the presence of a group of taxa principally associated with the Jarrah Forest: *Mesomelaena tetragona, Kingia australis, Tetrarrhena laevis, Astroloma ciliatum, Xanthorrhoea gracilis, Isopogon sphaerocephalus, Hibbertia cunninghamii, Johnsonia lupulina, Hakea cyclocarpa, Dasypogon hookeri, Hibbertia glomerata, Banksia grandis, Adenanthos barbiger, Calothamnus sanguineus* and *Eucalyptus haematoxylon* (species group 26/53/102; Appendix 3b); and
- the absence of the group of taxa that are typically associated with deep sands of the Swan Coastal Plain: *Stylidium brunonianum, Johnsonia acaulis, Gompholobium tomentosum, Calytrix flavescens, Leucopogon conostephioides, Lysinema ciliatum, Banksia ilicifolia, Kunzea glabrescens, Stylidium neurophyllum* and *Eremaea pauciflora* var. *pauciflora* (from species group 24/50/93; Appendix 3b)

Also of interest, especially in regard to patterning in group A is the presence of a group of damp sand species being: *Aphelia cyperoides, Centrolepis aristata, Drosera glanduligera, Kunzea rostrata, Siloxerus humifusus, Hydrocotyle callicarpa, Pericalymma ellipticum, Stylidium calcaratum* and *Drosera menziesii* subsp. *menziesii* (species group 25/52 (101); Appendix 3b). This group is of particular interest as a previously observed feature of Whicher Scarp vegetation is the occurrence of Swan Coastal Plain wetland taxa in upland areas indicating a complex local hydrology.

This group does not directly relate to either of the two upland Whicher Scarp groups identified in Gibson *et al.* (1994) as it contains one quadrat (OATES-1) from the sand group on the Whicher Scarp, SWAFCT 21b and two quadrats (will02, will04) from the laterite group SWAFCT 1a. The presence of these quadrats in Group A reflects the significance of taxa associated with both sands and the Jarrah Forest in the formation of Group A.

This group has a recognisable level of patterning and five community types are recognized and described in Appendix 3. The most well defined group is group A1.

[8] R = range in numbers of taxa per quadrat.

As can be seen from the descriptions below, these community types reflect the rapid species changeover, high species richness and transitional nature of the visually similar woodlands of the Whicher Scarp. As a consequence, there is a need to protect a series of these woodland areas to conserve them adequately.

3.2.1.1 Floristic community type A1: Central Whicher Scarp Mountain Marri woodland

No quadrats: 7, Photographs 3 and 4
This community type is located on Whicher Scarp mid slopes. A group of taxa identify this group, being: *Ricinocarpos* aff. *cyanescens* (Photograph 36), *Hibbertia ferruginea, Platysace filiformis, Conospermum capitatum* subsp. *glabratum, Thysanotus arbuscula, Schoenus brevisetis, Phlebocarya filifolia, Leucopogon glabellus, Pimelea rosea* subsp. *rosea, Adenanthos obovatus, Stylidium carnosum* and *Gompholobium capitatum* (species group 24/47/83; Appendix 3b).

This community type lacks a group of species which are present in subgroups A2 – A5, being such species as: *Lomandra preissii, Stylidium schoenoides, Pterostylis nana, Platysace compressa, Stylidium piliferum, Acacia applanata, Pterostylis sanguinea, Thysanotus sparteus, Boronia spathulata, Billardiera variifolia, Tricostularia neesii* var. *neesii, Thysanotus multiflorus, Conostylis laxiflora, Boronia dichotoma, Cassytha racemosa, Daviesia physodes, Poranthera microphylla, Hibbertia huegelii* and *Levenhookia stipitata* (species group 24/49/89; Appendix 3b).

3.2.1.2 Floristic community type A2: North Whicher Scarp Jarrah and Woody Pear woodland

No quadrats: 5, Photograph 5
This community type is found on the Whicher Scarp lower slopes and adjacent Plain in the North Whicher Scarp from the Abba to the Dardanup area. Species groups of interest in forming this group are the group of taxa associated with the damp sands: *Aphelia cyperoides, Centrolepis aristata, Drosera glanduligera, Kunzea rostrata, Siloxerus humifusus, Hydrocotyle callicarpa, Pericalymma ellipticum, Stylidium calcaratum* and *Drosera menziesii* subsp. *menziesii* (species group 25/52 (101); Appendix 3b).

A quadrat located at the interface of the Swan Coastal Plain and the Whicher Scarp (WONN-2) is a poor fit in this group. On the basis of its grouping in SWAFCT1b in Gibson *et al.* (1994) this is to be expected. However, it is also poorly allied with SWAFCT1b. The unusual nature of this quadrat may reflect its location in an ecotone but, as there is so little vegetated land remaining at the interface of the Plain and Scarp, it may represent a unit of vegetation that has been almost completely cleared.

3.2.1.3 Floristic community type A3: North Whicher Scarp Banksia and Woody Pear woodland

No quadrats: 4, Photographs 6 and 7
This community type is a drier representation of Group A and is missing the damp sands group present in A2, A4 and A5 (see above in section 3.2.1.2) and the group that distinguishes A1 (species group 24/47/83; Appendix 3b and see section 3.2.1.1). This community type is located in the northern section of the North Whicher Scarp.

3.2.1.4 Floristic community type A4: Whicher Scarp Banksia grandis, Jarrah and Marri woodland

No quadrats: 1
A single quadrat forms this community type (will02) and, while it shares a large number of taxa with other quadrats, it includes a large number of singletons (four) and six taxa rarely found in other quadrats. This is a further quadrat located near the interface of the Swan Coastal Plain and the Whicher Scarp and the unusual nature of this quadrat may reflect its location in an ecotone but, as there is so little vegetated land remaining at the interface of the Plain and Scarp, it may represent a unit of vegetation that has been almost completely cleared.

3.2.1.5 Floristic community type A5: Central/North Whicher Scarp Mountain Marri woodland

No quadrats: 6, Photographs 8
This community type is found in the Central and North Whicher Scarp overlapping the southern section of A2's range. Like A2, it has a good representation of taxa associated with the damp sands: *Aphelia cyperoides, Centrolepis aristata, Drosera glanduligera, Kunzea rostrata, Siloxerus humifusus, Hydrocotyle callicarpa, Pericalymma ellipticum, Stylidium calcaratum* and *Drosera menziesii* subsp. *menziesii* (species group 25/52 (101); Appendix 3b) and another group of damp taxa: *Lepyrodia macra, Caesia occidentalis, Boronia defoliata* and *Acacia mooreana* (species group 26/55/110; Appendix 3b).

3.2.2 *Floristic group B: Swan Coastal Plain centred woodlands of grey/white sands*

Photographs 9 to 11
Group B is formed from 22 quadrats and is less diverse than Group A, having an average of 55 (R34-79) native taxa and more weeds (average 3, R0-8) per quadrat. The woodlands in this group are typically dominated by *Banksia attenuata.*

Group B is effectively equivalent to SWAFCT 21b, with all but one of the quadrats from this group in Gibson *et al.* (1994) being in Group B. These woodlands are distinguished by the presence of *Banksia attenuata*, Bassendean Sand taxa, a general absence of *Eucalyptus haematoxylon*, and their lower species diversity (lowest of the upland woodland units). All but four of the plots located on sands on the Swan Coastal Plain were in this group. This is a well linked group, with two community types distinguished.

Within the Whicher Scarp the majority of Group B is found in the North Whicher Scarp from the Capel River to Dardanup area. The only other location of this group is single quadrat (CHAM03) in the West Whicher Scarp.

Group B is distinguished by the:

- presence of a group of common taxa of leached sands especially: *Amphipogon turbinatus, Leporella fimbriata, Drosera menziesii* subsp. *penicillaris, Hypolaena exsulca, Dasypogon bromeliifolius, Stirlingia latifolia, Petrophile linearis, Melaleuca thymoides, Adenanthos meisneri, Trachymene pilosa, Pyrorchis nigricans, Lyginia barbata, Phlebocarya ciliata, Banksia attenuata, Conostephium pendulum, Hibbertia vaginata, Bossiaea eriocarpa, and Jacksonia* sp. Whicher (species group 24/50/92; Appendix 3b) and *Stylidium brunonianum, Johnsonia acaulis, Gompholobium tomentosum, Calytrix flavescens, Leucopogon conostephioides, Lysinema ciliatum, Banksia ilicifolia, Kunzea glabrescens, Stylidium neurophyllum* and *Eremaea pauciflora* var. *pauciflora* (species group 24/50/93; Appendix 3b); and
- very low frequency of taxa principally associated with Jarrah Forest: *Mesomelaena tetragona, Kingia australis, Tetrarrhena laevis, Astroloma ciliatum, Xanthorrhoea gracilis, Isopogon sphaerocephalus, Hibbertia cunninghamii, Johnsonia lupulina, Hakea cyclocarpa, Dasypogon hookeri, Hibbertia glomerata, Banksia grandis, Adenanthos barbiger, Calothamnus sanguineus* and *Eucalyptus haematoxylon* (species group 26/52/102; Appendix 3b).

Two community types were distinguished; these are discussed below and described in Appendix 4.

3.2.2.1 Floristic community type B1: Swan Coastal Plain/North Whicher Scarp *Banksia attenuata* woodland

No quadrats: 21, Photograph 9
This community type contains the majority of quadrats and is described above.

3.2.2.2 Floristic community type B2: West Whicher Scarp *Banksia attenuata* woodland

No quadrats: 1, Photographs 10 and 11
This community type is formed from the only grey sand quadrat from the West Whicher Scarp. Obviously there is need for further quadrats from this area. However, it was observed that this quadrat was floristically

similar to the open *Banksia attenuata* woodlands with Peppermint (*Agonis flexuosa*) from the grey sands of the West Whicher Scarp. Peppermint is uncommon in the Central and North Whicher Scarp. With only 34 native taxa in the single quadrat this group is species poor when compared with an average of 56 in Group B1. While this plot is adjacent to a dieback front and could well have dieback present this is not considered to be the cause of the lower species diversity as a significant number of the quadrats in group B1 are in or adjacent to areas infected by dieback. It is generally considered that both groups are impacted by dieback.

While the sampling of grey sands on the West Whicher Scarp was very poor it is considered that this quadrat could be indicative of a group of grey sand communities in this area, allied with those identified in community type B1. The grey sands were difficult to sample in the current study as, while there are a number of blocks of bushland in this area they are, mostly private lands.

This group completely lacks a group of taxa: *Lomandra preissii, Stylidium schoenoides, Pterostylis nana, Platysace compressa, Stylidium piliferum, Acacia applanata, Pterostylis sanguinea, Thysanotus sparteus, Boronia spathulata, Billardiera variifolia, Tricostularia neesii* var. *neesii, Thysanotus multiflorus, Conostylis laxiflora, Boronia dichotoma, Cassytha racemosa, Daviesia physodes, Poranthera microphylla, Hibbertia huegelii* and *Levenhookia stipitata* (species group 24/49/89; Appendix 3b). A significant scattering of taxa from this group is found throughout Groups A and B, except for community types A1 and B2.

3.2.3 *Floristic group C: Whicher Scarp woodlands of coloured sands and laterites*

Photographs 12 to 18
Group C is formed from 49 quadrats and is typically associated with laterites and/or coloured sands, often with a finer clay/loam fraction. This group has the strongest affinities with the flora of the Jarrah Forest. This is also a species diverse group, with an average native taxa per plot of 67 (R46-86) and generally few weeds (average 2, R0-9). The diversity is comparable with that in Group A.

Group C is virtually equivalent to SWAFCT 1a from Gibson *et al*. (1994). Similarly to SWAFCT 1a, Group C is principally associated with the Whicher Scarp and the Blackwood Plateau. Three of the quadrats in Group C (ACTON-1, ACTN02 and Norm02) are mapped on the Swan Coastal Plain in all regional mapping but are in this group. Both ACTON-1 and ACTN02 are well tied to the group, suggesting that again, the communities of the Whicher Scarp extend onto the Plain (see section 3.2.1 for discussion in regard to quadrats ACTN01 and OATES-1). ACTON-1 is of particular interest as it is located over two kilometres from the Whicher Scarp and Swan Coastal Plain interface, the other three quadrats (ACTN01 and 02 and OATES-1) that ally floristically with the Whicher Scarp being within less than half a kilometre of the interface. The ACTON-1 quadrat is located on red sands and was the only quadrat able to be sampled in Gibson *et al.* (1994) on this surface type. As discussed below (section 3.2.3.6), Norm02 is poorly allied with this group and forms a community type of its own.

Group C is distinguished by the:

- concentrated representation of the group of taxa principally associated with the Jarrah Forest: *Mesomelaena tetragona, Kingia australis, Tetrarrhena laevis, Astroloma ciliatum, Xanthorrhoea gracilis, Isopogon sphaerocephalus, Hibbertia cunninghamii, Johnsonia lupulina, Hakea cyclocarpa, Dasypogon hookeri, Hibbertia glomerata, Banksia grandis, Adenanthos barbiger, Calothamnus sanguineus* and *Eucalyptus haematoxylon* (species group 26/53/102; Appendix 3b); and
- general low frequency of the group of common sand taxa (species group 24/50; Appendix 3b).

Patterning is evident in Group C but this is less robust than that identified in Group A. Generally the community types are poorly differentiated, being separated by a greater frequency of some common and less common sand taxa in community types C1 and C2, and a greater frequency of laterite favouring taxa in community types C3 to C6.

This group has a recognisable level of patterning and six community types distinguished. The most well defined group is C1.

3.2.3.1 Floristic community type C1: Central Whicher Scarp Jarrah woodland

No quadrats: 10, Photographs 12 and 13
This community type is associated with coloured sands on the moderate to gentle slopes of the Central Whicher Scarp in the Whicher forest and Treeton forest. The community type has the strongest representation of a less common group of southern sand taxa: *Podocarpus drouynianus*, *Loxocarya cinerea*, *Allocasuarina fraseriana*, *Drosera stolonifera*, *Amperea ericoides*, *Thysanotus triandrus*, *Cyathochaeta equitans*, *Hibbertia quadricolor*, *Comesperma calymega*, *Lepidosperma pubisquameum*, *Conospermum paniculatum*, *Acacia preissiana* and *Hybanthus debilissimus* (species group 24/48 (87); Appendix 3b).

3.2.3.2 Floristic community type C2: Whicher Scarp Jarrah woodland of deep coloured sands

No quadrats: 8, Photograph 14 and 15
This community type is found scattered through the Central and North Whicher Scarp on midslopes of the Whicher Scarp on deep, generally coloured sands rarely associated with laterites. This community type has the strongest representation of the common sand taxa in Group C, especially: *Hypolaena exsulca, Dasypogon bromeliifolius*, *Stirlingia latifolia*, *Petrophile linearis*, *Melaleuca thymoides* and *Adenanthos meisneri* (species group 24/50/92; Appendix 3b). These species are most strongly associated with a tighter portion of this community type found on the North Whicher Scarp in the Boyanup forest (boya01), Argyle forest (DAVE01 and 02) and the northern end of the Happy Valley forest (HAPP01, gibson02).

3.2.3.3 Floristic community type C3: Whicher Scarp Jarrah and Mountain Marri woodland on laterites

No quadrats: 11, Photograph 16
This community type is found on sands often associated with gravel and/or exposed laterite in the Central and North Whicher Scarp at the interface with the Blackwood Plateau. As would be expected, the community type is almost confined to upper laterite slopes. Linked through a loose scattering of less common laterite species (species group 26/54/104, 105 and 106; Appendix 3b) especially *Bossiaea* sp. Waroona (B.J. Keighery & N. Gibson 229), *Amblysperma spathulatum, Hakea lissocarpha, Goodenia eatoniana, Acacia lateriticola, Dryandra bipinnatifida* subsp. *multifida* and *Gompholobium marginatum* (species group 26/54/104; Appendix 3b) and the absence of most of the sand taxa especially those which help define Group C2 (species group 24/50/92; Appendix 3b).

Of interest in this community type are three quadrats in the Argyle forest (DAVE04, 05 and 06). These are closely linked through a less common group of laterite species: *Grevillea pulchella, Tetratheca hispidissima, Synaphea petiolaris* subsp. *petiolaris, Comesperma volubile, Paragonis grandiflora* and *Logania wendyae* (species group 26/54/106; Appendix 3b). Interestingly one of these taxa, *Logania wendyae*, is not located south of the Argyle forest and *Paragonis grandiflora* is a common component of laterite vegetation from the Argyle forest north.

3.2.3.4 Floristic community type C4: Whicher Scarp/Blackwood Plateau Jarrah and Marri woodland

No quadrats: 17, Photographs 17 and 18
This community type is found in all sectors of the Whicher Scarp and extends onto the Blackwood Plateau. Linked through a moderate representation of less common laterite species (species group 26/54/104, 105 and 106; Appendix 3b) especially *Amblysperma spathulatum, Patersonia juncea, Gompholobium marginatum, Xanthosia candida* and *Hypocalymma angustifolium* (species group 26/54/104; Appendix 3b) and the absence of most of the sand taxa especially those which help define Group C2 (species group 24/50/92; Appendix 3b).

Of interest in this group are the two quadrats located near the Sabina River (SABI02 and 06), being allied with Blackwood Plateau through the high presence of Jarrah forest taxa. While a series of wetland taxa (e.g. *Darwinia citriodora*) are associated with these plots they are not a large proportion of the species present.

3.2.3.5 Floristic community type C5: Dardanup Jarrah and Mountain Marri woodland on laterite

No quadrats: 2

This community type is located on an unusual surface of quartzite and laterite in the Dardanup forest which is an area where the Whicher Scarp, Blackwood Plateau and Darling Scarp interface. It is held together by two groups of uncommonly encountered laterite species being: *Lomandra* sp. Dardanup (G.J. Keighery 15065), *Lomandra spartea, Olax benthamiana, Andersonia heterophylla, Hemigenia incana, Acacia varia* var. *varia, Daviesia angulata* and *Pimelea preissii* (species group 16/27/47; Appendix 3b) and *Lomandra brittanii, Xanthorrhoea acanthostachya, Dryandra armata* var. *armata, Hakea stenocarpa, Stachystemon vermicularis, Lambertia multiflora* var. *darlingensis, Petrophile striata* and *Pimelea sulphurea* (species group 16/27/48; Appendix 3b). A series of these taxa are further discussed in section 3.5.3.

3.2.3.6 Floristic community type C6: Swan Coastal Plain Foothills Jarrah woodland on laterite

No quadrats: 1[9]

There is only one quadrat (Norm02) from the Foothills of the Swan Coastal Plain in Perth Metropolitan Region (PMR) in this community type. This community type is the most northern known and disjunct location of SWAFCT 1a and was an unusual member of that group. This quadrat has a large number of singletons (six including *Tetraria australiensis, Stypandra glauca, Dryandra kippistiana, Hakea auriculata, Jacksonia restioides* and *Eucalyptus marginata* subsp. *elegantella*) and taxa rarely found (six). This quadrat also shares few taxa with other quadrats in Group C. This plot was dominated by *Eucalyptus marginata* subsp. *elegantella*[10] and associated with woodland dominated by *Eucalyptus lanepoolei*. It is expected that this quadrat will be found to be most closely allied with Foothills units located to the south of the PMR near Pinjarra that were not sampled by Gibson *et al.* (1994) and DEP (1996). Work for Swan Bioplan between 2004 and 2007 established quadrats in the Foothills from Pinjarra to Waroona to provide a more comprehensive sampling of the Foothills south of the PMR (see comment on these in section 3.2.4 below).

3.2.4 *Floristic group D: Woodlands of the Harvey Swan Coastal Plain Foothills and Darling Scarp*

Group D is formed from ten quadrats located in the Korijekup Reserve in Harvey. This group is reasonably species diverse with an average native taxa per quadrat of 55 (R45-69), but has the equal highest average weed frequency for the groups (average 7, R3-17).

This group was included in the study to investigate the level of similarity between the vegetation of the Foothills and the Darling Scarp to that of the Whicher Scarp. This area was selected as it was the closest substantive public owned bushland area to the Whicher Scarp that shared a series of landform, soils and vegetation features with the Whicher Scarp. These shared characteristics are listed below.

- Landform – the location in a similar position and profile in relation to the Swan Coastal Plain as the Whicher Scarp, i.e. Swan Coastal Plain facing slopes of moderate grade.
- Soils – sequence of sands, laterites and quartzite/laterite.
- Vegetation – woodlands dominated by Marri, Jarrah and *Eucalyptus haematoxylon* and combinations of these.

No community types are considered in Group D. To delineate regional patterning in this group a further analysis should be done with quadrats located in the Foothills and along the Darling Scarp from Gibson *et al.* (1994), Markey (1997), DEP (1996) and DEC (2007a) in a similar manner to that done by Markey. The work for DEC (2007a) has established a series of quadrats to supplement those used by Markey. Markey's study area extended from Walyunga National Park to North Dandalup, additional quadrats being located along the Darling Scarp and associated Foothills, in the north from the Moore River to Walyunga National Park and, in the south, from Pinjarra to Harvey.

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[9] No map is given for this community type in Appendix 4, see Map 4a (most northern quadrat in the PMR) for location of this quadrat.

[10] *Eucalyptus marginata* subsp. *elegantella* is no longer recognised on Florabase but this taxon ia distinctive well known local variant and the name is here used to distinguish this variant.

Group D is distinguished by the:

- consolidated representation of laterite species of the Jarrah Forest/Darling Scarp taxa: *Macrozamia riedlei, Lagenophora huegelii, Lomandra purpurea, Leucopogon capitellatus, Austrodanthonia occidentalis, Leucopogon propinquus, Thysanotus manglesianus, Daucus glochidiatus, Microlaena stipoides, Caesia micrantha, Austrostipa campylachne, Dampiera alata, Luzula meridionalis, Bossiaea* sp. Waroona (B.J. Keighery & N. Gibson 229), *Amblysperma spathulatum, Hakea lissocarpha, Goodenia eatoniana, Acacia lateriticola, Dryandra bipinnatifida* subsp. *multifida* and *Gompholobium marginatum* (species group 26/54/104; Appendix 3b);
- presence of the group of taxa principally associated with Jarrah Forest, especially: *Mesomelaena tetragona, Kingia australis, Tetrarrhena laevis, Astroloma ciliatum, Eucalyptus calophylla, Xanthorrhoea gracilis, Isopogon sphaerocephalus* and *Hibbertia cunninghamii* (species group 26/53/102; Appendix 3b); and
- absence of the group of common sand taxa (species group 24/50; Appendix 3b).

3.2.5 *Floristic group E: Jarrah and Marri woodland wetland type 1*

No quadrats: 3 Photograph 19

Group E is a wetland group, formed from three quadrats. This group is species diverse for a wetland group, with an average native taxa per quadrat of 58 (R53-64), but with the equal highest average weed frequency for the groups (average 7, R2-11).

Group E is distinguished by the presence of:

- taxa associated with the damp sands: *Aphelia cyperoides, Centrolepis aristata, Drosera glanduligera, Kunzea rostrata, Siloxerus humifusus, Hydrocotyle callicarpa, Pericalymma ellipticum, Stylidium calcaratum* and *Drosera menziesii* subsp. *menziesii* (species group 25/52 (101); Appendix 3b); and
- a wetland species group: *Schoenus discifer, Drosera rosulata, Centrolepis mutica, Thelymitra flexuosa, Calothamnus lateralis, Philydrella pygmaea* subsp. *pygmaea* and *Grevillea manglesioides* subsp. *manglesioides* (species group 28/57; Appendix 3b)

This group can be referred to as floristic community type E as no subgroups are distinguished.

3.2.6 *Floristic group F: Jarrah and Marri woodland wetland type 2*

Group F is a wetland group, formed from four quadrats. This group has an average native taxa per quadrat of 43 (R40-45), and has a low weed frequency (average 2, R0-4).

This is a poor group linking through a series of common and uncommon upland and wetland taxa and is better considered as two community types. Only community type F1 is robust; the other is a poorly allied subgroup and is not considered sufficiently robust to describe.

3.2.6.1 Floristic community type F1 Sabina River Jarrah and Marri woodland

No quadrats: 2 Photograph 20

This community type is formed from two quadrats placed on the Sabina River alluvial fan where the Sabina River meets the Swan Coastal Plain. This community is distinguished by a group of wetland taxa of restricted occurrence in the study area: *Mirbelia dilatata, Lomandra pauciflora, Tremandra diffusa, Tremandra stelligera, Trymalium floribundum* subsp. *trifidum* and *Clematis aristata* var. *occidentalis* (species group 14/24/42; Appendix 3b). Three other taxa associated with wetlands are also significant in this community type: *Hovea elliptica*, *Leucopogon verticillatus* and *Darwinia citriodora* (species group13/23/40; Appendix 3b).

It is not expected that this group would be located elsewhere as the Sabina River is the only river vegetated to its intersection with the Plain. This very significant area should be added to the Whicher National Park.

3.2.6.2 Floristic community type F2: Miscellaneous Wetlands

No quadrats: 2
This is a poorly linked community type formed by two quadrats that have no close relatives.

3.2.7 *Floristic group G: West Whicher Scarp wetlands*

No quadrats: 2, Photographs 21 and 22
Two quadrats from the Carbunup River in the West Whicher Scarp form this group. Both quadrats are species poor, this group having an average native taxa per quadrat of 12 (R7-16), and average weed frequency 4 (R1-6).

The quadrats were linked by sharing two taxa, *Taraxis grossa* and *Astartea scoparia,* and the general low number of uncommon species in the quadrats. However, it is evident from the mapping of wetlands in the West Whicher Scarp that these two quadrats represent two wetland types (see below) that can be distinguished on a landform, structural and floristic basis. That is, while there is only one quadrat per group two community types are distinguished below. These two wetland types are discussed in section 3.4.3.1

3.2.7.1 Floristic community type G1: Creekline Blackbutt (*Eucalyptus patens*) and Marri forest

1 quadrat

3.2.7.2 Floristic community type G2: Shrublands of near permanent wetlands in creeklines

1 quadrat

3.2.8 *Floristic group H: Busselton Ironstones*

No quadrats: 11, Cover photograph 4
The last wetland group represents SWAFCT 10b: Shrublands on southern ironstones, the Busselton Ironstones, as described in Gibson *et al.* (1994 and 2000). Eleven quadrats from the ironstones surfaces are in Group H, nine from Gibson *et al*. (1994) and two from the Gale Road Ironstones.

A group of wetland taxa, some of which are restricted, or largely restricted to ironstone surfaces, are found in this group: *Opercularia vaginata* (Ironstone form) (B.J. Keighery and N. Gibson 238), *Loxocarya magna, Caustis dioica, Borya scirpoidea, Utricularia multifida, Thelymitra antennifera, Hakea oldfieldii, Centrolepis alepyroides, Stylidium ecorne, Dryandra squarrosa* subsp. *argillacea, Tremulina tremula, Andersonia ferricola, Haemodorum sparsiflorum, Utricularia violacea, Stylidium obtusatum* var. *obtusatum, Tribonanthes violacea* and *Stylidium megacarpum* (species group 28/57/114; Appendix 3b). The ironstone species include *Opercularia vaginata* (Ironstone form) (B.J. Keighery and N. Gibson 238), *Andersonia ferricola, Loxocarya magna* and *Dryandra squarrosa* subsp. *argillacea.*

In this study the Busselton Ironstones have an average native taxa per quadrat of 44 (R27-66), and an average weed frequency 5 (R1-12). For a consideration of community types in this group reference should be made to Gibson *et al*. (2000) which compares 28 quadrats on ironstone surfaces. Three Ironstone community types are distinguished. This grouping is comparable with that in this analysis with Ironstone community type 3F being found on the Whicher Scarp.

3.3 Threatened Ecological Communities

As outlined previously SWAFCT 10b: Shrublands on southern ironstones from Gibson *et al.* (1994), which is equivalent to Group H: Busselton Ironstones (this study), is listed by the State and Commonwealth as a threatened ecological community. This community is located both on the Central Whicher Scarp and the Swan Coastal Plain contiguous with the West and Central Whicher Scarp. Nine listed occurrences are within or adjacent to the Whicher Scarp (Table 1, Maps 2b, c, d and e) and the other is close by.

3.4 Restricted Vegetation Complexes and Plant Communities

3.4.1 *Vegetation Complexes*

As outlined earlier the Whicher Scarp is part of the Southern Jarrah Forest subregion but forms a very small percent, 0.7% of the subregion. That is, this is a naturally restricted landform. When the remaining area of native vegetation on the Whicher Scarp is considered to be reduced to 46% (9,215 ha from 20,183 ha, Table 4) of the original extent there is a relatively small area of Whicher Scarp vegetation complexes remaining.

Vegetation complexes (Table 2 and 4) are used in the criteria for assessment of regional significance as one of the surrogates for ecological communities (EPA 2006). As outlined previously three, of the Yelverton vegetation complexes (Y, Yf and Yw) have less than 30% of their original extent remaining, and another (Wcv) has only 327 ha remaining. Of the remaining two (Yd and Wc), only one (Wc) with around 3,000 ha remaining has a significant remaining area and percentage in formal and informal reserves (total 15% with 8% in formal reserves). The other complexes all have significantly less than 15% in both formal and informal reserves. These generally very small and relatively small areas of each vegetation complex reflect the restricted nature of the Whicher Scarp.

3.4.2 *Whicher Scarp Upland Woodland Floristic Associations*

The Whicher Scarp woodlands are distinguished from the woodlands of the Swan Coastal Plain and the Darling Scarp and Plateau by the presence of Group A: Whicher Scarp woodlands of grey/white sands. A further group, Group C: Whicher Scarp woodlands of coloured sands and laterites is typical of the Whicher Scarp and contiguous Blackwood Plateau.

However, as discussed previously the distinctiveness of the community types within the groups is often not clear due to the high species richness, rapid species changeover and transitional nature of the visually similar woodlands of the Whicher Scarp. Even so, there are a few community types that are relatively robust and have a restricted distribution, and these groups should be given particular attention in the consideration of the natural values of the Whicher Scarp vegetation. These groups are listed below.

- **Floristic group A: Whicher Scarp woodlands of grey/white sands**
- WHSFCT A1: Central Whicher Scarp Mountain Marri woodland.
- **Floristic group C: Whicher Scarp woodlands of coloured sands and laterites.**
- WHSFCT C1: Central Whicher Scarp Jarrah woodland.
- WHSFCT C2: Whicher Scarp Jarrah woodland of deep coloured sands.
- WHSFCT C5: Dardanup Jarrah and Mountain Marri woodland on laterite.

Also of interest in WHSFCT C2 are the quadrats from Boyanup (BOYA01) and Argyle forests (DAVE01 and 02) and northern end of the Happy Valley forest (HAPP01, gibson02) from the coloured sands of the North Whicher Scarp.

3.4.3 *Whicher Scarp Wetlands*

Generally the wetland floristic community types were related to too few quadrats to use this information alone to determine the extent and relationships of these wetland communities. However, quadrat data and general survey of the Whicher Scarp and the associated Foothills of the Swan Coastal Plain has identified some new related groups of permanent/near permanent wetlands that are typical of the areas of the Whicher Scarp and the Whicher Scarp and Swan Coastal Plain interface.

3.4.3.1 West Whicher Scarp Valley Wetlands

On the broad gentle slopes of West Whicher Scarp a group of wetland communities has been identified associated with permanent/near permanent wetlands of the natural drainage systems. It appears that these wetlands are fed by persistent freshwater seepages. These wetlands were most commonly found along the Carbunup River (and its tributaries) and the brooks and creeks to the west of the Carbunup River. Smith (1973) appears to have mapped these communities as *Melaleuca* dominated shrublands (see section 1.3.1).

Two wetland plant communities are identified. These have distinctive structural and floristic components. These communities are associated with disjunct occurrences of a series of taxa including: *Homalospermum firmum, Taxandria fragans, Cyathochaeta teretifolia* and *Taraxis grossa*. These and other disjunct taxa are described in Appendix 6.

3.4.3.1.1 Creekline Blackbutt (*Eucalyptus patens*) and Marri forest

This community dominates the wettest portions of the drainage channels. These creeklines typically support *Eucalyptus megacarpa, E. patens, E. calophylla, Agonis flexuosa, Hakea linearis, Pultenaea pinifolia, Gahnia decomposita* (Photograph 21), *Lepidosperma effusum, Cyathochaeta* sp. Carbunup, *Cyathochaeta teretifolia* and *Taraxis grossa*. One quadrat has been placed in this community and it is described as WHSFCT G1.

3.4.3.1.2 Shrublands of near permanent wetlands in creeklines

In the broadest valleys the freshwater seepages form sumplands dominated by shrublands that are dominated by combinations of *Homalospermum firmum, Beaufortia sparsa, Taxandria fragrans, T. linearifolia* and *Kunzea* aff. *micrantha*. These shrublands are typically associated with varying combinations of both common and uncommon sedges. Occasionally these swamps are associated with areas of ironstone such as observed in a Gale Road wetland (Swan Bioplan Remnant 4/4-5[11]). Poole Swamp in the Yelverton forest is a typical example of these wetlands and was the largest area of this wetland community observed in the study. One quadrat has been placed in this community and it is described as WHSFCT G2.

There is one wetland in the North Whicher Scarp, the Evans/Claymore Rd Swamp in the Abba forest that has similar characteristics to these wetlands, being dominated by *Homalospermum firmum, Taxandria fragans, T. linearifolia* and *Cyathochaeta teretifolia*.

3.4.3.2 Sabina River Jarrah and Marri woodland

Within the Central and North Whicher Scarp the predominant drainage lines are incised. These extend from the Whicher forest (Sabina River) to the Ferguson River in the north. Two plots were located on the Sabina River alluvial fan where the Sabina River meets the Swan Coastal Plain and these have been identified as WHSFCT F1 (see section 3.2.6.1). It is not expected that this group would be widely located elsewhere as the Sabina River is the only river known to be vegetated to its intersection with the Plain.

3.4.3.3 Swan Coastal Plain Paluslope Wetlands

These wetlands appear to have been first recognised in the ongoing System 6 and Part System 1 Update work in the Gwindinup area and were described as follows (30th March 2005).

> The principal wetland areas are seepage areas feeding Gynudup Brook and are best described as paluslopes. These paluslopes are similar to the TEC on Mound Springs and may have associated ground fauna communities. The broader wetland area associated with this area could be expected to provide significant habitat for other restricted fauna.

Three areas supporting sections of this wetland were described. Characteristic species of these wetlands were *Melaleuca preissiana, Astartea scoparia, Pultenaea pinifolia, Eucalyptus calophylla, Eucalyptus rudis, Taxandria linearifolia, Pultenaea pinifolia, Beaufortia sparsa, Oxylobium lineare, Kunzea glabrescens, Aotus cordifolia* and *Cyathochaeta teretifolia*.

Since this work was done a series of studies (for example Bennett Environmental Consulting Pty Ltd 2003, DEC 2007a, Biota Environmental Sciences Pty Ltd 2007) have considered these further. It appears now that the Foothills Paluslope Wetland communities are located on the Foothills of the Whicher Scarp (Cartis vegetation complex) and the Whicher Scarp/Pinjarra Plain interface from Gwindinup to the Chambers Road area adjacent to the Chambers Road Ironstones. It is most likely that these wetlands occur in four locations:

[11] Each native vegetation remnant identified in Swan Bioplan has a unique reference number; this sequence refers to the mapping sheet and the individual remnant.

Chambers Road, in and adjacent to 'Taylor's Nature Reserve', Vasse Highway and the Gwindinup area (See Table1). These wetlands are very wet all year round and are associated with areas of groundwater seepage from the sandy low hills at the base of the Scarp. At times these wetlands are contiguous with areas of Pinjarra Plain wetlands (which may include ironstone areas) and the wetlands of the two landforms merge. Such wetlands are found two locations being; Chambers Road, in and adjacent to 'Taylor's Nature Reserve'. The Davies Road Wetland (Table 1) could well have been contiguous with a paluslope wetland but the adjacent 'slope' area is cleared.

The vegetation of the Foothills Paluslope Wetlands is typified by combinations of the following species: *Melaleuca preissiana*, *Taxandria linearifolia*, *Taxandria fragans*, *Melaleuca incana* and *Cyathochaeta teretifolia*. Other species rarely or not previously recorded upon the Swan Coastal Plain are found within these wetlands include *Eucalyptus patens*, *Homalospermum firmum*, *Gahnia decomposita*, *Callistachys lanceolata*, *Hakea linearis*, *Melanostachya ustulata*, *Evandra aristata*, *Beaufortia sparsa*, *Callistemon glaucus* and *Pultenaea pinifolia*.

The majority of these Foothills Paluslope Wetlands are found on private land, much of the survey work being done from roadsides and within roadside remnants. Very few of these wetlands retain intact areas of vegetation as they have been preferentially developed for agricultural uses. Contiguous naturally vegetated areas of the Whicher Scarp and Swan Coastal Plain are very rare and contiguous areas of Whicher Scarp/Foothills Paluslope Wetland/Pinjarra Plain or Whicher Scarp/Foothills Paluslope Wetland are not known.

3.5 Flora

3.5.1 *Total Flora*

A total of 996 vascular plant taxa are recorded for the Whicher Scarp. Of these 917 (92%) are native taxa and 79 (7.9%) are weeds. These taxa are listed in Appendix 5a alongside information on a series of attributes. These attributes include: common names; significant flora; state endemic status; growth form; life form; and aquatic species. These attributes are described in the key to Appendix 5a. The significant flora categories are further described in section 2.6.2. This information, together with the quadrat lists in Appendix 2d can be used to gain a better understanding of the species that occur together in a particular plant community and floristic community type. Such information is essential in developing plant lists for restoration or biodiversity revegetation. Particular note needs to be taken of the categories of significant flora as these give a guide to where propagating material can be collected.

3.5.2 *Native Flora*

Ten of the native vascular plant taxa are non flowering plants, being three Gymnosperm taxa and seven Ferns and Fern Allies. The remaining 907 taxa are flowering plants with 298 monocotyledons and 609 dicotyledons. The most common plant families are the Papilionaceae (87 taxa), Proteaceae (78 taxa), Cyperaceae (66 taxa), Myrtaceae (64 taxa), Orchidaceae (58 taxa), Stylidiaceae (41 taxa), Epacridaceae (40 taxa), Anthericaceae (35 taxa), Asteraceae (34 taxa), Restionaceae (33 taxa), Mimosaceae (32 taxa), Droseraceae (26 taxa), Apiaceae (22 taxa), Dasypogonaceae (22 taxa), Dilleniaceae (22 taxa) Haemodoraceae (21), Poaceae (20), Haemodoraceae (17 taxa), Goodeniaceae (17 taxa) and Rutaceae (17 taxa).

The relative abundance of taxa in the Papilionaceae, Proteaceae and Myrtaceae is a feature of the flora of the south-west and is also reflected in the flora of the nearby bushland areas on the southern side of the Swan Coastal Plain in the Busselton area (BJ Keighery *et al.* 1996 and GJ Keighery *et al.* 1996). These families are principal components of the diverse shrub layers of the woodlands of the Whicher Scarp and the shrub layers of the communities of the Plain. However, two other families that are comparatively less common components of the Plain flora, the Epacridaceae and Mimosaceae, are well represented in the shrublands of the Whicher Scarp. The abundance of these two families reflects the affinities of the Whicher Scarp vegetation with the shrublands of the northern Swan Coastal Plain. A series of other families are important

components of the shrub layer of the Whicher Scarp communities being the Rutaceae, Apiaceae, Dilleniaceae, Euphorbiaceae, Thymelaeaceae and Tremandraceae.

A series of genera are represented by a large number of species these include – *Acacia* (32 taxa), *Leucopogon* (21), *Hibbertia* (22), *Boronia* (14), *Daviesia* (14) *Gompholobium* (13) and *Andersonia* (10). Of particular interest are the following genera.

Hibbertia (Dilleniaceae)
Twenty two *Hibbertia* species have been recorded from survey and collections in the Whicher Scarp with seven of these listed as significant taxa (underlined, see Appendix 6 for descriptions of these). These 22 taxa are: *Hibbertia acerosa, H. amplexicaulis, H. aurea, H. commutata, H. cunninghamii, H. diamesogenos, H. ferruginea, H. glomerata* subsp. *darlingensis, H. glomerata* subsp. *glomerata, H. huegelii, H. hypericoides, H. lasiopus, H. mylnei, H. notibractea, H. nymphaea, H. perfoliata, H. pilosa, H. quadricolor, H. racemosa, H. serrata, H. subvaginata* and *H. vaginata.* This diverse group of *Hibbertia* species reflects the sands and laterites of the Whicher Scarp flora elements.

Andersonia (Epacridaceae)
Ten species of *Andersonia* are recorded for the Whicher Scarp reflecting the laterites and sands of the study area. Six of these taxa are significant (underlined, see Appendix 6 for descriptions of these). These are: *Andersonia aristata, A. barbata, A. caerulea* subsp. *caerulea, A. fallax, A. ferricola, A. heterophylla, A. involucrata, A. lehmanniana, A. micrantha,* and *A. sprengelioides*.

Xanthorrhoea (Xanthorrhoeaceae)
A diversity of *Xanthorrhoea* species is found in the Whicher Scarp and one of these species is a significant taxon. (Underlined, see Appendix 6 for descriptions of these). These taxa are: *X. acanthostachya, X. brunonis, X. gracilis* and *X. preissii* reflecting the sand and laterite influences on the vegetation. *X. acanthostachya, X. gracilis* and *X preissii* are dominant taxa in many communities in the Whicher Scarp. Also of interest is what appears to be a series of hybrid populations between *X. acanthostachya* and *X. preissii*, individuals in these populations reflecting characteristics of both species. These *Xanthorrhoea* populations require further investigation.

Synaphea (Proteaceae)
Eight *Synaphea* taxa are listed for the Whicher Scarp. Three of these taxa are significant taxa (underlined, see Appendix 6 for descriptions of these). The taxa are: *Synaphea. floribunda, S. gracillima, S. hians, S. petiolaris* subsp. *petiolaris, simplex* and *triloba, Synaphea polypodioides* and *S. whicherensis*. This is substantive level of diversity for this genus.

Another feature of the flora of the Whicher Scarp reflected in the relative abundance of particular families is number of monocotyledons and other herbaceous perennial species such as those from the Cyperaceae, Stylidiaceae, Asteraceae, Droseraceae, Anthericaceae, Restionaceae, Haemodoraceae, Goodeniaceae, Poaceae and Dasypogonaceae. Considering the low number of wetlands, numbers of Cyperaceae and Restionaceae are of interest. This abundance is reflected in the large number of taxa in some of the genera in these families. Of interest is the diversity of taxa in a series of genera including *Stylidium* (37), *Drosera* (26), *Schoenus* (17), *Caladenia* (16), *Lepidosperma* (15) and *Thysanotus* (15). Of particular interest are the following genera.

Stylidium (Stylidiaceae)
With thirty seven *Stylidium* taxa being recorded from survey and collections in the Whicher Scarp this is the most diverse genus in the Whicher Scarp. These thirty seven taxa include: *Stylidium acuminatum, S. adnatum, S. affine, S. amoenum, S. barleei, S. breviscapum, S. brunonianum, S. caespitosum, S. calcaratum, S. carnosum, S. ciliatum, S. crassifolium, S. diuroides, S. diversifolium, S. ecorne, S. ferricola, S. guttatum, S. junceum* subsp. *brevius, S. junceum* subsp. *junceum, S. lateriticola, S. lineatum, S. luteum, S. megacarpum, S. mimeticum, S. miniatum, S. neurophyllum, S. obtusatum, S. perpusillum, S. petiolare, S. piliferum, S. repens,*

S. rhynchocarpum, S. scandens, S. schoenoides, Stylidium sp. Dardanup (G.S. McCutcheon GSM 1066) and *S. spathulatum.* Seven of these are significant taxa (underlined, see Appendix 6 for descriptions of these).

Thysanotus (Anthericaceae)
A rich flora of fifteen *Thysanotus* species are found on the Whicher Scarp – *T. arbuscula, T. arenarius, T. formosus, T. glaucus, T. gracilis, T. manglesianus, T. multiflorus, T. patersonii, T. pauciflorus, T. pseudojunceus, T. scaber, T. sparteus, T. tenellus, T. thyrsoideus* and *T. triandrus.* Three of these are significant taxa (underlined, see Appendix 6 for descriptions of these).

Cyathochaeta (Cyperaceae)
Currently six taxa of *Cyathochaeta* are on found on the Whicher Scarp – *Cyathochaeta avenacea*, *C. clandestina*, *C. equitans*, *C.* sp. Carbunup (G.J. Keighery 14123), *Cyathochaeta* sp. Sabina (SABI03 & 06) and *C. teretifolia*. All taxa are significant taxa (see Appendix 6 for descriptions of these).

Patersonia (Iridaceae)
Nine *Patersonia* taxa are located in the Whicher Scarp being: *P babianoides, P. juncea, P. limbata, P. maxwellii, P. occidentalis* var. *angustifolia, P. occidentalis* var. *occidentalis, P. umbrosa* var. *umbrosa*, *P. umbrosa* var. *xanthina* and *P. pygmaea*. This diversity of species reflects the Jarrah Forest associations of the vegetation and the occurrence of deep sands in the Whicher Scarp. Four of these taxa are significant taxa (underlined, see Appendix 6 for descriptions of these).

3.5.2.1 Upland Flora

The majority of the land surface in the Whicher Scarp is described as upland. These uplands support a diversity of species, particularly shrub taxa. Some interesting general features of some of the common Whicher Scarp distinguishing upland flora are outlined below under the different life forms.

3.5.2.1.1 Common Trees

Eucalyptus haematoxylon (Myrtaceae) (Photograph 2)
Mountain Marri (*Eucalyptus haematoxylon*) is the typical tree species of much of the Whicher Scarp and is the dominant tree in large areas of woodland between the Dardanup and Treeton forests. Pockets of Mountain Marri extend onto the Plain between the Vasse and Ludlow River.

3.5.2.1.2 Shrubs

Acacia varia var. *varia* (Mimosaceae)
This is a common species of the Jarrah Forest (to Perth in the north), Blackwood Plateau and east to Cape Arid. Within the Whicher Scarp it is a relatively common species in the North Whicher Scarp, with occurrences in plots in Dardanup and Boyanup forests. South of here it is also known from herbaria records located throughout the Whicher Scarp.

Dasypogon hookeri (Dasypogonaceae) (Photograph 23)
This spectacular member of the Dasypogonaceae was once considered to be rare. It is a characteristic species of the Whicher Scarp and adjacent Blackwood Plateau and has been referred to as the 'Mineral Sands plant' by some mineral sands prospectors.

Hakea cyclocarpa (Proteaceae)
This species is a common feature of the Whicher Scarp vegetation from Dardanup to Treeton forest and in the adjacent Blackwood Plateau.

Hibbertia ferruginea (Dilleniaceae)
A predominantly southern species, it is common on the Central and West Whicher Scarp but is uncommon in the North Whicher Scarp. This species is then found commonly in the Yelverton forest leached sands.

Jacksonia sp. Whicher (G.J. Keighery 9953) (Papilionaceae)
This is a dominant understorey plant in the *Banksia* Woodlands of the Busselton Swan Coastal Plain, Whicher Scarp and on the adjacent Blackwood Plateau.

Labichea punctata (Caesalpiniaceae)
While there are no collections of this species from the Whicher Scarp in Australian herbaria, this is a relatively commonly encountered species on the Whicher Scarp. The distribution of this species illustrates the relationship between the flora of the Whicher Scarp vegetation and that of the Jarrah Forest, Geraldton Sandplain and eastern/southern side of the Swan Coastal Plain.

Lambertia multiflora subsp. *darlingensis* (Proteaceae)
This species occurs as a dominant within Dardanup, Argyle and the western extent of Abba forests where laterite rock is exposed or comes close to the surface. This is an element of the flora of the eastern side of the Swan Coastal Plain and the Darling Scarp that is associated with the Whicher Scarp.

Leucopogon pulchellus (Epacridaceae)
This is a relatively common species of the North Whicher Scarp. Only a few populations are recorded for the Central Whicher Scarp in sands along Sabina Road in Whicher NP.

Leucopogon sp. Whicher (G.J. Keighery 11763) (Epacridaceae)
A species first distinguished from populations on the Whicher Scarp, now known to extend onto the Blackwood Plateau. This taxon is most common in the Central and West Whicher Scarp.

Paragonis grandiflora (Myrtaceae) (Photograph 24)
This species is commonly encountered on the North Whicher Scarp, especially between the Argyle forest and the Dardanup forest.

Pultenaea radiata (Papilionaceae) (Photograph 25)
This species is a dominant component of the lower shrub layer in the Central Whicher Scarp.

Synaphea whicherensis (Proteaceae) (Photograph 26)
This species is relatively widespread in the Whicher Scarp.

Xanthorrhoea acanthostachya (Xanthorrhoeaceae) (Cover photograph 1 and Photograph 16)
The southern-most extent of this predominantly Darling Scarp species extends as scattered populations (associated with outcropping laterite) throughout the North Whicher Scarp.

3.5.2.1.3 Perennial Herbs
Agrostocrinum hirsutum (Anthericaceae)
This is the only *Agrostocrinum* on the Whicher Scarp and the most common member of this taxon on the Plain. This species is found on sandy soils and sand over laterites in woodlands dominated by *Eucalyptus marginata, E. calophylla, E. haematoxylon* and combinations of these.

Johnsonia lupulina (Anthericaceae)
This striking plant with its large drooping flower heads is another species that is uncommon on the Swan Coastal Plain. It is found from Capel southward in Marri Woodlands on the southern side of the Plain and throughout the Whicher Scarp woodlands. *Johnsonia lupulina* extends further north on the Darling Range near the Scarp to Dwellingup.

P. umbrosa var. *xanthina* (Iridaceae) (Photograph 27)
This is one of the typical species of the woodlands of the Whicher Scarp and the adjacent Busselton Plain and Blackwood Plateau.

3.5.2.1.4 Sedges

Cyathochaeta equitans (Cyperaceae)

This large attractive *Cyathochaeta* grows up to a metre tall in deep sands. This taxon is characteristic of deep sands of the Whicher NP/Treeton forest. These populations are disjunct from populations in the PMR where it grows on sand dunes of the Pinjarra Plain and sands of the Foothills.

3.5.2.2 Wetland Flora

Wetlands are not a common feature of the Whicher Scarp. This is well demonstrated by the paucity of wetland *Melaleuca* species on the Whicher Scarp, only *M. preissiana* and *M. incana* being listed (Appendix 5a).

The most common wetlands on the Whicher Scarp are those associated with drainage lines. These fall into two categories as outlined below and in section 3.4.3.

- Incised drainage lines
  Within the Central and North Whicher Scarp the predominant drainage lines are incised. These extend from the Whicher forest (Sabina River) to the Ferguson River in the north. Only a few of the drainage lines are significantly vegetated being Sabina River, Crooked Brook and Camp Gully. The vegetation of these drainage lines is dominated by *Eucalyptus calophylla* and, occasionally, *Agonis flexuosa.* The general absence of *Eucalyptus rudis* from these communities distinguishes these channels from those of the Swan Coastal Plain. A series of damplands are associated with the gentler slopes of Camp Gully and Capel River (quadrat GOOD01).
- Shallow drainage lines and associated seepages
  As outlined in section 3.4.3, these wetlands that are most commonly found in the West Whicher Scarp drainage lines, typically support *Eucalyptus megacarpa, E. patens, E. calophylla, Agonis flexuosa, Hakea linearis, Pultenaea pinifolia, Gahnia decomposita, Lepidosperma effusum, Cyathochaeta* sp. Carbunup, *Cyathochaeta teretifolia* and *Taraxis grossa*. These are associated with sumplands supporting communities that include a series of significant wetland taxa such as: *Homalospermum firmum, Beaufortia sparsa, Taxandria fragrans, Taraxis grossa, Melanostachya ustulata, Cyathochaeta teretifolia* and *Gymnoschoenus anceps.*

Interestingly, a series of wetland taxa grow in the sandy Whicher Scarp Woodlands including *Platytheca galioides* (Photograph 34), *Aphelia cyperoides, Centrolepis aristata, Drosera glanduligera, Siloxerus humifusus, Hydrocotyle callicarpa, Pericalymma ellipticum, Stylidium calcaratum and Drosera menziesii* subsp. *menziesii*. Also of interest are a series of wetland taxa near, or at the northern end of their range in these woodlands. These include: *Baxteria australis, Hodgsoniola junciformis* (Photograph 37) and *Laxmannia jamesii*.

3.5.2.3 Species Richness

With more than 900 taxa in the study area, it is clearly an area of species richness. This richness is reflected in the quadrat data. For 88 quadrats included in the Whicher Scarp the species richness range is from 7 to 97 taxa per 10m x 10m quadrat. A feature of this diversity is the association with upland taxa, as there is a relatively small area of wetlands in the Whicher Scarp. When only the upland woodland quadrats are considered there are 34–97 taxa per quadrat and an average of more than 67 per quadrat.

This level of diversity compares to a species richness in the same size quadrats from:

- the southern Swan Coastal Plain with 7 to 86 (Gibson *et al.* 1994) [12];
- Eneabba-Mt Lesueur, Mt Manypeaks, Stirling Range with 77 to 92 (George *et al*. 1979);
- Warren with 50–56 (George *et al*. 1979);

[12] The species richness per quadrat within the Swan Coastal Plain was boosted by the presence of introduced species as compared to the Whicher Scarp in which very few weeds were recorded and these are not included in these numbers. However the Whicher figures are boosted by the singletons which are excluded from the Swan Coastal Plain data.

- Central Wheatbelt with 40–44 (George *et al.* 1979); and
- the mean species richness for four floristic groups of Western wheatbelt shrublands and woodlands on deep sand or laterite being 42.36 (standard error 1.72), 40.70 (standard error 1.58), 33.10 (standard error 3.02) and 40.71(standard error 1.94) (Gibson *et al.* 2004)[13].

3.5.3 *Significant Flora*

Initial work on compiling significant taxa for the Whicher Scarp recognised around 83 taxa as being significant taxa of the Whicher Scarp (Webb *et al.* 2006). Further work for this study has identified more than 208 significant taxa. The significant taxa are listed in Table 10 and in the flora list in Appendix 5a. Each of the significant taxa is briefly discussed in Appendix 6 together with recommendations for listing taxa on the WA lists and where further genetic and/or morphological study is considered to be required. These recommendations are summarised in the Recommendations section.

A series of characteristic features of the flora of the Whicher Scarp is demonstrated by the significant taxa. These features are discussed below under each 'significance' category.

3.5.3.1 Western Australian Listed Species/Commonwealth Listed Species

Sixty one taxa are State listed taxa. All nine Commonwealth listed species correspond with State listed taxa, eight being DRF and one P4. This alone demonstrates the high conservation value of the Whicher Scarp. A further ten taxa are recommended for listing as Priority 1 as a result of this study and more than 25 taxa should be investigated to determine their conservation status if they are distinguished as separate taxa. Two State listed taxa are recommended for listing as DRF (*Franklandia triaristata* and *Actinotus whicheranus,* Cover photograph 5) as their distributions and threats are considered sufficiently known to be able to determine that these taxa are at considerable risk of extinction.

3.5.3.2 Geographic Variation

3.5.3.2.1 Taxa Range Ends

Ninety taxa have the end of their range in the Whicher Scarp. There is obvious patterning in these range ends, a significant number of these taxa with their principal distributions on:

- sands on the coastal plains to the north (some also extend onto wheatbelt sands) – *Daviesia nudiflora, Calectasia narragara, Hibbertia huegelii, Andersonia heterophylla, Pityrodia bartlingii, Beaufortia squarrosa, Jacksonia lehmannii* and *Eremaea pauciflora* var. *pauciflora;*
- laterites/granites of the Jarrah Forest to the north – *Lomandra spartea, Xanthorrhoea acanthostachya, Trachymene grandis, Paragonis grandiflora* and *Stylidium latericola* (Photograph 33);
- Jarrah Forest to the south – *Dasypogon hookeri, Patersonia limbata, Acacia browniana* var. *browniana, Dryandra formosa* and *Hakea falcata;*
- south coast sands – *Hypolaena grandiuscula, Thysanotus pseudojunceus, Hibbertia ferruginea, Andersonia micrantha, Calytrix tenuiramea* (pink flowering shrub Photograph 11) and *Daviesia flexuosa;* and
- south coast wetland taxa – *Empodisma gracillimum, Xyris lanata, Amperea volubilis, Beaufortia sparsa* and *Taxandria fragrans.*

Of these, 49 taxa are at the northern end of their range and 32 taxa at the southern end of their range. These figures reflect the importance of the northern and southern elements in the flora of the Whicher Scarp. These figures mirror the proportions of southern and northern endemics and show that, while there is a both a large southern and northern element in the flora of the Whicher Scarp, the southern element is larger than the northern element.

[13] Mean species richness numbers do not include taxa occurring in <5 quadrats.

3.5.3.2.2 Disjunct Taxa

More than 100 taxa have population/s in the Whicher Scarp that represent disjunctions from other populations of the taxon. There is also clear patterning in these disjunctions, related to the patterns of the range ends (many range ends represent disjunct populations), for example:

- sands on the coastal plains to the north (some extend to wheatbelt sands too) – *Hibbertia acerosa, Daviesia divaricata* subsp. *divaricata, Conospermum acerosum* subsp. *acerosum, Daviesia nudiflora, Hibbertia huegelii, Andersonia heterophylla, Pityrodia bartlingii, Jacksonia lehmannii* and *Eremaea pauciflora* var. *pauciflora;*
- eastern Swan Coastal Plain/Jarrah Forest – *Andersonia aristata;*
- laterites of the Jarrah Forest to the north – *Stylidium latericola* (Photograph 33)
- Jarrah Forest to the south – *Dasypogon hookeri, Patersonia limbata, Dryandra formosa* and *Hakea falcata;*
- south coast sands – *Hypolaena grandiuscula, Thysanotus pseudojunceus* and *Daviesia flexuosa;* and
- south coast wetlands – *Empodisma gracillimum* and *Beaufortia sparsa*.

Some of these taxa illustrate remarkable disjunctions. *Dryandra mimica* is known from two distribution centres, the population in the Whicher Scarp and populations well to the north of Perth near the Moore River. *Dryandra baxteri* shows a similar disjunction from the south, being principally located in the Albany/Stirling Range area, except for the disjunct occurrence of three populations in the Abba forest.

There are also a set of taxa with unusual disjunctions related to different habitats. For example, *Platysace haplosciadia* is normally associated with granites but in the Whicher Scarp is found on deep sands.

3.5.3.2.3 Population Status

A large number of populations of taxa in the Whicher Scarp are significant.

- Poorly reserved taxa – More than 100 taxa are considered poorly reserved. While just over half of these are DRF and priority flora, nearly 50 other taxa are in this category.
- Significant population/s – Nearly 200 taxa are considered to represent significant populations in the Whicher Scarp. More than a quarter of these are DRF and priority flora where reservation is poor, many other taxa fill this category.
- Uncommon taxa – More than 160 taxa are considered uncommon in the study area. This is a large number of uncommon taxa.

3.5.3.3 Taxa with Regional and Ecological Preferences

3.5.3.3.1 Endemic Taxa

Endemism can be considered at a variety of levels. This study has considered endemic taxa at a variety of scales. As is to be expected, most of the flora of the Whicher Scarp is endemic to WA with more than 80% (808, 81%) from this category. With 70% of the flora of the south-west of WA being referred to as being endemic, this is a significantly higher percentage. Of further interest are five categories of endemism related to the distribution of the taxa in WA.

- Whicher Scarp – 13 taxa (only WHS) (for example *Logania wendyae* Photograph 29 and *Boronia humifusa*, Photograph 30).
- Local/restricted – 39 taxa (combinations of WHS with SWA(B), BP, SC and e); this includes 33 taxa that are endemic to the to the south-west corner (i.e. the area of the Busselton Swan Coastal Plain/Whicher Scarp to the Scott Coastal Plain).
- Swan Coastal Plain/south-west corner – 7 taxa (combinations of WHS with SWA, SWA/BP or SWA/SC).
- Southern – 43 taxa (endemic area WHS south).
- Northern – 9 taxa (endemic area WHS north).

The 13 taxa endemic to the Whicher Scarp are of particular interest as this is a large number of taxa identified as being confined to such a relatively small area. Many of these taxa are relatively recently recognised. Also, when this is combined with the 38 taxa with populations in the Scarp that require detailed

work to determine if they have distinctive genetic or morphological forms associated with the Scarp, up to 50 taxa may be found to be endemic to the Whicher Scarp.

3.5.3.3.2 Taxa with Habitat Preferences

More than 100 taxa (121) are allocated to this category. These taxa are generally associated with a series of specific habitats in the area being: deep sands, deep coloured sands, fresh water seepages, incised drainage lines, laterite surfaces and ironstone surfaces. These habitats are generally restricted, some being highly restricted. Some examples of such groups of species associated with these habitats are given below and the species associated with the freshwater seepages are discussed in section 3.5.2.2.

- Ironstone surfaces: More than 20 taxa are centred upon the ironstones surfaces (including those that have representation in the Whicher Scarp as well as, on occasion, extending into the adjoining forest vegetation units (indicated with +) including: *Dryandra nivea* subsp. *uliginosa*, *Dryandra squarrosa* subsp. *argillacea*, *Gastrolobium modestum*+, *Grevillea elongata*, *Calothamnus* sp. Whicher, *Calytrix* sp. Tutunup+, *Hakea oldfieldii*, *Isopogon formosus* subsp. *dasylepis*+ and *Allocasuarina thuyoides*+.
- Incised drainage lines: *Hakea lasianthoides* (Photograph 40), *Dryandra formosa* (Photograph 38), *Hakea falcata* and *Lambertia rariflora* subsp. *rariflora.*

These taxa are discussed individually in Appendix 6.

Also of interest under this heading are taxa considered to be confined to habitats that are relics of previous conditions. Fourteen taxa are listed in this group. This group could also include taxa that have major disjunctions as they may well have been associated with a once widespread habitat that is now altered in distribution and/or changed its nature. A very large number, 114 taxa, are listed under the disjunction category and at least 50 of these are major distance disjunctions, i.e. more than 60 taxa may represent relictual taxa. This could explain the large numbers of taxa with unexpected or reduced locations in the Whicher Scarp.

3.5.3.3.3 Taxa with Morphological and/or Genetic Variation

More than 20 taxa are expected to be able to be differentiated genetically and/or morphologically. If this is combined with the 43 taxa that have been recently described in the Whicher Scarp, it can be surmised that a significant number of taxa in the Whicher Scarp are new taxa. Further study would be expected to distinguish more taxa in this category.

4 VEGETATION CONDITION

4.1 General Vegetation Condition

Large areas of native vegetation on the Whicher Scarp are in Excellent condition and some, almost Pristine. This is reflected in the average condition score of Excellent (numeric score of 2) vegetation condition recorded for the 88 quadrats located on the Whicher Scarp (Appendix 5c). When only the upland woodland WHSFCTs are considered, the average condition is better than Excellent (numeric score 1.76). The most disturbed areas of vegetation are associated with cleared or partially cleared areas and areas adjacent to these.

4.2 Weed Flora

Compared to the fragmented bushland areas on or adjacent to, the Swan Coastal Plain the Whicher Scarp flora has few weeds. Less than 8% (7.9%, Appendix 5a) of the total flora are weeds; this is considerably lower than most bushland areas on or near the Swan Coastal Plain. The low number of weeds in the flora is also reflected in the Whicher Scarp quadrat data, with 30 quadrats having no weeds and 21 having only a single weed recorded.

Of particular interest in relation to low weed frequency is the association between species rich plant communities and intactness of the plant community. This is demonstrated here and in the species rich communities of the eastern side of the Swan Coastal Plain which maintain vegetation condition and biodiversity even when reduced to small remnants (BJ Keighery and ME Trudgen 1992, BJ Keighery *et al.* 1997, Mattiske Consulting Pty Ltd 1997).

4.3 Current Land Use, Disturbance and Possible Threats

4.3.1 *Clearing*

The most disturbed areas of native vegetation are associated with cleared or partially cleared areas and the margins of these areas. Clearing of native vegetation in the Whicher Scarp is associated with agriculture, non-native forestry and mining. The adjacent Swan Coastal Plain is generally cleared for agriculture and mining.

4.3.1.1 Agriculture

The majority of the clearing of the Whicher Scarp is associated with agriculture. As a consequence, the gently inclined well watered West Whicher Scarp, gently inclined lower slopes of the Central Whicher Scarp and the broad river valleys of the Central and North Whicher Scarp are the most heavily cleared areas. The Sabina River and the Abba River are only rivers with contiguous river/upland Whicher Scarp vegetation. A number of smaller drainage lines remain uncleared, the most extensive of these being Camp Gully in the North Whicher Scarp. Interestingly, small but significant areas along the rivers on the West Whicher Scarp have remained uncleared.

4.3.1.2 Forestry

4.3.1.2.1 Non-native Forests

A series of pine plantations is located on the gentle slopes of the Whicher Scarp, from the Sues Rd area of the Whicher forest to the northern end of the Abba forest. In the mid 1970s, clearing of significant areas of the Whicher Scarp and Blackwood Plateau were proposed for pine plantations (Forest Department of Western Australia 1975). In general this proposal did not eventuate. However, local land holders report that native vegetation in the Abba forest south of Williamson Road was scrub rolled in preparation for this activity. The legacy of this partial clearing can be seen in the lower average height of the trees and the frequency of hybrids between Mountain Marri and Marri in the area.

4.3.1.2.2 Native Forest

Several early reports have commented on the low values of areas of the Whicher Scarp for timber harvesting, being:

- CTRC (1974) in reference to the area proposed for the Whicher Range reserve 'It contains no natural commercial timber.'; and
- Forest Department of Western Australia (1975, page 3) which refers to the Donnybrook Sunklands as being 'large area of poor quality forest between Nannup and Busselton'.

At present, nearly 50% of the remaining area of Whicher Scarp native vegetation is in State Forest and nearly a quarter of this is in 'Informal reserves' (Table 4). That is, timber harvesting has the potential to impact over 35% of the remaining area of the native vegetation of the Whicher Scarp. While this is a large percentage of the remaining Whicher Scarp vegetation, it is very small percentage of the overall area available for timber harvesting in the Jarrah forest.

Unfortunately, a further disturbance associated with State forest is firewood collection. Firewood collection impacts areas of native vegetation as collectors often dispose of garden refuse and soil and focus on *Phytophthora* dieback areas when collecting firewood. The number of firewood collectors on the Whicher Scarp is highly likely to be greater than on the adjacent Blackwood Plateau as the Whicher Scarp is the closest forest area to the populated Swan Coastal Plain.

4.3.1.2.3 Basic Raw Materials

The deep gravel/laterite and sands on the Whicher Scarp has been a focus for mining activity. While much of this is historic, some remain active. In general, the deep pits were not rehabilated and/or were planted with non-local eucalypts. Fortunately the non-local eucalypts have grown poorly and are generally declining. Some work has been done in rehabilitating gravel pits focussing on ripping, contouring and direct seeding (M. Tichbon pers. comm.). Significant regeneration from soil stored seed has also occurred in patches in some of this area. Significant regeneration has also occurred in the shallow pits, especially along Sabina Road in the Whicher National Park.

4.3.1.2.4 Heavy Mineral Sands

The Whicher Scarp, and its interface with the Swan Coastal Plain, is subject to current exploration licenses and/or mining leases (DME and BRS 1998a and b). Between the Dardanup area and the Vasse Hwy this area has been significantly impacted by mining for heavy mineral sands. The mining in the Whicher Scarp has focused on the mid and lower Whicher Scarp slopes. None of these mined areas have been returned to native vegetation. Current mining proposals actively limit the amount of native vegetation proposed for clearing for mining but the mining necessarily focuses on the resource area on the Whicher Scarp slopes and the adjacent Plain. As a consequence, the mining has a significant impact on conservation of the Whicher Scarp as it impacts on some of the very significant values of the Whicher Scarp, being:

- Whicher Scarp communities and significant flora of the Whicher Scarp slopes;
- restricted and rare wetland communities within and adjacent to the Whicher Scarp; and
- ecological linkage between the Whicher Scarp and the Swan Coastal Plain.

4.3.2 *Petroleum and Gas Exploration*

The area from the coast at the mouth of the Capel River to just east of Quindalup to the south coast is subject to petroleum and gas exploration leases (DME and BRS 1998b).

4.3.3 *Phytophthora dieback*

In the 1970s it was estimated that 16% of the Donnybrook Sunklands was affected by *Phytophthora* dieback and up to 60% would be 'wiped out' by the expansion of these areas (Forest Department of Western Australia 1975). While *Phytophthora* dieback is a significant threat to the natural values of the Whicher Scarp, it is not evident at this predicted scale in the present day Whicher Scarp vegetation (observations for

this study and DEC 2006b). The areas of greatest impact appear to be in the West and parts of the Central Whicher Scarp.

Of particular interest in the North Whicher Scarp is the often apparent minimal impact of *Phytophthora* dieback within what should be highly dieback prone vegetation. The patterns of dieback movement within this area of the Scarp appear to be unusual, with heavily infested upland areas showing minimal signs of dieback spread into the lower sandy slopes. This is most evident in the Argyle forest. *Phytophthora* dieback impact generally appears to be associated with areas of gravel mining and associated road/track development. The low apparent level of *Phytophthora* dieback in the Argyle forest is notable.

4.3.4 *Hydrology*

The ecology and biology of the communities and significant species of the Whicher Scarp are very poorly known. However, the observed habitat requirements of many of the species that are encountered indicate that there are some unusual hydrological conditions on the Whicher Scarp. Such examples include the following.

- Presence of south coast wetland species in Whicher Scarp slope dryland communities – *Baxteria australis*, *Hodgsoniola junciformis* (Photograph 37) and *Laxmannia jamesii*.
- Significance of a wetland group of species in the floristic associations – *Aphelia cyperoides, Centrolepis aristata, Drosera glanduligera, Kunzea rostrata, Siloxerus humifusus, Hydrocotyle callicarpa, Pericalymma ellipticum, Stylidium calcaratum* and *Drosera menziesii* subsp. *menziesii* (see section 3.2.1).
- Development of a series of persistent wetlands – West Whicher Scarp Valley Wetlands and Swan Coastal Plain Paluslope Wetlands.
- Busselton Ironstones within and adjacent to the Whicher Scarp.
- Location of Jarrah Forest and south coast wetland species in the near-permanent wetlands – *Eucalyptus megacarpa, E. patens, Hakea linearis, Pultenaea pinifolia, Gahnia decomposita, Lepidosperma effusum, Taraxis grossa, Beaufortia sparsa, Taxandria fragrans, Melanostachya ustulata,* and *Gymnoschoenus anceps*.

In addition, there are a number of very restricted species and one would expect that the distribution of these may well be driven by soil and water requirements. Such taxa include *Lambertia rariflora* subsp. *rariflora* (P4), *Actinotus whicheranus* (P2, Cover photograph 5), *Platythec*a sp. Sabina (G.J. & B.J. Keighery 295, Photograph 34), *Dryandra mimica* (DRF) and *Daviesia elongata* subsp. *elongata* (DRF, Photograph 35).

As a consequence, until the hydrological factors contributing to the distribution of these taxa are understood, precautions should be followed when the hydrological regime is proposed to be altered in or adjacent to the Whicher Scarp.

5 CONSERVATION VALUES OF THE WHICHER SCARP

5.1 Natural Values of the Remaining Areas of the Whicher Scarp

It has been recognised for some time that the Whicher Scarp has unique landform, flora and vegetation values. This report develops and expands on these values. A synopsis of these values is given below.

- A distinct landform
  The Whicher Scarp is mapped as a distinct landform in two regional mapping datasets.
  - Whicher Scarp soil-landscape system (unit 214WS) in the soil-landscape systems mapping (DAFWA 2007).
  - Whicher Scarp vegetation complexes (CALM 1998a, Mattiske and Havel 1998).

  Three subdivisions are evident in the Whicher Scarp: the West, Central and North Whicher Scarp.

- A naturally restricted landform
  The Whicher Scarp is a naturally restricted landform (approx 21,000 ha) being just 0.7% of the Southern Jarrah Forest Biogeographic region of which around 46% (approx 9,200 ha) remains naturally vegetated. Of this remaining area, 64% (approx 5,800 ha) is found on public lands. The majority of the public lands are DEC lands located in nine forest areas.

- Ecological linkages maintained
  Within the Central and North Whicher Scarp effective ecological linkage is maintained. Three of the nine forest areas (Abba, Whicher and Treeton) are part of a contiguous naturally vegetated area, directly linked through State forest on the Blackwood Plateau. The five forest areas to the north (Dardanup, Boyanup, Donnybrook, Argyle and Happy Valley) are part of larger forest areas separated by predominantly cleared narrow bands of private land along the drainage lines. This Whicher Scarp ecological linkage can then link to the Darling Scarp through the Dardanup Forest Block (see section 1.4) thus contributing to 'open space of regional significance' (DCE1983b) extending from the Treeton forest through to the Darling Scarp.

- Six unique vegetation complexes
  Six vegetation complexes are confined to the Whicher Scarp, three (Y, Yf and Yw) have less than 30% of their original extent remaining. Of the remaining three vegetation complexes, one (Wcv) has only 327 ha remaining and the other two (Yd and WC) have relatively small areas remaining. Another vegetation complex associated with the Whicher Scarp, the Cartis vegetation complex, has less than 20% (284 ha) of its original extent remaining; again this is a very small area.

- A diverse suite of woodland floristic assemblages
  The investigation of regional floristic patterning of the Whicher Scarp has shown that the Whicher Scarp vegetation has the following characteristics.
  - The floristic communities are distinct from the communities of the Darling Scarp.
  - A set of communities on sands of the Whicher Scarp slopes are effectively confined to the Whicher Scarp (floristic community types A1-A5; C1 and C2).
  - A group of communities associated with laterites that are shared with and/or intergrade with those of the adjacent Blackwood Plateau (floristic community types C3 and C4).
  - A group of communities on grey sands that are shared with those of the Swan Coastal Plain (floristic community type B1).
  - A highly restricted floristic community is associated with the Whicher Scarp, Blackwood Plateau and Darling Scarp interface in the Dardanup forest (floristic community type C5).

- Restricted and rare wetland communities
  The Whicher Scarp is associated with a series of distinctive wetlands. These can be grouped according to their location in relation to the Whicher Scarp. The Busselton Ironstone communities are a threatened ecological community.

  - Whicher Scarp Wetlands
    - West Whicher Scarp Valley Wetlands (floristic community types G1 and G2)
    - Central Whicher Scarp Ironstones: Four of the Busselton Ironstones occurrences are located in the Central Whicher Scarp, four in the Treeton forest and one along Gale Road.
    - Incised River Valleys: The best remaining example is the Sabina River Valley (floristic community type F1).
  - Whicher Scarp/Swan Coastal Plain Interface Wetlands
    - Swan Coastal Plain Paluslope Wetlands: Four occurrences are known from Chambers Road, in and adjacent to 'Taylor's Nature Reserve', Vasse Highway and the Gwindinup area.
    - Whicher Scarp/Swan Coastal Plain interface Ironstones: Five occurrences of the Busselton Ironstones are located at the interface of the Whicher Scarp and the Swan Coastal Plain. Two are located adjacent to the West Whicher Scarp ('Taylor's Nature Reserve' and Chamber Road) and two adjacent to the North Whicher Scarp (Williamson Road and Tutunup Road).

- A diverse and rich flora

  The Whicher Scarp has a flora of more than 900 taxa. This flora reflects that of the Jarrah Forest, sands and wetlands of the south coast and Swan Coastal Plain sands as well as containing a large number of Whicher Scarp centred taxa. This species richness is a particular feature of the visually similar woodlands of the Whicher Scarp with species richness per 10m x 10m quadrat ranging from 34 to 97 taxa, and the woodlands confined to the Whicher Scarp (community type A) have an average species richness of 70 taxa. The Whicher Scarp is a local centre of species richness in the species rich south-west.

- A centre of speciation

  Forty three taxa have been recently described from the Whicher Scarp and more than 20 further taxa are expected to be able to be differentiated genetically and/or morphologically. Thus, the Whicher Scarp in its entirety fits the description from the System 1 report (CTRC 1974) in being 'biologically important'. The significance of the *Dampiera linearis* study (see section 1.3.2.1 and Appendix 6) in illustrating aspects of the process of speciation is further shown by other studies such as those on *Actinotus whicheranus* and the ironstone endemic *Dryandra nivea* subsp. *uliginosa*.

- A highly endemic flora

  The Whicher Scarp flora shows high levels of endemism at a national, regional and local scale. Six categories of endemism are identified on the Whicher Scarp.
  - National: 81% flora endemic to WA.
  - Southern element: 43 taxa are endemic to the area from the Whicher Scarp south.
  - Northern element: 9 taxa are endemic to the area from the Whicher Scarp north.
  - Swan Coastal Plain/south-west corner: 7 taxa are endemic to the area from the Swan Coastal Plain, Whicher Scarp to the Scott Coastal Plain.
  - South-west corner: 33 taxa are endemic to the area of the Busselton Swan Coastal Plain/Whicher Scarp to the Scott Coastal Plain.
  - Whicher Scarp: 13 taxa are endemic to the Whicher Scarp.

- More than 60 rare taxa

  More than 60 taxa are State listed taxa, eight being DRF and 53 Priority Taxa. Nine taxa are Commonwealth listed. It is recommended that a further ten taxa be listed as Priority 1 and two currently priority listed taxa be listed as DRF.

- Ninety taxa at the end of their range
  Ninety taxa have the end of their range in the Whicher Scarp. Of these 49 taxa are at the northern end of their range and 32 taxa are at the southern end of their range. These figures reflect the importance of the northern and southern elements in the flora of the Whicher Scarp.

- More than 100 taxa with disjunct populations
  More than 100 taxa have population/s in the Whicher Scarp that represent disjunctions from other populations of the taxon. Some of these taxa illustrate remarkable disjunctions. *Dryandra mimica* and *D. baxteri* illustrate such major disjunctions.

- A diversity of unusual and possibly relictual habitats
  More than 100 taxa are associated with specific habitats such as deep sands, deep coloured sands, river valleys, fresh water seepages, laterite surfaces and ironstone surfaces. Also of interest under this heading are the 14 taxa (and possibly as high as 60) considered to be confined to habitats that are relics of previous conditions. The presence of relictual habitats in the Whicher Scarp possibly explains the large numbers of taxa with unexpected or reduced distributions in the Whicher Scarp.

- A biodiversity hotspot
  Based on these studies, the Whicher Scarp deserves recognition as a local biodiversity hotspot (species richness and endemism) in the species rich south-west. While this was indicated for the West and Central Whicher Scarp in some previous studies (CALM 1998b), it was not recognized as such in the most recent study (Hopper and Gioia 2004).

- High degree of intactness of native vegetation
  Large areas of native vegetation on the Whicher Scarp are in Excellent condition and less than 8% of the flora of the Whicher Scarp are weeds.

5.2 Protection of the Whicher Scarp Vegetation and Flora

5.2.1 *Boundaries of the Whicher Scarp*

As outlined previously (sections 1 and 2.2), the two regional studies that map the extent of the Whicher Scarp (DAFWA 2007 and CALM 1998a), the Pre-European vegetation study (DAFWA 2005) and local conditions were used in the determination of the extent of the Whicher Scarp. In practical terms the area recognised as supporting Whicher Scarp vegetation should be determined from the extent of the Whicher Scarp System (DAFWA 2006) extended 0.5 km onto the Swan Coastal Plain and 1 km onto the Blackwood Plateau in upland areas, and 2 km along the drainage lines. This boundary allows for the following key habitats to be included in the protected areas.

- Whicher Scarp slopes.
- Laterites that are shared with and/or intergrade with those of the adjacent Blackwood Plateau.
- Grey sand areas that are shared with those of the Swan Coastal Plain.
- The area of the interface of the Whicher Scarp, Blackwood Plateau and Darling Scarp.
- Restricted and rare wetland communities within and adjacent to the Whicher Scarp.

5.2.2 *Protecting the Outstanding Natural Values of the Whicher Scarp*

The findings described in this report, and summarised above (section 5.1), have established that the Whicher Scarp is an area of outstanding flora values. The values described for the proposed 'Whicher Range reserve' (Figures 4 and 5) in the System 1 (CTRC 1974 and DCE 1976) area are a characteristic of the entire Whicher Scarp.

When these substantive values are considered together, the remaining naturally vegetated areas of the Whicher Scarp form an area of outstanding regional significance. That area meets the six criteria for regionally significant natural areas (EPA 2006): Representation of Ecological Communities, Diversity, Rarity, Maintaining Ecological Processes and Natural Systems, Scientific or Evolutionary Importance and

General Criteria for the Protection of Wetland, Streamline and Estuarine fringing Vegetation and Coastal vegetation.

Particular provision has been made for recognizing and protecting areas of 'significant flora values' in the Forest Management Plan 2004-2015, Appendix 13 (Conservation Commission of Western Australia 2004). Significant flora values include 'areas of high flora species richness, centres of endemic flora, centres of relictual flora, centres of disjunct flora, threatened ecological communities, and declared rare flora'. The Whicher Scarp vegetation demonstrates these values at an exceptional level. As a consequence, the area of State Forest and Timber Reserve in the Whicher Reference Areas outside the current forest 'Informal Reserve' area should be included in this category.

5.2.2.1 Conservation Areas

A series of conservation reserves are associated with the Whicher Scarp. Each of these reserves protects a series of Whicher Scarp natural values. The Whicher Scarp values encompassed by each are summarized below together with recommendations as to how the boundaries could be expanded to better encompass Whicher Scarp values. Specific recommendations are confined to public lands with some broad recommendations given in regard to non-public lands.

West Whicher Scarp: Yelverton National Park (729 ha) (Map 2b)
As currently configured, the Yelverton National Park does not include any areas mapped as in the Whicher Scarp System or vegetation complex.
Recommendation: The Yelverton National Park is a very significant conservation area. However, the boundaries of the Park should be expanded to include the full extent of the Yelverton forest public lands (Yelverton forest), thus encompassing significant areas of the upland and wetland communities associated with the West Whicher Scarp as well as populations and habitat of a series of significant species (GJ Keighery *et al.* 2008).

West Whicher Scarp: Haag Nature Reserve (9.261 ha) (Map 2b)
This small reserve contains mostly wetland communities of the West Whicher Scarp as well as populations and habitat of significant species associated with these communities, possibly including Albany Pitcher Plant (*Cephalotus follicularis*).
Recommendation: The Haag Nature Reserve is a small but significant West Whicher Scarp conservation area. The ecological linkage opportunities, west to the Yelverton Forest Block, and north east to the Chambers Road Ironstones, should be investigated.

West Whicher Scarp: Nature Reserve (Gale Road Ironstones, 9.8 ha) (Map 2b)
This area has very high conservation values associated with Busselton Ironstone communities and associated significant flora.
Recommendation: The Nature Reserve (Gale Road Ironstones) is a small but significant West Whicher Scarp conservation area. Ecological linkage opportunities south to the Treeton forest, south-west to Reserve 37063 and along the Carbunup River should be investigated.

Central Whicher Scarp: Whicher National Park (6,343 ha) (Map 2c and d)

- Soil-landscape Whicher Scarp System.
- Whicher Scarp vegetation complexes Yelverton (Y and Yw which have less than 30% of their original extent remaining).
- Whicher Scarp slopes (floristic community types A1 confined to Whicher forest, A5; C1).
- Laterites that are shared with and/or intergrade with those of the adjacent Blackwood Plateau (floristic community types C3 and C4).
- Restricted and rare wetland communities – part naturally vegetated Sabina River Valley.
- Supports diversity of the flora of the Central Whicher Scarp, a large number of significant taxa including at least 15 at the end of their range, a series of rare taxa including *Dryandra mimica* (DRF) and *Daviesia elongata* subsp. *elongata* (DRF) and taxa associated with the Kemp Road area

Andersonia fallax (Photograph 31), *Conospermum paniculatum*, *Stylidium barleei* and *Olearia strigosa*.
- Ecological linkage between the Abba, Whicher and Treeton forest areas through contiguous areas of the Blackwood Plateau forest blocks.
- High degree of intactness of native vegetation (significant areas pine plantation, gravel mines).

Recommendation: The Whicher National Park is a very significant Central Whicher Scarp conservation area. The boundaries of the Park should be expanded to include the full extent of the Whicher Scarp slopes on public lands. This boundary would encompass significant additional areas of the communities associated with these slopes north of Sabina Road and populations and habitat of a number of significant species including *Lambertia rariflora* subsp. *rariflora* (P4), *Actinotus whicheranus* (P2, recommended for listing as DRF) and *Platythec*a sp. Sabina (G.J. & B.J. Keighery 295) (recommended for listing as P1).
Note: The area identified above is closest to that recommended in the draft System report in 1974 (see Figure 4 this report from CTRC 1974). Additional work has established that the values attributed to the area in 1974 continue to be demonstrated in the area, and at a higher level than originally shown. In addition, as stated earlier these values are demonstrated by the entire extent of the Whicher Scarp.

North Whicher Scarp: Dardanup Conservation Park (Map 2g)
- Largest, northern-most area of Whicher Scarp remaining.
- Soil-landscape Whicher Scarp System.
- Whicher (Wc) vegetation complex.
- Whicher Scarp slopes (floristic community types A2 and 3).
- Laterites that are shared with and/or intergrade with those of the adjacent Blackwood Plateau.
- Grey sands that are shared with those of the Swan Coastal Plain (floristic community type B1).
- Supports diversity of the flora of the North Whicher Scarp and a large number of significant taxa including at least 11 at the end of their range and a series Whicher Scarp endemics including *Gastrolobium whicherense*, *Stylidium* sp. Dardanup (G.S. McCutcheon 1066), *Lomandra whicherensis* and *Logania wendyae*.
- Ecological linkage with contiguous Swan Coastal Plain vegetation in a small area of the western and northern extent of Conservation Park.
- Ecological linkage with contiguous Blackwood Plateau and Darling Scarp vegetation in State Forest and proposed Nature Reserve on the eastern extent of Conservation Park.
- High degree of intactness of native vegetation.

Recommendation: The Dardanup Conservation Park is a very significant North Whicher Scarp conservation area. The boundaries of the Park should be expanded to include the full extent of the Dardanup Forest Block (State Forest and proposed Nature Reserve), thus encompassing significant additional areas of the communities associated with the Whicher Scarp, Blackwood Plateau and Darling Scarp. Consideration should be given to making this a National Park.

North Whicher Scarp: Gwindinup Reserve (20.6 ha) (Reserves 2307 and 25500, Map 2f)
- Soil-landscape Whicher Scarp System.
- Whicher (Wc) vegetation complex.
- Whicher Scarp slopes (floristic community types A3).
- Laterites that are shared with and/or intergrade with those of the adjacent Blackwood Plateau.
- Grey sands that are shared with those of the Swan Coastal Plain (floristic community type B1).
- Supports diversity of the flora of the North Whicher Scarp and a number of significant taxa including *Dasypogon hookeri* and at least one at the end of its range.
- Ecological linkage with contiguous Swan Coastal Plain vegetation.
- Ecological linkage with nearby Whicher Scarp and Blackwood Plateau vegetation in State Forest.
- Intact native vegetation (some areas disturbed by sand and gravel mining as well as past settlements).

Recommendation: The Gwindinup Reserve is a significant North Whicher Scarp conservation area which should continue to be managed by the Capel Land Conservation District Committee for this purpose. The

ecological linkage opportunities west, and south to the Argyle forest (through Reserve 182377), should be investigated.

5.2.2.2 Towards Further Protecting Whicher Scarp Values

This study has identified a series of outstanding natural values for the Whicher Scarp. To move towards the better protection of these values, a series of additional recommendations are given below. However, in light of the values the entire remaining extent of the Whicher Scarp, as described in section 5.2.1, should be retained.

5.2.2.2.1 West Whicher Scarp

There is little public land in the area of the West Whicher Scarp. The area around the Carbunup River and 'Taylor's Nature Reserve' provides opportunity for retaining as series of linked areas. There are four reserves in this locality that contain areas of native vegetation, two on the Blackwood Plateau/Whicher Scarp interface (Reserves 37063 and 27906) and two on the Swan Coastal Plain/Whicher Scarp interface (Reserves 25325 and 37348) alongside 'Taylor's Nature Reserve'. The remnant native vegetation in these reserves could form the basis for linkage.

5.2.2.2.2 Central Whicher Scarp

Treeton forest

- Soil-landscape Whicher Scarp System.
- Whicher Scarp vegetation complexes, small area Yelverton (Y and Yw which have less than 30% of their original extent remaining).
- Whicher Scarp slopes (floristic community types C1 and C2).
- Laterites that are shared with and/or intergrade with those of the adjacent Blackwood Plateau.
- Restricted and rare wetland community of the Whicher Scarp - Busselton Ironstone communities are a threatened ecological community (four occurrences) and two drainage lines.
- Large number significant taxa including at least 5 taxa at the end of their range and a series of rare taxa including *Daviesia elongata* subsp. *elongata* (DRF), *Lambertia rariflora* subsp. *rariflora* (P4), *Gastrolobium modestum* (DRF) and *Dryandra nivea* subsp. *uliginosa* (DRF).
- Ecological linkage between the Abba, Whicher and Treeton forest areas through contiguous areas of the Blackwood Plateau forest blocks; contiguous area of Whicher Scarp vegetation on private land to north.
- High degree of intactness of remaining native vegetation (significant areas pine plantation, gravel mines).

Recommendation: A Central Whicher Scarp conservation area should be established in the Treeton forest to protect the specific Whicher Scarp values identified.

5.2.2.2.3 North Whicher Scarp

Abba forest (Map 2d and e)

- Soil-landscape Whicher Scarp System.
- Whicher Scarp vegetation complexes Yelverton (Y and Yw which have less than 30% of their original extent remaining and Yd); Whicher (Wcv and Wc).
- Whicher Scarp slopes (floristic community types A2, 3 and 4; C2).
- Laterites that are shared with and/or intergrade with those of the adjacent Blackwood Plateau (floristic community type C4).
- Restricted and rare wetland communities of the Whicher Scarp and Whicher Scarp/Swan Coastal Plain Interface Wetlands.
- Evans/Claymore Rd Swamp.
- Swan Coastal Plain Paluslope Wetlands: Vasse Highway.
- Whicher Scarp/Swan Coastal Plain interface Ironstones: Williamson Road and Tutunup Road.
- Supports diversity of the flora of the North Whicher Scarp, large number significant taxa including at least 18 at the end of their range, a series of rare taxa such as *Astroloma* sp. Nannup (R.D. Royce

3978) (P4), *Hemigenia rigida* (P1), *Pultenaea skinneri* (P4) and *Acacia flagelliformis* (P4) and many populations of disjunct taxa including *Actinostrobus acuminatus.*

- Ecological linkage between the Abba, Whicher and Treeton forest areas through contiguous areas of the Blackwood Plateau forest blocks.
- Ecological linkage with contiguous Swan Coastal Plain vegetation in a series of small areas of Cartis vegetation complex.
- High degree of intactness of native vegetation (significant areas pine plantation, gravel mines, rolled vegetation).

Recommendation: A North Whicher Scarp conservation area should be established in the Abba forest to protect the specific Whicher Scarp values identified.

Argyle forest (Map 2e and f)

- Soil-landscape Whicher Scarp System.
- Whicher Scarp vegetation complexes Whicher (Wcv and Wc).
- Whicher Scarp slopes (floristic community types A3 and C2).
- A group of communities associated with laterites that are shared with and/or intergrade with those of the adjacent Blackwood Plateau (floristic community types C3 and C4)
- A group of communities on grey sands that are shared with those of the Swan Coastal Plain (floristic community type B1).
- Supports diversity of the flora of the North Whicher Scarp and a large number of significant taxa including at least 9 taxa at the end of their range and a series of rare taxa including *Daviesia elongata* subsp. *elongata* (DRF), *Logania wendyae* (P1), *Stenanthemum sublineare* (P2) and the newly recognised taxa, *Lomandra whicherensis* and *Platytheca* sp. Argyle (G.J. & B.J. Keighery 281).
- Ecological linkage with contiguous Blackwood Plateau vegetation within State forest.
- Ecological linkage with contiguous Swan Coastal Plain vegetation in a series of small areas of Cartis vegetation complex (mostly on private land).
- A very high degree of intactness of native vegetation (least disturbed area of the Whicher Scarp observed).

Recommendation: A North Whicher Scarp conservation area should be established in the Argyle forest to protect the specific Whicher Scarp values identified.

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GIS after the date in the references	Geographic Information System(GIS) dataset
# at the beginning of the reference	Some mapping information in these studies is available in a GIS format and, at times, a database
Database after the date in the reference	A database (varying formats)

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8. TABLES

TABLE 1: Sectors, conservation areas, key locations and wetlands in the Whicher Scarp area. Refer to Maps 2a to 2g; coordinates are given for the wetlands not shown on Map 2.

Whicher Sector	NAME Whicher Reference Areas: Names derived from the core Forest Block in each area.	Components Whicher Reference Areas Nature Reserves, Forest Blocks and other Reserves encompassed in the area	Other bushland areas on or adjacent to the Whicher Scarp	Map 2	Wetlands: on the Whicher Scarp or on adjacent Swan Coastal Plain (WHS or SWA- Map 2 centroid location)
West	Yelverton forest	part Yelverton National Park part Yelverton Forest Block R29192 (C, Sand and Gravel) R36715 (C, Parklands)		2b 2b 2b 2b	Poole Swamp (WHS - Map 2b 6264800/323600)
West	na	na	Haag Nature Reserve (on Annie Brook)	2b	Haag Wetland (WHS)
West	na	na	Chambers Road Bushland	2b	Chambers Road Ironstones[1] and adjacent wetlands (SWA)
West	na	na	'Taylor's Nature Reserve'	2b	Taylor's Ironstones[1] (SWA)
West	na	na	R37348 (C, Rubbish Disposal) R25325 (C, Gravel and Recreation)	2b 2b	Taylor's or Payne Road Swamp (SWA)
West	na	na	R37063 (C, Gravel) R27906 (C, Gravel)	2b 2b	
Central	na	na	Nature Reserve	2b	Gale Road Ironstones [1]
Central	Treeton forest	part Treeton Forest Block		2b	Ironstone Gully Ironstones[1] (WHS) Smith Road Ironstones[1] (WHS) (three occurrences)
Central	na	na	R18918 (C, Recreation)-Acton Park Hall Reserve (6292000/350000)	2c	
Central	Whicher forest	R24564 (C, Gravel) part Whicher National Park part Whicher Forest Block R22455 (C, Gravel)		2c&d 2c&d 2c&d 2d	
Central	Whicher National Park	Whicher National Park	Whicher National Park	2c&d	
North	Abba forest	R 18915 (C, Timber for Settlers) part Abba Forest Block R 18047 (C, Water)		2d 2d&e 2e	Williamson Road Ironstones[1] (SWA) Tutunup Road Ironstones[1] (SWA) Vasse Hwy Swamp (SWA – Map 2d 626400/356000)

Whicher Sector	NAME Whicher Reference Areas: Names derived from the core Forest Block in each area.	Components Whicher Reference Areas Nature Reserves, Forest Blocks and other Reserves encompassed in the area	Other bushland areas on or adjacent to the Whicher Scarp	Map 2	Wetlands: on the Whicher Scarp or on adjacent Swan Coastal Plain (WHS or SWA- Map 2 centroid location)
					Evans/Claymore Rd Swamp (WHS - Map 2d 6274000/367600)
North	na	na	adjacent Abba forest– UCL 1793 (Map 2d 6272400/366600)	2d	
North	Happy Valley forest	part Happy Valley Forest Block R20291 (C, Recreation) R14076 (C, Timber for Settlers) R21313 (C, Quarry Gravel)		2e 2e 2e 2e	Davies Rd Swamp (SWA – Map 2e 6278000/371600)
North	Argyle forest	part Argyle Forest Block		2e&f	Gwindinup Swamp (SWA – Map 2e 6290400/381200))
North	na	na	R18237 (C, Landscape Protection)	2f	
North	na	na	R2302, R2590-Gwindinup Reserve (all C Landscape Protection)	2f	
North	Donnybrook forest	part Donnybrook Forest Block		2f	
North	Boyanup forest	part Boyanup Forest Block (also called Crooked Brook Forest)		2f	
North	Dardanup forest	part Dardanup Forest Block part Dardanup Conservation Park R8439 (C, Gravel and Rubbish)		2g 2g 2g	

1. Map 2 shows these as buffered locations of Critically Endangered Threatened Ecological Community-shrublands on Southern Swan Coastal Plain ironstones (Busselton area) (DEC 2008)

TABLE 2: Vegetation complexes of the Whicher Scarp after Mattiske and Havel (1998)

Whicher Scarp Vegetation Complexes (code)	Description
Uplands: Cartis (CSs) (Swan Coastal Plain this report)	Low open forest to open forest of *Eucalyptus marginata* subsp. *marginata-Corymbia calophylla-Corymbia haematoxylon* with some *Banksia attenuata* and *Xylomelum occidentale* on dissecting escarpment in the humid zone.
Whicher Scarp vegetation complexes as defined in this report	
Uplands: Whicher Scarp (WC)	Open forest of *Eucalyptus marginata* subsp. *marginata-Corymbia calophylla* on escarpment with some *Corymbia haematoxylon, Banksia attenuata* and *Xylomelum occidentale* in the humid zone.
Valleys: Whicher Scarp Valleys (WCv)	Open forest of *Eucalyptus marginata* subsp. *marginata-Corymbia calophylla* with some *Xylomelum occidentale* on valleys dissecting escarpment in the humid zone.
Uplands: Yelverton undulating plain: (Y)	Woodland of *Eucalyptus marginata* subsp. *marginata-Corymbia calophylla-Allocasuarina fraseriana-Agonis flexuosa* and open woodland of *Corymbia calophylla* on low undulating uplands in the humid zone.
Uplands: Yelverton dune (Yd)	Woodland of *Allocasuarina fraseriana-Eucalyptus marginata* subsp. *marginata-Xylomelum occidentale-Banksia attenuata* on sandy slopes in the humid zone.
Valleys: Yelverton fertile(Yf)	Woodland of *Corymbia calophylla-Eucalyptus patens-Agonis flexuosa* on less undulating lower slopes in the humid zone.
Valleys Yelverton Wet (Yw)	Woodland of *Allocasuarina fraseriana-Nuytsia floribunda-Agonis flexuosa-Banksia attenuata* on slopes and open forest of *Corymbia calophylla-Eucalyptus patens-Eucalyptus marginata* subsp. *marginata* on the lower slopes and *Eucalyptus rudis-Melaleuca rhaphiophylla* on the valley floors in the humid zone.

TABLE 3: Floristic community types located on the Whicher Scarp as identified in Gibson *et al.* (1994)

Floristic Community Type (SWAFCT)	Generalised Description	Predominant Landform Type (as mapped by Churchward and McArthur 1980)
1a	*E. haematoxylon - E. marginata* woodlands on Whicher foothills	Ridge Hill Shelf
10b	Shrublands on southern ironstones	Pinjarra Plain
21b	Southern *Banksia attenuata* woodlands	Ridge Hill / Pinjarra

TABLE 4: Original and remaining area of native vegetation in each of the vegetation complexes (DEC 2007b)

KEY

Column 1	**Vegetation Complex Code**	Code allocated to the complex by Mattiske and Havel (1998, from CALM 1998a)
Column 2	**Vegetation Complex Name**	Name allocated to the vegetation complex by Mattiske and Havel (1998)
Column 3	**Pre-European Area (ha)**	Pre-European (i.e. original or pre-clearing) extent of the vegetation complex
Column 4	**Area Remaining (circa 2003/4) (ha)**	The remaining area in circa 2003/4 of each vegetation complex
Column 5	**% Remaining**	The remaining area of the complex as a percentage of its pre-European extent
Column 6	**Area Remaining SF, TR and ED (ha)**	State forest, timber reserves and land held under title by the Director General (Executive Director-ED) - excluding informal reserves as described above
Column 7	**Area Remaining in Other Public Land (ha)**	
Column 8	**Area Remaining in Private Land (ha)**	
Column 9	**Area in Formal Reserves (ha)**	Area within National Park, Nature Reserve, Conservation Park, forest conservation areas, and CALM Act sections 5(1)(g) or 5(1)(h) reserves for the purpose of conservation.
Column 10	**Area in Informal Reserves (ha)**	Areas within State forest, timber reserves, and ED land that are excluded from timber harvesting for the protection of stream, diverse ecotype, and travel route zones, poorly represented vegetation complexes, remnant Darling Scarp ecosystem, and old-growth forest remaining outside formal conservation reserves
Column 11	**Area in Formal and Informal Reserves (ha)**	
Column 12	**% of Each Remaining of Pre-European Extent in Formal Reserves (2002)**	
Column 13	**% of Each Remaining of Pre-European Extent in Formal and Informal Reserves (2002)**	

Code	Vegetation Complex (CALM 1998)	Pre-European Area (ha)	Area Remaining (ha)	% Remaining	Area SF, TR and ED (ha)	Area Other Public Land (ha)	Area Private Land (ha)	Area Formal Reserves (ha)	Area Informal Reserves (ha)	Area Formal and Informal (ha)	% of Original Area in Formal Reserves	% of Original Area in Formal and Informal Reserves
CSs	Cartis	1,459	284	19%	44	0	236	0	3	3	0%	0%
Whicher Scarp vegetation complexes as defined in this report												
WC	Whicher Scarp	4,071	3,035	75%	1,845	95	491	337	266	603	8%	15%
WCv	Whicher Scarp	599	327	55%	147	23	115	0	42	42	0%	7%
Y	Yelverton	9,046	3,477	38%	1,378	288	1,267	280	264	544	3%	6%
Yd	Yelverton	2,214	1,254	57%	7	157	867	38	186	224	2%	10%
Yf	Yelverton	36	6	18%	0	0	6	0	0	0	0%	0%
Yw	Yelverton	4,216	1,116	26%	2	92	655	35	330	366	1%	9%
Total		20,183	9,215	46%	3,380	654	3,637	690	1,089	1,782	14%	47%

TABLE 5: Number of quadrats per classification group and Whicher Scarp study floristic community types

Classification Level and Number of Quadrats (#)						WHSFCT and Number of Quadrats (#)			
gp10	# gp10	gp20	# gp20	gp40	# gp40	Group	# Group	WHSFCT	# WHSFCT
1	23	1	17	1	7	A	23	1	7
				2	5			2	5
				3	4			3	4
				4	1			4	1
		2	6	5	2			5	6
				6	4				
2	22	3	21	7	19	B	22	1	21
				8	2				
		4	1	9	1			2	1
3	49	5	29	10	10	C	49	1	10
				11	3			2	8
				12	5				
				13	8			3	11
				14	3				
		6	17	15	2			4	17
				16	6				
				17	2				
				18	1				
				19	4				
				20	2				
		7	2	21	2			5	2
		8	1	22	1			6	1
4	10	9	9	23	5	D	10	1	3
				24	4				
		10	1	25	1				
5	3	11	3	26	1	E	3	1	3
				27	1				
				28	1				
6	4	12	2	29	2	F	4	1	2
		13	2	30	2			2	2
7	1	14	1	31	1	G	2	1	1
8	1	15	1	32	1			2	1
9	4	16	2	33	2	H	11	1	11
		17	2	34	1				
				35	1				
10	7	18	4	36	2				
				37	1				
				38	1				
		19	2	39	2				
		20	1	40	1				

TABLE 6: Floristic community types identified in the area of the Whicher Scarp

KEY

Column 1 **Whicher Scarp groups and floristic community types determined in this study**
Column 2 **Quadrats** Number of quadrats with this WHSFCT
Columns 3 - 12 **Averages and ranges**
Columns 13 - 14 **Average and range for vegetation condition**

Whicher Scarp Groups and Floristic Community Types			Quadrats	Native Taxa		Weed Taxa		Native Taxa in 1 Quadrat (Singleton)		Native Taxa in 2, 3 or 4 Quadrats		Native Taxa in Greater than 50 Quadrats		Vegetation Condition	
				Avg	Range	Avg	Range	Avg	Range	Avg	Range	Avg	Range	Avg	Range
A	**Whicher Scarp woodlands of grey/white sands**		**23**	**69.9**	**49 - 97**	**2.1**	**0 - 7**	**1.5**	**0 - 4**	**3.7**	**1 - 8**	**16.9**	**12 - 21**	**2.21**	**1.5 - 3.75**
	A1	Central Whicher Scarp Mountain Marri woodland	7	63.6	49 - 79	1.3	0 - 4	1.0	0 - 3	3.0	1 - 6	15.4	12 - 18	2.25	1.5 - 2.75
	A2	North Whicher Scarp Jarrah and Woody Pear woodland	5	79.6	61 - 97	3.4	1 - 7	2.8	2 - 4	4.4	3 - 8	18.0	15 - 21	2.00	2 - 2
	A3	North Whicher Scarp Banksia and Woody Pear woodland	4	62.5	52 - 68	2.8	0 - 5	0.5	0 - 2	2.3	1 - 4	19.0	18 - 20	2.44	2 - 3.75
	A4	Whicher Scarp *Banksia grandis*, Jarrah and Marri woodland	1	68.0	68 - 68	2.0	2 - 2	4.0	4 - 4	6.0	6 - 6	16.0	16 - 16	2.50	2.5 - 2.5
	A5	Central/North Whicher Scarp Mountain Marri woodland	6	74.3	65 - 89	1.7	0 - 4	1.3	0 - 2	4.7	2 - 8	16.5	14 - 20	2.13	1.5 - 3
B	**Swan Coastal Plain centred woodlands of grey/white sands**		**22**	**54.6**	**34 - 79**	**2.9**	**0 - 8**	**1.0**	**0 - 3**	**2.3**	**0 - 7**	**13.1**	**8 - 18**	**2.25**	**1 - 3.5**
	B1	Swan Coastal Plain/North Whicher Scarp *Banksia attenuata* woodland	21	55.6	44 - 79	2.9	0 - 8	1.0	0 - 3	2.4	0 - 7	13.2	8 - 18	2.21	1 - 3.5
	B2	West Whicher Scarp Banksia attenuata woodland	1	34.0	34 - 34	3.0	3 - 3	2.0	2 - 2	0.0	0 - 0	10.0	10 - 10	3.00	3 - 3
C	**Whicher Scarp woodlands of coloured sands and laterites**		**49**	**67.4**	**46 - 86**	**1.3**	**0 - 9**	**1.1**	**0 - 6**	**4.2**	**0 - 18**	**16.9**	**11 - 21**	**1.98**	**1 - 4**
	C1	Central Whicher Scarp Jarrah woodland	10	66.9	53 - 78	0.6	0 - 5	0.6	0 - 2	3.6	1 - 7	17.6	13 - 21	1.85	1 - 2.75
	C2	Whicher Scarp Jarrah woodland of deep coloured sands	8	67.3	60 - 74	0.6	0 - 2	0.5	0 - 2	2.9	0 - 9	18.5	14 - 21	1.97	1 - 4
	C3	Whicher Scarp Jarrah and Mountain Marri woodland on laterites	11	69.3	60 - 81	0.3	0 - 1	0.7	0 - 3	2.9	0 - 6	16.8	15 - 20	1.84	1 - 2.5
	C4	Whicher Scarp/Blackwood Plateau Jarrah and Marri woodland	17	66.2	46 - 86	2.8	0 - 9	1.4	0 - 4	5.2	0 - 18	16.5	12 - 21	2.19	1.25 - 3
	C5	Dardanup Jarrah and Mountain Marri woodland on laterite	2	72.0	64 - 80	0.0	0 - 0	2.0	1 - 3	9.5	7 - 12	14.0	12 - 16	1.50	1 - 2
	C6	Swan Coastal Plain Foothills Jarrah woodland on laterite	1	64.0	64 - 64	2.0	2 - 2	6.0	6 - 6	6.0	6 - 6	11.0	11 - 11	2.50	2.5 - 2.5

Whicher Scarp Groups and Floristic Community Types			Quadrats	Native Taxa		Weed Taxa		Native Taxa in 1 Quadrat (Singleton)		Native Taxa in 2, 3 or 4 Quadrats		Native Taxa in Greater than 50 Quadrats		Vegetation Condition	
				Avg	Range	Avg	Range	Avg	Range	Avg	Range	Avg	Range	Avg	Range
D	**Woodlands of the Harvey Swan Coastal Plain Foothills and Darling Scarp**		**10**	**55.2**	**45 - 69**	**7.3**	**3 - 17**	**1.8**	**0 - 6**	**5.3**	**1 - 9**	**13.4**	**8 - 18**	**2.78**	**2 - 3.75**
E	**Jarrah and Marri woodland wetland type 1**		**3**	**57.7**	**53 - 64**	**7.3**	**2 - 11**	**3.3**	**2 - 4**	**8.7**	**7 - 10**	**12.0**	**9 - 15**	**2.75**	**2 - 3.25**
F	**Jarrah and Marri woodland wetland type 2**		**4**	**42.5**	**40 - 45**	**1.8**	**0 - 4**	**0.8**	**0 - 2**	**8.5**	**4 - 13**	**8.8**	**6 - 11**	**1.88**	**1.5 - 2**
	F1	Sabina River Jarrah and Marri woodland	2	42.5	42 - 43	0.5	0 - 1	0.5	0 - 1	12.0	11 - 13	7.5	6 - 9	1.75	1.5 - 2
	F2	Miscellaneous Wetlands	2	42.5	40 - 45	3.0	2 - 4	1.0	0 - 2	5.0	4 - 6	10.0	9 - 11	2.00	2 - 2
G	**West Whicher Scarp wetlands**		**2**	**11.5**	**7 - 16**	**3.5**	**1 - 6**	**4.5**	**4 - 5**	**5.0**	**3 - 7**	**0.5**	**0 - 1**	**2.13**	**1.75 - 2.5**
	G1	Creekline Blackbutt *(Eucalyptus patens)* and Marri forest	1	16.0	16 - 16	6.0	6 - 6	5.0	5 - 5	7.0	7 - 7	1.0	1 - 1	1.75	1.75 - 1.75
	G2	Shrublands of near permanent wetlands in creeklines	1	7.0	7 - 7	1.0	1 - 1	4.0	4 - 4	3.0	3 - 3	0.0	0 - 0	2.50	2.5 - 2.5
H	**Busselton Ironstones**		**11**	**43.5**	**27 - 66**	**5.3**	**1 - 12**	**3.7**	**0 - 10**	**12.2**	**4 - 23**	**3.5**	**1 - 5**	**2.23**	**2 - 3**

TABLE 7: Comparison of numbers of quadrats in the various WHSFCTs and SWAFCTs

WHSFCT	SWAFCT			Number of Quadrats Not In SWAFCT Study
	01a	10b	21b	
A1				7
A2			1	4
A3				4
A4	1			
A5	1			5
B1			17	4
B2				1
C1	3			7
C2	4			4
C3	2			9
C4				17
C5	2			
C6	1			
D1				10
E1				3
F1				2
F2				2
G1				1
G2				1
H1		9		2

TABLE 8: WHSFCTs and soil-landscape units (DAFWA 2007)

First 3 characters (numbers) of map units represent soil-landscape zones: 212 = Bassendean Zone; 213 = Pinjarra Plain Zone; 214 = Donnybrook Sunklands Zone; 255 = Western Darling Zone.

Soil	Landform	WHSFCT	212Bs__B1	212Bs__B1b	212Bs__B2	212Bs__B3	212Bs__B6	213AbAB1	213AbABd	213AbABw	213AbABwi	213AbJDf	213Fo__F2b	213FoCSs	213Pj__P1b	214BpJL	214BpKI	214GvPR	214GvRO3	214ThTRh	214ThTRv	214WsWC2	214WsWCv	214WsYL	214WsYL1	214WsYL2	214WsYLd	214WsYLv	214WsYLvw	214WsYLw	214WsYLwi	255LvBL3	255LvBL4	255LvKR3
Deep bleached grey sands	Low relief dunes, undulating sandplain	A1						1														3			2		1							
Deep bleached grey sandy surface	Low relief dunes, undulating sandplain	A2						1		1					1									1											
Deep bleached grey sands	Well drained sandplain	A3												1								3												
Moderately deep, bleached sands	Poorly drained closed depressions and poorly defined stream channels	A4																									1							
Deep or very deep grey siliceous sands	Sandplain and broad extremely low rises	A5																	1					2			1		2					
Pale sandy earths, Semi-wet soils	Plain consisting of very low rises	B1	2	2	3	1	1		3								2					6					1							
Pale deep sands	Low sand rises	B2																									1							
Wet and Semi-wet soils	Poorly drained flats and depressions	C1						1												1		3			1	3				1				
Wet and Semi-wet soils	Poorly drained flats and depressions	C2										1		1					1			4	1		1									
Red/brown and Brown loamy earths	Well drained flats	C3															1		6			3				1								
Deep yellowish brown sands	Imperfectly drained sandplain and broad extremely low rises	C4											1			1	3	2	2				2	1	2	2	2							
Deep bleached grey sands	Very low relief (1-5%) foot slopes	C5															1		1															
Deep acidic mottled yellow duplex	Undulating plain. Imperfectly drained	C6																																
Sandy gravels	Shallow minor valleys	D																													5	2	3
Sandy gravels some Deep sands	Broad, undulating lateritic crests	E						1											1										1					
Brown loamy earths	River channels, narrow flood plains	F1																1	1															
Duplex sandy gravels	Low valley slopes (gradients 5-20%)	F2								1																			1					
Duplex sandy gravels	Gentle hillslopes	G1																										1						
Duplex sandy gravels	Narrow V-shaped open drainage	G2																											1					
Duplex sandy gravels	Gentle, smooth lateritic slopes	H							4	1										1	2									1	2			
Duplex sandy gravels	Minor valleys																																	
Duplex sandy gravels	Level to gently undulating surface																																	
Sandy gravels, loamy gravels	Raised flats																																	
Duplex sandy gravels, semi-wet soils	Undulating terrain																																	
Duplex sandy gravels, semi-wet soils	Sandy flats and rises																																	
Pale deep sands, gravelly pale deep	Narrow floored minor valleys																																	
Duplex sandy gravels, loamy gravels	Swampy floored minor valleys																																	
Wet and semi-wet soils	Poorly drained flats and depressions																																	
Wet and semi-wet soils	Poorly drained flats and depressions																																	
Wet soils (shallow loams)	Gentle to moderate valley slopes																																	
Friable red-brown loamy earths	Moderate valley slopes																																	
Friable red-brown loamy earths	Gentle to moderate slopes																																	
Duplex sandy gravels, Loamy gravels																																		

TABLE 9: Derived selected characteristics of 124 quadrats based on field data, field knowledge and regional datasets

Rock refers to laterite unless indicated.
WHSFCTs in bold are essentially confined to the Whicher Scarp

WHSFCT	Number of Quadrats	Biogeographic Regions and Major Landform Elements					SWA Major Landform Elements			Topographic Position on Whicher Scarp				Upland or Wetland			Soil Colour		Rock	
		Swan Coastal Plain (SWA)	Whicher Scarp	Blackwood Plateau	Blackwood Plateau Riverine	Foothills/Darling Scarp	SWA Foothills	SWA Pinjarra Plain	SWA Bassendean Dunes	Whicher Lower-Slope	Whicher Mid-Slope	Whicher Riverine	Whicher Upper-Slope	Upland	Upland Wet Patch	Wetland	Coloured	White/Grey	Absence of Rock	Presence of Rock
A1	**7**	**1**	**6**					**1**			**5**		**1**	**7**			**1**	**6**	**5**	**2**
A2	5	2	3					2		3				4		1	1	4	5	
A3	**4**		**4**							**2**	**2**			**4**				**4**	**3**	**1**
A4	1		1								1			1				1	1	
A5	6		6							1	4		1	5		1	3	3	3	3
B1	21	12	8	1				1	11	2	5		1	21				21	21	
B2	**1**		**1**							**1**				**1**				**1**	**1**	
C1	**10**	**1**	**9**					**1**		**3**	**3**	**1**	**2**	**9**		**1**	**8**	**2**	**6**	**4**
C2	**8**	**2**	**6**					**2**			**5**		**1**	**8**			**6**	**2**	**6**	**2**
C3	**11**		**10**	**1**						**1**	**2**		**7**	**10**	**1**		**6**	**5**		**11**
C4	17		11	6						2	5	3	1	15		2	13	4	8	9
C5	2			2										2			1	1		2
C6	1	1						1						1			1			1
D	10	7				3	6							9		1	10		5	5[1]
E	3	1	2					1		1		1				3	1	2	3	
F1	**2**		**2**									**2**				**2**	**2**		**2**	
F2	2	1	1					1				1				2	2		2	
G1	**1**		**1**									**1**				**1**	**1**			**1**[2]
G2	1		1							1						1	1		1	
H	11	5	3	1	2			5			3					11	9	2		11[3]

[1] One quadrat = granite
[2] Quadrat = ironstone
[3] All quadrats = ironstone

TABLE 10: Significant taxa of the Whicher Scarp

KEY

Column 1 **Family**
Families are grouped into Ferns, Gymnosperms, Monocotyledons and Dicotyledons

Column 2 **Scientific Name**
Genus + Species + Infra Species Rank + Infra Species Name + Informal Name from BJ Keighery *et al.* (2007). Some species names may be modified from original sources of information: DEP (1996) and Gibson *et al.* (1994). Some taxa yet to be formally described and named may have a reference collection number from the relevant collector. Taxa (species, sub-species and varieties) are listed alphabetically within genera.

*	Weed
subsp.	Subspecies
var.	Variety
MS	A manuscript name yet to be published
PN	A phrase name for a taxon yet to be described and published.

Column 3 **Common Name**

Columns 4 - 8 **Significant Taxa**

Column 4 **WA = Western Australian Listed Taxa**
Significant plant taxa (species, sub-species and varieties) listed under the State *Wildlife Conservation Act 1950* (Government of Western Australia 2006) and by the Department of Environment and Conservation (Atkins 2006). Priority taxa conservation code listings are current as at January 2008 (Western Australian Herbarium 2008). See Appendix 1 for further descriptions of the categories below.

R	Declared Rare Flora: Extant Taxa
X	Declared Rare Flora: Presumed Extinct Taxa
1	Priority 1: Poorly Known Taxa
2	Priority 2: Poorly Known Taxa
3	Priority 3: Poorly Known Taxa
4	Priority 4: Rare Taxa

Column 5 **IUCN = Internationally Listed Taxa**
Significant plant taxa (species, sub-species and varieties) listed according to the *IUCN Red List of Threatened Species* as of December 2006. Taxa are listed on the IUCN website (IUCN 2007). See Appendix 1 for further descriptions of the categories below.

CR	Taxa that are critically endangered
E	Taxa that are endangered
V	Taxa that are vulnerable

Column 6 **Com = Commonwealth Listed Taxa**
Significant plant taxa (species, sub-species and varieties) listed under the Commonwealth *Environment Protection and Biodiversity Conservation Act 1999* as of December 2006. Taxa are listed on the Department of the Environment, Water, Heritage and the Arts website (DEWHA 2007). See Appendix 1 for further descriptions of the categories below.

E	Taxa that are endangered
V	Taxa that are vulnerable

In some instances, the codes for the Commonwealth and the Internationally listed taxa differ; in these cases, the discrepancy is indicated by an asterisk in the 'Com' column.

Column 7 **OS = Other Categories of Significance**

z	Recently recognised taxa

Significant due to geographical location

r	Populations at the northern (N) or southern (S) limit of their known geographic range, limit indicated as follows. Example: r (N or S, Locality, Region).
d	Populations disjunct from their known geographic range

p Poorly reserved as is known from only a few populations in reserves (applies to all Declared Rare Flora and Priority taxa)
s Significant populations in reference to location, population size, diversity of ages and/or health (applies to all Declared Rare Flora and Priority taxa)
u Uncommon in the area (generally applies to disjunct populations)

Taxa with regional and/or ecological preferences

Endemic taxa

e Local endemic, less than 100 km range
e(AREA) AREA after Map 3 (Biogeographic region or subregion)
- **SWA** Swan Coastal Plain (Swan Coastal Plain)
- **SWA(B)** Busselton area of the Swan Coastal Plain (Swan Coastal Plain)
- **WHS** Whicher Scarp (Jarrah Forest South)
- **BP** Blackwood Plateau (Jarrah Forest South)
- **SC** Scott Coastal Plain (Warren)
- **MP** Margaret River Plateau (Warren and Jarrah Forest South)
- **JF** Jarrah Forest (Jarrah Forest)

Ne Extends well north from WHS
Se Extends well south from WHS (and adjacent Busselton Plain at times)

Taxa with ecological preferences

h Taxa with distinct habitat preference Example: h (ironstone)
a Relictual species (monotypic genera are annotated)

Taxa with morphological and/or genetic variation

v Morphological variant, unsure of significance at taxonomic level
t Morphological variant, significant taxonomically
g Genetic variant

Column 8 **Endemic (State)**

Taxa (species, sub-species and varieties) endemic to Western Australia (WA) or Australia (AUST; or >AUST = cosmopolitan). No records are given for weeds (see Hussey *et al.* 2007 for country of origin), unless the plant is also native to WA.

Family	Scientific Name	Common Name	Significant Taxa				Endemic
			WA	IUCN	Com	OS	
FERNS							
Adiantaceae	*Adiantum aethiopicum*	Common Maidenhair				d,p,s,u,h	AUST
Adiantaceae	*Cheilanthes austrotenuifolia*	Rock Fern				d,p,s,u,h	>AUST
GYMNOSPERMS							
Cupressaceae	*Actinostrobus acuminatus*	Creeping Cypress				d,p,s,u,h	WA
MONOCOTYLEDONS							
Anthericaceae	*Hodgsoniola junciformis*	Rush Lily				p,s,u,Se,h	WA
Anthericaceae	*Johnsonia acaulis*	Small Johnsonia				s,h,v	WA
Anthericaceae	*Johnsonia inconspicua*	Hidden Johnsonia	3			z,r(S,Yelverton, WHS),d,p,s,g	WA
Anthericaceae	*Johnsonia lupulina*	Elegant Johnsonia				Se,h	WA
Anthericaceae	*Laxmannia jamesii*	James' Paper Lily	4		V*	r(N,Whicher NP,WHS),d,p,s,u,a	WA
Anthericaceae	*Thysanotus formosus*	Fringed Lily	1			r(N,Boyanup,WHS),p,s,u,eWHS/BP	WA
Anthericaceae	*Thysanotus glaucus*	Fringed Lily	4			d,p,s,u,h	WA
Anthericaceae	*Thysanotus pseudojunceus*	Fringed Lily				r(N,Dardanup,WHS),d,s,u	WA
Cyperaceae	*Caustis dioica*	Caustis				r(S,Treeton,WHS),d,p,s,u,h,g	WA
Cyperaceae	*Caustis* sp. Boyanup (G.S. McCutcheon 1706) PN	Caustis	1			d,p,s,u,h,g	WA
Cyperaceae	*Cyathochaeta avenacea*	Cyathochaeta				v,t,g	WA
Cyperaceae	*Cyathochaeta clandestina*	Cyathochaeta				d,s,h	WA
Cyperaceae	*Cyathochaeta equitans*	Cyathochaeta				d,s,h	WA
Cyperaceae	*Cyathochaeta* sp. Carbunup (G.J. Keighery 14123)	Carbunup River Cyathochaeta				z,d,p,s,u,eSWA(B)/WHS,h	WA
Cyperaceae	*Cyathochaeta* sp. Sabina (SABI03&06)	Sabina River Cyathochaeta				z,p,s,u,eWHS,h	WA
Cyperaceae	*Cyathochaeta teretifolia*	Cyathochaeta	3			d,p,s,u,h	WA
Cyperaceae	*Evandra aristata*	Graceful Evandra				r(N,West WHS),d,s,u,Se,h	WA
Cyperaceae	*Gahnia decomposita*	Swamp Sawsedge				d,s,u,Se,h	WA
Cyperaceae	*Gymnoschoenus anceps*	Western Button Grass				r(N,West WHS),d,s,u,Se,h,a	WA

Family	Scientific Name	Common Name	Significant Taxa				Endemic
			WA	IUCN	Com	OS	
Cyperaceae	*Lepidosperma* aff. resinosum (A. Webb 10)	Busselton Lepidosperma				s,u,eSWA(B)/WHS	WA
Cyperaceae	*Lepidosperma obtusum*	Lepidosperma				r(W,Treeton,WHS),d,s,u,h,g	WA
Cyperaceae	*Schoenus pennisetis*	Schoenus	1			r(S,Goodwood Rd,WHS),p,s,u,h	WA
Cyperaceae	*Schoenus* sp. Whicher (G.J. Keighery and B.J. Keighery 901)	Whicher Schoenus				z,s,u,eWHS	WA
Dasypogonaceae	*Baxteria australis*	Baxteria				s,Se,h,a	WA
Dasypogonaceae	*Calectasia narragara*	Blue Tinsel Lily				r(S,Whicher NP,WHS),s,u,h	WA
Dasypogonaceae	*Chamaexeros serra*	Little Fringe-leaf				d,s,u	WA
Dasypogonaceae	*Dasypogon hookeri*	Hooker's Pineapple Bush				r(N,Boyanup,WHS),s,Se,h,a	WA
Dasypogonaceae	*Lomandra spartea*	Lomandra				r(S,Whicher NP,WHS),d,s,u,h	WA
Dasypogonaceae	*Lomandra whicherensis*	Whicher Lomandra				z,r(S,Argyle,WHS),p,s,u,e,h,a	WA
Iridaceae	*Patersonia limbata*	Hairy Flag				r(N,Dardanup,WHS),d,p,s,u,Se	WA
Iridaceae	*Patersonia maxwellii*	Maxwell's Flag				r(S,Yelverton,WHS),d,p,s,u	WA
Iridaceae	*Patersonia occidentalis* var. *angustifolia*	Swamp Flag				z,d,s,u,Se,h	WA
Iridaceae	*Patersonia umbrosa* var. *umbrosa*	Purple Flag				r(N,Gwindinup,WHS),d,p,s,u,eSWA(B)/BP,h	WA
Orchidaceae	*Caladenia longicauda* subsp. *clivicola*	Spider Orchid	4			p,s,u,e	WA
Orchidaceae	*Caladenia plicata*	Crab-lipped Spider Orchid	4			p,s,u	WA
Orchidaceae	*Caladenia speciosa*	Sandplain White Spider Orchid	4			z,r(S,Whicher NP,WHS),p,s,u	WA
Restionaceae	*Chordifex isomorphus*	Chordifex	4			p,s,Se	WA
Restionaceae	*Empodisma gracillimum*	Empodisma				d,p,s,u,Se,h,a	WA
Restionaceae	*Hypolaena caespitosa*	Hypolaena				Se	WA
Restionaceae	*Hypolaena exsulca*	Hypolaena				eSWA(B)/WHS,v	WA
Restionaceae	*Hypolaena grandiuscula*	Hypolaena				r(N,Whicher,WHS),d,p,s,u,Se,h,a	WA
Restionaceae	*Lepyrodia heleocharoides*	Lepyrodia	3			r(SW,Yelverton,WHS),d,p,s,u,Se	WA
Restionaceae	*Loxocarya magna*	Loxocarya	3			z,p,s,u,Se,h	WA

Family	Scientific Name	Common Name	Significant Taxa				Endemic
			WA	IUCN	Com	OS	
Restionaceae	*Loxocarya striata* subsp. *implexa* MS	Loxocarya				z,p,s,u,eSWA(B)/WHS,h	WA
Restionaceae	*Tyrbastes glaucescens*	Tyrbastes	4			z,p,s,u,Se,h	WA
Xanthorrhoeaceae	*Xanthorrhoea acanthostachya*	Prickly Balga				r(S,Abba,WHS),s,u,Ne,h,v,t	WA
Xyridaceae	*Xyris atrovirida*	Xyris				r(S,Abba,WHS),d,p,s,u,e,h	WA
Xyridaceae	*Xyris lacera*	Xyris				d,s,u,Se,h	WA
Xyridaceae	*Xyris lanata*	Xyris				d,p,s,u,Se,h	WA
Xyridaceae	*Xyris laxiflora*	Xyris				d,s,u,Se,h	WA
DICOTYLEDONS							
Apiaceae	*Actinotus whicheranus*	Whicher Flannel Flower	2			z,p,s,u,eWHS,h	WA
Apiaceae	*Platysace haplosciadia*	Platysace				r(N,Abba,WHS),d,s,u	WA
Apiaceae	*Trachymene grandis*	White Lace Flower				d,s,u	WA
Apiaceae	*Xanthosia atkinsoniana*	Xanthosia				d,s,u	AUST
Apiaceae	*Xanthosia tasmanica*	Xanthosia				r(N,Dardanup,WHS),d,s,u,Se,t	AUST
Asteraceae	*Amblysperma minor*	Claypan Native Gerbera				z,r(N,Dardanup,WHS),d,s,u,h	WA
Asteraceae	*Craspedia variabilis*	Bachelor's Buttons				d,s,u	AUST
Asteraceae	*Hyalosperma demissum*	Hyalosperma				r(S,Abba,WHS),d,s,u	WA
Asteraceae	*Olearia homolepis*	Olearia				d(Kemp Rd),u	WA
Asteraceae	*Olearia strigosa*	Olearia				r(S,Whicher NP,WHS),p,s,u,eSWA(B)/WHS	WA
Casuarinaceae	*Allocasuarina thuyoides*	Horned Sheoak				d,s,u	WA
Cephalotaceae	*Cephalotus follicularis*	Albany Pitcher Plant				r(N,Haag NR,WHS),d,p,s,u,h,a	WA
Dilleniaceae	*Hibbertia acerosa*	Needle-leaved Hibbertia				d,s,u	WA
Dilleniaceae	*Hibbertia aurea*	Hibbertia				d,s,u,v,g	WA
Dilleniaceae	*Hibbertia ferruginea*	Ferruginous Hibbertia				z,s,u,Se	WA
Dilleniaceae	*Hibbertia huegelii*	Huegel's Hibbertia				r(S,West WHS),d,s,u	WA
Dilleniaceae	*Hibbertia lasiopus*	Hibbertia				r(N,Argyle,WHS),d,p,s,u,t	WA
Dilleniaceae	*Hibbertia mylnei*	Hibbertia				d,s,u	WA

Family	Scientific Name	Common Name	Significant Taxa				Endemic
			WA	IUCN	Com	OS	
Dilleniaceae	*Hibbertia serrata*	Serrate-leaved Hibbertia				d	WA
Droseraceae	*Drosera hyperostigma*	Sundew				d,s,u	WA
Droseraceae	*Drosera myriantha*	Rainbow				r(N,Goodwood Rd,WHS),d,s,u	WA
Epacridaceae	*Andersonia aristata*	Andersonia				r(S,Gale Rd Ironstones,WHS),d,s,u,h	WA
Epacridaceae	*Andersonia barbata*	Andersonia				r(N,Abba,WHS),d,p,s,u,Se	WA
Epacridaceae	*Andersonia fallax* MS	Andersonia				z,r(N,Whicher NP,WHS),p,s,u,eWHS/BP,h	WA
Epacridaceae	*Andersonia ferricola* MS	Ironstone Andersonia	1			z,r(S,Treeton,WHS),p,s,u,eSWA(B)/WHS,h	WA
Epacridaceae	*Andersonia heterophylla*	Andersonia				r(S,Whicher NP,WHS),d,s,u,h	WA
Epacridaceae	*Andersonia micrantha*	Andersonia				r(N,Boyanup,WHS),p,s,u,Se	WA
Epacridaceae	*Astroloma* sp. Nannup (R.D. Royce 3978) PN	Nannup Astroloma	4			z,r(N,Abba,WHS),p,s,u,Se	WA
Epacridaceae	*Leucopogon oliganthus*	Beard Heath				r(S,Abba,WHS),d,s,u,a,g	WA
Epacridaceae	*Leucopogon* sp. Whicher Range (G.J. Keighery 11763) PN	Whicher Beard Heath				r(N,Abba,WHS),s,eWHS/BP	WA
Euphorbiaceae	*Amperea micrantha*	Amperea	2			p,s,u	WA
Euphorbiaceae	*Amperea volubilis*	Amperea				r(N,Whicher,WHS),d,p,s,u	WA
Euphorbiaceae	*Ricinocarpos* aff. cyanescens (A. Webb sn 27 October 2003)	Whicher Ricinocarpos				z,p,s,u,eWHS,h	WA
Euphorbiaceae	*Stachystemon vermicularis*	Stachystemon				d,p,s,u,h	WA
Goodeniaceae	*Anthotium junciforme*	Anthotium	4			p,s,u,h	WA
Goodeniaceae	*Dampiera linearis*	Dampiera				v,g	WA
Lamiaceae	*Hemigenia rigida*	Hemigenia	1			p,s,h	WA
Lamiaceae	*Pityrodia bartlingii*	Woolly Foxglove				r(SW,Whicher,WHS),d,p,s,u,Ne,h,g	WA
Loganiaceae	*Logania wendyae*	Wendy's Logania	1			z,p,s,u,eWHS,h	WA
Mimosaceae	*Acacia browniana* var. *browniana*	Brown's Wattle				r(N,Gwindinup Reserve,WHS)	WA

Family	Scientific Name	Common Name	Significant Taxa				Endemic
			WA	IUCN	Com	OS	
Mimosaceae	*Acacia flagelliformis*	Rush Wattle	4			p,s,u,eSWA/WHS/BP,h	WA
Mimosaceae	*Acacia inops*	Wattle	3			d,p,s,u,Se,h	WA
Mimosaceae	*Acacia luteola*	Wattle				r(N,Dardanup,WHS),d	WA
Mimosaceae	*Acacia mooreana*	Moore's Wattle				r(N,Dardanup,WHS),s,h	WA
Mimosaceae	*Acacia preissiana*	Preiss's Wattle				r(S,WHS),s	WA
Mimosaceae	*Acacia semitrullata*	Wattle	3			p,s,u,h	WA
Mimosaceae	*Acacia tayloriana*	Taylor's Wattle	4			r(N,Abba,WHS),p,s,u,eWHS/BP	WA
Mimosaceae	*Acacia tetragonocarpa*	Wattle				d,s,u	WA
Mimosaceae	*Acacia uliginosa*	Wattle				r(N,Whicher,WHS),p,s,u,Se	WA
Myrtaceae	*Actinodium cunninghamii*	Albany Swamp Daisy				p,s,u,h,g	WA
Myrtaceae	*Agonis flexuosa* var. *flexuosa*	Peppermint				s,u,h	WA
Myrtaceae	*Beaufortia sparsa*	Swamp Beaufortia				d,p,s,u,h,g	WA
Myrtaceae	*Beaufortia squarrosa*	Sandplain Beaufortia				r(S,Abba,WHS),d,p,s,u,Ne,h,g	WA
Myrtaceae	*Calothamnus pallidifolius*	Whicher Calothamnus				s,u	WA
Myrtaceae	*Calothamnus schaueri*	Schauer's Calothamnus				d,s,u	WA
Myrtaceae	*Calothamnus* sp. Scott River (R.D. Royce 84) PN	Scott River Calothamnus	2			z,r(N,Treeton,WHS),p,s,u,eWHS/SC,h	WA
Myrtaceae	*Calothamnus* sp. Whicher (B.J. Keighery & N. Gibson 230) PN	Ironstone Calothamnus	4			z,p,s,u,eSWA(B)/WHS,h	WA
Myrtaceae	*Calytrix fraseri*	Pink Summer Starflower				d,s,u,h	WA
Myrtaceae	*Calytrix* sp. Tutunup (G.J. Keighery & N. Gibson 2953) PN	Ironstone Starflower	2			z,p,s,u,eSWA(B)/WHS,h,t	WA
Myrtaceae	*Calytrix tenuiramea*	Starflower				r(W,Whicher NP,WHS),d,s,u,h	WA
Myrtaceae	*Chamelaucium erythrochlorum* MS	Blackwood Wax	4			z,r(N,Dardanup,WHS),p,s,u,eSWA(B)/WHS/BP,h	WA
Myrtaceae	*Darwinia vestita*	Pom-pom Darwinia				r(NW,Dardanup,WHS),p,s,u,Se	WA
Myrtaceae	*Eremaea asterocarpa*	Star-fruited Eremaea				r(S,Argyle,WHS),d,s,u,eSWA/WHS,h	WA

Family	Scientific Name	Common Name	Significant Taxa				Endemic
			WA	IUCN	Com	OS	
Myrtaceae	*Eremaea pauciflora* var. *pauciflora*	Sandplain Eremaea				d,s,u,h	WA
Myrtaceae	*Eucalyptus decipiens* subsp. *chalara*	Swamp Limestone Marlock				z,r(N,Goodwood Rd,WHS),p,s,u,h	WA
Myrtaceae	*Eucalyptus haematoxylon*	Mountain Marri				r(S,Treeton,WHS),d,s,Ne,g	WA
Myrtaceae	*Eucalyptus megacarpa*	Bullich				d,s,u,h	WA
Myrtaceae	*Eucalyptus relicta*	Whicher Mallee	2			z,p,s,u,eWHS/BP,h,a	WA
Myrtaceae	*Eucalyptus relicta x lane-poolei*	Hybrid Whicher Gum				p,s,u,eWHS	WA
Myrtaceae	*Homalospermum firmum*	Homalospermum				d,s,u,h	WA
Myrtaceae	*Kunzea rostrata*	Orange-fruited Kunzea				r(N,Dardanup,WHS),s,eSWA(B)/WHS/BP	WA
Myrtaceae	*Paragonis grandiflora* MS	Strange Peppermint				r(S,Whicher NP,WHS),s	WA
Myrtaceae	*Taxandria fragrans* MS	Swamp Peppermint				r(N,Argyle,WHS),d,s,u,h	WA
Myrtaceae	*Verticordia densiflora* var. *pedunculata*	Compacted Featherflower	R	E	E	d,p,s,u,eSWA(B)/WHS,h	WA
Papilionaceae	*Aotus cordifolia*	Swamp Aotus	3			p,s,u,h	WA
Papilionaceae	*Bossiaea pulchella*	Beautiful Bossiaea				r(S,Abba,WHS),p,s	WA
Papilionaceae	*Bossiaea* sp. Waroona (B.J. Keighery & N. Gibson 229) PN	Foothills Bossiaea				z,r(S,Goodwood Rd,WHS)	WA
Papilionaceae	*Chorizema reticulatum*	Showy Flame Pea	3			r(N,Argyle,WHS),p,s	WA
Papilionaceae	*Chorizema spathulatum*	Flame Pea				r(N,Whicher NP,WHS),d,Se	WA
Papilionaceae	*Daviesia divaricata* subsp. *divaricata* MS	Daviesia				d,s,u,h	WA
Papilionaceae	*Daviesia elongata* subsp. *elongata*	Spreading Daviesia	R	V	V	p,s,u,eSWA(B)/WHS,h	WA
Papilionaceae	*Daviesia flexuosa*	Flexible Daviesia				r(N,West WHS),d,s,u,Se	WA
Papilionaceae	*Daviesia major*	Daviesia				r(S,Abba,WHS),d	WA
Papilionaceae	*Daviesia nudiflora*	Leafy Daviesia				r(S,Argyle,WHS),d,s,u,h,v	WA
Papilionaceae	*Dillwynia* sp. Capel (P.A. Jurjevich 1771) PN	Capel Dillwynia				z,r(N,WHS),p,s,u,eWHS/BP	WA

Family	Scientific Name	Common Name	Significant Taxa				Endemic
			WA	IUCN	Com	OS	
Papilionaceae	*Gastrolobium modestum*	Modest Gastrolobium	R	V	V	z,p,s,u,eWHS/BP,h	WA
Papilionaceae	*Gastrolobium whicherense*	Whicher Gastrolobium	2			z,p,s,u,eWHS,h	WA
Papilionaceae	*Gompholobium cyaninum* MS	Blue Gompholobium				s,u,h	WA
Papilionaceae	*Gompholobium villosum*	Hairy Gompholobium				d,s,u	WA
Papilionaceae	*Hovea stricta*	Prickly Hovea				d,s,u,Ne	WA
Papilionaceae	*Jacksonia lehmannii*	Lehmann's Jacksonia				r(S,Whicher,WHS),d,s,u	WA
Papilionaceae	*Jacksonia* sp. Whicher (G.J. Keighery 9953)	Whicher Jacksonia				z,s,eSWA(B)/WHS/BP,h	WA
Papilionaceae	*Pultenaea brachytropis*	Pultenaea				r(N,Abba,WHS),Se	WA
Papilionaceae	*Pultenaea pinifolia*	Tree Pultenaea	3			d,p,s,u,eSWA(B)/WHS/BP,h	WA
Papilionaceae	*Pultenaea radiata*	Whicher Pultenaea				r(N,Dardanup,WHS),s,eWHS/BP,h	WA
Papilionaceae	*Pultenaea skinneri*	Skinner's Pultenaea	4			d,p,s,u,eSWA/WHS/BP,h	WA
Papilionaceae	*Pultenaea verruculosa*	Pultenaea				r(N,WHS)	WA
Proteaceae	*Adenanthos barbiger* subsp. *barbiger* MS	Hairy Jugflower				z,r(N,Dardanup,WHS),s,Se	WA
Proteaceae	*Banksia meisneri* subsp. *ascendens*	Meisner's Banksia	4			p,s,Se	WA
Proteaceae	*Banksia sphaerocarpa* var. *sphaerocarpa*	Fox Banksia				r(W,Abba,WHS),d,s	WA
Proteaceae	*Conospermum acerosum* subsp. *acerosum*	Needle-leaved Smokebush				d,s,u,h	WA
Proteaceae	*Conospermum caeruleum* subsp. *marginatum*	Blue Smokebush				s,u,eSWA(B)/WHS/BP	WA
Proteaceae	*Conospermum paniculatum*	Wiry Smokebush	3			p,s,Se	WA
Proteaceae	*Conospermum teretifolium*	Spider Smokebush				r(N,Argyle,WHS),d,s,u,Se,h	WA
Proteaceae	*Dryandra armata* var. *armata*	Prickly Dryandra				d,s,u,h	WA
Proteaceae	*Dryandra baxteri*	Baxter's Dryandra				r(N,Abba,WHS),d,s,u,h	WA
Proteaceae	*Dryandra formosa*	Showy Dryandra				r(N,Whicher NP,WHS),d,s,u,h,a,g	WA

Family	Scientific Name	Common Name	Significant Taxa				Endemic
			WA	IUCN	Com	OS	
Proteaceae	*Dryandra mimica*	Summer Honeypot	R	V	E*	r(S,Whicher NP,WHS),d,p,s,u,eSWA/WHS,h,a,g	WA
Proteaceae	*Dryandra nivea* subsp. *uliginosa*	Bush Honeypot	R	E	E	z,d,p,s,u,eSWA/WHS/SC,h	WA
Proteaceae	*Dryandra sessilis*	Parrotbush				d,u,h	WA
Proteaceae	*Dryandra squarrosa* subsp. *argillacea*	Ironstone Pingle	R	V	V	z,d,p,s,u,eSWA(B)/WHS,h	WA
Proteaceae	*Franklandia fucifolia*	Yellow Franklandia				r(NE,Abba,WHS),d,p,s,u,Se,h,v,g	WA
Proteaceae	*Franklandia triaristata*	Beautiful Franklandia	4			d,p,s,u,Se,h	WA
Proteaceae	*Grevillea bipinnatifida* subsp. *bipinnatifida*	Fuchsia Grevillea				d,s,u	WA
Proteaceae	*Grevillea brachystylis* subsp. Busselton (G.J. Keighery s.n. 28/8/1985) PN	Whicher Grevillea	R	CR	*	z,p,s,u,eSWA(B)/WHS	WA
Proteaceae	*Grevillea bronwenae*	Bronwen's Grevillea				p,s,u,eWHS/BP	WA
Proteaceae	*Grevillea pulchella* subsp. *ascendens* Whicher Scarp Form (G.J.Keighery & B.J.Keighery 938)	Beautiful Grevillea				z,s,u,eWHS,h	WA
Proteaceae	*Hakea cyclocarpa*	Ramshorn Hakea				s,h	WA
Proteaceae	*Hakea falcata*	Forest Hakea				r(N,Whicher NP,WHS),d,s,u,Se,h	WA
Proteaceae	*Hakea lasianthoides*	River Hakea				d,s,h	WA
Proteaceae	*Hakea linearis*	Swamp Hakea				r(N,West WHS),d,s,u,Se,h	WA
Proteaceae	*Hakea oldfieldii*	Oldfield's Hakea	3			d,p,s,u,h,g	WA
Proteaceae	*Hakea stenocarpa*	Narrow-fruited Hakea				d,s,u	WA
Proteaceae	*Isopogon attenuatus*	Coneflower				r(N,Abba,WHS),s	WA
Proteaceae	*Isopogon formosus* subsp. *dasylepis*	Rose Coneflower	3			d,p,s,u,Se,h	WA
Proteaceae	*Lambertia multiflora* var. *darlingensis*	Golden Lambertia				r(S,Abba,WHS),d,p,s,Ne,h	WA
Proteaceae	*Lambertia rariflora* subsp. *rariflora*	Whicher Lambertia	4			d,p,s,u,eWHS/BP,h	WA

Family	Scientific Name	Common Name	Significant Taxa				Endemic
			WA	IUCN	Com	OS	
Proteaceae	*Petrophile latericola* MS	Ironstone Petrophile	R	CR	E*	z,d,p,s,u,eSWA(B)/WHS,h	WA
Proteaceae	*Petrophile serruriae*	Petrophile				d,s,u,h,g	WA
Proteaceae	*Petrophile striata*	Petrophile				d,s,u	WA
Proteaceae	*Strangea stenocarpoides*	Strangea				s,Se,h	WA
Proteaceae	*Synaphea hians*	Synaphea	3			z,p,s,u	WA
Proteaceae	*Synaphea petiolaris* subsp. *simplex*	Synaphea	2			p,s,u,eSWA(B)/WHS,h	WA
Proteaceae	*Synaphea polypodioides*	Donnybrook Synaphea				z,p,s,eWHS	WA
Proteaceae	*Synaphea whicherensis*	Whicher Synaphea				z,r(N,Argyle,WHS),s,eSWA(B)/WHS/BP	WA
Rafflesiaceae	*Pilostyles hamiltonii*	Stemflower				s,u	WA
Rhamnaceae	*Stenanthemum sublineare*	Stenanthemum	2			d,p,s,u	WA
Rutaceae	*Boronia capitata* subsp. *gracilis*	Slender Boronia	2			r(SW,Yelverton,WHS),p,s,u,eSWA/WHS,h	WA
Rutaceae	*Boronia humifusa*	Whicher Boronia	1			p,s,u,eWHS,h	WA
Rutaceae	*Boronia purdieana* subsp. *purdieana*	Yellow Boronia				r(S,WHS),d,s,u,Ne,h	WA
Rutaceae	*Boronia tetragona*	Pink Boronia	3			d,p,s,u,Se,h	WA
Rutaceae	*Crowea angustifolia* var. *angustifolia*	Crowea				r(N,Whicher NP,WHS),d,s,u,Se,h	WA
Stackhousiaceae	*Tripterococcus paniculatus* MS	Tripterococcus	1			z,r(S,Boyanup,WHS),d,p,s,u,eSWA/WHS,h	WA
Sterculiaceae	*Thomasia laxiflora*	Whicher Thomasia	3			r(N,Boyanup,WHS),p,s,e,h	WA
Sterculiaceae	*Thomasia macrocarpa*	Large-fruited Thomasia				d,s,u,Ne	WA
Stylidiaceae	*Stylidium acuminatum* MS	Sharp-leaved Triggerplant				z,r(S,Argyle,WHS),d,p,s,u,e,h	WA
Stylidiaceae	*Stylidium affine*	Hills Queen Triggerplant				d	WA
Stylidiaceae	*Stylidium barleei*	Tooth-leaved Triggerplant	3			r(N,Acton Park,WHS),p,s,u,eSWA(B)/WHS/BP,h	WA
Stylidiaceae	*Stylidium caespitosum*	Fly-away Triggerplant				d,p,s,u,Se,h,g	WA
Stylidiaceae	*Stylidium ferricola*	Ironstone Triggerplant	1			p,s,u,eSWA(B)/WHS,h	WA
Stylidiaceae	*Stylidium lateriticola*	Laterite Triggerplant				r(SW,Whicher NP,WHS),d,p,s,u,Ne,h,g	WA

Family	Scientific Name	Common Name	Significant Taxa				Endemic
			WA	IUCN	Com	OS	
Stylidiaceae	*Stylidium* sp. Dardanup (G.S. McCutcheon GSM 1066) PN	Dardanup Triggerplant	1			z,p,s,u,eWHS,h	WA
Tremandraceae	*Platytheca* sp. Argyle (G.J. & B.J. Keighery 281) PN	Argyle Platytheca				z,p,s,u,eWHS,h,a	WA
Tremandraceae	*Platytheca* sp. Sabina (G.J. & B.J. Keighery 295) PN	Sabina River Platytheca				z,p,s,u,eWHS,h,a	WA
Tremandraceae	*Tetratheca parvifolia*	Tetratheca	3			p,s,u,e,h	WA

7. PHOTOGRAPHS

Photographs, unless otherwise indicated, are by Bronwen Keighery.

PHOTOGRAPH 1: The North Whicher Scarp from the Pinjarra Plain east of Capel.

PHOTOGRAPH 2: View of Mountain Marri in early summer with new red foliage, with inset of summer flowers and fruit.

PHOTOGRAPH 3: Jarrah and Mountain Marri Open Forest from Floristic Community Type A1 (ACTN01).

PHOTOGRAPH 4: Jarrah and *Allocasuarina fraseriana* Woodland over *Banksia attenuata*, *Banksia grandis* and Mountain Marri Open Low Woodland from Floristic Community Type A1 (SABI07); note grey sand. (Photography: Julia Cullity).

PHOTOGRAPH 5: Mountain Marri Open Low Woodland from Floristic Community Type A2 (OATES-1). (Photography: Mark Brundrett)

PHOTOGRAPH 6: *Allocasuarina fraseriana* Open Woodland from Floristic Community Type A3 (GAV01). (Photography: Mark Brundrett)

PHOTOGRAPH 7: Jarrah Woodland from Floristic Community Type A3 (GWINDR01). (Photography: Mark Brundrett)

PHOTOGRAPH 8: Wildflower Society Bushland Plant Survey volunteers in *Banksia grandis* and Mountain Marri Low Woodland from Floristic Community Type A5 (DAVE03). (Photography: Mark Brundrett)

PHOTOGRAPH 9: Wildflower Society Bushland Plant Survey volunteers in *Banksia attenuata* Low Woodland from Floristic Community Type B1 (GWINDR02). (Photography: Mark Brundrett)

PHOTOGRAPH 10: *Allocasuarina fraseriana* Woodland over *Banksia attenuata* Open Low Forest from Floristic Community Type B2 (CHAM 03).

PHOTOGRAPH 11: *Banksia attenuata* Open Low Forest adjacent to the Yelverton National Park; this community is likely to be from Floristic Community Type B2.

PHOTOGRAPH 12: Jarrah and Marri Open Forest from Floristic Community Type C1 (ACTN02).

PHOTOGRAPH 13: Jarrah Woodland over Mountain Marri and *Banksia grandis* Open Low Forest from Floristic Community Type C1 (SABI11).

PHOTOGRAPH 14: Mountain Marri, Jarrah and *Banksia grandis* Open Forest over *Xylomelum occidentale* Open Low Woodland from Floristic Community Type C2 (BOYA01).

PHOTOGRAPH 15: Jarrah Open Forest over *Xylomelum occidentale* Open Low Woodland from Floristic Community Type C2 (DAVE02). (Photography: Mark Brundrett)

PHOTOGRAPH 16: Mountain Marri and Jarrah Open Woodland over *Xanthorrhoea acanthostachya* and *Xanthorrhoea preissii* Open Scrub from Floristic Community Type C3 (DAVE04) (Photography: Mark Brundrett)

PHOTOGRAPH 17: Marri and Jarrah Open Tall Woodland over *Hakea lasianthoides*, *Mirbelia dilatata* and *Kingia australis* Open Tall Shrubland from Floristic Community Type C4 (SABI02).

PHOTOGRAPH 18: *Acacia extensa* Tall Shrubland over *Acacia pulchella* and *Hakea lissocarpha* Shrubland from Floristic Community Type C4 (GAV04). (Photography: Mark Brundrett)

PHOTOGRAPH 19: *Eucalyptus decipiens* Open Woodland over *Melaleuca preissiana* Open Low Woodland from Floristic Community Type E (GOOD01). (Photography: Mark Brundrett)

PHOTOGRAPH 20: Marri and Jarrah Closed Forest over *Mirbelia dilatata* Tall Shrubland over *Darwinia citriodora*, *Hovea elliptica* and *Xanthorrhoea preissii* Shrubland from Floristic Community Type F1 (SABI03).

PHOTOGRAPH 21: A creekline in the West Whicher Scarp dominated by *Eucalyptus megacarpa*, *E. patens*, *E. calophylla*, *Agonis flexuosa*, *Gahnia decomposita* and *Cyathochaeta* sp. Carbunup. This is considered to be a version of Creekline Blackbutt (*Eucalyptus patens*) and Marri forest (Floristic Community Type G2).

PHOTOGRAPH 22: In the mid-ground *Homalospermum firmum*, *Astartea scoparia* and *Taxandria fragrans* MS Closed Scrub over *Taraxis grossa* and *Baumea rubiginosa* Sedgeland from Floristic Community Type G2 (GIBB03).

PHOTOGRAPH 23: ***Dasypogon hookeri*** **which is at its northern-most location in the Boyanup forest.**

PHOTOGRAPH 24: ***Paragonis grandiflora.***

PHOTOGRAPH 25: *Pultenaea radiata*.

PHOTOGRAPH 26: *Synaphea whicherensis* adjacent to DAVE01 and 02; note coloured sands.

PHOTOGRAPH 27: ***Patersonia umbrosa*** **var.** ***xanthina.***

PHOTOGRAPH 28: Male flowers (top left) and female flowers (bottom left) and plants of ***Lomandra whicherensis*** **from the Dardanup forest.**

PHOTOGRAPH 29: ***Logania wendyae.***

PHOTOGRAPH 30: ***Boronia humifusa.***

PHOTOGRAPH 31: ***Andersonia fallax*****.**

PHOTOGRAPH 32: ***Daviesia physodes*** **and an inset of its flowers and the flowers of the parasitic** ***Pilostyles hamiltonii.***

PHOTOGRAPH 33: ***Stylidium latericola.***

PHOTOGRAPH 34: Three *Platytheca* taxa are located on the Whicher Scarp – *P. galioides* (top left), *Platytheca* sp. Sabina (G.J. & B.J. Keighery 295) (bottom left) and *Platytheca* sp. Argyle (G.J. & B.J. Keighery 281) (right).

PHOTOGRAPH 35: ***Daviesia elongata*** **subsp.** ***elongata.***

PHOTOGRAPH 36: ***Ricinocarpos*** **aff.** ***cyanescens*** **(A. Webb sn 27 October 2003).**

PHOTOGRAPH 37: ***Hodgsoniola junciformis*****.**

PHOTOGRAPH 38: ***Dryandra formosa.***

PHOTOGRAPH 39: ***Calothamnus pallidifolius.***

PHOTOGRAPH 40: ***Hakea lasianthoides.***

10. MAPS

MAP 1: **Soil-landscape features of the Whicher Scarp area**

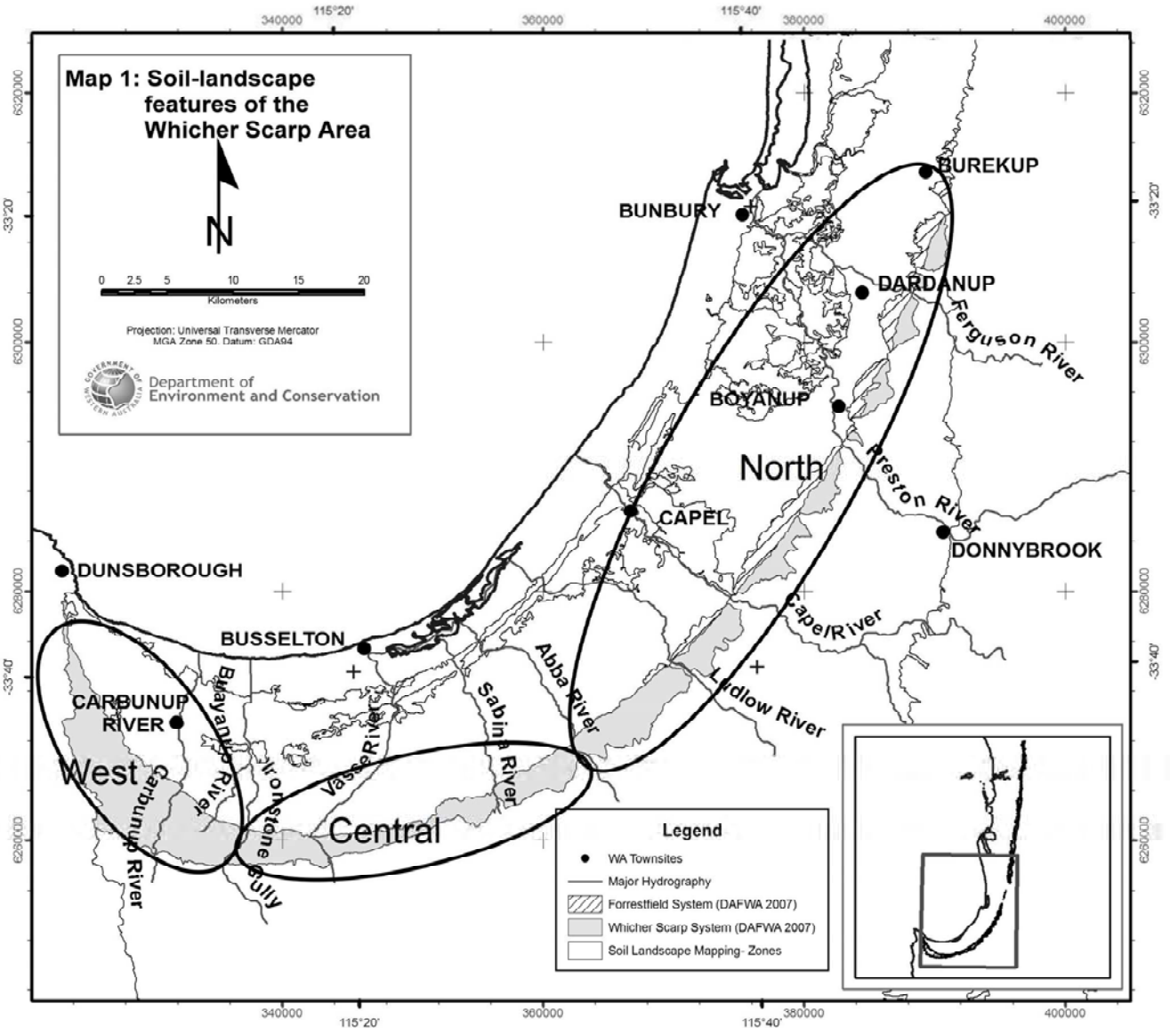
MAP 2a-g: **Remnant native vegetation, conservation areas, key locations and study sites in the Whicher Scarp area**

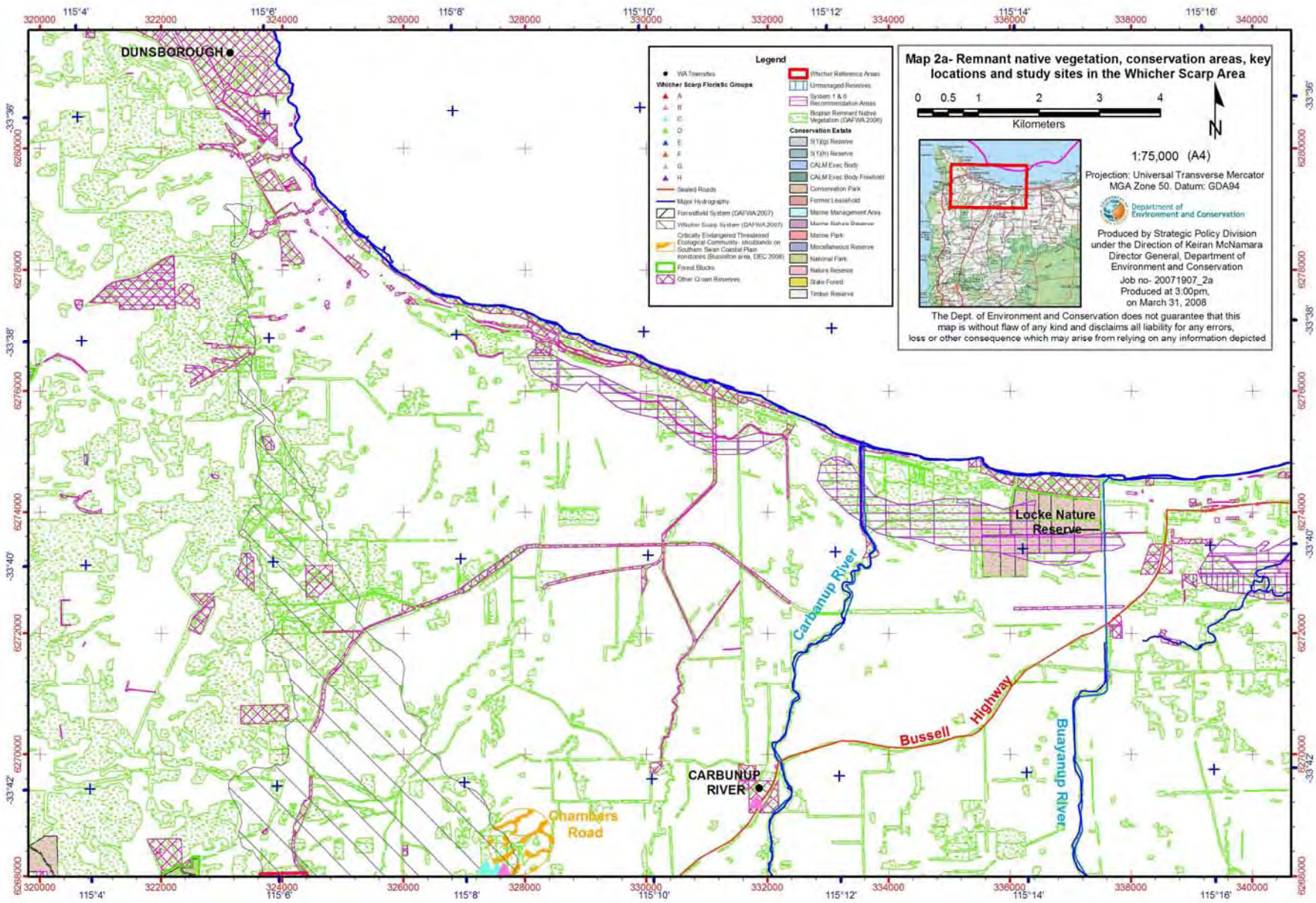
MAP 3: **Biogeographic regions and major landforms of the Bunbury/Leeuwin-Naturaliste area**

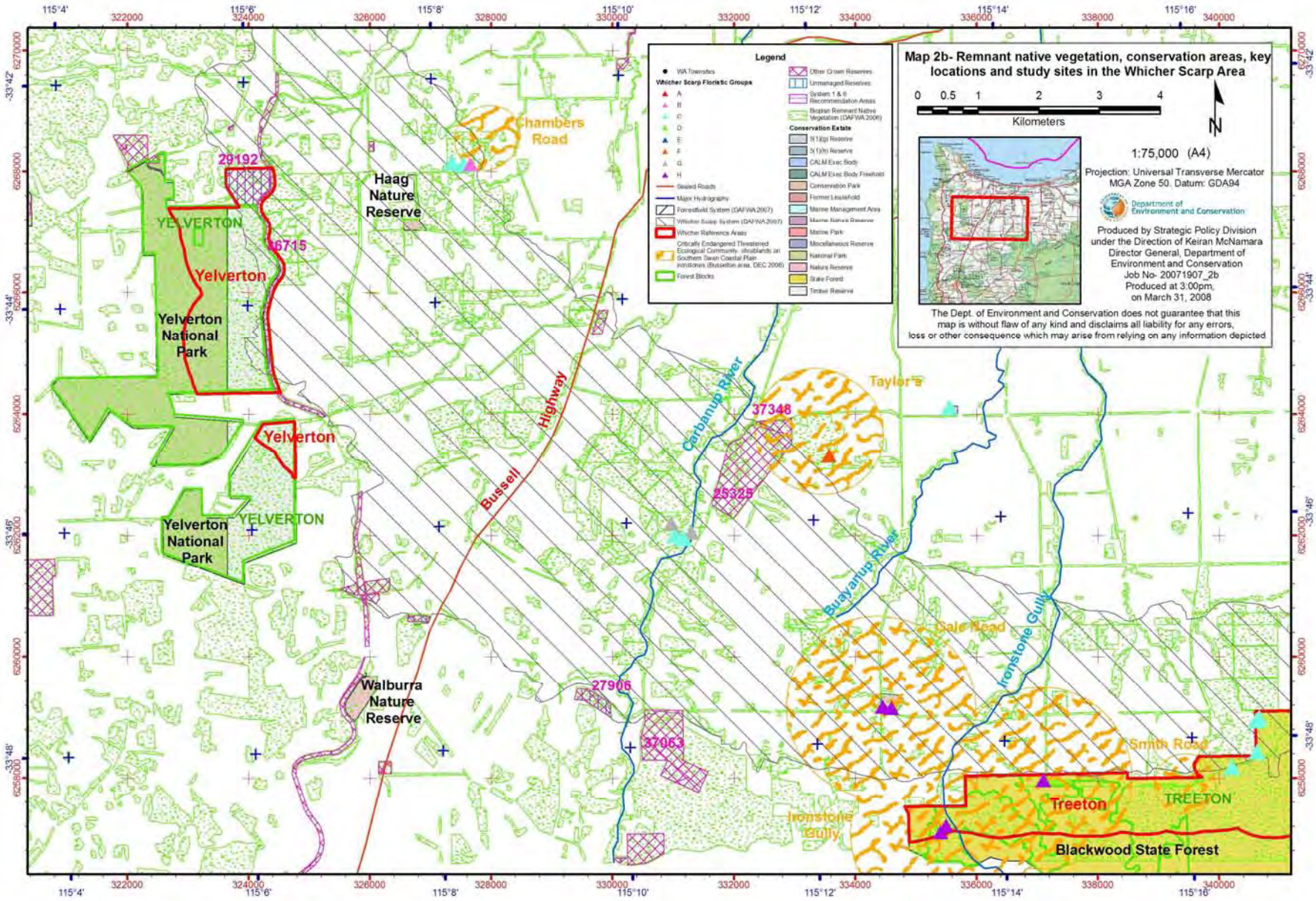
MAP 4: **Distribution of Swan Coastal Plain floristic community types 1a and 21b (after Gibson *et al.* 1994 and DEP 1996)**

MAP 4a: Distribution of Swan Coastal Plain floristic community type 1a

MAP 4b: Distribution of Swan Coastal Plain floristic community type 21b


Map 1: Soil-landscape features of the Whicher Scarp Area
N
0 2.5 5 10 15 20
Kilometers
Projection: Universal Transverse Mercator
MGA Zone 50, Datum: GDA94
Department of Environment and Conservation
115°20'
115°40'
340000
360000
380000
400000
6320000
6300000
6280000
6260000
-33°20'
-33°40'
BUNBURY
BUREKUP
DARDANUP
BOYANUP
CAPEL
DONNYBROOK
DUNSBOROUGH
BUSSELTON
CARBUNUP RIVER
North
Central
West
Ferguson River
Preston River
Capel River
Ludlow River
Abba River
Sabina River
Vasse River
Buayanup River
Carbunup River
Ironstone Gully
Legend
WA Townsites
Major Hydrography
Forrestfield System (DAFWA 2007)
Whicher Scarp System (DAFWA 2007)
Soil Landscape Mapping- Zones


DUNSBOROUGH
Legend
Whicher Scarp Floristic Groups
Sealed Roads
Major Hydrography
Forest Blocks
Other Crown Reserves
Conservation Estate
Conservation Park
Nature Reserve
State Forest
Timber Reserve
Map 2a- Remnant native vegetation, conservation areas, key locations and study sites in the Whicher Scarp Area
0 0.5 1 2 3 4
Kilometers
N
1:75,000 (A4)
Projection: Universal Transverse Mercator
MGA Zone 50. Datum: GDA94
Department of Environment and Conservation
Produced by Strategic Policy Division
under the Direction of Keiran McNamara
Director General, Department of
Environment and Conservation
Job no- 20071907_2a
Produced at 3:00pm,
on March 31, 2008
The Dept. of Environment and Conservation does not guarantee that this map is without flaw of any kind and disclaims all liability for any errors, loss or other consequence which may arise from relying on any information depicted.
Locke Nature Reserve
Carbanup River
Bussell Highway
Busyanup River
CARBUNUP RIVER
Chambers Road


Map 2b- Remnant native vegetation, conservation areas, key locations and study sites in the Whicher Scarp Area
Legend
Whicher Scarp Floristic Groups
Conservation Estate
Kilometers
1:75,000 (A4)
Projection: Universal Transverse Mercator
MGA Zone 50. Datum: GDA94
Department of Environment and Conservation
Produced by Strategic Policy Division
under the Direction of Keiran McNamara
Director General, Department of
Environment and Conservation
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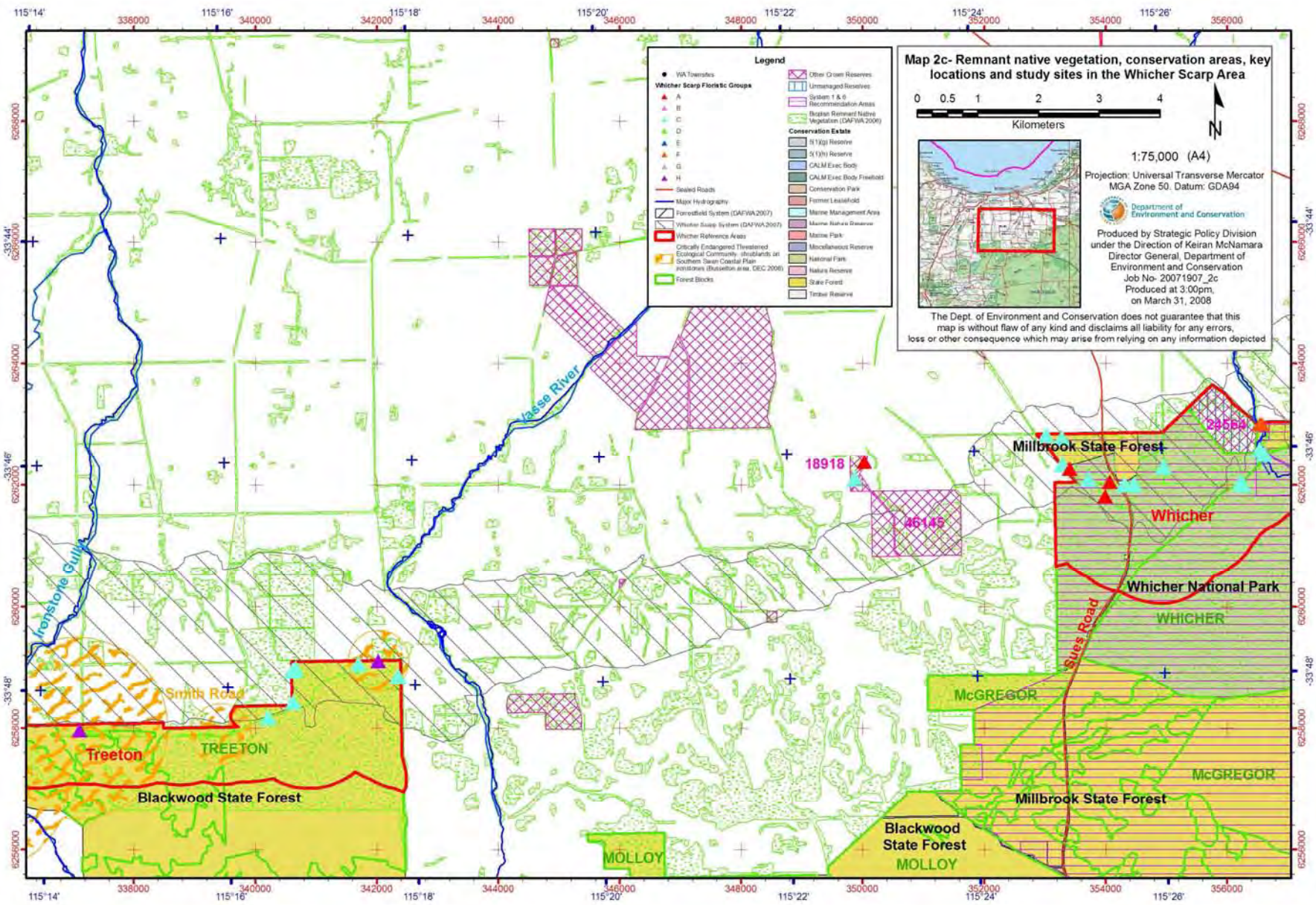
Produced at 3:00pm,
on March 31, 2008
The Dept. of Environment and Conservation does not guarantee that this map is without flaw of any kind and disclaims all liability for any errors, loss or other consequence which may arise from relying on any information depicted.
Chambers Road
Haag Nature Reserve
29192
YELVERTON
16715
Yelverton
Yelverton National Park
Yelverton
Yelverton National Park
YELVERTON
Bussell Highway
Carbanup River
Taylor's
37348
25325
Buayarup River
Ironstone Gully
Cale Road
Walburra Nature Reserve
27906
37063
Ironstone Gully
Smith Road
Treeton
TREETON
Blackwood State Forest



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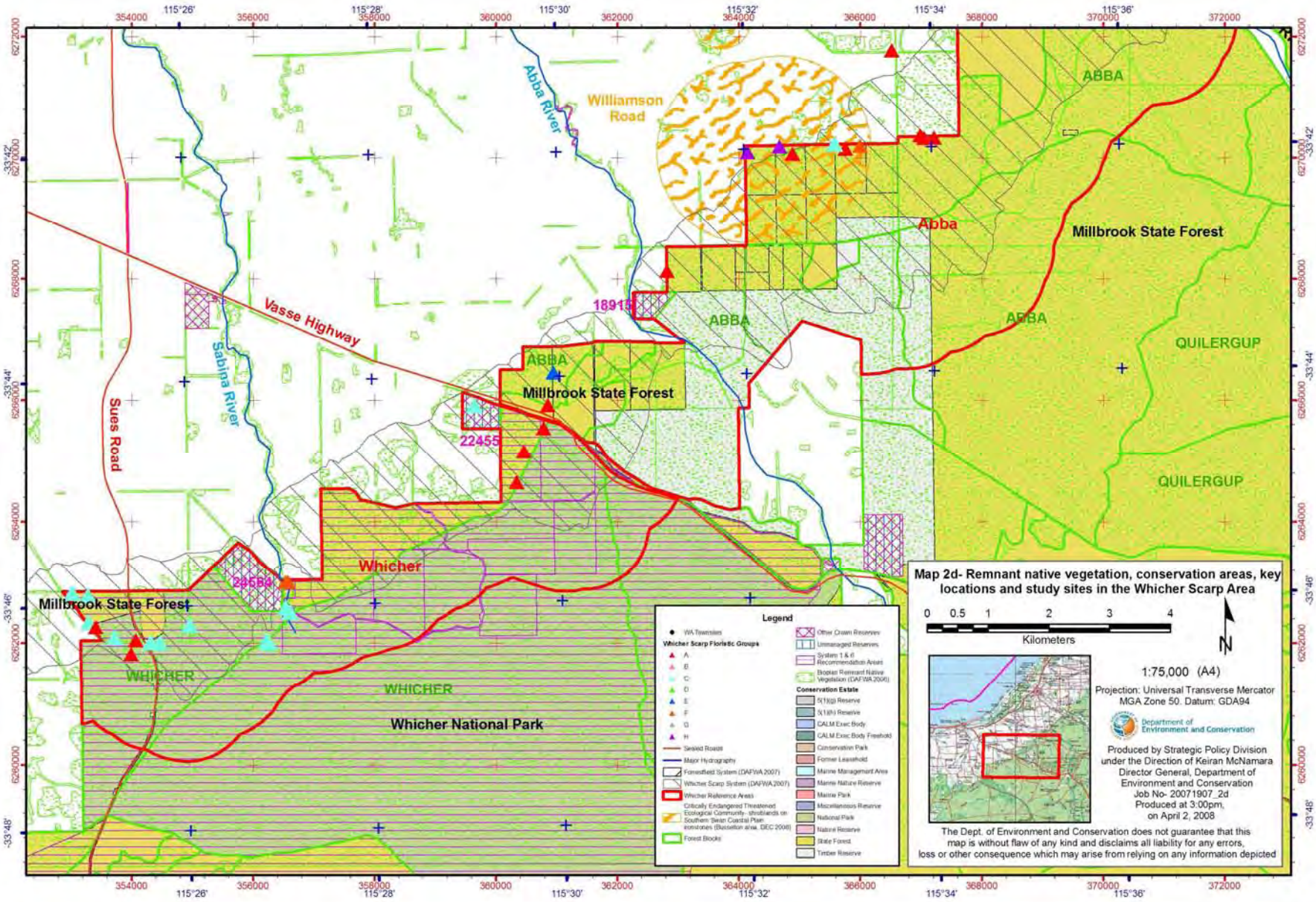

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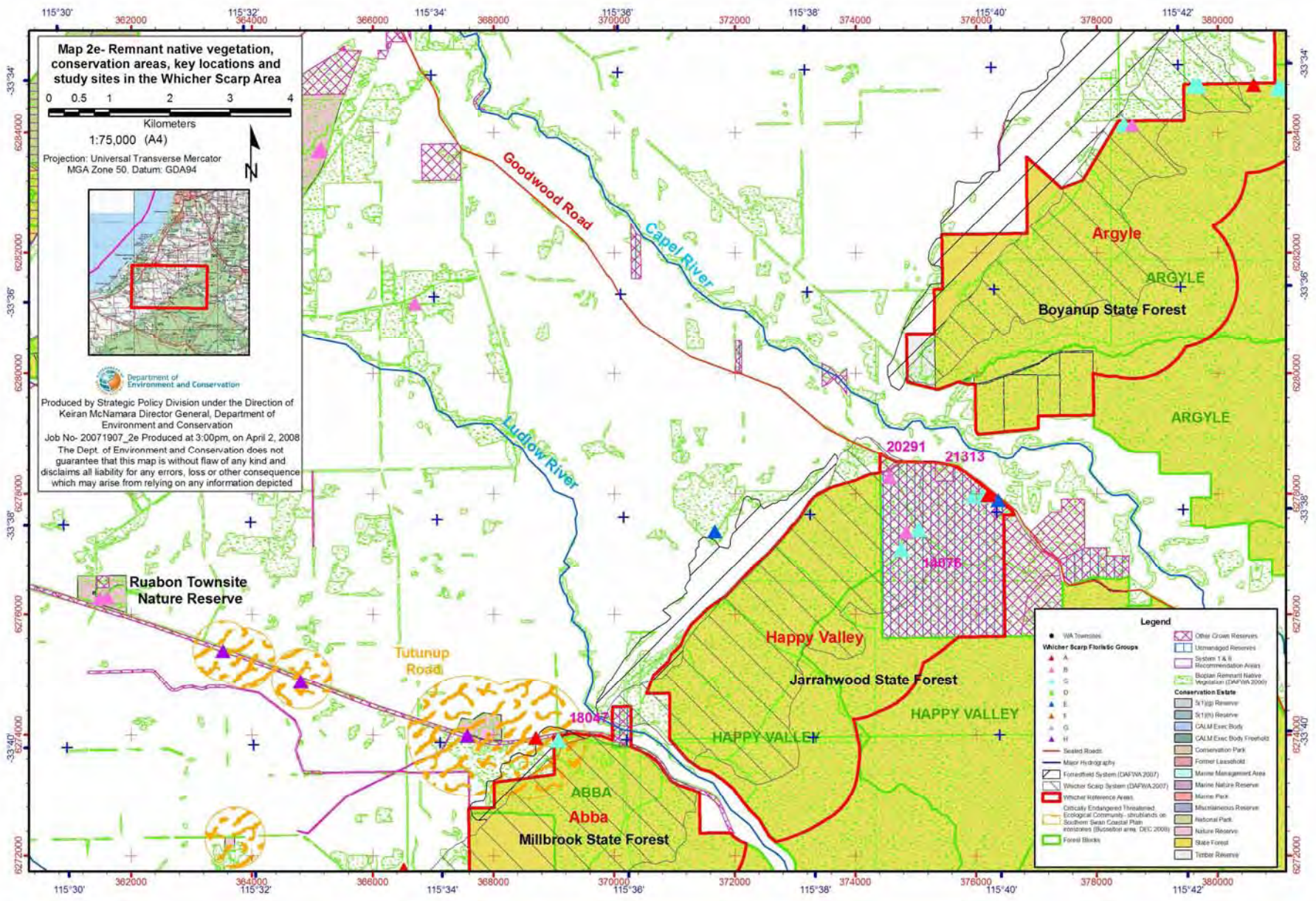
Map 2e- Remnant native vegetation, conservation areas, key locations and study sites in the Whicher Scarp Area
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Kilometers
1:75,000 (A4)
Projection: Universal Transverse Mercator
MGA Zone 50. Datum: GDA94
N
Department of Environment and Conservation
Produced by Strategic Policy Division under the Direction of Keiran McNamara Director General, Department of Environment and Conservation
Job No- 20071907_2e Produced at 3:00pm, on April 2, 2008
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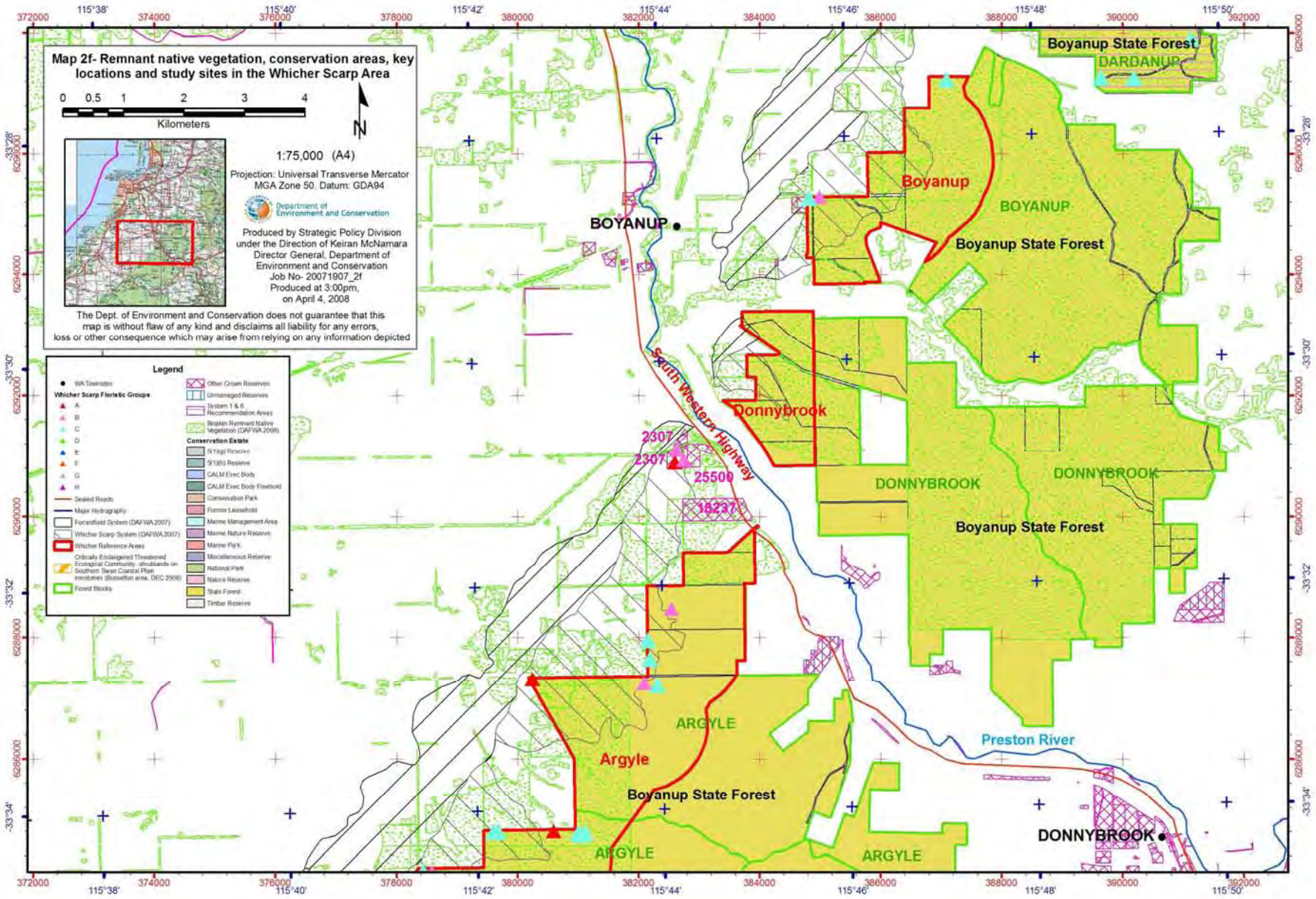
Goodwood Road
Capel River
Ludlow River
Argyle
ARGYLE
Boyanup State Forest
ARGYLE
20291
21313
18076
Ruabon Townsite Nature Reserve
Tutunup Road
Happy Valley
Jarrahwood State Forest
HAPPY VALLEY
HAPPY VALLEY
18047
ABBA
Abba
Millbrook State Forest
Legend
WA Townsites
Whicher Scarp Floristic Groups
A
B
C
D
E
F
G
H
Sealed Roads
Major Hydrography
Forestfield System (DAFWA 2007)
Whicher Scarp System (DAFWA 2007)
Whicher Reference Areas
Critically Endangered Threatened Ecological Community - shrublands on Southern Swan Coastal Plain ironstones (Busselton area, DEC 2008)
Forest Blocks
Other Crown Reserves
Unmanaged Reserves
System 1 & II Recommendation Areas
Biopian Remnant Native Vegetation (DAFWA 2000)
Conservation Estate
5(1)(g) Reserve
5(1)(h) Reserve
CALM Exec Body
CALM Exec Body Freehold
Conservation Park
Former Leasehold
Marine Management Area
Marine Nature Reserve
Marine Park
Miscellaneous Reserve
National Park
Nature Reserve
State Forest
Timber Reserve



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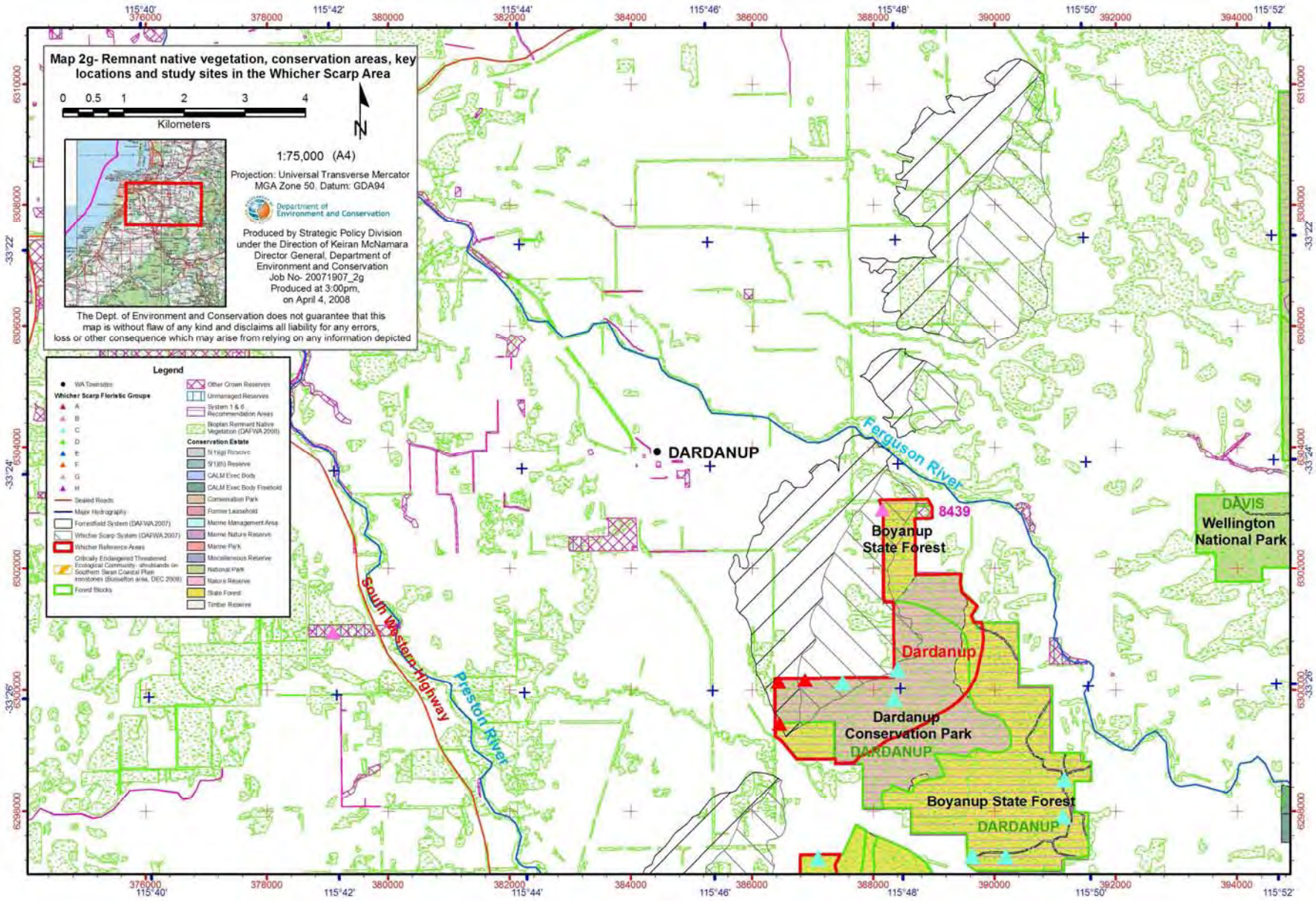


A report for the Department of Environment and Conservation
BJ Keighery *et al.* 2008

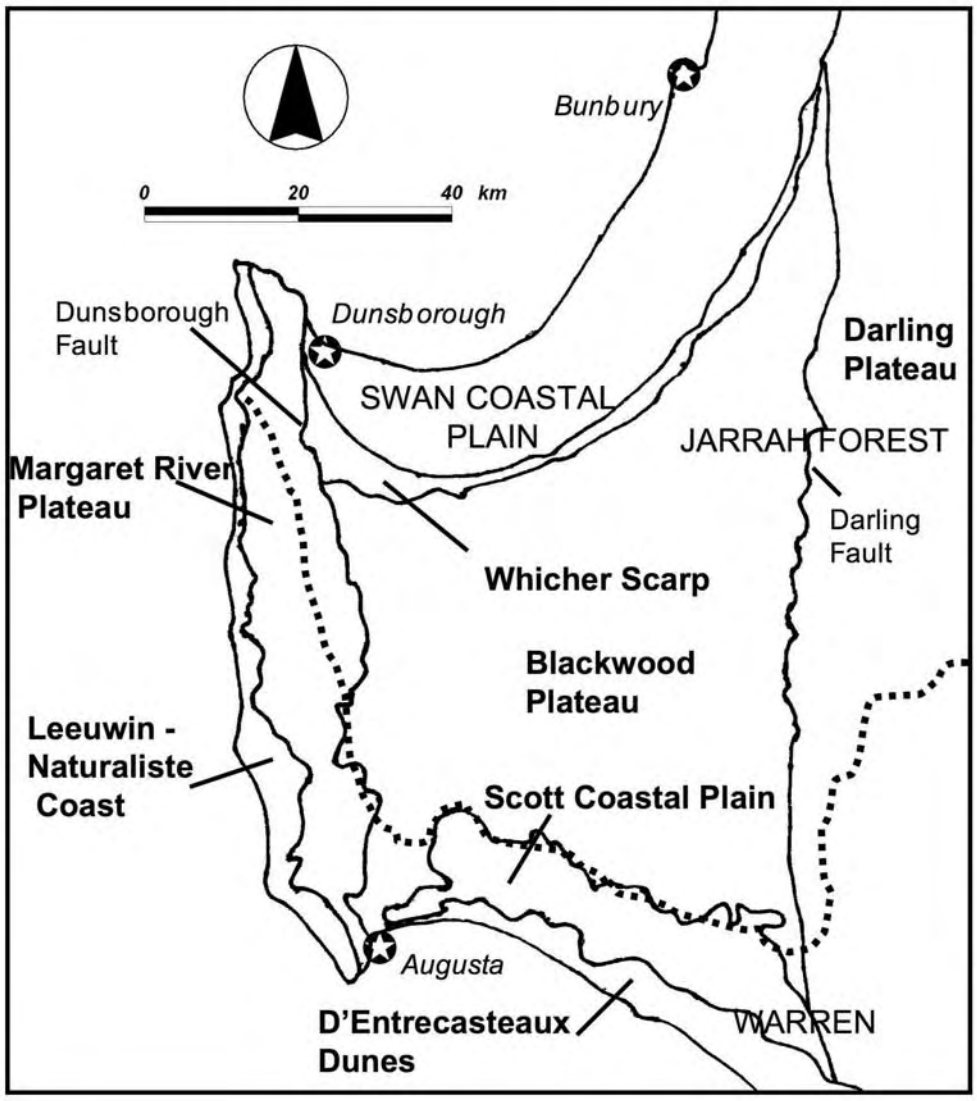
MAP 3: Biogeographic regions and major landforms of the Bunbury/Leeuwin-Naturaliste area (boundaries are approximate)

KEY

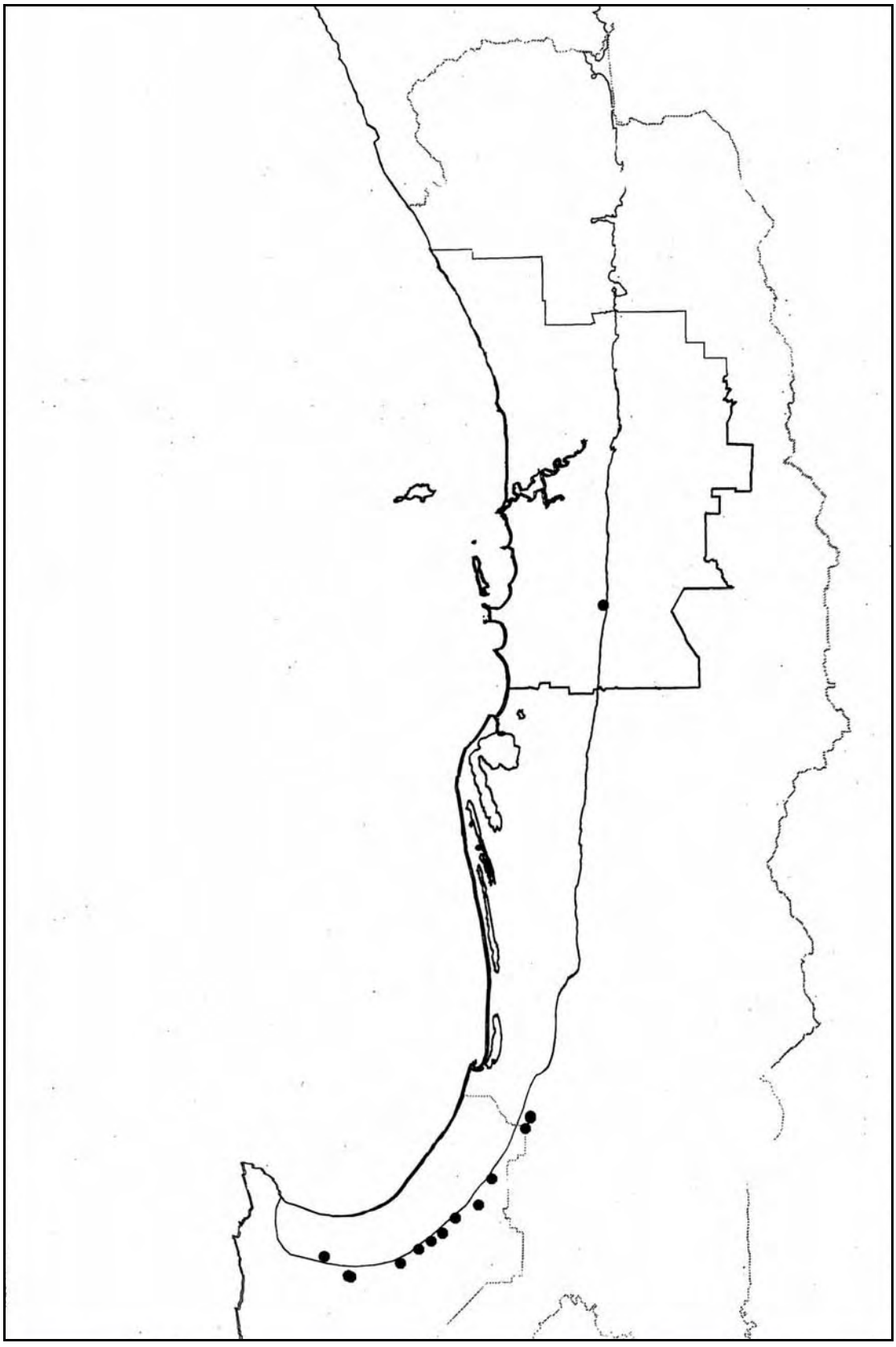
UPPER CASE Biogeographic regions (a dotted line separates the Warren and Jarrah Forest)

- SWAN COASTAL PLAIN (major landforms not shown)
- JARRAH FOREST (contains Whicher Scarp; part Margaret River, Darling and Blackwood Plateaus and part Leeuwin-Naturaliste Coast)
- WARREN (contains Scott Coastal Plain and D'Entrecasteaux Coast; part Margaret River, Darling and Blackwood Plateaus and part Leeuwin-Naturaliste Coast)

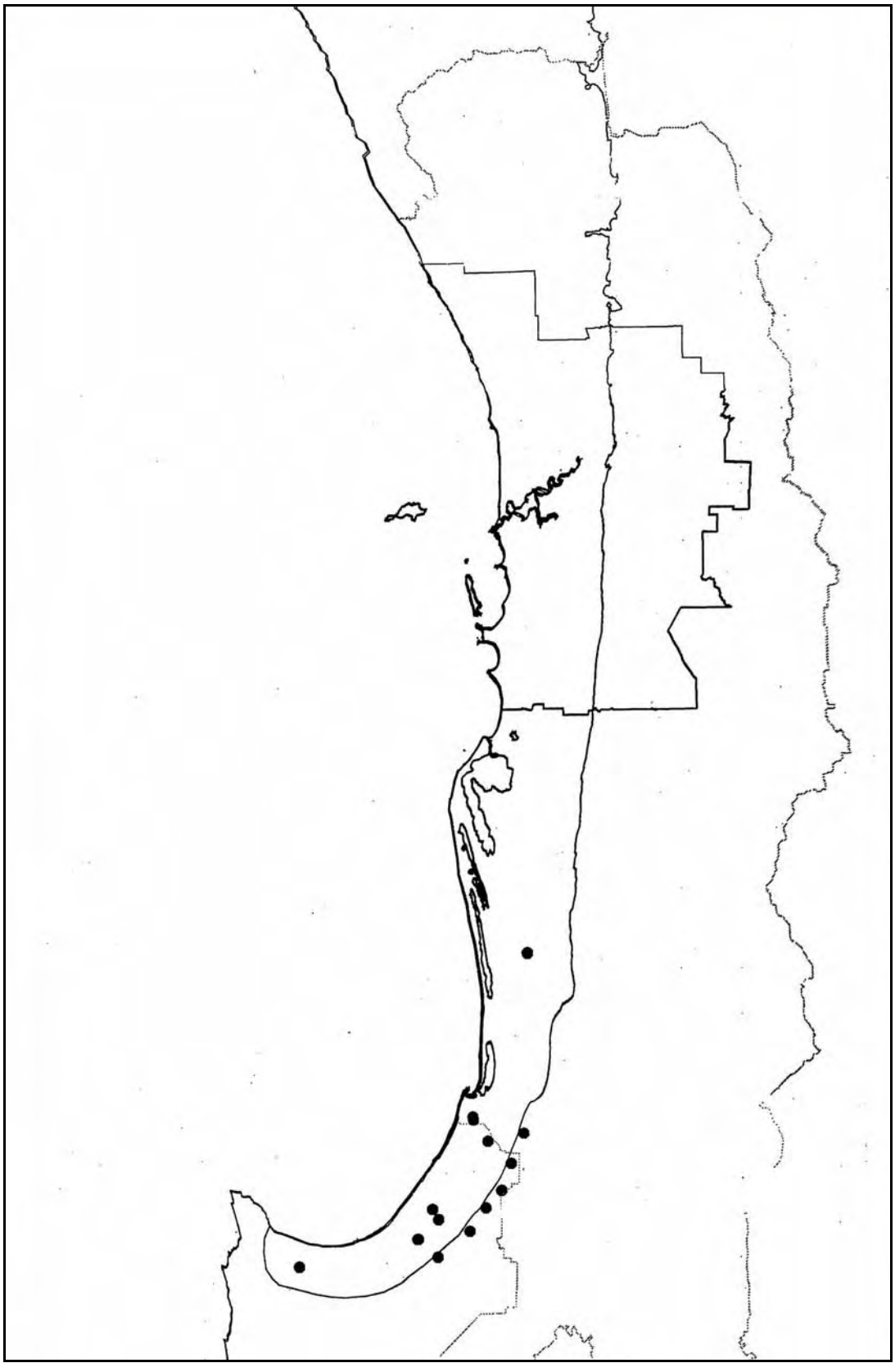
Bold Major landforms (not shown on the Swan Coastal Plain)



MAP 4a: Distribution of Swan Coastal Plain floristic community type 1a (after Gibson *et al.* 1994 and DEP 1996)



Map 4b: Distribution of Swan Coastal Plain floristic community type 21b (after Gibson *et al.* 1994 and DEP 1996)



11. FIGURES

FIGURE 1a: Vegetation complexes of the North Whicher Scarp (Subhumid southwest - SE Dardanup) (Appendix D, Havel and Mattiske 2000)

APPENDIX D: VEGETATION COMPLEXES OF THE SOUTH WEST FOREST REGION (p 175)

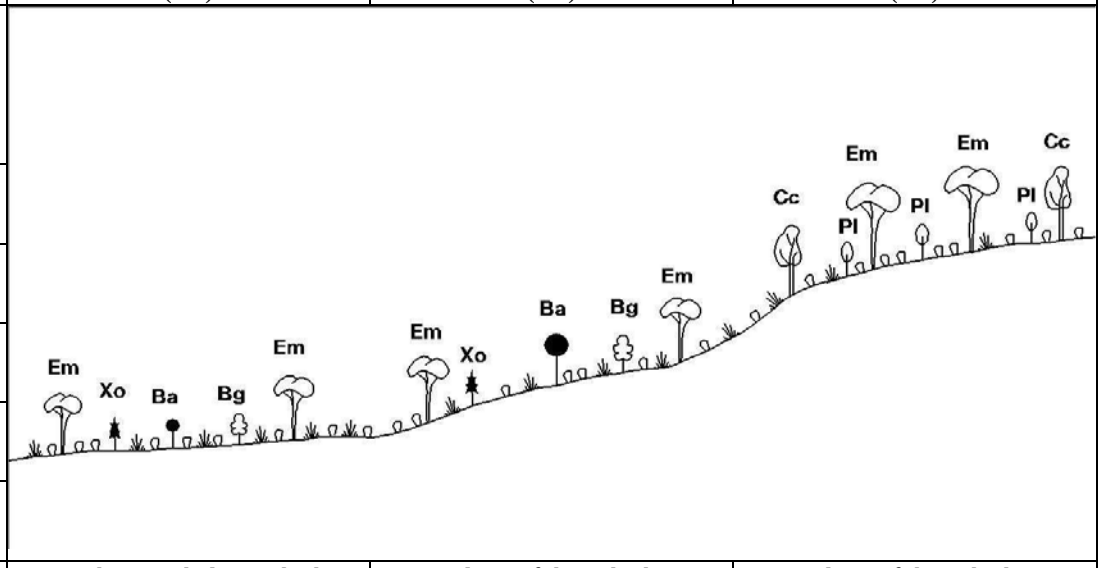
Geographic Region	Subhumid southwest	SE Dardanup	
Geomorphologic catena –VC (EVS)	CSs – Cartis (Jn5)	WC – Whicher Scarp (Jn5)	WC – Whicher Scarp (Jn5)
Landform and Vegetation profile 100m 80m 60m 40m 20m			
Land form description	Outwash apron below Whicher Scarp	Lower slope of the Whicher Scarp	Upper slope of the Whicher Scarp
Soil structure, texture and fertility	Pale yellowish brown loamy sand	Dark yellowish brown loamy sand	Yellowish brown gravely sand with moderate lateritic outcropping, underlain by sandy clay at depth
Soil hydrology	Neither water gaining nor water shedding, good infiltration but only moderate storage capacity due to coarse texture	Mildly water shedding via subsoil, good infiltration but only moderate storage due to coarse texture	Strongly water shedding via subsoil, good infiltration and storage capacity
Over storey (canopy or emergents)	Woodland of *Eucalyptus marginata* subsp. *marginata* (Em)	Woodland of *Eucalyptus marginata* subsp. *marginata* (Em) and *Banksia attenuata* (Ba)	Open Forest of *Eucalyptus marginata* subsp. *marginata* (Em) and *Corymbia calophylla* (Cc)
Second storey	*Banksia grandis* (Bg) *Banksia attenuata* (Ba) *Xylomelum occidentale* (Xo)	*Banksia grandis* (Bg) *Xylomelum occidentale* (Xo)	*Persoonia longifolia* (Pl)
Shrub and herb storey	*Xanthorrhoea preissii* *Melaleuca thymoides* *Dasypogon bromeliifolius* *Bossiaea eriocarpa* *Patersonia occidentalis* *Calothamnus sanguineus* *Stirlingia latifolia* *Adenanthos barbiger* *Allocasuarina humilis*	*Dasypogon bromeliifolius* *Hibbertia hypericoides* *Melaleuca thymoides* *Patersonia occidentalis* *Stirlingia latifolia* *Kunzea recurva* *Bossiaea eriocarpa* *Daviesia decurrens*	*Xanthorrhoea preissii* *Xanthorrhoea gracilis* *Hibbertia hypericoides* *Lepidosperma tenue* *Hakea stenocarpa* *Dasypogon bromeliifolius* *Isopogon sphaerocephalus* *Dryandra lindleyana* *Petrophile striata*

FIGURE 1b: Vegetation complexes of the North Whicher Scarp (Subhumid southwest - between Capel and Donnybrook) (Appendix D, Havel and Mattiske 2000)

APPENDIX D: VEGETATION COMPLEXES OF THE SOUTH WEST FOREST REGION (p 174)

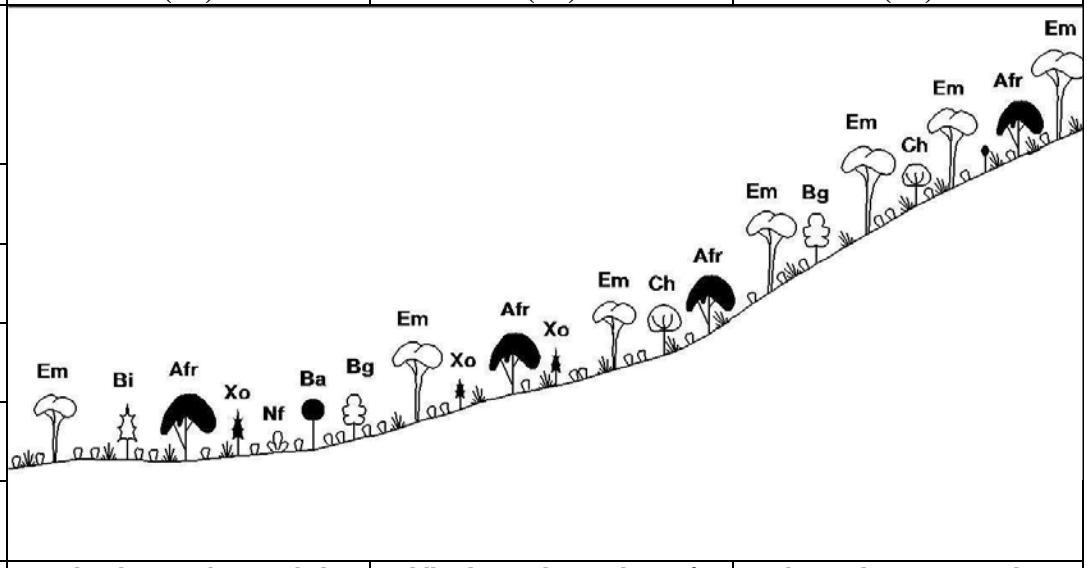
Geographic Region	Subhumid southwest Between Capel and Donnybrook		
Geomorphologic catena – VC (EVS)	CSs- Cartis (Jn5)	CSs - Cartis (Jn5)	WC – Whicher Scarp (Jn5)
Landform and Vegetation profile 100m 80m 60m 40m 20m			
Land form description	Near level outwash apron below Whicher Escarpment	Mildly sloping lower slope of the Whicher Escarpment	Moderate sloping upper slope - Whicher Escarpment
Soil structure, texture and fertility	Bleached white sand with organic stained topsoil over brown iron/organic hardpan at depth	Deep yellow brown sand over laterite at depth	Yellow brown gravely sandy loam with numerous outcrops of duricrust
Soil hydrology	Mildly water gaining but not waterlogged, good infiltration but only moderate storage capacity	Mildly water shedding via topsoil, good infiltration and intermediate storage capacity	Strongly water shedding via subsoil, with good infiltration and storage capacity
Over storey (canopy or emergents)	Woodland of *Eucalyptus marginata* subsp. *marginata* (Em), *Banksia attenuata* (Ba), *Banksia ilicifolia* (Bi) and *Allocasuarina fraseriana* (Afr)	Woodland of *Eucalyptus marginata* subsp. *marginata* (Em) with tall *Allocasuarina fraseriana* (Afr) as lower associate	Open Forest of *Eucalyptus marginata* subsp. *marginata* (Em)
Second storey	*Xylomelum occidentale* (Xo) *Nuytsia floribunda* (Nf) as associates or understorey	*Corymbia haematoxylon* (Ch) and *Xylomelum occidentale* (Xo)	*Banksia grandis* (Bg) *Corymbia haematoxylon* (Ch) *Allocasuarina fraseriana* (Afr) *Xylomelum occidentale* (Xo) *Persoonia elliptica* (Pe)
Shrub and herb storey	*Allocasuarina humilis Leucopogon conostephioides Adenanthos meisneri Dasypogon bromeliifolius Petrophile linearis, Stirlingia latifolia, Melaleuca thymoides, Lyginia barbata, Kunzea ericifolia*	*Stirlingia latifolia Podocarpus drouynianus Phlebocarya ciliata Melaleuca thymoides Dasypogon bromeliifolius Adenanthos meisneri Hibbertia hypericoides*	*Dasypogon hookeri Isopogon sphaerocephalus Xanthorrhoea gracilis Adenanthos barbiger Hibbertia hypericoides Hakea amplexicaulis Mesomelaena tetragona Daviesia incrassata*

FIGURE 1c: Vegetation complexes of the North Whicher Scarp (Humid southwest - SE of Busselton, Whicher Scarp on Nannup Rd & on Oats Rd) (Appendix D, Havel and Mattiske 2000)

APPENDIX D: VEGETATION COMPLEXES OF THE SOUTH WEST FOREST REGION (p 173)

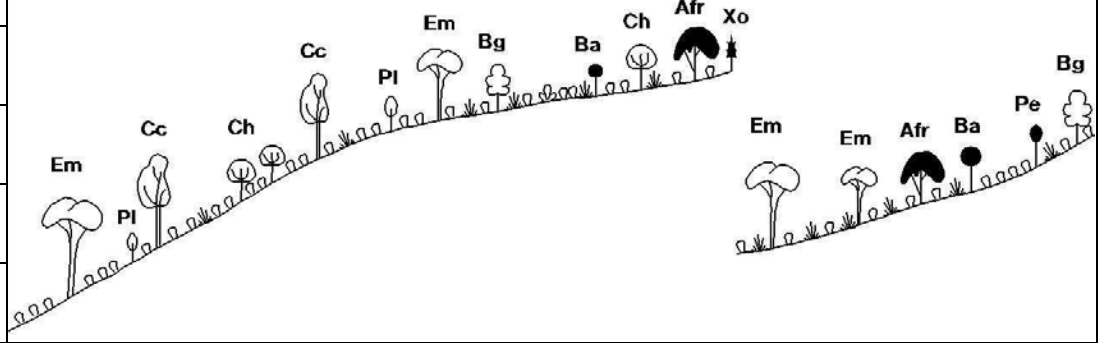
Geographic Region	Humid southwest SE of Busselton, Whicher Scarp on Nannup Rd & on Oats Rd		
Geomorphologic catena – VC (EVS)	WC – Whicher Scarp (Jn5)	WC – Whicher Scarp (Jn5)	WC – Whicher Scarp (Jn5)
Landform and Vegetation profile 100m 80m 60m 40m 20m			
Land form description	Moderately steep slope of the Whicher Escarpment	Mild slope of the Whicher Escarpment	Moderate slope of the Whicher Escarpment
Soil structure, texture and fertility	Gravely yellow brown sand over sandy clay, with lateritic floaters	Bleached pale grey siliceous sand over 1m deep	Bleached pale grey sand over yellow sand more than 1m deep
Soil hydrology	Moderately strongly water shedding with good infiltration and storage capacity	Mildly water shedding via subsoil, with good infiltration, storage capacity limited by coarseness	Mildly water shedding via subsoil, good infiltration but only moderate storage capacity
Over storey (canopy or emergents)	Woodland to Open Forest of *Corymbia calophylla* (Cc) and *Eucalyptus marginata* subsp. *marginata* (Em)	Woodland of *Eucalyptus marginata* subsp. *marginata* (Em) and tall *Allocasuarina fraseriana* (Afr)	Woodland of *Eucalyptus marginata* (Em) (both subsp. *marginata* and subsp. *elegantella*), *Banksia attenuata* (Ba), *Allocasuarina fraseriana* (Afr)
Second storey	*Persoonia longifolia* (Pl) *Corymbia haematoxylon* (Ch)	*Persoonia longifolia* (Pl) *Xylomelum occidentale* (Xo) *Corymbia haematoxylon* (Ch), *Banksia grandis* (Bg) *Banksia attenuata* (Ba) *Nuytsia floribunda* (Nf)	*Xylomelum occidentale* (Xo) *Persoonia elliptica* (Pe) *Banksia grandis* (Bg)
Shrub and herb storey	*Xanthorrhoea preissii, Hakea amplexicaulis, Calothamnus sanguineus, Hibbertia hypericoides, Mesomelaena tetragona, Trymalium ledifolium, Bossiaea ornata, Bossiaea eriocarpa, Acacia nervosa, Pimelea suaveolens Grevillea quercifolia*	*Hakea ruscifolia, Bossiaea eriocarpa, Adenanthos meisneri, Melaleuca thymoides, Acacia extensa, Pityrodia bartlingii, Stirlingia latifolia, Podocarpus drouynianus, Gompholobium confertum, Leucopogon distans, Leucopogon nutans, Petrophile media, Synaphea floribunda, Anarthria laevis*	*Adenanthos meisneri Stirlingia latifolia Bossiaea eriocarpa Melaleuca thymoides Scholtzia involucrata Adenanthos barbiger Podocarpus drouynianus Bossiaea pulchella Isopogon sphaerocephalus Kunzea recurva*

FIGURE 1d: Vegetation complexes of the West Whicher Scarp (Humid southwest - W of Carbunup) (Appendix D, Havel and Mattiske 2000)

APPENDIX D: VEGETATION COMPLEXES OF THE SOUTH WEST FOREST REGION (p 163)

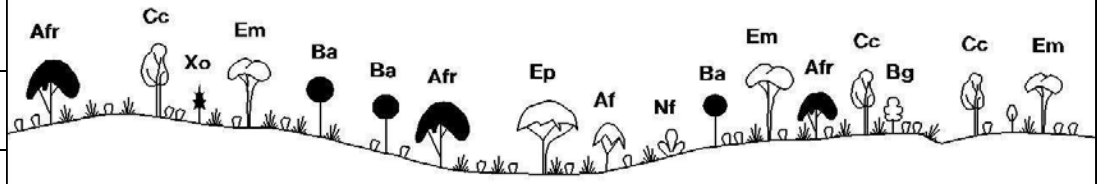
Geographic Region	Humid southwest W. of Carbunup		
Geomorphologic catena – VC (EVS)	Yd – Yelverton (Ac7)	Yw – Yelverton (Bk7)	Y – Yelverton (Jg5)
Landform and Vegetation profile 100m 80m 60m 40m 20m			
Land form description	Sandy rise on the Yelverton Shelf, the western edge of Blackwood Plateau	Shallow drainage depression within the Yelverton Shelf	Undulating plain on the Yelverton Shelf
Soil structure, texture and fertility	Bleached pale grey sand with organic stained topsoil, very interfile	Mixed alluvial soils, but in this case bleached pale grey sand	Bleached pale grey sand with organic stained topsoil, over laterite, infertile
Soil hydrology	Neither water shedding nor water gaining, good infiltration but only moderate storage capacity	Water gaining, but not waterlogged due to high porosity of the sand	Neither water shedding nor gaining, good infiltration but only moderate storage due to coarse structure
Over storey (canopy or emergents)	Woodland of *Allocasuarina fraseriana* (Afr), *Banksia attenuata* (Ba) and *Eucalyptus marginata* subsp. *marginata* (Em)	Woodland of *Allocasuarina fraseriana* (Afr), *Eucalyptus patens* (Ep) and *Banksia attenuata* (Ba)	Woodland of *Eucalyptus marginata* subsp. *marginata* (Em) and *Corymbia calophylla* (Cc)
Second storey	Weakly developed second storey of *Xylomelum occidentale* (Xo)	*Agonis flexuosa* (Af) *Nuytsia floribunda* (Nf)	*Banksia grandis* (Bg) *Allocasuarina fraseriana* (Afr) and *Persoonia longifolia* (Pl)
Shrub and herb storey	*Lindsaea linearis* *Stirlingia latifolia* *Dasypogon bromeliifolius* *Melaleuca thymoides* *Phlebocarya ciliata* *Conostephium pendulum* *Conostylis aculeata*	*Macrozamia riedlei* *Acacia extensa* *Kunzea rostrata* *Phlebocarya ciliata* *Pultenaea reticulata* *Leucopogon glabellus* *Lysinema ciliatum* *Lyginia barbata*	*Xanthorrhoea preissii* *Hakea amplexicaulis* *Dasypogon hookeri* *Bossiaea ornata* *Adenanthos barbiger* *Dampiera linearis* *Patersonia umbrosa* var. *xanthina*

FIGURE 2: Distribution of the *Dampiera linearis* chromosome races in the area to the south of Busselton (Figure 13 Bousfield 1970)

Indicative copy as this is a scan of a photocopy of the original.

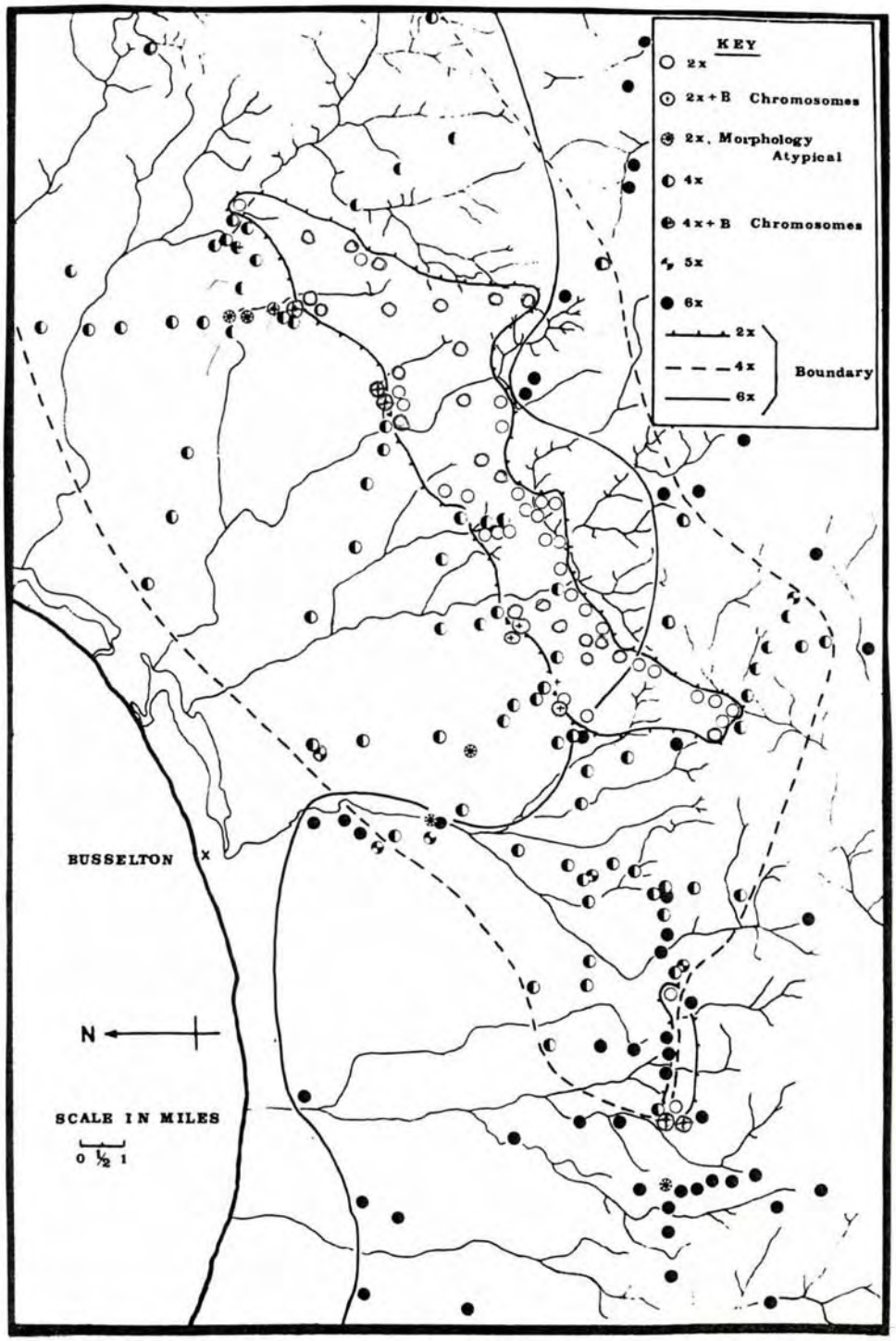


Figure 13. Distribution of the chromosome races identified in D.linearis from the Busselton diploid area shown in figure 12.

FIGURE 3: Centre of flora endemism identified in the area of the West and Central Whicher in the Regional Forest Assessment (after CALM 1998b)

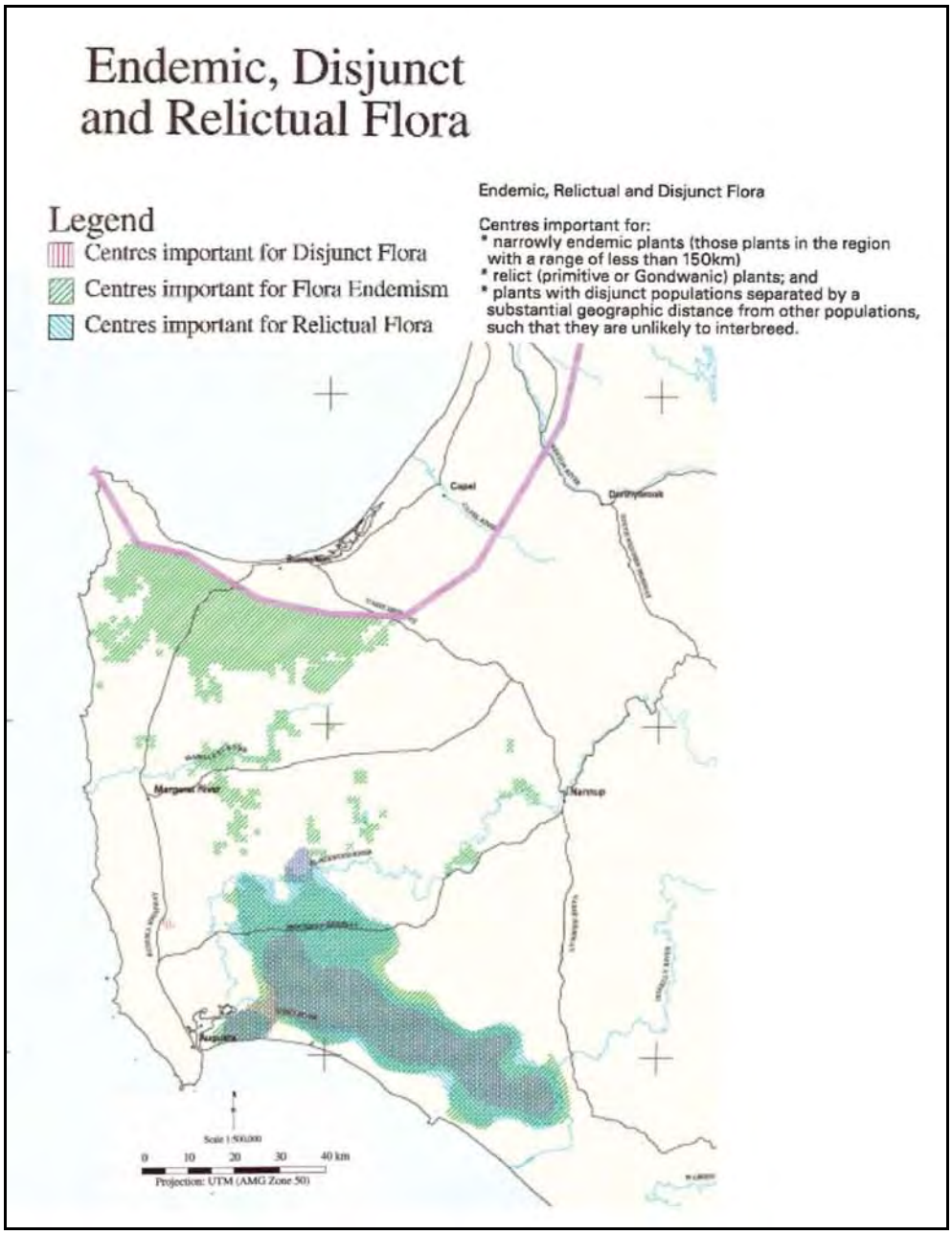


FIGURE 4: The area of the 'Whicher Range reserve' identified in the 1974 CTRC report ('Draft System 1 Report')

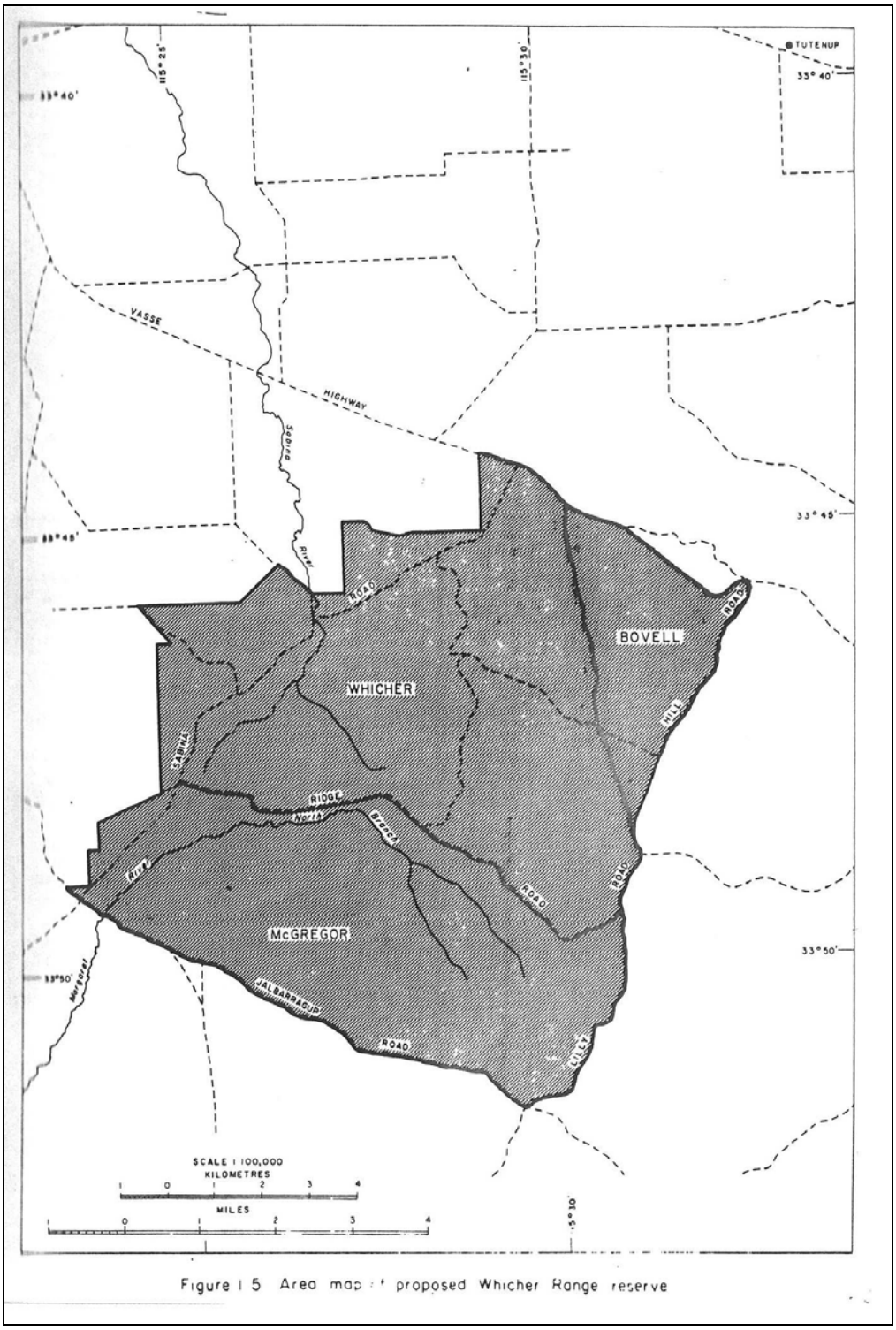


Figure 1 5 Area map of proposed Whicher Range reserve

FIGURE 5: The area of the 'Whicher Range reserve' identified in the 1976 DCE report

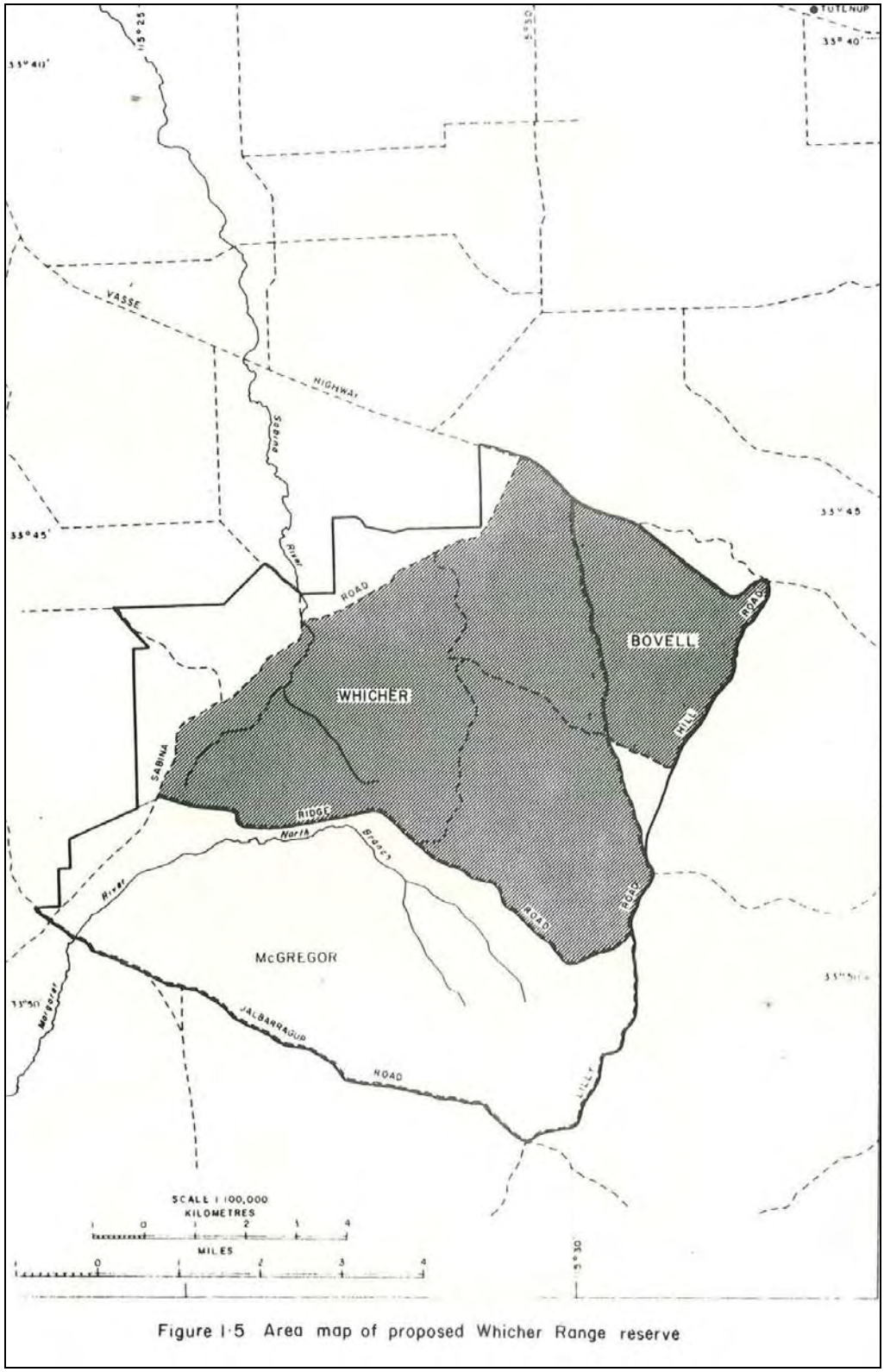


Figure 1·5 Area map of proposed Whicher Range reserve

FIGURE 6: Association matrix 10 group level

Values are average dissimilarity between quadrats in corresponding groups, excluding self-self values. Blank cells have only one quadrat.
The shading represents the degree of similarity of quadrats to each other - darkest is <0.45, next is 0.45 to 0.55, next is 0.55 and 0.6 and unshaded is >0.6.

gp10	1	2	3	4	5	6	7	8	9	10
1	0.62	0.68	0.70	0.77	0.76	0.82	0.98	1.00	0.87	0.90
2	0.68	0.55	0.81	0.83	0.82	0.91	0.97	1.00	0.89	0.91
3	0.70	0.81	0.63	0.70	0.80	0.76	0.97	1.00	0.91	0.93
4	0.77	0.83	0.70	0.56	0.81	0.76	0.96	1.00	0.93	0.95
5	0.76	0.82	0.80	0.81	0.67	0.82	0.96	0.99	0.81	0.83
6	0.82	0.91	0.76	0.76	0.82	0.62	0.95	1.00	0.96	0.96
7	0.98	0.97	0.97	0.96	0.96	0.95		0.83	0.92	0.96
8	1.00	1.00	1.00	1.00	0.99	1.00	0.83		1.00	0.99
9	0.87	0.89	0.91	0.93	0.81	0.96	0.92	1.00	0.63	0.75
10	0.90	0.91	0.93	0.95	0.83	0.96	0.96	0.99	0.75	0.69

FIGURE 7: Association matrix 20 group level

Values are average dissimilarity between quadrats in corresponding groups, excluding self-self values. Blank cells have only one quadrat.
The shading represents the degree of similarity of quadrats to each other - darkest is <0.45, next is 0.45 to 0.55, next is 0.55 and 0.6 and unshaded is >0.6.

	gp10	1	1	2	2	3	3	3	3	4	4	5	6	6	7	8	9	9	10	10	10
gp10	gp20	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20
1	1	0.60	0.66	0.65	0.71	0.69	0.73	0.76	0.79	0.76	0.84	0.77	0.85	0.81	0.98	1.00	0.89	0.86	0.90	0.90	0.97
1	2	0.66	0.59	0.76	0.75	0.66	0.68	0.76	0.74	0.76	0.81	0.72	0.84	0.77	0.98	1.00	0.84	0.85	0.85	0.85	0.94
2	3	0.65	0.76	0.54	0.68	0.80	0.82	0.85	0.82	0.83	0.85	0.82	0.92	0.89	0.98	1.00	0.91	0.87	0.91	0.90	0.98
2	4	0.71	0.75	0.68		0.81	0.77	0.87	0.78	0.83	0.90	0.83	0.88	0.88	0.96	1.00	0.85	0.75	0.87	0.89	0.90
3	5	0.69	0.66	0.80	0.81	0.58	0.64	0.66	0.72	0.69	0.81	0.81	0.80	0.75	0.98	1.00	0.92	0.93	0.94	0.93	0.98
3	6	0.73	0.68	0.82	0.77	0.64	0.60	0.70	0.76	0.67	0.75	0.77	0.72	0.69	0.96	1.00	0.89	0.89	0.91	0.91	0.98
3	7	0.76	0.76	0.85	0.87	0.66	0.70	0.47	0.71	0.70	0.84	0.84	0.87	0.83	0.98	1.00	0.93	0.92	0.97	0.94	0.98
3	8	0.79	0.74	0.82	0.78	0.72	0.76	0.71		0.76	0.80	0.83	0.92	0.90	0.98	1.00	0.82	0.88	0.90	0.91	0.96
4	9	0.76	0.76	0.83	0.83	0.69	0.67	0.70	0.76	0.53	0.66	0.80	0.73	0.77	0.96	1.00	0.93	0.94	0.94	0.96	0.99
4	10	0.84	0.81	0.85	0.90	0.81	0.75	0.84	0.80	0.66		0.82	0.78	0.84	0.97	1.00	0.87	0.94	0.92	0.95	0.97
5	11	0.77	0.72	0.82	0.83	0.81	0.77	0.84	0.83	0.80	0.82	0.67	0.87	0.77	0.96	0.99	0.78	0.85	0.82	0.80	0.92
6	12	0.85	0.84	0.92	0.88	0.80	0.72	0.87	0.92	0.73	0.78	0.87	0.44	0.69	0.97	1.00	0.96	0.99	0.98	0.99	1.00
6	13	0.81	0.77	0.89	0.88	0.75	0.69	0.83	0.90	0.77	0.84	0.77	0.69	0.55	0.93	1.00	0.94	0.95	0.94	0.93	0.99
7	14	0.98	0.98	0.98	0.96	0.98	0.96	0.98	0.98	0.96	0.97	0.96	0.97	0.93		0.83	0.93	0.92	0.95	0.98	0.95
8	15	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	0.99	1.00	1.00	0.83		1.00	1.00	1.00	1.00	0.94
9	16	0.89	0.84	0.91	0.85	0.92	0.89	0.93	0.82	0.93	0.87	0.78	0.96	0.94	0.93	1.00	0.41	0.68	0.73	0.75	0.71
9	17	0.86	0.85	0.87	0.75	0.93	0.89	0.92	0.88	0.94	0.94	0.85	0.99	0.95	0.92	1.00	0.68	0.65	0.75	0.79	0.76
10	18	0.90	0.85	0.91	0.87	0.94	0.91	0.97	0.90	0.94	0.92	0.82	0.98	0.94	0.95	1.00	0.73	0.75	0.63	0.72	0.76
10	19	0.90	0.85	0.90	0.89	0.93	0.91	0.94	0.91	0.96	0.95	0.80	0.99	0.93	0.98	1.00	0.75	0.79	0.72	0.60	0.72
10	20	0.97	0.94	0.98	0.90	0.98	0.98	0.98	0.96	0.99	0.97	0.92	1.00	0.99	0.95	0.94	0.71	0.76	0.76	0.72	

FIGURE 8: Association matrix 40 group level

Values are average dissimilarity between quadrats in corresponding groups, excluding self-self values. Blank cells have only one quadrat. The shading represents the degree of similarity of quadrats to each other - darkest is <0.45, next is 0.45 to 0.55, next is 0.55 and 0.6 and unshaded is >0.6.

	gp10	1	1	1	1	1	1	2	2	2	3	3	3	3	3	3	3	3	3	3	3	3	3	4	4	4	5	5	5	6	6	7	8	9	9	9	10	10	10	10	10
	gp20	1	1	1	1	2	2	3	3	4	5	5	5	5	5	6	6	6	6	6	6	7	8	9	9	10	11	11	11	12	13	14	15	16	17	17	18	18	18	19	20
gp10	gp20	gp40	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24	25	26	27	28	29	30	31	32	33	34	35	36	37	38	39	40
1	1	1	0.52	0.63	0.62	0.69	0.65	0.68	0.66	0.63	0.74	0.70	0.73	0.65	0.72	0.77	0.70	0.76	0.72	0.81	0.79	0.75	0.78	0.83	0.78	0.82	0.88	0.79	0.78	0.79	0.86	0.81	0.98	1.00	0.91	0.84	0.90	0.92	0.96	0.92	0.90	0.97
1	1	2	0.63	0.55	0.59	0.68	0.63	0.63	0.64	0.65	0.71	0.70	0.68	0.67	0.73	0.75	0.66	0.72	0.71	0.74	0.71	0.69	0.76	0.75	0.72	0.76	0.81	0.71	0.75	0.74	0.86	0.81	0.98	1.00	0.86	0.81	0.86	0.85	0.89	0.86	0.86	0.96
1	1	3	0.62	0.59	0.52	0.64	0.66	0.69	0.61	0.65	0.66	0.68	0.67	0.59	0.67	0.73	0.63	0.69	0.73	0.77	0.70	0.70	0.73	0.80	0.71	0.77	0.81	0.76	0.82	0.78	0.84	0.79	0.98	1.00	0.90	0.88	0.92	0.92	0.94	0.92	0.93	0.98
1	1	4	0.69	0.68	0.64		0.67	0.70	0.71	0.76	0.75	0.69	0.66	0.64	0.65	0.74	0.68	0.71	0.75	0.76	0.75	0.71	0.71	0.77	0.74	0.82	0.86	0.77	0.79	0.84	0.84	0.79	0.95	1.00	0.88	0.79	0.90	0.87	0.90	0.90	0.93	0.96
1	2	5	0.65	0.63	0.66	0.67	0.51	0.63	0.75	0.73	0.78	0.65	0.66	0.61	0.68	0.64	0.64	0.67	0.67	0.65	0.73	0.63	0.76	0.73	0.70	0.79	0.85	0.75	0.72	0.73	0.85	0.74	0.99	1.00	0.87	0.89	0.92	0.89	0.94	0.89	0.85	0.95
1	2	6	0.68	0.63	0.69	0.70	0.63	0.54	0.76	0.77	0.73	0.66	0.67	0.65	0.69	0.68	0.65	0.69	0.65	0.62	0.73	0.67	0.77	0.75	0.73	0.80	0.80	0.69	0.70	0.73	0.84	0.78	0.98	1.00	0.82	0.79	0.85	0.80	0.86	0.83	0.84	0.93
2	3	7	0.66	0.64	0.61	0.71	0.75	0.76	0.53	0.58	0.68	0.81	0.77	0.74	0.81	0.86	0.76	0.83	0.83	0.88	0.82	0.82	0.85	0.82	0.81	0.85	0.85	0.82	0.83	0.79	0.92	0.90	0.98	1.00	0.91	0.85	0.89	0.89	0.92	0.92	0.90	0.98
2	3	8	0.63	0.65	0.65	0.76	0.73	0.77	0.58	0.54	0.65	0.82	0.79	0.74	0.82	0.86	0.75	0.82	0.83	0.90	0.84	0.84	0.88	0.83	0.84	0.88	0.88	0.84	0.83	0.79	0.91	0.86	0.97	1.00	0.94	0.86	0.92	0.91	0.95	0.92	0.92	0.96
2	4	9	0.74	0.71	0.66	0.75	0.78	0.73	0.68	0.65		0.83	0.78	0.76	0.82	0.85	0.62	0.79	0.84	0.84	0.78	0.75	0.87	0.78	0.80	0.86	0.90	0.84	0.82	0.84	0.88	0.88	0.96	1.00	0.85	0.80	0.71	0.85	0.89	0.92	0.89	0.90
3	5	10	0.70	0.70	0.68	0.69	0.65	0.66	0.81	0.82	0.83	0.53	0.57	0.58	0.60	0.63	0.61	0.60	0.65	0.66	0.70	0.67	0.66	0.72	0.67	0.74	0.81	0.79	0.78	0.86	0.80	0.74	0.98	1.00	0.93	0.91	0.95	0.93	0.94	0.94	0.91	0.98
3	5	11	0.73	0.68	0.67	0.66	0.66	0.67	0.77	0.79	0.78	0.57	0.52	0.61	0.63	0.69	0.63	0.59	0.69	0.71	0.67	0.67	0.70	0.72	0.67	0.75	0.79	0.82	0.78	0.86	0.78	0.74	0.95	1.00	0.93	0.88	0.94	0.90	0.90	0.95	0.92	0.98
3	5	12	0.65	0.67	0.59	0.64	0.61	0.65	0.74	0.74	0.76	0.58	0.61	0.51	0.60	0.63	0.62	0.66	0.71	0.72	0.72	0.68	0.70	0.75	0.67	0.77	0.84	0.81	0.80	0.86	0.83	0.77	0.98	1.00	0.93	0.92	0.94	0.93	0.93	0.96	0.92	0.98
3	5	13	0.72	0.73	0.67	0.65	0.68	0.69	0.81	0.82	0.82	0.60	0.63	0.60	0.54	0.59	0.62	0.61	0.66	0.69	0.62	0.63	0.64	0.73	0.62	0.73	0.80	0.80	0.79	0.85	0.78	0.73	0.98	1.00	0.92	0.91	0.95	0.92	0.95	0.97	0.94	0.98
3	5	14	0.77	0.75	0.73	0.74	0.64	0.68	0.86	0.86	0.85	0.63	0.69	0.63	0.59	0.45	0.70	0.63	0.65	0.60	0.64	0.60	0.64	0.69	0.64	0.73	0.81	0.81	0.79	0.86	0.82	0.79	1.00	1.00	0.91	0.92	0.96	0.93	0.96	0.94	0.95	0.99
3	6	15	0.70	0.66	0.63	0.68	0.64	0.65	0.76	0.75	0.62	0.61	0.63	0.62	0.62	0.70	0.42	0.59	0.65	0.63	0.67	0.60	0.76	0.72	0.66	0.71	0.80	0.76	0.70	0.86	0.73	0.65	0.94	1.00	0.89	0.85	0.87	0.90	0.90	0.93	0.93	0.96
3	6	16	0.76	0.72	0.69	0.71	0.67	0.69	0.83	0.82	0.79	0.60	0.59	0.66	0.61	0.63	0.59	0.55	0.62	0.64	0.63	0.60	0.71	0.75	0.65	0.71	0.77	0.76	0.72	0.86	0.69	0.68	0.96	1.00	0.90	0.89	0.94	0.91	0.93	0.94	0.93	0.98
3	6	17	0.72	0.71	0.73	0.75	0.67	0.65	0.83	0.83	0.84	0.65	0.69	0.71	0.66	0.65	0.65	0.62	0.42	0.59	0.64	0.62	0.66	0.80	0.70	0.75	0.82	0.76	0.74	0.83	0.75	0.70	0.96	1.00	0.89	0.86	0.94	0.92	0.92	0.93	0.91	0.97
3	6	18	0.81	0.74	0.77	0.76	0.65	0.62	0.88	0.90	0.84	0.66	0.71	0.72	0.69	0.60	0.63	0.64	0.59		0.68	0.59	0.74	0.77	0.72	0.72	0.71	0.64	0.66	0.79	0.71	0.72	0.98	1.00	0.80	0.82	0.91	0.87	0.85	0.85	0.86	0.93
3	6	19	0.79	0.71	0.70	0.75	0.73	0.73	0.82	0.84	0.78	0.70	0.67	0.72	0.62	0.64	0.67	0.63	0.64	0.68	0.50	0.58	0.66	0.78	0.59	0.67	0.69	0.75	0.79	0.81	0.75	0.73	0.98	1.00	0.91	0.87	0.94	0.90	0.91	0.96	0.91	0.99
3	6	20	0.75	0.69	0.70	0.71	0.63	0.67	0.82	0.84	0.75	0.67	0.67	0.68	0.63	0.60	0.60	0.60	0.62	0.59	0.58	0.38	0.73	0.76	0.67	0.70	0.71	0.70	0.61	0.79	0.74	0.64	0.98	1.00	0.84	0.84	0.87	0.86	0.87	0.88	0.87	0.98
3	7	21	0.78	0.76	0.73	0.71	0.76	0.77	0.85	0.88	0.87	0.66	0.70	0.70	0.64	0.64	0.76	0.71	0.66	0.74	0.66	0.73	0.47	0.71	0.68	0.73	0.84	0.81	0.82	0.87	0.87	0.83	0.98	1.00	0.93	0.91	0.94	0.96	0.98	0.96	0.94	0.98
3	8	22	0.83	0.75	0.80	0.77	0.73	0.75	0.82	0.83	0.78	0.72	0.72	0.75	0.73	0.69	0.72	0.75	0.80	0.77	0.78	0.76	0.71		0.72	0.81	0.80	0.81	0.83	0.85	0.92	0.90	0.98	1.00	0.82	0.82	0.93	0.88	0.92	0.92	0.91	0.96
4	9	23	0.78	0.72	0.71	0.74	0.70	0.73	0.81	0.84	0.80	0.67	0.67	0.67	0.62	0.64	0.66	0.65	0.70	0.72	0.59	0.67	0.68	0.72	0.47	0.58	0.66	0.75	0.79	0.84	0.75	0.77	0.96	1.00	0.91	0.92	0.95	0.93	0.93	0.95	0.94	0.99
4	9	24	0.82	0.76	0.77	0.82	0.79	0.80	0.85	0.88	0.86	0.74	0.75	0.77	0.73	0.73	0.71	0.71	0.75	0.72	0.67	0.70	0.73	0.81	0.58	0.46	0.66	0.77	0.80	0.88	0.71	0.78	0.96	1.00	0.94	0.93	0.96	0.94	0.94	0.97	0.98	1.00
4	10	25	0.88	0.81	0.81	0.86	0.85	0.80	0.85	0.88	0.90	0.81	0.79	0.84	0.80	0.81	0.80	0.77	0.82	0.71	0.69	0.71	0.84	0.80	0.66	0.66		0.74	0.82	0.90	0.78	0.84	0.97	1.00	0.87	0.88	1.00	0.92	0.90	0.95	0.95	0.97
5	11	26	0.79	0.71	0.76	0.77	0.75	0.69	0.82	0.84	0.84	0.79	0.82	0.81	0.80	0.81	0.76	0.76	0.76	0.64	0.75	0.70	0.81	0.81	0.75	0.77	0.74		0.62	0.69	0.86	0.79	0.97	1.00	0.78	0.84	0.90	0.81	0.83	0.85	0.85	0.98
5	11	27	0.78	0.75	0.82	0.79	0.72	0.70	0.83	0.83	0.82	0.78	0.78	0.80	0.79	0.79	0.70	0.72	0.74	0.66	0.79	0.61	0.82	0.83	0.79	0.80	0.82	0.62		0.70	0.82	0.68	0.90	0.97	0.74	0.84	0.83	0.81	0.83	0.80	0.82	0.87
5	11	28	0.79	0.74	0.78	0.84	0.73	0.73	0.79	0.79	0.84	0.86	0.86	0.86	0.85	0.86	0.86	0.86	0.83	0.79	0.81	0.79	0.87	0.85	0.84	0.88	0.90	0.69	0.70		0.93	0.84	1.00	1.00	0.81	0.87	0.83	0.82	0.86	0.82	0.73	0.90
6	12	29	0.86	0.86	0.84	0.84	0.85	0.84	0.92	0.91	0.88	0.80	0.78	0.83	0.78	0.82	0.73	0.69	0.75	0.71	0.75	0.74	0.87	0.92	0.75	0.71	0.78	0.86	0.82	0.93	0.44	0.69	0.97	1.00	0.96	0.97	1.00	0.97	0.97	0.99	0.99	1.00
6	13	30	0.81	0.81	0.79	0.79	0.74	0.78	0.90	0.86	0.88	0.74	0.74	0.77	0.73	0.79	0.65	0.68	0.70	0.72	0.73	0.64	0.83	0.90	0.77	0.78	0.84	0.79	0.68	0.84	0.69	0.55	0.93	1.00	0.94	0.94	0.97	0.93	0.93	0.96	0.93	0.99
7	14	31	0.98	0.98	0.98	0.95	0.99	0.98	0.98	0.97	0.96	0.98	0.95	0.98	0.98	1.00	0.94	0.96	0.96	0.98	0.98	0.98	0.98	0.98	0.96	0.96	0.97	0.97	0.90	1.00	0.97	0.93		0.83	0.93	0.88	0.95	0.96	0.94	0.95	0.98	0.95
8	15	32	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	0.97	1.00	1.00	1.00	0.83		1.00	1.00	1.00	1.00	1.00	1.00	1.00	0.94
9	16	33	0.91	0.86	0.90	0.88	0.87	0.82	0.91	0.94	0.85	0.93	0.93	0.93	0.92	0.91	0.89	0.90	0.89	0.80	0.91	0.84	0.93	0.82	0.91	0.94	0.87	0.78	0.74	0.81	0.96	0.94	0.93	1.00	0.41	0.64	0.73	0.71	0.76	0.74	0.75	0.71
9	17	34	0.84	0.81	0.88	0.79	0.89	0.79	0.85	0.86	0.80	0.91	0.88	0.92	0.91	0.92	0.85	0.89	0.86	0.82	0.87	0.84	0.91	0.82	0.92	0.93	0.88	0.84	0.84	0.87	0.97	0.94	0.88	1.00	0.64		0.65	0.68	0.82	0.74	0.83	0.81
9	17	35	0.90	0.86	0.92	0.90	0.92	0.85	0.89	0.92	0.71	0.95	0.94	0.94	0.95	0.96	0.87	0.94	0.94	0.91	0.94	0.87	0.94	0.93	0.95	0.96	1.00	0.90	0.83	0.83	1.00	0.97	0.95	1.00	0.73	0.65		0.71	0.86	0.81	0.76	0.71
10	18	36	0.92	0.85	0.92	0.87	0.89	0.80	0.89	0.91	0.85	0.93	0.90	0.93	0.92	0.93	0.90	0.91	0.92	0.87	0.90	0.86	0.96	0.88	0.93	0.94	0.92	0.81	0.81	0.82	0.97	0.93	0.96	1.00	0.71	0.68	0.71	0.56	0.62	0.63	0.71	0.70
10	18	37	0.96	0.89	0.94	0.90	0.94	0.86	0.92	0.95	0.89	0.94	0.90	0.93	0.95	0.96	0.90	0.93	0.92	0.85	0.91	0.87	0.98	0.92	0.93	0.94	0.90	0.83	0.83	0.86	0.97	0.93	0.94	1.00	0.76	0.82	0.86	0.62		0.72	0.76	0.83
10	18	38	0.92	0.86	0.92	0.90	0.89	0.83	0.92	0.92	0.92	0.94	0.95	0.96	0.97	0.94	0.93	0.94	0.93	0.85	0.96	0.88	0.96	0.92	0.95	0.97	0.95	0.85	0.80	0.82	0.99	0.96	0.95	1.00	0.74	0.74	0.81	0.63	0.72		0.69	0.81
10	19	39	0.90	0.86	0.93	0.93	0.85	0.84	0.90	0.92	0.89	0.91	0.92	0.92	0.94	0.95	0.93	0.93	0.91	0.86	0.91	0.87	0.94	0.91	0.94	0.98	0.95	0.85	0.82	0.73	0.99	0.93	0.98	1.00	0.75	0.83	0.76	0.71	0.76	0.69	0.60	0.72
10	20	40	0.97	0.96	0.98	0.96	0.95	0.93	0.98	0.96	0.90	0.98	0.98	0.98	0.98	0.99	0.96	0.98	0.97	0.93	0.99	0.98	0.98	0.96	0.99	1.00	0.97	0.98	0.87	0.90	1.00	0.99	0.95	0.94	0.71	0.81	0.71	0.70	0.83	0.81	0.72	

FIGURE 9: Association matrix of sites

A representation of the association matrix of all 124 quadrats. Each column and row is a quadrat.
The thickest lines represent division between the group 10 level, the intermediate weight is the 20 group level and the fine black is the group 40 level.
Grey lines represent individual quadrats within the group 40 level.
The shading represents the degree of similarity of quadrats to each other – darkest is <0.45, next is 0.45 to 0.55, next is 0.55 and 0.6 and unshaded is >0.6.

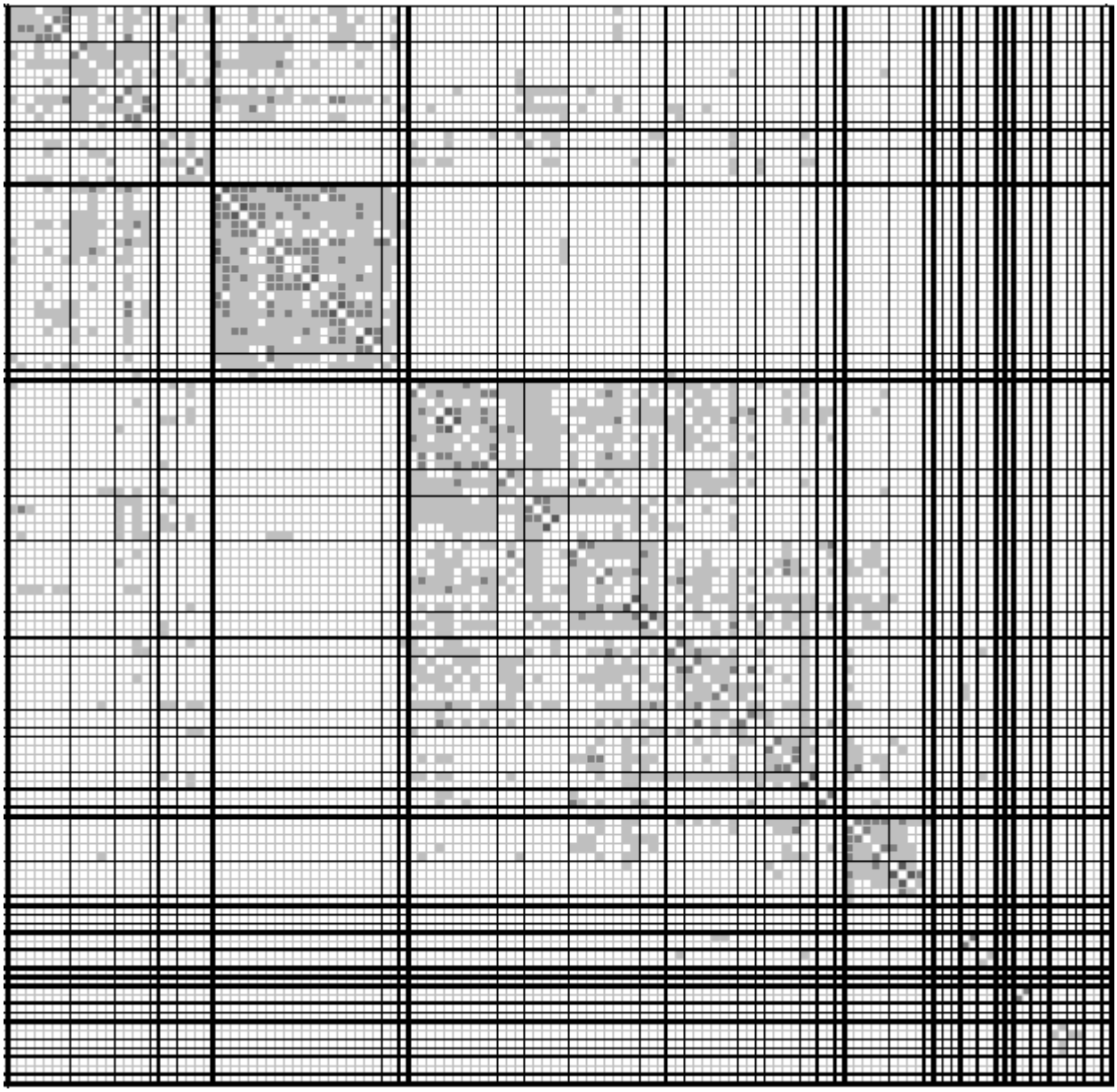
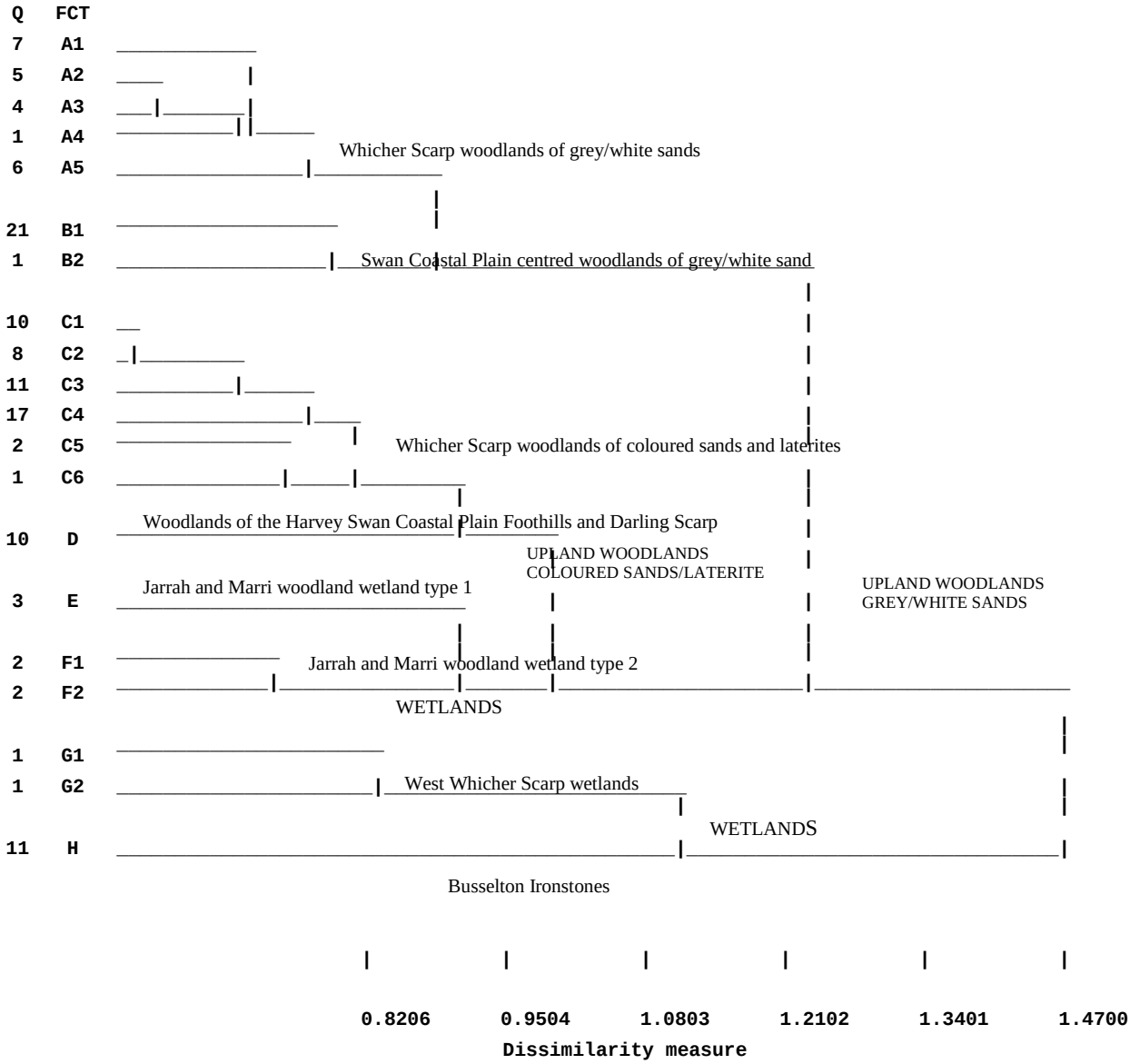


FIGURE 10: Summary dendrogram showing the 20 community types defined from the floristic presence/absence data set



12. APPENDICES

APPENDIX 1: Vegetation, flora and ecological community codes

APPENDIX 2: Quadrat and associated information

APPENDIX 2a: Quadrat location and descriptive information
APPENDIX 2b: Quadrat vegetation information
APPENDIX 2c: Quadrat vegetation descriptions
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APPENDIX 3: Floristic community types of the Whicher Scarp area - analysis summary

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APPENDIX 4: Whicher Scarp floristic community type descriptions and distributions

APPENDIX 5: Flora of the Whicher Scarp

APPENDIX 5a: Native and weedy vascular plants in the Whicher Scarp with reference to habitat preferences, growth and life forms and conservation status
APPENDIX 5b: Native and weedy vascular plants in the Whicher Scarp with reference to habitat preferences, growth and life forms and conservation status - database
APPENDIX 5c: Quadrats used to create the Whicher Scarp flora list
APPENDIX 5d: Whicher Scarp taxa name edits 2008

APPENDIX 6: Significant taxa of the Whicher Scarp

APPENDIX 1: Vegetation, flora and ecological community codes

Table 1: **Vegetation structure.** The classification system used to describe vegetation structure (based on BJ Keighery 1994, as adapted from Muir 1977 and Aplin 1979). Each row indicates a different vegetation layer.

Growth Form/Height Class	Canopy Cover			
	100-70%	**70-30%**	**30-10%**	**10-2%**
Trees over 30m	Closed Tall Forest **CTF**	Open Tall Forest **OTF**	Tall Woodland **TW**	Open Tall Woodland **OTW**
Trees 10-30m	Closed Forest **CF**	Open Forest **OF**	Woodland **W**	Open Woodland **OW**
Trees under 10m	Closed Low Forest **CLF**	Open Low Forest **OLF**	Low Woodland **LW**	Open Low Woodland **OLW**
Mallee over 8m (Tree Mallee)	Closed Tree Mallee **CTM**	Tree Mallee **TM**	Open Tree Mallee **OTM**	Very Open Tree Mallee **VOTM**
Mallee under 8m (Shrub Mallee)	Closed Shrub Mallee **CSM**	Shrub Mallee **SM**	Open Shrub Mallee **OSM**	Very Open Shrub Mallee **VOSM**
Shrubs over 2m	Closed Scrub **CSC**	Open Scrub **OSC**	Tall Shrubland **TS**	Open Tall Shrubland **OTS**
Shrubs 1-2m	Closed Heath **CH**	Open Heath **OH**	Shrubland **S**	Open Shrubland **OS**
Shrubs under 1m	Closed Low Heath **CLH**	Open Low Heath **OLH**	Low Shrubland **LS**	Open Low Shrubland **OLS**
Grasses	Closed Grassland **CG**	Grassland **G**	Open Grassland **OG**	Very Open Grassland **VOG**
Herbs	Closed Herbland **CHB**	Herbland **HB**	Open Herbland **OHB**	Very Open Herbland **VOHB**
Sedges	Closed Sedgeland **CSG**	Sedgeland **SG**	Open Sedgeland **OSG**	Very Open Sedgeland **VOSG**
Ferns	Closed Fernland **CFL**	Fernland **FL**	Open Fernland **OFL**	Very Open Fernland **VOFL**
Climbers	Closed Climbers **CC**	Climbers **C**	Open Climbers **OC**	Very Open Climbers **VOC**

Table 2: Vegetation condition scale (BJ Keighery 1994).

Vegetation Condition Scale	
1	**Pristine** Pristine or nearly so, no obvious signs of disturbance
2	**Excellent** Vegetation structure intact, disturbance affecting individual species and weeds are non-aggressive species.
3	**Very Good** Vegetation structure altered, obvious signs of disturbance. For example, disturbance to vegetation structure caused by repeated fires, the presence of some more aggressive weeds, dieback, logging and grazing.
4	**Good** 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
5	**Degraded** 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.
6	**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 or shrubs.

Table 3: Categories used to define the conservation status of flora taxa at state level, under the *Wildlife Conservation Act 1950.* Categories are defined in Atkins (2006).

Western Australian Flora Conservation Codes	
R	**Declared Rare Flora – Extant Taxa** Taxa which have been adequately searched for, and are deemed to be in the wild either rare, in danger of extinction, or otherwise in need of special protection, and have been gazetted as such.
X	**Declared Rare Flora - Presumed Extinct Taxa** Taxa which have not been collected, or otherwise verified, over the past 50 years despite thorough searching, or of which all known wild populations have been destroyed more recently, and have been gazetted as such.
P1	**Priority One - Poorly Known Taxa** Taxa which are known from one or a few (generally <5) populations which are under threat, either due to small population size, or being on lands under immediate threat, e.g. road verges, urban areas, farmland, active mineral leases, etc., or the plants are under threat, e.g. from disease, grazing by feral animals, etc. May include taxa with threatened populations on protected lands. Such taxa are under consideration for declaration as 'rare flora', but are in urgent need of further survey
P2	**Priority Two - Poorly Known Taxa** Taxa which are known from one or a few (generally <5) populations, at least some of which are not believed to be under immediate threat (i.e. not currently endangered). Such taxa are under consideration for declaration as 'rare flora', but are in urgent need of further survey
P3	**Priority Three - Poorly Known Taxa** Taxa which are known from several populations, and the taxa are not believed to be under immediate threat (i.e. not currently endangered), either due to the number of known populations (generally >5), or known populations being large, and either widespread or protected. Such taxa are under consideration for declaration as 'rare flora' but are in need of further survey.
P4	**Priority Four – Rare Taxa** Taxa which are considered to have been adequately surveyed and which, whilst being rare (in Australia), are not currently threatened by any identifiable factors. These taxa require monitoring every 5–10 years.

Note, the need for further survey of poorly known taxa is prioritised into the three categories depending on the perceived urgency for determining the conservation status of those taxa, as indicated by the apparent degree of threat to the taxa based on the current information.

Table 4: Categories used to define the conservation status of flora taxa at the Commonwealth level, under the *Environment Protection and Biodiversity Conservation Act 1999*. Categories are defined in Section 179 of the EPBC Act (Commonwealth of Australia 2007).

Commonwealth Flora Conservation Codes
Extinct A native species is eligible to be included in the Extinct category at a particular time if, at that time, there is no reasonable doubt that the last member of the species has died.
Extinct In The Wild A native species is eligible to be included in the Extinct In The Wild category at a particular time if, at that time: a. it is known only to survive in cultivation, in captivity or as a naturalised population well outside its past range; or b. it has not been recorded in its known and/or expected habitat, at appropriate seasons, anywhere in its past range, despite exhaustive surveys over a time frame appropriate to its life cycle and form.
Critically Endangered A native species is eligible to be included in the Critically Endangered category at a particular time if, at that time, it is facing an extremely high risk of extinction in the wild in the immediate future, as determined in accordance with the prescribed criteria.
Endangered A native species is eligible to be included in the Endangered category at a particular time if, at that time: a. it is not critically endangered; and b. it is facing a very high risk of extinction in the wild in the near future, as determined in accordance with the prescribed criteria.
Vulnerable A native species is eligible to be included in the Vulnerable category at a particular time if, at that time: a. it is not critically endangered or endangered; and b. it is facing a high risk of extinction in the wild in the medium-term future, as determined in accordance with the prescribed criteria.
Conservation Dependent A native species is eligible to be included in the Conservation Dependent category at a particular time if, at that time: a. the species is the focus of a specific conservation program the cessation of which would result in the species becoming vulnerable, endangered or critically endangered; or b. the following subparagraphs are satisfied: i. the species is a species of fish; ii. the species is the focus of a plan of management that provides for management actions necessary to stop the decline of, and support the recovery of, the species so that its chances of long term survival in nature are maximised; iii. the plan of management is in force under a law of the Commonwealth or of a State or Territory; iv. cessation of the plan of management would adversely affect the conservation status of the species.

Table 5: Categories used to define the conservation status of flora taxa at an international level, according to the *IUCN Red List of Threatened Species* (IUCN 2001).

IUCN Red List Categories
Extinct A taxon is Extinct when there is no reasonable doubt that the last individual has died. A taxon is presumed Extinct when exhaustive surveys in known and/or expected habitat, at appropriate times (diurnal, seasonal, annual), throughout its historic range have failed to record an individual. Surveys should be over a time frame appropriate to the taxon's life cycles and life form.
Extinct In The Wild A taxon is Extinct in the Wild when it is known only to survive in cultivation, in captivity or as a naturalised population (or populations) well outside the past range. A taxon is presumed Extinct in the Wild when exhaustive surveys in known and/or expected habitat, at appropriate times (diurnal, seasonal, annual), throughout its historic range have failed to record an individual. Surveys should be over a time frame appropriate to the taxon's life cycle and life form.
Critically Endangered A taxon is Critically Endangered when the best available evidence indicates that it meets any of the criteria A to E for Critically Endangered, and it is therefore considered to be facing an extremely high risk of extinction in the wild.
Endangered A taxon is Endangered when the best available evidence indicates that it meets any of the criteria A to E for Endangered, and it is therefore considered to be facing a very high risk of extinction in the wild.
Vulnerable A taxon is Vulnerable when the best available evidence indicates that it meets any of the criteria A to E for Vulnerable, and it is therefore considered to be facing a high risk of extinction in the wild.
Near Threatened A taxon is Near Threatened when it has been evaluated against the criteria but does not qualify for Critically Endangered, Endangered or Vulnerable now, but is close to qualifying for or is likely to qualify for a threatened category in the near future.
Least Concern A taxon is Least Concern when it has been evaluated against the criteria and does not qualify for Critically Endangered, Endangered, Vulnerable or Near Threatened. Widespread and abundant taxa are included in this category.
Data Deficient A taxon is Data Deficient when there is inadequate information to make a direct, or indirect, assessment of its risk of extinction based on its distribution and/or population status. A taxon in this category may be well studied, and its biology well known, but appropriate data on abundance and/or distribution are lacking. Data Deficient is therefore not a category of threat. Listing of taxa in this category indicates that more information is required and acknowledges the possibility that future research will show that threatened classification is appropriate. It is important to make positive use of whatever data are available. In many cases great care should be exercised in choosing between DD and a threatened status. If the range of a taxon is suspected to be relatively circumscribed, if a considerable period of time has elapsed since the last record of the taxon, threatened status may well be justified.
Not Evaluated A taxon is Not Evaluated when it is has not yet been evaluated against the criteria.

Table 6: Western Australian Ecological Community Conservation Codes (English and Blyth 1999). These ecological communities have been assessed through a procedure (co-ordinated by DEC) and assigned to one of the following categories related to the status of the threat to the community. One of the criteria used to determine the categories of threatened ecological community is an estimate of the geographic range and/or the total area occupied and/or the number of discrete occurrences reduced since European settlement.

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

APPENDIX 2: Quadrat and associated information

APPENDIX 2a: Quadrat location and descriptive information
MS Access: App2aQuadratInfo.mdb, disc

APPENDIX 2b: [1]Quadrat vegetation information
MS Access: App2bQuadratVeg.mdb, disc

APPENDIX 2c: [2]Quadrat vegetation descriptions
MS Word: App2cQuadratVeg.doc, disc and printed

APPENDIX 2d: Quadrat species information
MS Access: App2dQuadratSpecies.mdb, disc

[1,2] Since assembling these databases, a small number of taxa have been re-determined (see Appendix 5d for these changes). The names in Appendix 5d have been used in the general text, vegetation descriptions, floristic community type descriptions and the flora list.

APPENDIX 2a: Quadrat location and descriptive information

MS Access: App2aQuadratInfo.mdb, disc

KEY TO DATABASE

tblDiebackCode	***Phytophthora* dieback status** Interpreted from field data sheets and field knowledge by GJ Keighery and BJ Keighery.
tblEnvUrbGeolCode	**Environmental and urban geology descriptions**
tblForestCode	**General names of Whicher reference areas** See also Table 1 of this report.
tblHeddleVEGTYPECode	**Vegetation complex types and geomorphology according to DCE 1990**
tblQuadratInfo	**Location and further descriptive data for each quadrat** More detailed field descriptions are available (see table design view or bottom bar of database). The source of the data is indicated, where applicable, in table design view or on the bottom bar of the database: **RECORDED** — As on field data sheets **REGIONAL DATASET** — From regional datasets **DERIVED** — Interpreted from field data sheets, field knowledge by GJ Keighery and BJ Keighery and/or regional datasets
tblrfaVEGCOMPCode	**Vegetation complexes in the south-west forest region of WA according to CALM 1998a**
tblStudyCode	**Study descriptions**
tblSubsystem MAPPING_UNCode	**Soil-landscape mapping according to DAFWA (2007)**
tblSWAFCTCode	**Descriptions for the Swan Coastal Plain floristic community types**
tblTenureCode	**Tenure details**
tblVegeCondCode	**Vegetation condition**

APPENDIX 2b: Quadrat vegetation information

MS Access: App2bQuadratVeg.mdb, disc

KEY TO DATABASE

tblDominantTaxa	**Dominant taxa in the 124 Whicher Scarp quadrats, with one plant taxon per record** This table includes vegetation structure classes; canopy cover percentages and average height of the layer in metres, both according to the National Vegetation Information System (NVIS), where this information is available; NAME_ID; SPECIES_CODE; family name and scientific plant name. Dominant plants found adjacent to the quadrat are indicated.
tblDominantTaxaXtab	**Dominant taxa in the 124 Whicher Scarp quadrats, grouped by vegetation structure class per quadrat**
tblVegeClassCode	**Vegetation structure classes** after Table 1 in Appendix 1
WA_PLANT_FAMILIES	**WA Plant Census table of WA Plant Families (Western Australian Herbarium 1998- and 2008; Gioia 2005)**
WA_PLANT_NAMES_&_SUPP	**WA Plant Census table of WA Plant Names (Western Australian Herbarium 1998- and 2008; Gioia 2005) and supplementary plant names as in BJ Keighery *et al.* (2007)**

APPENDIX 2c: Quadrat vegetation descriptions

Also available as MS Word: App2cQuadratVeg.doc, disc and printed

Quadrat	Vegetation Description
ACTN01	*Eucalyptus marginata* subsp. *marginata* and *Eucalyptus haematoxylon* Open Forest over *Acacia extensa* Tall Shrubland over *Melaleuca thymoides* and *Xanthorrhoea preissii* Open Heath over *Dasypogon bromeliifolius* and *Adenanthos meisneri* Open Low Heath over *Anarthria prolifera*, *Hypolaena exsulca* and *Cyathochaeta equitans* Sedgeland
ACTN02	*Eucalyptus marginata* subsp. *marginata* and *Eucalyptus calophylla* Open Forest over *Hakea amplexicaulis* and *Acacia extensa* Tall Shrubland over *Calothamnus sanguineus*, *Stirlingia latifolia* and *Podocarpus drouynianus* Closed Low Heath over *Tetraria octandra*, *Mesomelaena tetragona* and *Cyathochaeta equitans* Sedgeland
ACTON-1	*Eucalyptus marginata* subsp. *marginata* Woodland over mixed Low Shrubland over mixed Very Open Herbland and *Lepidosperma* sp. (Eastern terete) (B.J. Keighery and N. Gibson 232) and *Tetraria octandra* Open Sedgeland
BOYA01	*Eucalyptus haematoxylon*, *Eucalyptus marginata* subsp. *marginata* and *Banksia grandis* Open Forest over *Xylomelum occidentale* Open Low Woodland over *Daviesia physodes* and *Podocarpus drouynianus* Shrubland over *Hibbertia hypericoides*, *Calothamnus sanguineus* and *Pityrodia bartlingii* Open Low Heath over *Patersonia umbrosa* var. *xanthina* and *Dasypogon bromeliifolius* Very Open Herbland and *Mesomelaena tetragona* and *Tetraria octandra* Open Sedgeland
boyan 01	*Eucalyptus marginata* subsp. *marginata* Open Woodland over *Banksia attenuata* Low Woodland over *Melaleuca thymoides* and *Jacksonia* sp. Whicher (G.J. Keighery 9953) MS Shrubland over *Hibbertia hypericoides* and *Stirlingia latifolia* Open Low Heath over *Phlebocarya ciliata* Herbland
boyan 02	*Eucalyptus marginata* subsp. *marginata* Open Forest over *Eucalyptus haematoxylon* and *Xylomelum occidentale* Open Low Woodland over *Xanthorrhoea preissii* Open Tall Shrubland over *Hakea lissocarpha* Open Shrubland over *Hibbertia hypericoides*, *Acacia varia* var. *varia* and *Bossiaea* sp. Waroona (B.J. Keighery & N. Gibson 229) PN Open Low Heath over *Patersonia umbrosa* var. *xanthina* Very Open Herbland
buffer01	*Banksia attenuata* Woodland over *Melaleuca thymoides*, *Allocasuarina humilis*, *Leucopogon* spp., *Adenanthos meisneri* and *Stirlingia latifolia* Open Low Heath
CAPEL-1	*Eucalyptus marginata* subsp. *marginata* Woodland over *Acacia extensa* Open Shrubland over *Hibbertia hypericoides*, *Xanthorrhoea preissii* and *Petrophile linearis* Low Shrubland over *Phlebocarya ciliata* Open Herbland and mixed Open Sedgeland
CAPEL-2	*Banksia ilicifolia* and *Banksia attenuata* Low Woodland over *Melaleuca thymoides* and *Jacksonia* sp. Whicher (G.J. Keighery 9953) MS Open Tall Shrubland over *Leucopogon polymorphus* Open Shrubland over *Leucopogon conostephioides*, *Eremaea pauciflora* var. *pauciflora* and *Calytrix flavescens* Low Shrubland over *Phlebocarya ciliata* Open Herbland
CARB-3	*Eucalyptus calophylla* Open Woodland over *Banksia attenuata*, *Allocasuarina fraseriana* and *Agonis flexuosa* var. *flexuosa* Low Woodland over *Jacksonia* sp. Whicher (G.J. Keighery 9953) MS and *Acacia extensa* Shrubland over *Stirlingia latifolia*, *Adenanthos meisneri*, *Melaleuca thymoides* and *Hibbertia hypericoides* Open Low Heath over *Phlebocarya ciliata* Open Herbland and *Lepidosperma squamatum* Very Open Sedgeland
CHAM01	*Eucalyptus marginata* subsp. *marginata*, *Eucalyptus calophylla* and *Allocasuarina fraseriana* Open Forest over *Persoonia elliptica* Open Low Woodland over *Hibbertia hypericoides* and *Acacia pulchella* Open Low Heath over *Patersonia umbrosa* var. *xanthina* Very Open Herbland over *Tetraria capillaris* Sedgeland and *Lindsaea linearis* Open Fernland
CHAM02	*Eucalyptus calophylla* and *Eucalyptus marginata* subsp. *marginata* Open Forest over *Allocasuarina fraseriana* and *Banksia grandis* Open Low Forest over *Kingia australis* and *Xanthorrhoea preissii* Tall Shrubland over *Xanthorrhoea gracilis* and *Hibbertia hypericoides* Closed Heath over *Drosera stolonifera* Closed Herbland
CHAM03	*Allocasuarina fraseriana* Woodland over *Banksia attenuata* Open Low Forest over *Calytrix flavescens* Open Low Shrubland
Chid01	*Banksia ilicifolia* and *Banksia attenuata* Low Woodland over *Verticordia nitens* and *Melaleuca thymoides* Open Heath over *Calytrix flavescens*, *Conostephium pendulum*, *Conostephium preissii* and *Calytrix fraseri* Open Low Heath over *Phlebocarya ciliata* and *Dasypogon bromeliifolius* Open Herbland and *Lyginia barbata* and *Hypolaena exsulca* Very Open Sedgeland

Quadrat	Vegetation Description
Chid02	*Eucalyptus marginata* subsp. *marginata* Woodland over *Banksia attenuata* and *Banksia ilicifolia* Open Low Woodland over *Melaleuca thymoides* and *Acacia extensa* Shrubland over *Stirlingia latifolia* and *Hibbertia hypericoides* Open Low Heath over *Lyginia barbata* Very Open Sedgeland
dard01	*Eucalyptus marginata* subsp. *marginata* Woodland over *Eucalyptus haematoxylon* Open Low Woodland over *Xanthorrhoea acanthostachya* Tall Shrubland over *Dryandra armata* var. *armata* and *Lambertia multiflora* var. *darlingensis* Open Heath over *Patersonia occidentalis* and *Lomandra* spp. Very Open Herbland
dard02	*Banksia attenuata* Woodland over *Acacia pulchella* and *Kunzea recurva* Shrubland over *Stirlingia latifolia*, *Melaleuca systena* and *Bossiaea eriocarpa* Open Low Heath over *Dasypogon bromeliifolius* and *Phlebocarya ciliata* Open Herbland and *Hypolaena exsulca* and *Lyginia barbata* Very Open Sedgeland
dard03	*Eucalyptus marginata* subsp. *marginata* Open Woodland over *Eucalyptus haematoxylon* Open Low Woodland over *Xanthorrhoea acanthostachya* and *Hakea cyclocarpa* Shrubland over *Dryandra armata* var. *armata*, *Hakea stenocarpa* and *Calothamnus sanguineus* Open Low Heath
DARP01	*Eucalyptus calophylla* Open Forest over *Xanthorrhoea preissii* Open Shrubland over *Hibbertia hypericoides* and *Acacia lateriticola* Open Low Heath over *Patersonia umbrosa* var. *xanthina* Very Open Herbland and *Tetraria octandra* and *Tetraria capillaris* Very Open Sedgeland
DARP02	*Eucalyptus calophylla* and *Eucalyptus haematoxylon* Woodland over *Xylomelum occidentale* and *Banksia attenuata* Open Low Woodland over *Melaleuca thymoides* and *Hibbertia hypericoides* Open Low Heath over *Phlebocarya ciliata* and *Dasypogon bromeliifolius* Herbland
DARP03	*Eucalyptus marginata* subsp. *marginata* Open Woodland over *Eucalyptus haematoxylon*, *Persoonia longifolia* and *Banksia grandis* Low Woodland over *Xanthorrhoea preissii* Open Shrubland over *Hibbertia hypericoides* Low Shrubland over *Patersonia umbrosa* var. *xanthina* Very Open Herbland
DARP04	*Eucalyptus calophylla* and *Eucalyptus marginata* subsp. *marginata* Open Woodland over *Xanthorrhoea preissii* Open Tall Shrubland over *Hakea amplexicaulis* and *Hakea lissocarpha* Low Shrubland over mixed Open Herbland and mixed Very Open Sedgeland
DARP05	*Eucalyptus marginata* subsp. *marginata* Woodland over *Eucalyptus calophylla* and *Persoonia longifolia* Low Woodland over *Xanthorrhoea preissii* and *Macrozamia riedlei* Open Shrubland over *Hakea stenocarpa*, *Isopogon sphaerocephalus* and *Bossiaea* sp. Waroona (B.J. Keighery & N. Gibson 229) PN Open Low Heath over *Patersonia umbrosa* var. *xanthina* Very Open Herbland
DARP06	*Eucalyptus haematoxylon*, *Banksia grandis*, *Banksia attenuata* and *Xylomelum occidentale* Low Woodland over *Hibbertia hypericoides*, *Stirlingia latifolia*, *Xanthorrhoea preissii* and *Xanthorrhoea gracilis* Open Low Heath over *Phlebocarya ciliata* and *Dasypogon bromeliifolius* Very Open Herbland
DARP07	*Eucalyptus marginata* subsp. *marginata* Open Woodland over *Banksia attenuata*, *Xylomelum occidentale* and *Persoonia longifolia* Open Tall Shrubland over *Xanthorrhoea preissii*, *Jacksonia furcellata* and *Daviesia physodes* Open Shrubland over *Hibbertia hypericoides*, *Pimelea rosea* subsp. *rosea* and *Petrophile linearis* Open Low Heath over *Patersonia occidentalis*, *Lomandra hermaphrodita* and *Dasypogon bromeliifolius* Open Herbland
DARP08	*Eucalyptus marginata* subsp. *marginata* and *Eucalyptus haematoxylon* Open Low Woodland over *Persoonia longifolia* and *Banksia grandis* Open Tall Shrubland over *Hakea cyclocarpa* and *Acacia extensa* Open Shrubland over *Xanthorrhoea preissii* Low Shrubland
DAVE01	*Eucalyptus haematoxylon* and *Eucalyptus marginata* subsp. *marginata* Open Woodland over *Banksia grandis* and *Banksia attenuata* Open Low Woodland over *Acacia stenoptera* Open Tall Shrubland over *Hakea ruscifolia*, *Hakea cyclocarpa* and *Isopogon sphaerocephalus* Open Shrubland over *Daviesia nudiflora*, *Hibbertia hypericoides* and *Stirlingia latifolia* Open Low Heath over *Lepidosperma scabrum* Very Open Sedgeland
DAVE02	*Eucalyptus marginata* subsp. *marginata* Open Forest over *Xylomelum occidentale* Open Low Woodland over *Xanthorrhoea preissii*, *Acacia extensa* and *Hakea cyclocarpa* Shrubland over *Daviesia nudiflora*, *Stirlingia latifolia*, *Hibbertia hypericoides* and *Dryandra lindleyana* Open Low Heath over *Patersonia umbrosa* var. *xanthina*, *Drosera erythrorhiza* and *Stylidium amoenum* var. *amoenum* Very Open Herbland
DAVE03	*Banksia grandis* and *Eucalyptus haematoxylon* Low Woodland over *Xanthorrhoea preissii* Open Shrubland over *Pericalymma ellipticum* Open Low Heath
DAVE04	*Eucalyptus haematoxylon* and *Eucalyptus marginata* subsp. *marginata* Open Woodland over *Xanthorrhoea acanthostachya* and *Xanthorrhoea preissii* Open Scrub over *Hakea lissocarpha* and *Hakea amplexicaulis* Shrubland over *Hibbertia hypericoides*, *Leucopogon pulchellus* and *Bossiaea ornata* Open Low Heath over *Patersonia umbrosa* var. *xanthina* Very Open Herbland

Quadrat	Vegetation Description
DAVE05	*Eucalyptus marginata* subsp. *marginata* Woodland over *Eucalyptus haematoxylon* Open Low Woodland over *Xanthorrhoea preissii* and *Kingia australis* Open Shrubland over mixed Low Shrubland over *Patersonia umbrosa* var. *xanthina* Very Open Herbland
DAVE06	*Xanthorrhoea preissii*, *Pericalymma ellipticum* and *Hakea lissocarpha* Open Shrubland over *Leucopogon capitellatus*, *Hypocalymma angustifolium* and *Hibbertia hypericoides* Open Low Heath over *Neurachne alopecuroidea* Open Grassland and *Stylidium ciliatum*, *Drosera marchantii* subsp. *marchantii* and *Tripterococcus brunonis* Very Open Herbland
davies04	*Eucalyptus haematoxylon* and *Eucalyptus calophylla* Woodland over *Kunzea recurva* and *Acacia pulchella* Open Heath over **Anthoxanthum odoratum* Very Open Grassland over **Parentucellia viscosa*, *Stylidium calcaratum*, *Aphelia cyperoides* and *Centrolepis aristata* Open Herbland over *Mesomelaena tetragona*, *Baumea juncea* and *Lepyrodia macra* Closed Sedgeland
GAV01	*Allocasuarina fraseriana* Open Woodland over mixed Open Low Woodland over *Xanthorrhoea preissii* Open Heath over *Dasypogon hookeri*, *Hibbertia hypericoides* and *Dryandra lindleyana* Low Shrubland
GAV02	*Eucalyptus marginata* subsp. *marginata* and *Eucalyptus calophylla* Woodland over *Xylomelum occidentale* Low Woodland over *Acacia extensa* Open Tall Shrubland over *Isopogon sphaerocephalus* Shrubland over *Hibbertia hypericoides*, *Acacia pulchella*, *Bossiaea* sp. Waroona (B.J. Keighery & N. Gibson 229) PN and *Dryandra lindleyana* Open Low Heath over *Patersonia umbrosa* var. *xanthina* Open Herbland
GAV03	*Eucalyptus marginata* subsp. *marginata* Woodland over *Eucalyptus calophylla* Open Low Woodland over *Kingia australis*, *Xanthorrhoea preissii* and *Acacia extensa* Open Tall Shrubland over *Dasypogon hookeri* and *Macrozamia riedlei* Shrubland over *Hibbertia hypericoides*, *Acacia pulchella* var. *glaberrima* and *Calothamnus sanguineus* Low Shrubland over *Lagenophora huegelii* and *Patersonia umbrosa* var. *xanthina* Open Herbland
GAV04	*Acacia extensa* Tall Shrubland over *Acacia pulchella* and *Hakea lissocarpha* Shrubland over *Hibbertia hypericoides* and *Calothamnus sanguineus* Open Low Shrubland over mixed Very Open Herbland
GAV05	*Banksia attenuata* Open Low Forest over *Stirlingia latifolia*, *Leucopogon pulchellus* and *Melaleuca thymoides* Open Low Heath
GIBB01	*Eucalyptus patens* and *Eucalyptus calophylla* Open Forest over *Hakea lasianthoides*, *Viminaria juncea*, *Hakea linearis* and *Taxandria linearifolia* MS Open Low Woodland over mixed Sedgeland
GIBB02	*Eucalyptus marginata* subsp. *marginata* and *Eucalyptus calophylla* Open Forest over *Banksia grandis* Closed Low Forest over *Kingia australis* and *Xanthorrhoea preissii* Open Tall Shrubland over *Podocarpus drouynianus* Open Shrubland over *Hibbertia hypericoides*, *Acacia pulchella* and *Xanthorrhoea gracilis* Low Shrubland over *Patersonia umbrosa* var. *xanthina* Very Open Herbland and *Lepidosperma tenue*, *Lepidosperma squamatum* and *Hypolaena exsulca* Very Open Sedgeland
GIBB03	*Homalospermum firmum*, *Astartea scoparia* and *Taxandria fragrans* MS Closed Scrub over *Taraxis grossa* and *Baumea rubiginosa* Sedgeland
GIBB06	*Eucalyptus calophylla* and *Eucalyptus marginata* subsp. *marginata* Open Forest over *Hibbertia hypericoides* Open Low Heath over *Tetraria octandra* and *Lepidosperma squamatum* Sedgeland
gibson01	*Allocasuarina fraseriana*, *Banksia attenuata*, *Banksia grandis* and *Banksia ilicifolia* Low Woodland over *Melaleuca thymoides*, *Jacksonia* sp. Whicher (G.J. Keighery 9953) MS and *Stirlingia latifolia* Low Shrubland over *Dasypogon bromeliifolius* Herbland
gibson02	*Eucalyptus marginata* subsp. *marginata* and *Allocasuarina fraseriana* Open Forest over *Eucalyptus haematoxylon* Open Low Woodland over *Isopogon sphaerocephalus*, *Hakea amplexicaulis* and *Acacia extensa* Shrubland over *Hibbertia hypericoides* Low Shrubland over *Tricostularia neesii* var. *neesii* and *Hypolaena exsulca* Very Open Sedgeland
GOOD01	Eucalyptus decipiens Open Woodland over *Melaleuca preissiana* Open Low Woodland over *Xanthorrhoea preissii* Open Shrubland over *Acacia mooreana*, *Stirlingia latifolia*, *Andersonia involucrata* and *Hypocalymma angustifolium* Open Low Heath over *Phlebocarya ciliata*, *Dasypogon bromeliifolius* and *Stylidium junceum* subsp. *brevius* Closed Herbland and *Desmocladus fasciculatus*, *Lyginia barbata* and *Leptocarpus tenax* Open Sedgeland
GOOD02	*Eucalyptus marginata* subsp. *marginata* Tall Woodland over *Eucalyptus calophylla* Open Low Woodland over *Xanthorrhoea acanthostachya* and *Acacia extensa* Open Tall Shrubland over mixed Open Low Heath over mixed Very Open Herbland and *Phlebocarya ciliata* Sedgeland and *Lindsaea linearis* Very Open Fernland

Quadrat	Vegetation Description
GOOD03	*Eucalyptus calophylla* and *Eucalyptus marginata* subsp. *marginata* Open Tall Forest over *Acacia pulchella* Open Tall Shrubland over *Xanthorrhoea preissii* Open Shrubland over *Hakea lissocarpha*, *Hibbertia hypericoides* and *Astroloma drummondii* Open Low Heath over *Patersonia umbrosa* var. *xanthina* Very Open Herbland
GOOD04	*Eucalyptus marginata* subsp. *marginata* Woodland over *Banksia grandis* and *Persoonia elliptica* Open Low Woodland over *Hibbertia hypericoides*, *Calothamnus sanguineus* and *Dryandra lindleyana* Open Low Heath over *Cyathochaeta avenacea* Very Open Sedgeland
GOUL01	*Eucalyptus marginata* subsp. *marginata*, *Banksia grandis* and *Banksia attenuata* Open Forest over *Petrophile serruriae*, *Melaleuca thymoides*, *Dasypogon hookeri* and *Hakea ruscifolia* Open Shrubland over *Hibbertia hypericoides*, *Philotheca spicata*, *Isopogon sphaerocephalus* and *Stirlingia latifolia* Open Low Heath over *Anarthria prolifera*, *Tetraria octandra* and *Mesomelaena tetragona* Open Sedgeland
GOUL02	*Eucalyptus marginata* subsp. *marginata* and *Eucalyptus calophylla* Open Forest over *Podocarpus drouynianus*, *Xanthorrhoea preissii* and *Hakea ruscifolia* Open Shrubland over *Patersonia umbrosa* var. *xanthina* Very Open Herbland and *Tetrarrhena laevis* Open Sedgeland
GWINDR01	*Eucalyptus marginata* subsp. *marginata* Woodland over *Xanthorrhoea preissii* Open Shrubland over *Hibbertia hypericoides* and *Hypocalymma robustum* Open Low Heath over **Hypochaeris glabra* and *Patersonia umbrosa* var. *xanthina* Very Open Herbland
GWINDR02	*Banksia attenuata* Low Woodland over *Melaleuca thymoides* Open Shrubland over *Stirlingia latifolia* and *Hypocalymma robustum* Low Shrubland over **Briza maxima* Open Grassland and **Hypochaeris glabra* Open Herbland
GWINDR03	*Xylomelum occidentale* Low Woodland over *Kunzea glabrescens* and *Melaleuca thymoides* Open Tall Shrubland over *Acacia pulchella* Open Shrubland over *Eremaea pauciflora* var. *pauciflora*, *Hibbertia hypericoides*, *Stirlingia latifolia* and *Dasypogon bromeliifolius* Open Low Heath over *Phlebocarya ciliata* and **Ursinia anthemoides* Open Herbland
HAPP01	*Eucalyptus haematoxylon* Woodland over *Banksia grandis* Open Low Woodland over *Kunzea glabrescens* Open Tall Shrubland over *Hibbertia hypericoides*, *Gompholobium confertum*, *Hakea ruscifolia*, *Bossiaea pulchella*, *Stirlingia latifolia* and *Dryandra lindleyana* Open Low Heath over *Lomandra sericea* and *Patersonia umbrosa* var. *xanthina* Very Open Herbland
HAPP02	*Nuytsia floribunda* and *Allocasuarina fraseriana* Low Woodland over *Stirlingia latifolia* and *Melaleuca thymoides* Shrubland over *Leucopogon pulchellus* and *Hibbertia vaginata* Low Shrubland
iron01	*Hakea oldfieldii* Open Tall Shrubland over *Kunzea* aff. *micrantha* Shrubland over mixed Closed Herbland and *Loxocarya magna*, *Desmocladus fasciculatus* and *Lepidosperma squamatum* Closed Sedgeland
iron02	*Kunzea* aff. *micrantha* and *Pericalymma ellipticum* Closed Heath over mixed Open Herbland and *Loxocarya magna* Very Open Sedgeland
kelly01	*Eucalyptus marginata* subsp. *marginata* and *Eucalyptus haematoxylon* Open Forest over *Banksia grandis* Low Woodland over *Patersonia umbrosa* var. *xanthina* Very Open Herbland
kelly02	*Allocasuarina fraseriana*, *Banksia attenuata* and *Xylomelum occidentale* Open Forest over *Jacksonia* sp. Whicher (G.J. Keighery 9953) MS, *Stirlingia latifolia* and *Adenanthos meisneri* Shrubland over *Hibbertia hypericoides* and *Bossiaea eriocarpa* Low Shrubland over *Phlebocarya ciliata* and *Patersonia occidentalis* Open Herbland and *Lyginia barbata*, *Anarthria prolifera* and *Hypolaena exsulca* Very Open Sedgeland
kemp01	*Eucalyptus haematoxylon* and *Eucalyptus marginata* subsp. *marginata* Open Forest over *Banksia grandis* Open Low Woodland over *Acacia extensa* Open Shrubland over *Hibbertia hypericoides* and *Podocarpus drouynianus* Low Shrubland over *Hypolaena exsulca* and *Anarthria prolifera* Open Sedgeland
KOJE01	*Eucalyptus marginata* subsp. *marginata* and *Eucalyptus calophylla* Open Forest over *Xanthorrhoea gracilis* Open Low Heath over *Tetrarrhena laevis* and **Briza maxima* Very Open Grassland and *Conostylis aculeata* and *Stylidium amoenum* var. *amoenum* Very Open Herbland and *Tetraria capillaris* and *Lepidosperma tenue* Open Sedgeland
KOJE02	*Eucalyptus marginata* subsp. *marginata* and *Eucalyptus calophylla* Open Forest over *Xanthorrhoea preissii* Shrubland over mixed Very Open Herbland and mixed Very Open Sedgeland
KOJE03	*Eucalyptus marginata* subsp. *marginata* Woodland over *Daviesia cordata* Open Shrubland over *Xanthorrhoea preissii*, *Xanthorrhoea gracilis* and *Acacia lateriticola* Open Low Heath over mixed Very Open Herbland and *Cyathochaeta avenacea* and *Tetraria octandra* Very Open Sedgeland

Quadrat vegetation descriptions
Appendix 2c in *A Floristic Survey of the Whicher Scarp*

Quadrat	Vegetation Description
KOJE04	*Eucalyptus wandoo* and *Eucalyptus calophylla* Open Forest over *Xanthorrhoea preissii*, *Hibbertia hypericoides* and *Phyllanthus calycinus* Open Heath over *Microlaena stipoides* Very Open Grassland and mixed Open Herbland and *Mesomelaena tetragona* Very Open Sedgeland
KOJE05	*Eucalyptus marginata* subsp. *marginata* Woodland over *Eucalyptus haematoxylon* Open Low Woodland over *Xanthorrhoea acanthostachya* and *Xanthorrhoea gracilis* Shrubland over *Lepidosperma gracile* and *Lepidosperma squamatum* Open Sedgeland
KOJE06	*Eucalyptus marginata* subsp. *marginata*, *Eucalyptus calophylla* and *Eucalyptus haematoxylon* Open Forest over *Xanthorrhoea acanthostachya* Tall Shrubland over *Hibbertia hypericoides* and *Dryandra lindleyana* Low Shrubland over **Hypochaeris glabra*, *Lomandra purpurea*, *Scaevola calliptera* and *Drosera pallida* Herbland and *Lepidosperma leptostachyum* Very Open Sedgeland
KOJE07	*Eucalyptus marginata* subsp. *marginata* and *Eucalyptus calophylla* Open Forest over *Banksia grandis* Low Woodland over *Xanthorrhoea acanthostachya* Shrubland over *Hibbertia hypericoides* Closed Low Heath over *Pentapeltis peltigera* and *Phlebocarya ciliata* Very Open Herbland and *Lepidosperma squamatum* and *Lepidosperma gracile* Open Sedgeland
KOJE08	*Eucalyptus calophylla* Open Forest over *Eucalyptus laeliae* and *Eucalyptus marginata* subsp. *marginata* Open Low Woodland over *Hakea amplexicaulis* Open Shrubland over *Hibbertia hypericoides*, *Xanthorrhoea preissii* and *Dryandra lindleyana* Open Low Heath over **Briza maxima* and *Microlaena stipoides* Very Open Grassland
KOJE09	*Xanthorrhoea preissii* Open Tall Shrubland over *Hakea amplexicaulis* Open Shrubland over *Xanthorrhoea gracilis* Low Shrubland over **Briza maxima* and *Poa homomalla* Very Open Grassland and *Lomandra pauciflora* Open Herbland and *Adiantum aethiopicum* Open Fernland
KOJE10	*Eucalyptus laeliae*, *Eucalyptus wandoo*, *Eucalyptus marginata* subsp. *marginata* and *Eucalyptus calophylla* Open Forest over *Xanthorrhoea preissii* Shrubland over **Briza maxima* Very Open Grassland and *Lagenophora huegelii*, **Hypochaeris glabra* and *Daucus glochidiatus* Herbland
MANEA-3	*Banksia attenuata* and *Xylomelum occidentale* Open Low Woodland over *Jacksonia* sp. Whicher (G.J. Keighery 9953) MS Open Shrubland over *Hibbertia hypericoides*, *Stirlingia latifolia*, *Melaleuca thymoides* and *Xanthorrhoea brunonis* Open Low Heath over *Phlebocarya ciliata* and *Dasypogon bromeliifolius* Very Open Herbland
MGK03	*Banksia attenuata*, *Eucalyptus marginata* subsp. *marginata* and *Xylomelum occidentale* Open Low Forest over *Melaleuca thymoides* and *Calytrix angulata* Open Low Heath over *Austrostipa compressa* Very Open Grassland and **Hypochaeris glabra* Very Open Herbland and *Lyginia barbata* Very Open Sedgeland
MGK04	*Eucalyptus marginata* subsp. *marginata* and *Eucalyptus calophylla* Woodland over *Banksia attenuata* Low Woodland over *Jacksonia* sp. Whicher (G.J. Keighery 9953) MS Open Tall Shrubland over *Melaleuca thymoides* Open Heath over *Leucopogon* spp. and *Hibbertia hypericoides* Low Shrubland over mixed Very Open Grassland and mixed Herbland
Norm02	*Eucalyptus marginata* subsp. *elegantella* Low Woodland over *Xanthorrhoea acanthostachya* and *Hakea stenocarpa* Shrubland over *Grevillea wilsonii*, *Dryandra kippistiana*, *Grevillea bipinnatifida* subsp. *bipinnatifida* and *Dryandra armata* var. *armata* Low Shrubland over *Lepidosperma squamatum* and *Tetraria octandra* Sedgeland
OATES-1	*Eucalyptus haematoxylon* Open Low Woodland over *Jacksonia* sp. Whicher (G.J. Keighery 9953) MS Open Tall Shrubland over *Hakea ruscifolia* Open Shrubland over *Melaleuca thymoides* and *Adenanthos meisneri* Low Shrubland
Plant03	*Eucalyptus marginata* subsp. *marginata* and Agonis flexuosa var. flexuosa Woodland over *Kunzea glabrescens* Open Tall Shrubland over *Melaleuca thymoides* and *Jacksonia* sp. Whicher (G.J. Keighery 9953) MS Shrubland over *Darwinia oederoides*, *Leucopogon conostephioides* and *Xanthorrhoea preissii* Low Shrubland over *Phlebocarya ciliata*, *Dasypogon bromeliifolius* and *Patersonia occidentalis* Very Open Herbland and *Lyginia barbata* Open Sedgeland
R116702	*Eucalyptus marginata* subsp. *marginata* Open Woodland over *Banksia attenuata* Open Low Woodland over *Kunzea glabrescens* and *Jacksonia* sp. Whicher (G.J. Keighery 9953) MS Tall Shrubland over *Hibbertia hypericoides*, *Melaleuca thymoides*, *Leucopogon conostephioides* and *Allocasuarina humilis* Open Low Heath over *Patersonia occidentalis* and *Phlebocarya ciliata* Open Herbland
RUAB-1	*Banksia attenuata* Open Low Forest over *Kunzea glabrescens* Open Tall Shrubland over *Melaleuca thymoides* Open Heath over *Calytrix flavescens* Low Shrubland over *Phlebocarya ciliata* Open Herbland and *Desmocladus flexuosus* Open Sedgeland

Quadrat	Vegetation Description
RUAB-2	*Banksia attenuata* Open Low Forest over *Kunzea glabrescens* Tall Shrubland over *Melaleuca thymoides* Shrubland over mixed Open Low Shrubland over *Phlebocarya ciliata* Open Herbland and *Lyginia barbata* Open Sedgeland
SABI01	*Eucalyptus haematoxylon, Eucalyptus calophylla, Eucalyptus marginata* subsp. *marginata* and *Eucalyptus haematoxylon* x calophylla Open Woodland over *Hakea amplexicaulis, Dasypogon hookeri* and *Pericalymma ellipticum* Shrubland over *Pultenaea drummondii, Thomasia laxiflora, Thomasia grandiflora* and *Hibbertia hypericoides* Open Low Heath over *Anarthria prolifera* and *Tetraria capillaris* Very Open Sedgeland
SABI02	*Eucalyptus calophylla* and *Eucalyptus marginata* subsp. *marginata* Open Tall Woodland over *Hakea lasianthoides, Mirbelia dilatata* and *Kingia australis* Open Tall Shrubland over *Xanthorrhoea preissii* Open Shrubland over *Chamelaucium erythrochlorum* MS, *Hypocalymma angustifolium, Hibbertia hypericoides* and *Darwinia citriodora* Open Low Heath
SABI03	*Eucalyptus calophylla* and *Eucalyptus marginata* subsp. *marginata* Closed Forest over *Mirbelia dilatata* Tall Shrubland over *Darwinia citriodora, Hovea elliptica* and *Xanthorrhoea preissii* Shrubland over *Hibbertia hypericoides* and *Hypocalymma angustifolium* Open Low Shrubland over *Microlaena stipoides* Very Open Grassland and *Drosera stolonifera* and *Lagenophora huegelii* Open Herbland and *Pteridium esculentum* Very Open Fernland
SABI04	*Eucalyptus marginata* subsp. *marginata* and *Eucalyptus calophylla* Woodland over *Eucalyptus haematoxylon* Low Woodland over *Pericalymma ellipticum* and *Xanthorrhoea preissii* Open Shrubland over *Andersonia fallax* MS and *Hibbertia hypericoides* Open Low Heath over *Patersonia umbrosa* var. *xanthina* Very Open Herbland and *Lepidosperma squamatum* Very Open Sedgeland
SABI05	*Eucalyptus marginata* subsp. *marginata* and *Eucalyptus calophylla* Open Tall Forest over *Lambertia rariflora* and *Trymalium floribundum* subsp. *trifidum* Open Scrub over *Macrozamia riedlei, Podocarpus drouynianus* and *Hovea elliptica* Shrubland over *Darwinia citriodora* Low Shrubland over *Tetrarrhena laevis* Very Open Grassland and *Loxocarya cinerea* and *Tetraria capillaris* Sedgeland
SABI06	*Eucalyptus marginata* subsp. *marginata* and *Eucalyptus calophylla* Open Forest over *Daviesia cordata, Grevillea trifida* and *Hakea falcata* Open Heath over *Hibbertia hypericoides, Hypocalymma angustifolium, Bossiaea ornata* and *Darwinia citriodora* Closed Low Heath over *Loxocarya cinerea* Very Open Sedgeland
SABI07	*Eucalyptus marginata* subsp. *marginata* and *Allocasuarina fraseriana* Woodland over *Banksia attenuata, Banksia grandis* and *Eucalyptus haematoxylon* Open Low Woodland over *Podocarpus drouynianus* and *Adenanthos obovatus* Shrubland over mixed Open Low Shrubland over *Dasypogon bromeliifolius* and *Phlebocarya ciliata* Very Open Herbland
SABI08	*Eucalyptus haematoxylon* Open Woodland over *Banksia attenuata, Banksia grandis* and *Nuytsia floribunda* Open Low Woodland over *Melaleuca thymoides, Adenanthos meisneri, Adenanthos obovatus* and *Stirlingia latifolia* Open Shrubland over *Adenanthos barbiger, Podocarpus drouynianus, Leucopogon glabellus* and *Leucopogon* sp. Whicher Range (G.J. Keighery 11763) PN Open Low Shrubland
SABI09	*Eucalyptus haematoxylon* and *Eucalyptus marginata* subsp. *marginata* Low Woodland over *Xanthorrhoea preissii* and *Melaleuca thymoides* Open Shrubland over *Calothamnus sanguineus, Stirlingia latifolia, Leucopogon glabellus* and *Andersonia sprengelioides* Open Low Heath over *Cyathochaeta equitans* Very Open Grassland and *Patersonia umbrosa* var. *xanthina* Very Open Herbland and *Anarthria scabra, Hypolaena exsulca* and *Anarthria prolifera* Open Sedgeland
SABI10	*Eucalyptus marginata* subsp. *marginata* and *Eucalyptus haematoxylon* Open Forest over *Xylomelum occidentale* and *Banksia grandis* Low Woodland over *Kingia australis* Open Tall Shrubland over *Xanthorrhoea preissii, Xanthorrhoea acanthostachya* and *Lambertia multiflora* var. *darlingensis* Open Heath over *Hibbertia hypericoides* and *Calothamnus sanguineus* Open Low Heath over mixed Very Open Herbland and mixed Very Open Sedgeland
SABI11	*Eucalyptus marginata* subsp. *marginata* Woodland over *Eucalyptus haematoxylon* and *Banksia grandis* Open Low Forest over *Lambertia multiflora* var. *darlingensis, Xanthorrhoea preissii* and *Hakea cyclocarpa* Shrubland over *Hibbertia hypericoides* Low Shrubland over *Burchardia congesta* and *Drosera marchantii* subsp. *marchantii* Very Open Herbland and *Tetraria capillaris* Sedgeland and *Lindsaea linearis* Open Fernland
SABI12	*Banksia attenuata* and *Eucalyptus haematoxylon* Open Low Forest over *Melaleuca thymoides* and *Podocarpus drouynianus* Open Heath over *Hibbertia hypericoides* and *Adenanthos meisneri* Low Shrubland over *Anarthria prolifera* and *Hypolaena exsulca* Open Sedgeland

Quadrat vegetation descriptions
Appendix 2c in *A Floristic Survey of the Whicher Scarp*

Quadrat	Vegetation Description
smith01	*Hakea oldfieldii* and *Dryandra squarrosa* subsp. *argillacea* Tall Shrubland over *Pericalymma ellipticum* Open Heath over mixed Very Open Herbland and *Loxocarya magna* and *Caustis dioica* Sedgeland
smith02	*Eucalyptus calophylla* and *Eucalyptus marginata* subsp. *marginata* Open Forest over *Acacia extensa* and *Kingia australis* Open Tall Shrubland over *Hibbertia hypericoides* Low Shrubland over *Mesomelaena tetragona* Open Sedgeland
smith03	*Eucalyptus marginata* subsp. *marginata* and *Eucalyptus haematoxylon* Woodland over *Banksia grandis* Open Low Woodland over *Hakea cyclocarpa*, *Kingia australis* and *Hakea amplexicaulis* Open Tall Shrubland over *Xanthorrhoea preissii* Open Shrubland over *Hibbertia hypericoides*, *Stirlingia latifolia* and *Dasypogon hookeri* Open Low Heath over *Dasypogon bromeliifolius* and *Lomandra sonderi* Open Herbland and *Tricostularia neesii* var. *neesii*, *Tetraria octandra* and *Mesomelaena tetragona* Very Open Sedgeland
smith04	*Dryandra nivea* subsp. *uliginosa* Tall Shrubland over *Kunzea* aff. *micrantha*, *Pericalymma ellipticum* and *Pultenaea reticulata* Open Heath over *Caustis dioica*, *Lepidosperma squamatum* and *Loxocarya magna* Open Sedgeland
TAYL01	*Eucalyptus marginata* subsp. *marginata* and *Eucalyptus calophylla* Open Forest over *Dasypogon hookeri*, *Xanthorrhoea preissii*, *Taxandria parviceps* MS and *Kingia australis* Open Scrub over *Adenanthos barbiger* Open Low Heath over *Patersonia umbrosa* var. *xanthina* Open Herbland and *Mesomelaena tetragona*, *Mesomelaena graciliceps*, *Tetraria octandra* and *Tetraria capillaris* Sedgeland and *Pteridium esculentum* Very Open Fernland
TREE01	*Eucalyptus marginata* subsp. *marginata* and *Eucalyptus calophylla* Open Forest over *Allocasuarina fraseriana* and *Banksia grandis* Low Woodland over *Persoonia longifolia* and *Hakea amplexicaulis* Open Tall Shrubland over *Xanthorrhoea gracilis*, *Isopogon sphaerocephalus*, *Daviesia preissii* and *Hibbertia hypericoides* Open Low Heath over *Tetraria capillaris* Open Sedgeland
TREE02	*Eucalyptus marginata* subsp. *marginata* Open Forest over *Dasypogon hookeri*, *Podocarpus drouynianus* and *Kingia australis* Open Shrubland over *Xanthorrhoea gracilis*, *Synaphea whicherensis*, *Bossiaea ornata* and *Hibbertia hypericoides* Low Shrubland over *Lomandra sonderi*, *Pentapeltis peltigera* and *Patersonia umbrosa* var. *xanthina* Very Open Herbland and *Loxocarya cinerea* and *Mesomelaena tetragona* Open Sedgeland
TREE03	*Eucalyptus marginata* subsp. *marginata* Woodland over *Eucalyptus haematoxylon* Low Woodland over *Hakea cyclocarpa*, *Hakea amplexicaulis*, *Bossiaea ornata* and *Kingia australis* Shrubland over *Banksia sphaerocarpa* var. *sphaerocarpa*, *Calothamnus sanguineus* and *Hibbertia hypericoides* Open Low Heath
TREE04	*Eucalyptus marginata* subsp. *marginata*, *Banksia grandis* and *Eucalyptus haematoxylon* Low Woodland over *Kingia australis*, *Petrophile serruriae* and *Dasypogon hookeri* Shrubland over *Daviesia elongata* subsp. *elongata* and *Dryandra lindleyana* Open Low Shrubland over mixed Open Sedgeland
UCL01	*Eucalyptus haematoxylon* Low Woodland over *Xanthorrhoea preissii* Open Shrubland over *Calothamnus sanguineus*, *Pericalymma ellipticum*, *Acacia pulchella* var. pulchella and *Bossiaea pulchella* Low Shrubland over *Phlebocarya ciliata* Very Open Herbland and *Loxocarya cinerea* Very Open Sedgeland
UCL02	*Eucalyptus marginata* subsp. *marginata*, *Eucalyptus haematoxylon* and *Nuytsia floribunda* Open Low Woodland over *Dasypogon hookeri* and *Taxandria linearifolia* MS Open Scrub over *Kingia australis* and *Xanthorrhoea preissii* Open Heath over *Calothamnus sanguineus* and *Hibbertia hypericoides* Low Shrubland over *Mesomelaena tetragona* Open Sedgeland and *Lindsaea linearis* Open Fernland
UCL03	*Eucalyptus haematoxylon* Woodland over *Xylomelum occidentale* Open Low Woodland over *Xanthorrhoea preissii* Tall Shrubland over *Melaleuca thymoides* and *Podocarpus drouynianus* Shrubland over *Hibbertia hypericoides* Open Low Heath over *Lindsaea linearis* Very Open Fernland
UCL04	*Eucalyptus calophylla* Woodland over *Banksia littoralis* Open Low Woodland over *Taxandria linearifolia* MS Open Scrub over *Cyathochaeta avenacea* Very Open Sedgeland and *Pteridium esculentum* Very Open Fernland
UCL05	*Eucalyptus haematoxylon* x *calophylla*, *Eucalyptus marginata* subsp. *marginata* and *Eucalyptus calophylla* Low Woodland over *Dasypogon hookeri* Open Tall Shrubland over *Xanthorrhoea preissii* Open Shrubland over mixed Low Shrubland over mixed Sedgeland

Quadrat vegetation descriptions
Appendix 2c in *A Floristic Survey of the Whicher Scarp*

Quadrat	Vegetation Description
UCL06	*Eucalyptus marginata* subsp. *marginata* Open Woodland over *Banksia attenuata, Banksia grandis* and *Xylomelum occidentale* Open Low Forest over *Daviesia physodes* and *Melaleuca thymoides* Open Tall Shrubland over *Hibbertia hypericoides, Hypocalymma angustifolium* and *Dasypogon bromeliifolius* Open Low Heath
WH01	*Eucalyptus marginata* subsp. *marginata* and *Eucalyptus calophylla* Open Forest over *Taxandria linearifolia* MS, *Acacia extensa* and *Astartea scoparia* Open Scrub over *Xanthorrhoea preissii* Low Shrubland over *Mesomelaena tetragona, Desmocladus fasciculatus, Hypolaena exsulca* and *Lepidosperma squamatum* Closed Sedgeland
WH02	*Eucalyptus haematoxylon* and *Nuytsia floribunda* Low Woodland over *Kunzea rostrata, Pericalymma ellipticum* and *Allocasuarina humilis* Open Heath over *Calothamnus sanguineus* and *Dasypogon hookeri* Open Low Heath over *Mesomelaena tetragona* Sedgeland
WH03	*Eucalyptus marginata* subsp. *marginata* and *Eucalyptus calophylla* Open Forest over *Kingia australis, Xanthorrhoea preissii* and *Hibbertia cunninghamii* Open Scrub over *Calothamnus sanguineus, Hibbertia hypericoides* and *Hypocalymma robustum* Closed Low Heath over *Mesomelaena tetragona* Sedgeland
WH04	*Eucalyptus marginata* subsp. *marginata* Woodland over *Eucalyptus haematoxylon* and *Banksia attenuata* Open Low Forest over *Xanthorrhoea preissii, Melaleuca thymoides* and *Pultenaea reticulata* Open Heath over mixed Closed Low Heath
WH05	*Eucalyptus marginata* subsp. *marginata* Woodland over *Eucalyptus haematoxylon, Allocasuarina fraseriana* and *Banksia grandis* Open Low Forest over *Gompholobium villosum, Pericalymma ellipticum* and *Hypocalymma robustum* Open Heath over *Hibbertia hypericoides* Open Low Heath over *Patersonia umbrosa* var. *xanthina* and *Dasypogon bromeliifolius* Very Open Herbland
WH06	*Eucalyptus marginata* subsp. *marginata* and *Banksia grandis* Woodland over *Eucalyptus haematoxylon, Xylomelum occidentale* and *Banksia attenuata* Low Woodland over *Melaleuca thymoides, Podocarpus drouynianus* and *Persoonia elliptica* Closed Heath over *Caustis* sp. Boyanup (G.S. McCutcheon 1706) PN Sedgeland
wicher01	*Eucalyptus calophylla* and *Eucalyptus marginata* subsp. *marginata* Open Forest over *Eucalyptus haematoxylon* Open Low Woodland over *Xanthorrhoea preissii* Tall Shrubland over *Hibbertia hypericoides* Open Low Heath over *Patersonia umbrosa* var. *xanthina* Open Herbland and *Lepidosperma squamatum* and *Anarthria prolifera* Open Sedgeland
will01	*Pericalymma ellipticum* and *Regelia ciliata* Open Heath over *Caustis dioica* Sedgeland
will02	*Eucalyptus marginata* subsp. *marginata* and *Eucalyptus calophylla* Open Forest over *Jacksonia* sp. Whicher (G.J. Keighery 9953) MS, *Persoonia longifolia* and *Banksia grandis* Low Woodland over *Melaleuca thymoides, Pultenaea ochreata* and *Adenanthos meisneri* Open Shrubland over *Hypolaena exsulca* Very Open Sedgeland
will03	*Hakea oldfieldii* and *Regelia ciliata* Tall Shrubland over *Dryandra nivea* subsp. *uliginosa* and *Verticordia plumosa* Low Shrubland over *Chordifex serialis* MS Open Sedgeland
will04	*Eucalyptus haematoxylon* Woodland over *Nuytsia floribunda* Open Low Woodland over *Pericalymma ellipticum* and *Dasypogon hookeri* Shrubland over *Bossiaea pulchella, Calothamnus sanguineus* and *Hibbertia hypericoides* Low Shrubland over *Mesomelaena tetragona* Very Open Sedgeland
WONN-1	*Eucalyptus marginata* subsp. *marginata* and *Eucalyptus calophylla* Open Forest over *Banksia grandis* and *Xylomelum occidentale* Low Woodland over *Xanthorrhoea preissii* and *Dasypogon hookeri* Open Heath over *Bossiaea pulchella* and *Hibbertia hypericoides* Low Shrubland over *Hypolaena exsulca* Open Sedgeland
WONN-2	*Eucalyptus haematoxylon, Banksia grandis* and *Xylomelum occidentale* Open Low Woodland over *Xanthorrhoea preissii* and *Dasypogon hookeri* Tall Shrubland over mixed Shrubland over *Hibbertia hypericoides* and *Calothamnus sanguineus* Open Low Heath over *Anarthria prolifera* Sedgeland
WONN-4	*Calothamnus* sp. Whicher (B.J. Keighery & N. Gibson 230) PN Shrubland over *Kunzea* aff. *micrantha* Open Low Shrubland over *Loxocarya magna* Sedgeland
WONN-5	*Viminaria juncea* Open Tall Shrubland over *Hakea sulcata* and *Pericalymma ellipticum* Closed Heath over mixed Very Open Herbland and *Tremulina tremula* Sedgeland
WONN-6	*Viminaria juncea* and *Dryandra squarrosa* subsp. *argillacea* Open Tall Shrubland over *Dryandra nivea* subsp. *uliginosa, Pericalymma ellipticum* and *Chamelaucium roycei* MS Open Heath over mixed Very Open Herbland and *Tremulina tremula* and *Loxocarya magna* Sedgeland
YIRON-1	*Hakea oldfieldii* Open Tall Shrubland over *Kunzea* aff. *micrantha* and *Pericalymma ellipticum* Open Heath over *Loxocarya magna, Chordifex serialis* MS and *Caustis dioica* Sedgeland

Quadrat vegetation descriptions
Appendix 2c in *A Floristic Survey of the Whicher Scarp*

Quadrat	Vegetation Description
YIRON-2	*Pericalymma ellipticum* Open Heath over *Andersonia ferricola* MS Open Low Shrubland over *Stylidium* megacarpum and *Stylidium* repens Very Open Herbland and *Chordifex serialis* MS, *Tremulina tremula* and *Hypolaena exsulca* Sedgeland

APPENDIX 2d: Quadrat species information

MS Access: App2dQuadratSpecies.mdb, disc

KEY TO DATABASE

tblQuadratSpecies	**Taxa listed for each quadrat. Adjacents and opportunistics are NOT included.**
WA_PLANT_FAMILIES	**WA Plant Census table of WA Plant Families (Western Australian Herbarium 1998- and 2008; Gioia 2005)**
WA_PLANT_NAMES_&_SUPP	**WA Plant Census table of WA Plant Names (Western Australian Herbarium 1998- and 2008; Gioia 2005) and supplementary plant names as in BJ Keighery *et al.* (2007)**

APPENDIX 3: Floristic community types of the Whicher Scarp area - analysis summary

APPENDIX 3a: Species reconciliation
MS Word: App3aSpeciesReconciliation, disc

APPENDIX 3b: Dendrogram, association matrix and two way table of species and sites

Association matrix
MS Excel: App3bWHS.xls worksheet 'AssociationMatrix', disc
MS Access: App3bWHS.mdb table tblAssociationMatrix, disc

Dendrogram
MS Excel: App3bWHS.xls worksheet 'Dendrogram', disc
MS Access: App3bWHS.mdb table tblDendrogram, disc

Two way table of species and sites (quadrats)
MS Excel: App3bWHS.xls worksheet 'SpAndSites', disc
MS Access: App3bWHS.mdb table tblSpAndSites, disc

APPENDIX 3a: Species reconciliation

MS Word: App 3aSpeciesReconciliation.doc, disc

KEY

Column 1 **Family**
Families are ordered alphabetically.

Columns 2-5 **Database name (App2dQuadratSpecies.mdb)**
Plant name as listed in the quadrat species information database, App2dQuadratSpecies.mdb.

Columns 6-9 **Species reconciliation name used in analysis (Appendix 3b)**

Columns 2 and 6 **NAME_ID**
Positive NAME_IDs are from the Census of Western Australian Plants (Western Australian Herbarium 1998- and 2008; Gioia 2005); negative NAME_IDs are as in BJ Keighery *et al.* (2007).

Columns 3 and 7 **SPECIES_CODE**
Source as for columns 2 and 6.

Columns 4-5 and 8-9 **Scientific name**
Taxa (species, sub-species and varieties) are listed alphabetically within genera in column 5.

*	Weed
subsp.	Subspecies
var.	Variety
MS	A manuscript name yet to be published
PN	A phrase name for a taxa yet to be described and published

APPENDIX 3b: Dendrogram, association matrix and two way table of species and sites (quadrats)

MS Access: App3bWHS.mdb, disc
MS Excel: App3bWHS.xls, disc

KEY TO DATABASE, App3bWHS.mdb

tblAssocationMatrix	**Individual sites matrix**
tblDendrogram	**Dendrogram for the 124 quadrats used in the Whicher Scarp study**
tblSpAndSites	**Two way table of species and sites (quadrats)**

KEY TO SPREADSHEET, App3bWHS.xls

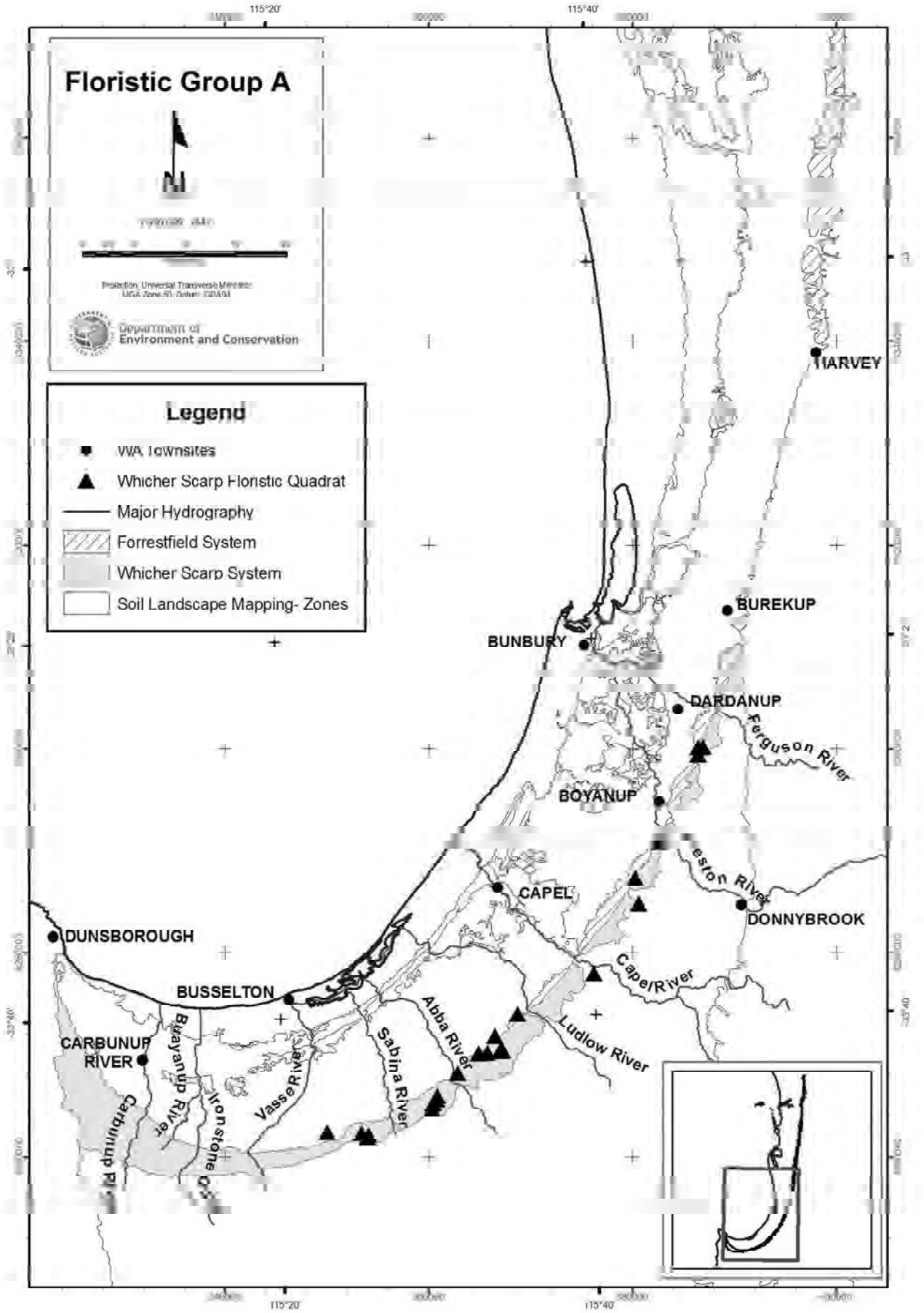
AssocationMatrix worksheet	**Individual sites matrix**
Dendrogram worksheet	**Dendrogram for the 124 quadrats used in the Whicher Scarp study**
SpAndSites worksheet	**Two way table of species and sites (quadrats)**

APPENDIX 4: Whicher Scarp floristic community type descriptions and distributions

KEY TO WHICHER SCARP GROUP MAPS

KEY TO WHICHER SCARP FLORISTIC COMMUNITY TYPE DESCRIPTIONS AND MAPS

WHSFCTs C6, D and H are not included below; WHSFCTs C6 and D are not found on the Whicher Scarp and H is described elsewhere (see Gibson *et al.* 1994 and 2000).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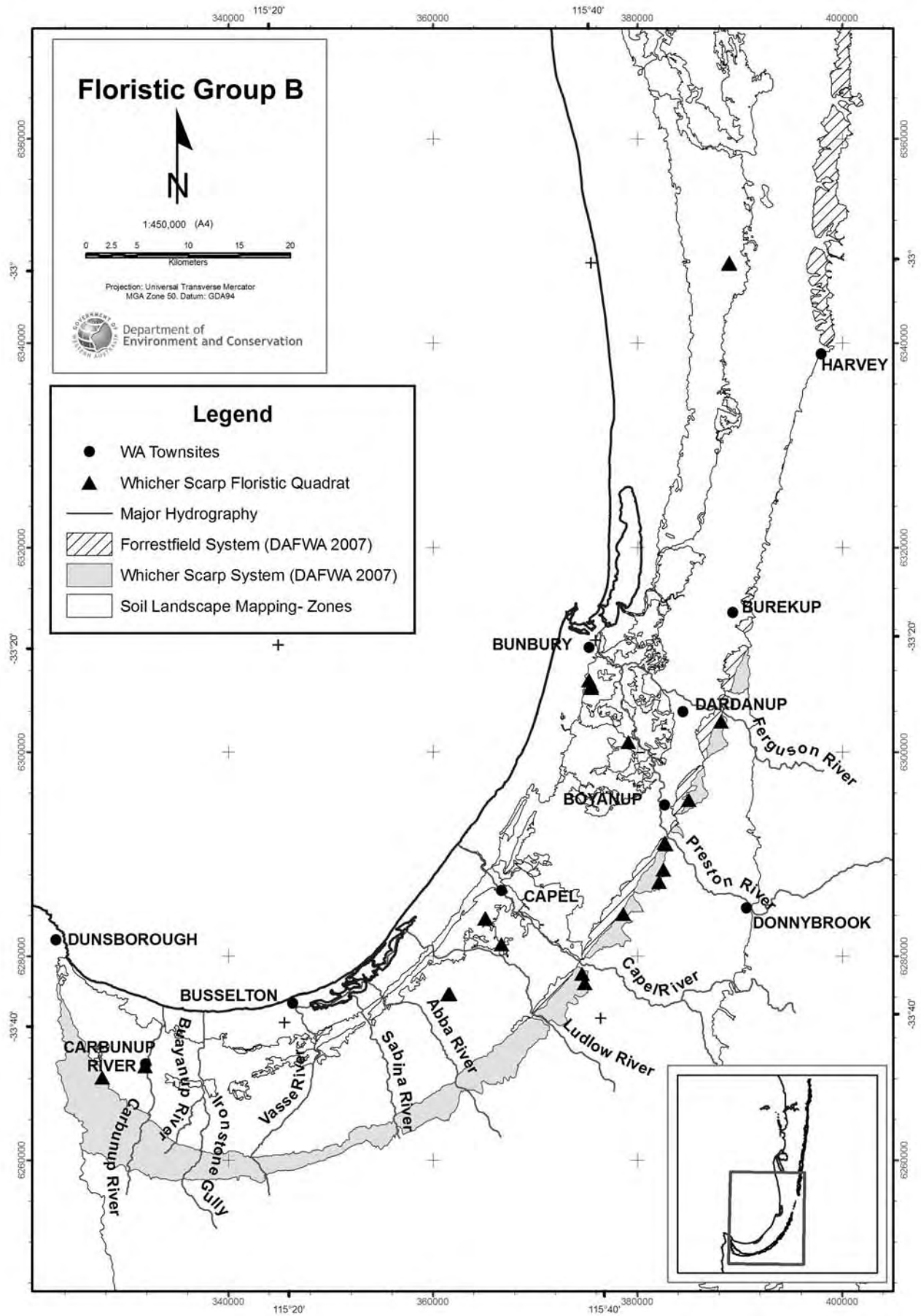
Department of Environment and Conservation
Legend
WA Townsites
Whicher Scarp Floristic Quadrat
Major Hydrography
Forrestfield System
Whicher Scarp System
Soil Landscape Mapping- Zones
115°20'
115°40'
HARVEY
BUREKUP
BUNBURY
DARDANUP
Ferguson River
BOYANUP
CAPEL
DONNYBROOK
DUNSBOROUGH
BUSSELTON
CARBUNUP RIVER
Abba River
Ludlow River
Sabina River
Vasse River
Ironstone Gully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Department of Environment and Conservation
Legend
WA Townsites
Whicher Scarp Floristic Quadrat
Major Hydrography
Forrestfield System (DAFWA 2007)
Whicher Scarp System (DAFWA 2007)
Soil Landscape Mapping- Zones
HARVEY
BUREKUP
BUNBURY
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Ferguson River
BOYANUP
Preston River
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BUSSELTON
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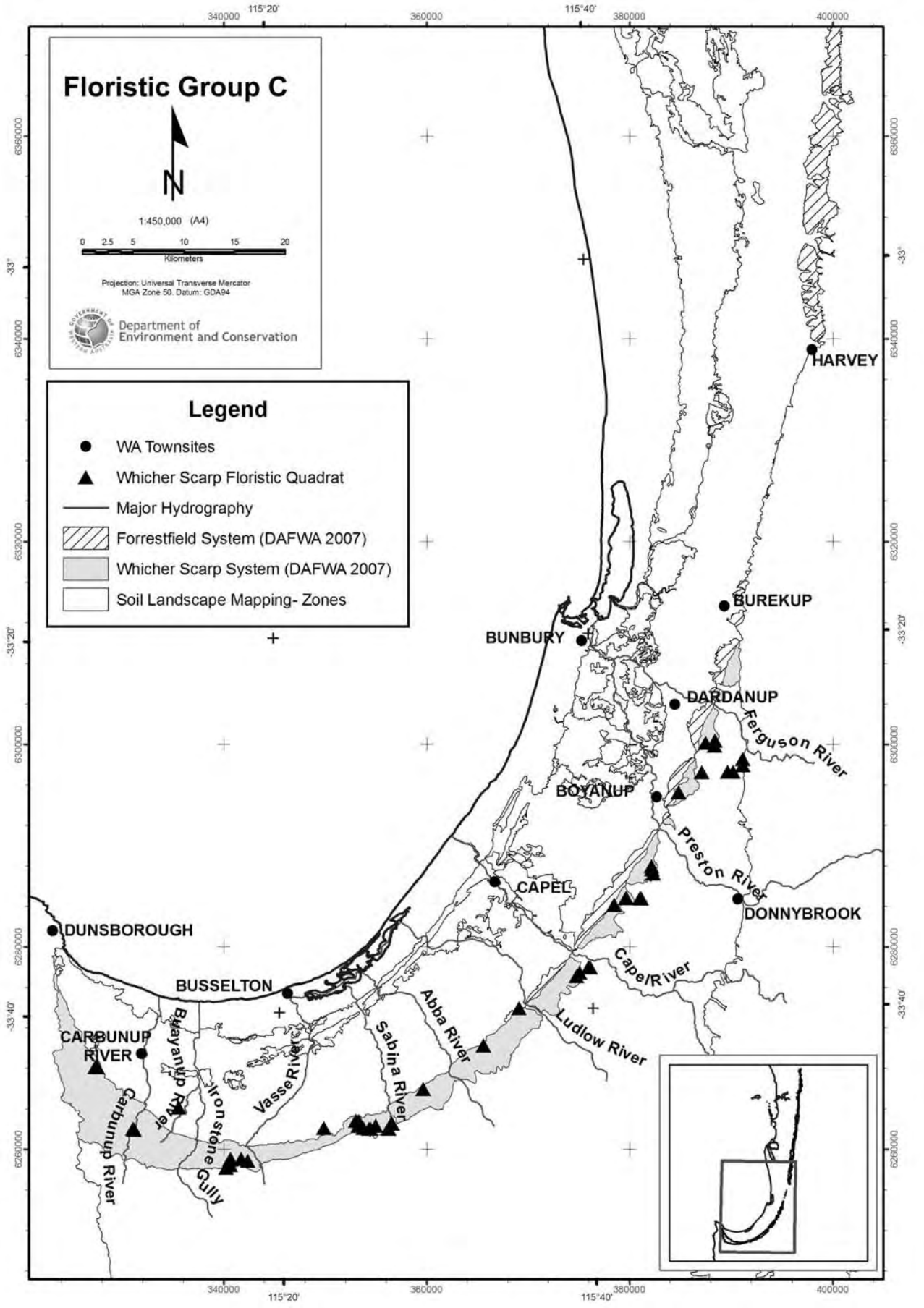
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Department of Environment and Conservation
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Major Hydrography
Forrestfield System (DAFWA 2007)
Whicher Scarp System (DAFWA 2007)
Soil Landscape Mapping- Zones
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DARDANUP
Ferguson River
BOYANUP
Preston River
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DONNYBROOK
DUNSBOROUGH
BUSSELTON
Cape River
Ludlow River
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Sabina River
Vasse River
Ironstone Gully
Carbunup River
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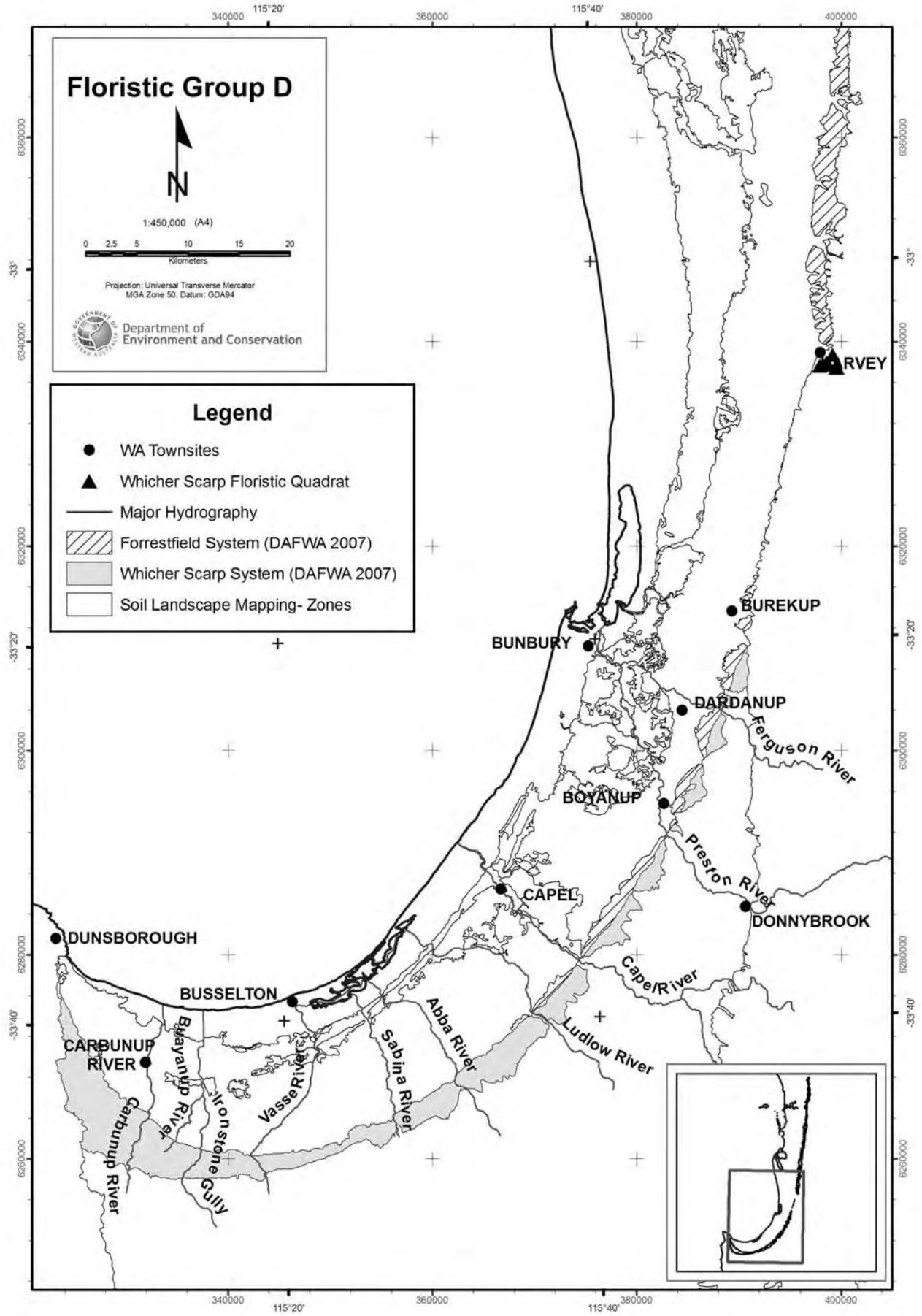
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Department of Environment and Conservation
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WA Townsites
Whicher Scarp Floristic Quadrat
Major Hydrography
Forrestfield System (DAFWA 2007)
Whicher Scarp System (DAFWA 2007)
Soil Landscape Mapping- Zones
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DUNSBOROUGH
BUSSELTON
CARBUNUP RIVER
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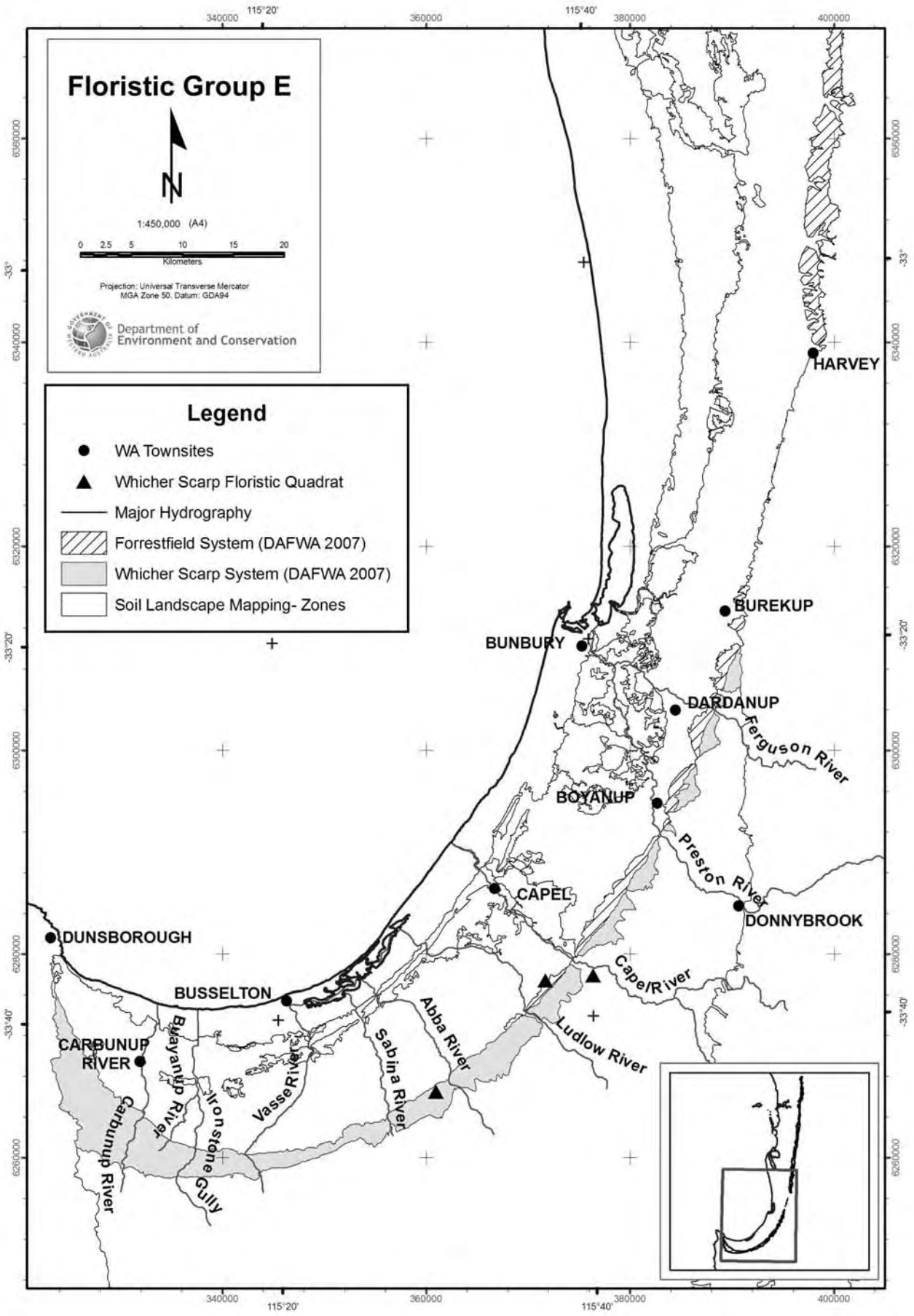
Carbunup River
Ironstone Gully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Major Hydrography
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Whicher Scarp System (DAFWA 2007)
Soil Landscape Mapping- Zones
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Ferguson River
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Preston River
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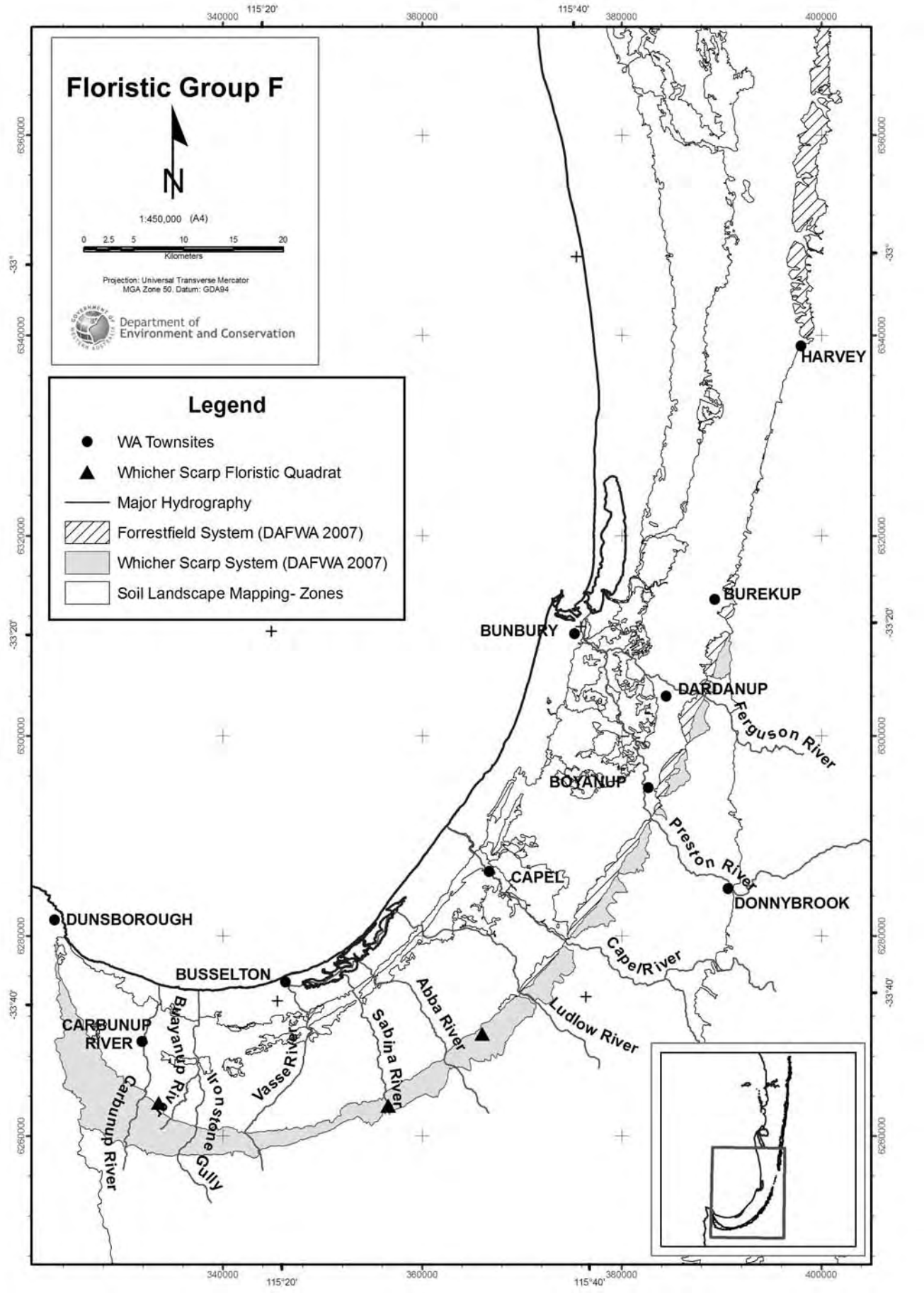
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Whicher Scarp Floristic Quadrat
Major Hydrography
Forrestfield System (DAFWA 2007)
Whicher Scarp System (DAFWA 2007)
Soil Landscape Mapping- Zones
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Ferguson River
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Cape River
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Abba River
Ludlow River
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Sabina River
Vasse River
Carbunup River
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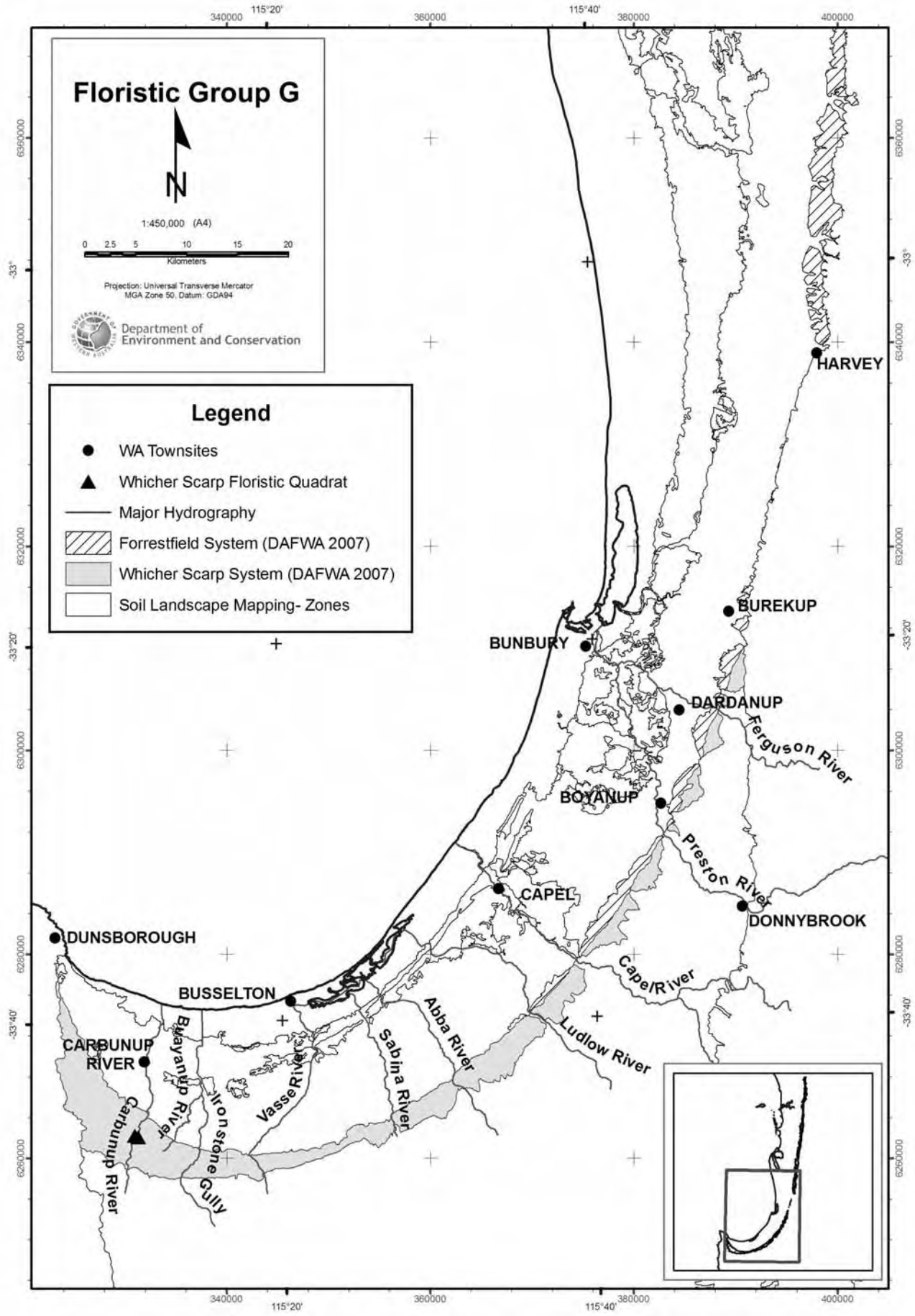
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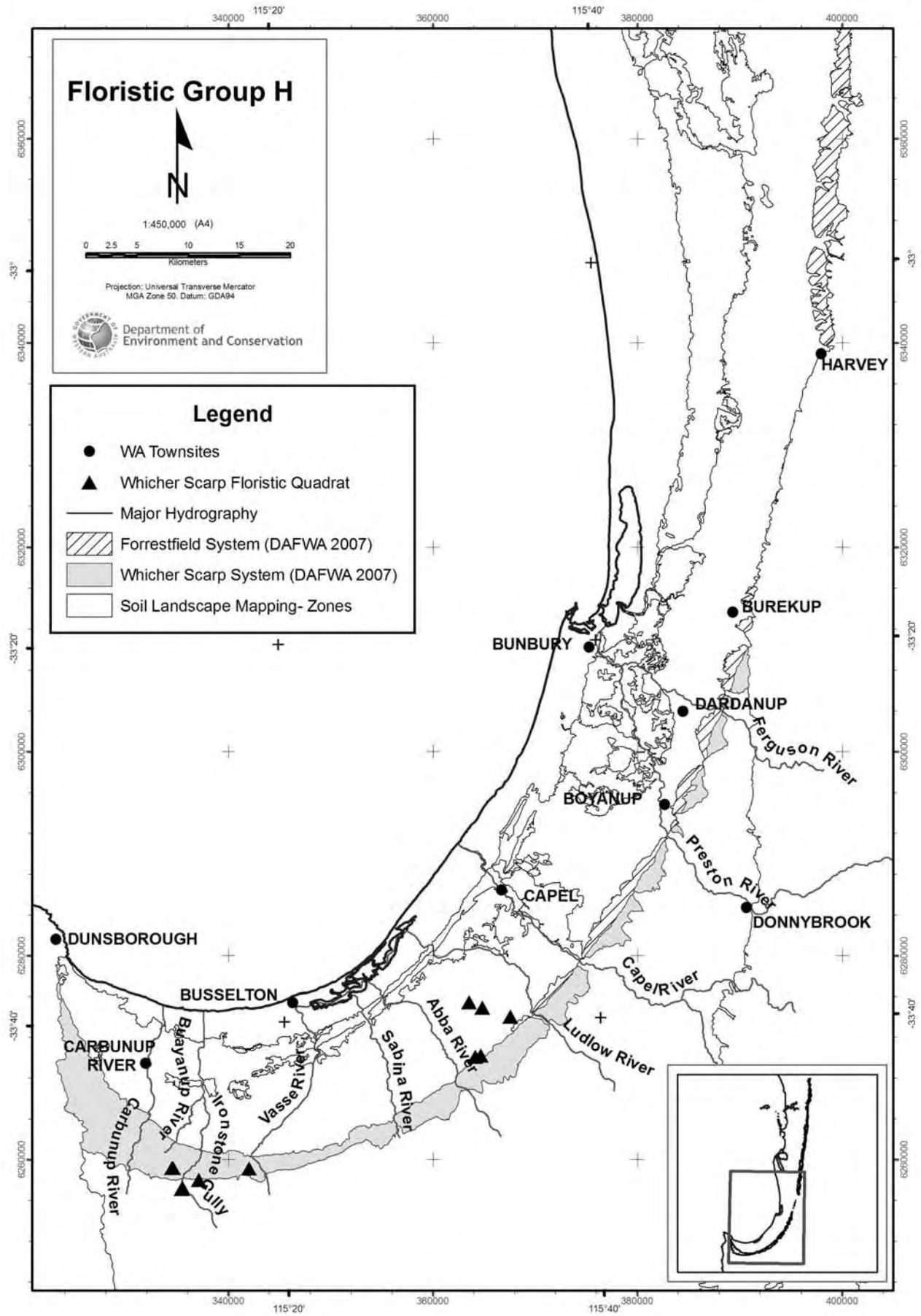
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Whicher Scarp Floristic Quadrat
Major Hydrography
Forrestfield System (DAFWA 2007)
Whicher Scarp System (DAFWA 2007)
Soil Landscape Mapping- Zones
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KEY TO WHICHER SCARP FLORISTC COMMUNITY TYPE DESCRIPTIONS

The following maps show the distribution of the floristic community types delineated during the survey. Accompanying each map is a description of each community.

Typical (>75%) and dominant (≥40%) taxa:	Typical taxa (taxa that occur in >75% of quadrats) are listed and dominant taxa (taxa that are dominant in ≥ 40% of quadrats) are underlined for each of the growth forms (trees, shrubs, grasses, herbs and sedges). Taxa are ordered within growth form in descending frequency and then alphabetically.
Other common (50-75%) and dominant (≥40%) taxa:	Common taxa (taxa that occur in 50-75% of quadrats) are listed and dominant taxa (taxa that are dominant in ≥ 40% of quadrats) are underlined for each of the growth forms (trees, shrubs, grasses, herbs and sedges). Taxa are ordered within growth form in descending frequency and then alphabetically. If the number of quadrats per FCT is less than 3, then only typical and dominant taxa are listed (i.e. common taxa are not listed).
Other dominant (≥40%) taxa:	Taxa that are dominant in ≥ 40% of quadrats but are not also listed as typical or common.
Vegetation layers	Mean number of layers of vegetation for each growth form (see Appendix 1 for a table of vegetation structure). The range of number of vegetation layers (R) is listed for trees and shrubs; the range is not listed for grasses, herbs and sedges as there is only one layer for each of these growth forms.
Mean native taxa	Mean number of native taxa[1]; standard deviation (SD) and range (R) is also listed.
Mean weed taxa	Mean number of weed taxa[2]; standard deviation (SD) and range (R) is also listed.
Mean vegetation condition	Mean vegetation condition and range (R).
Number of quadrats	
Quadrat codes	

[1,2] The mean numbers of native and weed taxa are derived from analysed data, after species reconciliations (Appendix 3a).

Community Type: A1 - Central Whicher Scarp Mountain Marri woodland

Typical (>75%) and dominant (≥40%) taxa:

TREES		SHRUBS		GRASSES/HERBS/SEDGES		
Eucalyptus haematoxylon	100.0	*Hibbertia hypericoides*	100.0	*Dampiera linearis*	Herb	100.0
Banksia attenuata	85.7	*Leucopogon glabellus*	100.0	*Dasypogon bromeliifolius*	Herb	100.0
Eucalyptus marginata subsp. *marginata*	85.7	*Melaleuca thymoides*	100.0	*Burchardia congesta*	Herb	85.7
		Stirlingia latifolia	100.0	*Lomandra hermaphrodita*	Herb	85.7
		Adenanthos meisneri	85.7	*Lomandra sericea*	Herb	85.7
		Calothamnus sanguineus	85.7	*Hypolaena exsulca*	Sedge	100.0
		Conostephium pendulum	85.7	*Anarthria prolifera*	Sedge	85.7
		Hibbertia ferruginea	85.7			
		Hypocalymma robustum	85.7			
		Petrophile linearis	85.7			
		Xanthorrhoea preissii	85.7			

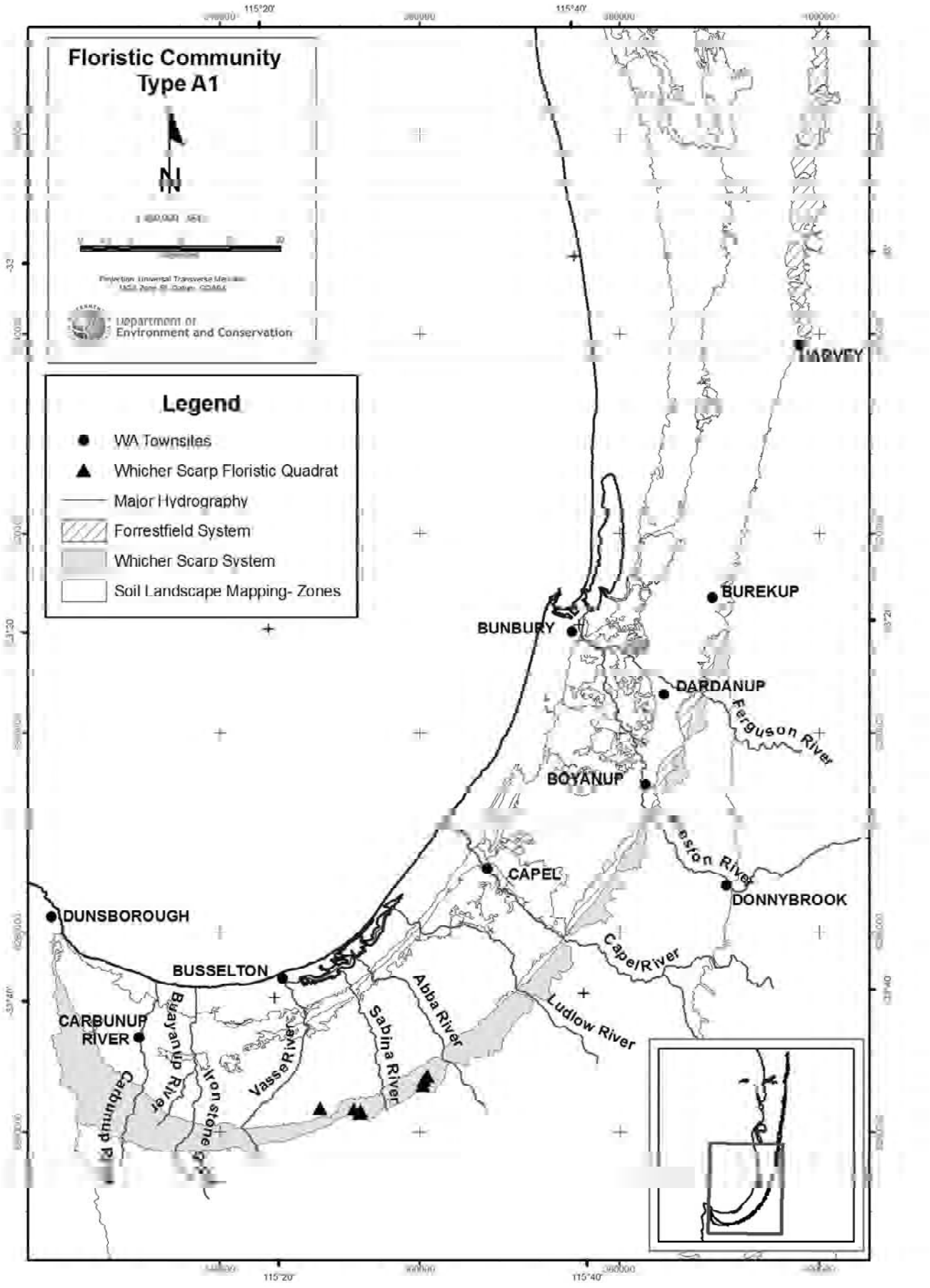
Other common (50-75%) and dominant (≥40%) taxa:

Xylomelum occidentale	71.4	*Adenanthos obovatus*	71.4	* *Hypochaeris glabra*	Herb	71.4
		Leucopogon sp. Whicher Range (G.J. Keighery 11763) PN	71.4	*Phlebocarya ciliata*	Herb	71.4
				Phlebocarya filifolia	Herb	71.4
		Podocarpus drouynianus	71.4	*Xanthosia huegelii* subsp. *huegelii* MS	Herb	71.4
		Acacia extensa	57.1			
		Acacia pulchella	57.1	*Drosera pallida*	Herb	57.1
		Conospermum capitatum subsp. *glabratum*	57.1	*Elythranthera brunonis*	Herb	57.1
				Goodenia coerulea	Herb	57.1
		Gompholobium capitatum	57.1	*Pyrorchis nigricans*	Herb	57.1
		Hibbertia cunninghamii	57.1	*Lepidosperma squamatum*	Sedge	71.4
		Jacksonia sp. Whicher (G.J. Keighery 9953)	57.1	*Loxocarya cinerea*	Sedge	57.1
				Lyginia barbata	Sedge	57.1
		Philotheca spicata	57.1			
		Pimelea rosea subsp. *rosea*	57.1			
		Ricinocarpos aff. *cyanescens* (A. Webb sn 27 October 2003)	57.1			

Other dominant (≥40%) taxa:
Banksia grandis

Vegetation layers:
1.6 (R = 1 - 2) 2.0 (R = 1 - 3) 0.1 (Grass); 0.3 (Herb); 0.6 (Sedge)

Mean native taxa:	63.6	(SD = 9.7;	R = 49 – 79)
Mean weed taxa:	1.3	(SD = 1.4;	R = 0 – 4)
Mean vegetation condition:	2.25	(	R = 1.50 - 2.75)
Number of quadrats:	7		
Quadrat codes:	ACTN01, SABI07, SABI08, SABI09, SABI12, WH04, WH06		


Floristic Community Type A1
N
Department of Environment and Conservation
Legend
WA Townsites
Whicher Scarp Floristic Quadrat
Major Hydrography
Forrestfield System
Whicher Scarp System
Soil Landscape Mapping- Zones
HARVEY
BUREKUP
BUNBURY
DARDANUP
Ferguson River
BOYANUP
CAPEL
DONNYBROOK
DUNSBOROUGH
BUSSELTON
CARBUNUP RIVER
Abba River
Ludlow River
Sabina River
Vasse River
Ironstone Gully
115°20'
115°40'

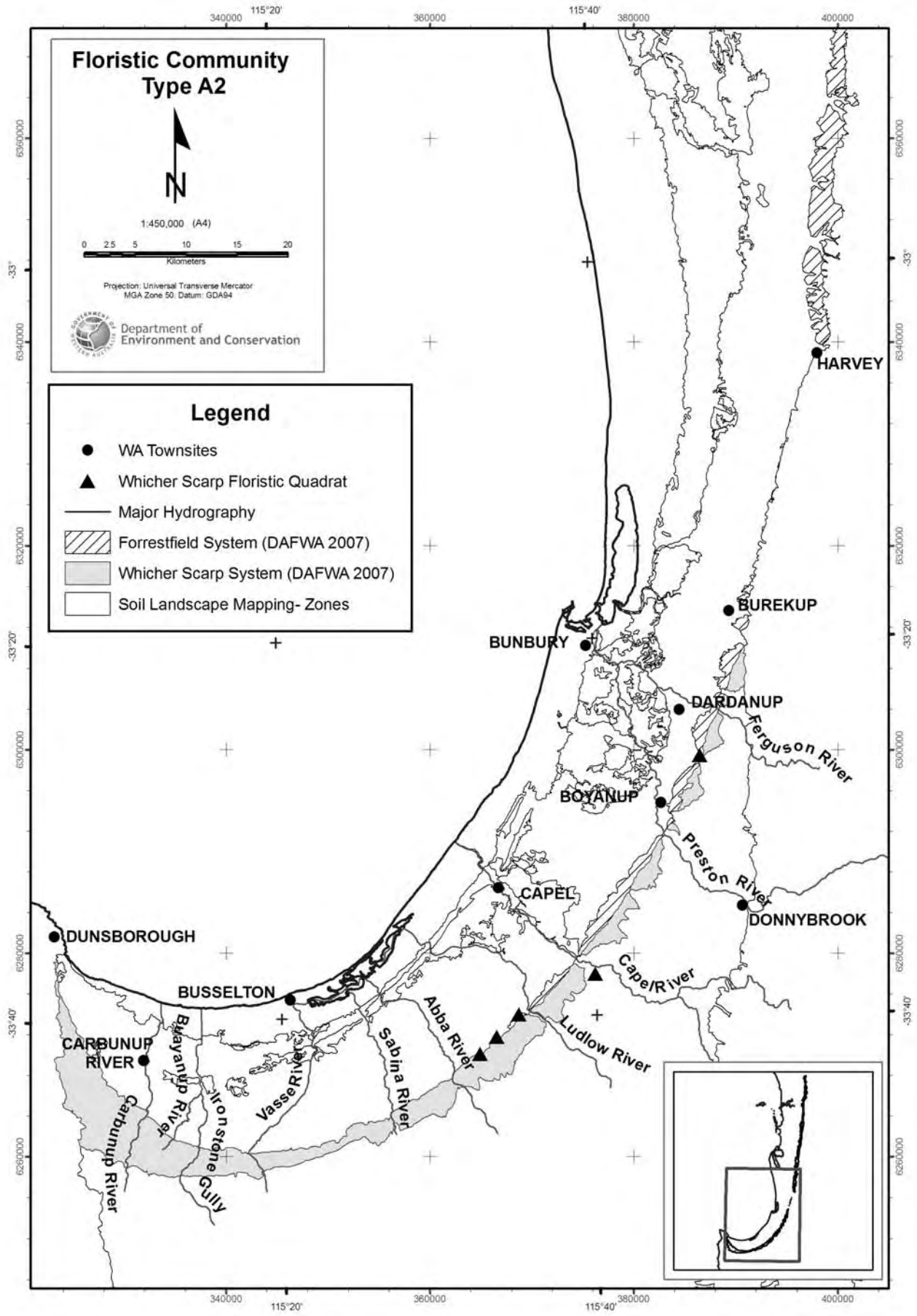
Community Type: A2 - North Whicher Scarp Jarrah and Woody Pear woodland

TREES		SHRUBS			GRASSES/HERBS/SEDGES		
Typical (>75%) and dominant (≥40%) taxa:							
Xylomelum occidentale	100	*Acacia extensa*	100	*	*Hypochaeris glabra*	Herb	100
Eucalyptus marginata subsp. *marginata*	80	*Adenanthos meisneri*	100		*Lomandra hermaphrodita*	Herb	100
		Bossiaea eriocarpa	100		*Millotia myosotidifolia*	Herb	100
		Dryandra lindleyana	100		*Dampiera linearis*	Herb	80
		Hibbertia hypericoides	100		*Dasypogon bromeliifolius*	Herb	80
		Hibbertia vaginata	100		*Drosera erythrorhiza*	Herb	80
		Hovea trisperma	100		*Drosera pallida*	Herb	80
		Hypocalymma robustum	100		*Levenhookia pusilla*	Herb	80
		Melaleuca thymoides	100		*Lindsaea linearis*	Herb	80
		Philotheca spicata	100		*Lomandra nigricans*	Herb	80
		Acacia pulchella	80		*Lomandra sericea*	Herb	80
		Stirlingia latifolia	80		*Rhodanthe citrina*	Herb	80
					Trachymene pilosa	Herb	80
					Tricoryne elatior	Herb	80
					Xanthosia huegelii subsp. *huegelii* MS	Herb	80
					Desmocladus fasciculatus	Sedge	100
					Mesomelaena tetragona	Sedge	100
					Tetraria octandra	Sedge	100
Other common (50-75%) and dominant (≥40%) taxa:							
Banksia attenuata	60	*Acacia stenoptera*	60	*	*Aira caryophyllea*	Grass	60
Eucalyptus calophylla	60	*Baeckea camphorosmae*	60		*Caladenia flava*	Herb	60
Eucalyptus haematoxylon	60	*Calothamnus sanguineus*	60		*Elythranthera brunonis*	Herb	60
		Gompholobium capitatum	60		*Eriochilus dilatatus*	Herb	60
		Petrophile linearis	60		*Lomandra preissii*	Herb	60
		Sphaerolobium medium	60		*Phyllangium paradoxum*	Herb	60
					Siloxerus humifusus	Herb	60
					Stylidium schoenoides	Herb	60
					Thysanotus thyrsoideus	Herb	60
					Anarthria prolifera	Sedge	60
					Centrolepis aristata	Sedge	60
					Hypolaena exsulca	Sedge	60
					Lepidosperma squamatum	Sedge	60
Other dominant (≥40%) taxa:							
Banksia grandis					*Phlebocarya ciliata*	Herb	

Vegetation layers:

1.6 (R = 1 - 2)	2.2 (R = 1 - 3)	0 (Grass); 0.6 (Herb); 0.4 (Sedge)

Mean native taxa:	79.6	(SD = 12.9;	R = 61 - 97)
Mean weed taxa:	3.4	(SD = 2.3;	R = 1 - 7)
Mean vegetation condition:	2.00	(	all 2.00)
Number of quadrats:	5		
Quadrat codes:	DARP02, GOOD02, OATES-1, UCL06, WONN-2		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Projection: Universal Transverse Mercator
MGA Zone 50. Datum: GDA94
Department of Environment and Conservation
Legend
WA Townsites
Whicher Scarp Floristic Quadrat
Major Hydrography
Forrestfield System (DAFWA 2007)
Whicher Scarp System (DAFWA 2007)
Soil Landscape Mapping- Zones
HARVEY
BUREKUP
BUNBURY
DARDANUP
Ferguson River
BOYANUP
Preston River
CAPEL
DONNYBROOK
DUNSBOROUGH
Capel River
BUSSELTON
Abba River
Ludlow River
Sabina River
CARBUNUP RIVER
Vasse River
Ironstone Gully
Carbunup River
340000
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115°20'
115°40'
-33°
-33°20'
-33°40'
6360000
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6280000
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Community Type: A3 - North Whicher Scarp Banksia and Woody Pear woodland

Typical (>75%) and dominant (≥40%) taxa:

TREES		SHRUBS			GRASSES/HERBS/SEDGES		
Xylomelum occidentale	100	*Acacia extensa*	100		*Caladenia flava*	Herb	100
		Bossiaea eriocarpa	100		*Dasypogon bromeliifolius*	Herb	100
		Gompholobium knightianum	100		*Drosera erythrorhiza*	Herb	100
		Hibbertia hypericoides	100		*Lomandra hermaphrodita*	Herb	100
		Hypocalymma robustum	100		*Trachymene pilosa*	Herb	100
		Melaleuca thymoides	100		*Anarthria prolifera*	Sedge	100
		Petrophile linearis	100		*Hypolaena exsulca*	Sedge	100
		Xanthorrhoea preissii	100				

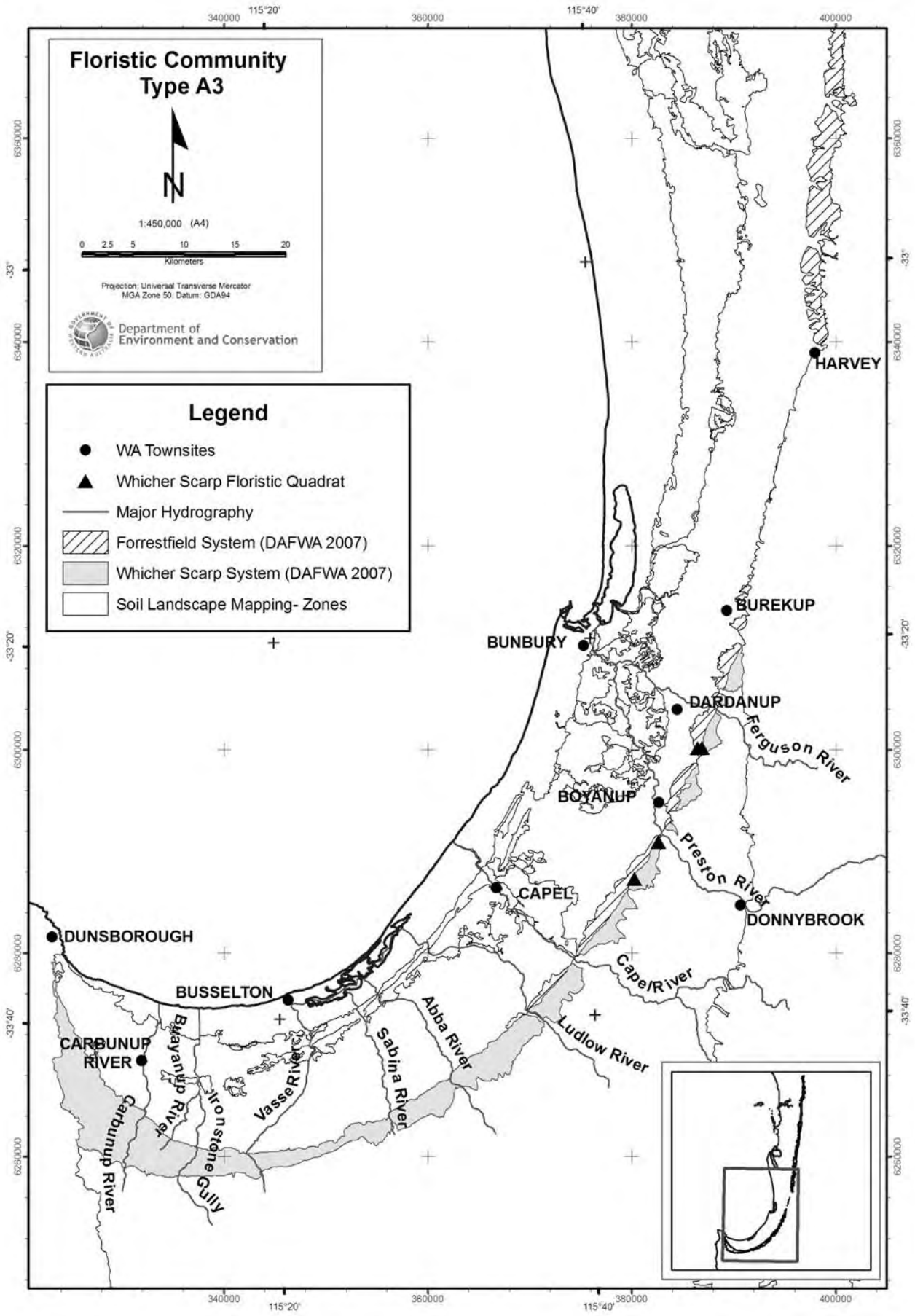
Other common (50-75%) and dominant (≥40%) taxa:

Banksia attenuata	75	*Adenanthos meisneri*	75	*	*Briza maxima*	Grass	50
Banksia grandis	75	*Dryandra lindleyana*	75		*Burchardia congesta*	Herb	75
Eucalyptus marginata subsp. *marginata*	50	*Gompholobium confertum*	75		*Cassytha glabella*	Herb	75
		Hovea trisperma	75		*Chamaescilla corymbosa*	Herb	75
Nuytsia floribunda	50	*Pimelea rosea* subsp. *rosea*	75		*Drosera pallida*	Herb	75
		Acacia applanata	50	*	*Hypochaeris glabra*	Herb	75
		Acacia pulchella	50		*Lechenaultia biloba*	Herb	75
		Acacia stenoptera	50		*Lomandra sericea*	Herb	75
		Adenanthos barbiger	50		*Patersonia occidentalis*	Herb	75
		Boronia dichotoma	50		*Pterostylis nana*	Herb	75
		Boronia spathulata	50		*Xanthosia huegelii* subsp. *huegelii* MS	Herb	75
		Conostephium pendulum	50		*Caladenia attingens* subsp. *attingens*	Herb	50
		Daviesia physodes	50		*Cassytha racemosa*	Herb	50
		Gompholobium capitatum	50		*Eriochilus dilatatus*	Herb	50
		Gompholobium preissii	50		*Isotropis cuneifolia* subsp. *cuneifolia*	Herb	50
		Hibbertia cunninghamii	50		*Johnsonia acaulis*	Herb	50
		Hibbertia racemosa	50		*Lagenophora huegelii*	Herb	50
		Hibbertia vaginata	50		*Levenhookia pusilla*	Herb	50
		Persoonia longifolia	50		*Lomandra nigricans*	Herb	50
		Philotheca spicata	50		*Microtis media*	Herb	50
		Stirlingia latifolia	50		*Patersonia umbrosa* var. *xanthina*	Herb	50
		Tetratheca hispidissima	50		*Phlebocarya ciliata*	Herb	50
		Xanthorrhoea gracilis	50		*Platysace tenuissima*	Herb	50
					Scaevola calliptera	Herb	50
					Stylidium brunonianum	Herb	50
					Desmocladus fasciculatus	Sedge	50
					Desmocladus flexuosus	Sedge	50
					Lepidosperma squamatum	Sedge	50
					Lepidosperma tenue	Sedge	50
					Tetraria capillaris	Sedge	50
					Tetraria octandra	Sedge	50

Vegetation layers:

1.3 (R = 1 - 2)	2.0 (R = 1 - 3)	0 (Grass); 0.8 (Herb); 0 (Sedge)

Mean native taxa:	62.5	(SD = 7.5;	R = 52 - 68)
Mean weed taxa:	2.8	(SD = 2.6;	R = 0 - 5)
Mean vegetation condition:	2.44	(	R = 2.00 - 3.75)
Number of quadrats:	4		
Quadrat codes:	DARP06, DARP07, GAV01, GWINDR01		


Floristic Community Type A3
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Kilometers
Projection: Universal Transverse Mercator
MGA Zone 50. Datum: GDA94
Department of Environment and Conservation
Legend
WA Townsites
Whicher Scarp Floristic Quadrat
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Forrestfield System (DAFWA 2007)
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Soil Landscape Mapping- Zones
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BUREKUP
BUNBURY
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Ferguson River
BOYANUP
Preston River
CAPEL
DONNYBROOK
DUNSBOROUGH
Capel River
BUSSELTON
Abba River
Ludlow River
CARBUNUP RIVER
Sabina River
Vasse River
Ironstone Gully
Carbunup River
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-33°
-33°20'
-33°40'

Community Type: A4 - Whicher Scarp *Banksia grandis*, Jarrah and Marri woodland

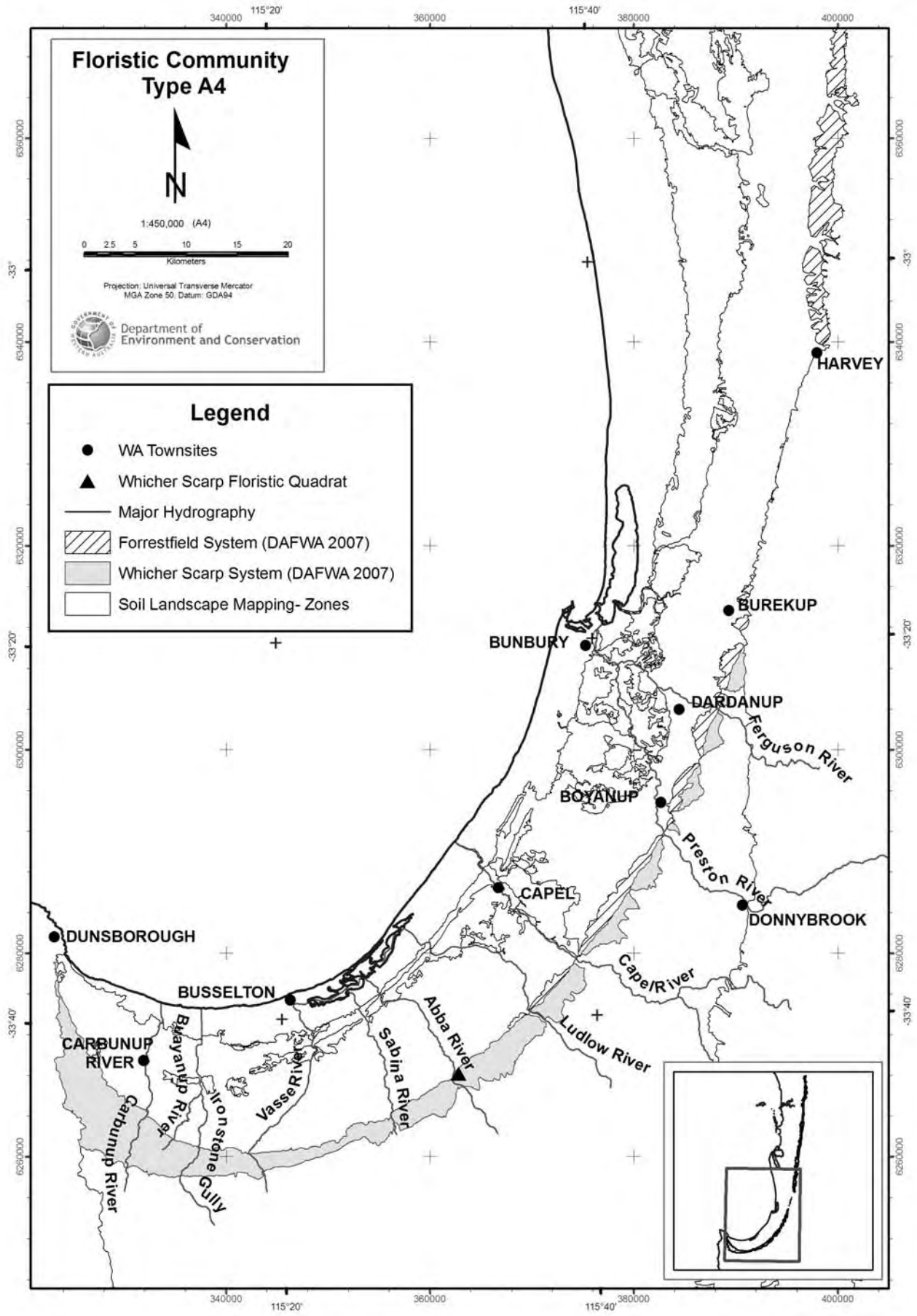
Typical (>75%) and dominant (≥40%) taxa:

TREES		SHRUBS			GRASSES/HERBS/SEDGES		
Banksia attenuata	100	*Acacia pulchella*	100		*Amphipogon amphipogonoides*	Grass	100
Banksia grandis	100	*Acacia tetragonocarpa*	100		*Dampiera linearis*	Herb	100
Eucalyptus calophylla	100	*Adenanthos meisneri*	100		*Dasypogon bromeliifolius*	Herb	100
Eucalyptus marginata subsp. *marginata*	100	*Boronia ramosa* subsp. *ramosa*	100	*	*Disa bracteata*	Herb	100
Xylomelum occidentale	100	*Bossiaea eriocarpa*	100		*Drosera stolonifera*	Herb	100
		Calytrix leschenaultii	100		*Eriochilus dilatatus*	Herb	100
		Daviesia divaricata subsp. *divaricata* MS	100		*Haemodorum spicatum*	Herb	100
		Daviesia preissii	100	*	*Hypochaeris glabra*	Herb	100
		Gompholobium confertum	100		*Isotropis cuneifolia* subsp. *cuneifolia*	Herb	100
		Grevillea trifida	100		*Johnsonia lupulina*	Herb	100
		Hemiandra pungens	100		*Levenhookia pusilla*	Herb	100
		Hibbertia aurea	100		*Lobelia rhombifolia*	Herb	100
		Hibbertia cunninghamii	100		*Logania serpyllifolia* subsp. *angustifolia*	Herb	100
		Hibbertia hypericoides	100		*Lomandra hermaphrodita*	Herb	100
		Hypocalymma robustum	100		*Lomandra sericea*	Herb	100
		Isopogon sphaerocephalus	100		*Patersonia juncea*	Herb	100
		Jacksonia sp. Whicher (G.J. Keighery 9953)	100		*Patersonia occidentalis*	Herb	100
		Kunzea rostrata	100		*Patersonia umbrosa* var. *xanthina*	Herb	100
		Leucopogon pendulus	100		*Pentapeltis peltigera*	Herb	100
		Macrozamia riedlei	100		*Phyllangium paradoxum*	Herb	100
		Melaleuca thymoides	100		*Platysace compressa*	Herb	100
		Persoonia longifolia	100		*Scaevola calliptera*	Herb	100
		Persoonia saccata	100		*Stylidium amoenum* var. *amoenum*	Herb	100
		Petrophile linearis	100		*Stylidium repens*	Herb	100
		Pultenaea ochreata	100		*Thelymitra graminea*	Herb	100
		Styphelia tenuiflora	100		*Thysanotus sparteus*	Herb	100
		Synaphea aff. *petiolaris* (BJ Keighery and N Gibson 37)	100		*Tripterococcus brunonis*	Herb	100
		Synaphea whicherensis	100		*Xanthosia ciliata*	Herb	100
		Xanthorrhoea preissii	100		*Anarthria laevis*	Sedge	100
					Cyathochaeta avenacea	Sedge	100
					Desmocladus fasciculatus	Sedge	100
					Desmocladus flexuosus	Sedge	100
					Hypolaena exsulca	Sedge	100
					Lepidosperma squamatum	Sedge	100
					Schoenus efoliatus	Sedge	100
					Tetraria octandra	Sedge	100

Vegetation layers:

2.0	1.0	0 (Grass); 0 (Herb); 1.0 (Sedge)

Mean native taxa:	68.0
Mean weed taxa:	2.0
Mean vegetation condition:	2.50
Number of quadrats:	1
Quadrat codes:	will02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MGA Zone 50; Datum: GDA94
Department of Environment and Conservation
Legend
WA Townsites
Whicher Scarp Floristic Quadrat
Major Hydrography
Forrestfield System (DAFWA 2007)
Whicher Scarp System (DAFWA 2007)
Soil Landscape Mapping- Zones
HARVEY
BUREKUP
BUNBURY
DARDANUP
Ferguson River
BOYANUP
Preston River
CAPEL
DONNYBROOK
DUNSBOROUGH
Capel River
BUSSELTON
Abba River
Ludlow River
CARBUNUP RIVER
Sabina River
Vasse River
Ironstone Gully
Carbunup River
340000
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115°20'
115°40'
-33°
-33°20'
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Community Type: A5 - Central/North Whicher Scarp Mountain Marri woodland

Typical (>75%) and dominant (≥40%) taxa:

TREES		SHRUBS		GRASSES/HERBS/SEDGES		
Eucalyptus haematoxylon	100.0	*Xanthorrhoea preissii*	100.0	*Drosera pallida*	Herb	100.0
Eucalyptus marginata subsp. *marginata*	83.3	*Acacia stenoptera*	83.3	*Burchardia congesta*	Herb	83.3
		Adenanthos barbiger	83.3	*Levenhookia pusilla*	Herb	83.3
		Dryandra lindleyana	83.3	*Lomandra caespitosa*	Herb	83.3
		Hibbertia hypericoides	83.3	*Lomandra hermaphrodita*	Herb	83.3
		Pericalymma ellipticum	83.3	*Lomandra sericea*	Herb	83.3
		Philotheca spicata	83.3	*Phyllangium paradoxum*	Herb	83.3
		Stirlingia latifolia	83.3	*Stylidium amoenum* var. *amoenum*	Herb	83.3
				Desmocladus fasciculatus	Sedge	100.0
				Hypolaena exsulca	Sedge	83.3
				Mesomelaena tetragona	Sedge	83.3
				Tetraria octandra	Sedge	83.3

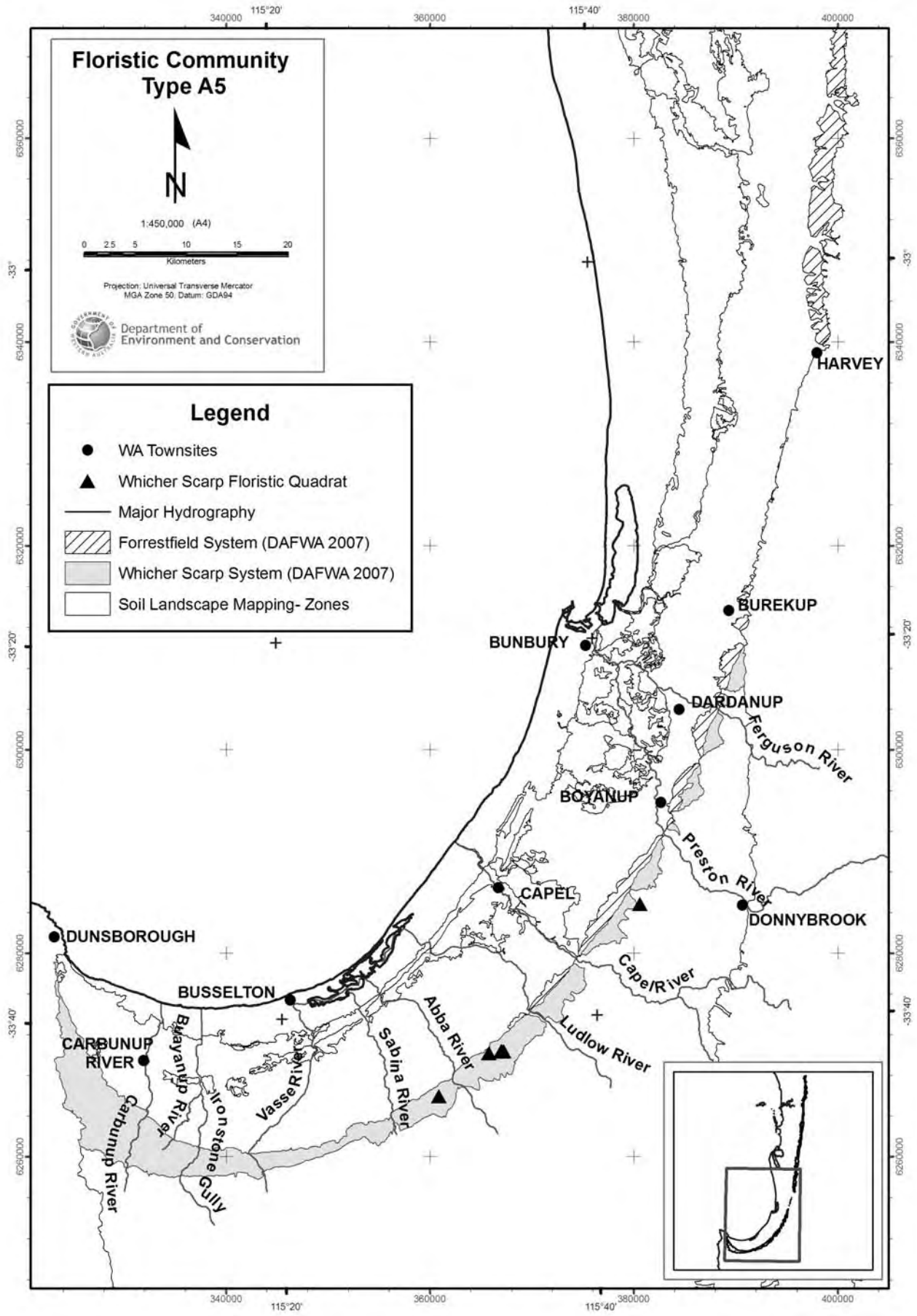
Other common (50-75%) and dominant (≥40%) taxa:

Nuytsia floribunda	50.0	*Acacia extensa*	66.7	*Amphipogon laguroides*	Grass	50.0
Xylomelum occidentale	50.0	*Acacia pulchella*	66.7	*Tetrarrhena laevis*	Grass	50.0
		Boronia defoliata	66.7	*Chamaescilla corymbosa* var. *corymbosa*	Herb	66.7
		Calothamnus sanguineus	66.7	*Conostylis setigera* subsp. *setigera*	Herb	66.7
		Dasypogon hookeri	66.7	*Hydrocotyle pilifera*	Herb	66.7
		Gompholobium knightianum	66.7	* *Hypochaeris glabra*	Herb	66.7
		Hibbertia diamesogenos MS	66.7	*Pentapeltis peltigera*	Herb	66.7
		Astroloma pallidum	50.0	*Stylidium calcaratum*	Herb	66.7
		Bossiaea pulchella	50.0	*Stylidium repens*	Herb	66.7
		Gompholobium capitatum	50.0	*Trachymene pilosa*	Herb	66.7
		Gompholobium confertum	50.0	*Dampiera linearis*	Herb	50.0
		Grevillea trifida	50.0	*Drosera glanduligera*	Herb	50.0
		Hypocalymma robustum	50.0	*Drosera menziesii* subsp. *menziesii*	Herb	50.0
		Kingia australis	50.0	*Elythranthera brunonis*	Herb	50.0
		Kunzea rostrata	50.0	*Haemodorum spicatum*	Herb	50.0
		Leucopogon sp. Margaret River (J. Scott 207) PN	50.0	*Patersonia occidentalis*	Herb	50.0
		Synaphea whicherensis	50.0	*Patersonia umbrosa* var. *xanthina*	Herb	50.0
				Scaevola calliptera	Herb	50.0
				Xanthosia ciliata	Herb	50.0
				Xanthosia huegelii subsp. *huegelii* MS	Herb	50.0
				Centrolepis aristata	Sedge	66.7
				Lepidosperma squamatum	Sedge	66.7
				Tetraria capillaris	Sedge	66.7
				Anarthria prolifera	Sedge	50.0
				Aphelia cyperoides	Sedge	50.0
				Lepyrodia macra	Sedge	50.0

Vegetation layers:

1.3 (R = 1 - 2)	2.3 (R = 2 - 3)	0 (Grass); 0.5 (Herb); 0.7 (Sedge)

Mean native taxa:	74.3	(SD = 8.7;	R = 65 - 89)
Mean weed taxa:	1.7	(SD = 1.6;	R = 0 - 4)
Mean vegetation condition:	2.13	(	R = 1.50 – 3.00)
Number of quadrats:	6		
Quadrat codes:	DAVE03, UCL01, UCL02, UCL03, WH02, will04		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Projection: Universal Transverse Mercator
MGA Zone 50; Datum: GDA94
Department of Environment and Conservation
Legend
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BUREKUP
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Ludlow River
Sabina River
CARBUNUP RIVER
Vasse River
Ironstone Gully
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Community Type: B1 - Swan Coastal Plain/North Whicher Scarp *Banksia attenuata* woodland

Typical (>75%) and dominant (≥40%) taxa:

TREES		SHRUBS			GRASSES/HERBS/SEDGES		
Banksia attenuata	85.7	*Melaleuca thymoides*	100.0		*Austrostipa compressa*	Grass	81.0
		Petrophile linearis	95.2		*Dasypogon bromeliifolius*	Herb	95.2
		Bossiaea eriocarpa	90.5		*Burchardia congesta*	Herb	90.5
		Hibbertia hypericoides	90.5		*Phlebocarya ciliata*	Herb	90.5
		Conostephium pendulum	85.7		*Lomandra hermaphrodita*	Herb	85.7
		Philotheca spicata	81.0		*Trachymene pilosa*	Herb	85.7
		Hibbertia vaginata	76.2		*Xanthosia huegelii* subsp. *huegelii* MS	Herb	85.7
				*	*Hypochaeris glabra*	Herb	81.0
					Chamaescilla corymbosa var. *corymbosa*	Herb	76.2
					Patersonia occidentalis	Herb	76.2
					Lyginia barbata	Sedge	90.5
					Hypolaena exsulca	Sedge	85.7

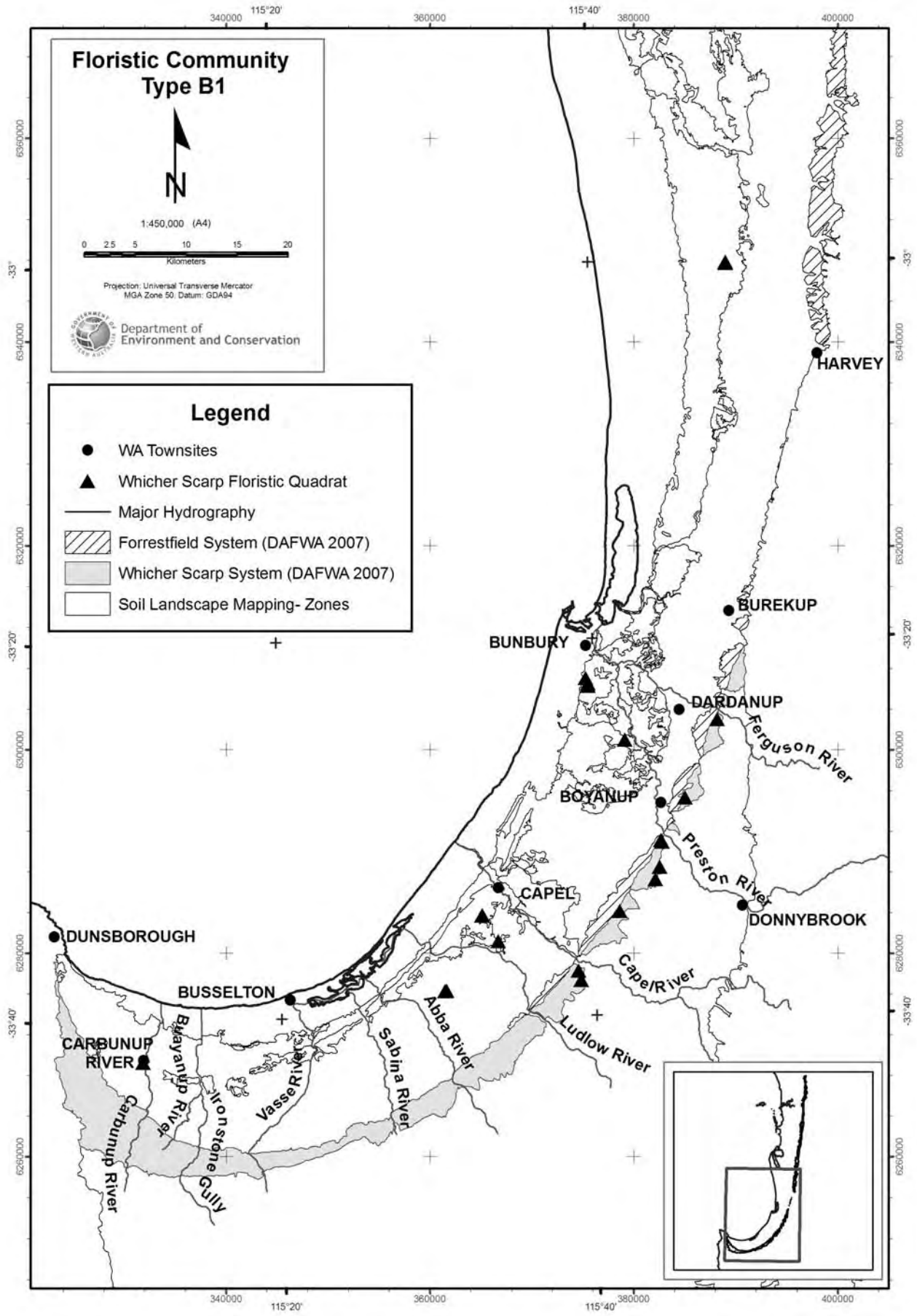
Other common (50-75%) and dominant (≥40%) taxa:

		Gompholobium tomentosum	71.4	*	*Briza maxima*	Grass	57.1
		Leucopogon conostephioides	71.4		*Caladenia flava*	Herb	57.1
		Stirlingia latifolia	71.4		*Drosera menziesii* subsp. *penicillaris*	Herb	57.1
		Hypocalymma robustum	66.7		*Lomandra caespitosa*	Herb	52.4
		Jacksonia sp. Whicher (G.J. Keighery 9953)	66.7		*Pyrorchis nigricans*	Herb	61.9
		Acacia pulchella	61.9		*Lepidosperma squamatum*	Sedge	61.9
		Calytrix flavescens	57.1				
		Hovea trisperma	57.1				
		Adenanthos meisneri	52.4				

Vegetation layers:

1.2 (R = 1 - 2)	2.1 (R = 1 – 3)	0.1 (Grass); 0.8 (Herb); 0.5 (Sedge)

Mean native taxa:	55.6	(SD = 9.8;	R = 44 - 79)
Mean weed taxa:	2.9	(SD = 2.4;	R = 0 - 8)
Mean vegetation condition:	2.21	(	R = 1.00 - 3.50)
Number of quadrats:	21		
Quadrat codes:	boyan 01, buffer01, CAPEL-1, CAPEL-2, CARB-3, Chid01, Chid02, dard02, GAV05, gibson01, GWINDR02, GWINDR03, HAPP02, kelly02, MANEA-3, MGK03, MGK04, Plant03, R116702, RUAB-1, RUAB-2		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Kilometers
Projection: Universal Transverse Mercator
MGA Zone 50. Datum: GDA94
Department of Environment and Conservation
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CARBUNUP RIVER
Sabina River
Vasse River
Ironstone Gully
Carbunup River
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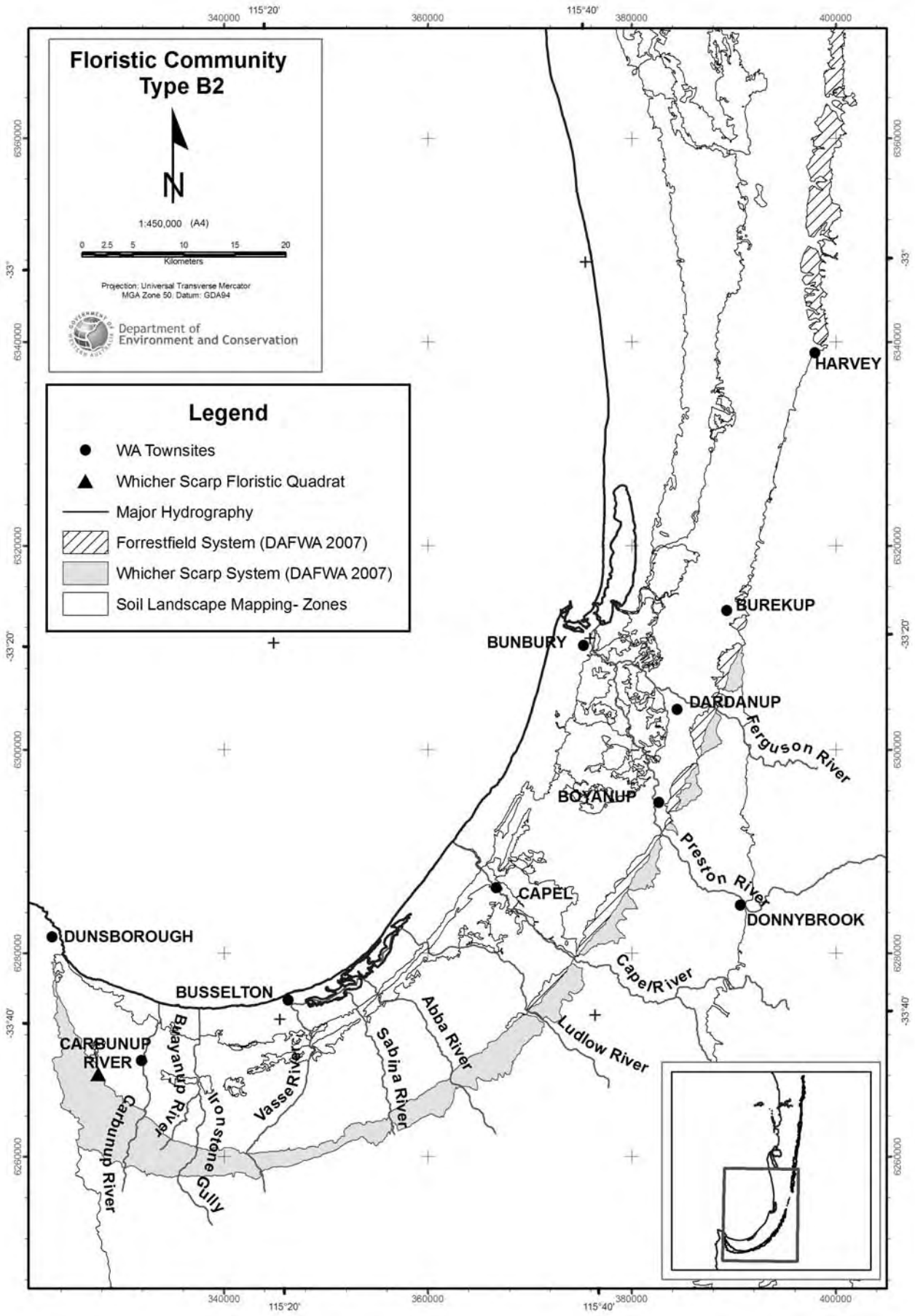
Community Type: B2 - West Whicher Scarp *Banksia attenuata* woodland

TREES		SHRUBS		GRASSES/HERBS/SEDGES		
Typical (>75%) and dominant (≥40%) taxa:						
Agonis flexuosa var. *flexuosa*	100	*Bossiaea praetermissa*	100	* *Aira caryophyllea*	Grass	100
Allocasuarina fraseriana	100	*Calytrix flavescens*	100	* *Briza maxima*	Grass	100
Banksia attenuata	100	*Gompholobium tomentosum*	100	*Burchardia congesta*	Herb	100
Xylomelum occidentale	100	*Hibbertia hypericoides*	100	*Caladenia flava*	Herb	100
		Hovea stricta	100	*Chamaescilla corymbosa* var. *corymbosa*	Herb	100
		Hypocalymma robustum	100			
		Kunzea rostrata	100	*Drosera erythrorhiza*	Herb	100
		Petrophile linearis	100	*Drosera pallida*	Herb	100
				Elythranthera brunonis	Herb	100
				* *Hypochaeris glabra*	Herb	100
				Lagenophora huegelii	Herb	100
				Levenhookia pusilla	Herb	100
				Lomandra hermaphrodita	Herb	100
				Millotia myosotidifolia	Herb	100
				Patersonia umbrosa var. *xanthina*	Herb	100
				Phyllangium paradoxum	Herb	100
				Pyrorchis nigricans	Herb	100
				Stylidium neurophyllum MS	Herb	100
				Thysanotus patersonii	Herb	100
				Trachymene pilosa	Herb	100
				Aphelia cyperoides	Sedge	100
				Desmocladus fasciculatus	Sedge	100
				Hypolaena exsulca	Sedge	100
				Lepidosperma squamatum	Sedge	100
				Schoenus curvifolius	Sedge	100
				Tetraria capillaris	Sedge	100

Vegetation layers:

2.0	1.0	0 (Grass); 0 (Herb); 0 (Sedge)

Mean native taxa:	34.0
Mean weed taxa:	3.0
Mean vegetation condition:	3.00
Number of quadrats:	1
Quadrat codes:	CHAM03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Kilometers
Projection: Universal Transverse Mercator
MGA Zone 50. Datum: GDA94
Department of Environment and Conservation
Legend
WA Townsites
Whicher Scarp Floristic Quadrat
Major Hydrography
Forrestfield System (DAFWA 2007)
Whicher Scarp System (DAFWA 2007)
Soil Landscape Mapping- Zones
HARVEY
BUREKUP
BUNBURY
DARDANUP
Ferguson River
BOYANUP
Preston River
CAPEL
DONNYBROOK
DUNSBOROUGH
Capel River
BUSSELTON
Abba River
Ludlow River
CARBUNUP RIVER
Sabina River
Vasse River
Ironstone Gully
Carbunup River
340000
360000
380000
400000
115°20'
115°40'
6360000
6340000
6320000
6300000
6280000
6260000
-33°
-33°20'
-33°40'

Community Type: C1 - Central Whicher Scarp Jarrah woodland

Typical (>75%) and dominant (≥40%) taxa:

TREES		SHRUBS		GRASSES/HERBS/SEDGES		
Eucalyptus marginata subsp. *marginata*	100	*Dryandra lindleyana*	100	*Dampiera linearis*	Herb	100
Banksia grandis	80	*Hibbertia hypericoides*	100	*Pentapeltis peltigera*	Herb	100
		Adenanthos barbiger	90	*Lomandra hermaphrodita*	Herb	90
		Gompholobium knightianum	90	*Patersonia umbrosa* var. *xanthina*	Herb	90
		Hibbertia cunninghamii	90			
		Hibbertia glomerata	90	*Lomandra sericea*	Herb	80
		Hovea trisperma	90	*Mesomelaena tetragona*	Sedge	90
		Xanthorrhoea gracilis	90	*Tetraria octandra*	Sedge	90
		Bossiaea ornata	80	*Desmocladus fasciculatus*	Sedge	80
		Dasypogon hookeri	80			
		Hakea amplexicaulis	80			
		Isopogon sphaerocephalus	80			

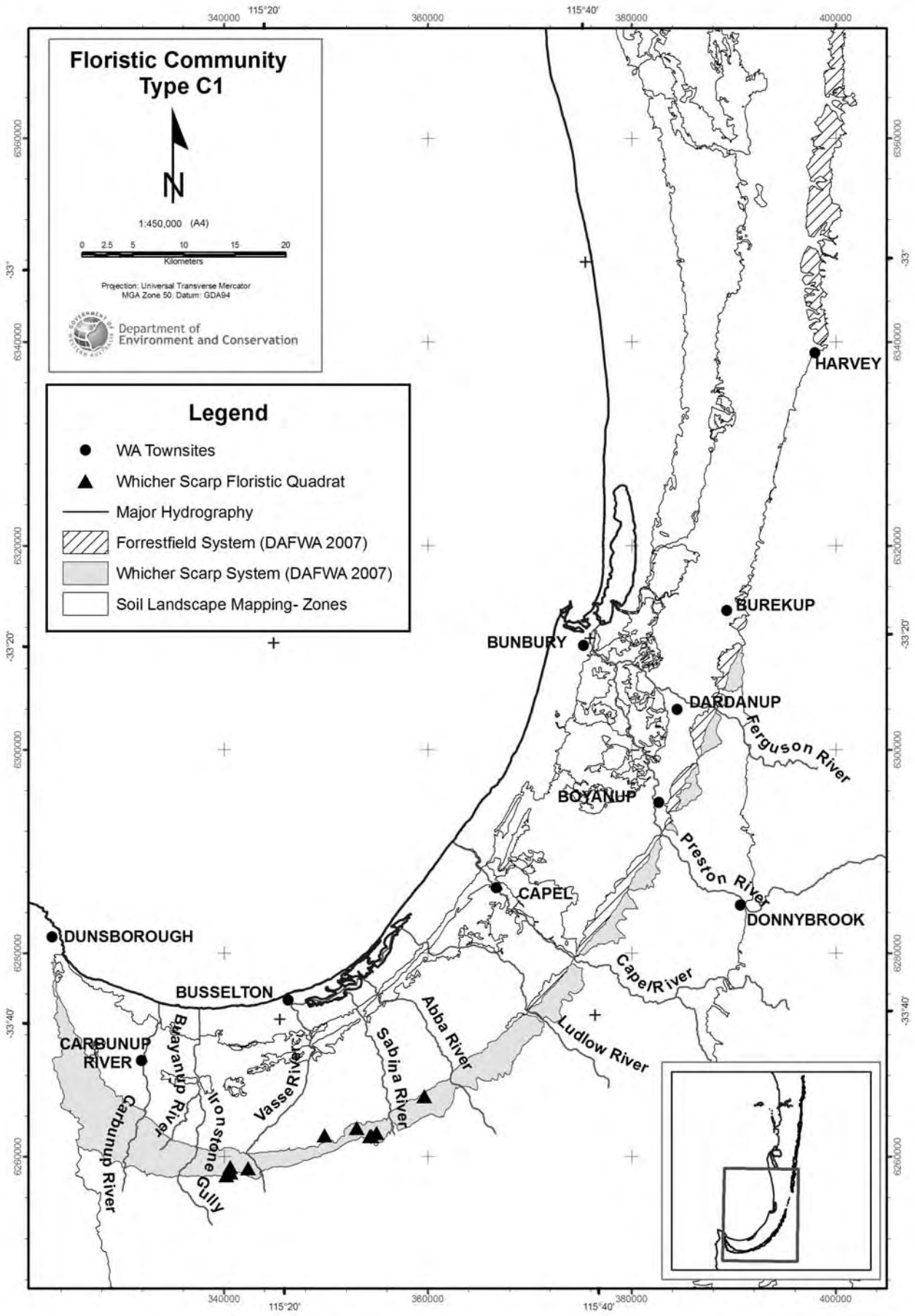
Other common (50-75%) and dominant (≥40%) taxa:

Eucalyptus haematoxylon	60	*Gompholobium polymorphum*	70	*Chamaescilla corymbosa* var. *corymbosa*	Herb	70
Xylomelum occidentale	50	*Hibbertia quadricolor*	70			
		Kingia australis	70	*Conostylis setigera* subsp. *setigera*	Herb	70
		Labichea punctata	70			
		Philotheca spicata	70	*Burchardia congesta*	Herb	60
		Calothamnus sanguineus	60	*Stylidium amoenum* var. *amoenum*	Herb	60
		Hypocalymma robustum	60			
		Xanthorrhoea preissii	60	*Agrostocrinum hirsutum*	Herb	50
		Boronia crenulata	50	*Lomandra sonderi*	Herb	50
		Hakea cyclocarpa	50	*Pterostylis recurva*	Herb	50
		Hibbertia diamesogenos MS	50	*Anarthria prolifera*	Sedge	70
		Hovea chorizemifolia	50	*Lepidosperma squamatum*	Sedge	60
		Sphaerolobium medium	50	*Cyathochaeta equitans*	Sedge	50
		Tetratheca hirsuta	50	*Hypolaena exsulca*	Sedge	50
				Loxocarya cinerea	Sedge	50
				Tetraria capillaris	Sedge	50

Vegetation layers:

1.6 (R = 1 - 2)	2.2 (R = 2 - 3)	0 (Grass); 0.6 (Herb); 0.9 (Sedge)

Mean native taxa:	66.9	(SD = 8.5;	R = 53 - 78)
Mean weed taxa:	0.6	(SD = 1.6;	R = 0 - 5)
Mean vegetation condition:	1.85	(	R = 1.00 - 2.75)
Number of quadrats:	10		
Quadrat codes:	ACTN02, GOUL01, kemp01, SABI10, SABI11, smith03, TREE02, TREE03, TREE04, wicher01		


Floristic Community Type C1
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Kilometers
Projection: Universal Transverse Mercator
MGA Zone 50. Datum: GDA94
Department of Environment and Conservation
Legend
WA Townsites
Whicher Scarp Floristic Quadrat
Major Hydrography
Forrestfield System (DAFWA 2007)
Whicher Scarp System (DAFWA 2007)
Soil Landscape Mapping- Zones
HARVEY
BUREKUP
BUNBURY
DARDANUP
Ferguson River
BOYANUP
Preston River
CAPEL
DONNYBROOK
DUNSBOROUGH
Capel River
BUSSELTON
Abba River
Ludlow River
CARBUNUP RIVER
Sabina River
Vasse River
Ironstone Gully
Carbunup River
340000
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115°20'
115°40'
6360000
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-33°
-33°20'
-33°40'

Community Type: C2 - Whicher Scarp Jarrah woodland of deep coloured sands

Typical (>75%) and dominant (≥40%) taxa:

TREES		SHRUBS		GRASSES/HERBS/SEDGES		
Eucalyptus marginata subsp. *marginata*	100.0	*Gompholobium knightianum*	100.0	*Burchardia congesta*	Herb	100.0
		Hibbertia hypericoides	100.0	*Lomandra hermaphrodita*	Herb	100.0
		Dryandra lindleyana	87.5	*Lomandra sericea*	Herb	100.0
		Hibbertia cunninghamii	87.5	*Chamaescilla corymbosa* var. *corymbosa*	Herb	87.5
		Hovea trisperma	87.5			
		Labichea punctata	87.5	*Conostylis setigera* subsp. *setigera*	Herb	87.5
				Patersonia umbrosa var. *xanthina*	Herb	87.5
				Desmocladus fasciculatus	Sedge	100.0
				Lepidosperma squamatum	Sedge	87.5
				Tetraria octandra	Sedge	87.5

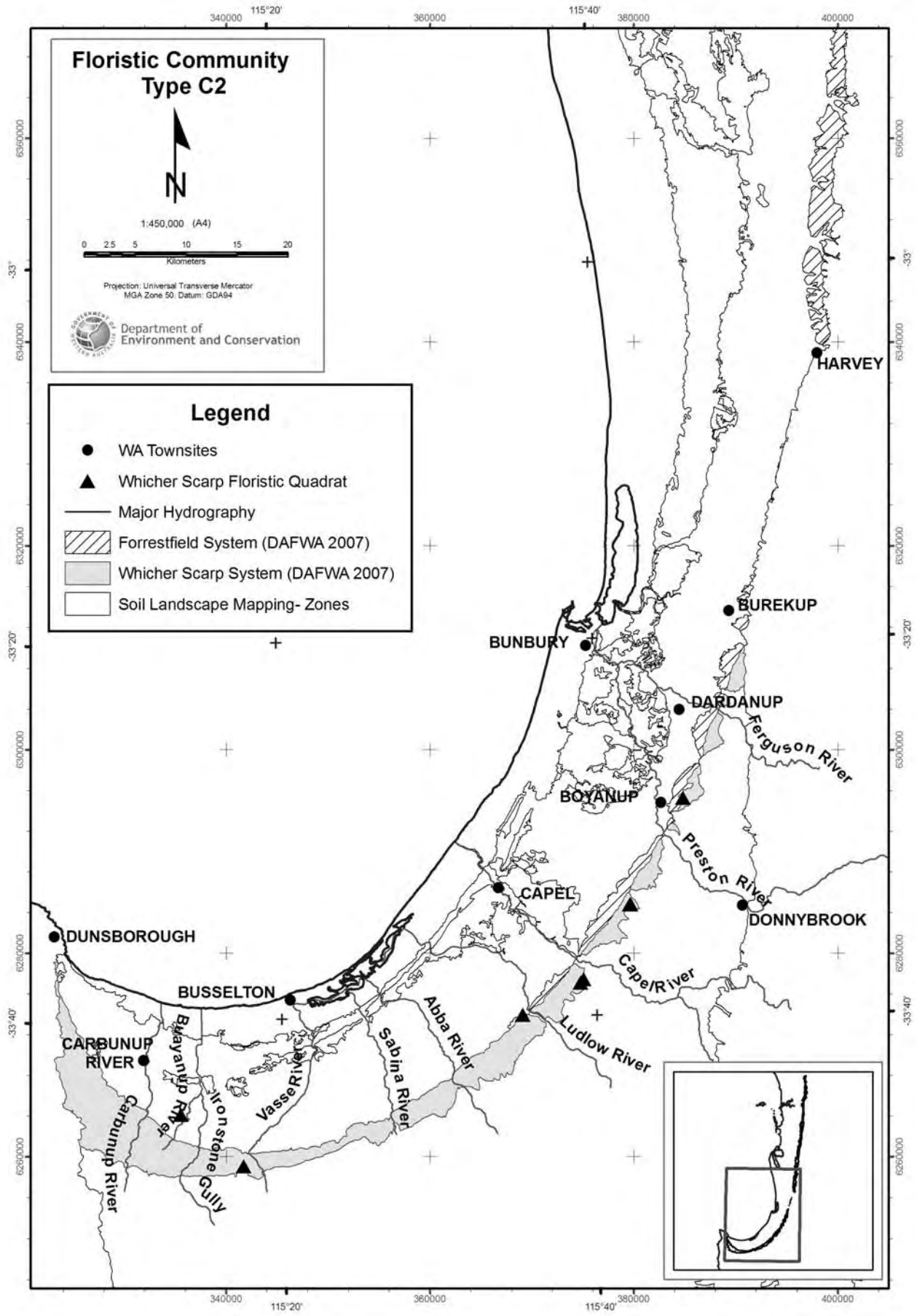
Other common (50-75%) and dominant (≥40%) taxa:

Banksia grandis	62.5	*Acacia extensa*	75.0	*Amphipogon amphipogonoides*	Grass	50.0
Eucalyptus haematoxylon	62.5	*Adenanthos barbiger*	75.0	*Dampiera linearis*	Herb	75.0
Xylomelum occidentale	62.5	*Hypocalymma robustum*	75.0	*Stylidium amoenum* var. *amoenum*	Herb	75.0
		Acacia stenoptera	62.5	*Pentapeltis peltigera*	Herb	62.5
		Dasypogon hookeri	62.5	*Drosera pallida*	Herb	50.0
		Gompholobium confertum	62.5	*Eriochilus dilatatus*	Herb	50.0
		Gompholobium preissii	62.5	*Lomandra sonderi*	Herb	50.0
		Grevillea trifida	62.5	*Anarthria prolifera*	Sedge	62.5
		Hibbertia acerosa	62.5	*Hypolaena exsulca*	Sedge	62.5
		Isopogon sphaerocephalus	62.5			
		Petrophile linearis	62.5			
		Stirlingia latifolia	62.5			
		Styphelia tenuiflora	62.5			
		Adenanthos meisneri	50.0			
		Billardiera variifolia	50.0			
		Boronia dichotoma	50.0			
		Daviesia divaricata subsp. *divaricata* MS	50.0			
		Gompholobium marginatum	50.0			
		Gompholobium polymorphum	50.0			
		Hakea ruscifolia	50.0			
		Hibbertia commutata	50.0			
		Hibbertia quadricolor	50.0			

Vegetation layers:

1.8 (R = 1 - 2)	2.0 (R = 1 - 3)	0 (Grass); 0.5 (Herb); 0.8 (Sedge)

Mean native taxa:	67.3	(SD = 6.3;	R = 60 - 74)
Mean weed taxa:	0.6	(SD = 0.7;	R = 0 - 2)
Mean vegetation condition:	1.97	(	R = 1.00 – 4.00)
Number of quadrats:	8		
Quadrat codes:	ACTON-1, BOYA01, DAVE01, DAVE02, gibson02, HAPP01, smith02, WONN-1		


Floristic Community Type C2
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Kilometers
Projection: Universal Transverse Mercator
MGA Zone 50. Datum: GDA94
Department of Environment and Conservation
Legend
WA Townsites
Whicher Scarp Floristic Quadrat
Major Hydrography
Forrestfield System (DAFWA 2007)
Whicher Scarp System (DAFWA 2007)
Soil Landscape Mapping- Zones
HARVEY
BUREKUP
BUNBURY
DARDANUP
Ferguson River
BOYANUP
Preston River
CAPEL
DONNYBROOK
DUNSBOROUGH
Capel River
BUSSELTON
Abba River
Ludlow River
CARBUNUP RIVER
Sabina River
Vasse River
Ironstone Gully
Carbunup River
340000
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115°20'
115°40'
6360000
6340000
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-33°
-33°20'
-33°40'

Community Type: C3 - Whicher Scarp Jarrah and Mountain Marri woodland on laterites

Typical (>75%) and dominant (≥40%) taxa:

TREES		SHRUBS		GRASSES/HERBS/SEDGES		
Eucalyptus marginata subsp. *marginata*	90.9	*Hibbertia cunninghamii*	100.0	*Lomandra sericea*	Herb	100.0
Eucalyptus haematoxylon	81.8	*Hibbertia hypericoides*	100.0	*Patersonia umbrosa* var. *xanthina*	Herb	90.9
		Hypocalymma robustum	100.0			
		Isopogon sphaerocephalus	100.0	*Xanthosia ciliata*	Herb	81.8
		Dryandra lindleyana	90.9	*Desmocladus fasciculatus*	Sedge	81.8
		Gompholobium knightianum	90.9	*Tetraria octandra*	Sedge	81.8
		Bossiaea ornata	81.8			
		Hakea amplexicaulis	81.8			
		Opercularia apiciflora	81.8			
		Xanthorrhoea gracilis	81.8			

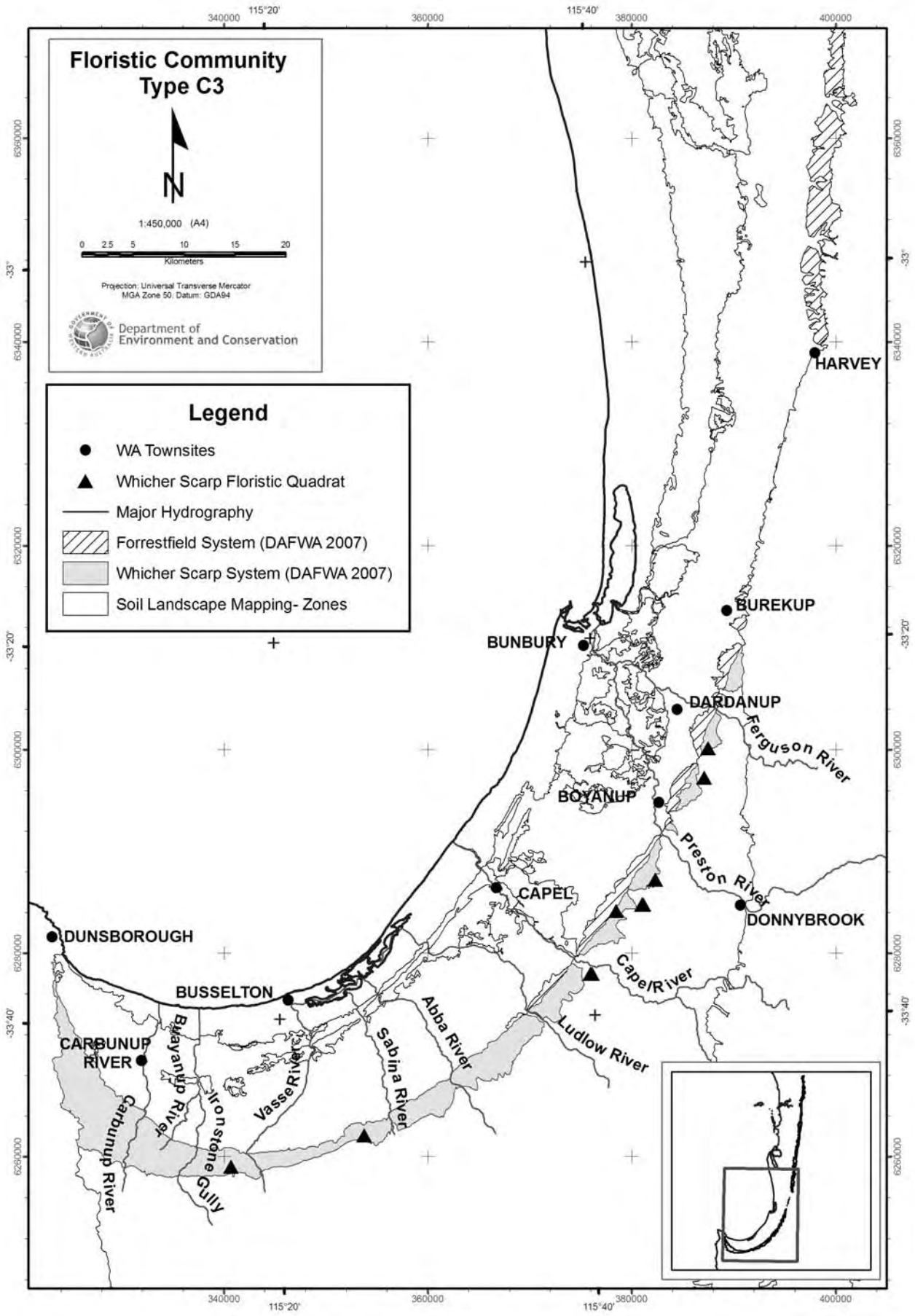
Other common (50-75%) and dominant (≥40%) taxa:

Banksia grandis	54.5	*Dryandra bipinnatifida* subsp. *multifida*	72.7	*Xanthosia huegelii* subsp. *huegelii* MS	Herb	72.7
		Persoonia longifolia	72.7	*Lechenaultia biloba*	Herb	63.6
		Styphelia tenuiflora	72.7	*Platysace tenuissima*	Herb	63.6
		Xanthorrhoea preissii	72.7	*Scaevola calliptera*	Herb	63.6
		Acacia extensa	63.6	*Conostylis setigera* subsp. *setigera*	Herb	54.5
		Adenanthos barbiger	63.6			
		Daviesia preissii	63.6	*Dampiera linearis*	Herb	54.5
		Hakea cyclocarpa	63.6	*Levenhookia pusilla*	Herb	54.5
		Hakea lissocarpha	63.6	*Lomandra hermaphrodita*	Herb	54.5
		Hibbertia commutata	63.6	*Patersonia babianoides*	Herb	54.5
		Hibbertia glomerata	63.6	*Pentapeltis peltigera*	Herb	54.5
		Hovea chorizemifolia	63.6	*Stylidium amoenum* var. *amoenum*	Herb	54.5
		Gompholobium preissii	54.5			
		Hibbertia diamesogenos MS	54.5	*Tetraria capillaris*	Sedge	63.6
		Marianthus tenuis	54.5			
		Tetratheca hirsuta	54.5			

Vegetation layers:

1.5 (R = 0 - 2)	2.2 (R = 0 - 3)	0.1 (Grass); 0.7 (Herb); 0.2 (Sedge)

Mean native taxa:	69.3	(SD = 7.2;	R = 60 - 81)
Mean weed taxa:	0.3	(SD = 0.5;	R = 0 - 1)
Mean vegetation condition:	1.84	(	R = 1.00 - 2.50)
Number of quadrats:	11		
Quadrat codes:	boyan 02, DARP08, DAVE04, DAVE05, DAVE06, GAV02, GOOD03, GOOD04, kelly01, TREE01, WH05		


Floristic Community Type C3
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Kilometers
Projection: Universal Transverse Mercator
MGA Zone 50. Datum: GDA94
Department of Environment and Conservation
Legend
WA Townsites
Whicher Scarp Floristic Quadrat
Major Hydrography
Forrestfield System (DAFWA 2007)
Whicher Scarp System (DAFWA 2007)
Soil Landscape Mapping- Zones
HARVEY
BUREKUP
BUNBURY
DARDANUP
Ferguson River
BOYANUP
Preston River
CAPEL
DONNYBROOK
DUNSBOROUGH
Capel River
BUSSELTON
Abba River
Ludlow River
CARBUNUP RIVER
Sabina River
Vasse River
Ironstone Gully
Carbunup River
340000
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400000
115°20'
115°40'
-33°
-33°20'
-33°40'
6360000
6340000
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6260000

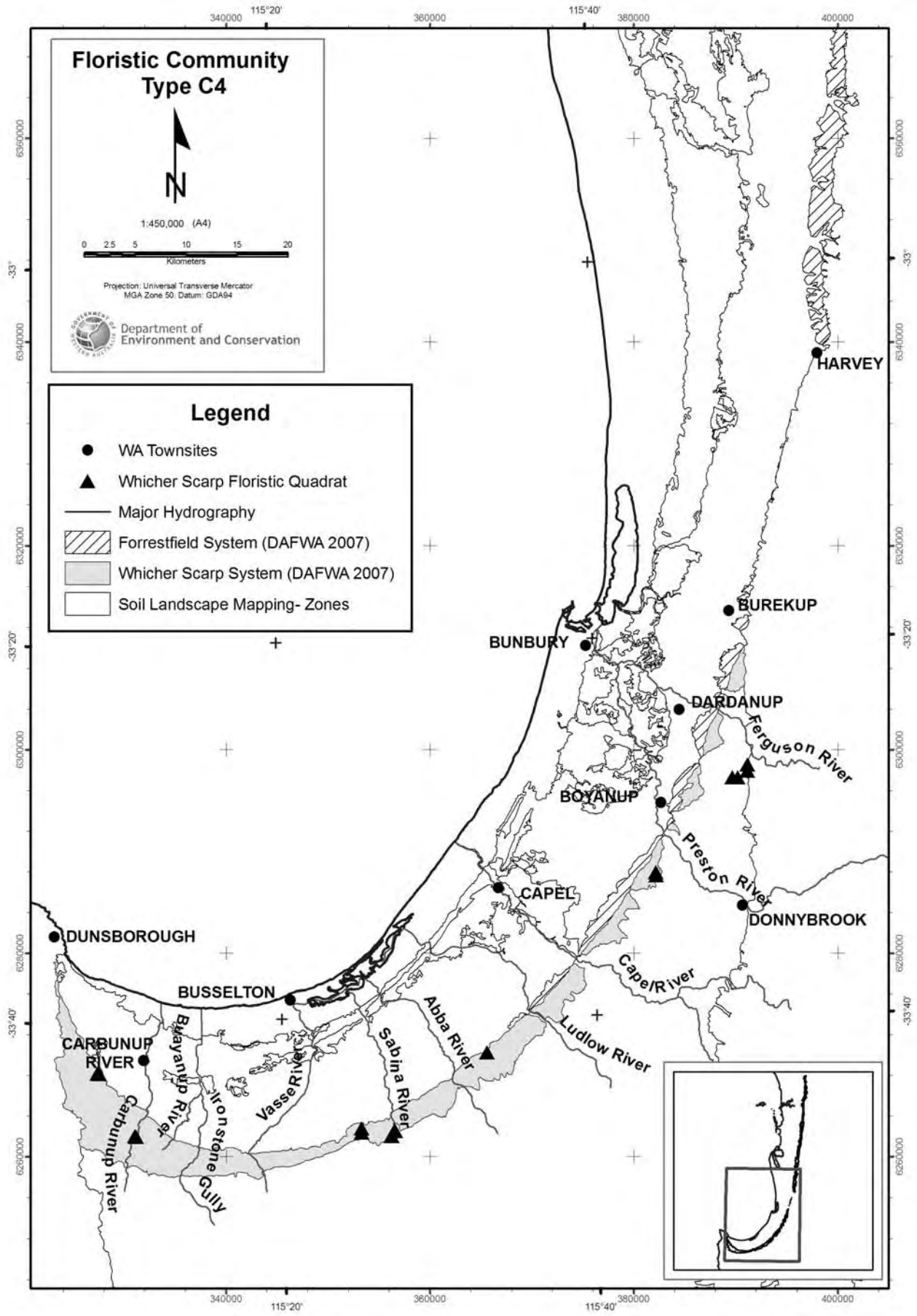
Community Type: C4 - Whicher Scarp/Blackwood Plateau Jarrah and Marri woodland

TREES		SHRUBS			GRASSES/HERBS/SEDGES		
Typical (>75%) and dominant (≥40%) taxa:							
Eucalyptus marginata subsp. *marginata*	100.0	*Hibbertia hypericoides*	94.1		*Tetrarrhena laevis*	Grass	76.5
Eucalyptus calophylla	94.1	*Xanthorrhoea preissii*	94.1		*Patersonia umbrosa* var. *xanthina*	Herb	94.1
		Acacia pulchella	82.4				
		Dryandra lindleyana	76.5		*Caladenia flava*	Herb	88.2
					Lomandra sericea	Herb	76.5
					Pentapeltis peltigera	Herb	76.5
					Platysace tenuissima	Herb	76.5
					Tetraria octandra	Sedge	100.0
					Tetraria capillaris	Sedge	76.5
Other common (50-75%) and dominant (≥40%) taxa:							
		Hibbertia cunninghamii	70.6		*Dampiera linearis*	Herb	70.6
		Hypocalymma robustum	70.6		*Lagenophora huegelii*	Herb	70.6
		Opercularia apiciflora	70.6		*Levenhookia pusilla*	Herb	70.6
		Hakea amplexicaulis	64.7		*Chamaescilla corymbosa* var. *corymbosa*	Herb	64.7
		Astroloma ciliatum	58.8				
		Philotheca spicata	58.8	*	*Hypochaeris glabra*	Herb	58.8
		Xanthorrhoea gracilis	58.8		*Lomandra hermaphrodita*	Herb	58.8
		Bossiaea ornata	52.9		*Stylidium calcaratum*	Herb	58.8
		Gompholobium knightianum	52.9		*Lechenaultia biloba*	Herb	52.9
		Hovea trisperma	52.9		*Desmocladus fasciculatus*	Sedge	64.7
		Hypocalymma angustifolium	52.9		*Mesomelaena tetragona*	Sedge	52.9
		Marianthus tenuis	52.9				

Vegetation layers:

1.4 (R = 0 - 2)	2.1 (R = 1 - 3)	0 (Grass); 0.7 (Herb); 0.6 (Sedge)

Mean native taxa:	66.2	(SD = 12.1;	R = 46 - 86)
Mean weed taxa:	2.8	(SD = 2.7;	R = 0 - 9)
Mean vegetation condition:	2.19	(	R = 1.25 – 3.00)
Number of quadrats:	17		
Quadrat codes:	CHAM01, CHAM02, DARP01, DARP03, DARP04, DARP05, GAV03, GAV04, GIBB02, GIBB06, GOUL02, SABI01, SABI02, SABI04, SABI06, UCL05, WH03		


Floristic Community Type C4
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Kilometers
Projection: Universal Transverse Mercator
MGA Zone 50. Datum: GDA94
Department of Environment and Conservation
Legend
WA Townsites
Whicher Scarp Floristic Quadrat
Major Hydrography
Forrestfield System (DAFWA 2007)
Whicher Scarp System (DAFWA 2007)
Soil Landscape Mapping- Zones
HARVEY
BUREKUP
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DARDANUP
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BUSSELTON
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Ludlow River
CARBUNUP RIVER
Sabina River
Vasse River
Ironstone Gully
Carbunup River
340000
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115°20'
115°40'
-33°
-33°20'
-33°40'
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6340000
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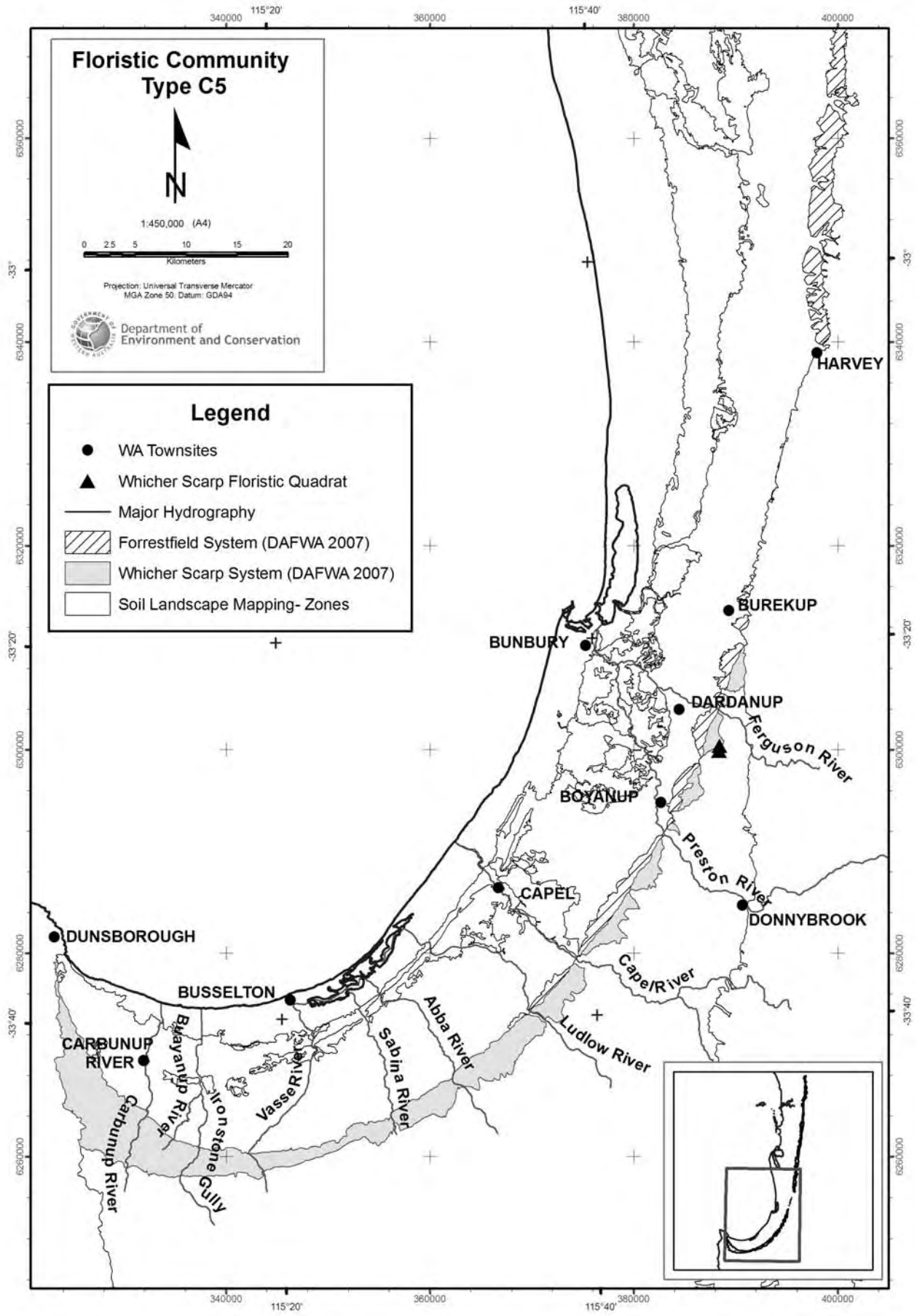
Community Type: C5 - Dardanup Jarrah and Mountain Marri woodland on laterite

TREES		SHRUBS		GRASSES/HERBS/SEDGES		
Typical (>75%) and dominant (≥40%) taxa:						
Eucalyptus haematoxylon	100	*Acacia varia* var. *varia*	100	*Amphipogon amphipogonoides*	Grass	100
Eucalyptus marginata subsp. *marginata*	100	*Andersonia heterophylla*	100			
		Boronia spathulata	100	*Agrostocrinum hirsutum*	Herb	100
		Calothamnus sanguineus	100	*Dampiera linearis*	Herb	100
		Dryandra armata var. *armata*	100	*Johnsonia lupulina*	Herb	100
		Dryandra lindleyana	100	*Lechenaultia biloba*	Herb	100
		Hakea cyclocarpa	100	*Levenhookia pusilla*	Herb	100
		Hemigenia incana	100	*Logania serpyllifolia* subsp. *angustifolia*	Herb	100
		Hibbertia commutata	100			
		Hibbertia cunninghamii	100	*Lomandra whicherensis*	Herb	100
		Hibbertia diamesogenos MS	100	*Lomandra spartea*	Herb	100
		Hibbertia hypericoides	100	*Patersonia babianoides*	Herb	100
		Hovea trisperma	100	*Patersonia juncea*	Herb	100
		Hypocalymma robustum	100	*Patersonia occidentalis*	Herb	100
		Isopogon sphaerocephalus	100	*Patersonia umbrosa* var. *xanthina*	Herb	100
		Olax benthamiana	100			
		Paragonis grandiflora MS	100	*Scaevola calliptera*	Herb	100
		Sphaerolobium medium	100	*Cyathochaeta avenacea*	Sedge	100
		Xanthorrhoea acanthostachya	100	*Lepidosperma squamatum*	Sedge	100
				Lepyrodia macra	Sedge	100
Other dominant (≥40%) taxa:						
		Gastrolobium whicherense	50	*Lomandra* spp.	Herb	
		Hakea stenocarpa	50			
		Lambertia multiflora var. *darlingensis*	50			
Vegetation layers:						
2.0 (all 2)		2.0 (all 2)		0 (Grass); 0.5 (Herb); 0 (Sedge)		

Mean native taxa:	72.0	(SD = 11.3;	R = 64 - 80)
Mean weed taxa:	0.0	(SD = 0;	all 0)
Mean vegetation condition:	1.50	(	R = 1.00 – 2.00)
Number of quadrats:	2		
Quadrat codes:	dard01, dard03		


Floristic Community Type C5
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Kilometers
Projection: Universal Transverse Mercator
MGA Zone 50. Datum: GDA94
Department of Environment and Conservation
Legend
WA Townsites
Whicher Scarp Floristic Quadrat
Major Hydrography
Forrestfield System (DAFWA 2007)
Whicher Scarp System (DAFWA 2007)
Soil Landscape Mapping- Zones
HARVEY
BUREKUP
BUNBURY
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Ferguson River
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Capel River
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Abba River
Ludlow River
CARBUNUP RIVER
Sabina River
Vasse River
Ironstone Gully
Carbunup River
340000
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115°40'
6360000
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-33°40'

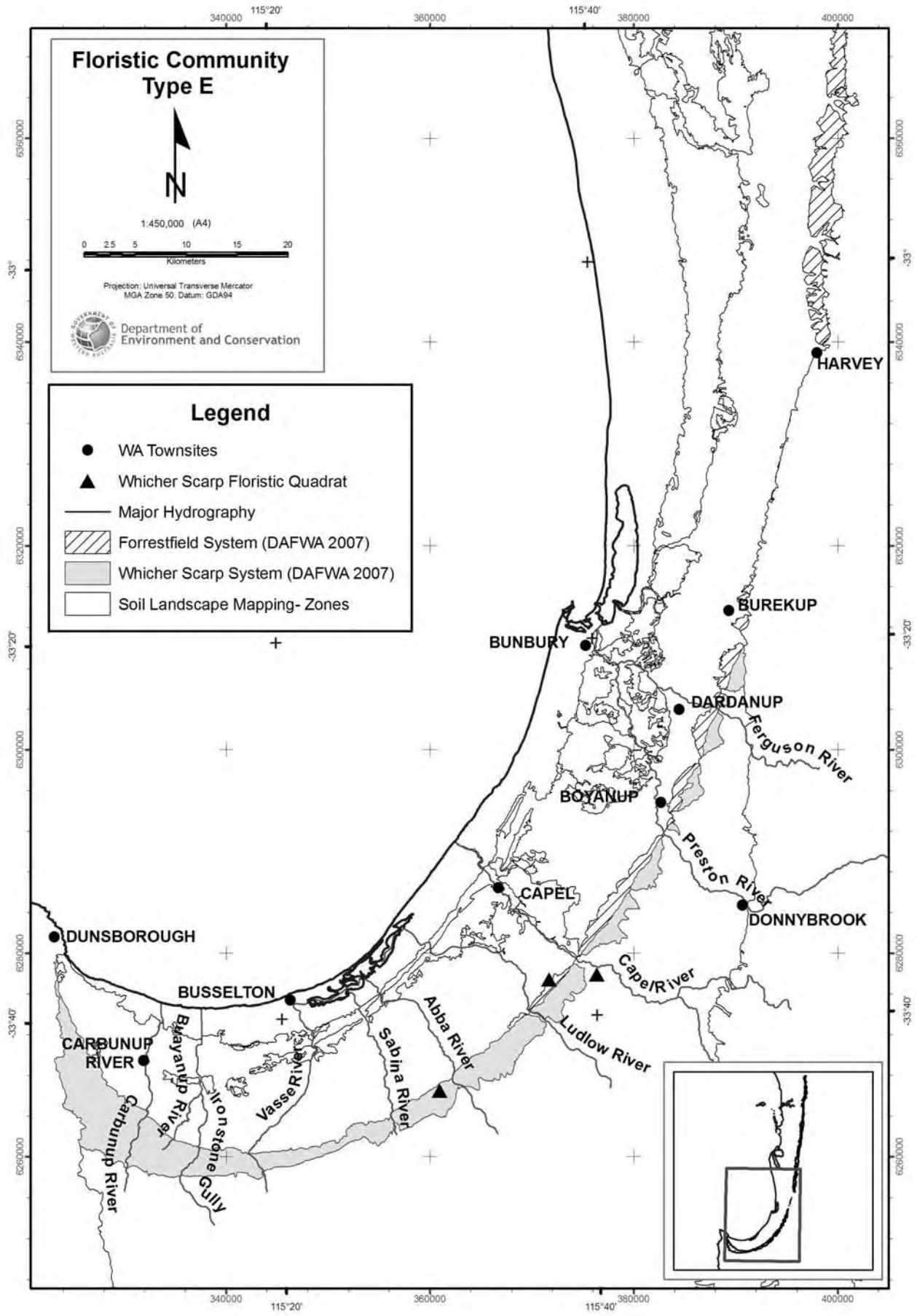
Community Type: E - Jarrah and Marri woodland wetland type 1

TREES		SHRUBS			GRASSES/HERBS/SEDGES		
Typical (>75%) and <u>dominant (≥40%)</u> taxa:							
Eucalyptus marginata subsp. *marginata*	100.0	*Xanthorrhoea preissii*	100.0		*Dampiera linearis*	Herb	100.0
					Dasypogon bromeliifolius	Herb	100.0
					Drosera glanduligera	Herb	100.0
				*	*Hypochaeris glabra*	Herb	100.0
				*	*Lotus angustissimus*	Herb	100.0
					Stylidium calcaratum	Herb	100.0
					Xanthosia huegelii subsp. *huegelii* MS	Herb	100.0
					Aphelia cyperoides	Sedge	100.0
					Desmocladus fasciculatus	Sedge	100.0
					Hypolaena exsulca	Sedge	100.0
					Mesomelaena tetragona	Sedge	100.0
Other common (50-75%) and <u>dominant (≥40%)</u> taxa:							
Eucalyptus calophylla	66.7	*Acacia extensa*	66.7	*	*Aira caryophyllea*	Grass	66.7
		Acacia pulchella	66.7	*	*Anthoxanthum odoratum*	Grass	66.7
		Calothamnus lateralis	66.7	*	*Briza minor*	Grass	66.7
		Kunzea micrantha	66.7		*Baxteria australis*	Herb	66.7
		Pericalymma ellipticum	66.7		*Caesia occidentalis*	Herb	66.7
					Chamaescilla corymbosa var. *corymbosa*	Herb	66.7
					Drosera gigantea subsp. *geniculata*	Herb	66.7
					Drosera pulchella	Herb	66.7
					Hydrocotyle callicarpa	Herb	66.7
					Levenhookia pusilla	Herb	66.7
				*	*Parentucellia viscosa*	Herb	66.7
					Patersonia occidentalis	Herb	66.7
					Philydrella pygmaea subsp. *pygmaea*	Herb	66.7
					Phlebocarya ciliata	Herb	66.7
					Phyllangium paradoxum	Herb	66.7
					Podolepis gracilis	Herb	66.7
					Siloxerus humifusus	Herb	66.7
					Stylidium brunonianum	Herb	66.7
					Stylidium crassifolium	Herb	66.7
					Centrolepis aristata	Sedge	66.7
					Cyathochaeta avenacea	Sedge	66.7
					Schoenus subbulbosus	Sedge	66.7

Vegetation layers:

1.3 (R = 1 - 2)	1.7 (R = 1 - 2)	0.3 (Grass); 0.7 (Herb); 1.0 (Sedge)

Mean native taxa:	57.7	(SD = 5.7;	R = 53 - 64)
Mean weed taxa:	7.3	(SD = 4.7;	R = 2 - 11)
Mean vegetation condition:	2.75	(	R = 2.00 - 3.25)
Number of quadrats:	3		
Quadrat codes:	davies04, GOOD01, WH01		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N
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Kilometers
Projection: Universal Transverse Mercator
MGA Zone 50, Datum: GDA94
Department of Environment and Conservation
Legend
WA Townsites
Whicher Scarp Floristic Quadrat
Major Hydrography
Forrestfield System (DAFWA 2007)
Whicher Scarp System (DAFWA 2007)
Soil Landscape Mapping- Zones
HARVEY
BUREKUP
BUNBURY
DARDANUP
Ferguson River
BOYANUP
Preston River
CAPEL
DONNYBROOK
DUNSBOROUGH
BUSSELTON
Capel River
Abba River
Ludlow River
Sabina River
Vasse River
Ironstone Gully
Carbunup River
Bayanup River
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Community Type: F1 - Sabina River Jarrah and Marri woodland

Typical (>75%) and dominant (≥40%) taxa:

TREES		SHRUBS		GRASSES/HERBS/SEDGES		
Eucalyptus calophylla	100	*Astroloma ciliatum*	100	*Microlaena stipoides*	Grass	100
Eucalyptus marginata subsp. *marginata*	100	*Darwinia citriodora*	100	*Tetrarrhena laevis*	Grass	100
		Hovea elliptica	100	*Caesia micrantha*	Herb	100
		Hypocalymma angustifolium	100	*Clematis aristata* var. *occidentalis*	Herb	100
		Leucopogon verticillatus	100			
		Macrozamia riedlei	100	*Haemodorum laxum*	Herb	100
		Mirbelia dilatata	100	*Lagenophora huegelii*	Herb	100
		Tremandra diffusa	100	*Lomandra pauciflora*	Herb	100
		Tremandra stelligera	100	*Patersonia umbrosa* var. *xanthina*	Herb	100
		Trymalium floribundum subsp. *trifidum*	100	*Thelymitra macrophylla*	Herb	100
		Xanthorrhoea preissii	100	*Loxocarya cinerea*	Sedge	100
				Tetraria capillaris	Sedge	100

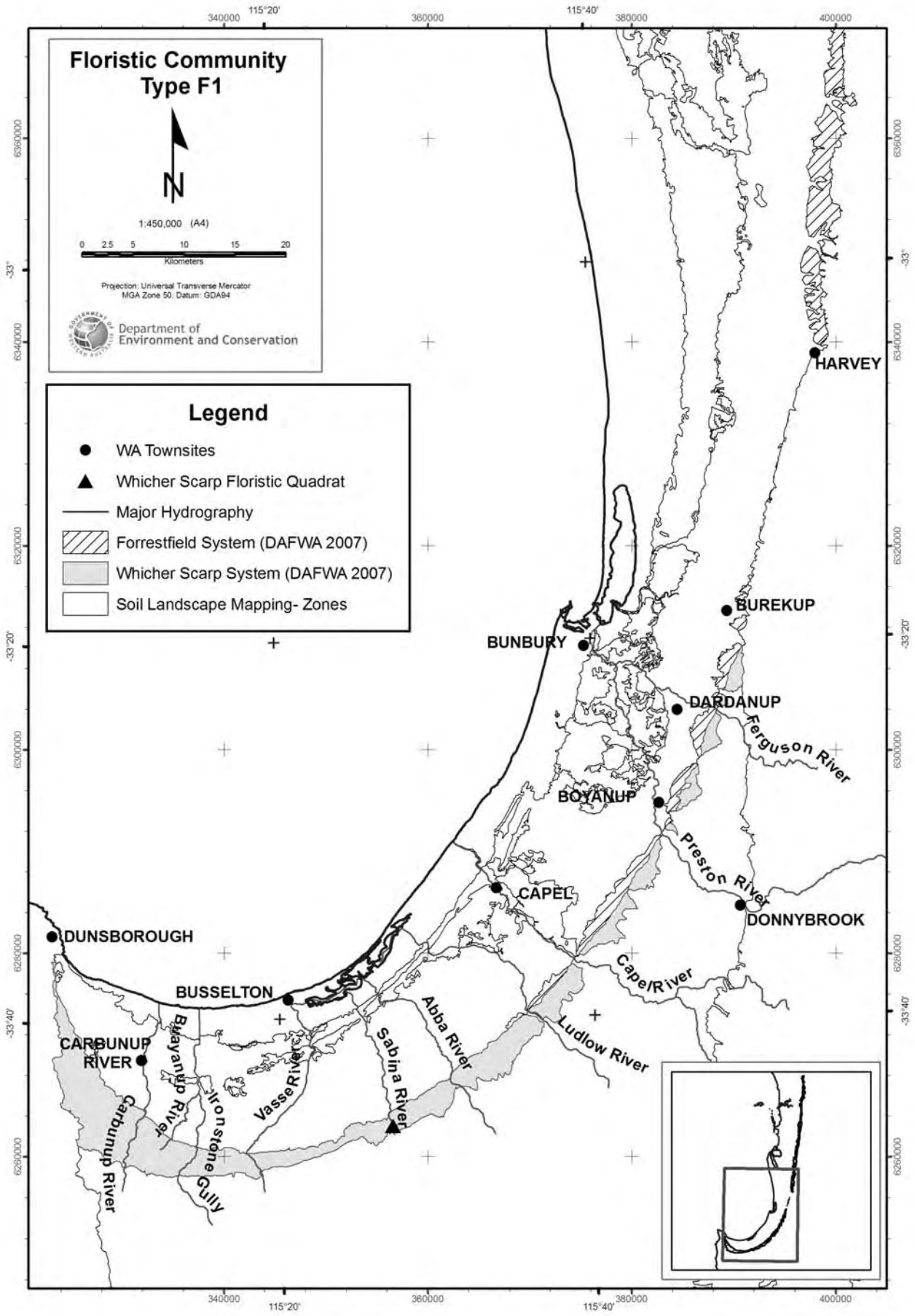
Other dominant (≥40%) taxa:

Hibbertia hypericoides	*Drosera stolonifera*	Herb
Lambertia rariflora	*Pteridium esculentum*	Herb
Podocarpus drouynianus		

Vegetation layers:

1.0 (all 1)	3.0 (all 3)	1.0 (Grass); 1.0 (Herb); 0.5 (Sedge)

Mean native taxa:	42.5	(SD = 0.7;	R = 42 - 43)
Mean weed taxa:	0.5	(SD = 0.7;	R = 0 - 1)
Mean vegetation condition:	1.75	(	R = 1.50 – 2.00)
Number of quadrats:	2		
Quadrat codes:	SABI03, SABI05		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Kilometers
Projection: Universal Transverse Mercator
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Department of Environment and Conservation
Legend
WA Townsites
Whicher Scarp Floristic Quadrat
Major Hydrography
Forrestfield System (DAFWA 2007)
Whicher Scarp System (DAFWA 2007)
Soil Landscape Mapping- Zones
HARVEY
BUREKUP
BUNBURY
DARDANUP
Ferguson River
BOYANUP
Preston River
CAPEL
DONNYBROOK
DUNSBOROUGH
Capel River
BUSSELTON
Abba River
Ludlow River
CARBUNUP RIVER
Sabina River
Vasse River
Ironstone Gully
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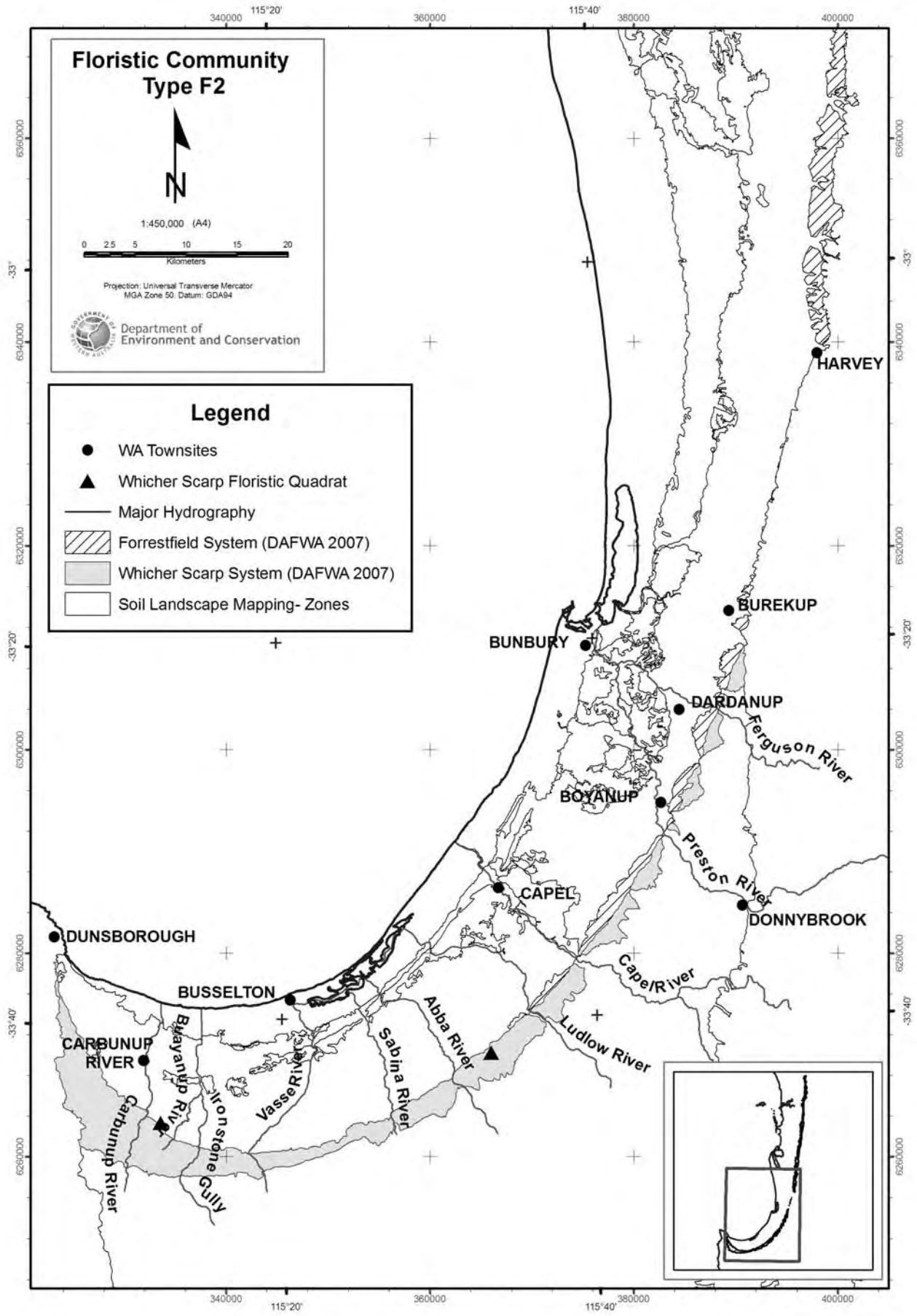
Community Type: F2 - Miscellaneous wetlands

TREES		SHRUBS			GRASSES/HERBS/SEDGES		
Typical (>75%) and dominant (≥40%) taxa:							
Eucalyptus calophylla	100	*Acacia divergens*	100		*Tetrarrhena laevis*	Grass	100
Eucalyptus marginata subsp. *marginata*	100	*Amperea simulans*	100		*Caladenia flava*	Herb	100
		Hibbertia cunninghamii	100		*Dampiera linearis*	Herb	100
		Marianthus tenuis	100	*	*Hypochaeris glabra*	Herb	100
		Opercularia apiciflora	100		*Kennedia coccinea*	Herb	100
		Taxandria linearifolia MS	100		*Lindsaea linearis*	Herb	100
		Xanthorrhoea preissii	100		*Lomandra caespitosa*	Herb	100
					Lomandra integra	Herb	100
					Patersonia umbrosa var. *xanthina*	Herb	100
					Pteridium esculentum	Herb	100
					Tetraria octandra	Sedge	100
Other dominant (≥40%) taxa:							
Banksia littoralis		*Adenanthos barbiger*			*Cyathochaeta avenacea*	Sedge	
		Dasypogon hookeri			*Mesomelaena graciliceps*	Sedge	
		Kingia australis			*Mesomelaena tetragona*	Sedge	
		Taxandria parviceps MS			*Tetraria capillaris*	Sedge	
Vegetation layers:							
1.5 (R = 1 - 2)		1.5 (R = 1 - 2)			0 (Grass); 1.5 (Herb); 1.0 (Sedge)		

Mean native taxa:	42.5	(SD = 3.5;	R = 40 - 45)
Mean weed taxa:	3.0	(SD = 1.4;	R = 2 - 4)
Mean vegetation condition:	2.00	(	all 2.00)
Number of quadrats:	2		
Quadrat codes:	TAYL01, UCL04		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Kilometers
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Department of Environment and Conservation
Legend
WA Townsites
Whicher Scarp Floristic Quadrat
Major Hydrography
Forrestfield System (DAFWA 2007)
Whicher Scarp System (DAFWA 2007)
Soil Landscape Mapping- Zones
HARVEY
BUREKUP
BUNBURY
DARDANUP
Ferguson River
BOYANUP
Preston River
CAPEL
DONNYBROOK
DUNSBOROUGH
Capel River
BUSSELTON
Abba River
Ludlow River
CARBUNUP RIVER
Sabina River
Vasse River
Ironstone Gully
Carbunup River
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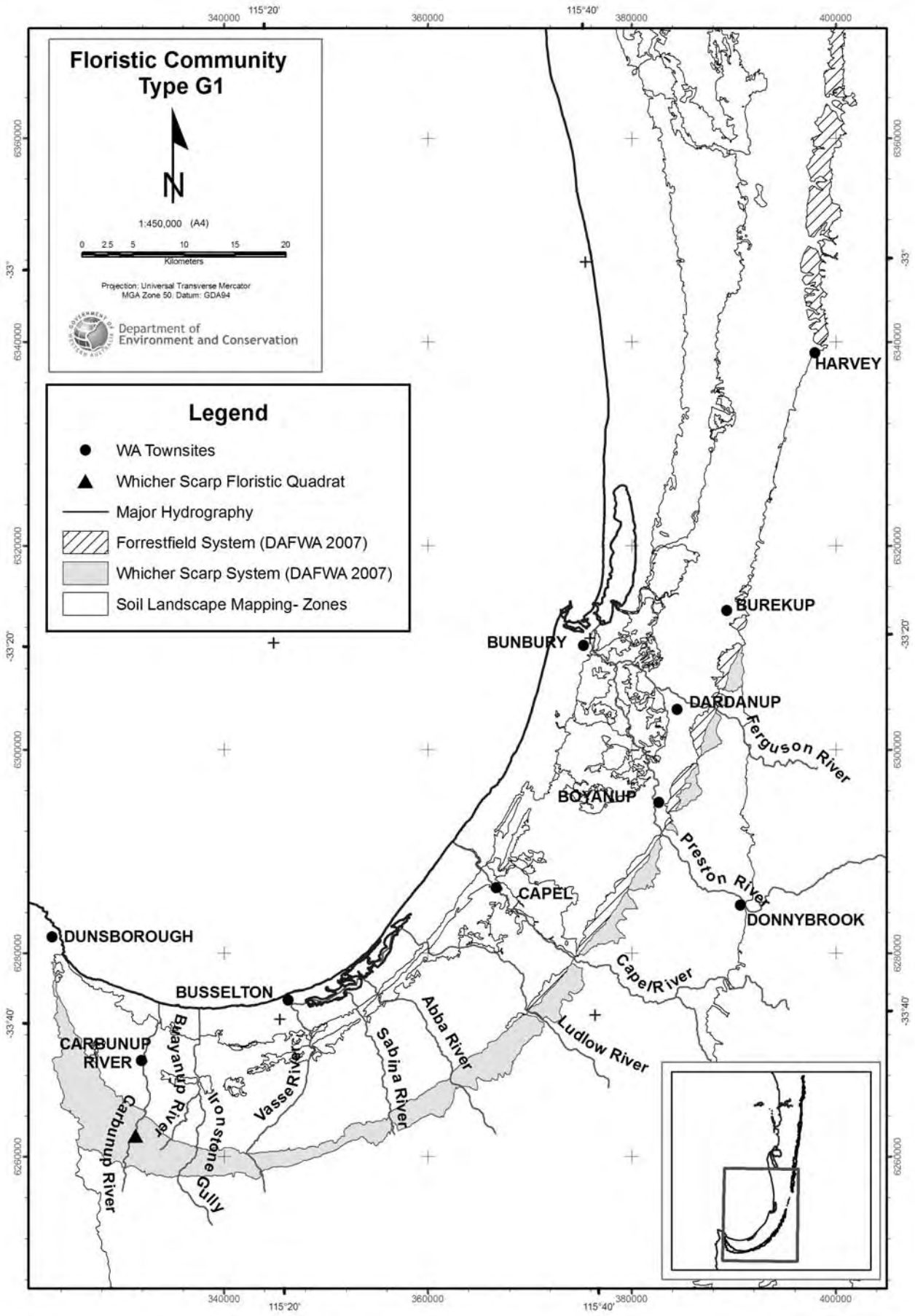
Community Type: G1 - Creekline Blackbutt *(Eucalyptus patens)* and Marri forest

TREES		SHRUBS			GRASSES/HERBS/SEDGES		
Typical (>75%) and dominant (≥40%) taxa:							
Eucalyptus calophylla	100	*Astartea scoparia*	100	*	*Anthoxanthum odoratum*	Grass	100
Eucalyptus patens	100	*Hakea lasianthoides*	100	*	*Holcus lanatus*	Grass	100
		Hakea linearis	100		*Anigozanthos flavidus*	Herb	100
		Taxandria linearifolia MS	100	*	*Cirsium vulgare*	Herb	100
		Viminaria juncea	100	*	*Hypochaeris glabra*	Herb	100
					Lobelia alata	Herb	100
				*	*Lotus suaveolens*	Herb	100
					Patersonia occidentalis var. *angustifolia*	Herb	100
				*	*Sonchus oleraceus*	Herb	100
					Baumea vaginalis	Sedge	100
					Cyathochaeta sp. Carbunup (G.J. Keighery 14123)	Sedge	100
					Juncus subsecundus	Sedge	100
					Lepidosperma squamatum	Sedge	100
					Leptocarpus diffusus	Sedge	100
					Taraxis grossa	Sedge	100

Vegetation layers:

2.0	0	0 (Grass); 0 (Herb); 1.0 (Sedge)

Mean native taxa: 16.0
Mean weed taxa: 6.0
Mean vegetation condition: 1.75
Number of quadrats: 1
Quadrat codes: GIBB01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Projection: Universal Transverse Mercator
MGA Zone 50. Datum: GDA94
Department of Environment and Conservation
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HARVEY
BUREKUP
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BUSSELTON
Abba River
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CARBUNUP RIVER
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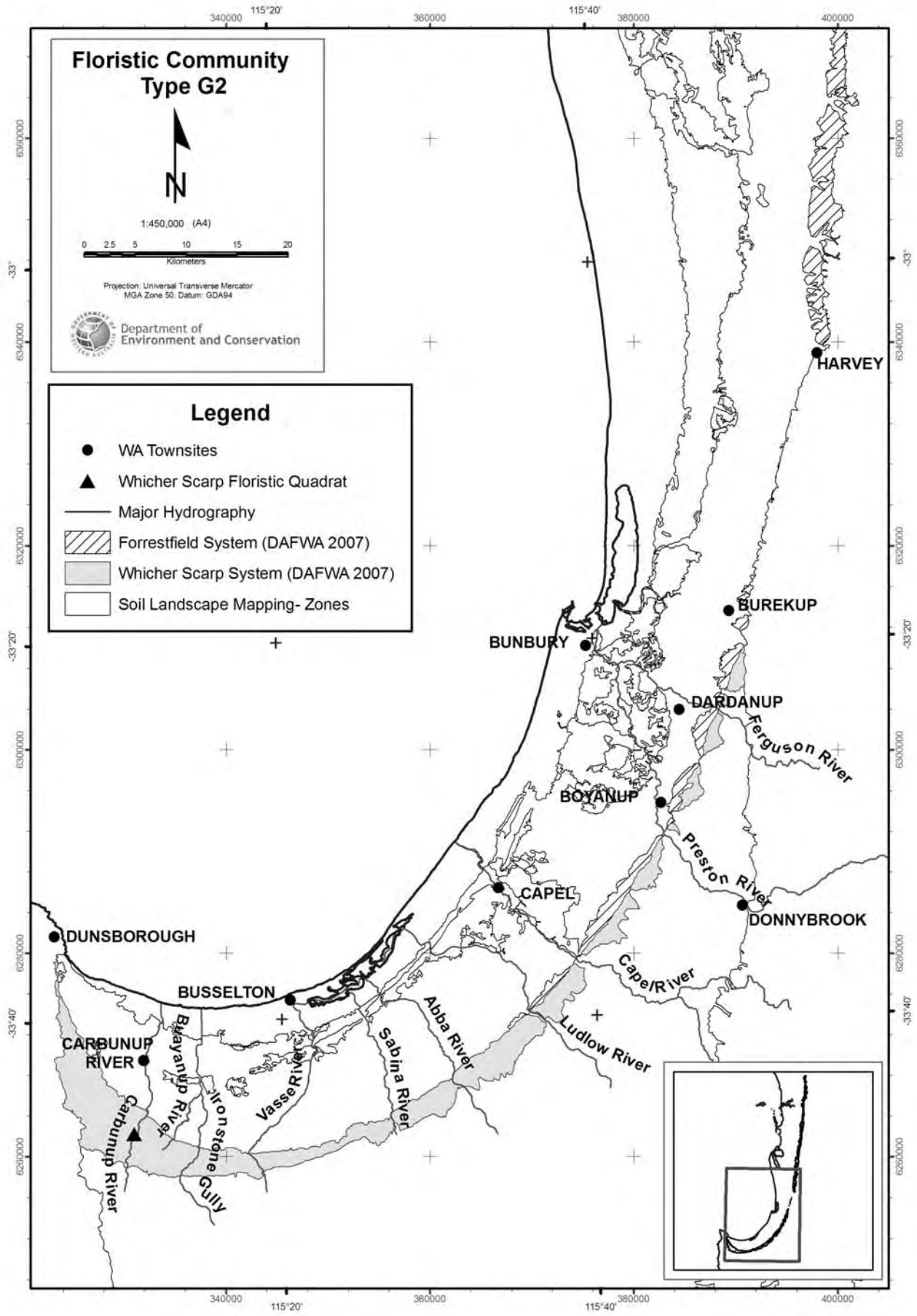
Community Type: G2 - Shrublands of near permanent wetlands in creeklines

TREES	SHRUBS		GRASSES/HERBS/SEDGES		
Typical (>75%) and dominant (≥40%) taxa:					
	Astartea scoparia	100	* *Anthoxanthum odoratum*	Grass	100
	Homalospermum firmum	100	*Baumea rubiginosa*	Sedge	100
	Taxandria fragrans MS	100	*Cyathochaeta teretifolia*	Sedge	100
			Isolepis cernua	Sedge	100
			Taraxis grossa	Sedge	100
Vegetation layers:					
0	1.0		0 (Grass); 0 (Herb); 1.0 (Sedge)		

Mean native taxa: 7.0
Mean weed taxa: 1.0
Mean vegetation condition: 2.50
Number of quadrats: 1
Quadrat codes: GIBB03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Kilometers
Projection: Universal Transverse Mercator
MGA Zone 50. Datum: GDA94
Department of Environment and Conservation
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Ferguson River
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CAPEL
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DUNSBOROUGH
Capel River
BUSSELTON
Abba River
Ludlow River
CARBUNUP RIVER
Sabina River
Vasse River
Ironstone Gully
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115°20'
115°40'
-33°
-33°20'
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APPENDIX 5: Flora of the Whicher Scarp

APPENDIX 5a: Native and weedy vascular plants in the Whicher Scarp with reference to habitat preferences, growth and life forms and conservation status

APPENDIX 5b: Native and weedy vascular plants in the Whicher Scarp with reference to habitat preferences, growth and life forms and conservation status - database
MS Access: App5bWHSFloraList.mdb, disc

APPENDIX 5c: Quadrats used to create the Whicher Scarp flora list
Ms Word: App5cWHSQuadrats.doc, disc and printed

APPENDIX 5d: Whicher Scarp taxa name edits 2008
MS Word: APP5dWHSNameEdits.doc, disc

APPENDIX 5a: Native and weedy vascular plants in the Whicher Scarp with reference to habitat preferences, growth and life forms and conservation status

KEY TO TABLE

Column 1 **Family**
Families are grouped into Ferns, Gymnosperms, Monocotyledons and Dicotyledons

Column 2 **Scientific Name**
Genus + Species + Infra Species Rank + Infra Species Name + Informal Name from BJ Keighery *et al.* (2007). Some species names may be modified from original sources of information: DEP (1996) and Gibson *et al.* (1994). Some taxa yet to be formally described and named may have a reference collection number from the relevant collector. Taxa (species, sub-species and varieties) are listed alphabetically within genera.

*	Weed
subsp.	Subspecies
var.	Variety
MS	A manuscript name yet to be published
PN	A phrase name for a taxon yet to be described and published.

Column 3 **Common Name**

Columns 4 - 8 **Significant Taxa**

Column 4 **WA = Western Australian listed taxa**
Significant plant taxa (species, sub-species and varieties) listed under the State *Wildlife Conservation Act 1950* (Government of Western Australia 2006) and by the Department of Environment and Conservation (Atkins 2006). Priority taxa conservation code listings are current as at January 2008 (Western Australian Herbarium 2008). See Appendix 1 for further descriptions of the categories below.

R	Declared Rare Flora: Extant Taxa
X	Declared Rare Flora: Presumed Extinct Taxa
1	Priority 1: Poorly Known Taxa
2	Priority 2: Poorly Known Taxa
3	Priority 3: Poorly Known Taxa
4	Priority 4: Rare Taxa

Column 5 **IUCN = Internationally listed taxa**
Significant plant taxa (species, sub-species and varieties) listed according to the *IUCN Red List of Threatened Species* as of December 2006. Taxa are listed on the IUCN website (IUCN 2007). See Appendix 1 for further descriptions of the categories below.

CR	Taxa that are critically endangered
E	Taxa that are endangered
V	Taxa that are vulnerable

Column 6 **Com = Commonwealth listed taxa**
Significant plant taxa (species, sub-species and varieties) listed under the Commonwealth *Environment Protection and Biodiversity Conservation Act 1999* as of December 2006. Taxa are listed on the Department of the Environment, Water, Heritage and the Arts website (DEWHA 2007).See Appendix 1 for further descriptions of the categories below.

E	Taxa that are endangered
V	Taxa that are vulnerable

In some instances, the codes for the Commonwealth and the Internationally listed taxa differ; in these cases, the discrepancy is indicated by an asterisk in the 'Com' column.

Column 7 **OS = Other categories of significance**

z	Recently recognised taxa

Significant due to geographical location

r	Populations at the northern (N) or southern (S) limit of their known geographic range, limit indicated as follows Example: r (N or S, Locality, Region)
d	Populations disjunct from their known geographic range
p	Poorly reserved as is known from only a few populations in reserves (applies to all Declared Rare Flora and Priority taxa)
s	Significant populations in reference to location, population size, diversity of ages and/or health (applies to all Declared Rare Flora and Priority taxa)
u	Uncommon in the area (generally applies to disjunct populations)

Taxa with regional and/or ecological preferences

Endemic taxa

e	Local endemic, less than 100 km range, not in a particular region/landform unit	
e(AREA)	AREA after Map 3 (Biogeographic region or subregion)	
	SWA	Swan Coastal Plain (Swan Coastal Plain)
	SWA(B)	Busselton area of the Swan Coastal Plain (Swan Coastal Plain)
	WHS	Whicher Scarp (Jarrah Forest South)
	BP	Blackwood Plateau (Jarrah Forest South)
	SC	Scott Coastal Plain (Warren)
	MP	Margaret River Plateau (Warren and Jarrah Forest South)
	JF	Jarrah Forest (Jarrah Forest)
Ne	Extends well north from WHS	
Se	Extends well south from WHS (and adjacent Busselton Plain at times)	

Taxa with ecological preferences

h	Taxa with distinct habitat preference Example: h (ironstone)
a	Relictual species (monotypic genera are annotated)

Taxa with morphological and/or genetic variation

v	Morphological variant, unsure of significance at taxonomic level
t	Morphological variant, significant taxonomically
g	Genetic variant

Column 8 **Endemic (State)**

Taxa (species, sub-species and varieties) endemic to Western Australia (WA) or Australia (AUST; or >AUST = cosmopolitan). No records are given for weeds (see Hussey *et al.* 2007 for country of origin), unless the plant is also native to WA.

Column 9 **Growth Form 1** (See Key to Growth Forms at the end of this key for definitions)

Woody Plants

T	Tree
M	Mallee
SH/T	Shrub/tree
SH	Shrub
SH-H	Shrub which is often called a herb

Non-woody Plants: non-grass-like

H	Herb
H-SH	Herb which is often called a shrub

Non-woody Plants: grass-like

G	Grass
S-C	Sedge – Cyperaceae and others
S-R	Sedge – Restionaceae
S-J	Sedge – Juncaceae and others

Column 10 **Growth Form 2** (See Key to terms at the end of this key for definitions)

CL	Climber
PR	Prostrate

Column 11 **Life Form**

A	Annual
A2	Biennial
P	Perennial
PAA	Perennial annually renewed from above ground part
PAB	Perennial annually renewed from below ground part
A-PAR	Annual - parasite or semi-parasite
P-PAR	Perennial - parasite or semi-parasite

Column 12 **Life Form – aquatic**

AQD	Aquatic – damp flowering. Grows in water, flowers in damp mud
AQE	Aquatic – emergent. Grows and flowers in water with some parts emergent above water (e.g. leaves, flowers)
AQF	Aquatic – floating. Whole plant floats on water
AQS	Aquatic – supported. Grows and flowers in water with most parts supported by water (e.g. leaves); flowers may be emergent above water

Column 13 **NAME_ID**

Positive NAME_IDs are from the Census of Western Australian Plants (Western Australian Herbarium 1998- and 2008; Gioia 2005); negative NAME_IDs are as in BJ Keighery *et al.* (2007).

KEY TO GROWTH FORM DEFINTIONS

Definitions adapted from BJ Keighery (1994), McDonald *et al.* (1990) and Executive Steering Committee for Australian Vegetation Information (2003).

GROWTH FORM 1

WOODY PLANTS

Plants with special thick-walled cells in their trunks and stems that form wood to support the plant. Trees are able to build up layer upon layer of this woody support tissue to form trunks and branches. All woody plants are perennial.

Tree	Plants with a single trunk and a canopy. The canopy is less than or equal to two thirds of the height of the trunk. No lignotuber is evident.
Shrub/Tree	Shrub or tree
Mallee	Plants with many trunks (usually 2-5) arising from a lignotuber. The canopy is usually well above the base of the plant. Most are from the genus Eucalyptus.
Shrub	Plants with one or more woody stems and foliage all or part of the total height of the plant. Includes palms, grass trees (Xanthorrhoea and Kingia species) and cycads (Zamia species).
Shrub-Herb	Shrub that appears herb-like. Plants with a woody stem/s that is lax enough to give the shrub a non-woody herb-like appearance, often called sub-shrubs.

NON-WOODY PLANTS

Plants with no (or insufficient) special thick-walled support cells in their stems to form wood for support. May be either annuals or perennials. Sub-divided according to growth form, pollination method and plant family.

NON-WOODY PLANTS – NON GRASS-LIKE Generally not pollinated by wind, monocots and dicots.

Herb	Plants with non-woody stems that are not grasses or sedges. Generally under half a metre tall. Most monocots are herbs except for the larger ones which are classed as shrubs such as palms, grass trees (Xanthorrhoea and Kingia species) and cycads (Zamia species).
Herb-Shrub	Herb that appears shrub-like. Plants with non-woody stems that are stiff enough to give the herb a woody shrub-like appearance, often called sub-shrubs.

NON-WOODY PLANTS – GRASS-LIKE Generally pollinated by wind and from the families Poaceae, Cyperaceae, Centrolepidaceae, Hydatellaceae, Juncaginaceae, Restionaceae, Juncaceae, Typhaceae or Xyridaceae.

Grasses	**Leaf sheath always split, ligule present, leaf usually flat, stem cross-section circular, evenly spaced internodes.**
Grass	Tufted or spreading plants from the family Poaceae. Some species form hummocks but none of these occur in south-west Western Australia.
Sedges	**Leaf sheath never split (except in some Restionaceae), usually no ligule, leaf not always flat, extended internode below inflorescence.**
Sedge – Cyperaceae and others	Tufted or spreading plants from the families Cyperaceae, Centrolepidaceae, Hydatellaceae or Juncaginaceae.
Sedge – Restionaceae	Tufted or spreading plants from the family Restionaceae. Commonly called rushes.
Sedge – Juncaceae and others	Tufted or spreading plants from the families Juncaceae, Typhaceae or Xyridaceae. Some of these are also called rushes.

GROWTH FORM 2

Climber	Plants in need of other plants or objects for support.
Prostrate	Spreading plants, often supported by the ground.

Native and weedy vascular plants in the Whicher Scarp with reference to habitat preferences, growth and life forms and conservation status
Appendix 5a in *A Floristic Survey of the Whicher Scarp*

Family		Scientific Name	Common Name	Significant Taxa				Endemic (State)	Growth Form 1	Growth Form 2	Life Form	Life Form - aquatic	NAME _ID
				WA	IUCN	Com	OS						
FERNS													
Adiantaceae		*Adiantum aethiopicum*	Common Maidenhair				d,p,s,u,h	AUST	H		PAB		25
Adiantaceae		*Cheilanthes austrotenuifolia*	Rock Fern				d,p,s,u,h	>AUST	H		PAB		31
Dennstaedtiaceae		*Pteridium esculentum*	Bracken					AUST	H		P		57
Lindsaeaceae		*Lindsaea linearis*	Screw Fern					AUST	H		PAB		59
Lycopodiaceae		*Phylloglossum drummondii*	Pygmy Clubmoss					>AUST	H		PAB	AQD	4
Pteridaceae		*Pteris vittata*	Chinese Brake					AUST	H	PR	P		45
Selaginellaceae		*Selaginella gracillima*	Tiny Clubmoss					>AUST	H		A		6
GYMNOSPERMS													
Cupressaceae		*Actinostrobus acuminatus*	Creeping Cypress				d,p,s,u,h	WA	SH	PR	P		89
Pinaceae	*	*Pinus pinaster*	Maritime Pine						T		P		87
Podocarpaceae		*Podocarpus drouynianus*	Emu Plum					WA	SH		P		86
Zamiaceae		*Macrozamia riedlei*	Riedlé's Zamia					WA	SH-H		P		85
MONOCOTYLEDONS													
Amaryllidaceae	*	*Amaryllis belladonna*	Easter Lily						H		PAB		1489
Anthericaceae		*Agrostocrinum hirsutum*	Clay Grasslily					WA	H		P		23474
Anthericaceae		*Agrostocrinum scabrum*	False Blindgrass					WA	H		P		1261
Anthericaceae		*Arthropodium capillipes*	Summer Lily					WA	H		PAB		8786
Anthericaceae		*Arthropodium preissii*	Swamp Lily					WA	H		PAB		8787
Anthericaceae		*Caesia micrantha*	Pale Grasslily					WA	H		PAB		1276
Anthericaceae		*Caesia micrantha* (Blue flowered form) (GJ Keighery 10857)	Pale Grasslily					WA	H		PAB		-20181
Anthericaceae		*Caesia occidentalis*	Tall Grasslily					WA	H		PAB		1277
Anthericaceae		*Chamaescilla corymbosa* var. *corymbosa*	Blue Squill					AUST	H		PAB		11299
Anthericaceae		*Corynotheca micrantha* var. *micrantha*	Tangled Lily					WA	H		PAB		11283

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			WA	IUCN	Com	OS						
Anthericaceae	*Hodgsoniola junciformis*	Rush Lily				p,s,u,Se,h	WA	H		P		1294
Anthericaceae	*Johnsonia acaulis*	Small Johnsonia				s,h,v	WA	H		P		1295
Anthericaceae	*Johnsonia inconspicua*	Hidden Johnsonia	3			z,r(S,Yelverton,WHS),d,p,s,g	WA	H		P		1296
Anthericaceae	*Johnsonia lupulina*	Elegant Johnsonia				Se,h	WA	H		P		1297
Anthericaceae	*Laxmannia jamesii*	James' Paper Lily	4		V*	r(N,Whicher NP,WHS),d,p,s,u,a	WA	H		P		1302
Anthericaceae	*Laxmannia ramosa* subsp. *ramosa*	Paper Lily					WA	H		P		11911
Anthericaceae	*Laxmannia sessiliflora* subsp. *australis*	Paper Lily					WA	H		P		11464
Anthericaceae	*Sowerbaea laxiflora*	Purple Tassels					WA	H		PAB		1312
Anthericaceae	*Thysanotus arbuscula*	Velvet Fringed Lily					WA	H		A/P		1318
Anthericaceae	*Thysanotus arenarius*	Limestone Fringed Lily					WA	H		PAB		1319
Anthericaceae	*Thysanotus formosus*	Fringed Lily	1			r(N,Boyanup,WHS),p,s,u,eWHS/BP	WA	H		PAB		1331
Anthericaceae	*Thysanotus glaucus*	Fringed Lily	4			d,p,s,u,h	WA	H		PAB		1334
Anthericaceae	*Thysanotus gracilis*	Fringed Lily					WA	H		PAA/A		1335
Anthericaceae	*Thysanotus manglesianus*	Twining Fringed Lily					WA	H	CL	PAB		1338
Anthericaceae	*Thysanotus multiflorus*	Fringed Lily					WA	H		P		1339
Anthericaceae	*Thysanotus patersonii*	Twining Fringed Lily					WA	H	CL	PAB		1343
Anthericaceae	*Thysanotus pauciflorus*	Fringed Lily					WA	H		P		1344
Anthericaceae	*Thysanotus pseudojunceus*	Fringed Lily				r(N,Dardanup,WHS),d,s,u	WA	H		P		1345
Anthericaceae	*Thysanotus scaber*	Rough Fringed Lily					WA	H		P		1350
Anthericaceae	*Thysanotus sparteus*	Fringed Lily					WA	H		P		1351
Anthericaceae	*Thysanotus tenellus*	Fringed Lily					WA	H		PAB		1354
Anthericaceae	*Thysanotus thyrsoideus*	Fringed Lily					WA	H		PAB		1357
Anthericaceae	*Thysanotus triandrus*	Fringed Lily					WA	H		P		1358
Anthericaceae	*Tricoryne elatior*	Yellow Summer Lily					AUST	H		P		1361
Anthericaceae	*Tricoryne humilis*	Yellow Summer Lily					WA	H		PAB		1362
Anthericaceae	*Tricoryne tenella*	Yellow Summer Lily					WA	H		P		1363

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				WA	IUCN	Com	OS						
Araceae	*	*Arum italicum*	Italian Arum						H		PAB		-21016
Araceae	*	*Zantedeschia aethiopica*	Arum Lily						H		PAB		1049
Boryaceae		*Borya scirpoidea*	Granite Pincushions					WA	H		P		1272
Boryaceae		*Borya sphaerocephala*	Swamp Pincushions					WA	H		P		1273
Centrolepidaceae		*Aphelia cyperoides*	Hairy Aphelia					WA	S-C		A		1117
Centrolepidaceae		*Aphelia drummondii*	Drummond's Aphelia					WA	S-C		A	AQD	1118
Centrolepidaceae		*Aphelia nutans*	Nodding Aphelia					WA	S-C		A	AQD	1119
Centrolepidaceae		*Centrolepis alepyroides*	Slender Centrolepis					WA	S-C		A	AQD	1120
Centrolepidaceae		*Centrolepis aristata*	Pointed Centrolepis					AUST	S-C		A		1121
Centrolepidaceae		*Centrolepis drummondiana*	Sand Centrolepis					AUST	S-C		A		1125
Centrolepidaceae		*Centrolepis mutica*	Toothed Centrolepis					WA	S-C		A		1132
Centrolepidaceae		*Centrolepis pilosa*	Hairy Centrolepis					WA	S-C		A		1133
Colchicaceae		*Burchardia congesta*	Kara					WA	H		PAB		12770
Colchicaceae		*Burchardia multiflora*	Kara					WA	H		PAB		1385
Colchicaceae		*Wurmbea dioica* subsp. *alba*	Early Nancy					AUST	H		PAB		12072
Cyperaceae		*Baumea acuta*	Pale Twigrush					AUST	S-C		P	AQE	739
Cyperaceae		*Baumea articulata*	Jointed Twigrush					>AUST	S-C		P	AQE	741
Cyperaceae		*Baumea juncea*	Bare Twigrush					>AUST	S-C		P		743
Cyperaceae		*Baumea preissii* subsp. *laxa* MS	Preiss's Baumea					WA	S-C		P		15837
Cyperaceae		*Baumea rubiginosa*	Baumea					WA	S-C		P	AQE	747
Cyperaceae		*Baumea vaginalis*	Sheath Twigrush					WA	S-C		P	AQE	748
Cyperaceae		*Bolboschoenus caldwellii*	Marsh Clubrush					>AUST	S-C		P	AQE	749
Cyperaceae		*Caustis dioica*	Caustis				r(S,Treeton,WHS),d,p,s,u,h,g	WA	S-C		P		760
Cyperaceae		*Caustis* sp. Boyanup (G.S. McCutcheon 1706) PN	Caustis	1			d,p,s,u,h,g	WA	S-R		P		13766
Cyperaceae		*Chorizandra cymbaria*	Heron Bristlerush					WA	S-C		P		762

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				WA	IUCN	Com	OS						
Cyperaceae		*Chorizandra enodis*	Black Bristlerush					AUST	S-C		P	AQD	763
Cyperaceae		*Cyathochaeta avenacea*	Cyathochaeta				v,t,g	WA	S-C		P		768
Cyperaceae		*Cyathochaeta clandestina*	Cyathochaeta				d,s,h	WA	S-C		P		769
Cyperaceae		*Cyathochaeta equitans*	Cyathochaeta				d,s,h	WA	S-C		P		17618
Cyperaceae		*Cyathochaeta* sp. Carbunup (G.J. Keighery 14123)	Carbunup River Cyathochaeta				z,d,p,s,u,eSWA(B)/WHS,h	WA	S-C		P		-21010
Cyperaceae		*Cyathochaeta* sp. Sabina (SABI03&06)	Sabina River Cyathochaeta				z,p,s,u,eWHS,h	WA	S-C		P		-21106
Cyperaceae		*Cyathochaeta teretifolia*	Cyathochaeta	3			d,p,s,u,h	WA	S-C		P	AQD	16245
Cyperaceae	*	*Cyperus eragrostis*	Umbrella Sedge						S-C		P		792
Cyperaceae	*	*Cyperus tenellus*	Tiny Flat Sedge						S-C		P		815
Cyperaceae		*Evandra aristata*	Graceful Evandra				r(N,West WHS),d,s,u,Se,h	WA	S-C		P		834
Cyperaceae		*Ficinia nodosa*	Knotted Clubrush					>AUST	S-C		P		20216
Cyperaceae		*Gahnia decomposita*	Swamp Sawsedge				d,s,u,Se,h	WA	S-C		P		902
Cyperaceae		*Gahnia trifida*	Coast Sawsedge					AUST	S-C		P		907
Cyperaceae		*Gymnoschoenus anceps*	Western Button Grass				r(N,West WHS),d,s,u,Se,h,a	WA	S-C		P		908
Cyperaceae		*Isolepis cernua*	Nodding Clubrush					>AUST	S-C		A		910
Cyperaceae		*Isolepis congrua*	Clubrush					AUST	S-C		P		911
Cyperaceae		*Isolepis cyperoides*	Clubrush					WA	S-C		P		912
Cyperaceae	*	*Isolepis marginata*	Coarse Clubrush						S-C		A		917
Cyperaceae		*Isolepis oldfieldiana*	Oldfield's Clubrush					WA	S-C		A		919
Cyperaceae	*	*Isolepis prolifera*	Budding Clubrush						S-C		P		10831
Cyperaceae		*Isolepis setiformis*	Clubrush					WA	S-C		A		923
Cyperaceae		*Isolepis stellata*	Star Clubrush					AUST	S-C		A		924
Cyperaceae		*Lepidosperma* aff. resinosum (A. Webb 10)	Busselton Lepidosperma				s,u,eSWA(B)/WHS	WA	S-C		P		-21127
Cyperaceae		*Lepidosperma brunonianum*	Lepidosperma					WA	S-C		P		928
Cyperaceae		*Lepidosperma carphoides*	Lepidosperma					WA	S-C		P		929
Cyperaceae		*Lepidosperma costale*	Lepidosperma					WA	S-C		P		930

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Cyperaceae	*Lepidosperma effusum*	Spreading Swordsedge					WA	S-C		P		932
Cyperaceae	*Lepidosperma gracile*	Thin Swordsedge					WA	S-C		P		934
Cyperaceae	*Lepidosperma leptostachyum*	Lepidosperma					WA	S-C		P		936
Cyperaceae	*Lepidosperma longitudinale*	Swamp Swordsedge					AUST	S-C		P		937
Cyperaceae	*Lepidosperma obtusum*	Lepidosperma				r(W,Treeton,WHS),d,s,u,h,g	WA	S-C		P		14642
Cyperaceae	*Lepidosperma pubisquameum*	Lepidosperma					WA	S-C		P		940
Cyperaceae	*Lepidosperma scabrum*	Rough Lepidosperma					WA	S-C		P		944
Cyperaceae	*Lepidosperma* sp. (Eastern terete) (BJ Keighery and N Gibson 232)	Lepidosperma					WA	S-C		P		-20199
Cyperaceae	*Lepidosperma squamatum*	Common Lepidosperma					WA	S-C		P		945
Cyperaceae	*Lepidosperma tenue*	Thin Lepidosperma					WA	S-C		P		947
Cyperaceae	*Lepidosperma tetraquetrum*	Square Swordsedge					WA	S-C		P		948
Cyperaceae	*Mesomelaena graciliceps*	Small Semaphore Sedge					WA	S-C		P		953
Cyperaceae	*Mesomelaena stygia* subsp. *stygia*	Telegraph Sedge					WA	S-C		P		11473
Cyperaceae	*Mesomelaena tetragona*	Large Semaphore Sedge					WA	S-C		P		957
Cyperaceae	*Schoenus bifidus*	Schoenus					WA	S-C		P		975
Cyperaceae	*Schoenus breviculmis*	Schoenus					WA	S-C		P		976
Cyperaceae	*Schoenus brevisetis*	Schoenus					WA	S-C		P		978
Cyperaceae	*Schoenus caespititius*	Schoenus					WA	S-C		P		979
Cyperaceae	*Schoenus clandestinus*	Schoenus					WA	S-C		P		982
Cyperaceae	*Schoenus curvifolius*	Schoenus					WA	S-C		P		984
Cyperaceae	*Schoenus discifer*	Schoenus					>AUST	S-C		A		985
Cyperaceae	*Schoenus efoliatus*	Schoenus					WA	S-C		P		986
Cyperaceae	*Schoenus nanus*	Schoenus					WA	S-C		A		1002
Cyperaceae	*Schoenus odontocarpus*	Schoenus					WA	S-C		A		1006

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Cyperaceae	*Schoenus pennisetis*	Schoenus	1			r(S,Goodwood Rd,WHS),p,s,u,h	WA	S-C		P		1008
Cyperaceae	Schoenus sp. Whicher (G.J. Keighery and B.J. Keighery 901)	Whicher Schoenus				z,s,u,eWHS	WA	S-C		P		-21006
Cyperaceae	*Schoenus subbarbatus*	Schoenus					WA	S-C		P		1016
Cyperaceae	*Schoenus subbulbosus*	Schoenus					WA	S-C		P		1017
Cyperaceae	*Schoenus subflavus* subsp. *subflavus*	Schoenus					WA	S-C		P		16252
Cyperaceae	*Schoenus sublateralis*	Schoenus					WA	S-C		P		1020
Cyperaceae	*Schoenus unispiculatus*	Schoenus					WA	S-C		P		1026
Cyperaceae	*Tetraria capillaris*	Tetraria					WA	S-C		P		1034
Cyperaceae	*Tetraria octandra*	Tetraria					WA	S-C		P		1036
Cyperaceae	*Tricostularia neesii* var. *neesii*	Tricostularia					WA	S-C		P		12048
Dasypogonaceae	*Baxteria australis*	Baxteria				s,Se,h,a	WA	H		P		1212
Dasypogonaceae	*Calectasia narragara*	Blue Tinsel Lily				r(S,Whicher NP,WHS),s,u,h	WA	H-SH		P		19309
Dasypogonaceae	*Chamaexeros serra*	Little Fringe-leaf				d,s,u	WA	H		P		1217
Dasypogonaceae	*Dasypogon bromeliifolius*	Pineapple Bush					WA	H		P		1218
Dasypogonaceae	*Dasypogon hookeri*	Hooker's Pineapple Bush				r(N,Boyanup,WHS),s,Se,h,a	WA	SH		P		1219
Dasypogonaceae	*Kingia australis*	Kingia					WA	SH		P		1221
Dasypogonaceae	*Lomandra brittanii*	Lomandra					WA	H		P		1222
Dasypogonaceae	*Lomandra caespitosa*	Tufted Lomandra					WA	H		P		1223
Dasypogonaceae	*Lomandra drummondii*	Drummond's Lomandra					WA	H		P		1225
Dasypogonaceae	*Lomandra hermaphrodita*	Lomandra					WA	H		P		1228
Dasypogonaceae	*Lomandra integra*	Lomandra					WA	H		P		1229
Dasypogonaceae	*Lomandra micrantha* subsp. *micrantha*	Lomandra					AUST	H		P		14542
Dasypogonaceae	*Lomandra nigricans*	Lomandra					WA	H		P		1234
Dasypogonaceae	*Lomandra odora*	Tiered Lomandra					WA	H		P		1236
Dasypogonaceae	*Lomandra pauciflora*	Lomandra					WA	H		P		1238
Dasypogonaceae	*Lomandra preissii*	Preiss's Lomandra					WA	H		P		1239
Dasypogonaceae	*Lomandra purpurea*	Purple Lomandra					WA	H		P		1240

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Dasypogonaceae	*Lomandra sericea*	Silky Lomandra					WA	H		P		1243
Dasypogonaceae	*Lomandra sonderi*	Sonder's Lomandra					WA	H		P		1244
Dasypogonaceae	*Lomandra spartea*	Lomandra				r(S,Whicher NP,WHS),d,s,u,h	WA	H		P		1245
Dasypogonaceae	*Lomandra suaveolens*	Lomandra					WA	H		P		1246
Dasypogonaceae	*Lomandra whicherensis*	Whicher Lomandra				z,r(S,Argyle,WHS),p,s,u,e,h,a	WA	H		P		-21107
Haemodoraceae	*Anigozanthos flavidus*	Tall Kangaroo Paw					WA	H		P		1407
Haemodoraceae	*Anigozanthos humilis* subsp. *humilis*	Catspaw					WA	H		PAB		11434
Haemodoraceae	*Anigozanthos humilis x manglesii*	Hybrid Paw					WA	H		PAB		-20533
Haemodoraceae	*Anigozanthos manglesii* subsp. *manglesii*	Kangaroo Paw					WA	H		PAB		11261
Haemodoraceae	*Anigozanthos viridis*	Green Kangaroo Paw					WA	H		PAB		1416
Haemodoraceae	*Conostylis aculeata* subsp. *aculeata*	Prickly Conostylis					WA	H		P		11826
Haemodoraceae	*Conostylis aurea*	Golden Conostylis					WA	H		P		1423
Haemodoraceae	*Conostylis laxiflora*	Conostylis					WA	H		P		1438
Haemodoraceae	*Conostylis serrulata*	Conostylis					WA	H		P		1453
Haemodoraceae	*Conostylis setigera* subsp. *setigera*	Conostylis					WA	H		P		11597
Haemodoraceae	*Haemodorum discolor*	Haemodorum					WA	H		PAB		1465
Haemodoraceae	*Haemodorum laxum*	Haemodorum					WA	H		PAB		1468
Haemodoraceae	*Haemodorum paniculatum*	Haemodorum					WA	H		PAB		1470
Haemodoraceae	*Haemodorum simplex*	Haemodorum					WA	H		PAB		1472
Haemodoraceae	*Haemodorum sparsiflorum*	Haemodorum					WA	H		PAB		1474
Haemodoraceae	*Haemodorum spicatum*	Haemodorum					WA	H		PAB		1475
Haemodoraceae	*Phlebocarya ciliata*	Phlebocarya					WA	H		P		1478
Haemodoraceae	*Phlebocarya filifolia*	Phlebocarya					WA	H		P		1479
Haemodoraceae	*Tribonanthes australis*	Tribonanthes					WA	H		PAB		1481
Haemodoraceae	*Tribonanthes brachypetala*	Tribonanthes					WA	H		PAB		1482
Haemodoraceae	*Tribonanthes violacea*	Tribonanthes					WA	H		PAB		1485
Hydatellaceae	*Trithuria bibracteata*	Trithuria					WA	S-C		A	AQE/AQD	1139

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Hypoxidaceae		*Hypoxis glabella* var. *glabella*	Yellow Star					>AUST	H		PAB		11699
Hypoxidaceae		*Hypoxis occidentalis*	Yellow Star					WA	H		PAB		1503
Iridaceae		*Orthrosanthus laxus* var. *laxus*	Common Orthrosanthus					WA	H		P		11749
Iridaceae		*Patersonia babianoides*	Crinkle-leaved Flag					WA	H		PAB		1542
Iridaceae		*Patersonia juncea*	Thin-leaved Flag					WA	H		P		1546
Iridaceae		*Patersonia limbata*	Hairy Flag				r(N,Dardanup,WHS),d,p,s,u,Se	WA	H		P		1548
Iridaceae		*Patersonia maxwellii*	Maxwell's Flag				r(S,Yelverton,WHS),d,p,s,u	WA	H		P		1549
Iridaceae		*Patersonia occidentalis* var. *angustifolia*	Swamp Flag				z,d,s,u,Se,h	WA	H		P		30471
Iridaceae		*Patersonia occidentalis* var. *occidentalis*	Purple Flag					WA	H		P		30472
Iridaceae		*Patersonia pygmaea*	Pygmy Flag					WA	H		P		1551
Iridaceae		*Patersonia umbrosa* var. *umbrosa*	Purple Flag				r(N,Gwindinup,WHS),d,p,s,u,eSWA(B)/BP,h	WA	H		P		14432
Iridaceae		*Patersonia umbrosa* var. *xanthina*	Yellow Flag					WA	H		P		11550
Iridaceae	*	*Romulea rosea*	Guildford Grass						H		PAB		1556
Iridaceae	*	*Watsonia meriana* var. *bulbillifera*	Bubil Watsonia						H		PAB		18108
Juncaceae	*	*Juncus bufonius*	Toadrush					>AUST	S-J		A		1178
Juncaceae	*	*Juncus capitatus*	Capitate Rush						S-J		A		1180
Juncaceae		*Juncus holoschoenus*	Jointed Rush					>AUST	S-J		P	AQD	1184
Juncaceae	*	*Juncus microcephalus*	Weedy Rush						S-J		P		1186
Juncaceae		*Juncus pallidus*	Giant Rush					>AUST	S-J		P		1188
Juncaceae		*Juncus planifolius*	Broadleaf Rush					>AUST	S-J		P		1190
Juncaceae		*Juncus subsecundus*	Finger Rush					AUST	S-J		P		1195
Juncaceae		*Luzula meridionalis*	Woodrush					AUST	S-J		PAB		1198
Juncaginaceae		*Triglochin muelleri*	Mueller's Triglochin					WA	S-C		A		148
Orchidaceae		*Caladenia attingens* subsp. *attingens*	Forest Mantis Orchid					WA	H		PAB		15332
Orchidaceae		*Caladenia brownii*	Karri Spider Orchid					WA	H		PAB		15335
Orchidaceae		*Caladenia cairnsiana*	Zebra Orchid					WA	H		PAB		1580

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Orchidaceae		*Caladenia discoidea*	Bee Orchid					WA	H		PAB		1586
Orchidaceae		*Caladenia ferruginea*	Rusty Spider Orchid					WA	H		PAB		1590
Orchidaceae		*Caladenia flava* subsp. *flava*	Cowslip Orchid					WA	H		PAB		15348
Orchidaceae		*Caladenia flava* subsp. *sylvestris*	Cowslip Orchid					WA	H		PAB		15350
Orchidaceae		*Caladenia latifolia*	Pink Fairy Orchid					WA	H		PAB		1599
Orchidaceae		*Caladenia longicauda* subsp. *clivicola*	Spider Orchid	4			p,s,u,e	WA	H		PAB		13859
Orchidaceae		*Caladenia longicauda* subsp. *eminens*	Spider Orchid					WA	H		PAB		15363
Orchidaceae		*Caladenia macrostylis*	Leaping Spider Orchid					WA	H		PAB		1604
Orchidaceae		*Caladenia marginata*	White Fairy Orchid					WA	H		PAB		1605
Orchidaceae		*Caladenia nana* subsp. *nana*	Little Pink Fan Orchid					WA	H		PAB		15371
Orchidaceae		*Caladenia plicata*	Crab-lipped Spider Orchid	4			p,s,u	WA	H		PAB		1610
Orchidaceae		*Caladenia reptans* subsp. *reptans*	Little Pink Fairy Orchid					WA	H		PAB		15377
Orchidaceae		*Caladenia speciosa*	Sandplain White Spider Orchid	4			z,r(S,Whicher NP,WHS),p,s,u	WA	H		PAB		13862
Orchidaceae		*Corybas recurvus*	Helmet Orchid					WA	H		PAB		12945
Orchidaceae		*Cryptostylis ovata*	Slipper Orchid					WA	H		PAB		1627
Orchidaceae		*Cyanicula gemmata*	Blue China Orchid					WA	H		PAB		15114
Orchidaceae		*Cyanicula sericea*	Silky Blue Orchid					WA	H		PAB		15404
Orchidaceae		*Cyrtostylis huegelii*	Midge Orchid					WA	H		PAB		10916
Orchidaceae	*	*Disa bracteata*	South African Orchid						H		PAB		19649
Orchidaceae		*Diuris corymbosa*	Common Donkey Orchid					WA	H		PAB		11049
Orchidaceae		*Diuris longifolia*	Purple Pansy Orchid					WA	H		PAB		1635
Orchidaceae		*Drakaea livida*	Warty Hammer Orchid					WA	H		PAB		11156
Orchidaceae		*Elythranthera brunonis*	Purple Enamel Orchid					WA	H		PAB		1643
Orchidaceae		*Elythranthera emarginata*	Pink Enamel Orchid					WA	H		PAB		1644

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Orchidaceae	*Eriochilus dilatatus* subsp. *dilatatus*	White Bunny Orchid					WA	H		PAB		15410
Orchidaceae	*Eriochilus dilatatus* subsp. *magnus*	White Bunny Orchid					WA	H		PAB		15411
Orchidaceae	*Eriochilus helonomos*	Swamp Bunny Orchid					WA	H		PAB		15414
Orchidaceae	*Eriochilus scaber* subsp. *scaber*	Pink Bunny Orchid					WA	H		PAB		15415
Orchidaceae	*Leporella fimbriata*	Hare Orchid					WA	H		PAB		1653
Orchidaceae	*Leptoceras menziesii*	Rabbit Orchid					AUST	H		PAB		15418
Orchidaceae	*Lyperanthus serratus*	Rattle Beaks					WA	H		PAB		1656
Orchidaceae	*Microtis media*	Common Mignonette Orchid					WA	H		PAB		10954
Orchidaceae	*Paracaleana nigrita*	Flying Duck Orchid					WA	H		PAB		1667
Orchidaceae	*Pheladenia deformis*	Blue Fairy Orchid					WA	H		PAB		20460
Orchidaceae	*Praecoxanthus aphyllus*	Leafless Orchid					WA	H		PAB		15424
Orchidaceae	*Prasophyllum brownii*	Christmas Leek Orchid					WA	H		PAB		1668
Orchidaceae	*Prasophyllum fimbria*	Fringed Leek Orchid					WA	H		PAB		1672
Orchidaceae	*Prasophyllum parvifolium*	Autumn Leek Orchid					WA	H		PAB		1680
Orchidaceae	*Pterostylis* aff. pyramidalis (GJ Keighery 11761)	Swamp Snail Orchid					WA	H		PAB		-21048
Orchidaceae	*Pterostylis barbata*	Bird Orchid					WA	H		PAB		1686
Orchidaceae	*Pterostylis dilatata*	Snail Orchid					WA	H		PAB		1687
Orchidaceae	*Pterostylis nana*	Small Snail Orchid					WA	H		PAB		1690
Orchidaceae	*Pterostylis recurva*	Jug Orchid					WA	H		PAB		1693
Orchidaceae	*Pterostylis sanguinea*	Dark Banded Greenhood					AUST	H		PAB		12217
Orchidaceae	*Pterostylis* sp. Slender Snail Orchid (G.J. Keighery 14516) PN	Greenhood					WA	H		PAB		18557
Orchidaceae	*Pterostylis turfosa*	Bearded Bird Orchid					WA	H		PAB		10998
Orchidaceae	*Pterostylis vittata*	Banded Greenhood					WA	H		PAB		1698
Orchidaceae	*Pyrorchis nigricans*	Red Beaks					AUST	H		PAB		16367

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Orchidaceae		*Thelymitra antennifera*	Lemon-scented Sun Orchid					WA	H		PAB		1701
Orchidaceae		*Thelymitra campanulata*	Shirt Orchid					WA	H		PAB		1702
Orchidaceae		*Thelymitra crinita*	Blue Lady Orchid					WA	H		PAB		1705
Orchidaceae		*Thelymitra flexuosa*	Twisted Sun Orchid					WA	H		PAB		1707
Orchidaceae		*Thelymitra fuscolutea*	Chestnut Sun Orchid					WA	H		PAB		1708
Orchidaceae		*Thelymitra graminea*	Shy Sun Orchid					WA	H		PAB		11143
Orchidaceae		*Thelymitra macrophylla*	Scented Sun Orchid					WA	H		PAB		11053
Orchidaceae		*Thelymitra vulgaris*	Sun Orchid					WA	H		PAB		20731
Philydraceae		*Philydrella pygmaea* subsp. *pygmaea*	Common Philydrella					WA	H		PAB		14306
Phormiaceae		*Dianella revoluta* var. *revoluta*	Common Dianella					WA	H		P		11313
Poaceae	*	*Aira caryophyllea*	Silvery Hairgrass						G		A		184
Poaceae	*	*Aira cupaniana*	Hairgrass						G		A		185
Poaceae	*	*Aira praecox*	Early Hairgrass						G		A		187
Poaceae		*Amphipogon amphipogonoides*	Amphipogon					WA	G		P		194
Poaceae		*Amphipogon debilis*	Amphipogon					WA	G		P		197
Poaceae		*Amphipogon laguroides* subsp. *laguroides*	Amphipogon					WA	G		P		20184
Poaceae		*Amphipogon turbinatus*	Amphipogon					WA	G		P		200
Poaceae	*	*Anthoxanthum odoratum*	Sweet Vernal Grass						G		A		202
Poaceae		*Austrodanthonia caespitosa*	Common Wallaby Grass					AUST	G		P		17950
Poaceae		*Austrodanthonia occidentalis*	Western Wallaby Grass					WA	G		P		17949
Poaceae		*Austrodanthonia setacea*	Small-flower Wallaby Grass					AUST	G		P		17945
Poaceae		*Austrostipa campylachne*	Hairy Speargrass					WA	G		P		17233
Poaceae		*Austrostipa compressa*	Golden Speargrass					WA	G		P		17234
Poaceae		*Austrostipa semibarbata*	Bearded Speargrass					AUST	G		P		17253
Poaceae	*	*Avellinia michelii*	Avellinia						G		A		231

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Poaceae	*	*Briza maxima*	Blowfly Grass						G		A		244
Poaceae	*	*Briza minor*	Shivery Grass						G		A		245
Poaceae	*	*Bromus diandrus*	Great Brome						G		A		249
Poaceae		*Deyeuxia quadriseta*	Reed Bentgrass					AUST	G		P		299
Poaceae		*Dichelachne crinita*	Plumegrass					>AUST	G		P		306
Poaceae		*Eragrostis elongata*	Native Swamp Eragrostis					AUST	G		P		379
Poaceae		*Hemarthria uncinata* var. *uncinata*	Hemarthria					AUST	G		P		11451
Poaceae	*	*Holcus lanatus*	Yorkshire Fog						G		A		444
Poaceae		*Lachnagrostis filiformis*	Blown Grass					>AUST	G		A		20019
Poaceae	*	*Lolium multiflorum*	Italian Ryegrass						G		A		475
Poaceae	*	*Lolium perenne*	Perennial Ryegrass						G		A		476
Poaceae	*	*Lolium rigidum*	Annual Ryegrass						G		A		478
Poaceae		*Microlaena stipoides*	Weeping Grass					>AUST	G		P		485
Poaceae		*Neurachne alopecuroidea*	Foxtail Mulga Grass					AUST	G		P		492
Poaceae	*	*Pennisetum clandestinum*	Kikuyu						G		P		536
Poaceae	*	*Phalaris minor*	Lesser Canary Grass						G		A		551
Poaceae	*	*Poa annua*	Wintergrass						G		A		571
Poaceae		*Poa drummondiana*	Drummond's Poa					AUST	G		P		573
Poaceae	*	*Stenotaphrum secundatum*	Buffalo Grass						G		P		636
Poaceae		*Tetrarrhena laevis*	Tetrarrhena					WA	G		P		667
Poaceae		*Themeda triandra*	Kangaroo Grass					>AUST	G		P		673
Poaceae	*	*Vulpia bromoides*	Squirrel's Tail Fescue						G		A		722
Poaceae	*	*Vulpia myuros*	Rat's Tail Fescue						G		A		724
Restionaceae		*Anarthria gracilis*	Anarthria					WA	S-R		P		1058
Restionaceae		*Anarthria laevis*	Anarthria					WA	S-R		P		1060
Restionaceae		*Anarthria prolifera*	Anarthria					WA	S-R		P		1062
Restionaceae		*Anarthria scabra*	Anarthria					WA	S-R		P		1063

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Restionaceae	*Chaetanthus leptocarpoides*	Chaetanthus					WA	S-R		P		1065
Restionaceae	*Chordifex isomorphus*	Chordifex	4			p,s,Se	WA	S-R		P		17828
Restionaceae	*Cytogonidium leptocarpoides*	Ctyogonidium					WA	S-R		P		17692
Restionaceae	*Desmocladus fasciculatus*	Desmocladus					WA	S-R		P		17691
Restionaceae	*Desmocladus flexuosus*	Desmocladus					WA	S-R		P		16595
Restionaceae	*Desmocladus virgatus*	Desmocladus					WA	S-R		P		16455
Restionaceae	*Empodisma gracillimum*	Empodisma				d,p,s,u,Se,h,a	WA	S-R		P		1067
Restionaceae	*Hypolaena caespitosa*	Hypolaena				Se	WA	S-R		P		16835
Restionaceae	*Hypolaena exsulca*	Hypolaena				eSWA(B)/WHS,v	WA	S-R		P		1070
Restionaceae	*Hypolaena grandiuscula*	Hypolaena				r(N,Whicher,WHS),d,p,s,u,Se,h,a	WA	S-R		P		19918
Restionaceae	*Hypolaena pubescens*	Hypolaena					WA	S-R		P		17841
Restionaceae	*Leptocarpus diffusus*	Leptocarpus					WA	S-R		P		15557
Restionaceae	*Leptocarpus tenax*	Leptocarpus					WA	S-R		P		1082
Restionaceae	*Lepyrodia glauca*	Lepyrodia					WA	S-R		P		1085
Restionaceae	*Lepyrodia heleocharoides*	Lepyrodia	3			r(SW,Yelverton,WHS),d,p,s,u,Se	WA	S-R		P		1086
Restionaceae	*Lepyrodia hermaphrodita*	Lepyrodia					WA	S-R		P		1087
Restionaceae	*Lepyrodia macra*	Lepyrodia					WA	S-R		P		1088
Restionaceae	*Lepyrodia muirii*	Lepyrodia					WA	S-R		P		1090
Restionaceae	*Loxocarya cinerea*	Loxocarya					WA	S-R		P		1092
Restionaceae	*Loxocarya magna*	Loxocarya	3			z,p,s,u,Se,h	WA	S-R		P		13779
Restionaceae	*Loxocarya striata* subsp. *implexa* MS	Loxocarya				z,p,s,u,eSWA(B)/WHS,h	WA	S-R		P		-21148
Restionaceae	*Lyginia barbata*	Lyginia					WA	S-R		P		1097
Restionaceae	*Lyginia imberbis*	Lyginia					WA	S-R		P		18049
Restionaceae	*Meeboldina coangustata*	Meeboldina					WA	S-R		P		17679
Restionaceae	*Meeboldina decipiens* subsp. *decipiens* MS	Meeboldina					WA	S-R		P		17976
Restionaceae	*Melanostachya ustulata*	Melanostachya					WA	S-R		P		17682

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Restionaceae	*Sporadanthus rivularis* MS	River Sporadanthus					WA	S-R		P		14917
Restionaceae	*Taraxis grossa*	Taraxis					WA	S-R		P		15827
Restionaceae	*Tremulina tremula*	Tremulina					WA	S-R		P		17684
Restionaceae	*Tyrbastes glaucescens*	Tyrbastes	4			z,p,s,u,Se,h	WA	S-R		P		17680
Xanthorrhoeaceae	*Xanthorrhoea acanthostachya*	Prickly Balga				r(S,Abba,WHS),s,u,Ne,h,v,t	WA	SH		P		1249
Xanthorrhoeaceae	*Xanthorrhoea brunonis*	Squat Balga					WA	SH		P		1251
Xanthorrhoeaceae	*Xanthorrhoea gracilis*	Mimidi					WA	SH		P		1253
Xanthorrhoeaceae	*Xanthorrhoea preissii*	Balga					WA	SH		P		1256
Xyridaceae	*Xyris atrovirida*	Xyris				r(S,Abba,WHS),d,p,s,u,e,h	WA	S-J		P		15819
Xyridaceae	*Xyris lacera*	Xyris				d,s,u,Se,h	WA	S-J		P	AQE	1149
Xyridaceae	*Xyris lanata*	Xyris				d,p,s,u,Se,h	WA	S-J		P	AQE	1150
Xyridaceae	*Xyris laxiflora*	Xyris				d,s,u,Se,h	WA	S-J		P		1151
DICOTYLEDONS												
Amaranthaceae	*Alternanthera nodiflora*	Common Joyweed					WA	H	PR	A		2652
Amaranthaceae	*Ptilotus manglesii*	Mulla Mulla					WA	H		PAB		2742
Amaranthaceae	*Ptilotus stirlingii* var. *stirlingii*	Stirling's Mulla Mulla					WA	H-SH	PR	P		11364
Apiaceae	*Actinotus glomeratus*	Hidden Flannelflower					WA	H-SH		P		6203
Apiaceae	*Actinotus whicheranus*	Whicher Flannel Flower	2			z,p,s,u,eWHS,h	WA	SH-H		P		19258
Apiaceae	*Daucus glochidiatus*	Australian Carrot					>AUST	H		A		6218
Apiaceae	*Homalosciadium homalocarpum*	Homahoma					WA	H		A		6222
Apiaceae	*Hydrocotyle alata*	Pennywort					WA	H		A		6223
Apiaceae	*Hydrocotyle callicarpa*	Pennywort					AUST	H		A		6226
Apiaceae	*Hydrocotyle pilifera* var. *glabrata*	Pennywort					WA	H		A		11546
Apiaceae	*Hydrocotyle pilifera* var. *pilifera*	Pennywort					WA	H		A		11847
Apiaceae	*Pentapeltis peltigera*	Pentapeltis					WA	H	PR	P		6245
Apiaceae	*Platysace compressa*	Platysace					WA	H-SH		P		6249
Apiaceae	*Platysace filiformis*	Platysace					WA	H-SH		P		6253

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Apiaceae		*Platysace haplosciadia*	Platysace				r(N,Abba,WHS),d,s,u	WA	H-SH		P		11160
Apiaceae		*Platysace tenuissima*	Platysace					WA	H-SH		P		6259
Apiaceae		*Schoenolaena juncea*	Rush Umbel					WA	H		PAB		6263
Apiaceae		*Trachymene grandis*	White Lace Flower				d,s,u	WA	H		A		19045
Apiaceae		*Trachymene pilosa*	Small Laceflower					AUST	H		A		6280
Apiaceae		*Xanthosia atkinsoniana*	Xanthosia				d,s,u	AUST	SH-H		P		6283
Apiaceae		*Xanthosia candida*	Xanthosia					WA	H-SH		P		6284
Apiaceae		*Xanthosia ciliata*	Xanthosia					WA	H-SH		P		6285
Apiaceae		*Xanthosia huegelii* subsp. *huegelii* MS	Xanthosia					WA	H-SH		P		15968
Apiaceae		*Xanthosia pusilla*	Xanthosia					WA	H-SH		P		6291
Apiaceae		*Xanthosia tasmanica*	Xanthosia				r(N,Dardanup,WHS),d,s,u,Se,t	AUST	SH-H		P		19330
Asteraceae		*Amblysperma minor*	Claypan Native Gerbera				z,r(N,Dardanup,WHS),d,s,u,h	WA	H		PAB	AQD	-20750
Asteraceae		*Amblysperma spathulatum*	Native Gerbera					WA	H		PAB		25843
Asteraceae		*Angianthus preissianus*	Preiss's Angianthus					AUST	H		A		7833
Asteraceae	*	*Arctotheca calendula*	Capeweed						H		A		7838
Asteraceae	*	*Cirsium vulgare*	Spear Thistle						H		P		7937
Asteraceae	*	*Conyza sumatrensis*	Fleabane						H		A		20074
Asteraceae		*Cotula australis*	Common Cotula					AUST	H		A		7943
Asteraceae		*Cotula cotuloides*	Smooth Cotula					AUST	H		A	AQE/AQD	7946
Asteraceae		*Craspedia variabilis*	Bachelor's Buttons				d,s,u	AUST	H		PAB		13354
Asteraceae	*	*Crepis capillaris*	Smooth Hawksbeard						H		A		7952
Asteraceae		*Euchiton collinus*	Cudweed					AUST	H		A		19088
Asteraceae	*	*Filago gallica*	Slender Cudweed						H		A		7974
Asteraceae		*Helichrysum luteoalbum*	Jersey Cudweed					>AUST	H		P		29594
Asteraceae		*Hyalosperma cotula*	Hyalosperma					WA	H		A		12741
Asteraceae		*Hyalosperma demissum*	Hyalosperma				r(S,Abba,WHS),d,s,u	WA	H		A		12742
Asteraceae	*	*Hypochaeris glabra*	Flatweed						H		A		8086
Asteraceae		*Ixiolaena viscosa*	Sticky Ixiolaena					WA	H		A		8092

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Asteraceae		*Lagenophora huegelii*	Western Lagenophora					AUST	H		PAB		18585
Asteraceae		*Millotia myosotidifolia*	Broadleaf Millotia					AUST	H		A		8105
Asteraceae		*Millotia tenuifolia* var. *tenuifolia*	Soft Millotia					AUST	H		A		14344
Asteraceae		*Olearia homolepis*	Olearia				d(Kemp Rd),u	WA	SH-H		P		8136
Asteraceae		*Olearia paucidentata*	Autumn Daisybush					WA	SH		P		8143
Asteraceae		*Olearia strigosa*	Olearia				r(S,Whicher NP,WHS),p,s,u,eSWA(B)/WHS	WA	SH		P		8150
Asteraceae		*Pithocarpa melanostigma*	Dark-stigma Pithocarpa					WA	SH-H		P		8164
Asteraceae		*Pithocarpa pulchella*	Beautiful Pithocarpa					WA	SH-H		P		8165
Asteraceae		*Podolepis gracilis*	Slender Podolepis					AUST	H		A		8175
Asteraceae		*Podotheca angustifolia*	Sticky Podotheca					AUST	H		A		8182
Asteraceae		*Podotheca gnaphalioides*	Golden Podotheca					WA	H		A		8184
Asteraceae		*Pterochaeta paniculata*	Woolly Waitzia					WA	H		A		13255
Asteraceae		*Quinetia urvillei*	Quinetia					AUST	H		A		8195
Asteraceae		*Rhodanthe citrina*	Yellow Rhodanthe					AUST	H		A		13300
Asteraceae		*Senecio diaschides*	Eastern Groundsel					AUST	H		P		-20853
Asteraceae		*Senecio hispidulus*	Hispid Groundsel					>AUST	H		P		8208
Asteraceae		*Senecio minimus*	Toothed Groundsel					AUST	H		A		8215
Asteraceae		*Senecio multicaulis* subsp. *multicaulis*	Groundsel					AUST	H		P		20663
Asteraceae		*Senecio quadridentatus*	Cotton Groundsel					AUST	H		P		8217
Asteraceae		*Siloxerus filifolius*	Siloxerus					WA	H	PR	A		8224
Asteraceae		*Siloxerus humifusus*	Siloxerus					WA	H		A		8225
Asteraceae	*	*Sonchus asper*	Rough Sowthistle						H		A		8230
Asteraceae	*	*Sonchus oleraceus*	Common Sowthistle						H		A		8231
Asteraceae	*	*Symphyotrichum squamatum*	Bushy Starwort						H		A/P		25902
Asteraceae	*	*Tolpis virgata*	Tuberous Tolpis						H		PAB		29048
Asteraceae	*	*Ursinia anthemoides*	Ursinia						H		A		8255
Asteraceae	*	*Vellereophyton dealbatum*	White Cudweed						H		A		8257

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				WA	IUCN	Com	OS						
Asteraceae		*Waitzia nitida*	Yellow Immortelle					WA	H		A		13328
Asteraceae		*Waitzia suaveolens*	White Immortelle					WA	H		A		8282
Caesalpiniaceae		*Labichea punctata*	Shrubby Labichea					WA	SH		P		3669
Campanulaceae	*	*Wahlenbergia capensis*	Cape Bluebell						H		A		7384
Campanulaceae		*Wahlenbergia preissii*	Preiss's Native Bluebell					AUST	H		A		7389
Caryophyllaceae	*	*Cerastium glomeratum*	Sticky Mouse-ear Chickweed						H		A		2889
Caryophyllaceae	*	*Petrorhagia dubia*	Velvet Pink						H		A		19825
Casuarinaceae		*Allocasuarina fraseriana*	Fraser's Sheoak					WA	T		P		1728
Casuarinaceae		*Allocasuarina humilis*	Dwarf Sheoak					WA	SH		P		1732
Casuarinaceae		*Allocasuarina thuyoides*	Horned Sheoak				d,s,u	WA	SH		P		1739
Cephalotaceae		*Cephalotus follicularis*	Albany Pitcher Plant				r(N,Haag NR,WHS),d,p,s,u,h,a	WA	H		P		3148
Clusiaceae		*Hypericum gramineum*	Small St John's Wort					>AUST	SH		P		5180
Crassulaceae		*Crassula closiana*	Stonecrop					AUST	H		A		17701
Crassulaceae		*Crassula colorata* var. *acuminata*	Dense Stonecrop					>AUST	H		A		11709
Crassulaceae		*Crassula colorata* var. *colorata*	Dense Stonecrop					>AUST	H		A		11563
Crassulaceae	*	*Crassula natans* var. *minus*	Pond Stonecrop						H		A	AQS/AQE/AQD	15706
Crassulaceae		*Crassula peduncularis*	Purple Stonecrop					>AUST	H		A		3144
Crassulaceae		*Crassula tetramera*	Stonecrop					AUST	H		A		20268
Cuscutaceae	*	*Cuscuta epithymum*	Lesser Dodder						H	CL	A-PAR		6663
Dilleniaceae		*Hibbertia acerosa*	Needle-leaved Hibbertia				d,s,u	WA	SH		P		5108
Dilleniaceae		*Hibbertia amplexicaulis*	Hibbertia					WA	SH		P		5109
Dilleniaceae		*Hibbertia aurea*	Hibbertia				d,s,u,v,g	WA	SH		P		5112
Dilleniaceae		*Hibbertia commutata*	Hibbertia					WA	SH		P		5114
Dilleniaceae		*Hibbertia cunninghamii*	Cunningham's Hibbertia					WA	SH		P		5118
Dilleniaceae		*Hibbertia diamesogenos* MS	Hibbertia					WA	SH		P		20051

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Dilleniaceae	*Hibbertia ferruginea*	Ferruginous Hibbertia				z,s,u,Se	WA	SH		P		5125
Dilleniaceae	*Hibbertia glomerata* subsp. *darlingensis*	Hibbertia					WA	SH		P		19778
Dilleniaceae	*Hibbertia glomerata* subsp. *glomerata*	Hibbertia					WA	SH		P		19777
Dilleniaceae	*Hibbertia huegelii*	Huegel's Hibbertia				r(S,West WHS),d,s,u	WA	SH		P		5134
Dilleniaceae	*Hibbertia hypericoides*	Common Hibbertia					WA	SH		P		5135
Dilleniaceae	*Hibbertia lasiopus*	Hibbertia				r(N,Argyle,WHS),d,p,s,u,t	WA	SH		P		5139
Dilleniaceae	*Hibbertia mylnei*	Hibbertia				d,s,u	WA	SH		P		5148
Dilleniaceae	*Hibbertia notibractea*	Hibbertia					WA	SH		P		19687
Dilleniaceae	*Hibbertia nymphaea*	Hibbertia					WA	SH		P		5150
Dilleniaceae	*Hibbertia perfoliata*	Hibbertia					WA	SH	CL	P		5154
Dilleniaceae	*Hibbertia pilosa*	Hibbertia					WA	SH		P		5155
Dilleniaceae	*Hibbertia quadricolor*	Hibbertia					WA	SH		P		5161
Dilleniaceae	*Hibbertia racemosa*	Stalked Hibbertia					WA	SH		P		5162
Dilleniaceae	*Hibbertia serrata*	Serrate-leaved Hibbertia				d	WA	SH		P		5169
Dilleniaceae	*Hibbertia subvaginata*	Hibbertia					WA	SH		P		5173
Dilleniaceae	*Hibbertia vaginata*	Hibbertia					WA	SH		P		5176
Droseraceae	*Drosera barbigera*	Sundew					WA	H		PAA		3090
Droseraceae	*Drosera enodes*	Sundew					WA	H		P		13200
Droseraceae	*Drosera erythrorhiza* subsp. *erythrorhiza*	Red Ink Sundew					WA	H		PAB		13217
Droseraceae	*Drosera gigantea* subsp. *geniculata*	Giant Sundew					WA	H		PAB		16244
Droseraceae	*Drosera gigantea* subsp. *gigantea*	Giant Sundew					WA	H		PAB		15453
Droseraceae	*Drosera glanduligera*	Sundew					AUST	H		A		3098
Droseraceae	*Drosera hyperostigma*	Sundew				d,s,u	WA	H		P		13197
Droseraceae	*Drosera leucoblasta*	Sundew					WA	H		PAA		3105
Droseraceae	*Drosera macrantha* subsp. *macrantha*	Rainbow					WA	H		PAB		14298
Droseraceae	*Drosera marchantii* subsp. *marchantii*	Marchant's Rainbow					WA	H		PAB		13209
Droseraceae	*Drosera menziesii* subsp. *menziesii*	Menzies' Rainbow					WA	H		PAB		11853

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			WA	IUCN	Com	OS						
Droseraceae	*Drosera menziesii* subsp. *penicillaris*	Menzies' Rainbow					WA	H		PAB		13216
Droseraceae	*Drosera microphylla*	Rainbow					WA	H		PAB		3110
Droseraceae	*Drosera myriantha*	Rainbow				r(N,Goodwood Rd,WHS),d,s,u	WA	H		PAB		3112
Droseraceae	*Drosera neesii* subsp. *neesii*	Rainbow					WA	H		PAB		11768
Droseraceae	*Drosera nitidula*	Sundew					WA	H		PAA		3114
Droseraceae	*Drosera paleacea* subsp. *paleacea*	Sundew					WA	H		PAA		13188
Droseraceae	*Drosera pallida*	Rainbow					WA	H		PAB		3118
Droseraceae	*Drosera platystigma*	Sundew					WA	H		PAA		3123
Droseraceae	*Drosera porrecta*	Sundew					WA	H		PAB		29178
Droseraceae	*Drosera pulchella*	Sundew					WA	H		PAA		3124
Droseraceae	*Drosera rosulata*	Sundew					WA	H		PAB		8911
Droseraceae	*Drosera stelliflora*	Sundew					WA	H		P		13385
Droseraceae	*Drosera stolonifera*	Sundew					WA	H		PAB		3131
Droseraceae	*Drosera subhirtella*	Rainbow					WA	H		PAB		3133
Droseraceae	*Drosera zonaria*	Sundew					WA	H		PAB		3135
Epacridaceae	*Andersonia aristata*	Andersonia				r(S,Gale Rd Ironstones,WHS),d,s,u,h	WA	SH		P		6300
Epacridaceae	*Andersonia barbata*	Andersonia				r(N,Abba,WHS),d,p,s,u,Se	WA	SH		P		6303
Epacridaceae	*Andersonia caerulea* subsp. *caerulea*	Andersonia					WA	SH		P		25844
Epacridaceae	*Andersonia fallax* MS	Andersonia				z,r(N,Whicher NP,WHS),p,s,u,eWHS/BP,h	WA	SH		P		19672
Epacridaceae	*Andersonia ferricola* MS	Ironstone Andersonia	1			z,r(S,Treeton,WHS),p,s,u,eSWA(B)/WHS,h	WA	SH		P		18102
Epacridaceae	*Andersonia heterophylla*	Andersonia				r(S,Whicher NP,WHS),d,s,u,h	WA	SH		P		6311
Epacridaceae	*Andersonia involucrata*	Andersonia					WA	SH		P		6312
Epacridaceae	*Andersonia lehmanniana* subsp. *lehmanniana*	Lehmann's Andersonia					WA	SH		P		11471
Epacridaceae	*Andersonia micrantha*	Andersonia				r(N,Boyanup,WHS),p,s,u,Se	WA	SH		P		6317
Epacridaceae	*Andersonia sprengelioides*	Andersonia					WA	SH		P		6321
Epacridaceae	*Astroloma ciliatum*	Astroloma					WA	SH		P		6323

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Epacridaceae	*Astroloma drummondii*	Drummond's Astroloma					WA	SH		P		6325
Epacridaceae	*Astroloma pallidum*	Astroloma					WA	SH		P		6334
Epacridaceae	*Astroloma* sp. Nannup (R.D. Royce 3978) PN	Nannup Astroloma	4			z,r(N,Abba,WHS),p,s,u,Se	WA	SH		P		14504
Epacridaceae	*Conostephium pendulum*	Pearlflower					WA	SH		P		6348
Epacridaceae	*Leucopogon* aff. gracilis (Gibson et al. 1994)	Beard Heath					WA	SH		P		-20543
Epacridaceae	*Leucopogon* aff. polymorphus (Gibson et al. 1994)	Beard Heath					WA	SH		P		-20546
Epacridaceae	*Leucopogon australis* subsp. *australis*	Beard Heath					AUST	SH		P		-20257
Epacridaceae	*Leucopogon capitellatus*	Beard Heath					WA	SH		P		6367
Epacridaceae	*Leucopogon conostephioides*	Beard Heath					WA	SH		P		6374
Epacridaceae	*Leucopogon cordatus*	Beard Heath					WA	SH		P		6375
Epacridaceae	*Leucopogon elatior*	Beard Heath					WA	SH		P		6389
Epacridaceae	*Leucopogon glabellus*	Beard Heath					WA	SH		P		6396
Epacridaceae	*Leucopogon gracillimus*	Beard Heath					WA	SH		P		6400
Epacridaceae	*Leucopogon hirsutus*	Beard Heath					WA	SH		P		6402
Epacridaceae	*Leucopogon nutans*	Beard Heath					WA	SH		P		6416
Epacridaceae	*Leucopogon obovatus*	Beard Heath					WA	SH		P		6417
Epacridaceae	*Leucopogon oliganthus*	Beard Heath				r(S,Abba,WHS),d,s,u,a,g	WA	SH		P		6421
Epacridaceae	*Leucopogon oxycedrus*	Beard Heath					WA	SH		P		6425
Epacridaceae	*Leucopogon parviflorus*	Beard Heath					WA	SH		P		6427
Epacridaceae	*Leucopogon pendulus*	Beard Heath					WA	SH		P		6428
Epacridaceae	*Leucopogon propinquus*	Beard Heath					WA	SH		P		6436
Epacridaceae	*Leucopogon pulchellus*	Beard Heath					WA	SH		P		6439
Epacridaceae	*Leucopogon* sp. Margaret River (J. Scott 207) PN	Beard Heath					WA	SH		P		19662

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Epacridaceae		*Leucopogon* sp. Whicher Range (G.J. Keighery 11763) PN	Whicher Beard Heath				r(N,Abba,WHS),s,eWHS/BP	WA	SH		P		18097
Epacridaceae		*Leucopogon verticillatus*	Tassel Bush					WA	SH		P		6454
Epacridaceae		*Lysinema ciliatum*	Curry Lysinema					WA	SH		P		6456
Epacridaceae		*Sphenotoma capitatum*	Paper Heath					WA	SH		P		6466
Epacridaceae		*Sphenotoma gracile*	Paper Heath					WA	SH		P		6469
Epacridaceae		*Styphelia tenuiflora*	Pin Heath					WA	SH		P		6476
Euphorbiaceae		*Amperea ericoides*	Amperea					WA	SH		P		4585
Euphorbiaceae		*Amperea micrantha*	Amperea	2			p,s,u	WA	SH		P		4586
Euphorbiaceae		*Amperea simulans*	Amperea					WA	SH-H		P		13101
Euphorbiaceae		*Amperea volubilis*	Amperea				r(N,Whicher,WHS),d,p,s,u	WA	SH		P		4588
Euphorbiaceae		*Monotaxis grandiflora* var. *grandiflora*	Monotaxis					WA	H		P		19585
Euphorbiaceae		*Monotaxis occidentalis*	Monotaxis					WA	H-SH		P		4666
Euphorbiaceae		*Phyllanthus calycinus*	Phyllanthus					WA	H		P		4675
Euphorbiaceae		*Poranthera huegelii*	Poranthera					AUST	H-SH		P		4690
Euphorbiaceae		*Poranthera microphylla*	Poranthera					WA	H-SH		P		4691
Euphorbiaceae		*Ricinocarpos* aff. cyanescens (A. Webb sn 27 October 2003)	Whicher Ricinocarpos				z,p,s,u,eWHS,h	WA	SH		P		-21109
Euphorbiaceae		*Ricinocarpos glaucus*	Wedding Bush					WA	SH		P		4695
Euphorbiaceae		*Stachystemon vermicularis*	Stachystemon				d,p,s,u,h	WA	SH		P		4716
Euphorbiaceae		*Stachystemon virgatus*	Pseudanthus					>AUST	H		A		20537
Fumariaceae	*	*Fumaria capreolata*	Climbing Fumitory						H	CL	A		2969
Fumariaceae	*	*Fumaria muralis*	Wall Fumitory						H	CL	A		2971
Gentianaceae	*	*Centaurium erythraea*	Centaury						H		A		6539
Gentianaceae		*Sebaea ovata*	Sebaea					WA	H		A		6544
Geraniaceae	*	*Geranium dissectum*	Cut-leaved Cranesbill						H		A		4337
Geraniaceae		*Geranium solanderi*	Native Geranium					AUST	H		A/P		4341
Goodeniaceae		*Anthotium junciforme*	Anthotium	4			p,s,u,h	WA	H		A/P		12724
Goodeniaceae		*Dampiera alata*	Dampiera					WA	H-SH		P		7420

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Goodeniaceae		*Dampiera hederacea*	Dampiera					WA	H-SH		P		7444
Goodeniaceae		*Dampiera leptoclada*	Dampiera					WA	H-SH		P		7452
Goodeniaceae		*Dampiera linearis*	Dampiera				v,g	WA	H-SH		P		7454
Goodeniaceae		*Goodenia coerulea*	Goodenia					WA	H-SH		P		29362
Goodeniaceae		*Goodenia eatoniana*	Goodenia					WA	H		P		7505
Goodeniaceae		*Goodenia incana*	Goodenia					WA	H		P		7517
Goodeniaceae		*Goodenia pulchella*	Goodenia					WA	H		P		7538
Goodeniaceae		*Lechenaultia biloba*	Blue Leschenaultia					WA	H-SH		P		7568
Goodeniaceae		*Lechenaultia expansa*	Leschenaultia					WA	H-SH		P		7572
Goodeniaceae		*Lechenaultia floribunda*	Leschenaultia					WA	H-SH		P		7574
Goodeniaceae		*Scaevola calliptera*	Royal Robe Fanflower					WA	H-SH		P		7602
Goodeniaceae		*Scaevola glandulifera*	Sticky Fanflower					WA	H-SH		P		7613
Goodeniaceae		*Scaevola phlebopetala*	Royal Robe Fanflower					WA	H-SH		P		7634
Goodeniaceae		*Scaevola striata*	Royal Robe Fanflower					WA	H-SH		P		7646
Goodeniaceae		*Velleia trinervis*	Velleia					WA	H		P		7665
Haloragaceae		*Glischrocaryon aureum*	Common Popflower					AUST	H-SH		P		6143
Haloragaceae		*Gonocarpus diffusus*	Gonocarpus					WA	H		P		6150
Haloragaceae		*Gonocarpus paniculatus*	Gonocarpus					WA	H		P		6160
Haloragaceae		*Haloragis brownii*	Haloragis					AUST	H		P	AQS/AQE	6170
Lamiaceae		*Hemiandra pungens*	Snakebush					WA	SH	PR	P		6839
Lamiaceae		*Hemigenia humilis*	Hemigenia					WA	SH		P		6855
Lamiaceae		*Hemigenia incana*	Hemigenia					WA	SH		P		6856
Lamiaceae		*Hemigenia rigida*	Hemigenia	1			p,s,h	WA	SH		P		6868
Lamiaceae		*Hemigenia sericea*	Hemigenia					WA	SH		P		6871
Lamiaceae	*	*Mentha pulegium*	Pennyroyal						H-SH		P		6883
Lamiaceae		*Pityrodia bartlingii*	Woolly Foxglove				r(SW,Whicher,WHS),d,p,s,u,Ne,h,g	WA	SH		P		6801
Lamiaceae	*	*Stachys arvensis*	Stagger Weed						H		P		6930
Lauraceae		*Cassytha flava*	Dodder Laurel					WA	H	CL	P-PAR		2951

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Lauraceae		*Cassytha glabella*	Dodder Laurel					WA	H	CL	P-PAR		2952
Lauraceae		*Cassytha micrantha*	Dodder Laurel					WA	H	CL	P-PAR		2954
Lauraceae		*Cassytha nodiflora*	Dodder Laurel					WA	H	CL	P-PAR		2955
Lauraceae		*Cassytha pomiformis*	Dodder Laurel					WA	H	CL	P-PAR		2956
Lauraceae		*Cassytha racemosa*	Dodder Laurel					AUST	H	CL	P-PAR		2957
Lentibulariaceae		*Utricularia multifida*	Pink Petticoats					WA	H		A	AQD	7148
Lentibulariaceae		*Utricularia tenella*	Pinkfans					AUST	H		A	AQD	7153
Lentibulariaceae		*Utricularia violacea*	Violet Bladderwort					AUST	H		A	AQD	7157
Linaceae	*	*Linum trigynum*	French Flax						H		A		4363
Lobeliaceae		*Isotoma hypocrateriformis*	Woodbridge Poison					WA	H		A		7396
Lobeliaceae		*Lobelia alata*	Angled Lobelia					>AUST	H		P		7400
Lobeliaceae		*Lobelia gibbosa*	Tall Lobelia					WA	H		A		7402
Lobeliaceae		*Lobelia rarifolia*	Lobelia					WA	H		A		7405
Lobeliaceae		*Lobelia rhombifolia*	Tufted Lobelia					WA	H		A		7406
Lobeliaceae		*Lobelia rhytidosperma*	Wrinkled Lobelia					WA	H		A		7407
Lobeliaceae		*Lobelia tenuior*	Slender Lobelia					WA	H		A		7408
Lobeliaceae	*	*Monopsis debilis*	Monopsis						H		A		7410
Loganiaceae		*Logania campanulata*	Bell-flowered Logania					WA	H		P		6506
Loganiaceae		*Logania serpyllifolia* subsp. *angustifolia*	Logania					WA	H-SH		P		13128
Loganiaceae		*Logania serpyllifolia* subsp. *serpyllifolia*	Logania					WA	H-SH		P		14551
Loganiaceae		*Logania wendyae*	Wendy's Logania	1			z,p,s,u,eWHS,h	WA	SH-H		P		29553
Loganiaceae		*Phyllangium divergens*	Phyllangium					WA	H		A		16825
Loganiaceae		*Phyllangium paradoxum*	Phyllangium					WA	H		A		16177
Loranthaceae		*Nuytsia floribunda*	Christmas Tree					WA	T		P-PAR		2401
Lythraceae	*	*Lythrum hyssopifolia*	Lesser Loosestrife						H		A		5281
Malvaceae		*Sida hookeriana*	Native Sida					WA	H		A		4980
Menyanthaceae		*Villarsia albiflora*	White Villarsia					WA	H		PAB	AQE	6553
Menyanthaceae		*Villarsia parnassiifolia*	Yellow Villarsia					WA	H		PAB	AQE	6559
Mimosaceae		*Acacia alata*	Winged Wattle					WA	SH		P		3207

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Mimosaceae	*Acacia applanata*	Yellow Grass Wattle					WA	SH		P		15466
Mimosaceae	*Acacia browniana* var. *browniana*	Brown's Wattle				r(N,Gwindinup Reserve,WHS)	WA	SH		P		11731
Mimosaceae	*Acacia dentifera*	River Wattle					WA	SH		P		3294
Mimosaceae	*Acacia divergens*	Wattle					WA	SH		P		3307
Mimosaceae	*Acacia extensa*	Wiry Wattle					WA	SH		P		3331
Mimosaceae	*Acacia flagelliformis*	Rush Wattle	4			p,s,u,eSWA/WHS/BP,h	WA	SH		P		3339
Mimosaceae	*Acacia gilbertii*	Gilbert's Wattle					WA	SH		P		3347
Mimosaceae	*Acacia hastulata*	Wattle					WA	SH		P		3363
Mimosaceae	*Acacia huegelii*	Huegel's Wattle					WA	SH		P		3374
Mimosaceae	*Acacia inops*	Wattle	3			d,p,s,u,Se,h	WA	SH		P		3386
Mimosaceae	*Acacia lasiocarpa*	Panjang					WA	SH		P		3409
Mimosaceae	*Acacia lateriticola*	Wattle					WA	SH		P		3410
Mimosaceae	*Acacia luteola*	Wattle				r(N,Dardanup,WHS),d	WA	SH		P		3428
Mimosaceae	*Acacia mooreana*	Moore's Wattle				r(N,Dardanup,WHS),s,h	WA	SH		P		3448
Mimosaceae	*Acacia myrtifolia*	Myrtle Wattle					AUST	SH		P		3453
Mimosaceae	*Acacia nervosa*	Ribbed Wattle					WA	SH		P		3454
Mimosaceae	*Acacia obovata*	Wattle					WA	SH		P		3464
Mimosaceae	*Acacia preissiana*	Preiss's Wattle				r(S,WHS),s	WA	SH		P		3496
Mimosaceae	*Acacia pulchella* var. *glaberrima*	Prickly Moses					WA	SH		P		15481
Mimosaceae	*Acacia pulchella* var. *pulchella*	Prickly Moses					WA	SH		P		15483
Mimosaceae	*Acacia saligna*	Coojong					WA	SH		P		3527
Mimosaceae	*Acacia semitrullata*	Wattle	3			p,s,u,h	WA	SH		P		3537
Mimosaceae	*Acacia sessilis*	Wattle					WA	SH		P		3541
Mimosaceae	*Acacia stenoptera*	Narrow-winged Wattle					WA	SH		P		3557
Mimosaceae	*Acacia tayloriana*	Taylor's Wattle	4			r(N,Abba,WHS),p,s,u,eWHS/BP	WA	SH		P		3571
Mimosaceae	*Acacia teretifolia*	Wattle					WA	SH		P		3574
Mimosaceae	*Acacia tetragonocarpa*	Wattle				d,s,u	WA	SH-H		P		3576
Mimosaceae	*Acacia uliginosa*	Wattle				r(N,Whicher,WHS),p,s,u,Se	WA	SH		P		3588
Mimosaceae	*Acacia urophylla*	Wattle					WA	SH		P		3591

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			WA	IUCN	Com	OS						
Mimosaceae	*Acacia varia* var. *varia*	Wattle					WA	SH		P		15487
Mimosaceae	*Acacia willdenowiana*	White Grass Wattle					WA	SH-H		P		3602
Myoporaceae	*Myoporum caprarioides*	Slender Myoporum					WA	SH		P		7289
Myrtaceae	*Actinodium cunninghamii*	Albany Swamp Daisy				p,s,u,h,g	WA	SH		P		5315
Myrtaceae	*Agonis flexuosa* var. *flexuosa*	Peppermint				s,u,h	WA	T		P		17202
Myrtaceae	*Astartea leptophylla*	Astartea					WA	SH		P		20249
Myrtaceae	*Astartea scoparia*	Astartea					WA	SH		P		20283
Myrtaceae	*Baeckea camphorosmae*	Camphor Myrtle					WA	SH		P		5336
Myrtaceae	*Beaufortia sparsa*	Swamp Beaufortia				d,p,s,u,h,g	WA	SH		P		5392
Myrtaceae	*Beaufortia squarrosa*	Sandplain Beaufortia				r(S,Abba,WHS),d,p,s,u,Ne,h,g	WA	SH		P		5393
Myrtaceae	*Calothamnus lateralis*	Swamp Calothamnus					WA	SH		P		5415
Myrtaceae	*Calothamnus pallidifolius*	Whicher Calothamnus				s,u	WA	SH		P		5422
Myrtaceae	*Calothamnus quadrifidus*	Freeway Calothamnus					WA	SH		P		5426
Myrtaceae	*Calothamnus sanguineus*	Silky-leaved Calothamnus					WA	SH		P		5429
Myrtaceae	*Calothamnus schaueri*	Schauer's Calothamnus				d,s,u	WA	SH		P		5430
Myrtaceae	*Calothamnus* sp. Scott River (R.D. Royce 84) PN	Scott River Calothamnus	2			z,r(N,Treeton,WHS),p,s,u,eWHS/SC,h	WA	SH		P		14255
Myrtaceae	*Calothamnus* sp. Whicher (B.J. Keighery & N. Gibson 230) PN	Ironstone Calothamnus	4			z,p,s,u,eSWA(B)/WHS,h	WA	SH		P		16742
Myrtaceae	*Calytrix angulata*	Yellow Starflower					WA	SH		P		5439
Myrtaceae	*Calytrix flavescens*	Yellow Summer Starflower					WA	SH		P		5458
Myrtaceae	*Calytrix fraseri*	Pink Summer Starflower				d,s,u,h	WA	SH		P		5460
Myrtaceae	*Calytrix leschenaultii*	Leschenault's Starflower					WA	SH		P		5465
Myrtaceae	*Calytrix* sp. Tutunup (G.J. Keighery & N. Gibson 2953) PN	Ironstone Starflower	2			z,p,s,u,eSWA(B)/WHS,h,t	WA	SH		P		19974

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Myrtaceae	*Calytrix tenuiramea*	Starflower				r(W,Whicher NP,WHS),d,s,u,h	WA	SH		P		5482
Myrtaceae	*Chamelaucium erythrochlorum* MS	Blackwood Wax	4			z,r(N,Dardanup,WHS),p,s,u,eSWA(B)/WHS/BP,h	WA	SH		P		13625
Myrtaceae	*Darwinia citriodora*	Lemon-scented Darwinia					WA	SH		P		5508
Myrtaceae	*Darwinia oederoides*	Running Darwinia					WA	SH		P		5519
Myrtaceae	*Darwinia vestita*	Pom-pom Darwinia				r(NW,Dardanup,WHS),p,s,u,Se	WA	SH		P		5533
Myrtaceae	*Eremaea asterocarpa*	Star-fruited Eremaea				r(S,Argyle,WHS),d,s,u,eSWA/WHS,h	WA	SH		P		13949
Myrtaceae	*Eremaea pauciflora* var. *pauciflora*	Sandplain Eremaea				d,s,u,h	WA	SH		P		14104
Myrtaceae	*Eucalyptus calophylla*	Marri					WA	T		P		5578
Myrtaceae	*Eucalyptus decipiens* subsp. *chalara*	Swamp Limestone Marlock				z,r(N,Goodwood Rd,WHS),p,s,u,h	WA	M		P		13538
Myrtaceae	*Eucalyptus haematoxylon*	Mountain Marri				r(S,Treeton,WHS),d,s,Ne,g	WA	T		P		5668
Myrtaceae	*Eucalyptus haematoxylon x calophylla*	Hybrid Gum					WA	T		P		-20560
Myrtaceae	*Eucalyptus marginata* subsp. *marginata*	Jarrah					WA	T		P		13547
Myrtaceae	*Eucalyptus megacarpa*	Bullich				d,s,u,h	WA	T/M		P		5709
Myrtaceae	*Eucalyptus patens*	Swan River Blackbutt					WA	T/M		P		5739
Myrtaceae	*Eucalyptus relicta*	Whicher Mallee	2			z,p,s,u,eWHS/BP,h,a	WA	T		P		20852
Myrtaceae	*Eucalyptus relicta x lane-poolei*	Hybrid Whicher Gum				p,s,u,eWHS	WA	T		P		-21129
Myrtaceae	*Eucalyptus rudis*	Flooded Gum					WA	T		P		5763
Myrtaceae	*Homalospermum firmum*	Homalospermum				d,s,u,h	WA	SH		P		5816
Myrtaceae	*Hypocalymma angustifolium*	White Myrtle					WA	SH		P		5817
Myrtaceae	*Hypocalymma cordifolium* subsp. *cordifolium*	Myrtle					WA	SH		P		19603
Myrtaceae	*Hypocalymma robustum*	Swan River Myrtle					WA	SH		P		5825
Myrtaceae	*Hypocalymma strictum*	Myrtle					WA	SH		P		5827

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Myrtaceae	*Kunzea* aff. micrantha (B.J. Keighery & N. Gibson 569)	Ironstone Kunzea					WA	SH		P		-21130
Myrtaceae	*Kunzea glabrescens*	Spearwood					WA	SH		P		15498
Myrtaceae	*Kunzea micrantha*	Clay Kunzea					WA	SH		P		5835
Myrtaceae	*Kunzea recurva*	Purple Swamp Kunzea					WA	SH		P		5841
Myrtaceae	*Kunzea rostrata*	Orange-fruited Kunzea				r(N,Dardanup,WHS),s,eSWA(B)/WHS/BP	WA	SH		P		14776
Myrtaceae	*Leptospermum erubescens*	Common Leptospermum					WA	SH		P		5847
Myrtaceae	*Melaleuca incana*	Grey Honeymyrtle					AUST	SH		P		5921
Myrtaceae	*Melaleuca preissiana*	Preiss's Paperbark					WA	T		P		5952
Myrtaceae	*Melaleuca systena*	Yellow Honeymyrtle					WA	SH		P		18598
Myrtaceae	*Melaleuca thymoides*	Yellow Honeymyrtle					WA	SH		P		5980
Myrtaceae	*Melaleuca trichophylla*	Pink Honeymyrtle					WA	SH		P		5983
Myrtaceae	*Paragonis grandiflora* MS	Strange Peppermint				r(S,Whicher NP,WHS),s	WA	SH		P		20101
Myrtaceae	*Pericalymma ellipticum*	Pericalymma					WA	SH		P		6006
Myrtaceae	*Pericalymma spongiocaule*	Pericalymma					WA	SH		P		15501
Myrtaceae	*Regelia ciliata*	Mouse Plant					WA	SH		P		6012
Myrtaceae	*Scholtzia involucrata*	Scholtzia					WA	SH		P		6033
Myrtaceae	*Taxandria fragrans* MS	Swamp Peppermint				r(N,Argyle,WHS),d,s,u,h	WA	SH		P		20114
Myrtaceae	*Taxandria juniperina* MS	River Peppermint					WA	SH		P		20115
Myrtaceae	*Taxandria linearifolia* MS	Creek Peppermint					WA	SH		P		20135
Myrtaceae	*Taxandria parviceps* MS	Swamp Peppermint					WA	SH		P		20133
Myrtaceae	*Verticordia densiflora* var. *densiflora*	Compacted Featherflower					WA	SH		P		15432
Myrtaceae	*Verticordia densiflora* var. *pedunculata*	Compacted Featherflower	R	E	E	d,p,s,u,eSWA(B)/WHS,h	WA	SH		P		12412
Myrtaceae	*Verticordia plumosa*	Plumed Featherflower					WA	SH		P		6110
Olacaceae	*Olax benthamiana*	Bentham's Olax					AUST	SH		P-PAR		2365

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Onagraceae		*Epilobium billardiereanum* subsp. *cinereum*	Willow Herb					WA	H		P		11756
Onagraceae		*Epilobium hirtigerum*	Hairy Willow Herb					WA	H		P		6133
Orobanchaceae	*	*Orobanche minor*	Broom Rape						H		A-PAR		7122
Oxalidaceae		*Oxalis exilis*	Native Oxalis					AUST	H		PAB		30375
Oxalidaceae	*	*Oxalis glabra*	Fingerleaf Oxalis						H		PAB		4352
Papilionaceae		*Aotus cordifolia*	Swamp Aotus	3			p,s,u,h	WA	SH		P		3686
Papilionaceae		*Aotus gracillima*	Aotus					WA	SH		P		3688
Papilionaceae		*Aotus procumbens*	Prostrate Aotus					WA	SH	PR	P		3692
Papilionaceae		*Bossiaea aquifolium* subsp. *aquifolium*	Bossiaea					WA	SH		P		14396
Papilionaceae		*Bossiaea eriocarpa*	Common Bossiaea					WA	SH		P		3710
Papilionaceae		*Bossiaea linophylla*	Bossiaea					WA	SH		P		3713
Papilionaceae		*Bossiaea ornata*	Hills Bossiaea					WA	SH		P		3714
Papilionaceae		*Bossiaea praetermissa*	Bossiaea					WA	SH		P		14291
Papilionaceae		*Bossiaea pulchella*	Beautiful Bossiaea				r(S,Abba,WHS),p,s	WA	SH		P		3717
Papilionaceae		*Bossiaea rufa*	Red Bossiaea					WA	SH		P		3718
Papilionaceae		*Bossiaea* sp. Waroona (B.J. Keighery & N. Gibson 229) PN	Foothills Bossiaea				z,r(S,Goodwood Rd,WHS)	WA	SH		P		18497
Papilionaceae		*Callistachys lanceolata*	Native Willow					WA	SH/T		P		10861
Papilionaceae		*Chorizema cordatum*	Flame Pea					WA	SH		P		8971
Papilionaceae		*Chorizema diversifolium*	Pale Flame Pea					WA	SH	CL	P		3754
Papilionaceae		*Chorizema glycinifolium*	Hidden Flame Pea					WA	SH	CL	P		3757
Papilionaceae		*Chorizema nanum*	Small Holly-leaved Flame Pea					WA	SH	CL	P		12765
Papilionaceae		*Chorizema reticulatum*	Showy Flame Pea	3			r(N,Argyle,WHS),p,s	WA	SH		P		3760
Papilionaceae		*Chorizema rhombeum*	Diamond-leaved Flame Pea					WA	SH		P		3761
Papilionaceae		*Chorizema spathulatum*	Flame Pea				r(N,Whicher NP,WHS),d,Se	WA	SH		P		14586
Papilionaceae		*Daviesia angulata*	Daviesia					WA	SH		P		3793
Papilionaceae		*Daviesia cordata*	Bookleaf Daviesia					WA	SH		P		3799

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Papilionaceae	*Daviesia decurrens* subsp. *decurrens* MS	Daviesia					WA	SH		P		19747
Papilionaceae	*Daviesia divaricata* subsp. *divaricata* MS	Daviesia				d,s,u,h	WA	SH		P		18560
Papilionaceae	*Daviesia elongata* subsp. *elongata*	Spreading Daviesia	R	V	V	p,s,u,eSWA(B)/WHS,h	WA	SH		P		14529
Papilionaceae	*Daviesia flexuosa*	Flexible Daviesia				r(N,West WHS),d,s,u,Se	WA	SH		P		3811
Papilionaceae	*Daviesia incrassata* subsp. *incrassata*	Daviesia					WA	SH		P		15505
Papilionaceae	*Daviesia inflata*	Daviesia					WA	SH		P		3817
Papilionaceae	*Daviesia major*	Daviesia				r(S,Abba,WHS),d	WA	SH		P		14892
Papilionaceae	*Daviesia nudiflora*	Leafy Daviesia				r(S,Argyle,WHS),d,s,u,h,v	WA	SH		P		3824
Papilionaceae	*Daviesia physodes*	Daviesia					WA	SH		P		3832
Papilionaceae	*Daviesia podophylla*	Daviesia					WA	SH		P		3833
Papilionaceae	*Daviesia preissii*	Preiss's Daviesia					WA	SH		P		3835
Papilionaceae	*Daviesia rhombifolia*	Daviesia					WA	SH		P		3839
Papilionaceae	*Dillwynia laxiflora*	Dillwynia					WA	SH		P		20367
Papilionaceae	*Dillwynia* sp. Capel (P.A. Jurjevich 1771) PN	Capel Dillwynia				z,r(N,WHS),p,s,u,eWHS/BP	WA	SH		P		19852
Papilionaceae	*Dillwynia uncinata*	Dillwynia					WA	SH		P		3866
Papilionaceae	*Euchilopsis linearis*	Swamp Pea					WA	SH		P		3872
Papilionaceae	*Eutaxia virgata*	Eutaxia					WA	SH		P		3880
Papilionaceae	*Gastrolobium capitatum*	Common Gastrolobium					WA	SH		P		20475
Papilionaceae	*Gastrolobium ebracteolatum*	River Gastrolobium					WA	SH		P		20473
Papilionaceae	*Gastrolobium modestum*	Modest Gastrolobium	R	V	V	z,p,s,u,eWHS/BP,h	WA	SH		P		20510
Papilionaceae	*Gastrolobium spinosum*	Prickly Poison					WA	SH		P		3924
Papilionaceae	*Gastrolobium whicherense*	Whicher Gastrolobium	2			z,p,s,u,eWHS,h	WA	SH		P		20474
Papilionaceae	*Gompholobium aristatum*	Yellow Gompholobium					WA	SH		P		3945
Papilionaceae	*Gompholobium capitatum*	Pretty Yellow Gompholobium					WA	SH		P		3948
Papilionaceae	*Gompholobium confertum*	Pretty Purple Gompholobium					WA	SH		P		10909

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Papilionaceae	*Gompholobium cyaninum* MS	Blue Gompholobium				s,u,h	WA	SH		P		19216
Papilionaceae	*Gompholobium knightianum*	Pink Climbing Gompholobium					WA	SH		P		3950
Papilionaceae	*Gompholobium marginatum*	Little Gompholobium					WA	SH		P		3951
Papilionaceae	*Gompholobium ovatum*	Red Gompholobium					WA	SH		P		3953
Papilionaceae	*Gompholobium polymorphum*	Many-coloured Scrambling Gompholobium					WA	SH	CL	P		3954
Papilionaceae	*Gompholobium preissii*	Preiss's Gompholobium					WA	SH		P		3955
Papilionaceae	*Gompholobium scabrum*	Showy Gompholobium					WA	SH		P		11083
Papilionaceae	*Gompholobium shuttleworthii*	Sticky Gompholobium					WA	SH		P		3956
Papilionaceae	*Gompholobium tomentosum*	Common Gompholobium					WA	SH		P		3957
Papilionaceae	*Gompholobium villosum*	Hairy Gompholobium				d,s,u	WA	SH		P		11115
Papilionaceae	*Hardenbergia comptoniana*	Hardenbergia					WA	SH	CL	P		3961
Papilionaceae	*Hovea chorizemifolia*	Holly-leaved Hovea					WA	SH		P		3964
Papilionaceae	*Hovea elliptica*	Tree Hovea					WA	SH		P		3965
Papilionaceae	*Hovea stricta*	Prickly Hovea				d,s,u,Ne	WA	SH		P		3967
Papilionaceae	*Hovea trisperma* var. *grandiflora*	Common Hovea					WA	SH		P		12907
Papilionaceae	*Hovea trisperma* var. *trisperma*	Common Hovea					WA	SH		P		12859
Papilionaceae	*Isotropis cuneifolia* subsp. *cuneifolia*	Granny's Bonnets					WA	H-SH		P		19700
Papilionaceae	*Jacksonia furcellata*	Grey Stinkwood					WA	SH/T		P		4012
Papilionaceae	*Jacksonia lehmannii*	Lehmann's Jacksonia				r(S,Whicher,WHS),d,s,u,	WA	SH		P		4018
Papilionaceae	*Jacksonia* sp. Whicher (G.J. Keighery 9953)	Whicher Jacksonia				z,s,eSWA(B)/WHS/BP,h	WA	SH		P		-21110
Papilionaceae	*Kennedia carinata*	Kennedia					WA	H	PR	P		4036
Papilionaceae	*Kennedia coccinea*	Coral Kennedia					WA	H	PR	P		4037
Papilionaceae	*Kennedia prostrata*	Running Postman					AUST	H	PR	P		4044

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Papilionaceae		*Latrobea tenella*	Latrobea					WA	SH		P		4052
Papilionaceae	*	*Lotus angustissimus*	Slender Birdsfoot Trefoil						H		A		4059
Papilionaceae	*	*Lotus subbiflorus*	Trefoil						H		A		8564
Papilionaceae		*Mirbelia dilatata*	Prickly Mirbelia					WA	SH		P		4090
Papilionaceae		*Nemcia reticulata*	Reticulate Nemcia					WA	SH		P		10805
Papilionaceae	*	*Ornithopus compressus*	Yellow Serradella						H		A		4113
Papilionaceae	*	*Ornithopus pinnatus*	Slender Serradella						H		A		4114
Papilionaceae	*	*Ornithopus sativus*	French Serradella						H		A		4115
Papilionaceae		*Pultenaea brachytropis*	Pultenaea				r(N,Abba,WHS),Se	WA	SH		P		20195
Papilionaceae		*Pultenaea ericifolia*	Pultenaea					WA	SH		P		4172
Papilionaceae		*Pultenaea ochreata*	Swamp Pultenaea					WA	SH		P		4177
Papilionaceae		*Pultenaea pinifolia*	Tree Pultenaea	3			d,p,s,u,eSWA(B)/WHS/BP,h	WA	SH		P		4179
Papilionaceae		*Pultenaea radiata*	Whicher Pultenaea				r(N,Dardanup,WHS),s,eWHS/BP,h	WA	SH		P		4180
Papilionaceae		*Pultenaea reticulata*	Swamp Pultenaea					WA	SH		P		4181
Papilionaceae		*Pultenaea skinneri*	Skinner's Pultenaea	4			d,p,s,u,eSWA/WHS/BP,h	WA	SH		P		4183
Papilionaceae		*Pultenaea verruculosa*	Pultenaea				r(N,WHS)	WA	SH		P		4187
Papilionaceae		*Sphaerolobium drummondii*	Drummond's Sphaerolobium					WA	SH		P		17551
Papilionaceae		*Sphaerolobium gracile*	Graceful Sphaerolobium					WA	SH		P		4203
Papilionaceae		*Sphaerolobium macranthum*	Beautiful Sphaerolobium					WA	SH		P		4206
Papilionaceae		*Sphaerolobium medium*	Common Sphaerolobium					WA	SH		P		4207
Papilionaceae		*Sphaerolobium scabriusculum*	Swamp Sphaerolobium					WA	SH		P		4210
Papilionaceae		*Sphaerolobium vimineum*	Twiggy Sphaerolobium					AUST	SH		P		4211
Papilionaceae	*	*Trifolium campestre*	Hop Clover						H		A		4292
Papilionaceae	*	*Trifolium dubium*	Suckling Clover						H		A		4295
Papilionaceae		*Viminaria juncea*	Swishbush					AUST	SH/T		P		4325
Pittosporaceae		*Billardiera floribunda*	White Billardiera					WA	SH	CL	P		3157
Pittosporaceae		*Billardiera fraseri*	Fraser's Billardiera					WA	SH	CL	P		25788

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				WA	IUCN	Com	OS						
Pittosporaceae		*Billardiera heterophylla*	Sollya					AUST	SH	CL	P		25796
Pittosporaceae		*Billardiera laxiflora*	Billardiera					WA	SH	CL	P		3159
Pittosporaceae		*Billardiera variifolia*	Variable Billardiera					WA	SH	CL	P		3165
Pittosporaceae		*Marianthus candidus*	White Marianthus					WA	SH	CL	P		17637
Pittosporaceae		*Marianthus tenuis*	Marianthus					WA	SH	CL	P		17630
Plantaginaceae	*	*Plantago lanceolata*	Ribwort Plantain						H		P		7303
Polygalaceae		*Comesperma calymega*	Blue Comesperma					AUST	SH-H		P		4550
Polygalaceae		*Comesperma ciliatum*	Twining Comesperma					AUST	SH	CL	P		4551
Polygalaceae		*Comesperma confertum*	Coastal Comesperma					WA	SH-H		P		4552
Polygalaceae		*Comesperma virgatum*	Pink Comesperma					WA	SH-H		P		4564
Polygalaceae		*Comesperma volubile*	Beautiful Twining Comesperma					WA	SH	CL	P		4566
Polygonaceae	*	*Acetosella vulgaris*	Sorrel						H		P		17774
Polygonaceae	*	*Rumex conglomeratus*	Clustered Dock						H		P		2432
Primulaceae	*	*Anagallis arvensis* var. *arvensis*	Scarlet Pimpernel						H		A		19404
Primulaceae	*	*Anagallis arvensis* var. *caerulea*	Blue Pimpernel						H		A		19405
Proteaceae		*Adenanthos barbiger* subsp. *barbiger* MS	Hairy Jugflower				z,r(N,Dardanup,WHS),s,Se	WA	SH		P		14966
Proteaceae		*Adenanthos meisneri*	Meisner's Jugflower					WA	SH	PR	P		1790
Proteaceae		*Adenanthos obovatus*	Swamp Jugflower					WA	SH		P		1791
Proteaceae		*Adenanthos* sp. Whicher Range (G.J. Keighery 9736) PN	Hairy Jugflower					WA	SH		P		28281
Proteaceae		*Banksia attenuata*	Candle Banksia					WA	T		P		1800
Proteaceae		*Banksia grandis*	Bull Banksia					WA	T		P		1819
Proteaceae		*Banksia ilicifolia*	Hollyleaf Banksia					WA	T		P		1822
Proteaceae		*Banksia littoralis*	Swamp Banksia					WA	T		P		1830
Proteaceae		*Banksia meisneri* subsp. *ascendens*	Meisner's Banksia	4			p,s,Se	WA	SH		P		17107
Proteaceae		*Banksia sphaerocarpa* var. *sphaerocarpa*	Fox Banksia				r(W,Abba,WHS),d,s	WA	SH		P		12111

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			WA	IUCN	Com	OS						
Proteaceae	*Conospermum acerosum* subsp. *acerosum*	Needle-leaved Smokebush				d,s,u,h	WA	SH		P		15607
Proteaceae	*Conospermum caeruleum* subsp. *marginatum*	Blue Smokebush				s,u,eSWA(B)/WHS/BP	WA	SH		P		15609
Proteaceae	*Conospermum caeruleum* subsp. *spathulatum*	Blue Smokebush					WA	SH		P		16878
Proteaceae	*Conospermum capitatum* subsp. *glabratum*	Shy Smokebush					WA	SH		P		16853
Proteaceae	*Conospermum flexuosum* subsp. *laevigatum*	Tangled Smokebush					WA	SH		P		16850
Proteaceae	*Conospermum paniculatum*	Wiry Smokebush	3			p,s,Se	WA	SH		P		16847
Proteaceae	*Conospermum teretifolium*	Spider Smokebush				r(N,Argyle,WHS),d,s,u,Se,h	WA	SH		P		1883
Proteaceae	*Dryandra armata* var. *armata*	Prickly Dryandra				d,s,u,h	WA	SH		P		16666
Proteaceae	*Dryandra baxteri*	Baxter's Dryandra				r(N,Abba,WHS),d,s,u,h	WA	SH		P		1890
Proteaceae	*Dryandra bipinnatifida* subsp. *multifida*	Fern Dryandra					WA	SH	PR	P		16670
Proteaceae	*Dryandra formosa*	Showy Dryandra				r(N,Whicher NP,WHS),d,s,u,h,a,g	WA	SH		P		1907
Proteaceae	*Dryandra lindleyana*	Couch Honeypot					WA	SH	PR	P		16672
Proteaceae	*Dryandra mimica*	Summer Honeypot	R	V	E*	r(S,Whicher NP,WHS),d,p,s,u,eSWA/WHS,h,a,g	WA	SH	PR	P		1913
Proteaceae	*Dryandra nivea* subsp. *uliginosa*	Bush Honeypot	R	E	E	z,d,p,s,u,eSWA/WHS/SC,h	WA	SH		P		16261
Proteaceae	*Dryandra sessilis*	Parrotbush				d,u,h	WA	SH		P		1932
Proteaceae	*Dryandra squarrosa* subsp. *argillacea*	Ironstone Pingle	R	V	V	z,d,p,s,u,eSWA(B)/WHS,h	WA	SH		P		14769
Proteaceae	*Franklandia fucifolia*	Yellow Franklandia				r(NE,Abba,WHS),d,p,s,u,Se,h,v,g	WA	SH		P		1944
Proteaceae	*Franklandia triaristata*	Beautiful Franklandia	4			d,p,s,u,Se,h	WA	SH		P		1945
Proteaceae	*Grevillea bipinnatifida* subsp. *bipinnatifida*	Fuchsia Grevillea				d,s,u	WA	SH		P		19628
Proteaceae	*Grevillea brachystylis* subsp. Busselton (G.J. Keighery s.n. 28/8/1985) PN	Whicher Grevillea	R	CR	*	z,p,s,u,eSWA(B)/WHS	WA	SH		P		28305

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Proteaceae	*Grevillea bronwenae*	Bronwen's Grevillea				p,s,u,eWHS/BP	WA	SH		P		12219
Proteaceae	*Grevillea centristigma*	Grevillea					WA	SH		P		13085
Proteaceae	*Grevillea manglesioides* subsp. *manglesioides*	Grevillea					WA	SH		P		13427
Proteaceae	*Grevillea pilulifera*	Woolly-flowered Grevillea					WA	SH		P		2066
Proteaceae	*Grevillea pulchella* subsp. *ascendens* Whicher Scarp Form (G.J.Keighery & B.J.Keighery 938)	Beautiful Grevillea				z,s,u,eWHS,h	WA	SH		P		-21125
Proteaceae	*Grevillea quercifolia*	Oakleaf Grevillea					WA	SH		P		2080
Proteaceae	*Grevillea trifida*	Grevillea					WA	SH		P		2112
Proteaceae	*Hakea amplexicaulis*	Prickly Hakea					WA	SH		P		2128
Proteaceae	*Hakea ceratophylla*	Horned-leaf Hakea					WA	SH		P		2137
Proteaceae	*Hakea cyclocarpa*	Ramshorn Hakea				s,h	WA	SH		P		2152
Proteaceae	*Hakea falcata*	Forest Hakea				r(N,Whicher NP,WHS),d,s,u,Se,h	WA	SH		P		2159
Proteaceae	*Hakea lasianthoides*	River Hakea				d,s,h	WA	SH		P		2170
Proteaceae	*Hakea linearis*	Swamp Hakea				r(N,West WHS),d,s,u,Se,h	WA	SH		P		2174
Proteaceae	*Hakea lissocarpha*	Honeybush					WA	SH		P		2175
Proteaceae	*Hakea oldfieldii*	Oldfield's Hakea	3			d,p,s,u,h,g	WA	SH		P		2190
Proteaceae	*Hakea prostrata*	Harsh Hakea					WA	SH		P		2197
Proteaceae	*Hakea ruscifolia*	Candle Hakea					WA	SH		P		2203
Proteaceae	*Hakea stenocarpa*	Narrow-fruited Hakea				d,s,u	WA	SH		P		2206
Proteaceae	*Hakea sulcata*	Furrowed Hakea					WA	SH		P		2212
Proteaceae	*Hakea varia*	Variable-leaved Hakea					WA	SH		P		2216
Proteaceae	*Isopogon attenuatus*	Coneflower				r(N,Abba,WHS),s	WA	SH		P		2222
Proteaceae	*Isopogon axillaris*	Coneflower					WA	SH		P		2223
Proteaceae	*Isopogon formosus* subsp. *dasylepis*	Rose Coneflower	3			d,p,s,u,Se,h	WA	SH		P		16522
Proteaceae	*Isopogon sphaerocephalus*	Drumstick Coneflower					WA	SH		P		2237

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Proteaceae	*Lambertia multiflora* var. *darlingensis*	Golden Lambertia				r(S,Abba,WHS),d,p,s,Ne,h	WA	SH		P		14083
Proteaceae	*Lambertia rariflora* subsp. *rariflora*	Whicher Lambertia	4			d,p,s,u,eWHS/BP,h	WA	SH		P		16879
Proteaceae	*Persoonia elliptica*	Snottygobble					WA	SH		P		2262
Proteaceae	*Persoonia longifolia*	Snottygobble					WA	SH		P		2267
Proteaceae	*Persoonia saccata*	Snottygobble					WA	SH		P		2273
Proteaceae	*Petrophile diversifolia*	Variable Petrophile					WA	SH		P		2293
Proteaceae	*Petrophile latericola* MS	Ironstone Petrophile	R	CR	E*	z,d,p,s,u,eSWA(B)/WHS,h	WA	SH		P		14085
Proteaceae	*Petrophile linearis*	Pixie Mops					WA	SH		P		2299
Proteaceae	*Petrophile serruriae*	Petrophile				d,s,u,h,g	WA	SH		P		2309
Proteaceae	*Petrophile squamata* subsp. *pluridissecta* MS	Petrophile					WA	SH		P		17766
Proteaceae	*Petrophile striata*	Petrophile				d,s,u	WA	SH		P		2312
Proteaceae	*Stirlingia latifolia*	Blueboy					WA	SH		P		2316
Proteaceae	*Stirlingia simplex*	Stirlingia					WA	SH		P		2317
Proteaceae	*Strangea stenocarpoides*	Strangea				s,Se,h	WA	SH		P		2320
Proteaceae	*Synaphea* aff. *petiolaris* (BJ Keighery and N Gibson 37)	Synaphea					WA	SH		P		-20459
Proteaceae	*Synaphea floribunda*	Synaphea					WA	SH		P		15529
Proteaceae	*Synaphea gracillima*	Synaphea					WA	SH		P		2323
Proteaceae	*Synaphea hians*	Synaphea	3			z,p,s,u	WA	SH	PR	P		16769
Proteaceae	*Synaphea petiolaris* subsp. *petiolaris*	Synaphea					WA	SH		P		16864
Proteaceae	*Synaphea petiolaris* subsp. *simplex*	Synaphea	2			p,s,u,eSWA(B)/WHS,h	WA	SH		P		16862
Proteaceae	*Synaphea petiolaris* subsp. *triloba*	Synaphea					WA	SH		P		16863
Proteaceae	*Synaphea polypodioides*	Donnybrook Synaphea				z,p,s,eWHS	WA	SH		P		-21149
Proteaceae	*Synaphea whicherensis*	Whicher Synaphea				z,r(N,Argyle,WHS),s,eSWA(B)/WHS/BP	WA	SH		P		15535
Proteaceae	*Xylomelum occidentale*	Woody Pear					WA	T		P		2331
Rafflesiaceae	*Pilostyles hamiltonii*	Stemflower				s,u	WA	H		P-PAR		2408

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Ranunculaceae		*Clematis aristata* var. *occidentalis*	Common Clematis					WA	H-SH	CL	P		25809
Rhamnaceae		*Cryptandra arbutiflora*	Cryptandra					WA	SH		P		4792
Rhamnaceae		*Stenanthemum sublineare*	Stenanthemum	2			d,p,s,u	WA	SH		P		19704
Rhamnaceae		*Trymalium floribundum* subsp. *trifidum*	River Trymalium					WA	SH/T		P		15143
Rhamnaceae		*Trymalium ledifolium* var. *rosmarinifolium*	Trymalium					WA	SH		P		13479
Rosaceae	*	*Prunus* sp.							SH		P		-21046
Rosaceae	*	*Rosa* sp.							SH		P		-21045
Rubiaceae	*	*Galium murale*	Bedstraw						H		A		7323
Rubiaceae		*Opercularia apiciflora*	Opercularia					WA	SH-H		P		18254
Rubiaceae		*Opercularia echinocephala*	Opercularia					WA	SH-H		P		7346
Rubiaceae		*Opercularia hispidula*	Opercularia					AUST	SH-H		P		7348
Rubiaceae		*Opercularia vaginata*	Opercularia					WA	SH-H		P		18255
Rubiaceae		*Opercularia vaginata* (Ironstone form) (BJ Keighery and N Gibson 238)	Opercularia					WA	SH-H		P		-20232
Rutaceae		*Boronia capitata* subsp. *gracilis*	Slender Boronia	2			r(SW,Yelverton,WHS),p,s,u,eSWA/WHS,h	WA	SH		P		11612
Rutaceae		*Boronia coerulescens*	Blue Boronia					WA	SH		P		4409
Rutaceae		*Boronia crenulata* subsp. *crenulata*	Pink Boronia					WA	SH		P		29274
Rutaceae		*Boronia crenulata* subsp. *pubescens*	Pink Boronia					WA	SH		P		17653
Rutaceae		*Boronia defoliata*	Blue Boronia					WA	SH		P		4415
Rutaceae		*Boronia denticulata*	Pink Boronia					AUST	SH		P		4416
Rutaceae		*Boronia dichotoma*	Pink Boronia					WA	SH		P		4417
Rutaceae		*Boronia fastigiata*	Pink Boronia					WA	SH		P		4420
Rutaceae		*Boronia humifusa*	Whicher Boronia	1			p,s,u,eWHS,h	WA	SH		P		16618
Rutaceae		*Boronia purdieana* subsp. *purdieana*	Yellow Boronia				r(S,WHS),d,s,u,Ne,h	WA	SH		P		17665
Rutaceae		*Boronia ramosa* subsp. *anethifolia*	Blue Boronia					WA	SH-H		P		11381

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Rutaceae		*Boronia ramosa* subsp. *ramosa*	Blue Boronia					WA	SH-H		P		11564
Rutaceae		*Boronia spathulata*	Pink Boronia					WA	SH		P		4441
Rutaceae		*Boronia tetragona*	Pink Boronia	3			d,p,s,u,Se,h	WA	SH		P		17804
Rutaceae		*Crowea angustifolia* var. *angustifolia*	Crowea				r(N,Whicher NP,WHS),d,s,u,Se,h	WA	SH		P		11306
Rutaceae		*Philotheca nodiflora*	Blue Philotheca					WA	SH		P		18530
Rutaceae		*Philotheca spicata*	Salt and Pepper					AUST	SH		P		18529
Santalaceae		*Leptomeria cunninghamii*	Currant Bush					AUST	SH		P-PAR		2342
Santalaceae		*Leptomeria ellytes*	Currant Bush					WA	SH		P-PAR		17703
Santalaceae		*Leptomeria scrobiculata*	Currant Bush					WA	SH		P-PAR		2353
Santalaceae		*Leptomeria squarrulosa*	Currant Bush					WA	SH		P-PAR		2355
Scrophulariaceae		*Gratiola pubescens*	Gratiola					AUST	H		A		14282
Scrophulariaceae	*	*Parentucellia viscosa*	Sticky Bartsia						H		A		7090
Solanaceae	*	*Solanum nigrum*	Black Berry Nightshade						H		A		7022
Stackhousiaceae		*Stackhousia huegelii*	Stackhousia					WA	H-SH		P		9069
Stackhousiaceae		*Stackhousia pubescens*	Downy Stackhousia					WA	H-SH		P		9070
Stackhousiaceae		*Tripterococcus brunonis*	Tripterococcus					WA	H-SH		P		4737
Stackhousiaceae		*Tripterococcus paniculatus* MS	Tripterococcus	1			z,r(S,Boyanup,WHS),d,p,s,u,eSWA/WHS,h	WA	H-SH		P		16998
Sterculiaceae		*Lasiopetalum floribundum*	Lasiopetalum					WA	SH		P		5033
Sterculiaceae		*Thomasia grandiflora*	Large-flowered Thomasia					WA	SH		P		5084
Sterculiaceae		*Thomasia heterophylla* MS	Thomasia					WA	SH		P		17259
Sterculiaceae		*Thomasia laxiflora*	Whicher Thomasia	3			r(N,Boyanup,WHS),p,s,e,h	WA	SH		P		5085
Sterculiaceae		*Thomasia macrocarpa*	Large-fruited Thomasia				d,s,u,Ne	WA	SH		P		5087
Stylidiaceae		*Levenhookia dubia*	Hairy Stylewort					AUST	H		A		7670
Stylidiaceae		*Levenhookia preissii*	Preiss's Stylewort					WA	H		A		7674
Stylidiaceae		*Levenhookia pusilla*	Midget Stylewort					AUST	H		A		7676

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Stylidiaceae	*Levenhookia stipitata*	Common Stylewort					WA	H		A		7677
Stylidiaceae	*Stylidium acuminatum* MS	Sharp-leaved Triggerplant				z,r(S,Argyle,WHS),d,p,s,u,e,h	WA	H		P		25820
Stylidiaceae	*Stylidium adnatum*	Common Beaked Triggerplant					WA	H		P		7678
Stylidiaceae	*Stylidium affine*	Hills Queen Triggerplant				d	WA	H		P		7681
Stylidiaceae	*Stylidium amoenum* var. *amoenum*	Lovely Triggerplant					WA	H		P		17666
Stylidiaceae	*Stylidium barleei*	Tooth-leaved Triggerplant	3			r(N,Acton Park,WHS),p,s,u,eSWA(B)/WHS/BP,h	WA	H		P		7688
Stylidiaceae	*Stylidium breviscapum*	Boomerang Triggerplant					WA	H		P		7692
Stylidiaceae	*Stylidium brunonianum*	Pink Fountain Triggerplant					WA	H		P		7693
Stylidiaceae	*Stylidium caespitosum*	Fly-away Triggerplant				d,p,s,u,Se,h,g	WA	H		P		7695
Stylidiaceae	*Stylidium calcaratum*	Book Triggerplant					AUST	H		A		7696
Stylidiaceae	*Stylidium carnosum*	Fleshy-leaved Triggerplant					WA	H		P		7699
Stylidiaceae	*Stylidium ciliatum*	Golden Triggerplant					WA	H		P		7702
Stylidiaceae	*Stylidium crassifolium*	Thick-leaved Triggerplant					WA	H		P		7708
Stylidiaceae	*Stylidium diuroides* subsp. *diuroides*	Donkey Triggerplant					WA	H		P		11808
Stylidiaceae	*Stylidium diversifolium*	Triggerplant					WA	H		P		7718
Stylidiaceae	*Stylidium ecorne*	Foot Triggerplant					AUST	H		A		7719
Stylidiaceae	*Stylidium ferricola*	Ironstone Triggerplant	1			p,s,u,eSWA(B)/WHS,h	WA	H		P		-21131
Stylidiaceae	*Stylidium guttatum*	Dotted Triggerplant					WA	H		P		7734
Stylidiaceae	*Stylidium junceum* subsp. *brevius*	Reed Triggerplant					WA	H		P		11995
Stylidiaceae	*Stylidium junceum* subsp. *junceum*	Reed Triggerplant					WA	H		P		12117
Stylidiaceae	*Stylidium lateriticola*	Laterite Triggerplant				r(SW,Whicher NP,WHS),d,p,s,u,Ne,h,g	WA	H		P		13083
Stylidiaceae	*Stylidium lineatum*	Sunny Triggerplant					WA	H		P		7752

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Stylidiaceae	*Stylidium luteum*	Yellow Triggerplant					WA	H		P		7757
Stylidiaceae	*Stylidium megacarpum*	Busselton Triggerplant					WA	H		P		19248
Stylidiaceae	*Stylidium mimeticum*	False Book Triggerplant					WA	H		A		12849
Stylidiaceae	*Stylidium miniatum*	Pink Butterfly Triggerplant					WA	H		P		7762
Stylidiaceae	*Stylidium neurophyllum* MS	Pink Triggerplant					WA	H		P		25829
Stylidiaceae	*Stylidium obtusatum* var. *obtusatum*	Pinafore Triggerplant					WA	H		P		11538
Stylidiaceae	*Stylidium perpusillum*	Tiny Triggerplant					AUST	H		A		7772
Stylidiaceae	*Stylidium petiolare*	Horn Triggerplant					WA	H		P		7773
Stylidiaceae	*Stylidium piliferum* subsp. *piliferum*	Common Butterfly Triggerplant					WA	H		P		11974
Stylidiaceae	*Stylidium repens*	Matted Triggerplant					WA	H		P		7785
Stylidiaceae	*Stylidium rhynchocarpum*	Black-beaked Triggerplant					WA	H		P		7787
Stylidiaceae	*Stylidium scandens*	Climbing Triggerplant					WA	H	CL	P		7796
Stylidiaceae	*Stylidium schoenoides*	Cow-kicks					WA	H		P		7798
Stylidiaceae	*Stylidium* sp. Dardanup (G.S. McCutcheon GSM 1066) PN	Dardanup Triggerplant	1			z,p,s,u,eWHS,h	WA	H		P		30273
Stylidiaceae	*Stylidium spathulatum*	Creamy Triggerplant					WA	H		P		7799
Stylidiaceae	*Stylidium violaceum*	Violet Triggerplant					WA	H		P		7808
Thymelaeaceae	*Pimelea angustifolia*	Narrow-leaved Banjine					WA	SH		P		5231
Thymelaeaceae	*Pimelea brevifolia*	Banjine					WA	SH		P		5235
Thymelaeaceae	*Pimelea imbricata* var. *piligera*	Downy Banjine					WA	SH		P		11402
Thymelaeaceae	*Pimelea preissii*	Preiss's Banjine					WA	SH		P		5259
Thymelaeaceae	*Pimelea rosea* subsp. *rosea*	Rose Banjine					WA	SH		P		18117
Thymelaeaceae	*Pimelea spectabilis*	White Banjine					WA	SH		P		5264
Thymelaeaceae	*Pimelea suaveolens* subsp. *suaveolens*	Scented Banjine					WA	SH		P		12041

Native and weedy vascular plants in the Whicher Scarp with reference to habitat preferences, growth and life forms and conservation status
Appendix 5a in *A Floristic Survey of the Whicher Scarp*

Family		Scientific Name	Common Name	Significant Taxa				Endemic (State)	Growth Form 1	Growth Form 2	Life Form	Life Form - aquatic	NAME _ID
				WA	IUCN	Com	OS						
Thymelaeaceae		*Pimelea sulphurea*	Yellow Banjine					WA	SH		P		5268
Thymelaeaceae		*Pimelea sylvestris*	Forest Banjine					WA	SH		P		5269
Tremandraceae		*Platytheca galioides*	Platytheca					WA	SH		P		4524
Tremandraceae		*Platytheca* sp. Argyle (G.J. & B.J. Keighery 281) PN	Argyle Platytheca				z,p,s,u,eWHS,h,a	WA	SH		P		25849
Tremandraceae		*Platytheca* sp. Sabina (G.J. & B.J. Keighery 295) PN	Sabina River Platytheca				z,p,s,u,eWHS,h,a	WA	SH		P		25850
Tremandraceae		*Tetratheca hirsuta*	Tetratheca					WA	SH		P		4535
Tremandraceae		*Tetratheca hispidissima*	Tetratheca					WA	SH		P		4536
Tremandraceae		*Tetratheca parvifolia*	Tetratheca	3			p,s,u,e,h	WA	SH		P		4538
Tremandraceae		*Tetratheca setigera*	Tetratheca					WA	SH	PR	P		4544
Tremandraceae		*Tremandra diffusa*	Tremandra					WA	SH		P		4547
Tremandraceae		*Tremandra stelligera*	Tremandra					WA	SH		P		4548
Violaceae		*Hybanthus calycinus*	Native Violet					WA	H-SH		P		5216
Violaceae		*Hybanthus debilissimus*	Native Violet					WA	H-SH		P		5218
Violaceae		*Hybanthus floribundus* subsp. *floribundus*	Native Violet					AUST	SH-H		P		12007
Violaceae	*	*Viola odorata*	Common Violet						H		P		5223
Vitaceae	*	*Vitis vinifera*	Grape						SH	CL	P		17042

APPENDIX 5b: Native and weedy vascular plants in the Whicher Scarp with reference to habitat preferences, growth and life forms and conservation status - database

MSAccess: App5bWHSFloraList.mdb, disc

KEY TO DATABASE

tblGrowthForm1Code	**Growth form 1 descriptions**
tblGrowthForm2Code	**Growth form 2 descriptions**
tblLifeFormAquaticsCode	**Life forms for aquatic taxa**
tblLifeFormCode	**Life form descriptions**
tblSupraCode	**Supra codes**
tblWHSFloraList	**Native and weedy vascular plants in the Whicher Scarp** See key to Appendix 5a for explanation of the fields.
WA_PLANT_FAMILIES	**WA Plant Census table of WA Plant Families (Western Australian Herbarium 1998- and 2008; Gioia 2005)**
WA_PLANT_NAMES_&_SUPP	**WA Plant Census table of WA Plant Names (Western Australian Herbarium 1998- and 2008; Gioia 2005) and supplementary plant names as in BJ Keighery *et al*. (2007)**

APPENDIX 5c: Quadrats used to create the Whicher Scarp flora list (Appendices 5a and 5b)

Quadrat			
BOYA01	DAVE05	HAPP01	TREE02
boyan 01	DAVE06	HAPP02	TREE03
boyan 02	GAV01	kelly01	TREE04
buffer01	GAV02	kelly02	UCL01
CHAM01	GAV03	kemp01	UCL02
CHAM02	GAV04	SABI01	UCL03
CHAM03	GAV05	SABI02	UCL04
dard01	GIBB01	SABI03	UCL05
dard02	GIBB02	SABI04	UCL06
dard03	GIBB03	SABI05	WH01
DARP01	GIBB06	SABI06	WH02
DARP02	gibson01	SABI07	WH03
DARP03	gibson02	SABI08	WH04
DARP04	GOOD01	SABI09	WH05
DARP05	GOOD02	SABI10	WH06
DARP06	GOOD03	SABI11	wicher01
DARP07	GOOD04	SABI12	will01
DARP08	GOUL01	smith01	will02
DAVE01	GOUL02	smith02	will04
DAVE02	GWINDR01	smith03	WONN-1
DAVE03	GWINDR02	smith04	YIRON-1
DAVE04	GWINDR03	TREE01	YIRON-2

APPENDIX 5d: Whicher Scarp taxa name edits 2008

MS Word: App5dWHSNameEdits.doc, disc

Name edits of select taxa listed in the quadrat species information database (Appendix 2d).

KEY

Column 1 **Family**
Families are ordered alphabetically.

Column 2 **Supra Code**

MON	Monocotyledon
DIC	Dicotyledon

Columns 3-5 **Database name (App2dQuadratSpecies.mdb)**
Plant name as listed in the quadrat species information database, App2dQuadratSpecies.mdb.

Columns 6-8 **Whicher Scarp flora list name (Appendix 5a and b)**

Columns 3 and 6 **NAME_ID**
Positive NAME_IDs are from the Census of Western Australian Plants (Western Australian Herbarium 1998- and 2008; Gioia 2005); negative NAME_IDs are as in BJ Keighery *et al.* (2007).

Columns 4 and 7 **SPECIES_CODE**
Source as for columns 2 and 6.

Columns 5 and 8 **Scientific name**
Taxa (species, sub-species and varieties) are listed alphabetically within genera in column 5.

*	Weed
subsp.	Subspecies
var.	Variety
MS	A manuscript name yet to be published
PN	A phrase name for a taxa yet to be described and published

APPENDIX 6: Significant taxa of the Whicher Scarp

All taxa identified as significant flora are briefly discussed below. The taxa are listed in families alphabetically, the families being grouped into Ferns, Gymnosperms, Monocotyledons and Dicotyledons. Within the families the taxa are listed alphabetically. This structure is the same as that in Table 10: Significant taxa of the Whicher Scarp and Appendix 5a: Native and weedy vascular plants in the Whicher Scarp. Each taxon's name is followed by a coded summary of the significance categories described in section 2.6.2 and discussed in section 3.5.3. A key to these codes is given below.

Code	Description
z	Recently recognised taxa
Significant due to geographical location	
r	Populations at the northern (N) or southern (S) limit of their known geographic range, limit indicated as follows. Example: r (N or S, Locality, Region).
d	Populations disjunct from their known geographic range
(all)	There is no apparent consolidated geographic range, all populations of the taxon are apparently disjunct
(areas)	Multiple disjunction centres
(series)	>3 disjunct populations in area of disjunction
(locality)	Names of location of up to 3 populations that are disjunct from the main range of the species
(habitat)	Taxa show distinct habitat preference and disjunction associated with the distribution of this habitat
p	Poorly reserved as is known from only a few populations in reserves (applies to all Declared Rare Flora and Priority taxa)
s	Significant populations in reference to location, population size, diversity of ages and/or health (applies to all Declared Rare Flora and Priority taxa)
u	Uncommon in the area (generally applies to disjunct populations)
Taxa with regional and/or ecological preferences	
Endemic taxa	
e	Local endemic, less than 100 km range
eAREA	AREA after Map 3 (Biogeographic region or subregion)
SWA	Swan Coastal Plain (Swan Coastal Plain)
SWA(B)	Busselton area of the Swan Coastal Plain (Swan Coastal Plain)
WHS	Whicher Scarp (Jarrah Forest South)
BP	Blackwood Plateau (Jarrah Forest South)
SC	Scott Coastal Plain (Warren)
MP	Margaret River Plateau (Warren and Jarrah Forest South)
JF	Jarrah Forest (Jarrah Forest)
In Appendix 6 additional codes are used to show greater detail of the distribution:	
+	Extends just beyond the indicated areas/regions
++	Extends well beyond the indicated area/region
SWA++	Extends north of SWA into the Geraldton Sandplain
BP++	Extends south and south-east of the BP along the South coast
These have been summarised occasionally as:	
Ne	Extends well north from WHS
Se	Extends well south from WHS (and adjacent Busselton Plain at times)
Taxa with ecological preferences	
h	Taxa with distinct habitat preference Example: h (ironstone)
a	Relictual species (monotypic genera are annotated)
Taxa with morphological and/or genetic variation	
v	Morphological variant, unsure of significance at taxonomic level
t	Morphological variant, significant taxonomically
g	Genetic variant

1 FERNS

1.1 Adiantaceae

Adiantum aethiopicum d, p, s, u, h (river/creek banks)
On the Swan Coastal Plain and Whicher Scarp this species is currently confined to forested moist banks along creeks and rivers. This species would most likely have been more widespread in the past before the degradation of riverine vegetation. At times this species has been considered to be a weed as it is similar to the garden fern (*A. capillus-veneris*). Significant locations are along the Serpentine River (*Eucalyptus rudis* Forest at Lowlands, Shire of Serpentine-Jarrahdale) and the Joshua Brook (*Eucalyptus calophylla/Agonis flexuosa* Forest on the Brook east of Boyanup).

Cheilanthes austrotenuifolia d, p, s, u, h (river/creek banks)
On the Swan Coastal Plain and Whicher Scarp this species is also confined to a few populations on moist banks of creeks and rivers. On the Whicher Scarp one such location is on creeklines in the Whicher National Park.

2 GYMNOSPERMS

2.1 Cupressaceae

Actinostrobus acuminatus r (S, Milyeannup Forest Block, JF), d (all), p, s, u, h (deep sands)
This is one of the taxa referred to as having 'relict populations' on the Whicher Scarp in the 1974 CTRC Report. *Actinostrobus acuminatus* is a poorly collected prostrate rhizomatous native cypress known from a series of disjunct locations. The majority of herbarium collections are from the Jurien–Eneabba area. A group of disjunct populations are found in the Perth Metropolitan Region (on the eastern Swan Coastal Plain and adjacent Darling Scarp) and another group in the Whicher Scarp within the Dardanup, Argyle and Abba forests. Several isolated records are also known from the Meelup Regional Park and Milyeannup Forest Block south-west of Nannup.

3 MONOCOTYLEDONS

3.1 Anthericaceae

Hodgsoniola junciformis (Photograph 37) r (N, Capel, SWA), p, s, u, eSWA(B)/WHS/BP++, h (damp sands)
This species occurs in a series of populations on seasonally waterlogged soils from Capel through the Blackwood Plateau and onto the Scott Coastal Plain. Within the Whicher Scarp this species occurs in Whicher National Park on mid-slopes dominated by *Eucalyptus haematoxylon* and *Banksia attenuata* woodland. That this species grows in such conditions indicates that groundwater may come close to the surface at this location. Several other species that are typically located in wetlands show a similar pattern of distribution in the Whicher Scarp; these include *Pericalymma ellipticum* and *Baxteria australis*.

Johnsonia acaulis s, h (sands), v
An atypical form of this small *Johnsonia*, with pedunculate rather than sessile inflorescences, is known from grey sands of the Whicher Scarp and Swan Coastal Plain in the Busselton area. Populations are recorded for the Yelverton forest and Carbunup River Bushland. This form was previously described as *Johnsonia pubescens* var. *intercedens* but placed in *Johnsonia acaulis* by GJ Keighery (1987).
Recommendation: The taxonomic and genetic status of this form should be investigated.

Johnsonia inconspicua z, r (S, Yelverton, WHS), d (all), p, s, g
This is another of the small species of *Johnsonia* and it has an unusual distribution being known from the Yelverton forest and the Julimar forest on the Dandaragan Plateau. This is a Priority 3 taxon.
Recommendation: The taxonomic and genetic status of the two areas should be investigated.

Johnsonia lupulina r (N, Capel, SWA), eSWA(B)/WHS/BP++, h (sands/laterites)
This striking plant with its large drooping flower heads is another species that is uncommon on the Swan Coastal Plain; it is found from Capel southward in Marri Woodlands on the southern side of the Plain and throughout the Whicher Scarp woodlands. *Johnsonia lupulina* extends further north on the Darling Range near the Scarp to Dwellingup.

Laxmannia jamesii r (N, Whicher NP, WHS), d (Albany, Whicher Scarp), p, s, u, (white sands), a
A very uncommon inconspicuous *Laxmannia* found in damp sands to the east of Albany and then south of Busselton on the sands at the base of the Central Whicher Scarp (Whicher National Park) and on the West Whicher Scarp (including Yelverton forest). This is a Priority 4 taxon.
Recommendation: The taxonomic and genetic status of the populations from the Albany and Whicher Scarp areas should be investigated.

Thysanotus formosus r (N, Boyanup forest, WHS), p, s, u, eWHS/BP
This species is recorded for the Whicher National Park and Boyanup forest. These records are north of its principal known range in a small area on the Blackwood Plateau. Collections from the Whicher Scarp area are required. This is a Priority 1 species.

Thysanotus glaucus d (habitat, Yelverton forest), p, s, u, h (sands)
This uncommon species has three centres of distribution on deep sands. Two of these centres are near Busselton on the Swan Coastal Plain and Whicher Scarp and the other on the Plain around Perth. This is a Priority 4 species.

Thysanotus pseudojunceus r (N, Dardanup forest, WHS), d, s, u
A rhizomatous herb, found from Albany to Alexandra Bridge in *Eucalyptus marginata* woodland. The population in Dardanup forest, is disjunct from the closest population at Nannup, and is at the northern limit of the species' range.

3.2 Cyperaceae

Caustis dioica r (S, Smith Ironstones, WHS), d (series), p, s, u, h (ironstone), g
Although widespread in southern WA this species has a highly disjunct series of occurrences on the Swan Coastal Plain, being found on duplex sands of the Foothills and Dandaragan Plateau, with rare records on Spearwood sands at Yanchep (and an old record from Kings Park) north of Perth. This species is then disjunct to the southern ironstones near Busselton and is found in the Smith and Gale Roads Ironstones.
Recommendation: The taxonomic and genetic status of the southern ironstone populations should be investigated.

Caustis sp. Boyanup (G.S. McCutcheon 1706) PN d (all), p, s, u, h (sands,), g
This taxon is known from a series of disjunct populations in the Whicher Scarp and to the south and south east (Kojonup area). Within the Whicher Scarp three populations are known from the Boyanup forest (the most northern population), Argyle forest, and the Whicher National Park (most southern population). This species is listed as Priority 1.

Cyathochaeta avenacea v, t, g
This species is found in a variety of habitats including damplands, damp sands and sand over laterite and varies greatly in leaf and plant size and habit (small to large tufted and rhizomatous plants). Work on this group could distinguish additional taxa.
Recommendation: The taxonomic and genetic status of the various forms of this taxon should be investigated.

Cyathochaeta clandestina d (Central WHS), s, h (sands)
Cyathochaeta clandestina, a very similar taxon to *C. equitans*, is also recorded from the Whicher. Flowering material is needed to distinguish these two taxa and all quadrat based records were amalgamated as *Cyathochaeta equitans*.

Cyathochaeta equitans d (Central WHS) s, h (sands)
This large attractive *Cyathochaeta* grows up to a metre tall in deep sands. This taxon is characteristic of deep sands of the Whicher National Park/Treeton forest. These populations are disjunct from populations in the Perth Metropolitan Region where it grows on sand dunes of the Pinjarra Plain and sands of the Foothills. Recently another population has been located to the north-west of Pinjarra. In the Perth area this taxon is characteristic of the SWAFCT 20.

Cyathochaeta sp. Carbunup (G.J. Keighery 14123) z, d (series), p, s, u, eSWA(B)/WHS, h (river banks)
The Carbunup River Cyathochaeta has concave saw edged leaves and grows in a tufted clump up to 1.5m tall and 1m wide. Two populations of this taxon have now been located along the banks of the Carbunup River. This *Cyathochaeta* is very similar in habit to *C. teretifolia*, and like this species rarely flowers unless burnt the previous year.
Recommendation: This taxon is recommended for listing as Priority 1.

Cyathochaeta sp. Sabina (SABI03&06) z, p, s, u, eWHS, h (river bank)
The *Cyathochaeta* observed along the Sabina River is a large perennial of similar habit to *Cyathochaeta* sp. Carbunup. However, this taxon has smooth leaf margins rather than serrated margins. At this stage only sterile material has been observed. This taxon and *Cyathochaeta* sp. Carbunup can both be distinguished from *C. teretifolia* and *C. stipoides* as they have tapering, flat to concave smooth surfaced leaves as compared with the hollow, terete or flattened leaves of *C. teretifolia* and *C. stipoides*. These four taxa have distinctive orange coloured leaf sheaves: however, those of *Cyathochaeta* sp. Carbunup and *Cyathochaeta* sp. Sabina are a much deeper orange than those of *C. teretifolia*, and those of *C. stipoides* are reddish.

Cyathochaeta teretifolia d (series), p, s, u, h (fresh water seepages)
This is an uncommon species of the Swan Coastal Plain and the Whicher Scarp, growing in wetlands fed by groundwater from Muchea south to the Whicher Scarp. A few isolated populations have been located on the Whicher, these being in Poole Swamp in the Yelverton Forest, in a wetland associated with the Carbunup River, along a tributary of the Mary Brook and at Evans/Claymore Road Swamp in Abba forest. Three other populations are associated with the Whicher Scarp but are located on the Foothills and Pinjarra Plain. The Foothills populations are associated with paluslope wetlands at Gwindinup and Vasse, one approved for mining and the other being proposed for mining. The population on the Pinjarra Plain at Yoganup was most likely associated with a paluslope wetland but the Foothills in this location have been mined. This is a Priority 3 species.

Evandra aristata r (N, West WHS), d (habitat), s, u, Se, h (fresh water seepages)
Evandra aristata is a large attractive wetland sedge. This is one of a group of south coast sedges found in the West Whicher Scarp wetlands. Only one location on the Swan Coastal Plain is currently known, being in the wetland at the base of Whicher Scarp on Payne Road in the area adjacent to the 'Taylor's Nature Reserve'. This species has been recorded from the Gale Road wetland (Swan Bioplan Remnant 4/4-5) and a creekline remnant (Swan Bioplan Remnant 14/3-9).

Gahnia decomposita d (habitat), s, u, Se, h (fresh water seepages)
This is a large sedge of the wetlands and creeklines of the south coast and western Jarrah Forest. It is often a dominant sedge in the West Whicher Scarp wetlands. This species is also known from a few isolated occurrences in wetlands associated with permanent water on the Swan Coastal Plain. Populations are currently known from the Harvey Main Drain and Drakes Brook in Waroona. It appears that there was a population as far north as Bayswater but this wetland has been lost.

Gymnoschoenus anceps r (N, West WHS), d (habitat), s, u, Se, h (fresh water seepages), a
This wetland sedge is the only member of its genus in WA. This is one of a group of south coast sedges found in the West Whicher Scarp wetlands at Poole Swamp in the Yelverton forest and the Gale Road wetland (Swan Bioplan remnant 4/4-5).

Lepidosperma aff. *resinosum* (A. Webb 10) s, u, eSWA(B)/WHS
This taxon was first recognised on ironstones in 'Taylor's Nature Reserve', but it appears to be associated with a few other wetlands (Swan Bioplan remnant 56/1-2).

Lepidosperma obtusum r (W, Treeton forest, WHS), d (smith01), s, u, h (ironstone), g
One of the sedges collected in the early 1990s survey (Gibson *et al.* 1994) from an ironstone community in the Treeton forest. While this species is relatively common in the Jarrah Forest, this population is well west of its typical range.
Recommendation: The taxonomic and genetic status of these populations should be investigated.

Schoenus pennisetis r (S, Goodwood Road, WHS), p, s, u, h (wetlands)
This small annual *Schoenus* is found in wetlands of the Swan Coastal Plain from the Perth area to the Busselton area and at Wongan Hills. The Wildflower Society/DEC survey in 2005 located a population along Goodwood Road (GOOD01) in the Happy Valley forest. This is a Priority 1 species.

Schoenus sp. Whicher (G.J. Keighery and B.J. Keighery 901) z, s, u, eWHS
This small perennial *Schoenus* was located in three quadrats in the Whicher Scarp forest as well as in the Whicher National Park. While allied to *Schoenus brevisetis,* it is considered significantly different from this taxon.
Recommendation: The taxonomic status of these populations should be investigated.

3.3 Dasypogonaceae

Baxteria australis r (N, Capel, SWA), s, eSWA(B)/WHS/BP++, h (damp sands), a (monotypic genus)
This rather unusual plant with its stiff leaves and prickly flowers is often overlooked or thought to be a sedge. However, it is relatively common in the sands in the central Whicher Scarp and in the damplands around Busselton on the Swan Coastal Plain. The Capel population is at the northern limit of the species' range on the Swan Coastal Plain and it is near the north of its range in the Whicher Scarp, east and west of the Vasse Hwy near the Sabina Road junction. Populations were located in the Abba and Whicher forests.

Calectasia narragara r (S, Whicher NP, WHS), s, u, h (sands)
Until recently this taxon was known as *C. cyanea* (now a restricted species located in the Albany area). This species is principally found in sands of the Swan Coastal Plain, the southern extent of the Geraldton Sandplain and the Avon Bioregions. This is the common *Calectasia* of the Swan Coastal Plain. The WA collections show the most southern location for this taxon is within the northern extent of Whicher National Park.

Chamaexeros serra d (Boyanup forest), s, u
While a common species of the Jarrah Forest, there is only one record from the Whicher Scarp (a survey record from the Boyanup forest). This represents a significant disjunction from its main distribution and is here at its southern limit. This record needs to be confirmed and a voucher lodged at the WA Herbarium.

Dasypogon hookeri (Photograph 23) r (N, Boyanup forest, WHS), s, eSWA(B)/WHS/BP+, h (sands/gravel/laterite), a
This spectacular member of the Dasypogonaceae was once considered to be rare. While this taxon is uncommon on the Swan Coastal Plain, a large number of populations are found in the woodlands and forests of the Whicher Scarp and Blackwood Plateau and it is no longer considered to be rare. Populations on the Swan Coastal Plain are confined to around Busselton, the population in the Carbunup Bushland being one of the few in reserved lands. The majority of the occurrences on the Plain are confined to roadsides to the south

and south-west of Busselton. *Dasypogon hookeri* is a characteristic species of the Whicher Scarp and has been referred to as the 'Mineral Sands Plant' by some mineral sands prospectors. The Boyanup forest (Crooked Brook Forest) population is at the northern limit of its range.

Lomandra spartea r (S, Whicher NP, WHS), d (series WHS), s, u, h (sand/gravel/laterite)
This species is typically a species of the Jarrah Forest between Perth, Brookton and Collie. This is an uncommon species of the Whicher Scarp and is at its most southern location in the Whicher National Park (SABI04).

Lomandra whicherensis ms (Photograph 28) z, r (S, Argyle, WHS), p, s, u, eWHS/JF, h (sand/gravel/laterite), a
This species is similar to *Lomandra nutans*, differing primarily in that *L. nutans* has both male and female flowering stalks reflexed while this taxon has reflexed male flowering stalks and much reduced erect female flowering stalks. This species is currently known from Dardanup, Boyanup and Argyle forests on the Whicher Scarp and near Collie (E Bennett pers. comm.) . This taxon was previously referred to as *Lomandra* sp. Dardanup (G.J. Keighery 15065) and *Lomandra* sp. nov. (GJ Keighery *et al*. 1996 and 2008). This species was considered endemic to the North Whicher Scarp (GJ Keighery *et al*. 1996 and 2008) but in late 2007 a large population was located in the Collie area.
Recommendation: This taxon is recommended for listing as Priority 1.

3.4 Iridaceae

Patersonia limbata r (N, Dardanup forest, WHS), d (series), p, s, u, eWHS/BP++
This rarely collected species is known from a series of disjunct populations in the South-West. Two populations are recorded in the Whicher, the most northern in the Dardanup forest, and another in the central Whicher Scarp (specimen held at MELB).

Patersonia maxwellii r (S, Yelverton forest, WHS), d (series), p, s, u
This rarely collected species is known from a series of disjunct populations between Collie and the Yelverton forest, and a group centred on Esperance. One population is recorded in the Whicher Scarp.

Patersonia occidentalis var. *angustifolia* z, r (N, Lake Bambum, SWA), d (series), s, u, eSWA/WHS/BP++, h (wetlands)
A population of this thin leafed and stemmed free flowering variety of *Patersonia occidentalis* was found on the Carbunup River on the Whicher. This taxon is most commonly found on the Swan Coastal Plain and along the south coast growing in damplands. While distinctive in the field and commonly cultivated, this form previously known as *Patersonia occidentalis* (swamp form NG & ML 544) is now recognised as *Patersonia occidentalis* var. *angustifolia*.

Patersonia umbrosa var. *umbrosa* r (N, Gwindinup, WHS), d (habitat), p, s, u, eSWA(B)/BP, h (fresh water seepages)
There is single sight record of this taxon from the West Whicher Scarp (Swan Bioplan remnant 57/6-3, Bennett Environmental Consulting Pty Ltd 2003a). However, there is another record from the Gwindinup area which is the most northerly record. Material from these populations need to be vouchered.

3.5 Orchidaceae

Caladenia longicauda subsp. *clivicola* r (N, Perth, SWA), p, s, u (Dardanup forest), eSWA/WHS/BP+
This species occurs between Pinjarra and Cape Naturaliste with a population in the Dardanup forest on the Whicher Scarp. This is listed as a Priority 4 species.

Caladenia plicata r (N, Busselton, SWA), p, s, u
This Priority 4 species is known from north Busselton and is considered to be found in the Whicher Scarp.

Caladenia speciosa z, r (S, Whicher NP, WHS), p, s, u
A population of this species was located in Jarrah dominated woodlands in the Whicher National Park. This is one of two populations of this species in the Jarrah Forest, the other being at Sullivans Rock near Perth. This is a Priority 4 species.

3.6 Restionaceae

Chordifex isomorphus p, s, Se
This species was previously known as *C. serialis* and is known from two areas of ironstone wetland, the Gale Road ironstones and a further small ironstone area (Swan Bioplan remnant 14/3-9) on the boundary of the Whicher Scarp and the Swan Coastal Plain. The latter location is the most northern known population of this species. Three centres of distribution are known for this species, the Busselton ironstones, the Scott River Ironstones and the Mt Barker, Albany area. This is a Priority 4 species.

Empodisma gracillimum r (N, Bayswater, SWA), d (habitat), p, s, u, Se, h (fresh water seepages), a
This wetland species is predominantly found in permanent or near-permanent wetlands along the south coast from Albany to the Scott River and extending north into broad spring-fed tributaries of the Blackwood River. The northern-most populations of the species are found within the West Whicher Scarp on very wet creeklines. The species is associated with other permanent or near-permanent wetland species such as *Taxandria fragans* and *Homalospermum firmum*. There are two northern disjunct populations recorded from Bunbury and Bayswater in 1953 and 1902 respectively. While these localities appear unlikely, there are a set of species records for both localities that require similar habitats (i.e. generally spring-fed fresh water permanent or near-permanent wetlands). The Bayswater wetland is lost and but it is possible that the species could be located in these habitats in Bunbury.

Hypolaena caespitosa r (N, Ruabon, SWA), eSWA(B)/WHS/BP++
This is one of two *Hypolaena* species which is at the north of its known range on the Busselton Plain and the adjacent Whicher Scarp.

Hypolaena exsulca eSWA(B)/WHS, v
In the Whicher Scarp/Busselton Swan Coastal Plain area this taxon has characteristically dense brown matted hairs on the culm sheaths.
Recommendation: The taxonomic status of these populations be investigated.

Hypolaena grandiuscula r (N, Sues Rd, WHS), d (series), p, s, u, eWHS/BP+, h (damp sands), a
This is an old, but newly circumscribed, species with a disjunct northern population in damp sands over laterite at the base of the Whicher Scarp along Sues Road. Populations of the priority species *Caustis* sp. Boyanup and *Amperea micrantha* are also known from this area. As the Whicher National Park does not include this area of State Forest this is of some concern.
Recommendation: This taxon is recommended for listing as Priority 1.

Lepyrodia heleocharoides r (SW, Yelverton forest, WHS), d (series), p, s, u, eSWA(B)/WHS/BP+
This Priority 3 species is known from the Jarrah Forest south of Perth and from the Whicher Scarp to Augusta. A population is located in the Whicher National Park. Several populations are also found on the Busselton Plain.

Loxocarya magna z, p, s, u, eSWA(B)/WHS/BP+, h (ironstone)
This species is a dominant in ironstone communities and is known from the Scott River and Busselton Ironstones. Within the Whicher Scarp it is found in the Yelverton Ironstones at Ironstone Gully, Smith Road and Gale Road Ironstones. The most northern locality of this species is in the Williamson Road Ironstones and it is a Priority 3 species.

Loxocarya striata subsp. *implexa* MS z, p, s, u, eSWA(B)/WHS, h (orange sand/ironstone)
This yet to be described species is currently only known from orange sands over Williamson Road Ironstones of the Abba forest and the Abba Wet Ironstones on the Swan Coastal Plain.
Recommendation: This taxon is recommended for listing as Priority 1.

Tyrbastes glaucescens z, p, s, u, Se, h (wetlands/rivers)
This large tangled almost shrub-like plant is found in several of the Whicher Scarp Ironstone wetlands and on the Carbunup River in the study area. These populations are at, or near, the north-west of its range, with a few populations to the north-east in the Jarrah Forest. The principal distribution of the species is south from the Whicher Scarp/Busselton Plain to the Walpole area on the south coast. This is a Priority 4 species.

3.7 Xanthorrhoeaceae

Xanthorrhoea acanthostachya (Cover photograph 1 and Photograph 16) r (S, Abba forest, WHS), s, u, eSWA+/WHS/DS, h (sand/gravel/laterite), v, t
This predominantly Darling Scarp species occurs in scattered populations on outcropping laterites throughout the Northern Whicher Scarp, extending south into the Abba forest. These Whicher Scarp populations are at the southern extent of the species range. On the eastern sands of the Whicher National Park (SABI10) there are populations of what appear to be *X. acanthostachya/X. preissii* intermediates. These need to be further investigated. *X. acanthostachya* is also known from a disjunct occurrence within the Mount Lesueur area. However, it is likely that this is a separate taxon.
Recommendation: The taxonomic and genetic status of the Whicher National Park populations be investigated.

3.8 Xyridaceae

Xyris atrovirida r (S, Evans/Claymore Rd Swamp, WHS/BP), d (habitat), p, s, u, eDS+/WHS, h (fresh water seepages)
A relatively uncommon species of swamps, apparently dependant on fresh water seepages found in several locations on the western edge of the Jarrah Forest between Perth (Byford) and Harvey and the Abba forest (Evans/Claymore Rd Swamp).

Xyris lacera r (N, Harvey Flats NR, SWA), d (habitat), s, u, Se, h (fresh water seepages)
This taxon is located in the West Whicher Scarp wetlands (Swan Bioplan remnants 4/3-4 and 22/2-6). This is a southern species that has several disjunct populations known to the north of its typical range.

Xyris lanata r (N, Davies Rd Swamp, SWA), d (habitat), p, s, u, eSWA(B)/WHS/BP++, h (freshwater seepages)
This is another *Xyris* species located in the West Whicher Scarp wetlands (Swan Bioplan remnant 31/4-7). This location is near its most northern locality which is on the Swan Coastal Plain in the Davies Road Swamp at the base of the Whicher. Both populations are significant disjunctions from the taxon's consolidated area of distribution on the southern margins of the Blackwood Plateau and the south coast.

Xyris laxiflora r (N, 'Taylor's Nature Reserve', SWA), d (habitat), s, u, eSWA(B)/WHS/BP+, h (fresh water seepages)
Another of the relatively uncommon *Xyris* species of swamps, apparently dependant on fresh water seepages, is found in several locations on the southern edge of the Swan Coastal Plain ('Taylor's Nature Reserve'), the Central Whicher Scarp (Smith Road Ironstones) and then on the Blackwood Plateau and Scott Coastal Plain.

4 DICOTYLEDONS

4.1 Apiaceae

Actinotus whicheranus (Cover photograph 5) z, p, s, u, eWHS, h (sands)
This summer flowering species was not described until 1999 (GJ Keighery 1999) and is confined to the sands on the lower eastern slopes of the Whicher forest along Sabina Road and the Gale Road Ironstones.

The currently proposed boundary of the Whicher National Park bisects the known populations of this species. The Whicher Range Flannel Flower's closest known relative, *A. minor*, is found in eastern Australia near Sydney (Henwood *et al.* 1999), a truly remarkable relationship. This species is currently listed as Priority 2.
Recommendation: This species be listed as Declared Rare Flora.

Platysace haplosciadia r (N, Abba forest, WHS), d (series), s, u
This taxon is typically found on the granites of the Leeuwin-Naturaliste coast. However, there are some disjunct populations at Cape le Grande and in the Whicher Scarp in the Abba and Yelverton forests. The most northern location is along Williamson Road in the Abba forest.

Trachymene grandis d (Abba forest), s, u
This white flowered southern forest form of *Trachymene coerulea* has been distinguished as a separate taxon. Three disjunct populations, well to the north of this species' typical range, are located on the Darling Scarp in the PMR and in the Whicher Scarp in the Abba forest. The population in the Abba forest, east of the Williamson Road Ironstones, is also the most western population of this species.

Xanthosia atkinsoniana d (Dardanup and Boyanup forest) s, u
A population of this species, disjunct from its main distribution in Jarrah Forest/Blackwood Plateau, has been recorded in the Dardanup and Boyanup forests.

Xanthosia tasmanica r (N, Dardanup forest, WHS), d (series), s, u, eWHS/BP++, t
During survey of the Dardanup forest in the mid 1990s this species was listed as *Xanthosia* sp. Dardanup (GJ Keighery *et al.* 1996c). A recent revision placed the material in *Xanthosia tasmanica* but further work is expected to distinguish this as a separate taxon. Four disjunct populations have been located in the Whicher Scarp during survey from Central Whicher Scarp (Treeton forest) and Dardanup forest.
Recommendation: The taxonomic status of the Whicher Scarp populations be investigated.

4.2 Asteraceae

Amblysperma minor z, r (N, Dardanup forest, WHS), d (habitat, series), s, u, eSWA+/WHS/BP+, h (wetlands)
This recently recognised species of seasonally inundated clays, sandy clays and ironstones is known from a population in the Yelverton Ironstones in the Treeton forest. The closest population is in the Tuart Forest claypans but it also occurs in a series of disjunct populations to the north of Cervantes on the Swan Coastal Plain and one on the Beaufort River. This species was previously known as *Trichocline* sp. Treeton (B.J. Keighery and N. Gibson 564) and is currently listed under this name on FloraBase. This taxon is listed as Priority 2.

Craspedia variabilis d (series), s, u
This is a relatively common species of the Jarrah Forest but is becoming less commonly encountered on the Swan Coastal Plain and the Darling Scarp and is uncommon on the Whicher Scarp. The Dardanup forest population is the only location currently recorded for the Whicher Scarp.

Hyalospermum demissum r (S, Abba forest, WHS), d (series), s, u
This species is widespread to the east of the Darling and Whicher Scarps. The most southern populations of this species are in the Whicher Scarp where it is recorded for the Dardanup, Argyle and Abba forests.

Olearia homolepis d (Kemp Rd), u
A single disjunct population of this species is located on Kemp Road on the Whicher Scarp in the Whicher National Park. The typical distribution of this species is Kalbarri to Lake Grace and Coolgardie and east to Esperance.

Olearia strigosa r (S, Whicher NP - Kemp Rd, WHS), p, s, u, eSWA(B)/WHS
While this species is not considered threatened on FloraBase (February 2008), it appears to be uncommon as only seven collections are held at the WA Herbarium. Only three of the collections have adequate locality information. These collections are from Dunsborough, along Kemp Road on the Whicher Scarp and from the Carbunup River. The Kemp Road population is the most southern known.

4.3 Casuarinaceae

Allocasuarina thuyoides d (series) s, u
This species is predominantly found along the south coast and extending through the Wheatbelt region on heavy clay soils often associated with the fringing vegetation of creekline or rock outcrops. Populations of this species run up the eastern boundary of the Jarrah Forest to occur on the north of the Swan Coastal Plain and the Geraldton Sandplain. In addition, a series of disjunct populations occur along the Darling Scarp (including the Perth Metropolitan Region) and into the Whicher Scarp within Treeton, Abba, Argyle and Dardanup forests. There is a population in the Whicher National Park.

4.4 Cephalotaceae

Cephalotus follicularis r (N, Haag NR, WHS), d (Haag NR), p, s, u, h (wetlands), a (monotypic genus)
The Albany Pitcher Plant (*Cephalotus follicularis*) was recorded from the Haag Nature Reserve in the 1960s (GJ Keighery 2003).

4.5 Dilleniaceae

Hibbertia acerosa d (series), s, u
This species is most common on the Dandaragan Plateau extending north into the Geraldton Sandplains. Further populations occur on the northern extent of the Swan Coastal Plain and along the eastern extent of the Plain south of Perth extending into the Darling Scarp to Harvey. At this point the species distribution moves inland across the Wheatbelt to the Albany area and along the south coast to the east of Esperance. A set of disjunct populations occur in the Whicher Scarp in Dardanup, Boyanup, Argyle, Happy Valley, Abba and Treeton forests.

Hibbertia aurea d (series), s, u, v, g
This species has a series of disjunct populations in the Busselton Plain/Whicher Scarp/ Blackwood Plateau area from its major area of distribution in the northern Jarrah Forest, and on the Swan Coastal Plain north of Perth, to the Geraldton Sandplain. The populations around Treeton forest may be a separate taxon.
Recommendation: The taxonomic and genetic status of the Treeton forest populations be investigated.

Hibbertia ferruginea z, r (N, Capel, SWA), s, u, eSWA(B)/WHS/BP+
A predominantly southern species, is common on the Whicher Scarp west of the Vasse Hwy, but uncommon to north of the Hwy. Two populations are recorded from the Whicher Scarp to the north of the Hwy, one along the Capel-Donnybrook Road and another to the east of the Williamson/Thompsett Road intersection (UCL03 and Abba forest).

Hibbertia huegelii r (S, West WHS), d (series), s, u
This species predominantly occurs within the northern extent of the Swan Coastal Plain including the Perth Metropolitan Region, the Dandaragan Plateau and extending into the Geraldton Sandplains to approximately the Eneabba area. South of the Perth Metropolitan Region the species is recorded as disjunct populations at Harvey, near Collie and within the northern forest blocks of Dardanup, Boyanup and Argyle of the Whicher Scarp. An occurrence of this species has been recorded on private land near Yelverton forest ; however, this record need to be confirmed.

Hibbertia lasiopus r (N, Argyle forest, WHS), d (Whicher NP), p, s, u, t
This species is described in the *Flora of the South West* (Wheeler *et al.* 2002) as having a disjunct population on the Whicher Scarp in the area of the Whicher National Park and in the Argyle forest (Bennett

Environmental Consulting Pty Ltd & Onshore Environemental Consulting 2006). Interestingly, the Whicher National Park collection in the WA Herbarium has since been annotated as *H.* aff. *lasiopus*.
Recommendation: The taxonomic and genetic status of the populations be investigated.

Hibbertia mylnei d (Sues Road), s, u
This species is recorded from a series of populations on the Whicher Scarp along Sues Road in the Whicher forest. These populations are disjunct from a series of widely spaced populations centred on the Darling Scarp.

Hibbertia serrata d (Dardanup Conservation Park)
This species is known from three key sets of populations from along the Leeuwin-Naturaliste National Park ridge, the south coast from Pemberton to Albany and along the Darling Scarp from John Forest National Park to Wellington National Park. Records of this species from Dardanup Conservation Park are the only records of this species from the Whicher Scarp.

4.6 Droseraceae

Drosera hyperostigma d (series), s, u
A species found principally in the Perth Metropolitan Region areas of the Darling Scarp and Jarrah Forest, with scattered populations in the Jarrah Forest to the south. However, survey work in the laterites of the Whicher National Park located several populations. This is major disjunction from its area of principal distribution.

Drosera myriantha r (N, Goodwood Road, WHS), d (Goodwood Road) s, u
A wetland taxon, with one record on the Whicher Scarp along the Donnybrook-Capel Road. This is most likely the most northern location of this species as the single location given for north of Bunbury is considered an unlikely locality.

4.7 Epacridaceae

Andersonia aristata r (S, Gale Road Ironstones, WHS), d (Gale Road Ironstones), s, u, h (ironstone)
This species' distribution is centred on the Perth Metropolitan Region portions of the eastern Swan Coastal Plain, Darling Scarp and Jarrah Forest, with scattered locations to the north, east and south. The most southern population on the east of the Plain is on sandy clays at Waroona then there is disjunction to a population on the Gale Road Ironstones just north of the base of the Whicher Scarp.

Andersonia barbata r (N, Abba forest, WHS), d (series), p, s, u, eWHS/BP++
This poorly collected species is only known from three herbarium records being at Nannup, Windy Harbour and on the Whicher Scarp within the northern extent of Abba forest.
Recommendation: It is recommended that this species be listed as Priority 1.

Andersonia fallax MS (Photograph 31) z, r (N, Whicher NP, WHS), p, s, u, eWHS/BP, h (sand/laterite)
A newly recognised species of the laterites and sandy laterites of the Blackwood Plateau and Whicher Scarp. The Whicher Scarp populations found along Kemp and Sabina Roads in the Whicher National Park.

Andersonia ferricola MS z, r (N, Ruabon, SWA; S Treeton, WHS), p, s, u, eSWA(B)/WHS, h (ironstone/laterites)
This species is generally considered a Busselton Ironstone endemic (Gale Road Ironstones, Treeton forest and Abba forest) but some populations have been identified in the Argyle forest laterites. Populations are also found along Tutunup Road near Ruabon in the Capel Shire. This species was previously referred to as *Andersonia* aff. *latiflora* or *A.* sp. Ironstone (B.J. Keighery and N. Gibson 227) but was described in late 2007 (Lemson 2007). This species is listed as Priority 1.

Andersonia heterophylla r (S, Whicher NP, WHS), d (Whicher NP and Dardanup forest), s, u, h (sands)
This is a relatively common species of the sands Swan Coastal Plain from Perth north and onto the Geraldton Sandplains. An old record from Kelmscott is the most southern of these records till the Busselton area where there is a record for a population on St Josephs Road in the Whicher National Park and survey records from three quadrats within the Dardanup forest.

Andersonia micrantha r (N, Boyanup forest, WHS/Capel, SWA), p, s, u, eSWA(B)/WHS/BP2++
This species is known principally from a series of scattered populations in the Blackwood Plateau and the Albany areas. The northern extent of the species is known from isolated records at Eagle Bay, private land near Capel Nature Reserve and on the Whicher Scarp at Boyanup, Argyle and Abba forests. The Whicher Scarp and Frenchman's Bay (near Albany) collections form the bulk of the records for this species.

Astroloma sp. Nannup (R.D. Royce 3978) PN z, r (N, Abba forest, WHS), p, s, u, eWHS/BP+
A recently recognised red flowered low shrub of the Jarrah forest of the Whicher Scarp and south of the Scarp. Two locations are known from the Whicher Scarp, the most northern location being in the Abba forest. This is a Priority 4 species.

Leucopogon oliganthus r (S, Abba forest, WHS), d (Abba forest), s, u, a, g
This species is virtually confined to the Dandaragan Plateau with a single disjunct record from Mount Seaview in Abba forest.
Recommendation: The taxonomic and genetic status of the Abba forest populations should be investigated.

Leucopogon sp. Whicher Range (G.J. Keighery 11763) PN r (N, Abba forest, WHS), s, eWHS/BP
A species first distinguished from populations on the Whicher Scarp, now known to extend onto the Blackwood Plateau. A relatively commonly recorded species of the central Whicher Scarp (Abba, Whicher and Treeton forests) and it is at its most northern known location in the Abba forest.

4.8 Euphorbiaceae

Amperea micrantha p, s, u, eSWA(B)/WHS/single outlier
All but one of the WA Herbarium collections of this species are from the Busselton Plain/Whicher Scarp area populations located in the Whicher National Park, Capel Nature Reserve, Ruabon Nature Reserve and at Yoongarillup. A disjunct population occurs in Mokine Nature Reserve, west of York. This taxon is listed as Priority 2.

Amperea volubilis r (N, Whicher forest, WHS), d (Whicher forest), p, s, u
A wetland species found predominantly along the south coast from the Scott Coastal Plain to Two Peoples Bay, with further populations in the southern Jarrah Forest. Two disjunct populations are recorded to the north, along a creekline in the Whicher forest just north of Sabina Road on Jalbarragup Road .

Ricinocarpos aff. *cyanescens* (A. Webb sn 27 October 2003) (Photograph 36) z, r (N, Argyle forest, WHS; S, Whicher NP, WHS), p, s, u, eWHS, h (sands)
Collections of this species previously sent to the WA Herbarium have been recognised as a different form of *Ricinocarpos cyanescens*, differing in characteristics such as plant height and leaf length. This taxon is currently known from Argyle forest and Whicher National Park in deep sands.
Recommendation: It is recommended that this taxon be listed as Priority 1 and the taxonomic status of the population be determined.

Stachystemon vermicularis r (S, WHS/BP), d (series), p, s, u, h (sands)
This species is not listed in the *Flora of the South West* (Wheeler *et al.* 2002); however, there is a WA Herbarium record from Treeton forest and several survey records locating this species in sands of the Dardanup, Boyanup and Whicher (Goulden Road) forests. These populations are disjunct from the main area of distribution of the species to the north. Another disjunct population is found on the Blackwood Plateau.

4.9 Goodeniaceae

Anthotium junciforme p, s, u, h (clay/ironstone wetlands)
This species is a habitat specialist generally occurring in clay/ironstone based wetlands, mostly on the eastern/southern side of the Swan Coastal Plain and Scott Coastal Plain. One population is found in the Gale Road Ironstones on the Whicher Scarp. This is a Priority 4 species.

Dampiera linearis v, g
Dampiera linearis is a widespread and common species of the south-west. Detailed work on the species across its range in the late 1960s identified a series diploid and polyploid races in the south-west (Bousfield 1970). Work on populations in an area south of Busselton within a band stretching along the Whicher Scarp, and associated Swan Coastal Plain, between Jalbarragup Road and Tutunup Road (Figure 2 this report) identified diploid (2X) and tetraploid (4X) races as well as a series of diploids with B chromosomes. The diploid populations were located on the laterites of the Whicher Scarp and tetraploids on the contiguous Swan Coastal Plain, while the diploid populations with B chromosomes were located on the interface of the Whicher Scarp and Swan Coastal Plain. It was postulated that the tetraploids had arisen from two diploid races, a laterite race and an ecotonal race. The populations with B chromosomes were considered to be heterogenomic diploids. The presence of the B chromosomes then contributing evolution of the 'new' tetraploid races on the derived Plain (Bousfield 1970; Bousfield and James 1976).). Hence the reference in the 1974 CTRC report to the importance of the area in demonstrating the process of speciation. The WA Herbarium holds a series of the vouchers associated with this study.

4.10 Lamiaceae

Hemigenia rigid p, s, h (laterites)
A species of lateritic soils in the Whicher Scarp, found in Dardanup, Boyanup, Argyle and Abba forests and Whicher National Park. This is a Priority 1 taxon.

Pityrodia bartlingii r (SW, Whicher forest, WHS), d (series), p, s, u, eSWA+/WHS, h (yellow sands), g
This northern sandplains species is commonly found on the Geraldton Sandplains, within the northern sandplain communities of the Swan Coastal Plain and in a series of disjunct populations on the eastern sands in the Perth Metropolitan Region. Significantly disjunct populations are then found in the Whicher Scarp, within yellow sand vegetation communities of the Boyanup forest, Argyle forest, Abba forest and eastern end of the Whicher forest (SABI08). Another significantly disjunct population of this species occurs in the Kulin area of the Wheatbelt.
Recommendation: The genetic status of the most southern populations should be investigated.

4.11 Loganiaceae

Logania wendyae (Photograph 29) z, p, s, u, eWHS, h (sand/laterite)
This species, with the use of existing taxonomic keys, identifies as *Logania serpyllifolia*, but the species is vastly different with significantly larger flowers and hairy leaves. This species is currently only known from Dardanup, Boyanup and Argyle forests. GJ Keighery *et al*. 1996c and 2008 have referred to this taxon as *Logania* sp. nov. This species is listed as Priority 1.

4.12 Mimosaceae

Acacia browniana var. *browniana* r (N, Gwindinup Reserve, WHS)
This species is recorded as occurring from the Whicher Scarp south to Augusta and Mt Manypeaks. The most northern locality is a survey record in the Gwindinup Reserve.

Acacia flagelliformis r (N, Harvey, SWA), p, s, u, eSWA/WHS/BP, h (damplands)
This is a Priority 4 species found in damplands from Harvey to Karridale. Within the Whicher Scarp it is known from along Goodwood Road (Happy Valley forest) and in the Abba forest and the Whicher National Park.

Acacia inops d (habitat), p, s, u, eSWA(B)/WHS/BP+, h (wetlands)
An uncommon shrub of sumplands of the Margaret River Plateau and Yelverton (Poole Swamp) area, currently listed as Priority 3.

Acacia luteola r (N, Dardanup forest, WHS), d
On the Whicher Scarp in the Dardanup and Boyanup forests this small inconspicuous *Acacia* is disjunct from the centre of its range in the Walpole–Albany area. In the Dardanup forest it is at its northwestern-most location.

Acacia mooreana r (N, Dardanup forest, WHS), s, h (sands)
Found from Dardanup forest south on the Whicher Scarp, Busselton Plain, Margaret River Plateau, Blackwood Plateau and south-east Jarrah Forest. The most northern population is that in the Dardanup forest.

Acacia preissiana r (S, WHS), s
This species occurs in the Jarrah Forest from north of Bindoon to the Whicher Scarp with a disjunct occurrence near Albany. Within the Whicher Scarp, populations are recorded from Dardanup forest to Treeton forest. While several Herbarium collections are known from the Blackwood Plateau, these have not been determined by B. Maslin or mentioned in his description of the distribution of this species on the WorldWideWattle website.

Acacia semitrullata p, s, u, h (sands)
A Priority 3 listed species which occurs in the Yarloop, Donnybrook and Yallingup areas on sandy soils. Populations are known from the Dardanup, Argyle and Whicher forests.

Acacia tayloriana r (N, Abba forest, WHS), p, s, u, eWHS/BP
Several populations of this taxon are located in the Whicher Scarp which is the most northern extent of its range on the Whicher and Blackwood Plateau. A sight record from Swan Bioplan remnant 55/1-3 along Claymore Road (Abba forest) is the most northerly location. This is a Priority 4 taxon.

Acacia tetragonocarpa d (all), s, u
This species has a discontinuous distribution, occurring in the south-eastern Perth Metropolitan Region and Busselton-Witchcliffe and Albany areas. Within the Busselton-Witchcliffe area two populations are recorded on the Whicher Scarp in the Argyle and Treeton forests.

Acacia uliginosa r (N, Whicher, WHS), p, s, u, Se
This shrub Acacia is at its northern-most location at Yoongarillup which, from the vegetation (*Banksia attenuata* woodland) and soil description (grey sand), is considered to be located on the Whicher Scarp.

4.13 Myrtaceae

Actinodium cunninghamii p, s, u, h (wetlands), g
This species is relatively common in wetlands in the Albany area, with scattered localities in the southern Jarrah Forest, Blackwood Plateau and Scott Coastal Plain. A few localities are known from swamps of the Busselton Plain, with an old record as far north as Boyanup. While there are some collections from around Perth, it has not been seen in the Perth area since the 1960s when it was observed in a wetland to the east of the Serpentine River. Within the Whicher Scarp it is known from the Yelverton Ironstones and there is another record from a swamp at Chapman Hill.

Agonis flexuosa var. *flexuosa* s, u, h (rivers/creeks)
Agonis flexuosa has a more restricted distribution on the Swan Coastal Plain and Whicher Scarp than is generally appreciated. This species is at the north of its range in the Perth Metropolitan Region where it is found in the Quindalup Dunes of the Swanbourne-City Beach area and along the northern banks of the Swan Estuary. It is difficult to determine the actual distribution on the estuary as plantings have occurred without reference to natural distribution. South of Perth there is a significant disjunction to south to the Dawesville

Cut. In the Spearwood and Quindalup Dunes south of the Cut it is a dominant species. However, in the Mandurah to Bunbury area it is generally absent from the centre (Bassendean Dunes) and east of the Plain, with a few occurrences along rivers within the centre of the Plain and east to the Darling Scarp. South of Bunbury this species becomes increasingly common on the entire Plain, dominating a variety of communities that are currently poorly distinguished.

The sandy communities of the Whicher Scarp from the Treeton forest, and to the east of this block, are generally distinguished by the absence of *Agonis flexuosa*. To the west of the Treeton forest, *A. flexuosa* becomes a significant component of the leached sand woodland communities dominated by *Banksia attenuata*, Jarrah and *Allocasuarina fraseriana*. Examples of this type of community are located in the West Whicher Scarp. These woodlands appear most similar to those of the Foothills of the Scarp (Cartis Complex) and woodlands of the remainder of the Plain (WHSFCT B1 and WHS FCT B2). Significant disjunct populations are found in some of the rivers/creeks.

Beaufortia sparsa d (habitat, series), p, s, u, h (wetlands), g
This species is known from wetlands on the Whicher Scarp in the Yelverton area, including Poole Swamp. There are also two populations known from the Swan Coastal Plain to the north of these, being at the base of the Whicher Scarp along Brilliant Road where it crosses the Gynudup Brook and in State Forest 12 associated with wetlands along the Capel River.

Beaufortia squarrosa r (S, Abba forest, WHS), d (series), p, s, u, eSWA++/WHS, h (sands), g
This species is common within the Dandaragan Plateau, extending into the Geraldton Sandplain Bioregion as far north as Kalbarri. Scattered population of the species occur within the Perth Metropolitan Region and then there is a large disjunction in the range to the Abba forest and adjacent Oates Road bushland. The Abba forest population is the most southern population of this species. While there is a FloraBase locality that indicates that the species occurs north of Bunbury, this is considered unlikely. The record is based on a 1917 collection made between '9-16 mile wells', Busselton to Jarrahdale road. Given that the population within the Whicher Scarp is on the road from Busselton to Jarrahwood in an area locally known as the 12 Mile Hill, it is likely that an error in the wording of Jarrahwood has resulted in this specimen locality being incorrect.
Recommendation: The taxonomic and genetic status of the Abba forest populations should be investigated.

Calothamnus pallidifolius (Photograph 39) s, u
This inconspicuous *Calothamnus* grows in the Whicher Scarp from the Capel–Donnybrook Road in the north to the Whicher forest in the south-west. Several populations were located in study sites on the Sabina River (SABI06) and in the Treeton forest (smith03). This is typically a Blackwood Plateau species with a few scattered localities on the western side of the southern Jarrah Forest north to Collie.

Calothamnus schaueri d (Dardanup forest WHS), s, u
A low spreading shrub found between Pingelly and the Stirling Range. The species is present as a series of disjunct populations in the Whicher Scarp and is rarely recorded this far west. A population is recorded in the Dardanup forest.

Calothamnus sp. Scott River (R.D. Royce 84) PN z, r (N, Treeton forest, WHS), p, s, u, eWHS/SC, h (ironstone)
This species is typically associated with the ironstones of the Scott Coastal Plain with several occurrences on the ironstones south of Busselton, one along Smith Road in the Treeton forest. This is a Priority 2 taxon.

Calothamnus sp. Whicher (B.J. Keighery & N. Gibson 230) PN z, p, s, u, eSWA(B)/WHS, h (ironstone)
A distinctive large version of *C. quadrifidus*, distinguished by being 2.5 metres tall, with glabrous leaves and brighter flowers, and reseeding after fire. While mostly confined to the Ironstone Communities, there are a few populations on the Whicher Scarp. The Whicher Scarp populations appear to be related to disturbance events and may be beyond their natural range. This is a Priority 4 species.

Calytrix fraseri d (habitat), s, u, h (sands)
This species is not recorded in the *Flora of the South West* (Wheeler *et al. 2002*) and is disjunct in the Whicher Scarp in the Yelverton forest area from the sands of the Swan Coastal Plain to the north.

Calytrix sp. Tutunup (G.J. Keighery and N. Gibson 2953) PN z, p, s, u, eSWA(B)/WHS, h (ironstone), t
This taxon is related to *Calytrix acutifolia* and will most likely be described as a subspecies in this complex. While principally confined to the Williamson Road and Tutunup Road Ironstones, there is a population south of the Williamson Road Ironstones in the damp sands (UCL06). The damp sands populations appear to be related to disturbance events and may be beyond their natural range. This is a Priority 2 species.

Calytrix tenuiramea r (W, Whicher NP, WHS), d (Whicher NP & Carbellup), s, u, h (sands)
This species is apparently confined to the south-west Whicher Scarp (Whicher National Park along the eastern end of Sabina Road), with one location on the Swan Coastal Plain at Carbellup. A dominant component of leached sands of the West Whicher Scarp. Beyond the Plain and the Whicher Scarp it is found in the southern Jarrah Forest, south-east to Denmark.

Chamelaucium erythrochlorum MS z, r (N, Dardanup forest, WHS), p, s, u, eSWA(B)/WHS/BP, h (river/creeks)
This species is endemic to creeklines of the southern side of the Busselton Plain, Whicher Scarp and adjacent Blackwood Plateau. On the Whicher Scarp it is found in the Dardanup, Treeton and Whicher forests, the most northern locality being in the Dardanup forest. This is listed as a Priority 4 species.

Darwinia vestita r (NW, Dardanup forest, WHS), p, s, u, Se
A predominantly southern species, stretching from east of Esperance to Cape Naturaliste. Populations are also located on the southern margins of the Swan Coastal Plain in the Busselton area and on the Whicher Scarp. The most north-western location is in the Dardanup forest and several other populations are known in the Argyle and Whicher forests (an isolated population to the north in the Jarrah Forest is expected to be a related undescribed taxon).

Eremaea asterocarpa r (S, Argyle forest, WHS), d (Dardanup and Argyle forests) s, u, eSWA/WHS, h (sands)
On the Swan Coastal Plain this species is predominantly located from the Peel area north, and the adjoining Dandaragan Plateau. There is then a large disjunction from the Peel area south to the Dardanup forest. This is an uncommon species in the Whicher Scarp, known from several locations, the second being in the Argyle forest.
Recommendation: The taxonomic and genetic status of the Argyle forest populations be investigated.

Eremaea pauciflora var. *pauciflora* d (series), s, u, h (sands)
On the Swan Coastal Plain this species is predominantly located within the Perth Metropolitan Region, the northern extent of the Plain and the adjoining Dandaragan Plateau. Beyond the Plain it is common in the Avon-Wheatbelt Bioregion with scattered occurrences within the goldfields and isolated occurrences around Collie. Outside this typical range disjunct populations of the species are found on the Swan Coastal Plain east of Mandurah and in the Capel Nature Reserve and on Whicher Scarp from Dardanup forest to the Abba forest.

Eucalyptus decipiens subsp. *chalara* z, r (N, Goodwood Road, WHS), p, s, u, h (paluslopes)
Two populations of this subspecies occur within the Whicher Scarp, one along Goodwood Road (Happy Valley forest) and the other within private property adjacent to Argyle forest. These populations are at the most northern extent of this subspecies which is generally known from Jarrah forest wetland dependent vegetation communities extending south-east to Albany.

Eucalyptus haematoxylon r (S, Treeton forest, WHS), d (series), s, eSWA+/WHS, g
Mountain Marri (*Eucalyptus haematoxylon* or *Corymbia haematoxylon*) is the dominant tree of the Whicher Scarp vegetation between the Dardanup and Treeton forests. Pockets of Mountain Marri extend onto the Plain between Oates Road and Acton Park. Beyond this area several disjunct populations occur along the interface of the Darling Scarp and Foothills from Harvey (Korijekup Reserve) to the southern boundary of the Perth Metropolitan Region. There is an additional isolated occurrence at Mount Lesueur. A record from 'Margaret River' needs to be confirmed.

Eucalyptus megacarpa d (habitat), s, u, h (fresh water seepages)
This is typically a species of the creeklines of the Jarrah Forest from the Perth area south but it has not been recorded on the Swan Coastal Plain. This species occurs in a series of creeklines fed by fresh water seepages in the West Whicher Scarp. These creeklines typically support *Eucalyptus megacarpa, E. patens, E. calophylla, Agonis flexuosa, Pultenaea pinifolia, Gahnia decomposita, Lepidosperma effusum, Cyathochaeta teretifolia* and *Taraxis grossa*.

Eucalyptus relicta z, p, s, u, eWHS/BP, h (WHS valleys), a
This species was originally placed in *E. lanepoolei* as 'var. Whicher' (after specimen SD Hopper 6316). This species is endemic to the area of the Whicher National Park and adjacent Blackwood Plateau. This is a Priority 2 species.

Eucalyptus relicta x lane-poolei p, s, u, eWHS
This unusual hybrid is found along the Sabina River. The closest known populations of *E. lane-poolei*, and the southern-most known of this taxon, are on the Foothills in Waroona.

Homalospermum firmum d (series), s, u, h (fresh water seepages)
This species is found in permanent to semi-permanent wetlands, principally along the south coast from Albany to Augusta and north on the Blackwood Plateau and Margaret River Plateau. There are a series of scattered localities on the south of the Busselton Plain, on the West Whicher Scarp and in the northern extent of the southern Jarrah Forest. There is then a major disjunction to populations in the headwaters of Boonanarring and Gingin Brooks north of Gingin.

Kunzea rostrata r (N, Dardanup forest, WHS), s, e SWA(B)/WHS/BP
A Busselton Plain, Whicher Scarp and Blackwood Plateau endemic which is most commonly found on the south-west of the Whicher Scarp. Isolated occurrences are found north to Dardanup forest, which is the most northerly location of the species.

Paragonis grandiflora (Photograph 24) MS r (S, Whicher NP, WHS), s
This low multi-stemmed shrub is found predominantly within the Darling Scarp area of the Perth Metropolitan Region and from scattered populations in Pinjarra, Harvey and the Whicher Scarp. This species is commonly encountered on the Whicher Scarp from Argyle forest to the Dardanup forest. Populations are also known south of Argyle forest to the Whicher National Park but it is no longer such a common component of the vegetation on outcropping laterite. North of Dardanup forest there are no records until east of Harvey. Populations on the Whicher Scarp exist as the southern-most limit of this species upon laterite soils north of the Sabina River. Another disjunct population of the species also exists north of Perth at Badgingarra.

Taxandria fragrans MS r (N, Argyle forest, WHS), d (habitat), s, u, h (rivers/creeks)
This predominantly south coast and southern forest species has disjunct occurrences scattered within the Blackwood Plateau in perennial creek systems. The northern-most extent of these scattered occurrences fall within Argyle, Abba and Yelverton forests and the Whicher Scarp landform units in a Shire reserve near Yelverton.

Verticordia densiflora var. *pedunculata* d (series), p, s, u, eSWA(B)/WHS, h (wet sands)
This rare variety of *Verticordia densiflora* is centred on the Swan Coastal Plain in the Busselton area but a significant population has recently been located in one of the small valleys associated with the Whicher Scarp (M. Tichbon MT02) to the south of Goodwood Road. This discovery well illustrates the detailed survey required in the area of the Whicher Scarp. It is apparent that the area contains a large variety of plant habitats that support numerous populations of significant flora. This taxon is state listed as Declared Rare Flora and listed as endangered under the *Environment Protection and Biodiversity Conservation Act 1999.*

4.14 Papilionaceae

Aotus cordifolia p, s, u, h (wetlands)
One small population of this species has been found at the base of the Whicher Scarp along Brilliant Road where it crosses the Gynudup Brook. This is a Priority 3 species.

Bossiaea pulchella r (S, Abba forest, WHS), p, s
This relatively restricted species is only known from two broad and disjunct areas, one on the Darling Scarp east of Perth extending inland on a south-east line to the Narrogin area and the other from the northern extent of the Whicher Scarp within the Boyanup, Happy Valley and Abba forests.

Bossiaea sp. Waroona (B.J. Keighery and N. Gibson 229) PN z, r (S, Goodwood Road, WHS)
This species is a member of the *Bossiaea eriocarpa* complex. The most recent taxonomic work on *Bossiaea eriocarpa* recognised that it was a widespread variable taxon (Ross 2006). The patterns of variation in the *Bossiaea eriocarpa* complex have proved confusing. For example, Marchant *et al.* (1987) commented that it appeared that *B. eriocarpa* and *B. ornata* intergraded in the Perth region. However, studies on the Swan Coastal and Whicher Scarp since the early 1990s have recognised this 'intergrade' as a large flowered and leaved form of *B. eriocarpa*. On the Swan Coastal Plain this species is apparently confined to Marri Woodlands on the south of the Plain (generally associated with floristic community type 3b). In the study area, these two taxa co-occurred in two areas (including one quadrat). This taxon should be recognised at the specific level.

Bossiaea sp. Waroona is a relatively common species in the Dardanup forest and is also found in the Boyanup and Argyle forests and along Goodwood Road (Happy Valley forest). Outside the Dardanup forest, *B. ornata* is the most commonly encountered *Bossiaea* on the Scarp.

Chorizema reticulatum r (N, Argyle forest, WHS), p, s
Populations of this species have been recorded from east of the Williamson Road Ironstones in the Abba forest and in the Argyle forest (DAVE06) to the north. This is a Priority 3 taxon.

Chorizema spathulatum r (N, Whicher NP, WHS), d (series), eWHS/BP++
This species is known from two disjunct populations on the Whicher Scarp in Treeton forest (Ironstone Gully) and the Whicher National Park. Several locations are given for unlikely locations/habitats on the Swan Coastal Plain ('Busselton' and 'Ludlow') but these are not considered to be sufficiently accurate for these to be taken into account.

Daviesia divaricata subsp. *divaricata* MS d (series), s, u, h (orange sands)
This subspecies is predominantly known from the Geraldton Sandplain Bioregion south of Geraldton and from the northern Swan Coastal Plain and the Perth Metropolitan Region. South of the Perth Metropolitan Region the species is known as scattered populations upon the Swan Coastal Plain and the Darling Scarp, the southern-most records of this species appear to occur upon orange sandy soils of the Whicher Scarp units. A further disjunct occurrence of this species has been recorded in the Leeuwin Naturaliste National Park near Sugarloaf Rock.

Daviesia elongata subsp. *elongata* (Photograph 35) p, s, u, eSWA(B)/WHS, h (sands)
This very uncommon prostrate *Daviesia* is presently known from one population on the Plain (Carbunup River) and a series of populations on the sands of the Whicher Scarp from the Treeton and Argyle forests and

the Whicher National Park. While this species can be locally common, particularly after a disturbance event, it becomes increasingly uncommon after these events. However, individuals do persist such as the large but cryptic individual in the long unburnt Whicher National Park (SABI12). There is a need to monitor some populations to establish the biology of the species, especially its response to repetitive fire or other disturbances. This taxon is listed as Declared Rare Flora and listed under the *Environment Protection and Biodiversity Conservation Act 1999.*

Daviesia flexuosa r (N, West WHS), d (WHS), s, u, Se
This distinctive species, with its divaricately arranged stems and leaves, is predominantly recorded along the south coast with population centres on the Scott Coastal Plain extending to just north of the Blackwood River, and from approximately Walpole through to Albany extending into the southern wheatbelt as far north as Cranbrook. A solitary and significantly disjunct population of the species was recently found by the Swan Bioplan survey within road verge vegetation (Swan Bioplan remnant 32/1-7) on the West Whicher Scarp of the Whicher.

Daviesia major r (S, Abba forest, WHS), d (Abba forest)
The exact location of this species in the area is uncertain, but as the soils are described as 'Brown, gravely sand over laterite', it is most likely to be on the Whicher Scarp, east of Ruabon in the Abba forest. This population is a major disjunction from the species' normal range around Esperance. This record is of further interest as the flowers are described as being cream rather than the typical orange/red.
Recommendation: The location of this species be confirmed and the taxonomic and genetic status of the populations then be investigated.

Daviesia nudiflora r (S, Argyle forest, WHS), d (Argyle forest), s, u, h (yellow sands), v
This species has a significant disjunct population occurrence within the Whicher Scarp. The species extent is predominantly within the Swan Coastal Plain and the Wheatbelt Bioregions north of a line east from Perth to the goldfields. Apart from a population within the Mallee Wheatbelt Bioregion, the solitary Whicher Scarp population currently known from Argyle forest is the southern-most occurrence of this species, disjunct from the nearest population within the Darling Scarp around the Byford area.
Recommendation: The taxonomic and genetic status of the Argyle forest population be investigated.

Dillwynia sp. Capel (P.A. Jurjevich 1771) PN z, r (N, West Donnybrook, WHS), p, s, u, eWHS/BP
This recently recognised taxon is poorly known and is confined to the Whicher Scarp/Blackwood Plateau area. None of the localities appear to be in a conservation reserve.
Recommendation: This taxon should be listed as Priority 1.

Gastrolobium modestum z, p, s, u, eWHS/BP, h (sands associated with ironstone)
This is a species of areas adjacent to outcropping ironstones and is found in the Treeton forest and Quilergup Forest Block on the Blackwood Plateau. This taxon is state listed as Declared Rare Flora and listed as vulnerable under the *Environment Protection and Biodiversity Conservation Act 1999.*

Gastrolobium whicherense z, p, s, u, eWHS, h (quartzite/laterite)
This species is apparently confined to quartzite/laterite ridges of the Whicher Scarp centred on the Dardanup and Boyanup forests with populations to the south in the Whicher National Park and Treeton forest. This is a Priority 2 species. Previously this species has been confused with *Gastrolobium* sp. Yoongarillup (S. Dilkes 1/9/1969) which is known from two specimens described as being from Busselton and Yoongarillup.

Gompholobium cyaninum MS s, u, h (laterites)
This is known from a series of scattered locations in the Jarrah Forest, Blackwood Plateau and Whicher Scarp. It is predominantly a species of the laterites in the Whicher, growing north to Camp Gully Road but most commonly encountered along the western end of Sabina Road. A population appears to occur on the Swan Coastal Plain at Yoongarillup.

Gompholobium villosum d (series), s, u
This species has two centres of distribution: a north-western centre on the Whicher Scarp and Blackwood Plateau south of Busselton and a south-eastern centre from Denmark to Bremmer Bay and north to the Stirling Ranges. The populations on the Whicher Scarp are currently confined to the Whicher National Park area.

Hovea stricta d (populations), s, u, Ne
The majority of the records for this species are found on the Swan Coastal Plain and Dandaragan Plateau north of Perth, extending into the Geraldton Sandplains Bioregion. However, there is a set of disjunct populations centred on the Whicher Scarp, being found from the Swan Coastal Plain south of Busselton, through the western extent of the Whicher Scarp, Gracetown and to the Scott National Park.

Jacksonia lehmannii r (S, Sues Road, WHS), d (series), s, u
This species grows on the Geraldton Sandplains around Eneabba and Three Springs, then has a series of disjunct populations on the east of the Plain/Darling Scarp south to the Whicher Scarp. The most southern populations are from site records in the Whicher National Park, on the sands west of Sues Road. There is also a record from the adjacent Busselton Plain at Ruabon.

Jacksonia sp. Whicher (G.J. Keighery 9953) z, r (N, Bunbury, SWA), s, eSWA(B)/WHS/BP, h (sands)
For a period of time this taxon was recognised as *Jacksonia sparsa* ms but it has since been placed in *J. horrida*. However, ongoing work on the Swan Coastal Plain and Whicher Scarp continue to recognise this as a distinct taxon as there is an apparent geographic and ecological separation between the two taxa. *Jacksonia* sp. Whicher is an open shrub and is a dominant understorey plant in the *Banksia* woodlands of the Busselton Plain, Whicher Scarp and on the Blackwood Plateau. There are records of this taxon in the Dardanup, Boyanup, Argyle, Happy Valley, Abba and Whicher forests (including the Whicher National Park).

Pultenaea brachytropis r (N, Abba forest, WHS), eWHS/BP+
This species is centred on the Blackwood Plateau and is uncommon in the Central Whicher Scarp, being recorded from the Whicher National Park and the Abba forest. There are a series of records allocated to the Swan Coastal Plain in FloraBase; however, these are considered all unlikely to be on the Plain as they are all from very general localities (Busselton, Yoongarillup and Ludlow). One of the Busselton specimens refers to the plant growing on gravel, supporting our allocation of these specimens to the Scarp.

Pultenaea pinifolia d (habitat), p, s, u, eSWA(B)/WHS/BP, h (fresh water seepages)
This species is endemic to the Blackwood Plateau, Margaret River Plateau, Leeuwin-Naturaliste Coast, the Yelverton area of the Whicher Scarp and the Swan Coastal Plain. The Whicher Scarp and Plain populations are found in wetlands and creeklines formed by freshwater seepages. Those on the Plain are in wetlands at the base of the Whicher Scarp. This is a Priority 3 species.

Pultenaea radiata (Photograph 25) r (N, Dardanup forest, WHS), s, eWHS/BP, h (sands/laterite)
This previously priority listed species is a Blackwood Plateau/Whicher Scarp endemic that has the northern extent of its occurrence occurring within Whicher Scarp vegetation units in the Dardanup forest. However, while this species extends as far north as the Dardanup forest it is uncommon in the North Whicher Scarp but a dominant in the Central Whicher Scarp.

Pultenaea skinneri r (N, Kemerton, SWA), d (habitat), p, s, u, eSWA/WHS/BP, h (damp sands)
This *Pultenaea* species is one of several in this genus associated with wetland habitats and is found growing in the damp margins of basin wetlands. This species is endemic to the area from Kemerton south-east along the Darling Scarp to the Blackwood Plateau and the Swan Coastal Plain from Bunbury south. One population is recorded for the Whicher Scarp, in Abba Block (near Will02). This is a Priority 4 species.

Pultenaea verruculosa r (N, 10km west Donnybrook, WHS)
On the Whicher Scarp this species is at the north of its principle range from Albany to the Whicher Scarp. There is a disjunct population at Eneabba, but this is most likely a different taxon.

4.15 Proteaceae

Adenanthos barbiger subsp. *barbiger* MS z, r (N, Dardanup forest, WHS), s, eSWA(B)/WHS/BP+
This taxon is a typical species of the Whicher Scarp, Blackwood Plateau and Leeuwin-Naturaliste Coast. The most northern location is in the Dardanup forest.

Banksia meisneri subsp. *ascendens* r (N, Ruabon Nature Reserve, SWA), p, s, eSWA(B)/WHS/BP+
The populations of this taxon described as being from the 'Tutunup' and 'Yoongarillup' areas are highly likely to be from the Abba forest area of the Whicher Scarp. This decision is based on the taxon's habitat preferences and the reference to 'gravel, laterite' on a specimen of *Dryandra baxteri* (Wittwer W 756) from near the same date and by the same collector. This is a Priority 4 listed taxon.

Banksia sphaerocarpa subsp. *sphaerocarpa* r (W, Yoongarillup, WHS), d (series), s
A series of scattered populations are located in the Treeton forest, Argyle forest and at Yoongarillup (from habitat preferences this is most likely to be in the Abba forest but it may be on the Swan Coastal Plain).

Conospermum acerosum subsp. *acerosum* d (series), s, u, h (sands)
This species is commonly recorded along the Swan Coastal Plain north of Perth extending into the Geraldton Sandplains as far north as Kalbarri. South of Perth there are a series of disjunct populations on the Swan Coastal Plain, Whicher Scarp and Blackwood Plateau. Disjunct occurrences of the species occur within the Whicher Scarp in sandy *Banksia attenuata* woodland communities in the Happy Valley forest. The most southern record from Cape Leeuwin in 1880 is considered to be a general non-specific locality and not a likely location.

Conospermum caeruleum subsp. *marginatum* s, u, eSWA(B)/WHS/BP
This taxon is known from relatively few populations and is confined to the Busselton Swan Coastal Plain, Central Whicher Scarp and south on the Blackwood Plateau to the Scott Coastal Plain. The most northerly record is from Ludlow. Survey records are known from the Treeton forest and Whicher National Park. A collection from Treeton forest may be *Conospermum caeruleum* subsp. *debile* which appears to be confined to ironstone surfaces.

Conospermum paniculatum r (N, Carbunup River Reserve, SWA), p, s, eSWA(B)/WHS/BP+
On the Whicher Scarp this species occurs in a series of scattered localities at the north of its range: in the Treeton and Whicher forests (along Kemp Road) and at Carbunup River Bushland. There is a significantly disjunct population near Darkan. This is a Priority 3 listed taxon.

Conospermum teretifolium r (N, Argyle Forest, WHS), d (habitat), s, u, Se, h (deep sands)
This predominantly south coast species extends into the deep sands of the Argyle forest and is found in both the West and North Whicher Scarp.

Dryandra armata var. *armata* d (habitat), s, u, h (quartzite/laterite)
The typical distribution of this taxon is in the Darling Scarp and wheatbelt. On the Darling Scarp the taxon extends from the Muchea area to Korijekup Conservation Park near Harvey and in the wheatbelt it occurs in a band from the Darling Scarp near Perth to Albany with further core areas around Jurien and Esperance.

South of Harvey a series of survey records locate a set of disjunct populations in and adjacent to the study area. These include populations in the North Whicher Scarp extending as far south as Abba forest. The taxon is most common in the Dardanup forest where it is a distinctive feature of the quartzite ridge. Further disjunct records are known from the eastern side of the Leeuwin-Naturaliste ridge (near Quindalup) and on the restricted low heath vegetation communities of the Blackwood Plateau. Recent treatments of *Dryandra* do not map these populations (George 1999 and Cavanagh and Peroni 2006).

Dryandra baxteri r (N, Abba forest, WHS), d (series), s, u, h (sands/ironstone)
This species is principally located in the Albany/Stirling Range area, except for a significant disjunct occurrence of three populations within woodland vegetation fringing the Busselton Ironstone occurrence in the Abba forest. There is a series of records from the Busselton Plain in the 1960s and 1970s but these are generally from non-specific localities. However, the reference to 'gravel, laterite' on the Tutunup locality for *Dryandra baxteri* (Wittwer W 756) indicates this is from the Whicher Scarp. Also, this is one of the taxa referred to as having 'relict populations' on the Whicher Scarp in the 1974 CTRC Report. Recent treatments of *Dryandra* refer to a Whicher Scarp form with gold-brown flowers, rather than the typical purple-brown (George 1999 and Cavanagh and Pieroni 2006).
Recommendation: The taxonomic and genetic status of the Whicher Scarp populations be investigated.

Dryandra formosa (Photograph 38) r (N, Sabina River, WHS), d (habitat), s, u, h (river bank), a, g
This is one of the taxa referred to as having 'relict populations' on the Whicher Scarp in the 1974 CTRC Report. The most northern, and disjunct, population of this species occurs along the Sabina River within the Whicher forest (part of the population extends into the Whicher National Park). The nearest population of this species is to the south-east, within Jarrah/Marri forest south-west of Nannup (south of Stewart Road). This species is predominantly a south coast species centred on the Albany area with another northern population occurrence at Kulikup (although a recent survey of the Kulikup area indicates that this record maybe an incorrect identification of *Dryandra stuposa*). Recent treatments of *Dryandra* refer to a Whicher Scarp form of smaller size and with smaller flowers and fruits (George 1999 and Cavanagh and Pieroni 2006).
Recommendation: The taxonomic and genetic status of the Whicher forest population be investigated.

Dryandra mimica r (S, Whicher NP, WHS), d (series), p, s, u, eSWA/WHS, h (sands), a, g
A species located in three disjunct locations, all on deep sand: at Mogumber on the Dandaragan Plateau, on the eastern side of the Plain in the Perth Metropolitan Region and in the Whicher National Park. Genetic work on the disjunct populations may elucidate differences not recognisable at a morphological level. This species is Declared Rare Flora and listed as vulnerable under the *Environment Protection and Biodiversity Conservation Act 1999.*
Recommendation: The taxonomic and genetic status of the Whicher National Park populations be investigated.

Dryandra nivea subsp. *uliginosa* z, d (habitat), p, s, u, eSWA/WHS/SC, h (ironstone)
Dryandra nivea subsp. *uliginosa* has only recently been named, even though it has been recognised for many years (George 1996). This is one of the mound-forming *Dryandra* species which grows on seasonally inundated soils. This taxon is state listed as Declared Rare Flora and listed as endangered under the *Environment Protection and Biodiversity Conservation Act 1999.*

This taxon is confined to the Busselton and the Scott River Ironstones. It is a reseeder and is highly susceptible to *Phytophthora*. A population is located in the Gale Road Ironstones within the south-western Whicher Scarp. Interestingly, recent genetic studies have indicated that the Swan Coastal Plain and Scott Coastal Plain populations are significantly different and should be recognised as distinct taxa (D Coates pers. comm.).

Dryandra sessilis subsp. *sessilis* d (series), u, h (laterite)
The general paucity of this species in the Whicher Scarp is of interest. This species is often a dominant of laterite surfaces but it has not been recorded in any quadrats incorporated in this study. Populations are known from the Argyle forest, Capel-Donnybrook Road and along Sabina Road east of Sues Road. This is a common and widespread species of the laterites of the Darling Scarp and Blackwood Plateau. Recent treatments of *Dryandra* do not map these populations (George 1999 and Cavanagh and Pieroni 2006).

Dryandra squarrosa subsp. *argillacea* z, d (habitat), p, s, u, eSWA(B)/WHS, h (ironstone)
This species is confined to the southern Ironstone shrublands (community type 10b) on the Busselton Plain and the Whicher Scarp (Smith and Gale Road Ironstones). This taxon is state listed as Declared Rare Flora and listed as vulnerable under the *Environment Protection and Biodiversity Conservation Act 1999.* There is a population of this species on Williamson Road, well west of the Williamson Road Ironstones on the Whicher Scarp (Abba forest). As this population is associated with disturbed ground, it is considered that this population is introduced to this locality.

Franklandia fucifolia r (NE, Abba forest, WHS), d (series), p, s, u, eWHS/BP+, h (sand/laterite), v, g
This unusual Proteaceae species with its yellow star-shaped flowers is a species of the deep sands of the south coast from Israelite Bay to Bow River, with scattered populations from Boyup Brook north to Kojonup. A series of disjunct populations is on the Blackwood Plateau and on the sand/laterite of the central Whicher Scarp (Whicher forest, possibly in the National Park). The general localities on the Swan Coastal Plain near Busselton and a Mandurah AVH record are not accepted. The populations in the Whicher Scarp are at, or near, its north-west limit and are morphologically distinct from the south coast and Boyup Brook/Kojonup forms (GJ Keighery and BJ Keighery 1996).
Recommendation: The taxonomic and genetic status of the Whicher Scarp populations should be investigated .

Franklandia triaristata r (N, Capel, SWA), d (series), p, s, u, eSWA(B)/WHS/BP+, h (sand)
Another *Franklandia* with white star-shaped chocolate/vanilla perfumed flowers is found uncommonly on sands of the Whicher Scarp and the Swan Coastal Plain from south of Bunbury to Capel (GJ Keighery and BJ Keighery 1996). The records in the Whicher Scarp are from the Boyanup, Happy Valley and Abba forests.
Recommendation: Growing in a series of disjunct populations, this species has the potential to be severely impacted by dieback and the species should be reinstated as Declared Rare Flora (current listing, Priority 4, Atkins 2006).

Grevillea bipinnatifida subsp. *bipinnatifida* d (Dardanup forest), s, u
This taxon is typical of, and almost restricted to, the Darling Scarp from Lowden forest in the south extending to Gillingarra on the Dandaragan Plateau to the north. Isolated records of the species are known from the western wheatbelt south-east of Lowden block with the southwestern-most record being from granite outcrops north-east of Manjimup. Records of this species from Dardanup forest are the only records of this taxon for the Whicher Scarp.

Grevillea brachystylis subsp. Busselton (G.J. Keighery sn 28/08/1985) PN z, p, s, u, eSWA(B)/WHS
This erect large red-flowered form of *Grevillea brachystylis*, distinct from the typical sprawling form, is found in only a few populations at the base of the Whicher Scarp and adjacent Swan Coastal Plain within a seven kilometre range from Jindong–Treeton Road to Jamison's Road. This uncommon attractive subspecies is listed as Declared Rare Flora.

Grevillea bronwenae p, s, u, eWHS/BP
This species has the northern and most abundant extent of its distribution centred within the Whicher Scarp in the Whicher National Park between the Vasse Hwy and Sues Rd. Other small scattered occurrences of the species are located at Cowaramup and toward the western extent of Blackwood Plateau within the Chapman forest. As the Cowaramup population is associated with a road verge, it is likely that this population has been introduced through movement of soil containing seed.
Recommendation: As this species is principally known from one small area and a single disjunct occurrence, it should be listed as Priority 1 and investigated for listing as Declared Rare Flora (currently not listed).

Grevillea pulchella subsp. *ascendens* Whicher Scarp Form (G.J. Keighery & B.J. Keighery 938) z, s, u, eWHS, h (coloured sands)
Within the orange sand communities of the Whicher Scarp in Argyle and Treeton forests there is a distinct slender erect form of this species. This form is distinct from the larger prostrate form which is a dominant on the adjoining Blackwood Plateau.
Recommendation: While in need of further study, collections of this taxon indicate that this is a distinct restricted form of this subspecies and should be listed as Priority 1.

Hakea cyclocarpa s, h (laterite)
This species has two centres, one in the north near Perth on the eastern side of the Swan Coastal Plain and adjacent Jarrah Forest and then it is a common feature of the Whicher Scarp vegetation from Dardanup to Treeton forest and in the adjacent Blackwood Plateau. Several scattered populations are recorded for the Darling Scarp between these two centres.

Hakea falcata r (N, Sabina River, WHS), d (habitat), s, u, eWHS/BP+, h (damp locations)
This species is at the northern limit of it range in the Whicher Scarp along the Sabina River in the Whicher forest (extends into the Whicher National Park). This species has two disjunct centres of distribution, one in and adjacent to the study area (Whicher Scarp/Blackwood Plateau/Scott Plain) and the other between Denmark to Albany and north to the to Stirling Range.

Hakea lasianthoides (Photograph 40) d (habitat), s, h (damp locations)
This is typically a species of the wet Jarrah forest and comes into the Whicher Scarp along creeklines and rivers from Abba forest, to the Sabina River in the Whicher National Park and west from here. There is a different, related form on the Dandaragan Plateau in the PMR.

Hakea linearis r (N, West WHS), d (habitat), s, u, Se, h (fresh water seepages)
This species is predominantly associated with wetlands at the head of the Margaret River in the Blackwood Plateau and with wetlands of the Scott River Plain, and also along the south coast from approximately Walpole to Albany. Populations of this species in wetlands at the base of the Whicher Scarp are the northern-most recorded occurrences of the species.

Hakea oldfieldii d (series),p, s, u, h (ironstones), g
In the Busselton area of the Swan Coastal Plain and the Whicher Scarp this species is associated with the wet ironstones, growing in the Gale Road Ironstones and the Smith Road and Ironstone Gully Ironstones in the Treeton forest. Interestingly this species has four centres of distribution around Kalbarri, Katanning, and north of Albany and south-west of Busselton. Further work should be done to ensure these are all the same taxon. Past studies on other species groups with similar disjunctions have distinguished the wet ironstones populations as separate taxa.
Recommendation: The taxonomic and genetic status of the Whicher Scarp and Busselton Plain populations should be investigated.

Hakea stenocarpa d (habitat), s, u
This species with its distinctive leaves is predominantly recorded from numerous populations along the Darling Scarp, extending into the western extent of the adjoining wheatbelt regions to as far south as North Dandalup, and extending north into the Geraldton Sandplains to Burma Road.
Outside this core area there are isolated records from the Porongurup National Park, a 1940 record at Koorda and a 1939 record for Busselton. There are also a set of disjunct records in the North Whicher Scarp between Dardanup forest and the top end of the Argyle forest.

Isopogon attenuatus r (N, Abba forest, WHS), s
While there is a collection of this taxon from 'Waterloo' in 1920 there is no currently known population at, or near, this locality. As a consequence, the most northern known location is from Quilgerup (Abba forest area).

Isopogon formosus subsp. *dasylepis* r (N, Elgin, SWA), d (habitat), p, s, u, eSWA(B)/WHS/BP/SC, h (damp locations)
This striking *Isopogon* is endemic to the Busselton Plain south to the Scott Coastal Plain. This taxon favours damp locations and is found in the interface of the Swan Coastal Plain and Whicher Scarp in the Treeton and Abba forests, and in the Gale Road Ironstones. Its most northern locality is a collection from near Elgin on the Swan Coastal Plain. This taxon is listed as Priority 3.

Lambertia multiflora subsp. *darlingensis* r (S, Abba forest, WHS), d (areas), p, s, eSWA/DS/WHS, h (laterite)
Disjunct occurrences of this species occur within Dardanup, Argyle and the western extent of Abba forests within the Whicher Scarp where laterite rock is exposed or comes close to the surface. The distribution of this species is predominantly within the Foothills in the Perth Metropolitan Region of the Swan Coastal Plain extending north and east into the Darling Scarp.

Lambertia rariflora subsp. *rariflora* d (habitat), p, s, u, eWHS/BP, h (damp locations)
It appears that this taxon is only known from several populations along the Sabina River in the Whicher National Park and several creeklines in the Treeton forest. It is considered that the other locations need to be confirmed. This taxon is listed as Priority 4.

Petrophile latericola MS z, d (habitat), p, s, u, eSWA(B)/WHS, h (wet ironstone)
This species is distinguished from the related but more widespread *Petrophile brevifolia* by its smaller inflorescences, leaves and lack of a lignotuber. This species is virtually confined to SWAFCT10b and associated communities. Along Williamson Road it grows from the Ironstones to the base of the Whicher Scarp. This species is highly susceptible to *Phytophthora* and is a reseeder. This taxon is state listed as Declared Rare Flora and listed as endangered under the *Environment Protection and Biodiversity Conservation Act 1999.*

Petrophile serruriae d (series), s, u, h (laterite), g
A series of disjunct occurrences of *Petrophile serruriae* occur within the Whicher Scarp. This species' distribution is in a band from Geraldton to Albany along the Geraldton Sandplains and 'woolbelt' areas of the Avon-Wheatbelt Bioregion.
Recommendation: The taxonomic and genetic status of the Whicher Scarp populations be investigated.

Petrophile striata d (series), s, u
There are a series of occurrences of *Petrophile striata* within the Whicher Scarp, in the Boyanup and Argyle forests and the Whicher National Park. This species is here near its southern extent.

Strangea stenocarpoides r (N, Ruabon, SWA), s, eSWA(B)/WHS/BP+, h (sands)
This species reaches its northern limit on the Busselton Plain/Whicher Scarp being recorded for Ruabon and the Abba forest (UCL03). On the Plain there are a series of populations associated with the thin Bassendean Sands over Pinjarra Plain at such places as Ambergate, Yoongarillup and Ruabon. Within the Whicher Scarp, populations are commonly found in the area from the Vasse Hwy west along Sabina Road and in the sands of the adjacent Plain at Acton Park.

Synaphea hians z, p, s, u
This is an uncommon, recently described species of *Synaphea* (George 1995). Populations are found between Collie and Busselton. A population is recorded for the Treeton forest (smith04). This is a Priority 3 taxon.

Synapheae petiolaris subsp *simplex* p, s, u, eSWA(B)/WHS, h (ironstone)
A collection of this Priority 2 taxon is found along Gale Road in the Central Whicher Scarp .

Synaphea polypodioides z, r (N, Dardanup forest, WHS; S Argyle forest, WHS), p, s, eWHS
This taxon has recently been described (Butcher 2007) and is known from collections in the Dardanup, Boyanup and Argyle (Gavins Road) forest. This new taxon was previously known as *Synaphea* sp.

Donnybrook (B.J. Lepschi and T. Lally 3111) and was first collected during the early survey for this study (G.J. Keighery 14538). This species is currently listed as Priority 3.
Recommendation: As this species is principally known from a small area, it should be listed as Priority 1.

Synaphea whicherensis (Photograph 24) z, r (N, Argyle forest, WHS), s, eSWA(B)/WHS/BP
This previously priority-listed species is recognised as a Whicher Scarp/Blackwood Plateau endemic predominantly north of Nannup. Populations of this species are found across the Whicher Scarp units from Argyle to Treeton forests. The populations in Argyle forest are at the northern limit of its range. A series of populations on the Plain/Whicher Scarp interface are found along Williamson Road, at Acton Park and Oats Road.

4.16 Rafflesiaceae

Pilostyles hamiltonii (Photograph 32) s, u
During survey work on the Whicher Scarp this cryptic parasitic plant has been located on several *Daviesia* species in a series of populations on and adjacent to the Whicher Scarp. This species is known from Cataby inland to the York/Northam area and then south-west through the Jarrah Forest to east of Margaret River. However, it appears that there is a concentration of populations centred on the Whicher Scarp/Busselton area.

4.17 Rhamnaceae

Stenanthemum sublineare d (all, Argyle forest), p, s, u
This species has an unusual distribution, being known from a small number of disjunct populations from the Perth Metropolitan Region south to Augusta and a group of populations near Albany. A specimen from the Argyle forest (EM Bennett 31 October 2005) has been provisionally determined as this taxon. This species is not listed in Wheeler *et al.* (2002) and is a Priority 2 species.

4.18 Rutaceae

Boronia capitata subsp. *gracilis* r (N, Yarloop, SWA; SW, Yelverton forest, WHS), p, s, u, eSWA/WHS, h (damp locations)
This species grows from west of Yarloop to the Yelverton forest in damp sands and wetlands. Within Whicher Scarp it has been found in the Whicher National Park and the Yelverton forest. This is listed as a Priority 2 taxon.

Boronia humifusa (Photograph 30) r (N, Argyle forest, WHS; SW, Abba forest, WHS), p, s, u, eWHS, h (laterite)
This small prostrate Boronia can be difficult to locate unless it is flowering. This is a North Whicher Scarp endemic found in Argyle, Happy Valley and Abba forests. While this species can be locally common, it is restricted in its distribution. This species is listed as Priority 1.

Boronia purdieana subsp. *purdieana* r (S, WHS), d (WHS), s, u, eSWA+/WHS, h (sands)
This delightful autumn flowering, yellow flowered shrub Boronia has an unusual distribution. The populations on the Swan Coastal Plain are recognised as *Boronia purdieana* subsp. *purdieana* which occurs in Bassendean Sands from Wanneroo north of Perth to the Boonanarring Nature Reserve. However, there is one collection from the Sussex district, Busselton by Miss Lambert in 1901. Considering the disjunctions in other species with similar preferences for deep sands to the north of Perth, this may well have been from the Whicher Scarp. This taxon is mentioned but not listed in Wheeler *et al.* (2002). While this record has been known for some time, survey work has not located this taxon in a suitable habitat in the Whicher Scarp or adjacent areas.
Recommendation: Comprehensive autumn survey is required to locate any extant populations of this taxon.

Boronia tetragona r (N, Capel, SWA; S, Cowaramup, MP), d (series), p, s, u, eSWA(B)/WHS/BP+, h (wetlands)
One of three pink *Boronia* species centred on the Whicher Scarp and adjacent Swan Coastal Plain and Margaret Plateau. This species prefers damp woodland areas and is listed as Priority 3.

Crowea angustifolia var. *angustifolia* r (N, Sabina River, WHS), d (habitat), s, u, eWHS/BP+, h (damp locations)
There are a series of records for this taxon in the area of the Whicher Scarp and the adjacent Swan Coastal Plain. However, it is currently known from small populations in the western extent of the Abba forest and along the Sabina River. Populations of this species are found further south fringing the eastern extent of the Margaret River system within the Blackwood Plateau. Other populations of the species occur at Pemberton and along the south coast to Albany. It is likely that the Swan Coastal Plain populations of this species are extinct, the last known record on the Swan Coastal Plain surrounding seasonal creek systems near the Acton Park group settlement, has been cleared (D Cooper pers. comm).
Recommendation: The taxonomic and genetic status of the Whicher Scarp populations be investigated.

4.19 Stackhousiaceae

Tripterococcus paniculatus MS z, r (S, Boyanup forest, WHS), d (habitat), p, s, u, eSWA/WHS, h (damp sands)
A population recorded in the Boyanup forest is in the area of this species' most southern populations (populations are also located in the Tutunup Road area). This is typically a species of damp sands on the eastern side of the Swan Coastal Plain and is listed as Priority 1.

4.20 Sterculiaceae

Thomasia laxiflora r (N, Boyanup forest, WHS), p, s, eSWA(B)/WHS+, h (sands)
This species is essentially a Whicher Scarp endemic, centred on the sands of the Whicher National Park, and the Abba and Treeton forests. Populations are also recorded for Acton Park, the locality of Cowaramup and the Boyanup forest. The actual location of the Cowaramup population is not clear and may well be on the Whicher Scarp. This same caveat may well apply to the Acton Park localities as, at times, some Acton Park localities are on the Whicher Scarp. This is a Priority 3 listed species.

Thomasia macrocarpa d (series), s, u, Ne
The majority of this species' distribution is to the east of Perth in the Perth Metropolitan Region. Several disjunct populations of this taxon are located in the West Whicher Scarp. A further disjunct population is known from near Bridgetown.

4.21 Stylidiaceae

Stylidium acuminatum MS z, r (S, Argyle forest, WHS), d (habitat, series), p, s, u, eWHS/JF, h (clayey sands/laterite)
This is a species of the Jarrah Forest located in a relatively confined area from the Collie area to the north and south to the Argyle forest on the Whicher Scarp. This is one of three species (*S. acuminatum*, *Lomandra whicherensis* and *Tetratheca parviflora*) extending from Collie to the Whicher Scarp.

Stylidium affine d (Sues Road)
A single population of this species, which is generally associated with granites to the north and north east, is found on Sues Road.

Stylidium barleei r (N, Acton Park, WHS), p, s, u, eSWA(B)/WHS/BP, h (sands, ironstone, gravel, laterite, sandy clay)
This uncommon species is a Busselton Plain/Whicher Scarp/Blackwood Plateau endemic found between Margaret River, Nannup and south of Busselton. This species is recorded from the Treeton forest and the Whicher NP (along Kemp Road). This is a Priority 3 listed species.

Stylidium caespitosum d (Sabina River, habitat), p, s, u, eDS/WHS/BP++, h (wetlands), g
This southern species is relatively common in wetlands from Manjimup to Albany. A series of disjunct populations are located along rivers on the Blackwood Plateau and two records from the Sabina and Collie Rivers on the Whicher and Darling Scarps respectively.

Stylidium ferricola p, s, u, eSWA(B)/WHS, h (wet ironstone)
This species was previously listed as *Stylidium* aff. *miniatum* (G.J. Keighery 12932) and *S.* sp. ironstone (G.J. Keighery 12932), being named and described as *S. ferricola* in late 2007 (Wege *et al*. 2007). This species is known from two occurrences of a threatened ecological community, both of which are associated with the Whicher Scarp and located within State Forest. This threatened ecological community and the adjacent Whicher Scarp and Swan Coastal Plain areas have been the subject of substantive survey effort over the past 15 years (Gibson *et al*. 1994; English and Blyth 1999; GJ Keighery 1999; Gibson *et al*. 2000; Government of Western Australia 2000). Despite this intensive survey effort, no additional populations have been recorded and it is considered endemic to this ecological community. Populations are known from the Abba and Treeton forests. Initially this report recommended that 'As this species is principally known from two small areas it should be listed as Priority 1'. However, in January 2008 it was listed as Priority 1.

Stylidium latericola (Photograph 33) r (SW, Whicher NP, WHS), d (habitat, series), p, s, u, Ne, h (laterite), g
This is a species of lateritic soils, principally in the northern Jarrah Forest south to the Helena Valley and Boddington. A disjunct series of populations is found along the central Whicher Scarp outcropping laterites/ironstones in the Whicher National Park and Gale Road Ironstones.

Stylidium sp. Dardanup (G.S. McCutcheon GSM 1066) PN z, p, s, u, eWHS, h (sand/laterite)
This newly distinguished taxon is only known from one location in the Dardanup forest (J Wege pers. comm). Initially this report recommended that 'As this species is not well known and recorded from one locality it should be listed as Priority 1'. However, in January 2008 it was listed as Priority 1.

4.22 Tremandraceae

Platytheca sp. Argyle (G.J. & B.J. Keighery 281) (Photograph 34) PN z, p, s, u, eWHS, h (sands/laterite), a
Only two species of *Platytheca* were known prior to this study; of these species, *Platytheca galioides* is widespread within the south-west and *Platytheca juniperina* is only known from the south coast (Albany-Esperance) area. This new species is currently only known from the Argyle forest and in the Happy Valley forest along Goodwood Road. The new species differs from *Platytheca galioides* in that it has ovate rather than linear leaves.
Recommendation: It is recommended that this species be listed as Priority 1.

Platytheca sp. Sabina (G.J. & B.J. Keighery 295) (Photograph 34) PN z, p, s, u, eWHS, h (river bank), a
This species is currently only known from a damp location on the banks of the Sabina River in the Whicher forest. This taxon differs from *Platytheca galioides* in that it has short narrowly ovate leaves, rather than longer narrow linear leaves. It differs from both *Platytheca galioides* and from *Platytheca* sp. Argyle in that it is a much smaller shrub and its stems and leaves are hairy.
Recommendation: It is recommended that this species be listed as Priority 1.

Tetratheca parvifolia p, s, u, eWHS/JF, h (sand/laterite)
A quadrat record of this Priority 3 species has been recorded from the Whicher forest (SABI12). This is a relatively uncommon species recorded from localities between Collie, Donnybrook and this record from the Whicher forest. This is one of three species (*S. acuminatum*, *Lomandra whicherensis* and *Tetratheca parviflora*) extending from Collie to the Whicher Scarp.

5 SIGNIFICANT TAXA OF THE WHICHER SCARP/SWAN COASTAL PLAIN INTERFACE

Gastrolobium papilio (Papilionaceae) z, p, s, u, eSWA(B), h (sands associated with ironstone)
This is a species of areas adjacent to outcropping ironstones and is found in the Williamson Road Ironstones in the Abba forest. This species is listed as Declared Rare Flora.

Lambertia echinata subsp. *occidentalis* (Proteaceae)
During the field work for a floristic survey of the Swan Coastal Plain (Gibson *et al.* 1994) this taxon was collected in the area of the Williamson Road Ironstones, in the transition between the Whicher Scarp and the Swan Coastal Plain. This population is one of a number of disjunct populations of Proteaceae of southern distributions that are found in the Whicher Scarp and adjacent Swan Coastal Plain. These include *Conospermum teretifolium, Dryandra formosa, Franklandia fucifolia* and *Lambertia rariflora* subsp. *rariflora*. The occurrence of taxa of northern and southern affinities at the ends of their respective ranges is a major feature of the vascular flora of this area. Some of these disjunct populations, including this *Lambertia,* have genetic (D Coates pers. comm.) and morphological distinctiveness. This *Lambertia* is reduced to a single population of a few surviving plants and is listed as Declared Rare Flora.

Stylidium pygmaeum (Stylidiaceae) r (N, 'Taylor's Nature Reserve'/Payne Rd, SWA)
A significantly disjunct population of this species is located in the wetland at the base of the Whicher Scarp on Payne Road (extends into 'Taylor's Nature Reserve') which is a major disjunction from its main area of distribution on the south coast in the Northcliffe/Shannon area and further east. This wetland also supports a population of *Evandra aristata*, which shows a similar distribution.

Stylidium leeuwinense (Stylidiaceae) r (N, Payne Rd, SWA),
A significantly disjunct population of this species is located in the wetland at the base of the Whicher Scarp on Payne Road in the area adjacent to the 'Taylor's Nature Reserve'. This species is typically located in the swamps of the Walpole–Augusta area with scattered records on the Blackwood Plateau.