



TECHNICAL REPORT

**WHEELARRA HILL NORTH
LEVEL 2 FLORA AND
VEGETATION
ASSESSMENT**

FEBRUARY 2012

**FOR
BHP BILLITON IRON ORE**



SYRINX ENVIRONMENTAL PL REPORT NO. RPT-1032-002 V2

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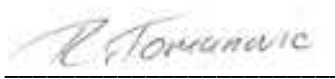
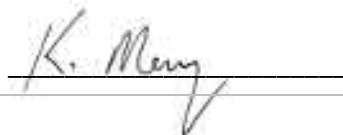
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REPORT DETAILS:

Version No.	Date	Author	Reviewer	Comment
0	28.12.2011	RT, AC	KM	Internal review
1	17.01.2012	RT	KM	Draft issue to BHPBIO
1	08.02.2012		BM	Feedback from BHPBIO
2	10.02.2012	RT	KM	Final issue to BHPBIO

Filename/ filepath: J:\JOB FILES\1032 BHPBIOFSWHIC - PROJECT\C10 - Deliverables\C10.03
Technical Report

	Signature		Signature
Author: RT, AC		Reviewer: KM	
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EXECUTIVE SUMMARY

INTRODUCTION

BHP Billiton Iron Ore Pty Ltd (BHPBIO) commissioned Syrinx Environmental PL (Syrinx) to undertake a Level 2 flora and vegetation assessment of the Wheelarra Hill North study area for the purpose of obtaining baseline information on the flora and vegetation prior to the commencement of mining activities in the area.

The study site is located in the eastern Ophthalmia Range approximately 40 kilometres (km) east of Newman, in the Pilbara region of Western Australia (WA) and is adjacent to the existing Jumblebar/Wheelarra Hill mine to the south. The project is located within the Jumblebar Lease AML7000244 held by BHPBIO and occupies an area of 49.72km².

This report presents the results of the assessment conducted during two floristic seasons, with the first survey conducted between 17 – 29th May and second between 04 and 12th October 2011.

The scope of works for this flora and vegetation assessment included:

1. A flora and vegetation database review for the Wheelarra Hill North study area, including an assessment of the likelihood of potential conservation significant species (determined via the database searches) being present within the study area);
2. A summary of previous flora and vegetation surveys undertaken within the study area, or within the vicinity of the study area;
3. A flora and vegetation survey of the study area;
4. A Declared Rare, Priority and Threatened Flora targeted survey within the study area;
5. A survey of Threatened Ecological Communities (TECs) and Priority Ecological Communities (PECs) listed under the Commonwealth *Environment Protection and Biodiversity Conservation Act, 1999* (EPBC Act), endorsed by the Minister of the Environment and recognised by the Department of Environment and Conservation;
6. A targeted survey within the study area for Declared Plants listed under the *Agriculture and Related Resources Protection Act 1976* (ARRP Act) and other environmental weed species;

7. A description and map of main vegetation associations present in the study area, according to the BHPBIO guidelines (WIN-ENV-LAND NW-008) including an assessment of the regional distribution of the vegetation associations;
8. Providing details on all conservation significant flora (Declared Rare and Priority Flora) and weeds recorded in the study area, including those recorded during previous surveys;
9. Providing species lists of all flora species recorded within the survey, including those from previous surveys;
10. Describing and mapping vegetation condition using a published rating scale; and
11. A report describing the outcomes of the above tasks.

NATIVE FLORA

A combined total of 83 50 x 50 metre (m) quadrats and 19 relevés were sampled within the survey area, resulting in the identification of 411 taxa from 49 families and 145 genera. This list includes subspecies (subsp.), variations (var.), affinities (aff.) and hybrids (x).

Due to lack of flowering and fruiting material available at the time of surveying to assist with identification, 38 species out of the 411 total species have not been fully identified to species name (e.g. *Centaurium* sp. (indet), or *Aristida ? jerichoensis* var. *subspinulifera*).

Of those 38 not fully identified species, 19 are considered to be singular species not belonging to any other species on the list. The remaining 19 species are likely to be duplicates of species already identified in the study area, however taxonomic certainty would require inspection of flowers and fruit which were not available at the time of collection. Removal of the 19 taxa that were not identified fully but are most likely to be taxa already identified on site, results in a total of 392 taxa.

A total of 44 additional taxa were collected during the second survey and eight species identified during first survey as having some doubt to their species name (i.e. species with question mark in front of species name) were confirmed fully. Of the 44 additional species recorded, majority were from Asteraceae and Poaceae families with 11 and seven taxa respectively.

The most commonly recorded family was Fabaceae (78 taxa, 14 genera), Poaceae (58 taxa, 28 genera) and Malvaceae (47 taxa, 12 genera). The dominant genus across the study area was *Acacia* with 40 taxa recorded followed by *Ptilotus* (16 taxa) and *Senna* (15 taxa). The most common species recorded in the study area was *Triodia epactia* which was recorded in 24 of the 25 vegetation associations, followed by *Ptilotus exaltatus* (22

vegetation associations) and *Acacia tetragonophylla* (21 vegetation associations). The most common tree found on site was *Acacia aptaneura*.

CONSERVATION SIGNIFICANT FLORA

No Threatened Flora listed under the WA *Wildlife Conservation Act, 1950*, or Threatened Flora species listed under the EPBC Act were recorded within the Wheelarra Hill North area.

One potential Priority 1 flora *Aristida ? jerichoensis var. subspinulifera* and nine range extension flora were identified for the study area: *Sclerolaena minuta*, *Eragrostis olida*, *Oldenlandia galioides*, *Evolvulus alsinoides var. decumbens*, *Phyllanthus erwinii*, *Phyllanthus maderaspatensis*, *Santalum spicatum*, *Cyperus ixiocarpus* and *Abutilon cunninghamii*, and two possible range extensions: *Tephrosia aff. sphaerospora* and *Hibiscus aff. apodus*.

Aristida ? jerichoensis var. subspinulifera was not fully confirmed due to the poor description of variation within the species as a result of the low number of collections, however the likelihood of it being a priority species cannot be discounted. This is particularly true as the specimens were found in the same habitat where two confirmed collections were found previously as part of the Jimblebar Wheelarra Hill mining lease survey in 2010 (Outback Ecology, 2010).

In comparison to other sites, the majority of taxa found at Wheelarra Hill North (91.8%) are found in the previously surveyed adjacent mining tenements, with 36 additional taxa recorded for Wheelarra Hill North (this number includes one hybrid and seven species with some doubt attached to their name (i.e. species with ?)). Of the additional species recorded, most numerous were Poaceae (seven taxa), Fabaceae (four taxa) and Malvaceae (four taxa). These taxa are not restricted to the study area and the Western Australian Herbarium (WAH) records show (WAH, 2011) that they have been found within the Pilbara region previously.

INTRODUCED FLORA

A total of four introduced flora species were recorded in the study area: **Bidens bipinnata*, **Cenchrus ciliaris*, **Malvastrum americanum* and **Portulaca oleracea*. None of these species are listed as Declared Plants under the ARR Act. **Cenchrus ciliaris* (Buffel Grass) is the only introduced flora species recorded during the survey which is classified as an 'Environmental Weed' by Environmental Weed Strategy of Western Australia (EWSWA). **Cenchrus ciliaris* was recorded at multiple locations across the study area however the populations were small and very sporadic. The main areas of infestation with a higher density were large drainage channels and a few areas along the access tracks.

**Portulaca oleracea* occurs on stony plains and footslopes dominated by Mulga. Whilst this species appeared to be widespread the densities at which it was found was very low.

**Malvastrum americanum* was found at two locations on site: one close to the Jimblebar Creek bank at the south east extent of the site and one on the plains. Both populations were very small in size (50m² or less) and had less than 50 plants.

**Bidens bipinnata* was found in a few isolated patches mostly under tree canopies that cattle and feral animals typically used for shade / shelter. This weed does not appear to have much impact in the study area with the low numbers found.

VEGETATION ASSOCIATIONS

Twenty-five (25) vegetation associations occurring within nine broad floristic formations were mapped and described within the Wheelarra Hill North study area. None of the vegetation associations mapped and described are listed as TECs or PECs.

The vegetation associations present within the Wheelarra Hill North study area are very similar to the vegetation associations of the surrounding areas with the main differences being in the cover of dominant or core species, or the dominance of different *Triodia* species to that in the surrounds.

Vegetation condition across the majority of the study area was rated as Very Good to Excellent. The change in condition was attributed to presence of weeds, access tracks and grazing by livestock, with the areas most affected being floodplains and large drainage channels.

PART 1 INTRODUCTION

1.0 PROJECT BACKGROUND

BHP Billiton Iron Ore Pty Ltd (BHPBIO) wishes to obtain baseline information on the flora and vegetation of Wheelarra Hill North required for potential future mining activities. Syrnix was commissioned by BHPBIO in May 2011 to conduct the Level 2 flora and vegetation survey of the Wheelarra Hill North study area. This report uses flora and vegetation survey data from two seasons (summer (end of May 2011) and winter (October 2011)) in order to provide baseline information on flora and vegetation of Wheelarra Hill North.

1.1 STUDY AREA

Wheelarra Hill North is located in the eastern Ophthalmia Range approximately 40 kilometres (km) east of Newman, in the Pilbara region of Western Australia (WA) (Figure 1). The study area covers an area of 49.72km² and is located within Jimblebar Lease AML7000244 held by BHPBIO (Figure 2).

2.0 SCOPE OF WORK

The scope of work of the project was to conduct a two season Level 2 vegetation and flora survey of Wheelarra Hill North.

In particular, the scope required:

1. A flora and vegetation database review for the Wheelarra Hill North study area, including an assessment of the likelihood of potential conservation significant species (determined via the database searches) being present within the study area);
2. A summary of previous flora and vegetation surveys undertaken within the study area, or within the vicinity of the study area;
3. A flora and vegetation survey of the study area;
4. Declared Rare, Priority and Threatened Flora targeted survey within the study area;
5. Survey of Threatened Ecological Communities (TECs) and Priority Ecological Communities (PECs) listed under the Commonwealth *Environment Protection and Biodiversity Conservation Act, 1999*, (EPBC Act), endorsed by the Minister of the Environment and recognised by the Department of Environment and Conservation (DEC);

6. A targeted survey within the study area for Declared Plants listed under the *Agriculture and Related Resources Protection Act, 1976* (ARRP Act) and other environmental weed species;
7. A description and map of main vegetation associations present in the study area, according to the BHPBIO guidelines (WIN-ENV-LAND NW-008), including an assessment of the regional distribution of the vegetation association;
8. Details on all conservation significant flora (Threatened Flora, Declared Rare Flora (DRF) and Priority Flora) and weeds recorded in the study area, including those recorded during previous surveys;
9. Species lists of all flora species recorded within the survey, including those from previous surveys;
10. A description and map of the vegetation condition using a published rating scale; and
11. A report describing the outcomes of the above tasks.

The survey was conducted in conjunction with the following policy, statutory and BHPBIO requirements:

- Environmental Protection Authority (EPA) Position Statement No. 3, Terrestrial Biological Surveys as an Element of Biodiversity Protection (EPA, 2002);
- EPA Guidance No. 51, Terrestrial Flora and Vegetation Surveys for Environmental Impact Assessment in Western Australia (EPA, 2004);
- DEC Clearing Guidance, A Guide to Clearing Permits (DEC, 2005);
- Department of Industry and Resources (DoIR) (now Department of Mines and Petroleum) Fact Sheet, Information Required to Assess Your Clearing Permit Application (DoIR, 2007);
- BHPBIO (2009) Guidance for Vegetation and Flora Surveys in the Pilbara Region (WINENV- LAND NW-008);
- BHPBIO (2009) Plant Specimen Identification through Sponsored Botanist at the WA Herbarium (WIN-IEN-LAND-004); and
- BHPBIO (2009) Flora Quadrat Data Sheet (FRM-IEN-LAND NW-001).

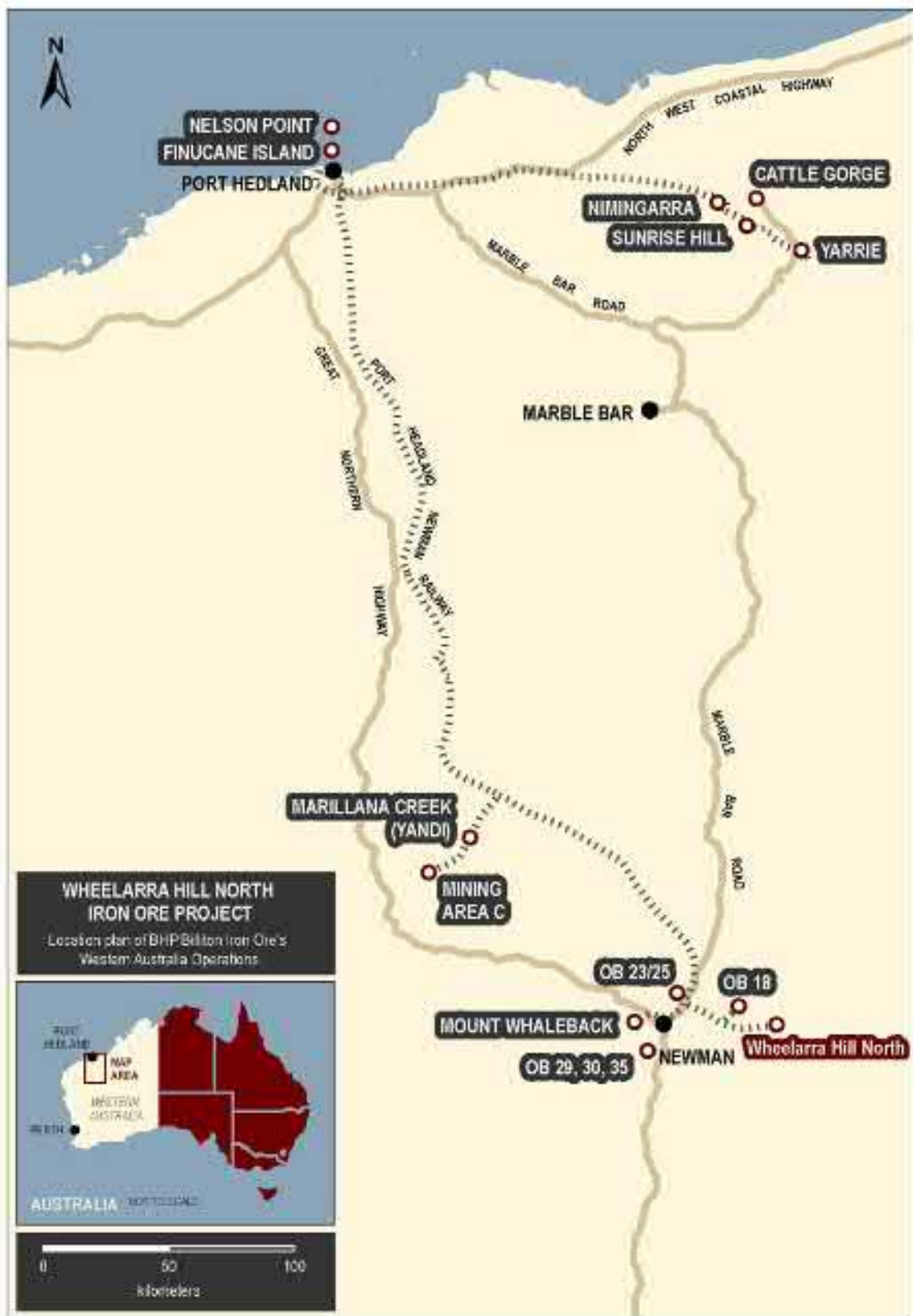


Figure 1 Location of Wheelarra Hill North in comparison to other BHPBIO Mining Operations in the Pilbara Western Australia



Figure 2 Project boundary in relation to BHPBIO mining tenements in the Eastern Pilbara

PART 2 EXISTING ENVIRONMENT

3.0 BIOGEOGRAPHIC REGION

The Interim Biogeographic Regionalisation for Australia (IBRA) divides Australia into 85 bioregions based on climate, geomorphology, landform, lithology and biological attributes (Department of Sustainability, Environment, Water, Population and Communities (SEWPaC, 2011a) and includes 403 sub-regions. The bioregions and sub-regions are the reporting units for assessing the status of native ecosystems.

The Pilbara bioregion is made up of four subregions: Chichester, Fortescue, Hamersley and Roebourne. The study area encompasses the southern portion of the Fortescue Plains subregion (PIL 2) (covering 70% of the study area) and the northern portion of the Hamersley subregion (PIL 3) (30% of the study area). The study area therefore represents the transition between these two subregions in terms of vegetation assemblages and flora diversity.

The Fortescue Plains subregion is characterised by alluvial plains and river frontages with extensive salt marshes, Mulga bunch grasses, and short grass communities on alluvial plains in the east (Kendrick, 2001a). An extensive calcrete aquifer (originating within a palaeo-drainage valley) feeds numerous permanent springs in the central Fortescue subregion, supporting large permanent wetlands with extensive stands of River Gum (*Eucalyptus camaldulensis*) and Cajuput (*Melaleuca* sp.) woodlands (Australian Government, 2009a). This subregion contains the northern limit of Mulga (*Acacia aneura*) (Australian Government, 2009a).

The Hamersley subregion is characterised by Mulga low woodland over bunch grasses on fine textured soils in valley floors, and *Eucalyptus leucophloia* over *Triodia brizoides* on skeletal soils of the ranges (Kendrick, 2001b).

The survey area encompasses a section of Jumblebar Creek and several drainage channels crossing the study area forming its tributaries. The creek is associated with the upper Fortescue Marshes catchment area.

4.0 LAND SYSTEMS

Land systems are grouped according to a combination of landforms, soils, vegetation and drainage patterns. According to the land system classification by the Department of Agriculture and Food and the Department of Land Administration (now Land gate) (Van Vreeswyk *et al.*, 2004), a total of six land systems are present within the study area. These

include: Boolgeeda, Divide, McKay, Newman, River and Washplain and are summarised in Table 1 and shown in Figure 3.

Table 1 Land systems within the study area (Van Vreeswyk *et al.*, 2004)

Land System	Description	Extent in the IBRA Pilbara region (Ha)	Extent within the study area (Ha)	Extent within the study area as % of the Pilbara region extent
Boolgeeda	Stony lower slopes and plains below hill systems supporting hard and soft Spinifex grasslands and Mulga shrublands.	967555.25	1412.46	0.146
Divide	Sandplains and occasional dunes supporting shrubby hard Spinifex grasslands.	437133.27	15.611	0.004
McKay	Hills, ridges, plateaux remnants and breakaways of metasedimentary and sedimentary rocks supporting hard Spinifex grasslands.	427807.38	459.572	0.107
Newman	Rugged jaspilite plateaux, ridges and mountains supporting hard Spinifex grasslands.	2007150.40	2701.22	0.135
River	Active flood plains and major rivers supporting grassy eucalypt woodlands, tussock grasslands and soft Spinifex grasslands	484386.20	87.81	0.018
Washplain	Hardpan plains supporting groved Mulga shrublands.	66332.10	295.96	0.446

4.1 **BOOLGEEDA LAND SYSTEM**

The Boolgeeda Land System is located in a relatively narrow strip across the northern portion of the study area (28.40% of the study area). This land system typically comprises low hills and rises (4%), stony slopes and upper plains (20%), stony lower plains (65%), groves (1%), and narrow drainage floors and channels (10%) (Van Vreeswyk *et al.*, 2004).

4.2 **DIVIDE LAND SYSTEM**

The Divide Land System is predominantly made up of sandplains (76%) and is also comprised of plains with thin sand cover (15%), tracts receiving run on (5%), stony plains

(4%), sand dunes (1%) and with less than 1% of low hills (Van Vreeswyk *et al.*, 2004). This land system occupies a very small portion of the study area (0.31%) in the north east corner of the study area.

4.3 MCKAY LAND SYSTEM

This land system occupies a central portion at the western extent of the study area (a total of 9.24%). Typically, 60% of this land system comprises of hills, ridges and plateaux remnants, 2% breakaways, 10% lower footslopes, 20% stony plains and 8% drainage floors (Van Vreeswyk *et al.*, 2004).

4.4 NEWMAN LAND SYSTEM

Located in the southern as well as in the northern section of the study area (54.32% of the study area) this land system typically comprises of plateaux, ridges, mountains and hills (70%), lower slopes (20%), stony plains (5%), and narrow drainage floors with channels (5%) (Van Vreeswyk *et al.*, 2004).

4.5 RIVER LAND SYSTEM

This land system encompasses the creek bed and flood plain of the Jimblebar Creek located at the north eastern boundary of the study area (1.77% of the study area). Typically, the River Land System is described as consisting of sandy levees and sand sheets (15%), upper terraces (5%), flood plains and lower terraces (50%), stony plains (10%) and minor and major channels (20%) (Van Vreeswyk *et al.*, 2004).

4.6 WASHPLAIN LAND SYSTEM

Washplain Land System occupies a small area in the north west portion of the study area (a total of 5.95%). This land system typically comprises of stony plains (6%), alluvial hardpan plains (62%), groves (15%), sandplains (3%), and tracts receiving more concentrated through flow (14%) (Van Vreeswyk *et al.*, 2004).

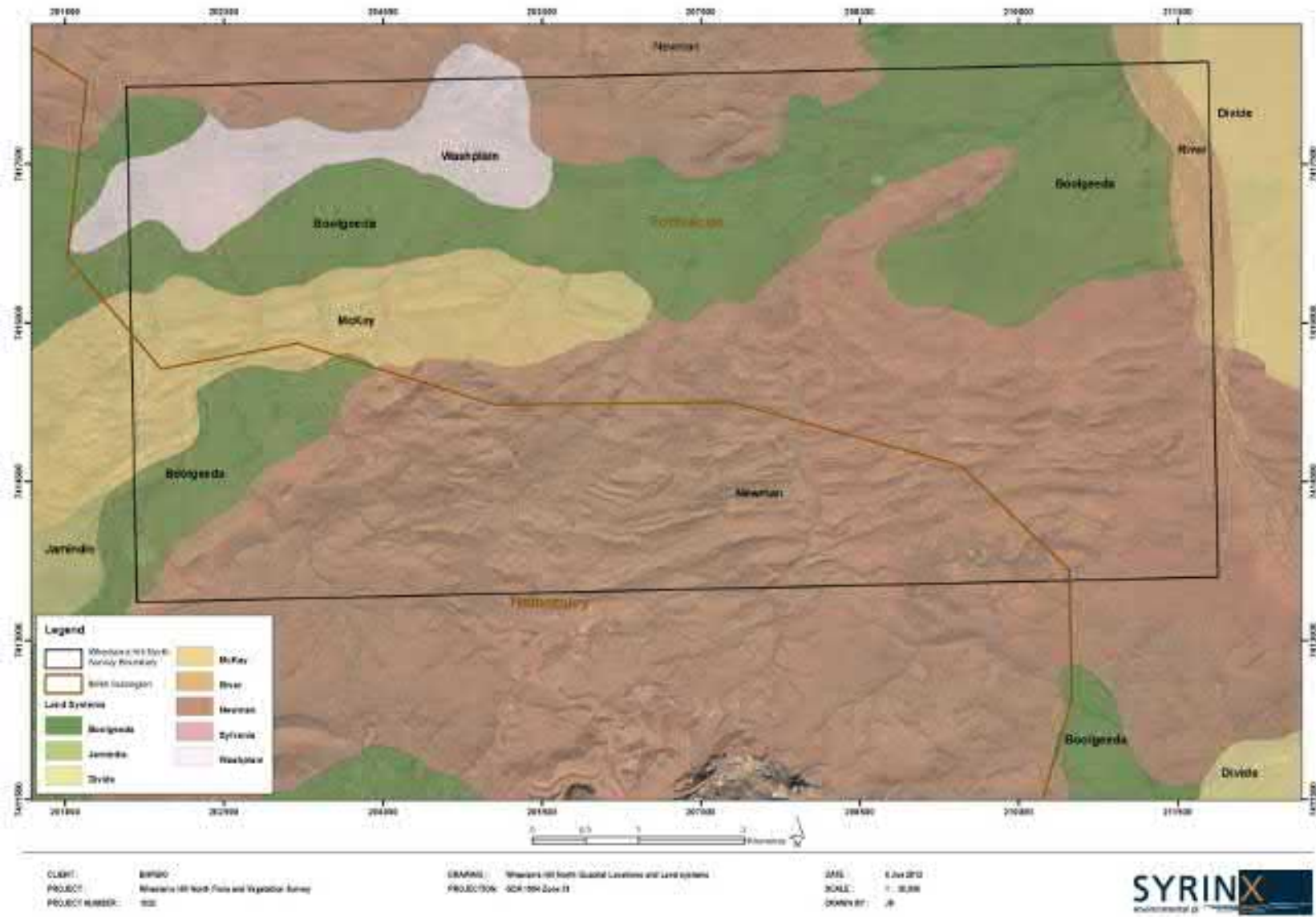


Figure 3 Land Systems within the Wheelarra Hill North Study Area

5.0 GEOLOGY AND SOILS

5.1 GEOLOGY

The surface geology of the study area contains several geological formations (Williams and Tyler, 1991) that are representative of multiple land systems. These formations include:

- **Alluvium (Qa)** - is located in the low lying drainage areas of the site predominately in the northern portion of the study area associated with wide drainage tracts and channels receiving more concentrated flow. The formation is characterised by deposits of silt, sand and gravel which are typical of floodplains and drainage channels in the region.
- **Colluvium and Minor Alluvium (Qc)** - is located in the northern and central parts of the study area associated with grassy plains. Typically it contains silt, sand, and small rock fragments.
- **Colluvium and Alluvium (Qw)** - is located in a small pocket of vegetation in the north eastern portion of the study area and is defined by clay, silt, sand and gravel in a broad sheet wash area.
- **Calcrete (Czk)** - located in a small section in the north east corner of the study area this formation is characterised by carbonate in sheets and lenses and is usually found in or near major drainage lines as is the case with the large Jimblebar Creek tributary to the east of the study area.
- **Colluvium (Czc)** - located at the footslopes of the hills in the south west corner of the study area this formation is typically composed of partly consolidated and consolidated ferruginised silt and gravel associated with valley fill deposits dissected by present drainage.
- **Marra Mamba Iron Formation (Hm)** - occupies an area in the south west and central west portions of the study area. It is characterised by chert, ferruginous chert and minor shale on low hills and rises.
- **Brockman Iron Formation (Hb)** - is present in small pockets in the south west and central portions of the study area. This formation is characterised by banded iron, chert and shale.
- **Weeli Wolli Formation (Hj)** - is present predominantly along the southern boundary of the study area associated with breakaway ridges and high hills. Typically, this formation consists of interlayered banded iron and metadoleritic sills and minor shale.
- **Boolgeda Iron Formation (Ho)** - located in the central to eastern portion of the study area associated with hilly terrain, this formation typically consists of fine grained, finely laminated, dark grey to black flaggy iron formation, minor chert and jasperlite shale.

- **Jeerinah Formation (Fj)** - characterised by interbedded shale, chert, sandstone and minor felsic tuff, this formation occupies centre of the western portion of the study area.
- **Woongarra Volcanics (Hw)** - extends across the central portion of the survey area and is commonly porphyritic with minor tuff and jaspilitic iron formation.
- **Mount McRae Shale and Mount Sylvia Formation (Hs)** - located in small pockets across the northern section of the study area, this formation is typified by interbedded shale, chert and banded ironstone.

5.2 SOILS

The Australian Soil Resource Information System (CSIRO, 2006) has described the soils of the study areas as two types:

- **Fa13** - Ranges of banded jaspilite and chert along with shales, dolomites, and iron ore formations; some areas of ferruginous duricrust as well as occasional narrow winding valley plains and steeply dissected pediments. This unit is largely associated with the Hamersley and Ophthalmia Ranges. The soils are frequently stony and shallow and there are extensive areas without soil cover. Chief soils are shallow stony earthy loams (Um5.51) along with some (Uc5.11) soils on the steeper slopes. Associated are (Dr2.33, Dr2.32) soils on the limited areas of dissected pediments, while (Um5.52) and (Uf6.71) soils occur on the valley plains; and
- **Mz25** - Plains associated with the Fortescue valley; there is a surface cover of stony gravels close to the ranges and hills: chief soils are acid red earths (Gn2.11) with some neutral red earths (Gn2.12); red-brown hardpan is absent. Associated are areas of calcareous earths (Gc) and loams (Um1) on calcrete (kunkar) and some hard red (Dr) soils around creek lines.

6.0 LANDUSE

The dominant land uses in the Fortescue Plains subregion are grazing, native pastures, conservation, Aboriginal land and unallocated crown land (Kendrick, 2001a). The Fortescue Plains subregion contains small portions of Class A Reserves including the Millstream – Chichester National Park and Karijini National Park, with 0.79% of land under some form of conservation tenure (Kendrick, 2001a), none of which occur within the study area.

The land uses within the Hamersley subregion are similar to the Fortescue Plains subregion with the dominant land uses being grazing, Crown reserves, native pastures, conservation, mining and urban (Kendrick, 2001b). The majority of Karijini National Park is contained within the Hamersley subregion as well as part of the Cane River Conservation Park with 14.4% of land being under some form of conservation (Kendrick, 2001b).

7.0 CLIMATE

The Pilbara region has an arid climate with two distinct seasons, a hot summer from October to April and a mild winter from May to September. This region experiences a wide range of temperatures with average maximum temperatures ranging from 23 degrees Celsius (°C) to 39.5°C whilst the average minimum temperatures range from 6°C to 25°C. Temperature ranges are generally greater in inland areas away from the moderating effects on onshore winds common in coastal areas (Australian Government, 2009b). In summer, the Pilbara region is influenced by tropical storms and cyclones bringing heavy rainfall. The mild winter rainfall is usually the result of cold fronts moving north-easterly across the State.

Climate data given in this report (Figure 4) is based on records (1971 – 2011) from the Newman Airport Bureau of Meteorology Weather Station (007176), situated 40km west from the study area. The survey times are indicated by arrows.

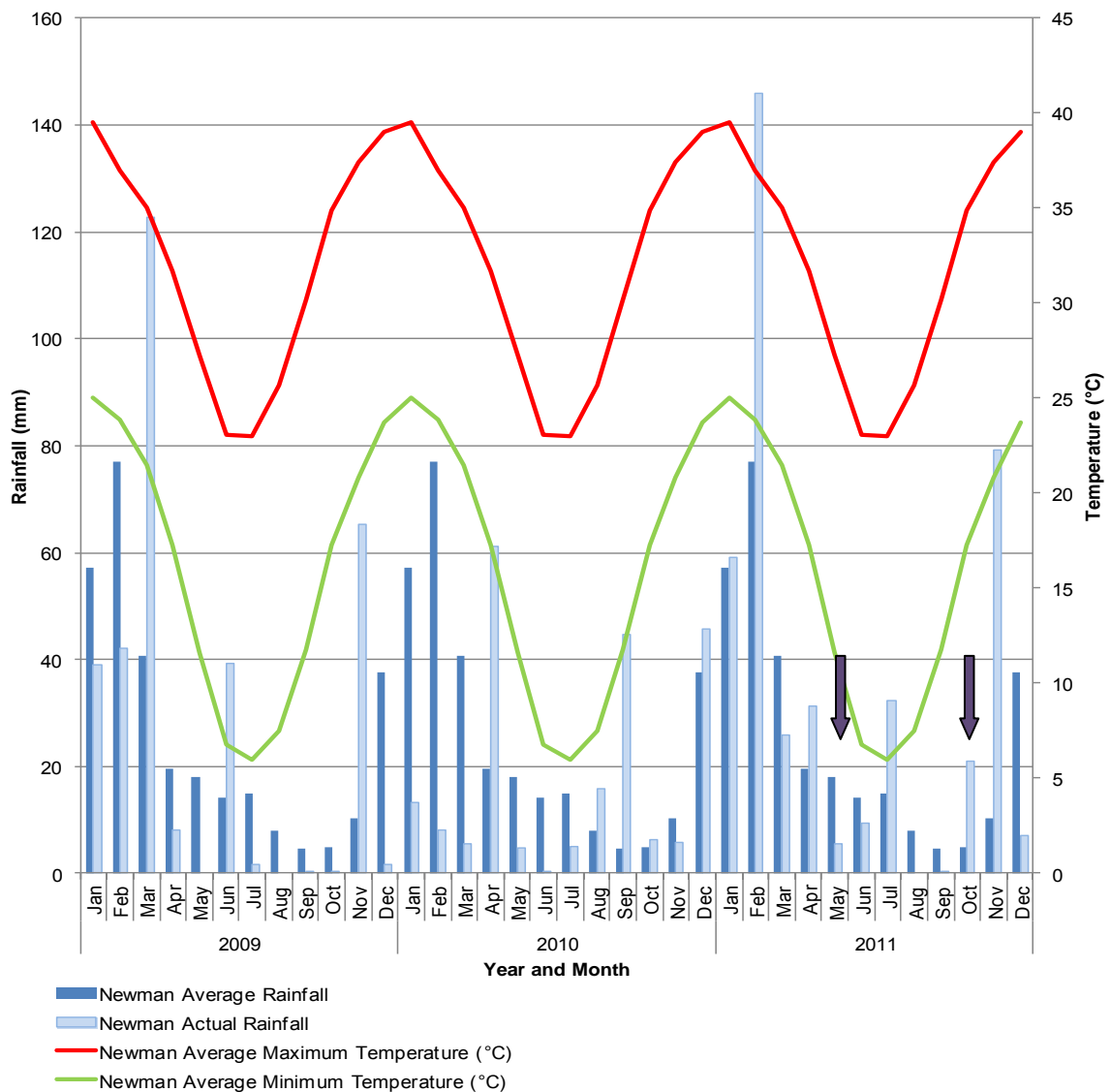


Figure 4 Climate Data for Newman Weather Station (007176)

Newman receives an average annual rainfall of 313 millimetres (mm). The majority of the rainfall occurs during summer months with February being the wettest month with an average of 78.8mm. The rainfall received prior to fieldwork followed an unseasonably dry 2010. To the end of May 2011 the total rainfall received for Newman was 267.8mm with February receiving almost double of its average monthly rainfall (145.8mm) and good follow-up rains in April (31.4mm) and July (32.2 mm) (BOM, 2011). In contrast in 2010 the total annual rainfall was 216mm indicating that 2011 was more favourable for growth and germination of many herb and grass species in particular and therefore provide a good floristic season.

8.0 REVIEW OF EXISTING FLORA AND VEGETATION DATA

8.1 PREVIOUS VEGETATION SURVEYS

8.1.1 Regional

8.1.1.1 Beard's mapping

Historically, the flora and vegetation of the Pilbara region has been recorded only at a broad scale (1:1,000,000) in vegetation surveys conducted by Beard (1975) that mapped only major structural vegetation formations. Beard describes vegetation of areas occupied by Fortescue and Hamersley ranges to be typically open, and frequently dominated by *Triodia* species, *Acacia* and occasional *Eucalyptus* species. The vegetation units that are broadly applicable to the Wheelarra Hill North on the basis of Beard's mapping are:

- Mulga Low Woodland (a₁Li);
- Tree steppe with patches of Mulga (e₁₆Lr.t₃Hi); and
- *Eucalyptus gamophylla* and Spinifex (e₂₅Sr.t₂Hi).

8.1.1.2 National Vegetation Information System

Wheelarra Hill North was broadly mapped as part of the National Vegetation Information System (NVIS) using data provided in most part by the Department of Agriculture WA. NVIS information has been compiled to enable Australia-wide analyses of the Major Vegetation Groups (MVGs) and Major Vegetation Subgroups (MVSs), which are based on the detailed NVIS Level I-VI data (Commonwealth of Australia, 2010). This broad scale mapping was limited to approximately 30 MVGs and 67 MVSs that represent the dominant vegetation in each spatial feature and is available in Present (Extant) and Estimated Pre- 1750 vegetation themes. It is important to note that the exact number of Groups and Subgroups varies between different NVIS versions. NVIS Stage 1

Version 3.1 Abers was used to map the study area. According to this mapping the following vegetation subgroups are present in the study area:

- Hummock grasslands (MVS33);
- Mulga (*Acacia aneura*) woodlands and shrublands with hummock grass (MVS 51); and
- *Eucalyptus* low open woodlands with hummock grass (MVS 18).

These vegetation groups are congruent with Beard's (1975) mapping.

8.1.1.3 DEC 2001 Audit

In 2001, the Department of Conservation and Land Management (CALM) (currently DEC) conducted a biodiversity audit of Western Australia's 53 Biogeographical Subregions (May and McKenzie, 2003). Two of these subregions occur in the study area: Pilbara 2 PIL2 - Fortescue Subregion (70% of the site) and Pilbara 3 PIL3 - Hamersley Subregion (30% of the site).

The Pilbara 2 PIL2 - Fortescue Subregion was described by Kendrick (2001a) as:

- Extensive salt marsh, Mulga bunch grass, and short grass communities on alluvial plains in the east. Deeply incised gorge systems in the western (lower) part of the drainage. River Gum woodlands fringe the drainage lines; and
- An extensive calcrete aquifer (originating within a paleodrainage valley) feeds numerous permanent springs in the central Fortescue, supporting large permanent wetlands with extensive stands of River Gum and Cadjeput *Melaleuca* woodlands.

The Pilbara 3 PIL3 - Hamersley Subregion was described by Kendrick (2001b) as:

- Mulga low woodland over bunch grasses on fine textured soils in valley floors; and
- *Eucalyptus leucophloia* over *Triodia brizoides* on skeletal soils in the ranges.

As part of the vegetation and land use audit, Shepherd, *et. al.* (2002) classified vegetation occurring in the area as:

- **Vegetation type/association 82:** Hummock grasslands, low tree steppe; Snappy Gum over *Triodia wiseana*;
- **Vegetation type/association 111:** Hummock grasslands, shrub steppe; *Eucalyptus gamophylla* over hard Spinifex; and
- **Vegetation association/type 216:** Low woodland; Mulga (with Spinifex) on rises.

The Department of Agriculture WA (2011a) has recently updated the mapping for native vegetation extent in WA to 1:20,000 and this mapping shows the same vegetation types and

extent as identified by Shepherd *et. al.* (2002). At present, this dataset is the most accurate baseline against which changes in land use (e.g. pastoral to mining and the subsequent vegetation clearing) can be assessed. As such, this new dataset will be used as a primary reference source to discuss vegetation on site in a regional context. As with NVIS data, this dataset is congruent with broadscale mapping by Beard and is used to describe the status and distribution of vegetation in relation to boundaries of natural resource areas (e.g. mining and pastoral leases). The extent of each vegetation type presented above is shown in Figure 5.

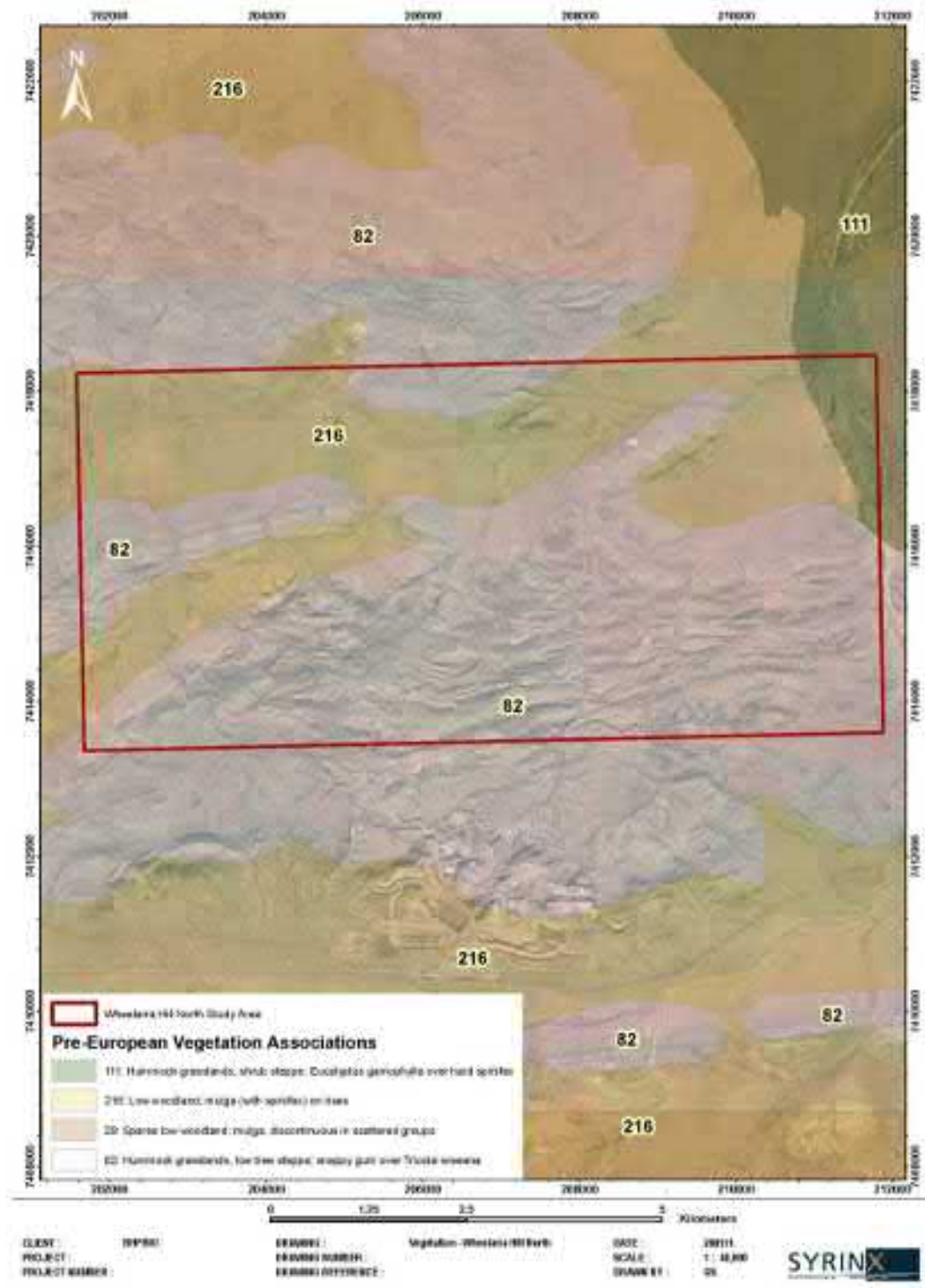


Figure 5 Pre-European Extent of Vegetation Associations

8.1.1.4 Van Vreeswyk

More recently, Van Vreeswyk *et. al.*, (2004) described the vegetation of the Pilbara region based on the land system representation, general ecological information, vegetation survey data and conservation status of vegetation communities. As stated previously in Section 4.0 and Figure 3, the study area encompasses six land systems: Boolgeeda, Divide, McKay, Newman, River and Washplain however the dominant land systems that occupy 88% of the study area are Newman, Boolgeeda and Washplain and as such vegetation typical of these land systems will be described in more detail below.

According to Van Vreeswyk *et. al.*, (2004), the **Newman Land System** is characterised by the following vegetation types:

- High Spinifex Grasslands (HSPG) and Plain Hard Spinifex Grassland (PHSG) on Low Hills and Rises with stony soils and red shallow loams;
- Hill Eucalypt Spinifex Grassland (HESG) Plain Mulga Spinifex Shrubland/Grassland (PMSS) and PHSG on Stony Slopes and Upper Plains with red shallow loams or red loamy earths;
- Plain Soft Spinifex Grassland (PSSG) and PHSG on Stony Plains with stony soils, red shallow loams with some red loamy earths; and
- Alluvial Plain Soft Spinifex Grassland (ASSG), Drainage Eucalypt and *Acacia* Grassy Woodland/Shrubland (DEGW), Drainage *Acacia* Hummock Grass Shrubland/Woodland (DAHW), and Drainage Spinifex Grassland with Eucalypt overstorey (DESG) on Narrow Drainage Floors with Channels containing red shallow loams, red loamy earths and channels with river bed soils.

The **Boolgeeda Land System** includes many of the abovementioned vegetation types associated with similar landforms and in addition to the above has Grove Mulga Woodland/Shrubland (GMUW) and Grove Mulga Grassy Woodland/Shrubland (GMGW) that are associated with Groves – small drainage foci that occur infrequently on stony slopes and upper plains as well as Stony Lower Plains with red loamy earths.

The **Washplain Land System** is associated with larger drainage tracts receiving more water flow which is usually typified by Drainage *Acacia* Hummock Grass Shrubland/Woodland (DAHW) and Drainage Eucalypt and *Acacia* Woodland/Shrubland (DEAW).

8.1.1.5 Syrinx Environmental PL Regional Mapping

In 2008/2009, Syrinx undertook regional vegetation mapping in the central Pilbara for BHPBIO, using a combination of orthophotos, land systems mapping, previous georeferenced survey data, DEC database searches and field traverse surveys (Syrinx, 2009). The mapping was undertaken at 1:25,000 scale or better for boundary areas and

smaller landform units such as footslopes, or 1:50,000 scale for extensive ridges and hillslopes. The nomenclature and scale is defined as a unit equivalent to the Level 5 (Association) which records the dominant growth form, cover, height and dominant genus and species for each of the three traditional strata. This is the hierarchy above Vegetation Community level mapping which is undertaken as part of standard floristic surveys for mining approvals. This scale of mapping is accepted by the DEC as suitable for comparison of vegetation at a regional scale (S. van Leeuwen, *pers. comm*).

Based on this study, three vegetation assemblages occur in this area:

- *Acacia aneura* very open shrubland with scattered *Eucalyptus leucophloia* over mixed open low shrubland over *Triodia pungens* closed hummock grassland (a₁Se₂xSt₃H);
- *Acacia aneura* open shrubland over mixed open shrubland over *Triodia pungens* closed hummock grassland (a₁SxSt₃H); and
- Mixed open tall shrubland over *Triodia basedowii* closed hummock grassland (xSt₁H).

Acacia aneura open shrubland over mixed open shrubland over *Triodia pungens* closed hummock grassland has been identified as a potential vegetation assemblage that occurs within an ecosystem at risk (Syrinx, 2009), however this ecosystem does not occur within the study area. No other high or critical conservation assets were identified for the study area during the regional mapping (Syrinx, 2009).

8.1.1.6 DEC Biodiversity Survey

As part of the Biodiversity Survey of the Pilbara (2002 – 2009) project the DEC has collected data on both flora and fauna in order to provide region wide, plot based data to determine current distribution of the biota across the Pilbara region (McKenzie *et al.*, 2009). This data once processed, will provide a baseline against which future surveys of specific areas, mining tenements in particular, can be analysed in a regional context in order to assess the likely impact of mining proposals on the environment.

As most of the data gathered during the Pilbara survey is currently under review by DEC, only a few published papers can be used for current surveys. An introductory paper published by McKenzie *et al.* (2009) summarises the methodology and broad findings of the survey and gives a comprehensive background to the region. Further papers integrating the survey results (including manuscripts on species/community distributions, environmental patterns and reserve recommendations) will be prepared as soon as all datasets become available (McKenzie *et al.*, 2009).

8.1.2 Local Vegetation Surveys

An increase in resource development projects in the Pilbara has resulted in the requirement for a significant number of site-specific biological surveys being carried out, most of which were undertaken for approvals under the *Environmental Protection Act, 1986* (WA). Within the last 10 years numerous flora and vegetation surveys were conducted in the vicinity of the study area (i.e. within 50km) particularly within Jimblebar – Wheelarra Hill Lease. Surveys relevant to the current study (in chronological order) are:

- BHP Iron Ore (1994) Jimblebar Mine Site: Biological Survey;
- ecologia (2004) Jimblebar - Wheelarra Hill Biological Study;
- Biota (2004) Jimblebar - Wheelarra Hill 3 Flora and Fauna Assessment;
- ecologia (2007) Hashimoto Exploration Project Biological Survey: Flora and Vegetation;
- GHD (2008) Report for Mesa Gap Biological Survey;
- Outback Ecology (2009) Wheelarra Hill Iron Ore Mine Modification Flora and Fauna Assessment);
- Outback Ecology (2010) Jimblebar Iron Ore Project Flora and Vegetation Assessment;
- Syrinx Environmental (2011a) BHPBIO Orebody 31 Flora and Vegetation Assessment; and
- Syrinx Environmental (2011b) BHPBIO South West Jimblebar Vegetation Assessment (report in preparation).

The most relevant studies in terms of proximity to the study area and currently available information are the Orebody 31 (OB31) flora and vegetation assessment (Syrinx, 2011a), Jimblebar survey data and review report by Outback Ecology (2009 and 2010), Mesa Gap biological survey (GHD, 2008) and the South West Jimblebar (Syrinx, 2011b in prep.). Data collected during these surveys will assist with the assessment of the vegetation in a regional context and the naming of vegetation communities will aim to be consistent with the vegetation types/associations, recorded in these reports were possible.

BHPBIO Orebody 31 Flora and Vegetation Assessment (Syrinx, 2011a)

OB31 occupies an area of approximately 30km² within Jimblebar Lease AML7000244 held by BHPBIO and is directly adjacent to the north of the of the Wheelarra Hill North study area. The vegetation survey of OB31 was completed in March 2011, two months prior to Wheelarra Hill survey and incorporated survey of approximately 5.5km² or 10% of Wheelarra Hill North study area. Eleven quadrats surveyed for OB31 were located within the northern portion of

the study area and therefore are incorporated in the overall survey for the Wheelarra Hill North.

A total of 29, 50 x 50 metre (m) quadrats and three relevés were sampled during the survey resulting in identification of 206 taxa from 36 families 93 genera. The most commonly recorded family was Poaceae, with a total of 33 taxa recorded. Other dominant families include Fabaceae (10 taxa), Malvaceae (20 taxa) and Chenopodiaceae (12 taxa). The dominant genus across the study area was *Acacia* with 30 taxa recorded followed by *Senna* (12 taxa) and *Eremophila* (10 taxa).

No Threatened flora (DRF) listed under the WA *Wildlife Conservation Act, 1950* (WC Act), Priority flora or Threatened flora species listed under the EPBC Act were recorded within the OB31 area and there were no range extensions.

Twenty-one vegetation associations occurring within 12 broad floristic formations were mapped and described within the OB31 study area. The broad floristic assemblages were:

- *Acacia* Low Open Forest (Floodplain);
- *Acacia* Low Woodland (Floodplains and Drainage Channels);
- *Acacia* Closed Scrub (Drainage Lines);
- *Acacia* High Shrubland (Lower Hill Slope);
- *Acacia* Shrubland (Steep Upper Scree Slope);
- *Acacia* Open Shrubland (Drainage Line);
- Mixed Low Open Heath (Broad Valley Plain);
- *Eremophila* Low Open Shrubland (Floodplain);
- *Triodia* Closed Hummock Grasslands (Low Hill Slope);
- *Triodia* Hummock Grassland (Low Hill Slopes, Hillcrests and Upper Slopes);
- *Triodia* Open Hummock Grassland (Foothills, Broad Drainage Lines and Hillcrests); and
- *Aristida* Tussock Grassland (Broad Drainage Line to Plain).

Jimblebar Iron Ore Project Flora and Vegetation Assessment (Outback Ecology, 2010)

The Jimblebar study area is a large mining lease located approximately 40km east of Newman and adjacent to the existing Wheelarra Hill Mine within Jimblebar Lease M266SA and occupies an area of approximately 90km². The eastern portion of the lease borders north

east of the study area and the centre of the lease is located approximately 7km north east of Wheelarra Hill North.

The report shows results for four flora and vegetation surveys conducted in the Jimblebar Lease by Outback Ecology in July and September 2008, and January and March 2009, and reviews results for the area since 1994. A total of 128, 50 x 50m (or equivalent) non-permanent quadrats were established within the study area. This resulted in the description and mapping of 21 vegetation associations within Jimblebar Lease. The 21 vegetation associations were found to occur within 12 broad floristic formations, as listed below:

- *Acacia* Low Open Forest (Gullies and Gorges and Floodplains (often forming groves));
- *Eucalyptus* Woodland (Incised Drainage Channels);
- *Corymbia* Low Woodland (Unincised Drainage Channels);
- *Acacia* Low Woodland (Floodplains and Sandy Loam Plain);
- *Acacia* High Shrubland (Stony Eroded Slopes or Breakaways);
- *Acacia* High Open Shrubland (Stony Plains or Intergroves, Plains and Flats);
- *Acacia* Open Shrubland (Sandy Plains Recently Burnt);
- *Frankenia* Low Scattered Shrubs (Localised Drainage Foci);
- *Triodia* Closed Hummock Grassland (Low Hills and Rises, Sandy Plains, Plains, Hill Slopes and Low Hills);
- *Triodia* Hummock Grassland (Low Hills and Rises);
- *Triodia* Open Hummock Grassland (Hill Slopes and Low Rises); and
- **Cenchrus* Tussock Grassland (Levee Banks of Incised Drainage Channels).

A total of 326 taxa were recorded from 42 families and 111 genera with the most dominant genera being *Acacia* (43 taxa), *Senna* (15 taxa), *Ptilotus* (14 taxa), *Eremophila* (14 taxa) and *Sida* (10 taxa).

Whilst no Threatened flora (DRF) were found in the study area, three Priority flora (as listed at the time of the survey) were recorded: *Goodenia nuda* (P3, currently listed as P4) *Acacia balsamea* (now not threatened) and *Josephinia* sp. Marrandoo (P1).

Four other Priority species were collected in the earlier surveys although not re-recorded in latest surveys (2008 – 2009) despite targeted searching. These species included *Goodenia hartiana*

(P2), *Tephrosia* sp. Pilbara Ranges (now *Tephrosia* sp. Cathedral Gorge and now not threatened), *Brachyscome* sp. Wanna Munna Flats (P1) and *Aristida jerichoensis* var. *subspinulifera* (P1).

Report for Mesa Gap Biological Survey (GHD, 2008)

Mesa Gap is located between Wheelarra Hill and Orebody 18 (OB18) mine sites adjacent to the western boundary of the study area and 40km south east from Newman township. It occupies an area of approximately 27km² that is for a small part extending into the study area.

The flora and vegetation survey was conducted in 2008 by undertaking walking transects across the study area and establishing 40 (50 x 50m) quadrats. The vegetation was classified into five vegetation associations and eight vegetation types. The report found considerable overlap between vegetation types due to the similarity of underlying geology and landform. Vegetation on Broad Valley Plains, Drainage Lines, Foot Slopes, Broad Valley Plains, Hill Crests and Slopes, Foot Slopes, Broad Valley and Plain (Floodplain) were described as typically Snappy Gum over Spinifex or Mixed *Corymbia hamersleyana* and *Acacia aneura* low open woodland.

A total of 133 taxa from 32 families were recorded from the survey area. Dominant genera recorded from the survey area were: *Acacia* (21 taxa), *Senna* (seven taxa) and *Eremophila* (seven taxa). No weed species were recorded from the survey area. Similarly, no Threatened (DRF) or Priority flora were recorded.

BHPBIO South West Jimblebar Flora and Vegetation Assessment (Syrinx, 2011b)

South West Jimblebar study area is located adjacent to BHPBIO Jimblebar/Wheelarra Hill mining operations approximately 40 km east of Newman. This site covers an area of 20.5km² and is located within Jimblebar Lease AML7000266 held by BHPBIO.

A total of 19 50 x 50m quadrats and four releves were sampled during the 2011 survey (one season Level 2 survey) resulting in identification of 202 taxa from 33 families and 93 genera. The most commonly recorded family was Poaceae, with a total of 42 taxa recorded. Other dominant families included Fabaceae (38 taxa), Malvaceae (14 taxa) and Amaranthaceae (11 taxa). The dominant genus across the site was *Acacia* with 23 taxa recorded followed by *Eremophila* (10 taxa) and *Ptilotus* (9 taxa).

A potential Priority 1 species, *Aristida ? jerichoensis* var. *subspinulifera* (one location), and a potential Priority 4 species *Goodenia ? nuda* (five locations) were found on site. Neither of the species was fully confirmed due to the specimens' young age and/or the lack of floral parts rather than issues with the taxonomy.

Seventeen vegetation associations occurring within ten broad floristic formations were mapped and described within the South West Jimblebar study area. None of the vegetation associations mapped and described are listed as TECs or PECs.

A short summary of other studies in the area surrounding the site are provided in the summary table on the next page (Table 2).

Table 2 Summary of previous vegetation and flora surveys within the vicinity of the Wheelarra Hill North study area

Report	Proximity to Study Area	Survey Technique + Time of Survey	Vegetation Associations + Landforms	Floristic Composition	Significant Flora
BHP Iron Ore (1994) Jimblebar Mine Site: Biological Survey	South of Wheelarra Hill Mine. Approximately 5km south of the study area	20 unbounded 100m ² sites (plotless sampling). Survey conducted in July 1994.	Five broad vegetation associations: Tall Shrubland, Sparse Tree Steppe, Shrub Steppe, Open Mixed Shrubland and Mixed Communities.	Total of 134 taxa representing 30 families with the dominant families being Mimosaceae (19 taxa), Poaceae (10 taxa) and Myrtaceae (nine taxa). Only one weed species was recorded * <i>Rumex vesicarius</i> (now * <i>Acetosa vesicaria</i>).	No DRF recorded. Two Priority 3 identified: <i>Ptilotus aphyllus</i> and <i>Cryptandra</i> sp. Mt Meharry (S. van Leeuwen 682) (now <i>Cryptandra monticola</i>). Both species have been removed from the Priority flora list.
ecologia (2004) Jimblebar - Wheelarra Hill Biological Study	Jimblebar – Wheelarra Hill. Approximately 4km south of the study area	Combination of transects, quadrats and opportunistic sampling. A total of 44 quadrats were sampled, each measuring 100 x 100m. Survey was conducted in February 2004.	Nine vegetation associations were mapped including: • Range Crests; • Rocky Range Slopes; • <i>Acacia aneura</i> (Mulga) Woodland; • Valley Plains; • Scattered <i>Corymbia deserticola</i> and <i>Eucalyptus gamophylla</i> and Shrubs over <i>Triodia basedowii</i> ; • Range Slopes; • Gorges and Gullies; • Minor Drainage Channels; and • Minor Creeklines.	A total of 181 plant taxa were identified from 47 families and 80 genera, with the dominant genera being <i>Acacia</i> (30 taxa), <i>Senna</i> (10 taxa) and <i>Eremophila</i> (seven taxa). One weed species, * <i>Cenchrus ciliaris</i> was recorded in the study area.	<i>Goodenia hartiana</i> (P2) was recorded during the survey; however samples were not provided to the herbarium. Collection locations were checked during the 2008 and 2009 surveys by Outback Ecology and the collections made that were later identified as <i>Goodenia</i> sp. Sandy Creek which is not a priority species (verified by Steve Dillon (WAH)) (Outback Ecology, 2011).
Biota (2004) Jimblebar - Wheelarra Hill 3 Flora and Fauna Assessment	Jimblebar - Wheelarra Hill immediately west of the Wheelarra Hill four mining operations. Approximately 5km south of the study area	The survey was reviewing and updating existing botanical information and recording supplementary floristic data. August 2003.	Six vegetation types described were based on ecologia (1999) flora survey of the area. Vegetation was confined to following landforms: Range Crests, Range Slopes, Rocky Range Slopes, Lower Footslopes, Gorges and Gullies and Numerous Minor Creek Channels.	A total of 227 taxa of native vascular flora from 99 genera belonging to 42 families were recorded. Dominant genera were <i>Acacia</i> (29 taxa), <i>Senna</i> (15 taxa) and <i>Ptilotus</i> (nine taxa). One weed species: * <i>Acetosa vesicaria</i> was recorded in the study area.	No DRF recorded. One Priority species was recorded, <i>Tephrosia</i> sp. Pilbara Ranges (P3). This species has been re-named to <i>Tephrosia</i> sp. Cathedral Gorge (F.H. Mollemans 2420) and is not on the DEC Priority list.

Report	Proximity to Study Area	Survey Technique + Time of Survey	Vegetation Associations + Landforms	Floristic Composition	Significant Flora
<p>ecologia (2007) Hashimoto Exploration Project Biological Survey: Flora and Vegetation</p>	<p>Hashimoto is located approximately 50km east of Newman on Mineral Lease M266SA.</p> <p>Approximately 17km south east of the study area</p>	<p>Data was collected from 55 (50 x 50m) quadrats.</p> <p>Two field trips in August/September 2005 and February 2006.</p>	<p>Nine broad vegetation associations were identified in the study area:</p> <ul style="list-style-type: none"> • Range Crest Vegetation; • Rocky Range Slope Vegetation; • <i>Acacia aneura</i> (Mulga) Woodland; • Valley Plain Vegetation; • Scattered <i>Corymbia deserticola</i> and <i>Eucalyptus gamophylla</i> and Shrubs over <i>Triodia basedowii</i>; • Range Slope Vegetation; • Gorge and Gully Vegetation; • Minor Drainage Channel Vegetation; and • Minor Creekline Vegetation. 	<p>372 taxa, representing 43 families and 129 genera were recorded. Thirty eight (38) collections could not be identified beyond genus level, and two could not be identified beyond family level.</p> <p>The most commonly recorded genera were <i>Acacia</i> (26 taxa), <i>Ptilotus</i> (20 taxa), <i>Eremophila</i> (16 taxa) and <i>Sida</i> (15 taxa).</p> <p>Three introduced species were recorded: *<i>Cenchrus ciliaris</i>, *<i>Bidens bipinnata</i> and *<i>Sonchus oleraceus</i>.</p>	<p>Two Priority flora were recorded: <i>Goodenia hartiana</i> (P2) (previously <i>Goodenia</i> sp. Rudall River) and <i>Goodenia nuda</i> (P3, now P4).</p>
<p>Outback Ecology (2009) Wheelarra Hill Iron Ore Mine Modification Flora and Fauna Assessment</p>	<p>Wheelarra Hill Iron Ore Mine is located approximately 40km east of Newman.</p> <p>Approximately 4km south of the study area –borders whole of southern boundary of the study area</p>	<p>22 (50 x 50m) quadrats.</p> <p>This report documents the results of supplementary flora and vegetation surveys conducted in October and November 2008 and January 2009 and supplementary vertebrate fauna surveys conducted in June, September and October 2008.</p>	<p>Five broad vegetation associations were identified in the study area:</p> <ul style="list-style-type: none"> • <i>Acacia aneura</i> Woodland/Tall Shrubland; • <i>Acacia-Eremophila-Senna</i> Shrubland; • <i>Acacia</i> spp. (<i>Acacia ancistrocarpa</i>, <i>Acacia hilliana</i>, <i>Acacia adoxa</i>) Shrubland over <i>Triodia basedowii</i> or <i>Triodia epactia</i> Hummock Grassland; • <i>Acacia bivenosa</i> Tall Open Scrub with <i>Eucalyptus gamophylla</i> over <i>Triodia epactia</i> Hummock Grassland; and • Mixed <i>Acacia</i> Shrublands. 	<p>A total of 146 taxa (including subspecies and variants) from 29 families and 62 genera were recorded across the study area.</p> <p>Eight specimens could not be identified to the species level due to insufficient material to resolve characters.</p> <p>One introduced flora species was recorded: *<i>Cenchrus ciliaris</i>.</p>	<p>No DRF recorded.</p> <p>One Priority flora species, <i>Goodenia nuda</i> (P4) recorded in one location.</p>

8.2 POTENTIAL VEGETATION AND FLORA OF CONSERVATION SIGNIFICANCE

8.2.1 Threatened Ecological Communities

A TEC is defined as a community which is found to fit into one of the following categories: “presumed totally destroyed”, “critically endangered”, “endangered” or “vulnerable” (DEC, 2010). TECs are categorised at both State level (DEC, 2010) and Commonwealth level (Australian Government, 1999). The status of the State and Commonwealth community rankings are summarised in Appendix 1.

The EPBC Protected Matters Database (SEWPaC, 2011b) search revealed that no TECs were known to occur within the study area. No TECs are listed on the EPBC Protected Matters Database for the Pilbara region.

The DEC’s Database identifies two TECs for the Pilbara region:

1. The vulnerable *Themeda* grasslands on cracking clays (Hamersley Station, Pilbara). This TEC is described as grassland plains dominated by the perennial *Themeda* (Kangaroo grass) and many annual herbs and grasses; and
2. The endangered Ethel Gorge aquifer stygobiont community.

The *Themeda* grassland TEC is located within the Hamersley (PIL3) IBRA subregion (Kendrick, 2001b) and the Ethel Gorge aquifer stygobiont community within the Fortescue Plains (PIL2) IBRA subregion (Kendrick, 2001a).

DEC’s TEC database was queried for known occurrences of TECs in the vicinity of study area. There are no known occurrences of TECs recorded within 50km of the study area. The review of all available literature for sites adjacent to the study area also confirmed no known TECs were found in these areas.

8.2.2 Priority Ecological Communities

Ecological communities that do not meet survey criteria for TEC or that are not adequately defined are added to the PEC list under Priorities 1, 2 and 3 (DEC, 2010). PECs are classed at State level only.

Currently there are 29 PECs listed the Pilbara region (DEC, 2010) none of which are in the immediate vicinity of the study area.

No PECs listed by the DEC have been identified within the study area and the 50km buffer in relation to flora and vegetation from the database searches and the review of literature.

8.2.3 Environmentally Sensitive Areas

A search of the DEC's Native Vegetation Viewer indicated that no Environmentally Sensitive Areas (ESAs) occur within the study area and the immediate surrounds. The study area however forms a part of the catchment for watercourses that feed Jimblebar Creek to the east of the survey area. Jimblebar Creek forms a part of the tributary system to the Fortescue Marshes, which is an ESA.

8.2.4 Ecosystems at Risk

In a biodiversity audit of Western Australia's 53 Biogeographical Subregions in 2002, Kendrick (2002b) lists 'Grove-intergrove Mulga, eastern Hamersley Range' (MVS 23, 24), 'Valley floor Mulga' (MVS 23, 24), 'Lower-slope Mulga' (MVS 23), and 'Hill-top floras, Hamersley Range' (MVS 33), as being 'Ecosystems at risk'. The 'Hill-top floras, Hamersley Range' (MVS 33) ecosystem occurs in the study area and is at risk from, fire, alteration to surface water flow, weed ingress and mining activities.

8.3 DECLARED RARE AND THREATENED FLORA

Conservation significant flora species are classified as Declared Rare, Threatened or Priority flora. These flora have populations that are either geographically restricted, threatened by local processes or both.

Threatened flora (DRF) gazetted under the WC Act thereby making it an offence to remove or damage rare flora without a Ministerial approval.

Currently there are two DRF species recorded for the Pilbara region *Thryptomene wittweri* and *Lepidium catapycnon*. Of these two, a DEC database search has found that *Lepidium catapycnon* may occur in the study area and the 50km buffer.

Thryptomene wittweri does not appear on the DEC search results most probably as the nearest location for this species is some 200km west of Wheelarra Hill North and the habitat for this species is very different to those found within the study area boundary.

The EPBC Protected Matters Database was also searched and that search has included *Pityrodia augustensis* as a possible DRF species for the area.

Both of the possibly occurring DRF species are described below in more detail.

8.3.1 *Lepidium catapycnon*

Lepidium catapycnon, also known as Hamersley Lepidium, is a short-lived perennial shrub up to 40 centimetres (cm) high. *Lepidium catapycnon* grows in skeletal soils on hillsides in hummock grassland with an over-storey of Snappy Gum (*Eucalyptus leucophloia*) and *Acacia* species (Mattiske & Assoc., 1994; Brown *et al.*, 1998).

Previously this species has been identified at the Mt Whaleback mine site which is within 50km of the study area. *Lepidium catapycnon* may occur in the study area as a similar habitat that supports this species exists within the boundary of the study area. This species is listed under the EPBC Act as Vulnerable, but it does not appear on the EPBC Protected Matters Database search for the study area or within the 5km buffer.

8.3.2 *Pityrodia augustensis*

The search of EPBC Protected Matters Database for the study area and the 50km buffer included *Pityrodia augustensis* as the only Vulnerable species that occurs in the vicinity of the area. However, this species does not appear in the DEC database search.

Syrinx has checked WAH records to establish if this species is likely to occur in the area. A total of 13 records are listed on the FloraBase (WAH, 2011), all of which have been collected on the rocky hillsides / slopes in the Mt Augustus area, north-east of Carnarvon, and Mt Fraser in the Robinson Range, north of Meekatharra in the Geraldton district of WA (Brown *et al.*, 1998). The landforms included drainage gullies and lower slopes adjacent to creeks within vegetation communities dominated by *Eremophila latrobei*, *E. pendulina* and *E. clarkei*, Open low woodland of *Eucalyptus camaldulensis*, *E. ferritcola* and *Cymbopogon ambiguus* or Very open *Acacia* shrubland with associated species of *Ptilotus obovatus* and *Sida* sp. (WAH, 2011). Most of the rock types were of sandstone or granitic origin and the soils were derived from these.

Based on the information presented above, it is unlikely that *Pityrodia augustensis* would be present on site as the rock type and vegetation associations are not found in the area.

No DRF flora has been found in previous surveys of the areas closest to the study area, however the potential habitat for *Lepidium catapycnon* was identified (Outback Ecology, 2010).

Details of the nearest location to the study area where these Threatened (DRF) flora have been found is outlined in Table 3.

8.4 PRIORITY FLORA

From the database searches and previous surveys conducted in the area, a total of 19 Priority flora species were identified to potentially occur in the study area (Table 4). The sources of the Priority flora records were:

- DEC Database search for the study area and within the 50km buffer – 10 species;
- WAH records and Naturemap searches – four species; and
- Previous surveys in the vicinity of the area – five species.

One Priority species (*Aristida jerichoensis* var. *subspinulifera* (P1)) has been previously found in the south west section of the study area during flora survey by Outback Ecology during 2009 survey of the adjacent Jimblebar lease.

None of the Priority species listed in the database searches or previously found on site are listed under the EPBC Act.

Location details (coordinates) for all Priority flora previously recorded (and still current) for the areas surrounding Wheelarra Hill North study area are provided in Appendix 2.

Table 3 Threatened Flora (DRF) Potentially Occurring in the Study Area

Species Name	Plant Description as per <i>FloraBase</i>	EPBC Status	DEC Status	Habitat Type	Nearest Location to the Study Area	Likelihood of Species Occurring Within Study Area
<i>Lepidium catapycnon</i> (DEC database search)	Perennial shrub up to 40cm high with stems that zigzag. The flowers are white, up to 6mm long, and occur in clusters of dense terminal racemes. Flowering August to January.	Vulnerable	Threatened	Vegetation: <i>Triodia wiseana</i> hummock grassland with <i>Acacia bivenosa</i> , <i>A. inaequilatera</i> , <i>A. pruinocarpa</i> , <i>A. pyrifolia</i> , <i>Triodia sp.</i> Shovelanna Hill (S. van Leeuwen 3835). Landform: Base of south facing slope. Red gravel over Banded ironstone.	Within 50km of site. Mt Whaleback Mine site. Date: 11/09/2009.	Possible
<i>Pityrodia augustensis</i> (EPBC database search)	Small shrub growing to 1m tall, with stems and branches densely clothed in greenish-white hairs. Flowers purple, red, August to September.	Vulnerable	Threatened	Vegetation: Very open <i>Acacia</i> shrubland. Associated species: <i>Ptilotus obovatus</i> , <i>Sida sp.</i> Landform: Rocky hillsides in the Mt Augustus area, north-east of Carnarvon, and Mt Fraser in the Robinson Range, north of Meekatharra in the Geraldton district of Western Australia.	Within 600km of site. Mt Augustus area 523km SW of Newman. Date: 22/11/2005.	Unlikely

Likelihood Ratings

Likely – Similar habitat is anticipated on site due to matching landforms / soils/ underlying geology. Species was previously found within 10km radius of the study area previously.

Possible – Similar habitat is anticipated in the study area due to matching landforms/ soils/ underlying geology. Species was previously found within 50km radius of the study area.

Unlikely – No habitat (based on landforms / soils/ underlying geology) and/or species was not previously found within 100km of the study area.

Table 4 Potential Priority Flora

Species Name	Plant Description as per FloraBase	DEC Status	Habitat Type	Nearest Location to the Study Area	Likelihood of Species Occurring Within Study Area
<i>Acacia bromilowiana</i> (DEC database search)	Tree or shrub, to 12m high, bark dark grey, fibrous; phyllodes more or less glaucous and slightly pruinose; inflorescence in spikes. Flowers yellow, pink, July–August.	P4	Vegetation: Open Shrub Mallee of <i>Eucalyptus gamophylla</i> and <i>E. kingsmillii</i> with scattered emergent <i>E. leucophloia</i> over Open Low Scrub of <i>Grevillea</i> sp. (SVL 4073) and <i>Senna ferraria</i> over Dwarf Scrub of <i>Scaevola browniana</i> , <i>Ptilotus obovatus</i> and <i>Asteraceae</i> sp. (SVL 4245) over Mid-Dense Hummock Grass of <i>Triodia wiseana</i> . Landform: Rocky hills, breakaways, scree slopes, gorges, creek beds. Red skeletal stony loam, orange-brown pebbly, gravel loam, laterite, banded ironstone, basalt.	Within 100km of site. 20.6km WNW of Mt Newman. Date: 1/10/1998.	Possible
<i>Acacia subtiliformis</i> (DEC database search)	Spindly, slender, erect shrub, to 3.5m high, phyllodes green, new growth slightly viscid, resinous, aromatic; inflorescence in heads to 6mm diameter; peduncles red. Flowers yellow, in June.	P3	Vegetation: Tall open scrub to low shrubland over hummock grassland. <i>Eucalyptus leucophloia</i> , <i>Triodia</i> aff. <i>basedowii</i> . Landform: Small open rocky calcrete plateau.	Within 150km from site (due West). 105km West-north-west of Newman. Date: 19/11/2006.	Unlikely
<i>Amaranthus centralis</i> (DEC database search)	Single stemmed herb to 50cm. Red stem, flowers and fruit in clumps, long petioles. Flowers in May.	P3	Vegetation: With <i>*Cenchrus ciliaris</i> under <i>Eucalyptus camaldulensis</i> . Landform: River bank. Also found low in landscape, flat terrain, alluvial flat, gritty red damp clay loam.	Within 100km of site. 57km north-west of Newman, Fortescue River. Date: 17/07/2001. Also found near Karijini NP within 200km radius of site.	Unlikely
<i>Aristida jerichoensis</i> var. <i>subspinulifera</i> (DEC database search)	Compactly tufted perennial, grass, ranging in height from 0.3 to 0.8m. It is distinguishable by its muricate lemma groove.	P1	Vegetation: Mulga woodland. Landform: Hardpan plain with deep soil.	Found previously on site. Date: 2009, Outback Ecology.	Likely (Previously recorded from within the study area)

Species Name	Plant Description as per FloraBase	DEC Status	Habitat Type	Nearest Location to the Study Area	Likelihood of Species Occurring Within Study Area
<i>Brachyscome</i> sp. Wanna Munna Flats (S. van Leeuwen 4662) (DEC database search)	Erect annual herb, flowers light purple, height 15-20cm by width 5-15cm. Flowering time: June.	P1	Vegetation: Open Low Woodland - Open Low Scrub of <i>Acacia aneura</i> and <i>A. tetragonophylla</i> with scattered <i>Hakea lorea</i> over Very Open Tussock Grass of <i>Themeda triandra</i> and <i>Chrysopogon fallax</i> over Dense Low Grass of <i>Eriachne benthamii</i> , <i>Eriachne ovata</i> and <i>Enneapogon</i> sp. over Open Herbs of <i>Brachycome ciliocarpa</i> and <i>Calotis</i> spp. Landform: occurs on plains or depressions and is associated with clayey loam soils.	Within 5km of site. Adjacent to Jimblebar Lease. Date: 2009, 2010, Outback Ecology.	Likely
<i>Brunonia</i> sp. Long hairs (D.E. Symon 2440) (DEC database search)	Erect open annual herb, 48cm high by 40cm wide. Very silky hairy, discolourous, spatulate leaf 35-100mm long by 3-10mm wide, all at base. Flowers July blue- violet colour, in head up to 30mm across.	P1	Vegetation: Low trees. With <i>Acacia</i> sp., <i>Goodenia</i> sp., <i>Calandrinia</i> sp., <i>Rutidosia</i> sp., native grasses. Landform: Floodplain. Red clay. Hardpan plain with deep soil.	Within 50km of site. Road to Eagle Rock Falls, 36km from Newman, 0.8km from Great Northern Highway. Date: 7/30/2004.	Possible
<i>Crotalaria smithiana</i> (WAH database search)	Annual, herb, to 0.4m high. Flowers yellow, in June.	P3	Vegetation: <i>Astrebla</i> grassland or Sparse Mulga woodland. Landform: Floodplain.	Within 100km of site (north). 10km south-east of Ethel Creek Homestead. Date: 10/06/1994.	Unlikely
<i>Eremophila magnifica</i> subsp. <i>velutina</i> (DEC database search)	Shrub, 0.5–1.5m high. Flowers blue - purple, August – September.	P3	Vegetation: Open Shrub Mallee of <i>Eucalyptus pilbarensis</i> , <i>E. gamophylla</i> , <i>E. kingsmillii</i> over Low Scrub B over Dwarf Scrub D over Mid Dense Hummock Grass of <i>Triodia wiseana</i> and <i>T. pungens</i> . Landform: Skeletal soils over ironstone. Summits. Gully on north side of flat topped hill. Growing on old scree slope in gully (near bottom). Soil: very stony red loam.	Within 300km of site. South-west of Mount Bruce, Hamersley Range NP Date: 22 June 1975.	Possible

Species Name	Plant Description as per <i>FloraBase</i>	DEC Status	Habitat Type	Nearest Location to the Study Area	Likelihood of Species Occurring Within Study Area
<i>Eremophila rigida</i> (WAH database search)	Bushy shrub, 0.3–4m high. Flowers cream, in September.	P3	Vegetation: N/A Associated species: N/A Landform: Stony plain.	Within 150km of site (north). Prairie Downs, 72km south-west of Newman. Date: 25 /06/2007.	Unlikely
<i>Goodenia hartiana</i> (DEC database search)	Erect to spreading, multistemmed perennial, herb or shrub (sub-shrub). Flowers blue, purple, August – September.	P2	Vegetation: <i>Acacia stipuligera</i> shrubland over <i>Triodia basedowii</i> . Landform: Low lying area in dune swale. Red moist sand.	Within 500km of site. Telfer Mine site. Date: 06/07/2006.	Unlikely
<i>Goodenia lyrata</i> (DEC database search)	Prostrate, mat-forming annual herb with yellow flowers spreading to 20cm wide. Flowers in August.	P1	Vegetation: Mulga woodland. Landform: Clay soiled broad drainage tract in hardpan plain.	Within 100km of site. North-west of Newman, on inventory site I60. Date: 3/06/1999.	Unlikely
<i>Goodenia</i> sp. East Pilbara (AA Mitchell PRP 727) (DEC database search)	Open, erect annual or biennial, herb, to 0.2m high. Flowers yellow, in August.	P3	Vegetation: Open shrubland with <i>Acacia</i> sp., <i>Petalostylis</i> sp., and <i>Codonocarpus cotinifolius</i> . Landform: Low undulating plain, swampy plains. Red-brown clay soil, calcrete pebbles.	Within 100km of site. 23.7km north of the turnoff from the Great Northern Highway on the Weeli Wolli Springs Road. Date: 05/09/2004.	Possible
<i>Goodenia nuda</i> (previous surveys in the surrounding area)	Erect to ascending herb, to 0.5m high. Flowers yellow, April–August.	P4	Vegetation: High Shrubland of <i>Acacia paraneura</i> , <i>A. wanyu</i> and <i>Senna glutinosa</i> ssp. <i>luerssenii</i> over Low Shrubland of <i>Eremophila cuneifolia</i> , <i>E. jucunda</i> ssp. <i>pulcherrima</i> , <i>Maireana</i> spp. and Open Hummock Grassland of <i>Triodia pungens</i> and <i>Triodia</i> sp. Shovelanna Hill (S. van Leeuwen 3835). Landform: Flat red/brown sandy clay loam and gravel.	Within 5km of site. Jimplebar and Mesa Gap. Date: 18/03/2009.	Likely

Species Name	Plant Description as per FloraBase	DEC Status	Habitat Type	Nearest Location to the Study Area	Likelihood of Species Occurring Within Study Area
<i>Gompholobium karijini</i> (previous surveys in the surrounding area)	Shrub 50cm tall, densely leaved and stemmed. Standard and wings dark yellow, keel pale yellow-green. Calyx and peduncles reddish-brown. Bark grey, coarsely fibrous, rough.	P2	Vegetation: <i>Eucalyptus</i> low open woodland over <i>Acacia bivenosa</i> low open shrubland over dense <i>Triodia wiseana</i> hummock grassland. Landform: On exposed hillside. Coarse, loose, very pebbly surface over pebbly red-brown loam.	Within 5 -200km of site. Found in Jimblebar on 17/03/2009 and Karijini NP. Date: 19/06/2007.	Possible
<i>Josephinia</i> sp. Marandoo (previous surveys in the surrounding area)	Small, upright shrub, to 0.3m high, round, woolly, soft spined fruit. Flowers pink, in August.	P1	Vegetation: Low Woodland of <i>Acacia aneura</i> var. <i>aneura</i> , <i>A. aneura</i> var. <i>tenuis</i> and <i>A. catenulata</i> ssp. <i>occidentalis</i> over Shrubland of <i>Senna glutinosa</i> ssp. <i>luerssenii</i> , <i>Eremophila latrobei</i> ssp. <i>filiformis</i> and <i>Eremophila fraseri</i> ssp. <i>fraseri</i> with Open Tussock Grassland of <i>Paspalidium clementii</i> , <i>Chrysopogon fallax</i> and <i>Perotis rara</i> . Landform: Gritty soil associated with granite on plains.	Within 5km of site. Found in Jimblebar Iron Ore Quadrats JS67 and JS67. Date: 19/03/2009.	Likely
<i>Nicotiana umbratica</i> (DEC database search)	Straggly, much-branched viscid, erect, short-lived annual or perennial, herb, 0.3–0.7m high. Flowers white, April–June.	P3	Vegetation: <i>Triodia</i> grassland with scattered trees and subshrubs. Landform: Granite outcrops. Shallow soil under granite overhang.	Within 50km of site. Road to Nullagine, 2-5km from junction with Great Northern Highway, Pilbara.	Unlikely
<i>Rhagodia</i> sp. Hamersley (M. Trudgen 17794) (WAH database search)	Erect shrub 0.6 - 1.2m tall. Flowers green - cream, November.	P3	Vegetation: With <i>Triodia brizoides</i> , <i>Eucalyptus leucophloia</i> , <i>Ptilotus obovatus</i> . Landform: On lower slope of range.	Within 150km of site. West end of Ophthalmia Range, 63km due west-north-west of Newman.	Possible

Species Name	Plant Description as per <i>FloraBase</i>	DEC Status	Habitat Type	Nearest Location to the Study Area	Likelihood of Species Occurring Within Study Area
<p><i>Themeda</i> sp. Hamersley Station (M.E. Trudgen 11431)</p> <p>(NatureMap search)</p>	<p>Tussocky perennial, grass-like or herb, 0.9–1.8m high.</p> <p>Flowers in August.</p>	P3	<p>Vegetation: Mulga woodland over <i>Eremophila forrestii</i> and grasses including *<i>Bidens bipinnata</i>, <i>Acacia aneura</i> var. <i>pilbarana</i>, <i>A. pruinocarpa</i>, <i>A. acradenia</i> and <i>Digitaria ammophila</i>.</p> <p>Landform: Valley floor with red-brown loam/clay with superficial gravel over quartz.</p>	<p>Within 50km of site. East Angelas (also found in: Wanna Munna Flats area, ca 8km north of Giles Point, 66km west-north-west of Newman).</p> <p>Date: 02/08/2006.</p>	Possible
<p><i>Triodia triticoides</i></p> <p>(DEC database search)</p>	<p>Tussock-forming perennial, grass-like or herb, 0.45–2m high, panicle spiciform continuous racemose, lemma deeply and unequally lobed. Flowers January–March/ June–July.</p>	P1	<p>Vegetation: N/A</p> <p>Landform: sandstone hills.</p>	<p>Distance from site greater than 500km. All DEC records (six in total) in Kannanura (five) and Kimberley (one).</p> <p>Date: 28/01/1949 and one record form 8/02/1999.</p>	Unlikely

8.5 IUCN THREATENED FLORA

The International Union for Conservation of Nature (IUCN) Red List of Threatened Species is recognized as the most comprehensive, objective global approach for evaluating the conservation status of plant and animal species (IUCN, 2011). The data set used for the formulation of the Red List, does have however, some important limitations, amongst which is the strong bias towards animals, rather than plants.

The Red List database was queried and no IUCN Threatened Flora was listed for the study area or the surrounding areas. No flora previously found in the surrounding areas is categorised under the IUCN Red List.

8.6 INTRODUCED FLORA

From previous surveys conducted in the surrounding areas a total of eight introduced plant species were identified: **Acetosa vesicaria*, **Bidens bipinnata*, **Cenchrus ciliaris*, **Cucumis melo*, **Cucumis myriocarpus*, **Eragrostis cilianensis*, **Malvastrum americanum* and **Portulaca oleracea*. These species may potentially occur on the study area due to disturbance factors such as animal movements (cows and camels for example), vehicle movement, and mining activities in the vicinity of the study area. All known GPS locations of weed species found in previous studies and including those found in this study are presented in Appendix 2. None of the weed species previously found are listed as Declared Plants under the ARR Act (Department of Agriculture, 2011b).

8.7 OTHER SIGNIFICANT FLORA

Whilst previous surveys discuss range extensions of flora or flora that has previously not been widely collected, the high intensity of surveys within the past five years has generally confirmed such flora are more common than originally described. For example *Acacia hamersleyensis* was described in BHP Iron Ore (1994) as poorly collected, however more than 100 collections are now in Florabase. Mulga are known to be at the northernmost extent of the known range in this area and species such as *Eriachne lanata* and *Mollugo molluginea* that were collected at OB31 at the southernmost extent of its range.

PART 3 SURVEY METHODOLOGY

9.0 FLORA AND VEGETATION SURVEY

9.1 DATABASE SEARCHES

To determine the species and status of protected flora and vegetation the following searches were undertaken for the study area and a 5km buffer:

- Protected Matters Database (SEWPaC, 2011b) and TECs listed under the EPBC Act;
- DEC TECs and PECs database (DEC, 2011a);
- Declared Threatened (DRF) and Priority Flora list by DEC;
- FloraBase (DEC, 2011b; WAH, 2011);
- WAH database for Rare and Priority flora (WAH, 2011);
- NatureMap database for all flora species records occurring within the study area (DEC, 2011c); and
- IUCN Red List of Threatened Species (IUCN, 2011).

Searches of the Department of Environment and Conservation's (DEC's) Threatened Flora database, the WAH Specimen database, and DEC Declared Rare and Priority Flora List were conducted on the 29 of March 2011 to provide information on rare flora in the study area. The search co-ordinates (AMG Zone 50) used were selected at the upper left corner of site - 23.2998 latitude and 120.0502 longitude and lower right corner of site -23.3688 latitude 120.2082 with an additional 5 km buffer surrounding the study area.

9.2 PREVIOUS VEGETATION AND FLORA REPORTS

All available hardcopy and digital BHPBIO reports pertaining to the areas surrounding the study area were sourced from BHPBIO. The information in the reports was reviewed and the relevant data extracted (e.g. location of significant flora, introduced flora and types of vegetation communities with relevance to landforms). A summary table (Table 2, see Section 8.1.2) was constructed using information from those reports describing flora and vegetation adjacent to Wheelarra Hill North as it was most likely to be similar to flora and vegetation of the study area.

Data sourced from the reports together with digital mapping information (orthophotos, land systems map, geology etc) was used to collect information on location, types and extent of vegetation associations mapped within the vicinity of the study area. The literature review also focussed on identifying previously mapped significant vegetation and flora, including TECs, PECs, DRF and Priority species as well as significant land systems and landforms. This information was over-laid on digital aerial photography to help guide the identification of vegetation associations, based on the mapping information from previous reports. Boundaries of vegetation associations and the locations of landforms supporting possible DRF and Priority Flora requiring field verification were delineated on the aerial map prior to the field trip.

9.3 SURVEY TEAM

The survey work was undertaken by Kelly McCreery, Botanist (Flora Licence No: SL009079), Anita Cole, Conservation Scientist (Flora Licence No: SL009269) and Radmila Tomanovic, Environmental Scientist (Flora Licence No: SL009264).

9.4 SURVEY TIMING

The survey was carried out in two phases. The first phase was carried out at the end of summer over 13 days (17th – 29th May, 2011). The survey was conducted after an above-average rainfall season with both February and April having above seasonally average rainfall recorded by Bureau of Meteorology (BoM, 2011) (see Figure 4).

The second phase was conducted in winter from 04th – 12th October 2011. In the three months prior to the survey, rainfall was above average for the month of July, but below average, with very little rain recorded for August and September (0.2mm). October rainfall shown in Figure 4 occurred after the survey was completed.

Both phases of the Level 2 survey captured a variety of winter and summer rainfall dependent annual species, resulting in a relatively good floristic survey season and a high proportion of flora within the study area sampled.

9.5 FLORISTIC SURVEY

The survey methodology was based on a Level 2 flora and vegetation survey as outlined in Guidance Statement 51 (EPA, 2004) and is consistent with the methodology outlined in BHPBIO Guidance for Vegetation and Flora Surveys (WIN-ENV-LAND NW-008).

The study area was traversed by vehicle (restricted to access tracks only) and on foot. Quadrats (50 x 50m) were established in areas that were representative of a vegetation assemblage.

A total of 83 quadrats and 19 releves were set up to survey vegetation in the study area over the two phases of the survey.

Seventy-two (72) quadrats and 1 releve transects were set up during phase 1 (May 2011). In addition to those quadrats, 10 quadrats and one releve previously surveyed in the northern portion of the study area in March 2011 as part of the OB31 survey (see plots labelled with OB31 prefix in Figure 6) were added for data analysis.

During the second phase of the survey (October 2011), 45 plots and one releve were revisited including three plots established as part of OB31 survey. This equates to 55% of the total number of sites established for the first phase of the survey being re-surveyed. In addition to revisiting plots, one additional plot and 17 releves were surveyed to further delineate vegetation association boundaries.

The releve transects incorporated species present in a total of 2500m² area (equivalent to the area of an 50 x 50m quadrat) to allow for direct comparison with the quadrat data. All quadrats were permanently marked using steel fence droppers located in the north-west corner of the quadrat. These were individually numbered for future reference (e.g. WHN_28). The location of all quadrats within the study area is presented in Figure 6.

The following parameters were recorded for each quadrat in accordance with the BHPBIO Guidance for Vegetation and Flora Surveys (2010):

- Personnel/ recorder;
- Date;
- GPS Location (recorded in UTM GDA94) (north-west corner);
- Quadrat dimension;
- Quadrat orientation (90° from base of quadrat, e.g. north-south);
- Topography/aspect;
- Soil type and colour;
- Condition of vegetation;
- List of vascular plant species, with details of:
 - height;
 - exact percentage cover;

- presence of flowers; and
- form.
- Disturbances;
- Broad floristic formation;
- Vegetation association;
- Vegetation sub- association; and
- Photograph of the quadrat.

Samples of each species recorded in the field were collected multiple times for later identification and verification by a plant taxonomist. Nomenclature and taxonomy follow the conventions currently adopted by the WAH (FloraBase, 2011).

Any flora not previously collected within the quadrat, but encountered during walks between the quadrats, was collected opportunistically.

All species present within each quadrat (including those of the OB31 survey) are presented in Appendix 3.

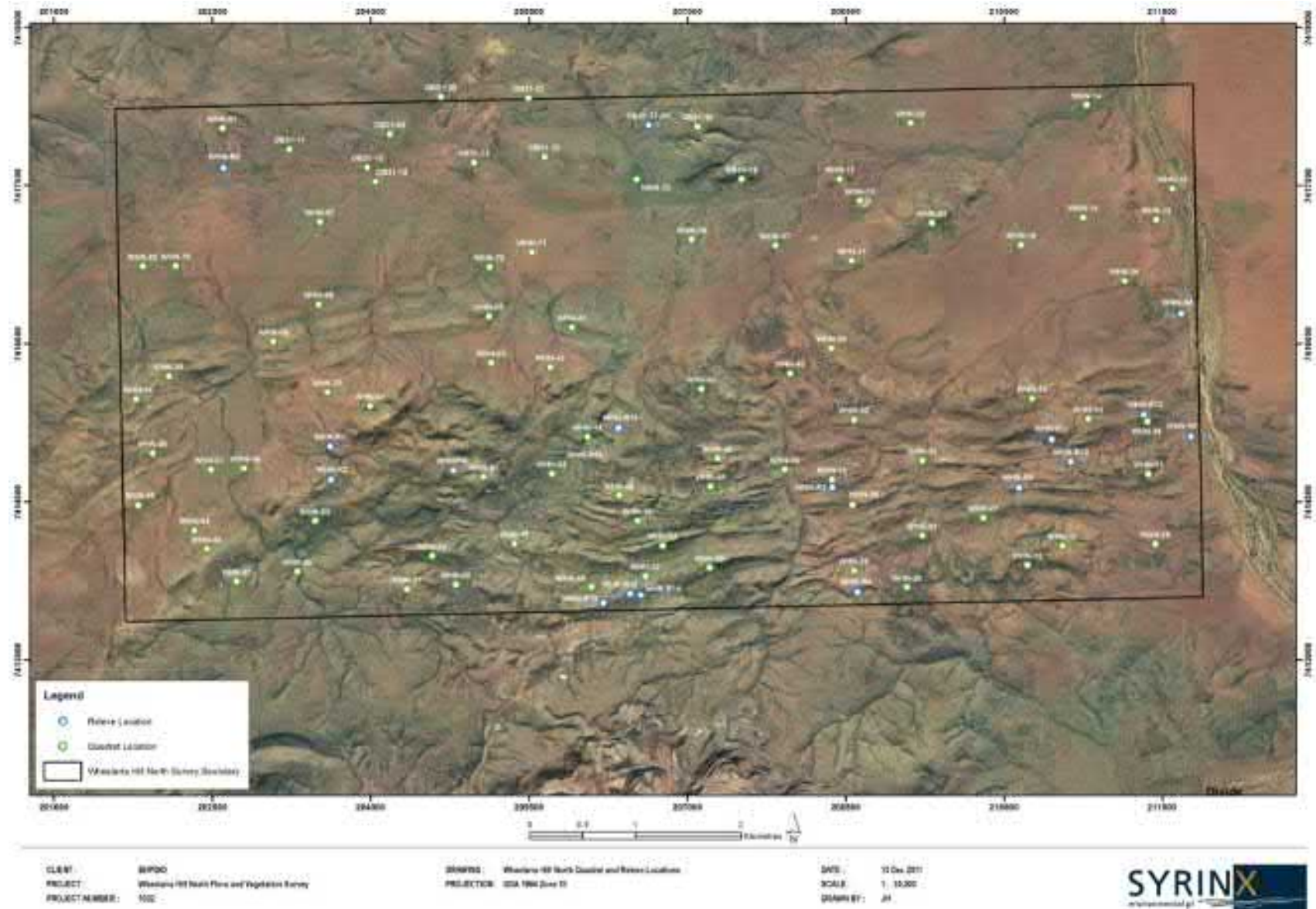


Figure 6 Flora Survey Quadrat Locations

9.6 VEGETATION DESCRIPTION AND MAPPING

Vegetation associations were described based on BHP Billiton Iron Ore's Guidance for Vegetation and Flora Surveys in the Pilbara Region (BHPBIO, 2010). Quadrat and releve data as well as field observations were used to delineate vegetation association mapping boundaries. The data was then analysed and the vegetation associations synthesised based on the dominant species and life form of each strata and similarities in environmental attributes such as soil types and position within the landscape. For areas not traversed on foot, the vegetation assemblages were extrapolated using aerial photography and the knowledge of the landforms and vegetation associations gained during the survey. Some of the vegetation units were intermingled as a mosaic with areas too small to be individually mapped. In those instances only large occurrences of these were mapped.

Numerical (i.e. PATN) analysis of the quadrat and releve data collected in both phases of the survey was conducted by Astron Environmental Services (Astron, 2011, see Appendix 7) to investigate relationships between quadrats and releves on the basis of floristic composition and abundance (cover). This information was used to refine the vegetation types identified from the vegetation survey and to assist in identification of uncommon vegetation types. A correlation of land systems to quadrat groupings was made to determine if certain land systems support vegetation assemblages that are significantly different to other land systems.

PATN analysis did not include a comparison analysis with data collected from other surveys conducted in the region. Therefore regional significance analysis is based on comparison of vegetation assemblages described for the surrounding areas.

Vegetation mapping was undertaken using ArcGIS 10 and orthorectified digital aerial imagery supplied by BHPBIO.

9.7 VEGETATION CONDITION

Condition of vegetation within the study area was assessed in accordance with the Government of Western Australia (2000) Bush Forever Volume 2 (Table 5).

Table 5 Vegetation Condition Scale

Vegetation Condition	Description
(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 disturbances. 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 some very aggressive weeds at high density, 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.

9.8 SURVEY FOR FLORA OF CONSERVATION SIGNIFICANCE

Prior to fieldwork, Florabase records were accessed to provide detail of associated species and habitat types for all flora of conservation significance that had been identified during desktop study to have a potential to occur on the study area. A visit to the WA Reference Herbarium was undertaken to familiarise team members with the key identifying features of Threatened (DRF) and Priority flora. Aerial photography interpretation was undertaken to identify areas of major landforms to target during the survey, taking into account the knowledge gained from the desktop study.

During the survey period, potential habitats for conservation significant flora were traversed on foot. Where flora specimens indicative of the Priority flora were located, the GPS position and photograph were taken and population counts conducted. Voucher specimens of the species were also collected in anticipation of them being lodged with the WAH.

9.9 PLANT IDENTIFICATION

Common species that were identifiable in the field and known to the survey team were identified in the field with a single collection of the specimen taken. Voucher specimens of the remaining flora were collected and tagged with a unique number for ease of recording and tracking data. In most instances the same specimen was collected at multiple locations and therefore several specimens were collected for most species present on site. The plant specimens were pressed prior to drying for 48 hours and then sorted for identification at the WAH where verifications were provided by Consultant Botanists Kelly McCreery, Cate Tauss and Arthur Weston. Nomenclature was checked against the current listing of scientific names recognised by the WAH (WAH, 2011). Specimens that could not be identified or those that were considered significant (e.g. potential Priority flora and range extension flora) were provided to the BHP Sponsored Botanist Steve Dillon at the WAH for confirmation.

A list of all species recorded within in study area can be found in Appendix 4, along with a complete list of flora species recorded within the surrounding areas between 1994 and 2011 (Appendix 5).

10.0 SURVEY LIMITATIONS AND CONSTRAINTS

There are a number of factors that can impact of the results of a flora and vegetation survey. The EPA (2004) in its Guidance to Terrestrial Flora and Vegetation Surveys, lists a number of possible limitations and constraints that can impact on the adequacy of flora surveys. These are listed in Table 6 with an assessment against the survey conducted for this project.

Table 6 Summary of Potential Vegetation and Flora Survey Constraints

Aspect	Constraint	Comment
Competency/ Experience of consultants	No	All members of the field team have at least three years experience in flora and vegetation surveys of the Pilbara, and 20 years across Western Australia. The consultant botanists who identified the samples post-fieldwork have up to 40 years experience in the identification of Pilbara flora.

Aspect	Constraint	Comment
Scope	No	The scope was clearly defined to ensure the survey could be used for a NVCP with data suitable for a one-season a Level 2 survey.
Proportion of flora identified	Yes	<p>No identification process is 100% accurate. This is due to a number of factors, including how relatively unresolved the WA flora is. Taking into account the experience of the botanists completing the identifications, it is estimated there would normally be an approximate accuracy of 90%. This would be for relatively good material and full collection access, however taking into account the above factors, the accuracy may be slightly lower than this.</p> <p>Some specimens collected were lacking fully developed vegetative parts and fruits or flowers. This meant that identification to species and in some cases genus level was not possible.</p> <p>The WAH is in the process of moving the main collection to a new building. This has meant that access to the collection is not possible. Some groups in the Pilbara are poorly known or not taxonomically resolved (e.g. Mulga) and in conjunction with not having access to the main collection, this has made the identification of those groups problematic. This has meant that a larger number of species than usual are marked as having some doubt attached to their identity.</p> <p>However, the opinion of the expert taxonomists at WAH is that the unidentified taxa are unlikely to be new species, although possible hybrids (in particular of Mulga) cannot be discounted.</p> <p>A total of 1582 flora specimens were collected for both phases of the survey. Of 1582 specimens, 92 had some doubt attached to the species name (species with “?” in front of species name), 37 were identified to a genus level only and 28 collections were not identified fully to subspecies level. This results in a total of 157 (or 10%) of the total collections not being fully identified. Therefore 90% of the flora specimens collected on site were fully identified.</p>
Information sources (e.g. historic or recent)	No	Several regional and local studies had been conducted previously in a 50km radius of the study area. All relevant information sources were accessed and used in the literature review including the most up to date vegetation clearing data.

Aspect	Constraint	Comment
Proportion of task achieved, and further work which may be needed	No	Survey is considered complete as all vegetation associations were ground truthed and had at least two plots located in each vegetation association with only very small associations (i.e. less than 3 hectares (ha) having only one plot. All potential habitats for significant flora were traversed on foot. The statistical analysis indicates that sufficient sampling effort for the study area occurs after approximately 80 quadrats. This survey has sampled 83 quadrats and 19 relevés therefore it is considered that the vascular flora has been adequately sampled for the study area.
Timing / weather / season / cycle	Yes (minor)	Dec 2010 – Feb 2011 and April 2011 preceding the first phase of the survey had received above average rainfall which had followed two years of below average rainfall. In the three months prior to the second phase of the survey, rainfall was recorded for July only. This is considered average for Newman at this time of year. Whilst most of the annual grasses (and herbs for the second phase) were still identifiable at the time of survey, many were senescent resulting in a decreased quality of specimens collected for identification.
Disturbances	Yes	Approximately 35% of the study area (east section of the study area) was affected by fire in 2007 resulting in altered species dominance (i.e. abundance or cover) and species composition to some extent. Evidence of grazing and trampling by cattle and horses particularly along Jimblebar Creek and major drainage lines to the northeast of the study area was present alongside large areas of weed infestation (<i>Cenchrus ciliaris</i>) along banks of the creek. There were no major areas of recent (<18 months) fire disturbance.
Intensity	No	Survey intensity was adequate for the purpose of a NVCP application, with a single season survey carried out which was performed with an intensity that is consistent with a Level 2 survey.
Completeness	No	The survey is considered complete as all vegetation associations were able to be identified, mapped and compared against clearing data in the Pilbara.
Resources	No	Resources were adequate to conduct the survey satisfactorily.

Aspect	Constraint	Comment
Remoteness / access problems	No	Wheelarra Hill North study area covers 4972.07ha. The access to the western half of the study area was available via two well defined tracks to the north of the study area which allowed for easy access to the quadrat sites. Access to the eastern half of the study area particularly towards north-east was limited as there was no vehicle access. This area was accessed in most part on foot somewhat limiting number of quadrats in the area.
Availability of contextual information	No	Information was available for the NVIS, Shepherd <i>et al.</i> (2002) vegetation types in WA, extent type and status, Van Vreeswyk <i>et al.</i> (2004), May and McKenzie, (2003), FloraBase, DEC lists, and Bureau of Meteorology (2011).

PART 4 RESULTS

11.0 FLORA

A total of 411 taxa from 49 families and 145 genera were recorded across the Wheelarra Hill North study area. This list includes subspecies (subsp.), variations (var.), affinities (aff.) and hybrids (x). Out of these 411 taxa, 38 were not identified fully. Eighteen (18) collections out of those 38, have some doubt attached to the species name (taxa with ? in front of species name), however they are different to any other specimen in the collection and their accurate identification is dependent on analysis of flowers and/or fruiting bodies. Of the remaining 20 not fully identified collections, five taxa were not identified to subspecies level, 10 were identified to a genus level only (one of these is a unique specimen not similar to any other specimen on site i.e. *Centaurium* sp. (indet)), four collections were undetermined hybrids and one specimen was identified to a family level only. It is likely that at least some of the latter 20 taxa are duplicated in the known species set – i.e. these specimens may be of poor condition, immature (e.g. seedling), or missing flowering or fruiting material necessary to be able to make a final identification.

Taking the above into consideration, the total number of fully identified taxa in the study area is 392, including the 19 species identified as being different to all other fully identified species on site but not fully confirmed (e.g. species like *Chrysocephalum* ? *gilesii*). This number of taxa was used to determine the final proportion of taxa per family and genera for this study area.

The most commonly recorded family was Fabaceae (78 taxa, 14 genera) Poaceae (58 taxa, 28 genera) and Malvaceae (47 taxa, 12 genera). The dominant genus across the study area was *Acacia* with 40 taxa recorded followed by *Ptilotus* (16 taxa) and *Senna* (15 taxa). The most common species recorded in the study area was *Triodia epactia* which was recorded in 24 of the 25 vegetation associations, followed by *Ptilotus exaltatus* (22 vegetation associations) and *Acacia tetragonophylla* (21 vegetation associations). The most common tree found on site was *Acacia aptaneura*.

The majority of taxa found at Wheelarra Hill North (91.8%) are found in the previously surveyed adjacent mining tenements, with 36 additional taxa recorded for Wheelarra Hill North (this number includes one hybrid and seven species with some doubt attached to their name (i.e. species with ?). Of the additional species recorded, most numerous were Poaceae (seven taxa), Fabaceae (four taxa) and Malvaceae (four taxa).

A list of species recorded within the Wheelarra Hill North study area as well as flora species recorded in the surrounding area from previous surveys is included in Appendices 4 and 5.

11.1.1 Threatened Flora (DRF)

No Threatened or Declared Rare flora listed under the WA Act or Threatened flora species listed under the EPBC Act have been found in the Wheelarra Hill North study area.

11.1.2 Priority Flora

One possible Priority 1 species was identified in the study area: *Aristida ? jerichoensis* var. *subspinulifera*. More information on this species is provided below:

11.1.2.1 *Aristida jerichoensis* var. *subspinulifera*

Aristida jerichoensis var. *subspinulifera* is a compactly tufted perennial grass ranging in height from 0.3–0.8m (WAH, 2011). Its most distinguishing feature is the muricate lemma groove. This species has been poorly described and only three records exist in the WAH (WAH, 2011). The habitat was described as “Hardpan plains” or “Large grove in hardpan plain” (WAH, 2011). The locations where this species was found previously are Sylvania station (approximately 20km south of the study area), Packsaddle Outcamp (20km south east of Newman) and East Angelas (30km north east of Wheelarra Hill North study area).

Two locations with this flora have been recorded by Outback Ecology (2010) within the south west portion of the study area (see Figure 7 and Appendix 2). Despite a targeted search in the previously identified locations at the south west extent of the study area, this species was not recorded at the same locations; however they have been collected within similar habitat within a 1km boundary. Outback Ecology (2010) mention in their report that the specimens collected were lodged with WAH however the records are not published on the Florabase website to date (accessed October 31, 2011).

The specimens found in this survey (*Aristida ? jerichoensis* var. *subspinulifera*) appear atypical (hence the ? in front of species name). Steven Dillon a WAH Botanist, has examined the specimens and observed the following: “*The glumes are unequal by up to 3mm, some glumes are longer than the description, most of the (mature) lemma have tubercles not only lining the groove but also on other parts (not seen on any of the main collection) and the overall size of some specimens is much larger than usual. The specimens sit somewhere between Aristida inaequiglumis and Aristida jerichoensis var. subspinulifera. Unsure if it is just due to the good rainfall or typical variation*”. Syrinx has vouchered one of the specimens (05.25) (see Plate 1) and a copy of this document can be found in Appendix 6.

Aristida ? jerichoensis var. *subspinulifera* was found at four locations in the study area (see Plate 1, Table 7 and Figure 7). Figure 7 also shows locations of all previously found (and confirmed) Priority flora in or directly adjacent to the study area (species highlighted in blue). Despite thorough searches of the areas where *Aristida jerichoensis* var. *subspinulifera* was

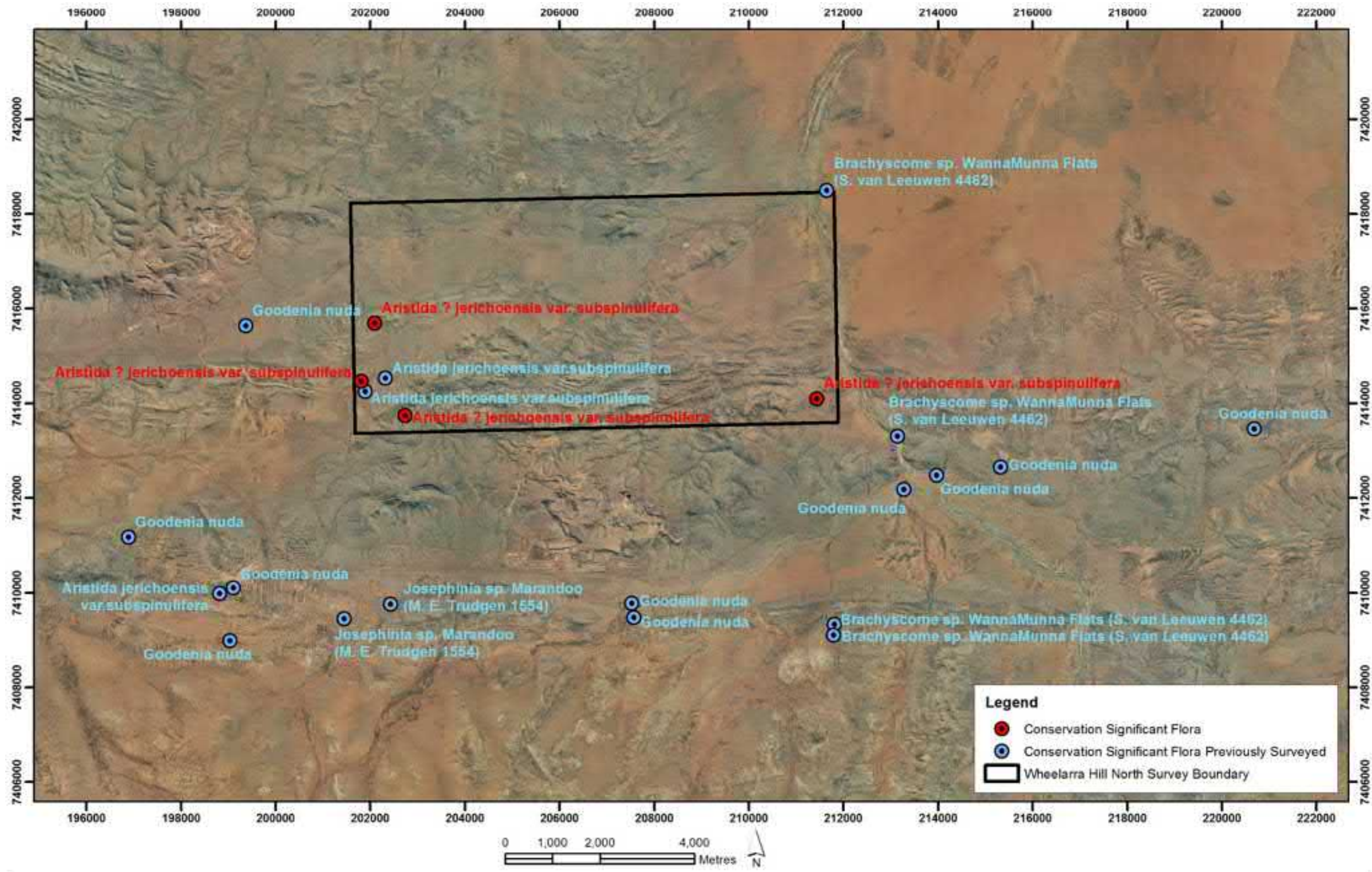
previously recorded (by Outback Ecology, 2010) this species was found at the same locations. The habitat of the area searched however appears to be consistent with the habitat of the *Aristida ? jerichoensis* var. *subspinulifera* habitat found in the current survey.

Table 7 Priority Flora locations within the Study Area

Priority Species	Easting	Northing	Number of plants	Plot location - Wheelarra Hill North
<i>Aristida ? jerichoensis</i> var. <i>subspinulifera</i>	202086	7415691	3	WHN-05
<i>Aristida ? jerichoensis</i> var. <i>subspinulifera</i>	211434	7414100	3	WHN-29
<i>Aristida ? jerichoensis</i> var. <i>subspinulifera</i>	202727	7413744	1	WHN-57
<i>Aristida ? jerichoensis</i> var. <i>subspinulifera</i>	201798	7414466	2	WHN-65



Plate 1 Sample of *Aristida ? jerichoensis* var. *subspinulifera* collected at Wheelarra Hill North



CLIENT : BHPBIO
 PROJECT : Wheelarra Hill North Flora and Vegetation Survey
 PROJECT NUMBER : 1032

DRAWING : Wheelarra Hill North Previous Significant Flora
 PROJECTION : GDA 1994 Zone 51

DATE : 26/10/2011
 SCALE : 1 : 100,000
 DRAWN BY : AH



Figure 7 Locations of Conservation Significant Flora within the Wheelarra Hill North Survey Area

11.1.3 IUCN Threatened Flora

No flora recorded from within the study area are currently listed on the IUCN Threatened Flora Red List.

11.1.4 Other Flora of Potential Conservation Significance

11.1.4.1 Range Extension Flora

Based on the existing vouchered specimen information available through Florabase (WAH, 2011), the following taxa represent an extension to the previously known range of distribution of those particular taxa.

Sclerolaena minuta – is an annual or perennial (short-lived), herb, 0.08-0.2m high that flowers in September and grows on weathered granite rocky hillsides (FloraBase, 2011). Only one specimen of this species is listed on FloraBase and that specimen was found in the Gascoyne region some 300km south of the survey area. No specimens of this species were recorded in the previous studies of the surrounding tenements. This species was found growing in small patches on the stony saddles or depressions with deeper saline soils usually dominated by Chenopodiaceae species and *Frankenia setosa*.

Eragrostis olida – is an odorous, viscid perennial, grass-like or herb, 0.17-0.5m high that usually grows on skeletal stony soils in dry creek beds or in sandstone rocks (WAH, 2011). There are 10 records of this species on Florabase (mostly northern WA), with only one previously recorded in the Pilbara region (55km north west of the study area at Mindy North mining tenement E47/632 (WAH, 2011)). The species was found in a similar type of habitat (gorge - gully, breakaway) as the species at Wheelarra Hill North.

Oldenlandia galioides – is a delicate, diffuse, sprawling, procumbent to ascending annual, herb, 0.07-0.25 (-0.4)m high with white flowers in March to August. The species grows in moist soils along watercourses, edges of pools and swamps (WAH, 2011). This species was found in a deeply incised gully or gorge at the south west extent of the study area. Although there are 77 species recorded on Florabase, the nearest record to this site location is approximately 280km north west of the study area (30km north west of Tom Price).

Other species that show the southernmost (or south western) extent of range are *Evolvulus alsinoides* var. *decumbens* (recorded at eight locations in the study area and previously recorded at OB31), *Phyllanthus erwinii* (recorded at 10 locations in the study area and previously recorded in the nearby tenements), *Abutilon cunninghamii* (recorded at three locations on site and previously found within Jimblebar – Wheelarra Hill lease (Outback Ecology, 2010)), *Phyllanthus maderaspatensis* (recorded at one location and also previously

recorded in the adjacent mining tenements), *Cyperus ixiocarpus* (one found on site and recorded in two studies adjacent to the study area (Outback Ecology, 2010 and ecologia 2004)) and *Santalum spicatum* (recorded in one area on site and previously found in the adjacent tenements (Outback Ecology, 2010 and ecologia, 1999)).

Two other possible range extensions have also been recorded on site: *Tephrosia* aff. *sphaerospora* and *Hibiscus* aff. *apodus*.

Tephrosia* aff. *sphaerospora (17 records on the FloraBase) is considered to be at the north east (approx. from nearest confirmed location) extent of its range as nearest location of the confirmed species have been found at South West Jimblebar some 10km south west of the study area. Currently this genus is undergoing revision and therefore this identification has some doubt attached to it, however the habitat in which it has been found on site appears to be congruent with the known habitats supporting this species and therefore its significance cannot be discounted.

Only one specimen of ***Hibiscus* aff. *apodus*** (30 records on the FloraBase) was found on site and this specimen was not sufficient to confirm the species fully. Comments from the WAH botanist Steven Dillon on this specimen are: “(This specimen) *has glandular hairs & spatulate epicalyx lobes so falls into the H. panduriformis complex. H. panduriformis is an excluded name (Blumea 50(2)) so H. apodus is the closest species to aff. this specimen to. H. apodus has long simple hairs over the stellate & glandular hairs on the stems as well as discolorus, lobed leaves & longer epicalyx segments. This is a very poor specimen - a better collection (with flowers as well as fruit) would have to be collected & sent to L. Craven (who has the majority of the WA Hibiscus material)*”.

As this specimen was previously found only in the Kimberley region (no records exist for the Pilbara) and the specimen was of poor quality (very young specimen) it is possible that this specimen is one of the more common species found on site rather than the range extension, however the habitat in which the species was found is similar to that of the confirmed species. Hence the species is included as being a possible range extension.

11.1.5 Introduced Flora Species

Three introduced flora species were recorded within the survey area. These include: **Bidens bipinnata*, **Cenchrus ciliaris*, **Malvastrum americanum* and **Portulaca oleracea*. The location and extent of infestation of introduced species is shown in Figure 8.

None of the weed species found in this survey or in previous surveys of the areas surrounding Wheelarra Hill North are listed as Declared Plants under the ARR Act (Department of Agriculture, 2011b).

When assessed under criteria listed in the Environmental Weed Strategy for Western Australia (EWSWA) (CALM, 1999) according to invasiveness, distribution and environmental impact, **Cenchrus ciliaris* scored High and **Malvastrum americanum* scored Moderate. **Bidens bipinnata* and **Portulaca oleracea* are not classified as being invasive, however their distribution is wide and their rating is under consideration.

**Cenchrus ciliaris* (Buffel Grass) is the only introduced flora to be classified as an 'Environmental Weed' by EWSWA and is classified as having High ratings due to its high impact on biodiversity (CALM, 1999). This means is that effort should be geared towards prioritising control and research into control of this weed species.

**Cenchrus ciliaris* was recorded at multiple locations across the study area however the main areas of infestation with a higher density were large drainage channels particularly the sandy banks of Jimblebar Creek and larger tributaries to the west. The density and frequency of occurrence of **Cenchrus ciliaris* is reduced further away from the creek (some 2-3km away), and mostly appear in isolated patches with higher soil moisture and frequent traffic by cattle and feral animals such as horses for example.

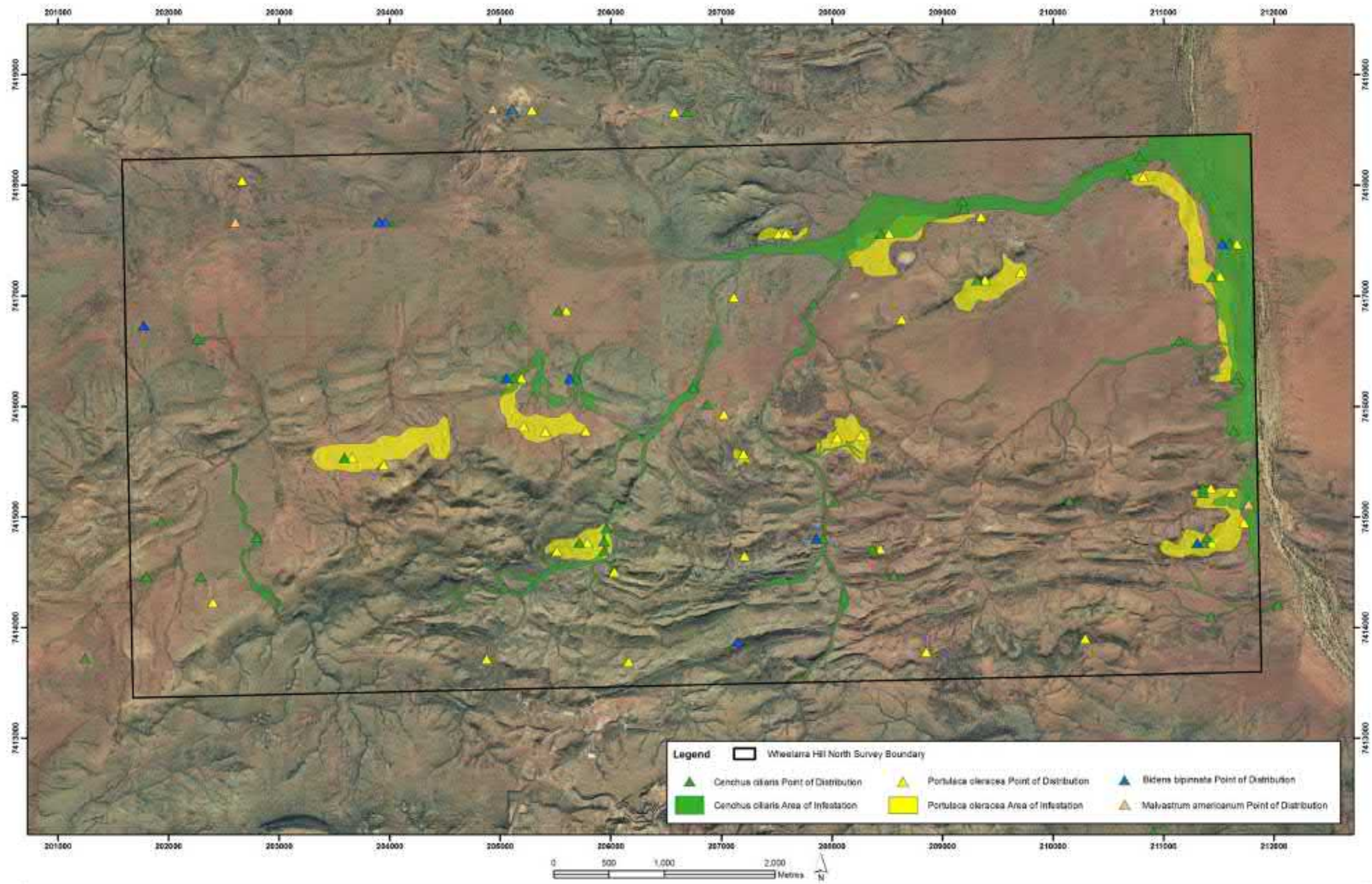
**Malvastrum americanum* (Spiked Malvastrum) is classified as having a Moderate rating for biodiversity impact (CALM, 1999), based on this species-wide distribution and high potential to invade natural ecosystems, particularly those associated with the alluvial sands on. Two occurrences of the weed were recorded in the second phase of the survey (October 2011) one associated with the floodplain, receiving more concentrated water flow and second on the banks of the Jimblebar Creek at the eastern extent of the site. The plant density at the two locations was low, with 30 - 50 plants in areas smaller than 50m².

**Portulaca oleracea* (Purslane) occurs mainly on stony lower footslopes and plain areas with Mulga. Figure 8 outlines some of the areas where this weed is most commonly found. Density of **Portulaca oleracea* is much lower than that of **Cenchrus ciliaris* with less than five plants per 1000m². Most of the plants observed and collected during the survey were immature seedlings, with a significant proportion of adult plants senescent or dehisced particularly in the plain areas.

**Bidens bipinnata* (Bipinnate Beggartick) was found in a few isolated patches mostly under tree canopies that cattle and feral animals typically used for shade / shelter. This weed does not appear to have much impact in the study area with the low numbers found. The most suited habitat for this weed appears to be on the banks of Jimblebar Creek.

All of the introduced species found in the study area, in particular **Cenchrus ciliaris*, are widespread throughout the Pilbara, and have been recorded in most surveys adjacent to the study area. Those populations that were small in size (10 – 2500m²) are represented as "Point of Distribution" on the map (Figure 8) rather than polygons. As seen on the map,

Jimblebar Creek, drainage channels and the plain areas are most affected by weeds. Areas affected by fire also show a higher level of weed occurrence (e.g. eastern extent of the study area).



CLIENT: BHPBIO
 PROJECT: Wheelarra Hill North Flora and Vegetation Survey
 PROJECT NUMBER: 1032

DRAWING: Wheelarra Hill North Introduced Flora Locations
 PROJECTION: GDA 1984 Zone 51

DATE: 11/01/2012
 SCALE: 1: 30,000
 DRAWN BY: JH



Figure 8 Locations and Extent of Infestation for Introduced Flora Species at Wheelarra Hill North

11.2 VEGETATION

11.2.1 Vegetation Association Descriptions

The vegetation associations within the Wheelarra Hill North study area were described and mapped as 25 vegetation associations, which form nine broad floristic groups. An overview of the vegetation associations in the study area, including information on dominant landform and quadrat and releve numbers used to derive the vegetation associations, is listed in Table 9 and detailed in Figure 10 and Figure 11.

Table 8 Vegetation Associations by Broad Floristic Group for Wheelarra Hill North

Code	Vegetation Association	Number of Quadrats Sampled	Dominant Landform
Acacia Woodland			
1a	Woodland of <i>Acacia citrinoviridis</i> , <i>Eucalyptus victrix</i> and <i>Acacia coriacea</i> subsp. <i>pendens</i> over Low Open Shrubland <i>Acacia pyrifolia</i> , <i>Corchorus crozophorifolius</i> and <i>Tephrosia rosea</i> var. <i>clementii</i> over Very Open Tussock Grassland of <i>Cenchrus ciliaris</i> , <i>Cymbopogon procerus</i> and <i>Eulalia aurea</i>	1 + 1 releve	Stream Channel / Incised Drainage Channel
Acacia Low Woodland			
2a	Low Woodland of <i>Acacia aptaneura</i> , <i>Acacia ? pteraneura</i> and <i>Acacia pruinocarpa</i> over Open Hummock Grassland of <i>Triodia epactia</i> and <i>Triodia</i> sp. Shovelanna Hill (S.van Leeuwen 3835) with Shrubland of <i>Acacia wanyu</i> , <i>Acacia tetragonophylla</i> and <i>Senna stricta</i>	7 + 2 releves	Hillslope
2b	Low Woodland of <i>Acacia paraneura</i> , <i>Acacia ? pteraneura</i> and <i>Acacia pruinocarpa</i> over Open Shrubland of <i>Eremophila fraserii</i> subsp. <i>fraseri</i> , <i>Eremophila forrestii</i> subsp. <i>forrestii</i> and <i>Acacia tetragonophylla</i> over Very Open Hummock Grassland of <i>Triodia epactia</i> , <i>Triodia</i> sp. Shovelanna Hill (S. van Leeuwen 3835) and <i>Triodia lanigera</i>	1	Plain
2c	Low Woodland of <i>Acacia aptaneura</i> and <i>Corymbia hamersleyana</i> over Very Open Shrubland of <i>Acacia wanyu</i> , <i>Acacia ancistrocarpa</i> and <i>Eremophila forrestii</i> subsp. (indet) over Very Open Hummock Grassland of <i>Triodia epactia</i> and <i>Triodia lanigera</i>	3 + 1 releve	Plain
2d	Low Woodland of <i>Acacia ? aptaneura</i> , <i>Acacia mulganeura</i> and <i>Ficus brachypoda</i> over High Open Shrubland of <i>Acacia monticola</i> , <i>Grevillea wickhamii</i> subsp. (indet) and <i>Acacia wanyu</i> over Very Open Tussock Grassland of <i>Eragrostis cumingii</i> , <i>Amphipogon sericeus</i> and <i>Themeda triandra</i>	1	Drainage Depression
Acacia Low Open Woodland			
3a	Low Open Woodland of <i>Acacia aptaneura</i> and <i>Acacia pruinocarpa</i> over High Open Shrubland of <i>Acacia tetragonophylla</i> and <i>Acacia synchronica</i> over Very Open Hummock Grassland of <i>Triodia</i> sp. Shovelanna Hill (S. van Leeuwen 3835)	2	Hillslope
Acacia High Shrubland			
4a	High Shrubland of <i>Acacia monticola</i> , <i>Rulingia luteiflora</i> and <i>Gossypium robinsonii</i> with Low Woodland of <i>Corymbia hamersleyana</i> , <i>Eucalyptus victrix</i> and <i>Eucalyptus leucophloia</i> subsp. <i>leucophloia</i> over Very Open Tussock Grassland of <i>Themeda triandra</i> , * <i>Cenchrus ciliaris</i> and <i>Cymbopogon procerus</i>	8 + 2 releve	Drainage Depression
4b	High Shrubland of <i>Acacia monticola</i> , <i>Acacia hamersleyensis</i> and <i>Petalostylis labicheoides</i> over Open Hummock Grassland of <i>Triodia melvillei</i> , <i>Triodia epactia</i> and <i>Triodia</i> sp. Shovelanna Hill (S. van Leeuwen 3835) with Low Open Woodland of <i>Corymbia ferriticola</i> and <i>Ficus brachypoda</i>	1	Gully

Code	Vegetation Association	Number of Quadrats Sampled	Dominant Landform
Triodia Hummock Grassland			
5a	Hummock Grassland of <i>Triodia brizoides</i> , <i>Triodia epactia</i> and <i>Triodia angusta</i> with Open Shrubland of <i>Acacia tetragonophylla</i> and <i>Acacia synchronicia</i> with Very Open Woodland of <i>Eucalyptus leucophloia</i> subsp. <i>leucophloia</i> and <i>Acacia ? pteraneura</i> (hybrid?)	2	Hillslope
5b	Hummock Grassland of <i>Triodia</i> sp. Shovelanna Hill (S. van Leeuwen 3835) with Low Open Shrubland of <i>Acacia hilliana</i> , <i>Acacia adoxa</i> var. <i>adoxo</i> and <i>Halgania solanacea</i> var. Mt Doreen (G.M. Chippendale 4206) with Scattered Low Trees of <i>Eucalyptus leucophloia</i> subsp. <i>leucophloia</i> and <i>Acacia pruinocarpa</i>	10 + 2 relevés	Hillslope
5c	Hummock Grassland of <i>Triodia lanigera</i> and <i>Triodia</i> sp. Shovelanna Hill (S. van Leeuwen 3835) with Open Shrubland of <i>Hakea lorea</i> subsp. <i>lorea</i> , <i>Acacia ancistrocarpa</i> and <i>Acacia adsurgens</i> with Scattered Low Trees of <i>Corymbia hamersleyana</i> and <i>Acacia pruinocarpa</i>	6	Plain
5d	Hummock Grassland of <i>Triodia brizoides</i> , <i>Triodia</i> sp. Shovelanna Hill (S. van Leeuwen 3835) and <i>Triodia epactia</i> with Open Shrubland of <i>Acacia tetragonophylla</i> , <i>Eremophila fraseri</i> subsp. <i>fraseri</i> and <i>Senna glutinosa</i> subsp. <i>pruinosa</i>	3 + 1 relevés	Hillslope
5e	Hummock Grassland of <i>Triodia</i> sp. Shovelanna Hill (S. van Leeuwen 3835), <i>Triodia angusta</i> and <i>Triodia epactia</i> with Scattered Shrubs of <i>Acacia tenuissima</i> , <i>Acacia melleodora</i> and <i>Eremophila cuneifolia</i> with Scattered Low Trees of <i>Acacia aptaneura</i> and <i>Acacia pruinocarpa</i>	1	Hillslope
5f	Hummock Grassland of <i>Triodia lanigera</i> and <i>Triodia epactia</i> with High Open Shrubland of <i>Acacia bivenosa</i> , <i>Acacia ancistrocarpa</i> and <i>Acacia tenuissima</i> with Very Open Mallee of <i>Eucalyptus gamophylla</i>	2	Plain
5g	Hummock Grassland of <i>Triodia epactia</i> , <i>Triodia brizoides</i> and <i>Triodia</i> sp. Shovelanna Hill (S. van Leeuwen 3835), with Low Open Woodland of <i>Acacia aptaneura</i> , <i>Eucalyptus leucophloia</i> subsp. <i>leucophloia</i> and <i>Acacia pruinocarpa</i> over Scattered Shrubs of <i>Acacia tetragonophylla</i> , <i>Scaevola acacioides</i> and <i>Acacia wanyu</i>	5 + 3 relevés	Hillslope
5h	Hummock Grassland of <i>Triodia</i> sp. Shovelanna Hill (S. van Leeuwen 3835), <i>Triodia epactia</i> and <i>Triodia brizoides</i> with High Open Shrubland of <i>Acacia bivenosa</i> and <i>Acacia tetragonophylla</i> with Scattered Low Trees of <i>Eucalyptus leucophloia</i> subsp. <i>leucophloia</i> and <i>Acacia aptaneura</i>	5 + 1 releve	Hillcrest
Triodia Open Hummock Grassland			
6a	Open Hummock Grassland of <i>Triodia</i> sp. Shovelanna Hill (S. van Leeuwen 3835) with Low Open Shrubland of <i>Halgania solanacea</i> var. Mt Doreen (G.M. Chippendale 4206), <i>Gompholobium</i> sp. Pilbara (N.F. Norris 908) and <i>Acacia adoxa</i> var. <i>adoxo</i>	5 + 1 releve	Hillslope
6b	Open Hummock Grassland of <i>Triodia epactia</i> and <i>Triodia</i> sp. Shovelanna Hill (S. van Leeuwen 3835) with Low Open Shrubland of <i>Senna glutinosa</i> subsp. <i>pruinosa</i> , <i>Acacia synchronicia</i> and <i>Eremophila cuneifolia</i>	1	Hillslope
6c	Open Hummock Grassland of <i>Triodia epactia</i> and <i>Triodia angusta</i> with Scattered Mallees of <i>Eucalyptus socialis</i> subsp. <i>eucentrica</i> over Scattered Shrubs of <i>Acacia bivenosa</i>	1	Hillslope
6d	Open Hummock Grassland of <i>Triodia</i> sp. Shovelanna Hill (S. van Leeuwen 3835), <i>Triodia epactia</i> and <i>Triodia brizoides</i> with Low Open Woodland of <i>Acacia aptaneura</i> , <i>Acacia ? pteraneura</i> (hybrid?) and <i>Acacia rhodophloia</i> over Open Shrubland of <i>Acacia tetragonophylla</i> , <i>Acacia adsurgens</i> and <i>Senna glutinosa</i> subsp. <i>glutinosa</i>	5 + 3 relevés	Hillslope
6f	Open Hummock Grassland of <i>Triodia</i> sp. Shovelanna Hill (S. van Leeuwen 3835) and <i>Triodia epactia</i> with Low Open Shrubland of <i>Acacia hilliana</i> , <i>Sida</i> sp. <i>excedentifolia</i> (J.L. Egan 1925) and <i>Senna glutinosa</i> subsp. <i>pruinosa</i> with Scattered Trees of <i>Eucalyptus leucophloia</i> subsp. <i>leucophloia</i>	1	Hillcrest
6g	Open Hummock Grassland of <i>Triodia brizoides</i> and <i>Triodia epactia</i> with Low Open Shrubland of <i>Eremophila fraseri</i> subsp. <i>fraseri</i> , <i>Senna artemisioides</i> subsp. <i>oligophylla</i> and <i>Senna artemisioides</i> subsp. <i>helmsii</i>	4	Footslope

Code	Vegetation Association	Number of Quadrats Sampled	Dominant Landform
Triodia Very Open Hummock Grassland			
7a	Very Open Hummock Grassland of <i>Triodia lanigera</i> and <i>Triodia</i> sp. Shovelanna Hill (S. van Leeuwen 3835) with Scattered Shrubs of <i>Grevillea wickhamii</i> subsp. (indet), <i>Acacia ancistrocarpa</i> and <i>Hakea lorea</i> subsp. <i>lorea</i> with Scattered Trees of <i>Corymbia hamersleyana</i>	2	Plain
Mixed Tussock Grassland			
8a	Tussock Grassland of <i>Eulalia aurea</i> , <i>Themeda triandra</i> and <i>Aristida inaequiglumis</i> with Low Open Woodland of <i>Corymbia hamersleyana</i> , <i>Acacia aptaneura</i> and <i>Acacia citrinoviridis</i> over Open Shrubland of <i>Acacia ancistrocarpa</i> , <i>Gossypium robinsonii</i> and <i>Acacia pyrifolia</i>	3 + 1 releve	Plain
Mixed Open Tussock Grassland			
9a	Open Tussock Grassland of <i>Themeda triandra</i> , <i>Aristida inaequiglumis</i> and <i>Aristida contorta</i> with Open Shrubland of <i>Acacia monticola</i> , <i>Acacia ancistrocarpa</i> and <i>Grevillea wickhamii</i> subsp. <i>aprica</i> with Scattered Low Trees of <i>Corymbia hamersleyana</i>	3	Plain

11.2.1.1 PATN Analysis

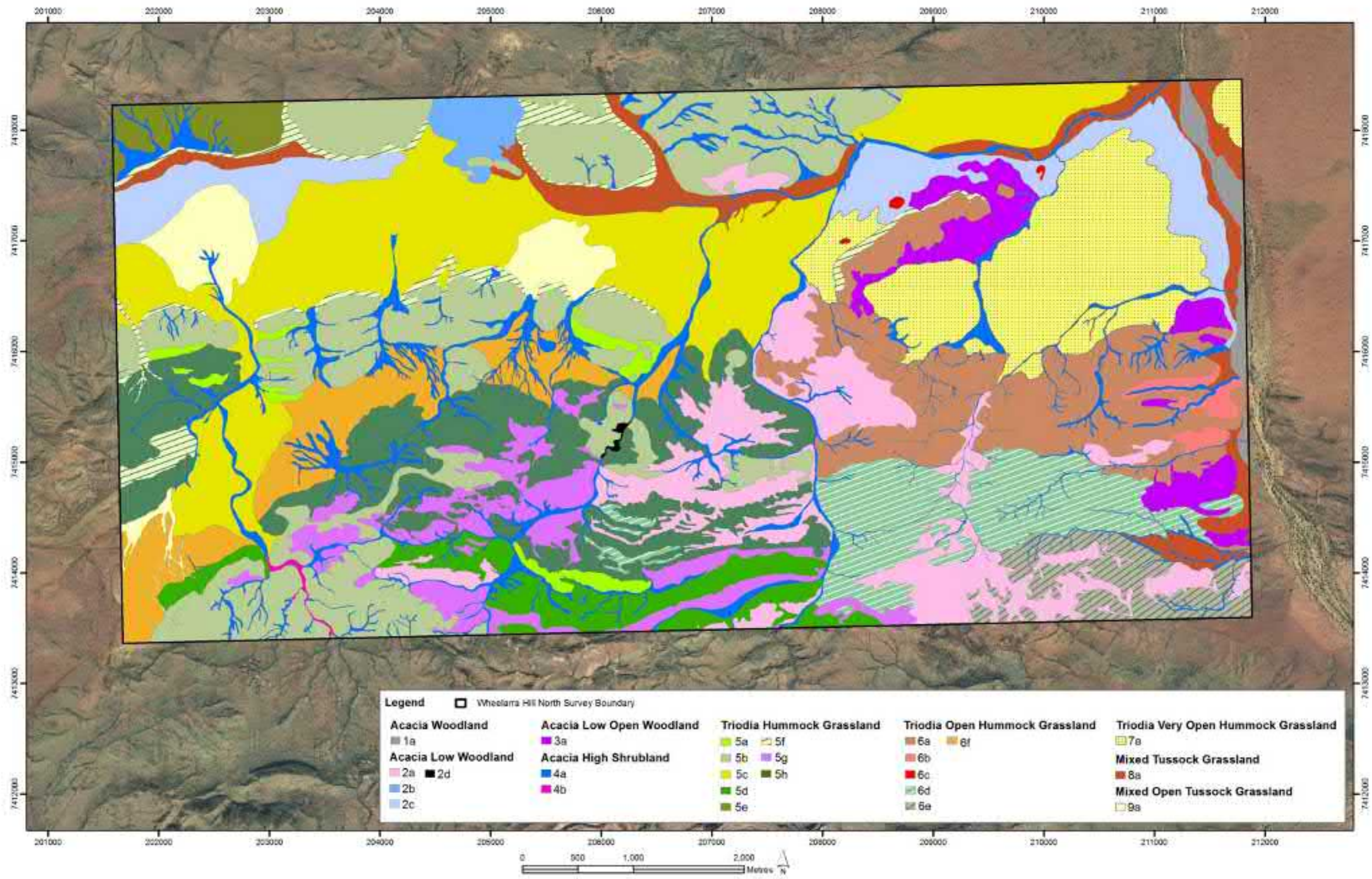
The results of the numerical (i.e. PATN) analysis were taken into consideration in preparation of vegetation mapping and vegetation descriptions as indicated in Table 8. The results of the analysis are presented in Appendix 7 (Astron, 2011).

The vegetation associations recorded at each quadrat compared moderately to the classifications based on PATN. Difficulties in comparison of data come from looking at perennial species only and the fact that some quadrats had several common species between them. Fire events that have affected the study area have also contributed to particular groupings in PATN that are otherwise not congruent with vegetation association descriptions (i.e. they reflect changing vegetation community dynamics, rather than broader vegetation associations). Field observations were therefore crucial in delineating differences between some associations.

Species accumulation is determined based on counts of observed species as a function of the number of quadrats surveyed. This indicates sufficient sampling effort after approximately 80 quadrats (Astron, 2011, see Appendix 7 for species accumulation curve figure).

Vegetation Associations Legend	
Acacia Woodland	
1a	Woodland of <i>Acacia citrinoviridis</i> , <i>Eucalyptus victrix</i> and <i>Acacia coriacea</i> subsp. <i>pendens</i> over Low Open Shrubland <i>Acacia pyrifolia</i> , <i>Cenchrus crozophorifolius</i> and <i>Tephrosia rosea</i> var. <i>clementi</i> over Very Open Tussock Grassland of <i>Cenchrus ciliaris</i> , <i>Cymbopogon procerus</i> and <i>Eulalia aurea</i>
Acacia Low Woodland	
2a	Low Woodland of <i>Acacia aptaneura</i> , <i>Acacia ? pteraneura</i> and <i>Acacia pruinocarpa</i> over Open Hummock Grassland of <i>Triodia epacta</i> and <i>Triodia sp.</i> Shovelanna Hill (S.van Leeuwen 3835) with Shrubland of <i>Acacia wanyu</i> , <i>Acacia tetragonophylla</i> and <i>Senna stricta</i>
2b	Low Woodland of <i>Acacia paraneura</i> , <i>Acacia ? pteraneura</i> and <i>Acacia pruinocarpa</i> over Open Shrubland of <i>Eremophila fraseri</i> subsp. <i>fraseri</i> , <i>Eremophila forestii</i> subsp. <i>forestii</i> and <i>Acacia tetragonophylla</i> over Very Open Hummock Grassland of <i>Triodia epacta</i> , <i>Triodia sp.</i> Shovelanna Hill (S. van Leeuwen 3835) and <i>Triodia lanigera</i>
2c	Low Woodland of <i>Acacia aptaneura</i> and <i>Corymbia hamersleyana</i> over Very Open Shrubland of <i>Acacia wanyu</i> , <i>Acacia ancistrocarpa</i> and <i>Eremophila forestii</i> subsp. <i>(indet)</i> over Very Open Hummock Grassland of <i>Triodia epacta</i> and <i>Triodia lanigera</i>
2d	Low Woodland of <i>Acacia ? aptaneura</i> , <i>Acacia mulganera</i> and <i>Ficus brachypoda</i> over High Open Shrubland of <i>Acacia monticola</i> , <i>Grevillea wickhamii</i> subsp. <i>(indet)</i> and <i>Acacia wanyu</i> over Very Open Tussock Grassland of <i>Eragrostis cunningii</i> , <i>Amphipogon sericeus</i> and <i>Themeda triandra</i>
Acacia Low Open Woodland	
3a	Low Open Woodland of <i>Acacia aptaneura</i> and <i>Acacia pruinocarpa</i> over High Open Shrubland of <i>Acacia tetragonophylla</i> and <i>Acacia synchronica</i> over Very Open Hummock Grassland of <i>Triodia sp.</i> Shovelanna Hill (S.van Leeuwen 3835)
Acacia High Shrubland	
4a	High Shrubland of <i>Acacia monticola</i> , <i>Rulingia luteiflora</i> and <i>Gossypium robinsoni</i> with Low Woodland of <i>Corymbia hamersleyana</i> , <i>Eucalyptus victrix</i> and <i>Eucalyptus leucophloia</i> subsp. <i>leucophloia</i> over Very Open Tussock Grassland of <i>Themeda triandra</i> . * <i>Cenchrus ciliaris</i> and <i>Cymbopogon procerus</i>
4b	High Shrubland of <i>Acacia monticola</i> , <i>Acacia hamersleyensis</i> and <i>Petalostylis lachneoides</i> over Open Hummock Grassland of <i>Triodia melvillei</i> , <i>Triodia epacta</i> and <i>Triodia sp.</i> Shovelanna Hill (S.van Leeuwen 3835) with Low Open Woodland of <i>Corymbia ferricola</i> and <i>Ficus brachypoda</i>
Triodia Hummock Grassland	
5a	Hummock Grassland of <i>Triodia brizoides</i> , <i>Triodia epacta</i> and <i>Triodia angusta</i> with Open Shrubland of <i>Acacia tetragonophylla</i> and <i>Acacia synchronica</i> with Very Open Woodland of <i>Eucalyptus leucophloia</i> subsp. <i>leucophloia</i> and <i>Acacia ? paraneura</i> (hybrid?)
5b	Hummock Grassland of <i>Triodia sp.</i> Shovelanna Hill (S. van Leeuwen 3835) with Low Open Shrubland of <i>Acacia hilliana</i> , <i>Acacia adoxa</i> var. <i>adoxo</i> and <i>Halgania solanacea</i> var. <i>Mt Doreen</i> (G.M. Chippendale 4206) with Scattered Low Trees of <i>Eucalyptus leucophloia</i> subsp. <i>leucophloia</i> and <i>Acacia pruinocarpa</i>
5c	Hummock Grassland of <i>Triodia lanigera</i> and <i>Triodia sp.</i> Shovelanna Hill (S.van Leeuwen 3835) with Open Shrubland of <i>Hakea lorea</i> subsp. <i>lorea</i> , <i>Acacia ancistrocarpa</i> and <i>Acacia adsurgens</i> with Scattered Low Trees of <i>Corymbia hamersleyana</i> and <i>Acacia pruinocarpa</i>
5d	Hummock Grassland of <i>Triodia brizoides</i> , <i>Triodia sp.</i> Shovelanna Hill (S.van Leeuwen 3835) and <i>Triodia epacta</i> with Open Shrubland of <i>Acacia tetragonophylla</i> , <i>Eremophila fraseri</i> subsp. <i>fraseri</i> and <i>Senna glutinosa</i> subsp. <i>pruinosa</i>
5e	Hummock Grassland of <i>Triodia sp.</i> Shovelanna Hill (S.van Leeuwen 3835), <i>Triodia angusta</i> and <i>Triodia epacta</i> with Scattered Shrubs of <i>Acacia tenuissima</i> , <i>Acacia melaleuca</i> and <i>Eremophila cuneifolia</i> with Scattered Low Trees of <i>Acacia aptaneura</i> and <i>Acacia pruinocarpa</i>
5f	Hummock Grassland of <i>Triodia lanigera</i> and <i>Triodia epacta</i> with High Open Shrubland of <i>Acacia bivenosa</i> , <i>Acacia ancistrocarpa</i> and <i>Acacia tenuissima</i> with Very Open Mallee of <i>Eucalyptus gamophylla</i>
5g	Hummock Grassland of <i>Triodia sp.</i> Shovelanna Hill (S.van Leeuwen 3835), <i>Triodia epacta</i> and <i>Triodia brizoides</i> with High Open Shrubland of <i>Acacia bivenosa</i> and <i>Acacia tetragonophylla</i> with Scattered Low Trees of <i>Eucalyptus leucophloia</i> subsp. <i>leucophloia</i> and <i>Acacia aptaneura</i>
5h	Hummock Grassland of <i>Triodia brizoides</i> with Open Shrubland of <i>Acacia wanyu</i> , <i>Scaevola acacioides</i> and <i>Acacia tetragonophylla</i> with Low Open Woodland of <i>Acacia ? pteraneura</i> (hybrid?) and <i>Acacia pruinocarpa</i>
Triodia Open Hummock Grassland	
6a	Open Hummock Grassland of <i>Triodia sp.</i> Shovelanna Hill (S.van Leeuwen 3835) with Low Open Shrubland of <i>Halgania solanacea</i> var. <i>Mt Doreen</i> (G.M. Chippendale 4206), <i>Gompholobium sp.</i> Pilbara (N.F. Norris 908) and <i>Acacia adoxa</i> var. <i>adoxo</i>
6b	Open Hummock Grassland of <i>Triodia epacta</i> and <i>Triodia sp.</i> Shovelanna Hill (S.van Leeuwen 3835) with Low Open Shrubland of <i>Senna glutinosa</i> subsp. <i>pruinosa</i> , <i>Acacia synchronica</i> and <i>Eremophila cuneifolia</i>
6c	Open Hummock Grassland of <i>Triodia epacta</i> and <i>Triodia angusta</i> with Scattered Mallees of <i>Eucalyptus socialis</i> subsp. <i>eucentrica</i> over Scattered Shrubs of <i>Acacia bivenosa</i>
6d	Open Hummock Grassland of <i>Triodia sp.</i> Shovelanna Hill (S.van Leeuwen 3835), <i>Triodia epacta</i> and <i>Triodia brizoides</i> with Low Open Woodland of <i>Acacia aptaneura</i> , <i>Acacia ? pteraneura</i> (hybrid?) and <i>Acacia rhodophloia</i> over Open Shrubland of <i>Acacia tetragonophylla</i> , <i>Acacia adsurgens</i> and <i>Senna glutinosa</i> subsp. <i>glutinosa</i>
6e	Open Hummock Grassland of <i>Triodia sp.</i> Shovelanna Hill (S.van Leeuwen 3835) and <i>Triodia epacta</i> with Low Open Shrubland of <i>Acacia hilliana</i> , <i>Sida sp. excedentifolia</i> (J.L. Egan 1925) and <i>Senna glutinosa</i> subsp. <i>pruinosa</i> with Scattered Trees of <i>Eucalyptus leucophloia</i> subsp. <i>leucophloia</i>
6f	Open Hummock Grassland of <i>Triodia brizoides</i> and <i>Triodia epacta</i> with Low Open Shrubland of <i>Eremophila fraseri</i> subsp. <i>fraseri</i> , <i>Senna artemisioides</i> subsp. <i>oligophylla</i> and <i>Senna artemisioides</i> subsp. <i>helmsii</i>
Triodia Very Open Hummock Grassland	
7a	Very Open Hummock Grassland of <i>Triodia lanigera</i> and <i>Triodia sp.</i> Shovelanna Hill (S.van Leeuwen 3835) with Scattered Shrubs of <i>Grevillea wickhamii</i> subsp. <i>(indet)</i> , <i>Acacia ancistrocarpa</i> and <i>Hakea lorea</i> subsp. <i>lorea</i> with Scattered Trees of <i>Corymbia hamersleyana</i>
Mixed Tussock Grassland	
8a	Tussock Grassland of <i>Eulalia aurea</i> , <i>Themeda triandra</i> and <i>Aristida inaequalis</i> with Low Open Woodland of <i>Corymbia hamersleyana</i> , <i>Acacia aptaneura</i> and <i>Acacia citrinoviridis</i> over Open Shrubland of <i>Acacia ancistrocarpa</i> , <i>Gossypium robinsoni</i> and <i>Acacia pyrifolia</i>
Mixed Open Tussock Grassland	
9a	Open Tussock Grassland of <i>Themeda triandra</i> , <i>Aristida inaequalis</i> and <i>Aristida contorta</i> with Open Shrubland of <i>Acacia monticola</i> , <i>Acacia ancistrocarpa</i> and <i>Grevillea wickhamii</i> subsp. <i>aprica</i> with Scattered Low Trees of <i>Corymbia hamersleyana</i>

Figure 9 Wheelarra Hill North Vegetation Associations Legend



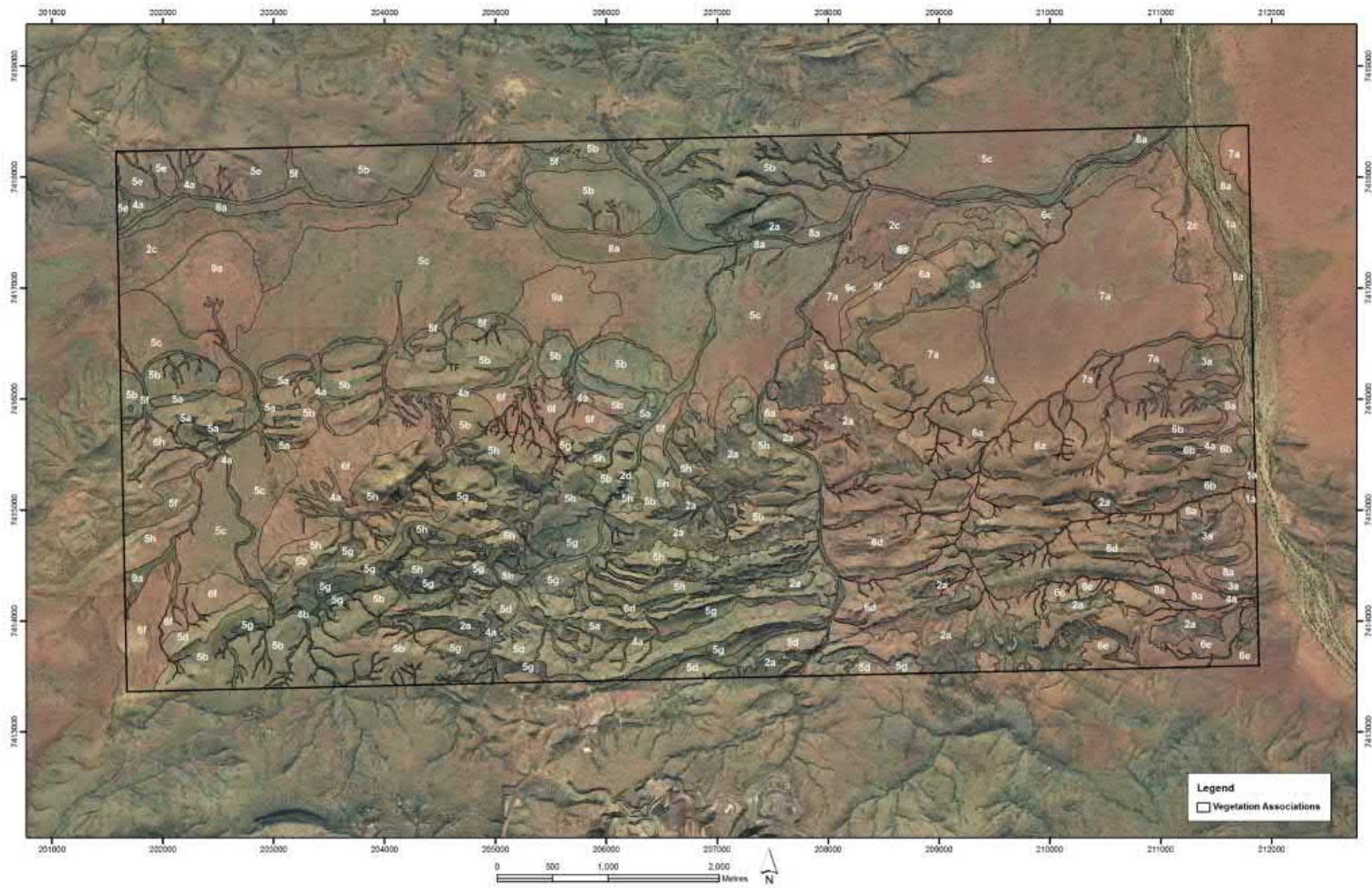
CLIENT : BHPBIO
 PROJECT : Wheelarra Hill North Flora and Vegetation Survey
 PROJECT NUMBER : 1032

DRAWING : Wheelarra Hill North Vegetation Associations
 PROJECTION : GDA 1994 Zone 51

DATE : 13/01/2012
 SCALE : 1 : 30,000
 DRAWN BY : JH



Figure 10 Wheelarra Hill North Vegetation Associations



CLIENT : BHPBIO
 PROJECT : Wheelarra Hill North Flora and Vegetation Survey
 PROJECT NUMBER : 1032

DRAWING : Wheelarra Hill North Vegetation Associations
 PROJECTION : GDA 1984 Zone 51

DATE : 11/01/2012
 SCALE : 1 : 30,000
 DRAWN BY : JH



Figure 11 Wheelarra Hill North Vegetation Associations Outlines

1 Acacia Woodland

1a Woodland of *Acacia citrinoviridis*, *Eucalyptus victrix* and *Acacia coriacea* subsp. *pendens* over Low Open Shrubland *Acacia pyrifolia*, *Corchorus crozophorifolius* and *Tephrosia rosea* var. *clementii* over Very Open Tussock Grassland of *Cenchrus ciliaris*, *Cymbopogon procerus* and *Eulalia aurea*

Area Mapped: 37.59 ha (0.76 % of the study area)

ID of quadrats sampled: WHN_15

Location + Landform

Located to the north east of the study area and confined by the extent of the Jimblebar Creek, this vegetation association dominant landform is that of the stream channel or incised drainage channel.

Vegetation Stratum Levels

Tallest tree sub-stratum	<i>Eucalyptus victrix</i>
Sub-canopy layer, second tree layer	<i>Acacia citrinoviridis</i> and <i>Acacia coriacea</i> subsp. <i>pendens</i>
Tallest shrub layer	Wild Cotton (<i>Gossypium robinsonii</i>)
Next shrub layer	<i>Melaleuca glomerata</i> , Ranji Bush (<i>Acacia pyrifolia</i>)
Third shrub layer	<i>Corchorus crozophorifolius</i> , <i>Tephrosia rosea</i> var. <i>clementii</i> and
Tallest ground Species	Lemon Grass (<i>Cymbopogon procerus</i>), <i>Eulalia aurea</i> , <i>Themeda triandra</i> , Feathertop Threeawn (<i>Aristida inaequiglumis</i>) and Buffel Grass (<i>Cenchrus ciliaris</i>).
Other Ground Species	Tickweed (<i>Cleome viscosa</i>), <i>Evolvulus alsinoides</i> var. <i>decumbens</i> , <i>Trichodesma zeylanicum</i> var. <i>zeylanicum</i> , <i>Phyllanthus erwinii</i> and Golden Beard Grass (<i>Chrysopogon fallax</i>)
Vegetation Condition	Good. A high cover of Buffel Grass (<i>Cenchrus ciliaris</i>) particularly on the banks of the creek (70%) and bed of the creek about 10%. * <i>Bidens bipinnata</i> and * <i>Portulaca oleracea</i> are also present however in small numbers. Animal tracks and dung evident in the creek bed as well as the banks and contribute to lower grading of vegetation condition for this association.
Geology	Alluvium - clay, silt, sand, gravel in drainage channels and adjacent flood plains (after Williams and Tyler, 1991).
Soil Attributes	Coarse sand in creek bed and sandy clay loam on the banks, orange in colour.

Other Locations

This vegetation association is commonly found in wide ephemeral drainage channels across the Pilbara region. The most similar vegetation association described for the areas closest to Wheelarra Hill North is vegetation association 2a from Outback Ecology (2010). Differences lie in the density or abundance of the sub-canopy layer making this an *Acacia* rather than *Eucalyptus* Woodland for this survey. Otherwise, vegetation association 2d in OB31 (Syrinx 2011) provides the closest match.



2 Acacia Low Woodland

2a Low Woodland of *Acacia aptaneura*, *Acacia ? pteraneura* and *Acacia pruinocarpa* over Open Hummock Grassland of *Triodia epactia* and *Triodia* sp. Shovelanna Hill (S.van Leeuwen 3835) with Shrubland of *Acacia wanyu*, *Acacia tetragonophylla* and *Senna stricta*

Area Mapped: 372.40 ha (7.49 % of the study area)

ID of quadrats sampled: OB31_15, WHN_12, WHN_26, WHN_40, WHN_50, WHN_58, WHN_59, WHN_R11 and WHN_R17

Location + Landform

Located predominantly in the south east and central parts of the study area, this vegetation association is mostly found on hillslopes and gullies of breakaway ridges and high hillslopes.

Vegetation Stratum Levels

Tallest tree sub-stratum	<i>Acacia aptaneura</i> , <i>Acacia ? pteraneura</i> , <i>Acacia paraneura</i> , Gidgee (<i>Acacia pruinocarpa</i>) and <i>Eucalyptus leucophloia</i> subsp. <i>leucophloia</i> .
Tallest Shrub Layer	<i>Acacia wanyu</i> , Kurara (<i>Acacia tetragonophylla</i>), <i>Acacia rhodophloia</i> , <i>Acacia synchronicia</i> , <i>Eremophila oppositifolia</i> subsp. <i>angustifolia</i> , <i>Psydrax suaveolens</i> and <i>Scaevola acacioides</i>
Next shrub layer	Pinyuru (<i>Emophila cuneifolia</i>), <i>Senna stricta</i> , <i>Senna glutinosa</i> subsp. <i>x luerksenii</i> <i>Corchorus crozophorifolius</i> , Ranji Bush (<i>Acacia pyrifolia</i>), Currant Bush (<i>Scaevola spinescens</i>) and <i>Enchylaena tomentosa</i> .
Third shrub layer	<i>Solanum phlomoides</i> , Pussy Bluebush (<i>Maireana melanocoma</i>), Satiny Bluebush (<i>Maireana georgei</i>), <i>Sida</i> sp. Shovelanna Hill (S. van Leeuwen 3842), and <i>Hibiscus burtoni</i> .
Tallest ground Species	<i>Triodia epactia</i> , <i>Triodia brizoides</i> , <i>Triodia</i> sp. Shovelanna Hill (S.van Leeuwen 3835), (<i>Cymbopogon procerus</i> and Buffel Grass (<i>Cenchrus ciliaris</i>).
Other Ground Species	<i>Paspalidium clementii</i> , <i>Bulbostylis barbata</i> , <i>Eriachne pulchella</i> subsp. <i>dominii</i> , <i>Ptilotus exaltatus</i> and <i>Sporobolus australasicus</i> .
Vegetation Condition	Excellent. Presence of Purslane (<i>Portulaca oleracea</i>) in small numbers in some parts of this association.
Geology	Woongarra Volcanics with porphyritic with minor tuff and jaspilitic iron formation and Weeli Wolli Formation associated with breakaway ridges and high hills typically made of interlayered banded iron and metadoleritic sills and minor shale (after Williams and Tyler, 1991).
Soil Attributes	Red to brown sandy to silty loam with ironstone rock fragments 2-5cm.

Other Locations

This Vegetation association is most similar to vegetation association 4a from Orebody 31 and similar associations have been found in adjacent tenements (Orebody 18, (ENV 2008)) on stony breakaway slopes or footslopes, however their descriptions vary due to the variable cover of dominant species (which are the same for all locations).



2b Low Woodland of *Acacia paraneura*, *Acacia ? pteraneura* and *Acacia pruinocarpa* over Open Shrubland of *Eremophila fraserii* subsp. *fraseri*, *Eremophila forrestii* subsp. *forrestii* and *Acacia tetragonophylla* over Very Open Hummock Grassland of *Triodia epactia*, *Triodia* sp. Shovelanna Hill (S. van Leeuwen 3835) and *Triodia lanigera*

Area Mapped: 43.66 ha (0.88 % of the study area)

ID of quadrats sampled: OB31_32

Location + Landform

Located along the north west boundary of the study area on the stony alluvium floodplain.

Vegetation Stratum Levels

Tallest tree sub-stratum	<i>Acacia paraneura</i> , <i>Acacia ? pteraneura</i> , and Gidgee (<i>Acacia pruinocarpa</i>).
Tallest Shrub Layer	Burra (<i>Eremophila fraseri</i>), <i>Eremophila forrestii</i> subsp. <i>forrestii</i> , Kurara (<i>Acacia tetragonophylla</i>) <i>Eremophila latrobei</i> subsp. <i>filiformis</i> and <i>Anthobolus leptomerioides</i>
Tallest Ground Species	<i>Triodia epactia</i> , <i>Triodia</i> sp. Shovelanna Hill (S. van Leeuwen 3835) and <i>Triodia lanigera</i> .
Other Ground Species	<i>Cleome oxalidea</i> , <i>Boerhavia schomburgkiana</i> and <i>Evolvulus alsinoides</i> var. <i>villosicalyx</i>
Vegetation Condition	Excellent. No weeds were noted in this area. Some animal (cow) tracks on the exposed stony plains.
Geology	Alluvium - clay, silt, sand, and gravel in drainage channels and adjacent floodplains (after Williams and Tyler, 1991).
Soil Attributes	Dark reddish brown silty loam with sub-angular ironstone gravel.

Other Locations

Vegetation Association 2b from Orebody 31 (Syrinx, 2011a) is congruent with this association. Similar vegetation associations were also found on stony alluvium hardpans of washplain areas in the Pilbara.



2c Low Woodland of *Acacia aptaneura* and *Corymbia hamersleyana* over Very Open Shrubland of *Acacia wanyu*, *Acacia ancistrocarpa* and *Eremophila forrestii* subsp. (indet) over Very Open Hummock Grassland of *Triodia epactia* and *Triodia lanigera*

Area Mapped: 222.90 ha (4.48 % of the study area)

ID of quadrats sampled: OB31-10, WHN_13, WHN_17 and WHN_R6

Location + Landform

This vegetation association is located alongside Jimblebar Creek to the north east of the study area on the stony plains and in part on the clayey hardpan plains to the north west.

Vegetation Stratum Levels

Tallest tree sub-stratum	<i>Acacia aptaneura</i> , <i>Corymbia hamersleyana</i>
Sub-canopy layer, second tree layer	<i>Acacia paraneura</i> , Gidgee (<i>Acacia pruinocarpa</i>) and <i>Acacia citrinoviridis</i>
Tallest Shrub Layer	Fitzroy Wattle (<i>Acacia ancistrocarpa</i>), Yellow-flowered Rulingia (<i>Rulingia luteiflora</i>), <i>Acacia wanyu</i> , <i>Eremophila platycalyx</i> subsp. <i>pardalota</i> , <i>Hakea lorea</i> subsp. <i>lorea</i> and Bastard mulga (<i>Acacia sibirica</i>).
Next shrub layer	<i>Senna stricta</i> , Thorny Saltbush (<i>Rhagodia eremaea</i>), Cotton Bush (<i>Ptilotus obovatus</i>), <i>Eremophila fraseri</i> subsp. <i>fraseri</i> , <i>Senna artemisioides</i> subsp. <i>oligophylla</i> , Kurara (<i>Acacia tetragonophylla</i>).
Third shrub layer	<i>Corchorus sidioides</i> subsp. <i>sidioides</i> , <i>Dicrastylis cordifolia</i> , <i>Hibiscus burtonii</i> , Low Bluebush (<i>Maireana planifolia</i>), Cartwheel Burr (<i>Sclerolaena cornishian</i>) and <i>Sida fibulifera</i> .
Tallest Ground Species	<i>Triodia lanigera</i> , <i>Triodia epactia</i> , <i>Themeda triandra</i> , Feathertop Threeawn (<i>Aristida inaequiglumis</i>) and <i>Eulalia aurea</i> .
Other Ground Species	Tall Mulla Mulla (<i>Ptilotus exaltatus</i>), Cotton Panic Grass (<i>Digitaria brownii</i>), Bunched Kerosene Grass (<i>Aristida contorta</i>), Northern Mulga Grass (<i>Paraneurachne muelleri</i>), Prince of Wales Feather (<i>Ptilotus polystachyus</i>), Buffel Grass (<i>Cenchrus ciliaris</i>) and <i>Yakirra australiensis</i> var. <i>australiensis</i> .
Vegetation Condition	Very Good. Presence of Buffel Grass (<i>Cenchrus ciliaris</i>) and Purslane (<i>Portulaca oleracea</i>) as well as animal tracks. This vegetation community is affected by fire particularly to the east of the study area.
Geology	Alluvium - clay, silt, sand, gravel in drainage channels and adjacent flood plains (after Williams and Tyler, 1991).
Soil Attributes	Red sandy clay loam.

Other Locations

Same vegetation association was noted for Mesa Gap (GHD, 2008) (Vegetation type 7), Jimblebar Lease (Outback Ecology, 2010 Vegetation Association 12a) and similar association at Orebody 18 (ENV, 2008) (Mulga Woodland on Red Soils).



2d Low Woodland of *Acacia* ? *aptaneura*, *Acacia mulganeura* and *Ficus brachypoda* over High Open Shrubland of *Acacia monticola*, *Grevillea wickhamii* subsp. (indet) and *Acacia wanyu* over Very Open Tussock Grassland of *Eragrostis cumingii*, *Amphipogon sericeus* and *Themeda triandra*

Area Mapped: 1.98 ha (0.04 % of the study area)

ID of quadrats sampled: WHN_44

Location + Landform

This vegetation association occupies a small area in the central portion of the study area associated with a deeply incised channel / gorge.

Vegetation Stratum Levels

Tallest tree sub-stratum	<i>Eucalyptus victrix</i> , <i>Eucalyptus leucophloia</i> subsp. <i>leucophloia</i> and <i>Acacia aptaneura</i> .
Sub-canopy layer, second tree layer	<i>Corymbia ferritcola</i> , <i>Acacia mulganeura</i> , and <i>Corymbia hamersleyana</i> .
Sub-canopy layer, third tree layer	<i>Gidgee</i> (<i>Acacia pruinocarpa</i>) and <i>Ficus brachypoda</i> .
Tallest Shrub Layer	Gawar (<i>Acacia monticola</i>), <i>Grevillea wickhamii</i> subsp. (indet), Wild Cotton (<i>Gossypium robinsonii</i>) and <i>Clerodendrum tomentosum</i> var. <i>lanceolatum</i>
Next Shrub Layer	<i>Acacia wanyu</i> , <i>Dodonaea pachyneura</i> , <i>Dodonaea viscosa</i> subsp. <i>angustissima</i> , Kurara (<i>Acacia tetragonophylla</i>) and Slender Petalostylis (<i>Petalostylis labicheoides</i>).
Third Shrub Layer	<i>Abutilon otocarpum</i> , Cotton Bush (<i>Ptilotus obovatus</i>), <i>Tephrosia rosea</i> var. <i>glabrior</i> , <i>Sida</i> sp. <i>Excedentifolia</i> (J.L. Egan 1925) and <i>Solanum phlomoides</i> .
Tallest Ground Species	<i>Triodia epactia</i> , <i>Triodia melvillei</i> , <i>Themeda triandra</i> , Cuming's Love Grass (<i>Eragrostis cumingi</i>), Scent Grass (<i>Cymbopogon ambiguous</i>) and <i>Eriachne tenuiculmis</i> .
Other Ground Species	<i>Amphipogon sericeus</i> , Cotton Panic Grass (<i>Digitaria brownii</i>), Mountain Wanderrie Grass (<i>Eriachne mucronata</i>), <i>Evolvulus alsinoides</i> var. <i>villosicalyx</i> , Buffel Grass (<i>Cenchrus ciliaris</i>).
Vegetation Condition	Excellent. Presence of Buffel Grass (<i>Cenchrus ciliaris</i>), isolated patch.
Geology	Brockman Iron Formation. This formation is characterised by banded iron, chert and shale (after Williams and Tyler, 1991).
Soil Attributes	Red gravelly sand to sandy clay loam.

Other Locations

Most similar to Vegetation Association 4b on study site in terms of species composition, however the presence of *Acacia aptaneura* and the higher abundance of the tree strata somewhat differentiate this association from that of 4b. The underlying geology is also different at both locations (association 4b is on Marra Mamba Iron Formation). Association 1a from Outback Ecology (2010) and 5 in Biota (2004) are very similar to this association.



3 Acacia Low Open Woodland

3a Low Open Woodland of *Acacia aptaneura* and *Acacia pruinocarpa* over High Open Shrubland of *Acacia tetragonophylla* and *Acacia synchronicia* over Very Open Hummock Grassland of *Triodia* sp. Shovelanna Hill (S.van Leeuwen 3835)

Area Mapped: 111.13 ha (2.24 % of the study area)

ID of quadrats sampled: WHN_24 and WHN_31

Location + Landform

This vegetation association occurs on steep hillslopes of small hills at the eastern extent of the study area.

Vegetation Stratum Levels

Tallest tree sub-stratum	<i>Acacia aptaneura</i> and Gidgee (<i>Acacia pruinocarpa</i>).
Tallest Shrub Layer	Kurara (<i>Acacia tetragonophylla</i>), <i>Senna glutinosa</i> subsp. <i>x luerssenii</i> , <i>Eremophila latrobei</i> subsp. <i>latrobei</i> , <i>Acacia synchronicia</i> and <i>Dodonaea pachyneura</i> .
Next Shrub Layer	Pinyuru (<i>Eremophila cuneifolia</i>), <i>Senna artemisioidea</i> subsp. <i>helmsii</i> , Currant Bush (<i>Scaevola spinescens</i>), <i>Dodonaea petiolaris</i> , <i>Sida echinocarpa</i> and <i>Tribulus suberosus</i> .
Third Shrub Layer	Low Bluebush (<i>Maireana planifolia</i>), Bristly Frankenia (<i>Frankenia ? setosa</i>), <i>Maireana villosa</i> , Slender Peppergrass (<i>Lepidium platypetalum</i>) and Potato Bush (<i>Solanum ellipticum</i>).
Tallest Ground Species	<i>Triodia</i> sp. Shovelanna Hill (S.van Leeuwen 3835), <i>Triodia epactia</i> , Scentgrass (<i>Cymbopogon ambiguous</i>), <i>Eragrostis eriopoda</i> , <i>Aristida holathera</i> var. <i>holathera</i> .
Other Ground Species	Bunched Kerosene Grass (<i>Aristida contorta</i>), Comb Finger Grass (<i>Digitaria ctenantha</i>), Leafy Nineawn (<i>Enneapogon polyphyllus</i>), Tall Bindii (<i>Sclerolaena eriacantha</i>), Tall Mulla Mulla (<i>Ptilotus exaltatus</i>), <i>Bulbostylis barbata</i> , Buffel Grass (<i>Cenchrus ciliaris</i>) and Purslane (<i>Portulaca oleracea</i>).
Vegetation Condition	Excellent. Presence of Buffel Grass (<i>Cenchrus ciliaris</i>) and Purslane (<i>Portulaca oleracea</i>) observed occasionally and in low numbers.
Geology	Woongarra Volcanics - porphyritic with minor tuff and jaspilitic iron formation and Boolgeda Iron Formation with fine grained, finely laminated, dark grey to black flaggy iron formation, minor chert and jasperlite shale (after Williams and Tyler, 1991).
Soil Attributes	Red to brown silty to sandy clay loam.

Other Locations

Very similar to Vegetation Association 5a from OB31 (Syrinx, 2011a) and Outback Ecology (2010) Vegetation association 5a. This vegetation association was affected by fire and therefore comparison to other vegetation associations in the area problematic, however several studies including that of OB 18 (ENV, 2008) describe similar association on hillslopes but the cover of dominant species is different.



4 Acacia High Shrubland

4a High Shrubland of *Acacia monticola*, *Rulingia luteiflora* and *Gossypium robinsonii* with Low Woodland of *Corymbia hamersleyana*, *Eucalyptus victrix* and *Eucalyptus leucophloia* subsp. *leucophloia* over Very Open Tussock Grassland of *Themeda triandra*, **Cenchrus ciliaris* and *Cymbopogon procerus*

Area Mapped: 306.91 ha (6.17 % of the study area)

ID of quadrats sampled: OB31_17-R1, WHN_03, WHN_05, WHN_06, WHN_20, WHN_25, WHN_29, WHN_33, WHN_37 and WHN_R1

Location + Landform

Drainage lines, channels and depressions on hills and plains.

Vegetation Stratum Levels

Tallest tree sub-stratum	<i>Eucalyptus victrix</i> , <i>Corymbia hamersleyana</i> , <i>Eucalyptus leucophloia</i> subsp. <i>leucophloia</i> .
Sub-canopy layer, second tree layer	Twin-leaf Mallee (<i>Eucalyptus gamophylla</i>), <i>Acacia aptaneura</i> and <i>Acacia citrinoviridis</i> .
Tallest Shrub Layer	Gawar (<i>Acacia monticola</i>), Ranji Bush (<i>Acacia pyrifolia</i>), Yellow-flowered Rulingia (<i>Rulingia luteiflora</i>), Wild Cotton (<i>Gossypium robinsonii</i>), Fitzroy Wattle (<i>Acacia ancistrocarpa</i>), <i>Duperreya commixta</i> and <i>Grevillea wickhamii</i> subsp. <i>aprica</i> .
Next Shrub Layer	Maitland's Wattle (<i>Acacia maitlandii</i>), <i>Acacia adsurgens</i> , <i>Acacia pachyacra</i> , Bastard mulga (<i>Acacia sibirica</i>), <i>Senna glutinosa</i> subsp. <i>glutinosa</i> and <i>Petalostylis cassioides</i> .
Third Shrub Layer	<i>Triumfetta leptacantha</i> , <i>Tephrosia rosea</i> var. <i>glabrior</i> , <i>Solanum phlomoides</i> , <i>Hybanthus aurantiacus</i> , <i>Indigofera monophylla</i> , <i>Corchorus sidoides</i> subsp. <i>sidoides</i> , <i>Abutilon lepidum</i> , <i>Corchorus lasiocarpus</i> subsp. <i>lasiocarpus</i> , <i>Hibiscus sturtii</i> var. <i>campylochlamys</i> .
Tallest Ground Species	<i>Triodia epactia</i> , <i>Themeda triandra</i> , Lemon Grass (<i>Cymbopogon procerus</i>), <i>Triodia melvillei</i> , Golden Beard Grass (<i>Chrysopogon fallax</i>).
Other Ground Species	Mountain Wanderrie Grass (<i>Eriachne mucronata</i>), <i>Eriachne tenuiculmis</i> , Northern Mulga Grass (<i>Paraneurachne muelleri</i>), Buffel Grass (<i>Cenchrus ciliaris</i>), Cotton Panic Grass (<i>Digitaria brownii</i>), <i>Evolvulus alsinoides</i> var. <i>villosicalyx</i> , Clements Paspalidium (<i>Paspalidium clementi</i>) and Tall Mulla Mulla (<i>Ptilotus exaltatus</i>).
Vegetation Condition	Very Good. Fire (at the eastern extent of the site) and weeds such as Buffel Grass (<i>Cenchrus ciliaris</i>) are present however they have not impacted vegetation structure or species diversity.
Geology	Varied, however mostly confined to Alluvium - clay, silt, sand, gravel in drainage channels and adjacent flood plains (after Williams and Tyler, 1991).
Soil Attributes	Red loamy – clayey sand under mixed colluvial rock fragments of varied size.

Other Locations

A very widespread association locally – it was observed for most surveys surrounding the study site. Mesa Gap (GHD, 2008) Association 2 (but *Acacia monticola* was not as dominant), OB31 (Syrinx, 2011a) Vegetation Association 3a and Jimblebar - Wheelarra Hill 3 (Biota, 2004), Vegetation Association 6.



4b High Shrubland of *Acacia monticola*, *Acacia hamersleyensis* and *Petalostylis labicheoides* over Open Hummock Grassland of *Triodia melvillei*, *Triodia epactia* and *Triodia* sp. Shovelanna Hill (S.van Leeuwen 3835) with Low Open Woodland of *Corymbia ferriticola* and *Ficus brachypoda*

Area Mapped: 3.33 ha (0.07 % of the study area)

ID of quadrats sampled: WHN_55

Location + Landform

This vegetation association occupies a small area in the south west section of the study area associated with deeply incised creek channels and gulleys of high hills.

Vegetation Stratum Levels

Tallest tree sub-stratum	<i>Corymbia ferriticola</i> and <i>Ficus brachypoda</i> .
Tallest Shrub Layer	Gawar (<i>Acacia monticola</i>), <i>Acacia hamersleyensis</i> , Wild Cotton (<i>Gossypium robinsonii</i>), <i>Grevillea wickhamii</i> subsp. <i>aprica</i> , Slender <i>Petalostylis</i> (<i>Petalostylis labicheoides</i>) and Yellow-flowered Rulingia (<i>Rulingia luteiflora</i>).
Next shrub layer	<i>Dodonaea pachyneura</i> , Ironplant (<i>Astrotricha hamptonii</i>), Bastard mulga (<i>Acacia sibirica</i>) and <i>Hibiscus brachychlaenus</i> .
Third shrub layer	<i>Tephrosia rosea</i> var. <i>glabrior</i> , <i>Triumfetta maconochieana</i> and <i>Sida</i> sp. <i>Excedentifolia</i> (J.L. Egan 1925)
Tallest Ground Species	<i>Themeda triandra</i> , Scentgrass (<i>Cymbopogon ambiguous</i>), <i>Triodia melvillei</i> and <i>Triodia epactia</i> .
Other Ground Species	Northern Mulga Grass (<i>Paraneurachne muelleri</i>), Mountain Wanderrie Grass (<i>Eriachne mucronata</i>), Clements Paspalidium (<i>Paspalidium clementii</i>), <i>Eriachne lanata</i> and <i>Triodia</i> sp. Shovelanna Hill (S.van Leeuwen 3835).
Vegetation Condition	Excellent to Pristine.
Geology	Marra Mamba Iron Formation which is characterised by chert, ferruginous chert and minor shale on low hills and rises (after Williams and Tyler, 1991).
Soil Attributes	Red clay loam, sandy.

Other Locations

Similar vegetation associations were found previously in gorges at Hashimoto (ecologia, 2007), Orebody 18 (ENV, 2008) (Gorges/Gullies base and adjacent slopes) and Wheelarra Hill 3 (Association 5) (Biota, 2004).



5 *Triodia* Hummock Grassland

5a Hummock Grassland of *Triodia brizoides*, *Triodia epactia* and *Triodia angusta* with Open Shrubland of *Acacia tetragonophylla* and *Acacia synchronicia* with Very Open Woodland of *Eucalyptus leucophloia* subsp. *leucophloia* and *Acacia ? pteraneura* (hybrid?)

Area Mapped: 43.66 ha (0.88 % of the study area)

ID of quadrats sampled: WHN_41 and WHN_47

Location + Landform

This small vegetation association is found on the south facing hillslopes of ridges at the central and southern extent of the study area.

Vegetation Stratum Levels

Tallest tree sub-stratum	<i>Acacia ? pteraneura</i> (hybrid?) and Gidgee (<i>Acacia pruinocarpa</i>).
Tallest Shrub Layer	<i>Acacia synchronicia</i> , <i>Acacia bivenosa</i> , Kurara (<i>Acacia tetragonophylla</i>), Fitzroy Wattle (<i>Acacia ancistrocarpa</i>), Maitland's Wattle (<i>Acacia maitlandii</i>) and <i>Hakea lorea</i> subsp. <i>lorea</i>
Next shrub layer	<i>Senna glutinosa</i> subsp. <i>pruinosa</i> , <i>Senna glutinosa</i> subsp. <i>glutinosa</i> , <i>Acacia tenuissima</i> and <i>Tribulus suberosus</i> .
Third shrub layer	Pussy Bluebush (<i>Maireana melanocoma</i>), <i>Corchorus lasiocarpus</i> subsp. <i>lasiocarpus</i> .
Tallest Ground Species	<i>Triodia brizoides</i> , <i>Triodia angusta</i> , <i>Triodia epactia</i> , Scentgrass (<i>Cymbopogon ambiguus</i>) and Weeping Mulla Mulla (<i>Ptilotus calostachyus</i>).
Other Ground Species	<i>Aristida holathera</i> var. <i>holathera</i> , <i>Eriachne pulchella</i> subsp. <i>dominii</i> , <i>Iseilema dolichotrichum</i> .
Vegetation Condition	Excellent to Pristine.
Geology	Marra Mamba Iron Formation characterised by ferruginous chert and minor shale on low hills and rises and Weeli Wollli Formation associated with ridges and high hills consisting of interlayered banded iron and metadoleritic sills and minor shale.
Soil Attributes	Red sandy clay loam.

Other Locations

The exact combination of species and their respective cover are not commonly found in the adjacent previously surveyed mining lease areas. It is possible that such vegetation assemblage can be found in a similar habitat (landform and land system) in the 20 km buffer from the study area however, this data is not available for review.



5b Hummock Grassland of *Triodia* sp. Shovelanna Hill (S. van Leeuwen 3835) with Low Open Shrubland of *Acacia hilliana*, *Acacia adoxa* var. *adoxo* and *Halgania solanacea* var. Mt Doreen (G.M. Chippendale 4206) with Scattered Low Trees of *Eucalyptus leucophloia* subsp. *leucophloia* and *Acacia pruinocarpa*

Area Mapped: 677.02 ha (13.62 % of the study area)

ID of quadrats sampled: OB31_09, OB31_13, OB31_14, OB31_16, OB31_21, WHN_09, WHN_48, WHN_51, WHN_57, WHN_69, WHN_R5 and WHN_R16

Location + Landform

This vegetation association occurs on gently to moderately inclined hillslopes and hill crests of low hills to the north and west of the study area.

Vegetation Stratum Levels

Tallest tree sub-stratum	<i>Acacia aptaneura</i> , <i>Eucalyptus leucophloia</i> subsp. <i>leucophloia</i> , Gidgee (<i>Acacia pruinocarpa</i>) and <i>Eucalyptus kingsmillii</i> subsp. <i>kingsmillii</i>
Tallest Shrub Layer	<i>Hakea chordophylla</i> , <i>Acacia trudgeniana</i> , <i>Grevillea wickhamii</i> subsp. (indet), <i>Senna glutinosa</i> subsp. <i>pruinosa</i> and <i>Acacia bivenosa</i> .
Next shrub layer	<i>Keraudrenia nephrosperma</i> , <i>Senna glutinosa</i> subsp. <i>glutinosa</i> <i>Keraudrenia velutina</i> subsp. <i>elliptica</i> , Baderi (<i>Acacia inaequilatera</i>), <i>Mirbelia viminalis</i> and <i>Tribulus suberosus</i> .
Third shrub layer	<i>Acacia hilliana</i> , <i>Acacia adoxa</i> var. <i>adoxo</i> , <i>Calytrix carinata</i> , <i>Halgania solanacea</i> var. Mt Doreen (G.M. Chippendale 4206)
Tallest Ground Species	<i>Triodia</i> sp. Shovelanna Hill (S.van Leeuwen 3835), Scentgrass (<i>Cymbopogon ambiguus</i>) and Weeping Mulla Mulla (<i>Ptilotus calostachyus</i>)
Other Ground Species	Mountain Wanderrie Grass (<i>Eriachne mucronata</i>), <i>Eriachne lanata</i> , <i>Amphipogon sericeus</i> , Woollybutt Grass (<i>Eragrostis eriopoda</i>) and <i>Goodenia triodiophila</i>
Vegetation Condition	Excellent.
Geology	Marra Mamba Iron Formation characterised ferruginous chert and minor shale on low hills and rises and Brockman Iron Formation characterised by banded iron, chert and shale (after Williams and Tyler, 1991).
Soil Attributes	Red sandy to clayey loam.

Other Locations

Several sites in the 20km buffer have mapped this vegetation association. Locally, Mesa Gap study Vegetation Association 5, (GHD, 2008). Orebody 31 .Vegetation Association 10d (Syrinx, 2011a) and Vegetation Association 10a (Outback Ecology, 2010) are most similar.



5c Hummock Grassland of *Triodia lanigera* and *Triodia* sp. Shovelanna Hill (S.van Leeuwen 3835) with Open Shrubland of *Hakea lorea* subsp. *lorea*, *Acacia ancistrocarpa* and *Acacia adsurgens* with Scattered Low Trees of *Corymbia hamersleyana* and *Acacia pruinocarpa*

Area Mapped: 674.65 ha (13.57 % of the study area)

ID of quadrats sampled: OB31_12, WHN_02, WHN_07, WHN_22, WHN_39 and WHN_67

Location + Landform

This vegetation association is located in the northern and central parts of the study area associated with grassy plains.

Vegetation Stratum Levels

Tallest tree sub-stratum	<i>Corymbia hamersleyana</i> , <i>Corymbia candida</i> subsp. <i>dipsodes</i> and <i>Acacia pachyacra</i> .
Sub-canopy layer, second tree layer	Gidgee (<i>Acacia pruinocarpa</i>), <i>Acacia aptaneura</i> and <i>Acacia citrinoviridis</i> .
Tallest Shrub Layer	Fitzroy Wattle (<i>Acacia ancistrocarpa</i>), <i>Acacia adsurgens</i> , <i>Acacia pachyacra</i> , <i>Acacia melleodora</i> , Ranji Bush (<i>Acacia pyrifolia</i>) and <i>Hakea lorea</i> subsp. <i>lorea</i> .
Next shrub layer	<i>Bonamia</i> sp. (indet), <i>Eremophila forrestii</i> subsp. <i>forrestii</i> , Bastard mulga (<i>Acacia sibirica</i>), Thargomindah Nightshade (<i>Solanum sturtianum</i>), Cotton Bush (<i>Ptilotus obovatus</i>) and <i>Senna artemisioides</i> subsp. <i>oligophylla</i> .
Third shrub layer	<i>Hybanthus aurantiacus</i> , <i>Sida cardiophylla</i> , <i>Trichodesma zeylanicum</i> var. <i>zeylanicum</i> , Flannel Bush (<i>Solanum lasiophyllum</i>) and <i>Dicrastylis cordifolia</i> .
Tallest Ground Species	<i>Triodia lanigera</i> , <i>Triodia</i> sp. Shovelanna Hill (S.van Leeuwen 3835), Feathertop Threeawn (<i>Aristida inaequiglumis</i>), Scentgrass (<i>Cymbopogon ambiguus</i>).
Other Ground Species	Northern Mulga Grass (<i>Paraneurachne muelleri</i>), Bunched Kerosene Grass (<i>Aristida contorta</i>), Tall Mulla Mulla (<i>Ptilotus exaltatus</i>), <i>Yakirra australiensis</i> var. <i>australiensis</i> and <i>Amphipogon sericeus</i> .
Vegetation Condition	Excellent. Evidence of grazing and occurrence of sporadic weeds such as Buffle grass (<i>Cenchrus ciliaris</i>) and Purslane (<i>Portulaca oleracea</i>).
Geology	Colluvium and Minor Alluvium typically containing silt, sand, and small rock fragments (after Williams and Tyler, 1991).
Soil Attributes	Red sandy loam.

Other Locations

Similar vegetation association were found in adjacent mining tenement areas. Closest descriptions are those of vegetation associations recorded at Orebody 31 (Vegetation association 10b) (Syrinx, 2011a), and Mesa Gap (Vegetation Association 4) (GHD, 2008).



5d Hummock Grassland of *Triodia brizoides*, *Triodia* sp. Shovelanna Hill (S.van Leeuwen 3835) and *Triodia epactia* with Open Shrubland of *Acacia tetragonophylla*, *Eremophila fraseri* subsp. *fraseri* and *Senna glutinosa* subsp. *pruinosa*

Area Mapped: 142.89 ha (2.87 % of the study area)

ID of quadrats sampled: WHN_45, WHN_52, WHN_66 and WHN_R13

Location + Landform

This vegetation associations found on hillslopes of high ridges at the southern boundary of the study area.

Vegetation Stratum Levels

Tallest tree sub-stratum	<i>Eucalyptus leucophloia</i> subsp. <i>leucophloia</i> and Gidgee (<i>Acacia pruinocarpa</i>).
Tallest Shrub Layer	<i>Eremophila fraseri</i> subsp. <i>fraseri</i> , <i>Acacia synchronicia</i> , Kurara (<i>Acacia tetragonophylla</i>), <i>Senna glutinosa</i> subsp. <i>pruinosa</i> , <i>Acacia tenuissima</i> and <i>Senna artemisioides</i> subsp. <i>oligophylla</i> .
Next Shrub Layer	<i>Acacia adsurgens</i> , <i>Corchorus lasiocarpus</i> subsp. <i>lasiocarpus</i> , <i>Solanum phlomoides</i> , Pinyuru (<i>Eremophila cuneifolia</i>) and <i>Tribulus suberosus</i> .
Tallest Ground Species	<i>Triodia brizoides</i> , <i>Triodia</i> sp. Shovelanna Hill (S.van Leeuwen 3835), <i>Triodia epactia</i> , Weeping Mulla Mulla (<i>Ptilotus calostachyus</i>) and Scentgrass (<i>Cymbopogon ambiguus</i>).
Other Ground Species	Bunched Kerosene Grass (<i>Aristida contorta</i>), Limestone Grass (<i>Enneapogon caerulescens</i>), Clements Paspalidium (<i>Paspalidium clementii</i>), Leafy Nineawn (<i>Enneapogon polyphyllus</i>), <i>Aristida holathera</i> var. <i>holathera</i> and <i>Polycarpaea longiflora</i> .
Vegetation Condition	Excellent to Pristine. Occasional presence of Purslane (<i>Portulaca oleracea</i>).
Geology	Weeli Wolli Formation consisting of interlayered banded iron and metadoleritic sills and minor shale (after Williams and Tyler, 1991).
Soil Attributes	Red silty loamy sand.

Other Locations

This vegetation association does not commonly appear in the descriptions of vegetation in areas immediately bordering the site. The indicator species for this vegetation association is *Eremophila fraseri* subsp. *fraserii*. Most similar Vegetation association to this one is WJ16, Stony Plains, found at West Jimblebar Exploration Lease (ENV, 2007c)



5e Hummock Grassland of *Triodia* sp. Shovelanna Hill (S.van Leeuwen 3835), *Triodia angusta* and *Triodia epactia* with Scattered Shrubs of *Acacia tenuissima*, *Acacia melleodora* and *Eremophila cuneifolia* with Scattered Low Trees of *Acacia aptaneura* and *Acacia pruinocarpa*

Area Mapped: 57.45 ha (1.16 % of the study area)

ID of quadrats sampled: WHN_01

Location + Landform

North west corner of the study area adjacent to OB 31 boundary. Hillslope.

Vegetation Stratum Levels

Tallest tree sub-stratum *Acacia aptaneura* and Gidgee (*Acacia pruinocarpa*).

Tallest Shrub Layer *Acacia tenuissima*, *Acacia melleodora*, *Senna glutinosa* subsp. *glutinosa*, Kurara (*Acacia tetragonophylla*), *Acacia wanyu* and *Eremophila cuneifolia*.

Next Shrub Layer Flannel Bush (*Solanum lasiophyllum*), *Senna stricta*, Satiny Bluebush (*Maireana georgei*), *Maireana tomentosa* subsp. *tomentosa*, Pussy Bluebush (*Maireana melanocoma*) and Currant Bush (*Scaevola spinescens*).

Tallest Ground Species *Triodia angusta*, *Triodia* sp. Shovelanna Hill (S.van Leeuwen 3835), *Triodia epactia*, *Themeda triandra*, Silkyheads (*Cymbopogon obtectus*) Feathertop Threeawn (*Aristida inaequiglumis*) and Weeping Mulla Mulla (*Ptilotus calostachyus*).

Other Ground Species Wiry Nineawn (*Enneapogon lindleyanus*), *Amphipogon sericeus*, Mountain Wanderrie Grass (*Eriachne mucronata*), Tall Mulla Mulla (*Ptilotus exaltatus*) and *Gomphrena kanisii*.

Vegetation Condition **Excellent.** Occasional presence of Purslane (*Portulaca oleracea*).

Geology **Mount McRae Shale and Mount Sylvia Formation.** This formation is typified by interbedded shale, chert and banded ironstone (after Williams and Tyler, 1991).

Soil Attributes Red sandy clay loam.

Other Locations

This vegetation community appears atypical as it has been affected by fire and it is close to the plain therefore incorporating transitional taxa. However it occupied an area large enough to be mapped separately. Most similar vegetation association to this one is Orebody 18 East Upper Slopes to East (ENV, 2008)



5f Hummock Grassland of *Triodia lanigera* and *Triodia epactia* with High Open Shrubland of *Acacia bivenosa*, *Acacia ancistrocarpa* and *Acacia tenuissima* with Very Open Mallee of *Eucalyptus gamophylla*

Area Mapped: 91.35 ha (1.84 % of the study area)

ID of quadrats sampled: WHN_08 and WHN_72

Location + Landform

Located at the footslopes of smaller hills adjacent to large plain areas and at times on plains in small isolated patches or rivulets on the plain.

Vegetation Stratum Levels

Tallest tree sub-stratum	<i>Corymbia hamersleyana</i> .
Sub-canopy layer, second tree layer	Twin-leaf Mallee (<i>Eucalyptus gamophylla</i>)
Tallest Shrub Layer	<i>Acacia bivenosa</i> , Fitzroy Wattle (<i>Acacia ancistrocarpa</i>), <i>Acacia tenuissima</i> , <i>Acacia adsurgens</i> , <i>Acacia trudgeniana</i> and <i>Senna glutinosa</i> subsp. <i>glutinosa</i> .
Next Shrub Layer	<i>Acacia melleodora</i> , <i>Dodonaea coriacea</i> , Kurara (<i>Acacia tetragonophylla</i>), <i>Hibiscus brachychlaenus</i> .
ThirdShrub Layer	<i>Bonamia</i> sp. (indet), <i>Corchorus sidoides</i> subsp. <i>sidoides</i> , <i>Dicrastylis cordifolia</i> and <i>Hybanthus aurantiacus</i> .
Tallest Ground Species	<i>Triodia lanigera</i> , <i>Triodia epactia</i> , Feathertop Threeawn (<i>Aristida inaequiglumis</i>), Scentgrass (<i>Cymbopogon ambiguus</i>) and Weeping Mulla Mulla (<i>Ptilotus calostachyus</i>).
Other Ground Species	<i>Scaevola parvifolia</i> subsp. (indet), Northern Mulga Grass (<i>Paraneurachne muelleri</i>), <i>Aristida holathera</i> var. <i>holathera</i> , Buffel Grass (<i>Cenchrus ciliaris</i>), <i>Yakirra australiensis</i> var. <i>australiensis</i> , Woollybutt Grass (<i>Eragrostis eriopoda</i>) and <i>Gomphrena kanisii</i> .
Vegetation Condition	Very Good. Occasional presence of Buffel Grass (* <i>Cenchrus ciliaris</i>)
Geology	Colluvium and Minor Alluvium containing silt, sand, and small rock fragments as well as Jeerinah Formation which is characterised by interbedded shale, chert, sandstone and minor felsic tuff. (after Williams and Tyler, 1991).
Soil Attributes	Orange silty loam.

Other Locations

Commonly found at the base or footslopes of low hills transitioning into plain areas, similar vegetation type was described at Wheelarra Hill 3 (Vegetation Type 4, (Biota, 2004)) and Mesa Gap (Vegetation Association 6, (GHD, 2008)).



5g Hummock Grassland of *Triodia epactia*, *Triodia brizoides* and *Triodia* sp. Shovelanna Hill (S.van Leeuwen 3835), with Low Open Woodland of *Acacia aptaneura*, *Eucalyptus leucophloia* subsp. *leucophloia* and *Acacia pruinocarpa* over Scattered Shrubs of *Acacia tetragonophylla*, *Scaevola acacioides* and *Acacia wanyu*

Area Mapped: 184.91 ha (3.72 % of the study area)

ID of quadrats sampled: WHN_49, WHN_53, WHN_54, WHN_60, WHN_62, WHN_R4, WHN_R14 and WHN_R15

Location + Landform

This vegetation association is found to the south west of the study area on hillslopes of high hills and ridges.

Vegetation Stratum Levels

Tallest tree sub-stratum	<i>Eucalyptus leucophloia</i> subsp. <i>leucophloia</i> , <i>Acacia aptaneura</i> , <i>Corymbia hamersleyana</i> and <i>Acacia</i> ? <i>pteraneura</i> (hybrid?).
Sub-canopy layer, second tree layer	Gidgee (<i>Acacia pruinocarpa</i>), <i>Acacia catenulata</i> subsp. <i>occidentalis</i> and Twin-leaf Mallee (<i>Eucalyptus gamophylla</i>)
Tallest Shrub Layer	Kurara (<i>Acacia tetragonophylla</i>), <i>Acacia synchronicia</i> , <i>Acacia wanyu</i> , <i>Scaevola acacioides</i> , <i>Acacia bivenosa</i> , <i>Psydrax suaveolens</i> and <i>Eremophila fraseri</i> subsp. <i>fraseri</i>
Next Shrub Layer	<i>Senna glutinosa</i> subsp. <i>glutinosa</i> , Yellow-flowered Rulingia (<i>Rulingia luteiflora</i>), <i>Dodonaea pachyneura</i> , Cotton Bush (<i>Ptilotus obovatus</i>), Maitland's Wattle (<i>Acacia maitlandii</i>) and <i>Eremophila latrobei</i> subsp. <i>latrobei</i>
ThirdShrub Layer	<i>Senna stricta</i> , <i>Sida echinocarpa</i> , <i>Senna artemisioides</i> subsp. <i>oligophylla</i> , Pussy Bluebush (<i>Maireana melanocoma</i>) and <i>Indigofera monophylla</i> .
Tallest Ground Species	<i>Triodia epactia</i> , <i>Triodia</i> sp. Shovelanna Hill (S.van Leeuwen 3835), <i>Triodia brizoides</i> , Scentgrass (<i>Cymbopogon ambiguus</i>).
Other Ground Species	Mountain Wanderrie Grass (<i>Eriachne mucronata</i>), Bunched Kerosene Grass (<i>Aristida contorta</i>), Desert Spurge (<i>Euphorbia tannensis</i> subsp. <i>eremophila</i>), Clements Paspalidium (<i>Paspalidium clementii</i>) and <i>Bulbostylis barbata</i> .
Vegetation Condition	Excellent to Pristine.
Geology	Predominantly located on Weeli Wolli Formation that is associated with breakaway ridges and high hills. Other sites are located on Brockman Iron Formation (characterised by banded iron, chert and shale) and Boolgeda Iron Formation which is associated with hilly terrain, consisting of fine grained, finely laminated, dark grey to black flaggy iron formation, minor chert and jasperlite shale
Soil Attributes	Red to orange silty loam to loamy sand

Other Locations

Similar combination of dominant species is not common in the surrounding areas, however examples of similar vegetation association were previously recorded for Hashimoto (ecologia, 2007) for the Rocky Range Slopes *Acacia aneura* Woodland.



5h Hummock Grassland of *Triodia* sp. Shovelanna Hill (S.van Leeuwen 3835), *Triodia epactia* and *Triodia brizoides* with High Open Shrubland of *Acacia bivenosa* and *Acacia tetragonophylla* with Scattered Low Trees of *Eucalyptus leucophloia* subsp. *leucophloia* and *Acacia aptaneura*

Area Mapped: 401.73 ha (8.08 % of the study area)

ID of quadrats sampled: WHN_04, WHN_46, WHN_56, WHN_61, WHN_68 and WHN_R2

Location + Landform

Located on hillslopes and hillcrests of medium sized hills, this vegetation association is found in the centre of the western portion of the study area.

Vegetation Stratum Levels

Tallest tree sub-stratum	<i>Eucalyptus leucophloia</i> subsp. <i>leucophloia</i> , <i>Acacia aptaneura</i> and Gidgee (<i>Acacia pruinocarpa</i>).
Tallest Shrub Layer	<i>Acacia bivenosa</i> , Kurara (<i>Acacia tetragonophylla</i>), Maitland's Wattle (<i>Acacia maitlandii</i>), <i>Eremophila latrobei</i> subsp. <i>latrobei</i> and <i>Grevillea wickhamii</i> subsp. <i>aprica</i> .
Next Shrub Layer	<i>Scaevola acacioides</i> , <i>Senna glutinosa</i> subsp. <i>pruinosa</i> , <i>Dodonaea pachyneura</i> , <i>Acacia pachyacra</i> and Fitzroy Wattle (<i>Acacia ancistrocarpa</i>).
Third Shrub Layer	Satiny Bluebush (<i>Maireana georgei</i>), Pinyuru (<i>Eremophila cuneifolia</i>), <i>Acacia melleodora</i> , <i>Solanum phlomoides</i> and <i>Indigofera monophylla</i>
Tallest Ground Species	<i>Triodia epactia</i> , <i>Triodia</i> sp. Shovelanna Hill (S.van Leeuwen 3835), <i>Triodia brizoides</i> and Scentgrass (<i>Cymbopogon ambiguus</i>).
Other Ground Species	Clements Paspalidium (<i>Paspalidium clementii</i>), Mountain Wanderrie Grass (<i>Eriachne mucronata</i>), <i>Aristida holathera</i> var. <i>holathera</i> and <i>Eriachne pulchella</i> subsp. <i>dominii</i> .
Vegetation Condition	Excellent to Pristine. Few fire affected areas.
Geology	Marra Mamba Iron Formation which is characterised ferruginous chert and minor shale on low hills and rises and Woongarra Volcanics commonly comprising of jaspilitic iron formation (after Williams and Tyler, 1991).
Soil Attributes	Red loamy sand to sandy clay loam.

Other Locations

Similar vegetation association was recorded for the adjacent Jimblebar Lease by Outback Ecology (2010); Vegetation association 10d.



6 *Triodia* Open Hummock Grassland

6a Open Hummock Grassland of *Triodia* sp. Shovelanna Hill (S.van Leeuwen 3835) with Low Open Shrubland of *Halgania solanacea* var. Mt Doreen (G.M. Chippendale 4206), *Gompholobium* sp. Pilbara (N.F. Norris 908) and *Acacia adoxa* var. *adoxoidea*

Area Mapped: 353.83ha (7.12 % of the study area)

ID of quadrats sampled: WHN_21, WHN_32, WHN_34, WHN_38, WHN_42 and WHN_R12

Location + Landform

Hillslopes and hillcrests at the centre west of the study area.

Vegetation Stratum Levels

Tallest tree sub-stratum *Eucalyptus leucophloia* subsp. *leucophloia* and Gidgee (*Acacia pruinocarpa*) and *Acacia ? pteraneura* (hybrid?).

Tallest Shrub Layer *Grevillea wickhamii* subsp. (indet), *Hakea lorea* subsp. *lorea*, *Senna glutinosa* subsp. *glutinosa* and *Acacia pachyacra*.

Next Shrub Layer *Senna glutinosa* subsp. *pruinosa*, Prince of Wales Feather (*Ptilotus rotundifolius*), *Sida arenicola*, *Grevillea ? berryana*, *Acacia melleodora* and *Tribulus suberosus*.

Third Shrub Layer *Acacia hilliana*, *Gompholobium* sp. Pilbara (N.F. Norris 908), *Acacia adoxa* var. *adoxoidea*, *Halgania solanacea* var. Mt Doreen (G.M. Chippendale 4206), *Calytrix carinata*, *Keraudrenia* sp. (indet) and *Sida* sp. *Excedentifolia* (J.L. Egan 1925)

Tallest Ground Species *Triodia* sp. Shovelanna Hill (S.van Leeuwen 3835), Scentgrass (*Cymbopogon ambiguus*) Northern Mulga Grass (*Paraneurachne muelleri*), Weeping Mulla Mulla (*Ptilotus calostachyus*) and Woollybutt Grass (*Eragrostis eriopoda*).

Other Ground Species *Eriachne lanata*, *Fimbristylis simulans*, *Amphipogon sericeus*, Mountain Wanderrie Grass (*Eriachne mucronata*), Senale Redgrass (*Schizachyrium fragile*) and *Goodenia ramelii*.

Vegetation Condition Excellent. Evidence of fire (in 2000 and 2007) and drill tracks and pads in the area,

Geology **Boolgeda Iron Formation** which typically consists of fine grained, finely laminated, dark grey to black flaggy iron formation, minor chert and Jasperlite shale (after Williams and Tyler, 1991).

Soil Attributes Red sandy to silty loam.

Other Locations

Similar to Vegetation Association 5c in the study area, but affected by fire, this vegetation assemblage shows a high similarity in dominant species diversity.

Locally, Mesa Gap study Vegetation Association 5, (GHD, 2008). Orebody 31 Vegetation Association 10d (Syrinx, 2011a) and Vegetation Association 10a (Outback Ecology, 2010) are most similar.



6b Open Hummock Grassland of *Triodia epactia* and *Triodia* sp. Shovelanna Hill (S.van Leeuwen 3835) with Low Open Shrubland of *Senna glutinosa* subsp. *pruinosa*, *Acacia synchronicia* and *Eremophila cuneifolia*

Area Mapped: 26.11ha (0.53 % of the study area)

ID of quadrats sampled: WHN_36

Location + Landform

Adjacent to the centre eastern site boundary this association is found on steep hillslopes.

Vegetation Stratum Levels

Tallest tree sub-stratum	<i>Acacia ? pteraneura</i> (hybrid?).
Tallest Shrub Layer	<i>Senna glutinosa</i> subsp. <i>pruinosa</i> , <i>Acacia synchronicia</i> , Cotton Bush (<i>Ptilotus obovatus</i>), Thorny Saltbush (<i>Rhagodia eremaea</i>).
Next Shrub Layer	Pinyuru (<i>Eremophila cuneifolia</i>), Threewinged Bluebush (<i>Maireana triptera</i>), <i>Indigofera monophylla</i> , <i>Hibiscus sturtii</i> var. <i>campylochlamys</i> , Flannel Bush (<i>Solanum lasiophyllum</i>), <i>Corchorus lasiocarpus</i> subsp. <i>lasiocarpus</i> and Kurara (<i>Acacia tetragonophylla</i>), <i>Dodonaea pachyneura</i> and <i>Sida arenicola</i> .
Tallest Ground Species	<i>Triodia epactia</i> , <i>Triodia</i> sp. Shovelanna Hill (S.van Leeuwen 3835), Tall Mulla Mulla (<i>Ptilotus exaltatus</i>) and Silkyheads (<i>Cymbopogon obtectus</i>)
Other Ground Species	<i>Amphipogon sericeus</i> , Buffel Grass (<i>Cenchrus ciliaris</i>), Northern Mulga Grass (<i>Paraneurachne muelleri</i>), <i>Aristida holathera</i> var. <i>holathera</i> , Leafy Nineawn (<i>Enneapogon polyphyllus</i>) and <i>Gomphrena kanisii</i> .
Vegetation Condition	Good. Presence of Buffel Grass (* <i>Cenchrus ciliaris</i>) in relatively high density. Close to <i>C. ciliaris</i> infested creek banks.
Geology	Boolgeda Iron Formation which typically consists of fine grained, finely laminated, dark grey to black flaggy iron formation, minor chert and jasperlite shale (after Williams and Tyler, 1991).
Soil Attributes	Red sand.

Other Locations

Affected by fires in 2000 and 2007, this vegetation community is highly modified and therefore does not match up easily with vegetation associations recorded previously for the adjacent areas.

This vegetation type is most probably vegetation Association 2c on site, transitioning to upper slopes.



6c Open Hummock Grassland of *Triodia epactia* and *Triodia angusta* with Scattered Mallees of *Eucalyptus socialis* subsp. *eucentrica* over Scattered Shrubs of *Acacia bivenosa*

Area Mapped: 2.24 ha (0.05 % of the study area)

ID of quadrats sampled: WHN_19

Location + Landform

Located on small outcrops or mounds of calcrete near drainage line to the north east of the study area.

Vegetation Stratum Levels

Tallest tree sub-stratum	<i>Eucalyptus socialis</i> subsp. <i>eucentrica</i> .
Tallest Shrub Layer	<i>Acacia bivenosa</i> , <i>Sida arenicola</i> , <i>Senna glutinosa</i> subsp. <i>glutinosa</i> and <i>Acacia adsurgens</i> .
Next Shrub Layer	<i>Scaevola amblyanthera</i> var. <i>centralis</i> , <i>Halgania solanacea</i> var. Mt Doreen (G.M. Chippendale 4206), <i>Senna</i> sp. Meekatharra (E. Bailey 1-26) and <i>Senna glutinosa</i> subsp. <i>pruinosa</i> .
Tallest Ground Species	<i>Triodia epactia</i> , <i>Triodia angusta</i> , Tall Mulla Mulla (<i>Ptilotus exaltatus</i>) and Mountain Wanderrie Grass (<i>Eriachne mucronata</i>).
Other Ground Species	Wiry Nineawn (<i>Enneapogon lindleyanus</i>), Tassel Top (<i>Ptilotus clementii</i>), <i>Salsola ? australis</i> and <i>Amphipogon sericeus</i> .
Vegetation Condition	Excellent. Evidence of fire and presence of Purslane (<i>Portulaca oleracea</i>).
Geology	Calcrete. This formation is characterised by carbonate in sheets and lenses and is usually found in or near major drainage lines (after Williams and Tyler, 1991).
Soil Attributes	Pale sandy clay loam with calcrete rocks.

Other Locations

This vegetation association was not previously recorded in the adjacent BHP mining leases. The dominant or indicator species for this assemblage is *Eucalyptus socialis* subsp. *eucentrica* which occurs throughout south eastern Pilbara in the same type of habitat and with very similar co-dominant species. Nearest occurrences of this type of association are within a 20km radius from the study site.



6d Open Hummock Grassland of *Triodia* sp. Shovelanna Hill (S.van Leeuwen 3835), *Triodia epactia* and *Triodia brizoides* with Low Open Woodland of *Acacia aptaneura*, *Acacia ? pteraneura* (hybrid?) and *Acacia rhodophloia* over Open Shrubland of *Acacia tetragonophylla*, *Acacia adsurgens* and *Senna glutinosa* subsp. *glutinosa*

Area Mapped: 252.13 ha (5.07 % of the study area)

ID of quadrats sampled: WHN_23, WHN_27, WHN_28, WHN_30, WHN_35, WHN_R3, WHN_R9 and WHN_R10.

Location + Landform

Located at the south east extent of the study area this vegetation association is found on hillslopes of high hills and breakaway ridges.

Vegetation Stratum Levels

Tallest tree sub-stratum	<i>Eucalyptus leucophloia</i> subsp. <i>leucophloia</i> , <i>Acacia aptaneura</i> and <i>Acacia rhodophloia</i> .
Sub-canopy layer, second tree layer	Gidgee (<i>Acacia pruinocarpa</i>) and <i>Acacia ? pteraneura</i> (hybrid?)
Tallest Shrub Layer	Bastard mulga (<i>Acacia sibirica</i>), <i>Senna glutinosa</i> subsp. <i>pruinosa</i> , Kurara (<i>Acacia tetragonophylla</i>), <i>Acacia wanyu</i> , <i>Senna glutinosa</i> subsp. <i>glutinosa</i> and <i>Acacia adsurgens</i> .
Next Shrub Layer	Cotton Bush (<i>Ptilotus obovatus</i>), Pinyuru (<i>Eremophila cuneifolia</i>), <i>Scaevola acacioides</i> and <i>Tribulus suberosus</i> .
Third Shrub Layer	<i>Sida echinocarpa</i> , <i>Senna stricta</i> , Satiny Bluebush (<i>Maireana georgei</i>), <i>Corchorus lasiocarpus</i> subsp. <i>lasiocarpus</i> and <i>Solanum phlomoides</i> .
Tallest Ground Species	<i>Triodia epactia</i> , <i>Triodia</i> sp. Shovelanna Hill (S.van Leeuwen 3835), <i>Triodia brizoides</i> , Scentgrass (<i>Cymbopogon ambiguus</i>) and Weeping Mulla Mulla (<i>Ptilotus calostachyus</i>).
Other Ground Species	Clements Paspalidium (<i>Paspalidium clementii</i>), Limestone Grass (<i>Enneapogon caerulescens</i>), Mountain Wanderie Grass (<i>Eriachne mucronata</i>), Bunched Kerosene Grass (<i>Aristida contorta</i>), <i>Eriachne pulchella</i> subsp. <i>dominii</i> and <i>Bulbostylis barbata</i> .
Vegetation Condition	Excellent. Evidence of fire for most of the vegetation association with few unburnt patches. Presence of weeds such as Purslane (<i>Portulaca oleracea</i>) and Buffel Grass (<i>Cenchrus ciliaris</i>).
Geology	Weeli Wolli Formation which is associated with breakaway ridges and high hills of interlayered banded iron and Woongarra Volcanics commonly comprising of jaspilitic iron formation (after Williams and Tyler, 1991).
Soil Attributes	Red sandy clay loam.

Other Locations

Presence of *Acacia rhodophloia* is the main indicator of this vegetation association. Similar vegetation assemblage was recorded by ecologia (2007) for Hashimoto and Biota (2004) for Wheelarra Hill 3 mining leases for “Rocky Range Slopes”. The dominance of the upper strata is low due to effects of fire.



6e Open Hummock Grassland of *Triodia* sp. Shovelanna Hill (S.van Leeuwen 3835) and *Triodia epactia* with Low Open Shrubland of *Acacia hilliiana*, *Sida* sp. *excedentifolia* (J.L. Egan 1925) and *Senna glutinosa* subsp. *pruinosa* with Scattered Trees of *Eucalyptus leucophloia* subsp. *leucophloia*

Area Mapped: 98.64 ha (1.98 % of the study area)

ID of quadrats sampled: WHN_11

Location + Landform

This vegetation association is found at the south east corner of the study area and is associated with hillslopes and hillcrests of high hills.

Vegetation Stratum Levels

Tallest tree sub-stratum	<i>Eucalyptus leucophloia</i> subsp. <i>leucophloia</i> and Gidgee (<i>Acacia pruinocarpa</i>).
Tallest Shrub Layer	<i>Grevillea wickhamii</i> subsp. <i>aprica</i> , <i>Senna glutinosa</i> subsp. <i>pruinosa</i> and <i>Senna glutinosa</i> subsp. <i>glutinosa</i> .
Next Shrub Layer	<i>Acacia hilliiana</i> , <i>Sida</i> sp. <i>excedentifolia</i> (J.L. Egan 1925), <i>Acacia adoxa</i> var. <i>adoxo</i> , <i>Corchorus lasiocarpus</i> subsp. <i>lasiocarpus</i> and <i>Gompholobium</i> sp. Pilbara (N.F. Norris 908)
Tallest Ground Species	<i>Triodia epactia</i> , <i>Triodia</i> sp. Shovelanna Hill (S.van Leeuwen 3835), Scentgrass (<i>Cymbopogon ambiguus</i>), <i>Goodenia stobbsiana</i> and Feathertop Threeawn (<i>Aristida inaequiglumis</i>)
Other Ground Species	Woollybutt Grass (<i>Eragrostis eriopoda</i>), Clements Paspalidium (<i>Paspalidium clementii</i>), <i>Fimbristylis simulans</i> and <i>Goodenia ramelii</i> .
Vegetation Condition	Excellent. Evidence of fire.
Geology	Weeli Wollie Formation which is associated with breakaway ridges and high hills of interlayered banded iron (after Williams and Tyler, 1991).
Soil Attributes	Red sandy clay loam.

Other Locations

This vegetation association is the result of fire modification – it is most similar to vegetation association 5c on site which is also found in most surrounding tenements and is common in the eastern Pilbara.



6f Open Hummock Grassland of *Triodia brizoides* and *Triodia epactia* with Low Open Shrubland of *Eremophila fraseri* subsp. *fraseri*, *Senna artemisioides* subsp. *oligophylla* and *Senna artemisioides* subsp. *helmsii*

Area Mapped: 192.45 ha (3.87 % of the study area)

ID of quadrats sampled: WHN_43, WHN_63, WHN_64 and WHN_70.

Location + Landform

This vegetation association is found on footslopes of .medium sized hills in the western section of the study area.

Vegetation Stratum Levels

Tallest Shrub Layer	<i>Hakea lorea</i> subsp. <i>lorea</i> , <i>Senna glutinosa</i> subsp. <i>x luerssenii</i> , Fitzroy Wattle (<i>Acacia ancistrocarpa</i>), Bastard mulga (<i>Acacia sibirica</i>) and <i>Hakea chordophylla</i>
Next Shrub Layer	<i>Eremophila fraseri</i> subsp. <i>fraseri</i> , <i>Senna artemisioides</i> subsp. <i>oligophylla</i> , <i>Senna artemisioides</i> subsp. <i>helmsii</i> , <i>Tribulus suberosus</i> and <i>Acacia adsurgens</i> .
Third Shrub Layer	<i>Ptilotus astrolasius</i> , <i>Corchorus lasiocarpus</i> subsp. <i>lasiocarpus</i> , Potato Bush (<i>Solanum ellipticum</i>), <i>Tephrosia</i> aff. <i>sphaerospora</i> and <i>Indigofera monophylla</i> .
Tallest Ground Species	<i>Triodia epactia</i> , <i>Triodia brizoides</i> , <i>Triodia</i> sp. Shovelanna Hill (S.van Leeuwen 3835), Scentgrass (<i>Cymbopogon ambiguus</i>), Tall Mulla Mulla (<i>Ptilotus exaltatus</i>) and Weeping Mulla Mulla (<i>Ptilotus calostachyus</i>)
Other Ground Species	Bunched Kerosene Grass (<i>Aristida contorta</i>), Northern Mulga Grass (<i>Paraneurachne muelleri</i>), Wiry Nineawn (<i>Enneapogon lindleyanus</i>), <i>Goodenia muelleriana</i> , <i>Salsola ? australis</i> , Hairy Mulla Mulla (<i>Ptilotus helipteroides</i>) and <i>Ptilotus auriculifolius</i> .
Vegetation Condition	Excellent. Presence of Purslane (<i>Portulaca oleracea</i>) for most of the association,
Geology	Predominantly on Colluvium and Minor Alluvium associated with grassy plains typically containing silt, sand, and small rock fragments. Alluvium which is associated with wide drainage tracts and channels receiving more concentrated flow. The formation is characterised by deposits of silt, sand and gravel which are typical of floodplains and drainage channels in the region, and in small part Calcrete which is characterised by carbonate in sheets and lenses (after Williams and Tyler, 1991).
Soil Attributes	Red loamy sand.

Other Locations

Typified by *Eremophila fraseri* subsp. *fraseri* presence of Similar vegetation association was recorded at West Jimblebar Exploration Lease (WNV, 2007c).



7 *Triodia* Very Open Hummock Grassland

7a Very Open Hummock Grassland of *Triodia lanigera* and *Triodia* sp. Shovelanna Hill (S.van Leeuwen 3835) with Scattered Shrubs of *Grevillea wickhamii* subsp. (indet), *Acacia ancistrocarpa* and *Hakea lorea* subsp. *lorea* with Scattered Trees of *Corymbia hamersleyana*

Area Mapped: 368.66 ha (7.41 % of the study area)

ID of quadrats sampled: WHN_16 and WHN_18

Location + Landform

Located on the large plain in the north east section of the study area.

Vegetation Stratum Levels

Tallest tree sub-stratum	<i>Corymbia hamersleyana</i> .
Tallest Shrub Layer	<i>Acacia bivenosa</i> , <i>Hakea lorea</i> subsp. <i>lorea</i> and <i>Grevillea wickhamii</i> subsp. (indet)
Next Shrub Layer	<i>Acacia trudgeniana</i> , Fitzroy Wattle (<i>Acacia ancistrocarpa</i>), <i>Senna glutinosa</i> subsp. <i>glutinosa</i> and <i>Sida arenicola</i> .
Third Shrub Layer	<i>Kennedia prorepens</i> , <i>Bonamia</i> sp. (indet), <i>Hybanthus aurantiacus</i> , Thargomindah Nightshade (<i>Solanum sturtianum</i>), <i>Sida cardiophylla</i> and <i>Dicrasyllis cordifolia</i> .
Tallest Ground Species	<i>Triodia lanigera</i> , <i>Triodia</i> sp. Shovelanna Hill (S.van Leeuwen 3835), Northern Mulga Grass (<i>Paraneurachne muelleri</i>) and Silkyheads (<i>Cymbopogon obtectus</i>).
Other Ground Species	<i>Aristida holathera</i> var. <i>holathera</i> , <i>Amphipogon sericeus</i> , <i>Goodenia ramelii</i> , Rat's Tail (<i>Dysphania kalpari</i>) and <i>Yakirra australiensis</i> var. <i>australiensis</i> .
Vegetation Condition	Very Good. Presence of Buffel Grass (<i>Cenchrus ciliaris</i>) adjacent to the drainage channels and the Jimblebar Creek and Purslane (<i>Portulaca oleracea</i>) in patches throughout the extent of this vegetation association.
Geology	Colluvium and Minor Alluvium contains silt, sand, and small rock fragments (after Williams and Tyler, 1991).
Soil Attributes	Red sandy loam.

Other Locations

Affected by fire in 2007, this vegetation association is closely related to Vegetation Association 5d on site. Similar vegetation assemblages have been previously recorded at the Orebody 31 (Syrinx, 2011a) as Vegetation Association 11b, Orebody 18 (ENV, 2008) as part of "Flood Plains" and Hashimoto, (ecologia, 2007 as "Valley Plains".



8 Mixed Tussock Grassland

8a Tussock Grassland of *Eulalia aurea*, *Themeda triandra* and *Aristida inaequiglumis* with Low Open Woodland of *Corymbia hamersleyana*, *Acacia aptaneura* and *Acacia citrinoviridis* over Open Shrubland of *Acacia ancistrocarpa*, *Gossypium robinsonii* and *Acacia pyrifolia*

Area Mapped: 181.61ha (3.65 % of the study area)

ID of quadrats sampled: OB_11, WHN_14, WHN_73 and WHN_R8

Location + Landform

Associated with the floodout areas and banks of large drainage channels (drainage depressions) this vegetation association is located in the eastern section of the study area.

Vegetation Stratum Levels

Tallest tree sub-stratum	<i>Corymbia hamersleyana</i> .
Sub-canopy layer, second tree layer	<i>Acacia citrinoviridis</i> and <i>Acacia aptaneura</i> .
Tallest Shrub Layer	Fitzroy Wattle (<i>Acacia ancistrocarpa</i>), Ranji Bush (<i>Acacia pyrifolia</i>), Maitland's Wattle (<i>Acacia maitlandii</i>), Gawar (<i>Acacia monticola</i>), <i>Acacia tenuissima</i> and Wild Cotton (<i>Gossypium robinsonii</i>).
Next Shrub Layer	<i>Acacia sclerosperma</i> subsp. <i>sclerosperma</i> , <i>Abutilon macrum</i> , <i>Bonamia</i> sp. (indet), <i>Melhania oblongifolia</i> and <i>Triumfetta leptacantha</i> .
Tallest Ground Species	<i>Triodia epactia</i> , Golden Beard Grass (<i>Chrysopogon fallax</i>), <i>Themeda triandra</i> and Tall Mulla Mulla (<i>Ptilotus exaltatus</i>).
Other Ground Species	<i>Eulalia aurea</i> , <i>Themeda triandra</i> , Feathertop Threeawn (<i>Aristida inaequiglumis</i>) Buffel Grass (<i>Cenchrus ciliaris</i>), <i>Triodia</i> sp. Shovelanna Hill (S.van Leeuwen 3835), <i>Aristida holathera</i> var. <i>holathera</i> and Tickweed (<i>Cleome viscosa</i>).
Vegetation Condition	Very Good - Good. Prominent presence of Buffel Grass (<i>Cenchrus ciliaris</i>), on the banks of the large drainage channels at times occupying up to 70% of ground cover particularly near Jimplebar Creek.
Geology	Alluvium- This formation is characterised by deposits of silt, sand and gravel which are typical of floodplains and drainage channels in the region (after Williams and Tyler, 1991).
Soil Attributes	Brown silty clay loam.

Other Locations

This vegetation is commonly found along ephemeral watercourses and similar vegetation associations have been previously recorded by Outback Ecology (2010) for Jimplebar lease (Association 3a) and (syrinx, 2011a) for Orebody 31 (Association 11a)



9 Mixed Open Tussock Grassland

9a Open Tussock Grassland of *Themeda triandra*, *Aristida inaequiglumis* and *Aristida contorta* with Open Shrubland of *Acacia monticola*, *Acacia ancistrocarpa* and *Grevillea wickhamii* subsp. *aprica* with Scattered Low Trees of *Corymbia hamersleyana*

Area Mapped: 122.85 ha (2.47 % of the study area)

ID of quadrats sampled: WHN_10, WHN_65 and WHN_71

Location + Landform

This vegetation association is located on the plain in the north west portion of the study area.

Vegetation Stratum Levels

Tallest tree sub-stratum	<i>Corymbia hamersleyana</i> .
Sub-canopy layer, second tree layer	<i>Acacia aptaneura</i> , <i>Acacia citrinoviridis</i> and <i>Acacia ? pteraneura</i> (hybrid?)
Sub-canopy layer, third tree layer	Twin-leaf Mallee (<i>Eucalyptus gamophylla</i>)
Tallest Shrub Layer	Fitzroy Wattle (<i>Acacia ancistrocarpa</i>), Gawar (<i>Acacia monticola</i>), <i>Acacia adsurgens</i> , <i>Acacia elachantha</i> , Wild Cotton (<i>Gossypium robinsonii</i>), <i>Grevillea wickhamii</i> subsp. <i>aprica</i> , <i>Acacia bivenosa</i> , <i>Hakea lorea</i> subsp. <i>lorea</i> and Northern Sandalwood (<i>Santalum lanceolatum</i>).
Next Shrub Layer	<i>Acacia melleodora</i> , <i>Senna artemisioides</i> subsp. <i>oligophylla</i> , Cotton Bush (<i>Ptilotus obovatus</i>), Ranji Bush (<i>Acacia pyrifolia</i>), Poison Sage (<i>Isotropis atropurpurea</i>), Thargomindah Nightshade (<i>Solanum sturtianum</i>), Kurara (<i>Acacia tetragonophylla</i>).
Third Shrub Layer	<i>Corchorus sidoides</i> subsp. <i>sidoides</i> , <i>Bonamia</i> sp. (indet), <i>Hybanthus aurantiacus</i> , <i>Hibiscus sturtii</i> var. <i>platyklamys</i> , Silver Sida (<i>Sida fibulifera</i>) and <i>Sida echinocarpa</i> .
Tallest Ground Species	Feathertop Threeawn (<i>Aristida inaequiglumis</i>), <i>Themeda triandra</i> , Golden Beard Grass (<i>Chrysopogon fallax</i>), <i>Triodia lanigera</i> , <i>Eulalia aurea</i> and <i>Triodia epactia</i> .
Other Ground Species	Woollybutt Grass (<i>Eragrostis eriopoda</i>), <i>Aristida holathera</i> var. <i>holathera</i> , Bunched Kerosene Grass (<i>Aristida contorta</i>), Tall Mulla Mulla (<i>Ptilotus exaltatus</i>) and Northern Mulga Grass (<i>Paraneurachne muelleri</i>).
Vegetation Condition	Excellent. Evidence of fire and weeds such as Buffel Grass (<i>Cenchrus ciliaris</i>) and Purslane (<i>Portulaca oleracea</i>).
Geology	Colluvium and Minor Alluvium which typically contains silt, sand, and small rock fragments. Alluvium is characterised by deposits of silt, (after Williams and Tyler, 1991).
Soil Attributes	Red sandy loam.

Other Locations

Similar vegetation associations to this one have been recorded previously at Orebody 31 as Vegetation Association 12a (Syrinx, 2011a), Mesa Gap (Vegetation Association 6), (GHD, 2008) and possibly "Moderately deep red/orange loam sand on Flood Plains" vegetation assemblage at Orebody 18 (ENV, 2008).



11.2.2 Vegetation Condition

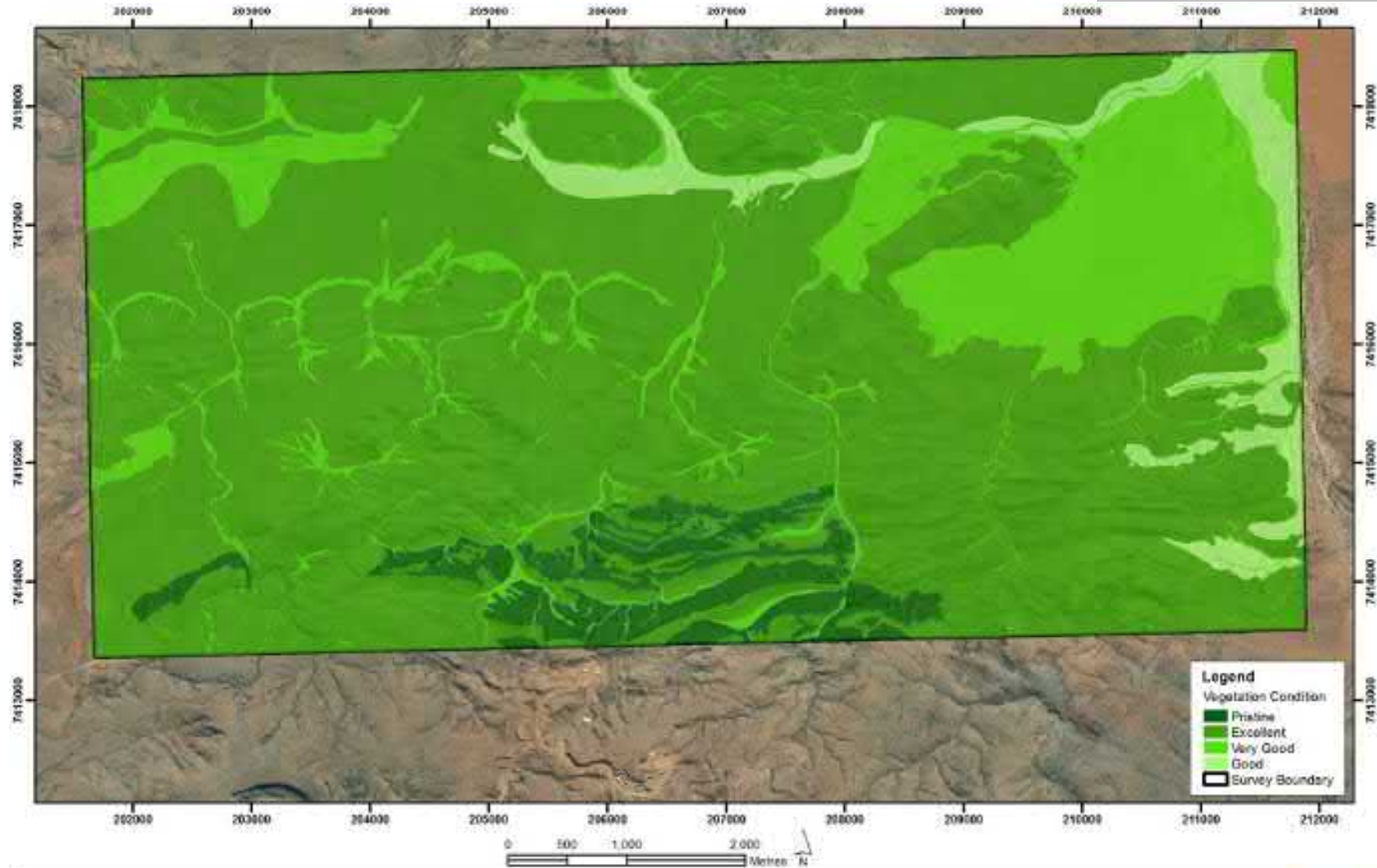
The vegetation condition across the study area ranges from Good to Pristine however the majority of the study area is in Very Good to Excellent condition (90% of the study area) (Figure 12). The decline in condition of vegetation to Good is due to the presence of weeds, tracks, grazing and animal movement.

The areas most affected by weeds were floodplains and drainage lines where **Cenchrus ciliaris* was present. Vegetation Association 1a and 8a were particularly affected with a high density of **Cenchrus ciliaris* recorded on the sandy seasonally moist banks of the Jimblebar Creek and the large drainage channel to the north west. The high infestation levels by **Cenchrus ciliaris* have contributed to ranking of this vegetation association as Good although the vegetation structure remains mostly intact. Overall, approximately 5.5% of the study area is affected by this species.

Another commonly found introduced flora species in the study area was **Portulaca oleracea*. This species occurred more widely than **Cenchrus ciliaris*, however in much lower densities. Most affected areas were stony plains with Mulga. The total area affected by this species is approximately 0.3% of the study area, however this coverage may increase in a good rainfall season. Syrinx has noted elsewhere that this species responds rapidly to high rainfall periods, and declines rapidly in dry periods.

11.2.3 Threatened Ecological Communities

A search of the DEC database and EPBC Protected Matters Database revealed no TECs or PECs within the study area; additionally none were recorded in this survey.



CLIENT: BHPBIO
PROJECT: Wheelarra Hill North Flora and Vegetation Survey
PROJECT NUMBER: 1032

DRAWING: Wheelarra Hill North Vegetation Condition
PROJECTION: GDA 1994 Zone 51

DATE: 26/8/2011
SCALE: 1 : 40,000
DRAWN BY: AH



Figure 12 Vegetation Condition for Wheelarra Hill North Study Area

PART 5 DISCUSSION

12.0 FLORA

The vegetation of the Wheelarra Hill North study area is considered to be regionally diverse, with 392 taxa from 49 families and 145 genera recorded within the boundaries of the study area. This species richness is higher than previously recorded for OB18 (276 taxa) (ENV, 2008), Mesa Gap (133 taxa) (GHD, 2008), Jimblebar mining lease (326 taxa) (Outback Ecology, 2010), OB31 (206 taxa) (Syrinx, 2011a) and the South West Jimblebar (202 taxa) (Syrinx, 2011b in prep.).

Taking into account the total size of the surveyed area, the variability of rainfall and the variety of landforms between sites, the species richness of Wheelarra Hill North compares well with that of the surrounding areas. The dominant genera at Wheelarra Hill North are also congruent with the surrounding sites, with the dominant genus being *Acacia* (40 taxa), followed by *Ptilotus* (16 taxa) and *Senna* (15 taxa). In comparison to other sites, the majority of taxa found at Wheelarra Hill North (over 91.8%) are found in the previously surveyed adjacent areas, suggesting no particular taxa is restricted to the Wheelarra Hill North study area.

As the study area represents a transition between the Hamersley subregion to the south and Fortescue Plains subregion to the north, the species diversity is typical of such transitional environments. The species diversity is also related to the varied landforms and geomorphology within the study area boundary.

According to the PATN analysis (Appendix 7) the species in the study area appear to not be restricted to or unique to one particular land system. However, field observations show that the distribution of species does reflect landform type and underlying geomorphology.

12.1 CONSERVATION SIGNIFICANT FLORA

No Threatened (DRF) listed flora under the WC Act or Threatened Flora listed under the EPBC Act were identified in the study area.

One potential Priority 1 flora species, *Aristida ? jerichoensis var. subspinulifera*, was found at four locations within the study area. This species has not been fully confirmed due to the poor description of variation within the species as a result of the low number of collections, however the likelihood of it being a priority species cannot be discounted, particularly as the specimens were found in the same habitat where two previously confirmed collections were taken as part of the Jimblebar Wheelarra Hill mining lease survey in 2010 (Outback Ecology, 2010). Priority 1 flora is considered by the DEC to be potentially rare or threatened and require further survey effort to assess their status.

Nine range extension flora were identified for the study area (*Sclerolaena minuta*, *Eragrostis olida*, *Oldenlandia galioides*, *Evolvulus alsinoides* var. *decumbens*, *Phyllanthus erwinii*, *Phyllanthus maderaspatensis*, *Cyperus ixiocarpus*, *Santalum spicatum* and *Abutilon cunninghamii*) and two possible range extensions (*Tephrosia* aff. *sphaerospora* and *Hibiscus* aff. *apodus*). Such a large number of range extent flora is possibly due to the varied habitats present on site, particularly habitats delineated by deeply incised gorges and gullies.

12.2 INTRODUCED FLORA

Overall, the majority of the vegetation within the Wheelarra Hill North study area boundary was in Very Good to Excellent condition. Localised areas such as creek lines, drainage channels and patches of Mulga on stony plains and footslopes of breakaway ridges and high hills were affected by weeds in some cases quite significantly, therefore reducing their condition rating to Good.

Wild fires, particularly the fire event of 2007, has most probably contributed to spread of weeds such as that of *Cenchrus ciliaris* on the sandy plains and floodout areas west of Jimblebar Creek. This form of weed spread has been observed in vegetation surveys throughout the Pilbara.

Cenchrus ciliaris is a relatively fire resistant species but has the ability to carry fire in areas where fire was not normally part of the ecosystem. Therefore, this particular species not only poses problems by out competing with native vegetation and decreasing biodiversity, it also increases the risk of fire in areas, such as large creeks and riverine systems that have a unique suite of species that are often not fire resistant.

Whilst the weed infestation on site is localised and in many instances sparse, weed management strategies should be developed and implemented to decrease or avoid the spread of weeds to new areas and possibly implement strategies to control already existing weed populations where feasible.

12.3 VEGETATION ASSOCIATIONS

A total of 25 vegetation associations that belong to nine broad floristic groups were identified for the study area. The classification analysis of the quadrat similarity matrix (i.e. PATN analysis) identified 23 groups of two or more quadrats and six ungrouped quadrats giving a total of 29 different vegetation groupings, which is slightly higher but comparable, to that presented in the final mapping of the area (25 associations).

This discrepancy and the failure of some quadrats to form vegetation association groups, can be explained by the fire history of the Wheelarra Hill North study area. Fires occurred most recently in 2000 (affecting the southern third of the study area), in 2001 (affecting the north west section of the study area), and in 2007 (affecting the eastern section of the study area, representing approximately 30% of the total study area). This means that some areas

were burnt three times in the last 10 years, resulting in a highly altered vegetation structure and absence of key indicator species that may have provided definitive evidence of the pre-fire vegetation association. This, together with uncertainty as to whether the current vegetation association represents a permanent shift from the pre-disturbance vegetation association, has resulted in a high number of vegetation associations described for the study area. The complexity of geological forms in this area also supports the notion that the higher number of vegetation associations in the field is likely.

Where vegetation associations in the study area were similar but affected by fire, the same colour shading was used for mapping, however hatching was used (for areas affected by fire) to delineate differences between associations (see Figure 10).

The comparison of vegetation associations present in the study area to those of previous studies vary mostly in the presence of dominant shrubland species and in some cases vegetation structure. Such differences may be a result of the study area location and the geological features of the area. Particular difficulties in mapping vegetation types arose from the presence of mosaic communities, such as those of plain areas (e.g. vegetation association 5c) where small stony rises and wide open depressions supported a variety of vegetation types. As these mosaic communities were too small to map individually, the vegetation association description incorporates these communities as one association.

Most of the vegetation associations recorded during the survey are similar to those of adjacent mining lease areas, in particular the Jimplebar lease, and are considered widespread throughout the south east Pilbara.

12.4 CONSERVATION STATUS

The significance of the flora occurring within the Wheelarra Hill North study area has been assessed at four spatial scales: National, State, Regional and Local.

Wheelarra Hill North is located at the transition between the Fortescue Plains and Hamersley subregions. It is characterised by geological features that support a variety of vegetation associations and the presence of flora that is typical of both subregions. The variety of land systems found in the study area as well as the associated landforms support a mosaic of vegetation communities with a high diversity of flora.

12.4.1 National Significance

National significance refers to those features of the environment which are recognised under legislation as being of importance to the Australian community. Communities scheduled under the Commonwealth EPBC Act are regarded as nationally significant.

No vegetation communities of national significance were identified in the Wheelarra Hill North study area.

12.4.2 State Significance

Those features of the environment that are recognised under State legislation as of importance to the Western Australian community are considered as “State significant” in particular, communities scheduled under the WC Act.

The presence of the potential Priority 1 species, *Aristida ? jerichoensis* var. *subspinulifera* is considered of State significance. This species was recorded outside the study area, at three locations, all found within a 30km radius from the study area (Sylvania station, Packsaddle Outcamp and East Angelas, (WAH, 2011)). It is possible that the extent of the distribution for this species is wider as similar habitats exist in the areas surrounding the site. However this species has not been surveyed extensively and most of the areas where suitable habitat occurs are under threat from mining activities.

No PECs or TECs were recorded in the study area and therefore any mining exploration within the boundary of the study area would not impact on any currently listed PECs or TECs.

12.4.3 Regional Significance

Regional significance refers to the representation of the species and vegetation assemblages within Wheelarra Hill North study area compared to the species and habitats in the greater bioregional area.

12.4.3.1 Flora

This survey did not reveal a high level of endemism of species as the majority of species found within the Wheelarra Hill North study area have been found previously in the surveyed adjacent areas, suggesting no particular species is restricted to the Wheelarra Hill North study area.

A single Priority species *Aristida ? jerichoensis* var. *subspinulifera* (P1) was recorded on the plains adjacent to the south west boundary of the study area. Given that this species is not yet well described and recorded habitats are few according to WAH records this species may be considered as regionally significant due to limited knowledge about its distribution and the fact that it was not found within an existing conservation reserve. In accordance with the BHPBIO Offsets study (BHPB, 2009), Priority 1 species are ranked to be of Level 2 (Major) conservation significance. As such the species should be protected from clearing where

possible, and in cases where the species will be affected by vegetation clearing activities, appropriate offsets should be provided.

Range extensions were recorded for nine species and possible range extensions for two species, three of which (*Sclerolaena minuta*, *Eragrostis olida* and *Oldenlandia galioides*) occur in specialised habitats, such as stony saddles or depressions with saline soils, or gorges and gullies, which are uncommon in the study area. No populations of *Sclerolaena minuta* were recorded for the Pilbara previously, with only one old record circa 1973, listed on FloraBase (2011) 300km south west of the study area. This species has not been previously collected in the surrounding tenements. Only one population of *Eragrostis olida* has been found within the Pilbara region (55km north-west of study area) previously, which also occurs in a mining tenement. *Oldenlandia galioides*, while more widespread, is 280km south east of the nearest population near Tom Price. These species can therefore be considered to be of regional importance.

12.4.3.2 Vegetation Associations

When assessing regional importance of vegetation associations, comparison needs to be made with the available data on vegetation associations in the Pilbara that are typical to particular land systems. This is especially important where the extent of such land systems is regionally small, or where the specific vegetation association is rare for that particular land system (e.g. vegetation that normally occurs in less than 5% of the total vegetation for that particular land system).

Of the six land systems present in the study area, Washplain land system occupies the smallest area in the Pilbara region (0.5% of the total Pilbara area surveyed by van Vreeswyk *et. al.*, 2004) followed by River and McKay land systems (2.3% each).

For the Wheelarra Hill North, vegetation association 2b of Low *Acacia* Woodland with Mulga in groves, can be considered of regional importance as only 15% of Washplain land system is understood to have similar vegetation communities.

Vegetation association 1a that is part of the River land system, compares well to that of Major and Minor channels vegetation that is found in 20% of that land system. Given the small area of the River land system that occurs in the survey area relative to the area in the Pilbara, vegetation association 1a found on site is considered to have medium regional significance.

Comparison of the remaining vegetation associations described for the Wheelarra Hill North study area with that typical of the remaining four land systems found within the study area boundary does not identify any associations to be regionally significant.

Comparison of Wheelarra Hill North vegetation assemblages to that of the surrounding areas indicate that no unique or significant habitats are located within the study area.

Therefore these assemblages are not considered regionally significant based on the available information from the studies of the surrounding areas.

12.4.4 Local Significance

At a local level the ecological significance is given to those vegetation communities that support greatest biodiversity with a mosaic of vegetation assemblages. Species that are confined to a specific habitat that is not common locally are considered locally significant as removal or damage to that particular habitat would cause the local extinction of that particular species.

Priority 1 flora *Aristida ? jerichoensis* var. *subspinulifera* is considered locally significant as this species was not previously found in the surrounding tenements.

In addition to range extension flora previously discussed as being of regional significance (*Eragrostis olida*, *Oldenlandia galioides* and *Sclerolaena minuta*), eight additional species with southernmost (or south western) range extensions were recorded. These species occur more widely and have been previously recorded at nearby tenements. These species include *Abutilon cunninghamii* (recorded at three locations on site and previously found within Jimblebar – Wheelarra Hill lease (Outback Ecology, 2010)), *Cyperus ixiocarpus* (one found on site and recorded in two studies adjacent to the study area (Outback Ecology, 2010 and ecologia, 2004)), *Evolvulus alsinoides* var. *decumbens* (recorded at eight locations in the study area and previously recorded at OB31 (Syrinx, 2011a)), *Phyllanthus erwinii* (recorded at 10 locations in the study area and previously recorded in the nearby tenements), *Phyllanthus maderaspatensis* (recorded at one location and also previously recorded in the adjacent mining tenements) and *Santalum spicatum* (recorded in one area on site and previously found in the adjacent tenements (Outback Ecology, 2010 and ecologia, 1999)). These species are considered of local significance. *Tephrosia* aff. *sphaerospora* and *Hibiscus* aff. *apodus* have also been recorded on site and are considered to be at the north east and southernmost extents of their range respectively and may be considered of regional significance due to the distance of more than 200km between the previously confirmed specimens and the ones found on site. However, due to the *Tephrosia* genus being currently revised and the *Hibiscus* aff. *apodus* specimen of poor quality (very young specimen) their identification could not be fully confirmed despite a careful analysis at the WAH. Nonetheless, these specimens cannot be discounted from being the true range extensions.

Wheelarra Hill North has a high species diversity and a range of vegetation assemblages including gorges and the tall shrublands associated with the deeply incised drainage lines.

Therefore it is recommended that the disturbance to these assemblages be kept to a minimum or avoided where practicable in order to conserve locally significant flora.

12.4.5 Assessment of Vegetation Representation on the Basis of Pre-European Vegetation Extent

Based on the Bioregional Conservation Status of Ecological Vegetation Classes (Department of Natural Resources and Environment, 2002) a vegetation type is considered underrepresented if there is less than 30% of its original (i.e. pre European or pre 1750) distribution remaining. Therefore, 30% is considered as the threshold level below which species loss appears to accelerate exponentially at an ecosystem level.

From a biodiversity perspective, and not taking into account any other land degradation issues, there are several key criteria that can be applied to vegetation where clearing is still occurring. These criteria are broad scale criteria and are supplementary to clearing principles outlined in the Western Australian Schedule 5 of the *Environmental Protection Amendment Act 2003*. The criteria which would place the threat level into any of the following classes should be avoided:

Presumed extinct:	Probably no longer present in the bioregion;
Endangered	<10% of pre-European extent remains;
Vulnerable	10-30% of pre-European extent exists;
Depleted	>30% and up to 50% of pre-European extent exists; and
Least concern	>50% pre-European extent exists and subject to little or no degradation over a majority of this area.

Native vegetation associations that are present in the study area have been quantified in a regional context based on their extent and reservation status by Shepherd *et. al.*, (2002) using more recent data from Department of Agriculture (2011a). Table 9 outlines the status of those communities in the Pilbara region.

Table 9 Vegetation extent and status in the Pilbara IBRA region showing extent of vegetation in the study area

Vegetation Association Number	Association Description	Pre-European Extent in the IBRA region (Ha)	Current extent in the IBRA region (Ha)	% Remaining	Pre-European Current Extent in IUCN Class 1a-4 Reserves (Ha)	% Pre-European Current Extent in IUCN Class 1a-4 Reserves	Pre-European Current Extent within Study Area (Ha)	% Current Extent within Study Area
82	Hummock Grasslands, Low Tree Steppe; Snappy Gum over <i>Triodia wiseana</i>	2578483.58	2565751.04693	99.51%	264036.06	10.29%	3084.24	0.12%
111	Hummock Grasslands, Shrub Steppe; <i>Eucalyptus gamophylla</i> over hard Spinifex	551201.39	551146.59074	99.99%	7124.97	1.29%	132.46	0.02%
216	Low Woodland; Mulga (with Spinifex) on Rises	26708.79	26411.08306	98.89%	0.00	0.00%	1755.94	6.65%

To produce the "Pre-European Current Extent", the Pre-European vegetation dataset was clipped by the Native Vegetation Extent dataset.

IUCN categories have been taken from the DEC Land and Managed Waters dataset. IUCN stands for the "International Union for Conservation of Nature" and is a classification system for determining the conservation status of reserves. Details on the categories can be found here <http://www.environment.gov.au/parks/iucn.html>

Please note: There are no IUCN categories in the Study area

The extent of the vegetation associations in the study area is considered of Least Concern (intact) with over 98% of the pre-European extents of each vegetation association remaining.

If all the vegetation in the study area is to be removed, this would represent losses of 0.12% for vegetation association 82 and 0.02% for vegetation association 111. Both of these vegetation associations have some remnant vegetation protected in the IUCN reserves. If all of vegetation association 216 is cleared for the entire study area it would represent a relatively high loss (6.65%) for that vegetation type as none of the remaining extent of vegetation association 216 is protected in IUCN conservation reserves. For this reason, vegetation associations found in the study area are ranked as medium in terms of reservation priorities (Kendrick, 2001a).

13.0 CONCLUDING STATEMENT

The study identified 392 taxa and 25 vegetation associations. The flora and vegetation found in the study area does not differ significantly from that found in adjacent areas, and are well represented in the Pilbara biogeographic region.

One potential Priority 1 flora *Aristida ? jerichoensis* var. *subspinulifera* was found at four locations within the study area in addition to nine range extension flora and two possible range extension flora; three of which are considered to be of local and possibly regional importance.

No Threatened or Potential Ecological Communities were found in the study area.

No Declared Plants were found in the study area. Most weed populations were sporadically distributed, mostly associated with large drainage channels and run-off plains.

As a result it is considered that the flora and vegetation within the Wheelarra Hill North study area although diverse, is not unique for the eastern Pilbara. Therefore any disturbance or impacts to most of the vegetation associations and flora would not constitute a significant loss to overall biodiversity of the Pilbara bioregion.

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APPENDICES

**Appendix 1 Definitions of Threatened and Priority Ecological Communities and DRF
and Priority Flora**

EPBC Definition for Priority Ecological Communities based on Environmental Protection and Biodiversity Conservation Act 1999

EPBC Category	Act	Definition
Priority Ecological Communities		
Critically Endangered (CR)		An ecological community that is facing an extremely high risk of extinction in the wild in the immediate future.
Endangered (EN)		An ecological community that is not critically endangered, and is facing a very high risk of extinction in the wild in the new future.
Vulnerable (VU)		An ecological community that is not critically endangered or endangered, and is facing a high risk of extinction in the medium-term future.

Categories of Threatened Flora Species (Environmental Protection and Biodiversity Conservation Act 1999)

Conservation Code	Definition
Threatened Flora Species	
Ex	Extinct Taxa which at a particular time if, at the time, there is no reasonable doubt that the last member of the species has died.
ExW	Extinct in the Wild Taxa which is known only to survive in cultivation, in captivity or as a naturalised population well outside its past range; or it has not been recorded in its known 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.
CE	Critically Endangered Taxa which at a particular 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.
E	Endangered Taxa which is not critically endangered and it is facing a very high risk of extinction in the wild in the medium-term future, as determined in accordance with the prescribed criteria.
V	Vulnerable Taxa which is not critically endangered or endangered and is facing a high risk of extinction in the wild in the medium-term future, as determined in accordance with the prescribed criteria.
CD	Conservation Dependent Taxa which at a particular time if, at that time, 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 within a period of 5 years.

DEC Definitions and criteria for Threatened Ecological Communities

Criteria	Definition
Threatened Ecological Communities	
Presumed Totally Destroyed (PD)	<p>An ecological community that 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.</p> <p>An ecological community will be listed as presumed totally destroyed if there are no recent records of the community being extant and either of the following applies (A or B):</p> <p>A) Records within the last 50 years have not been confirmed despite thorough searches of known or likely habitats or</p> <p>B) All occurrences recorded within the last 50 years have since been destroyed</p>
Critically Endangered (CR)	<p>An ecological community that has been adequately surveyed and found to have been subject to a major contraction in area and/or that 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.</p> <p>An ecological community will be listed as Critically Endangered when it has been adequately surveyed and is found to be facing an extremely high risk of total destruction in the immediate future. This will be determined on the basis of the best available information, by it meeting any one or more of the following criteria (A, B or C):</p> <p>A) The estimated geographic range, and/or total area occupied, and/or number of discrete occurrences since European settlement have been reduced by at least 90% and either or both of the following apply (i or ii):</p> <ul style="list-style-type: none"> i) geographic range, and/or total area occupied and/or number of discrete occurrences are continuing to decline such that total destruction of the community is imminent (within approximately 10 years); ii) modification throughout its range is continuing such that in the immediate future (within approximately 10 years) the community is unlikely to be capable of being substantially rehabilitated. <p>B) Current distribution is limited, and one or more of the following apply (i, ii or iii):</p> <ul style="list-style-type: none"> i) geographic range and/or number of discrete occurrences, and/or area occupied is highly restricted and the community is currently subject to known threatening processes which are likely to result in total destruction throughout its range in the immediate future (within approximately 10 years); ii) there are very few occurrences, each of which is small and/or isolated and extremely vulnerable to known threatening processes; iii) there may be many occurrences but total area is very small and each occurrence is small and/or isolated and extremely vulnerable to known threatening processes. <p>C) The ecological community exists only as highly modified occurrences that may be capable of being rehabilitated if such work begins in the immediate future (within approximately 10 years).</p>

Criteria	Definition
Threatened Ecological Communities	
Endangered (EN)	<p>An ecological community that 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.</p> <p>An ecological community will be listed as Endangered when it has been adequately surveyed and is not Critically Endangered but is facing a very high risk of total destruction in the near future. This will be determined on the basis of the best available information by it meeting any one or more of the following criteria (A, B, or C):</p> <p>A) The geographic range, and/or total area occupied, and/or number of discrete occurrences have been reduced by at least 70% since European settlement and either or both of the following apply (i or ii):</p> <ul style="list-style-type: none"> i) the estimated geographic range, and/or total area occupied and/or number of discrete occurrences are continuing to decline such that total destruction of the community is likely in the short term future (within approximately 20 years); ii) modification throughout its range is continuing such that in the short term future (within approximately 20 years) the community is unlikely to be capable of being substantially restored or rehabilitated. <p>B) Current distribution is limited, and one or more of the following apply (i, ii or iii):</p> <ul style="list-style-type: none"> i) geographic range and/or number of discrete occurrences, and/or area occupied is highly restricted and the community is currently subject to known threatening processes which are likely to result in total destruction throughout its range in the short term future (within approximately 20 years); ii) there are few occurrences, each of which is small and/or isolated and all or most occurrences are very vulnerable to known threatening processes; iii) there may be many occurrences but total area is small and all or most occurrences are small and/or isolated and very vulnerable to known threatening processes. <p>C) The ecological community exists only as very modified occurrences that may be capable of being substantially restored or rehabilitated if such work begins in the short-term future (within approximately 20 years).</p>
Vulnerable (VU)	<p>An ecological community that has been adequately surveyed and is found to be declining and/or has declined in distribution and/or condition and whose ultimate security has not yet been assured and/or a community that 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.</p> <p>An ecological community will be listed as Vulnerable when it has been adequately surveyed and is not Critically Endangered or Endangered but is facing a high risk of total destruction or significant modification in the medium to long term future. This will be determined on the basis of the best available information by it meeting any one or more of the following criteria (A, B or C):</p> <p>A) The ecological community exists largely as modified occurrences that are likely to be capable of being substantially restored or rehabilitated.</p> <p>B) The ecological community may already be modified and would be vulnerable to threatening processes, is restricted in area and/or range and/or is only found at a few locations.</p> <p>C) The ecological community may be still widespread but is believed likely to move into a category of higher threat in the medium to long term future because of existing or impending threatening</p>

DEC Definitions and criteria for Priority Ecological Communities

Criteria	Definition
Priority Ecological Communities	
Priority One	Ecological communities with apparently few, small occurrences, all or most not actively managed for conservation (e.g. within agricultural or pastoral lands, urban areas, active mineral leases) and for which current threats exist. Communities may be included if they are comparatively well-known from one or more localities but do not meet adequacy of survey requirements, and/or are not well defined, and appear to be under immediate threat from known threatening processes across their range.
Priority Two	Communities that are known from few small occurrences, all or most of which are actively managed for conservation (e.g. within national parks, conservation parks, nature reserves, state forest, unallocated Crown land, water reserves, etc.) and not under imminent threat of destruction or degradation. Communities may be included if they are comparatively well known from one or more localities, but do not meet adequacy of survey requirements, and / or are not well defined, and appear to be under threat from known threatening processes.
Priority Three	Communities that are known from several to many occurrences, a significant number or area of which are not under threat of habitat destruction or degradation or; ii. Communities known from a few widespread occurrences, which are either large or within significant remaining areas of habitat in which other occurrences may occur, much of it not under imminent threat, or; iii. Communities made up of large, and/or widespread occurrences, that may or may not be represented in the reserve system, but are under threat of modification across much of their range from processes such as grazing by domestic and/or feral stock, and inappropriate fire regimes. Communities may be included if they are comparatively well known from several localities, but do not meet adequacy of survey requirements and / or are not well defined, and known threatening processes exist that could affect them.
Priority Four	Ecological communities that are adequately known, rare but not threatened or meet criteria for Near Threatened, or that have been recently removed from the threatened list. These communities require regular monitoring. a. Rare. Ecological communities known from few occurrences that are considered to have been adequately surveyed, or for which sufficient knowledge is available, and that are considered not currently threatened or in need of special protection, but could be if present circumstances change These communities are usually represented on conservation lands. b. Near Threatened. Ecological communities that are considered to have been adequately surveyed and that do not qualify for Conservation Dependent, but that are close to qualifying for Vulnerable. c. Ecological communities that have been removed from the list of threatened communities during the past five years.
Priority Five	<i>Conservation Dependent Ecological Communities</i> Ecological Communities that are not threatened but are subject to a specific conservation program, the cessation of which would result in the community becoming threatened within five years.

DEC Definitions and criteria for DRF and Priority Flora – DEC

Conservation Code	Definition
DRF and Priority Flora	
T	<p>Threatened Flora 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 (Schedule 1 under the Wildlife Conservation Act 1950).</p> <p>Threatened Flora (Schedule 1) are further ranked by the Department according to their level of threat using IUCN Red List criteria: * CR: Critically Endangered – considered to be facing an extremely high risk of extinction in the wild * EN: Endangered – considered to be facing a very high risk of extinction in the wild * VU: Vulnerable – considered to be facing a high risk of extinction in the wild.</p>
X	<p>Presumed Extinct Flora Taxa which have been adequately searched for and there is no reasonable doubt that the last individual has died, and have been gazetted as such (Schedule 2 under the Wildlife Conservation Act 1950).</p> <p>Species that have not yet been adequately surveyed to be listed under Schedule 1 or 2 are added to the Priority Flora List under Priorities 1, 2 or 3. These three categories are ranked in order of priority for survey and evaluation of conservation status so that consideration can be given to their declaration as threatened flora or fauna. Species that are adequately known, are rare but not threatened, or meet criteria for Near Threatened, or that have been recently removed from the threatened list for other than taxonomic reasons, are placed in Priority 4. These species require regular monitoring. Conservation Dependent species are placed in Priority 5.</p>
P1	<p>Priority One: Poorly-known species Species that are known from one or a few collections or sight records (generally less than five), all on lands not managed for conservation, e.g. agricultural or pastoral lands, urban areas, Shire, Westrail and Main Roads WA road, gravel and soil reserves, and active mineral leases and under threat of habitat destruction or degradation. Species may be included if they are comparatively well known from one or more localities but do not meet adequacy of survey requirements and appear to be under immediate threat from known threatening processes.</p>
P2	<p>Priority Two: Poorly-known species Species that are known from one or a few collections or sight records, some of which are on lands not under imminent threat of habitat destruction or degradation, e.g. national parks, conservation parks, nature reserves, State forest, vacant Crown land, water reserves, etc. Species may be included if they are comparatively well known from one or more localities but do not meet adequacy of survey requirements and appear to be under threat from known threatening processes.</p>
P3	<p>Priority Three: Poorly-known species Species that are known from collections or sight records from several localities not under imminent threat, or from few but widespread localities with either large population size or significant remaining areas of apparently suitable habitat, much of it not under imminent threat. Species may be included if they are comparatively well known from several localities but do not meet adequacy of survey requirements and known threatening processes exist that could affect them.</p>
P4	<p>Priority Four: Rare, Near Threatened and other species in need of monitoring (a) Rare. Species that are considered to have been adequately surveyed, or for which sufficient knowledge is available, and that are considered not currently threatened or in need of special protection, but could be if present circumstances change. These species are usually represented on conservation lands. (b) Near Threatened. Species that are considered to have been adequately surveyed and that do not qualify for Conservation Dependent, but that are close to qualifying for Vulnerable. (c) Species that have been removed from the list of threatened species during the past five years for reasons other than taxonomy.</p>
P5	<p>Priority Five: Conservation Dependent species Species that are not threatened but are subject to a specific conservation program, the cessation of which would result in the species becoming threatened within five years.</p>

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**Appendix 2 Coordinates of Conservation Significant and Introduced Flora Species
Recorded within Wheelarra Hill North and the Surrounding Sites**

Conservation Significant Flora recorded within Wheelarra Hill North and the surrounding Jimblebar Lease areas

Species	Conservation Significance	Zone	GPS E	GPS N	Consultant	Year	Survey area
<i>Aristida jerichoensis</i> var. <i>subspinulifera</i>	P1	51K	198809	7409983	Naturemap 2009	2009	Adjacent to Jimblebar Lease
<i>Aristida jerichoensis</i> var. <i>subspinulifera</i>	P1	51K	202307	7414528	Outback Ecology	2010	Adjacent to Jimblebar Lease
<i>Aristida jerichoensis</i> var. <i>subspinulifera</i>	P1	51K	201884	7414254	Outback Ecology	2010	Adjacent to Jimblebar Lease
<i>Aristida ? jerichoensis</i> var. <i>subspinulifera</i>	P1	51K	197012	7408670	Syrinx Environmental PL	2011	South West Jimblebar
<i>Aristida ? jerichoensis</i> var. <i>subspinulifera</i>	P1	51K	202086	7415691	Syrinx Environmental PL	2011	Wheelarra Hill North
<i>Aristida ? jerichoensis</i> var. <i>subspinulifera</i>	P1	51K	211434	7414100	Syrinx Environmental PL	2011	Wheelarra Hill North
<i>Aristida ? jerichoensis</i> var. <i>subspinulifera</i>	P1	51K	202727	7413744	Syrinx Environmental PL	2011	Wheelarra Hill North
<i>Aristida ? jerichoensis</i> var. <i>subspinulifera</i>	P1	51K	201798	7414466	Syrinx Environmental PL	2011	Wheelarra Hill North
<i>Brachyscome</i> sp. WannaMunna Flats (S. van Leeuwen 4462)	P1	51K	211799	7409329	Outback Ecology	2009	Adjacent to Jimblebar Lease
<i>Brachyscome</i> sp. WannaMunna Flats (S. van Leeuwen 4462)	P1	51K	211781	7409109	Outback Ecology	2009	Adjacent to Jimblebar Lease
<i>Brachyscome</i> sp. WannaMunna Flats (S. van Leeuwen 4462)	P1	51K	211637	7418496	Outback Ecology	2009	Adjacent to Jimblebar Lease
<i>Brachyscome</i> sp. WannaMunna Flats (S. van Leeuwen 4462)	P1	51K	213133	7413309	Outback Ecology	2009	Adjacent to Jimblebar Lease
<i>Goodenia nuda</i>	P3	51K	199024	7408989	Outback Ecology	2009	Adjacent to Jimblebar Lease
<i>Goodenia nuda</i>	P3	51K	220677	7413460	Outback Ecology	2008-9	Jimblebar Lease
<i>Goodenia nuda</i>	P3	51K	215315	7412656	Outback Ecology	2008-9	Jimblebar Lease
<i>Goodenia nuda</i>	P3	51K	207521	7409774	Outback Ecology	2008-9	Jimblebar Lease
<i>Goodenia nuda</i>	P3	51K	196884	7411173	ENV	2007	Jimblebar
<i>Goodenia nuda</i>	P3	51K	213274	7412183	ecologia	2007	Hashimoto
<i>Goodenia nuda</i>	P3	51K	213963	7412479	ecologia	2007	Hashimoto
<i>Goodenia nuda</i>	P3	51K	199099	7410100	ecologia	2006	Marra mamba
<i>Goodenia nuda</i>	P3	51K	207568	7409474	ecologia	2006	Hashimoto
<i>Goodenia nuda</i>	P3	51K	199360	7415637	ENV	2010	Jimblebar
<i>Goodenia ? nuda</i>	P4	51K	198011	7407530	Syrinx Environmental PL	2011	South West Jimblebar
<i>Goodenia ? nuda</i>	P4	51K	202611	7408609	Syrinx Environmental PL	2011	South West Jimblebar
<i>Goodenia ? nuda</i>	P4	51K	201545	7407643	Syrinx Environmental PL	2011	South West Jimblebar
<i>Goodenia ? nuda</i>	P4	51K	196280	7408522	Syrinx Environmental PL	2011	South West Jimblebar
<i>Goodenia ? nuda</i>	P4	51K	198262	7407673	Syrinx Environmental PL	2011	South West Jimblebar
<i>Josephinia</i> sp. Marandoo(M. E. Trudgen 1554)	P1	51K	202421	7409757	Outback Ecology	2008-9	Jimblebar Lease
<i>Josephinia</i> sp. Marandoo(M. E. Trudgen 1554)	P1	51K	201439	7409454	Outback Ecology	2008-9	Jimblebar Lease

Introduced Flora Recorded within Wheelarra Hill North and the Surrounding Jimblebar Lease areas

Species	Zone	GPS E	GPS N	Consultant	Year	Survey Area
* <i>Acetosa vesicaria</i>	51K	205075	7412071	Biota	2004	Jimblebar-Wheelarra Hill Expansion
* <i>Acetosa vesicaria</i>	51K	205594	7411580	Biota	2004	Jimblebar-Wheelarra Hill Expansion
* <i>Bidens bipinnata</i>	51K	220677	7413460	Outback Ecology	2008-9	Jimblebar Lease
* <i>Bidens bipinnata</i>	51K	220491	7411028	Outback Ecology	2008-9	Jimblebar Lease
* <i>Bidens bipinnata</i>	51K	218376	7411534	Outback Ecology	2008-9	Jimblebar Lease
* <i>Bidens bipinnata</i>	51K	215315	7412656	Outback Ecology	2008-9	Jimblebar Lease
* <i>Bidens bipinnata</i>	51K	213840	7409702	Outback Ecology	2008-9	Jimblebar Lease
* <i>Bidens bipinnata</i>	51K	207521	7409774	Outback Ecology	2008-9	Jimblebar Lease
* <i>Bidens bipinnata</i>	51K	200506	7410337	Outback Ecology	2008-9	Jimblebar Lease
* <i>Bidens bipinnata</i>	51K	199174	7410523	Outback Ecology	2008-9	Jimblebar Lease
* <i>Bidens bipinnata</i>	51K	206973	7409755	EMV	2007	Jimblebar TPG4 Rail loop
* <i>Bidens bipinnata</i>	51K	213498	7409984	ecologia	2006	Marra Mamba
* <i>Bidens bipinnata</i>	51K	199104	7409899	ecologia	2006	Marra Mamba
* <i>Bidens bipinnata</i>	51K	207766	7409649	ecologia	2006	Marra Mamba
* <i>Bidens bipinnata</i>	51K	207730	7409656	ecologia	2006	Marra Mamba
* <i>Bidens bipinnata</i>	51K	209907	7409493	ecologia	2006	Marra Mamba
* <i>Bidens bipinnata</i>	51K	205046	7418679	Syrinx Environmental PL	2011	Orebody 31 - Jimblebar Lease
* <i>Bidens bipinnata</i>	51K	203965	7417672	Syrinx Environmental PL	2011	Orebody 31 - Jimblebar Lease
* <i>Bidens bipinnata</i>	51K	204040	7421274	Syrinx Environmental PL	2011	Orebody 31 - Jimblebar Lease
* <i>Bidens bipinnata</i>	51K	203965	7417671	Syrinx Environmental PL	2011	Wheelarra Hill North
* <i>Bidens bipinnata</i>	51K	201837	7416734	Syrinx Environmental PL	2011	Wheelarra Hill North
* <i>Bidens bipinnata</i>	51K	205118	7416257	Syrinx Environmental PL	2011	Wheelarra Hill North
* <i>Bidens bipinnata</i>	51K	211595	7417472	Syrinx Environmental PL	2011	Wheelarra Hill North
* <i>Bidens bipinnata</i>	51K	211367	7414764	Syrinx Environmental PL	2011	Wheelarra Hill North
* <i>Bidens bipinnata</i>	51K	207921	7414805	Syrinx Environmental PL	2011	Wheelarra Hill North
* <i>Bidens bipinnata</i>	51K	207209	7413873	Syrinx Environmental PL	2011	Wheelarra Hill North
* <i>Bidens bipinnata</i>	51K	203965	7417671	Syrinx Environmental PL	2011	Wheelarra Hill North
* <i>Bidens bipinnata</i>	51K	198011	7407530	Syrinx Environmental PL	2011	South West Jimblebar
* <i>Bidens bipinnata</i>	51K	198663	7408748	Syrinx Environmental PL	2011	South West Jimblebar
* <i>Bidens bipinnata</i>	51K	195521	7408293	Syrinx Environmental PL	2011	South West Jimblebar
* <i>Bidens bipinnata</i>	51K	202846	7407923	Syrinx Environmental PL	2011	South West Jimblebar
* <i>Bidens bipinnata</i>	51K	201360	7408511	Syrinx Environmental PL	2011	South West Jimblebar
* <i>Bidens bipinnata</i>	51K	201111	7408958	Syrinx Environmental PL	2011	South West Jimblebar

Species	Zone	GPS E	GPS N	Consultant	Year	Survey Area
* <i>Bidens bipinnata</i>	51K	197012	7408670	Syrinx Environmental PL	2011	South West Jimblebar
* <i>Bidens bipinnata</i>	51K	199491	7407975	Syrinx Environmental PL	2011	South West Jimblebar
* <i>Bidens bipinnata</i>	51K	198262	7407673	Syrinx Environmental PL	2011	South West Jimblebar
* <i>Bidens bipinnata</i>	51K	202616	7407373	Syrinx Environmental PL	2011	South West Jimblebar
* <i>Cenchus ciliaris</i>	51K	201244	7413720	Outback Ecology	2008-9	Jimblebar Lease
* <i>Cenchus ciliaris</i>	51K	203921	7410095	Outback Ecology	2008-9	Jimblebar Lease
* <i>Cenchus ciliaris</i>	51K	211757	7411419	Outback Ecology	2008-9	Jimblebar Lease
* <i>Cenchus ciliaris</i>	51K	213081	7412323	Outback Ecology	2008-9	Jimblebar Lease
* <i>Cenchus ciliaris</i>	51K	215676	7411776	Outback Ecology	2008-9	Jimblebar Lease
* <i>Cenchus ciliaris</i>	51K	213699	7412728	Outback Ecology	2008-9	Jimblebar Lease
* <i>Cenchus ciliaris</i>	51K	210911	7412145	Outback Ecology	2008-9	Jimblebar Lease
* <i>Cenchus ciliaris</i>	51K	214797	7411870	Outback Ecology	2008-9	Jimblebar Lease
* <i>Cenchus ciliaris</i>	51K	214864	7411989	Outback Ecology	2008-9	Jimblebar Lease
* <i>Cenchus ciliaris</i>	51K	209133	7409919	Outback Ecology	2008-9	Jimblebar Lease
* <i>Cenchus ciliaris</i>	51K	211869	7410072	Outback Ecology	2008-9	Jimblebar Lease
* <i>Cenchus ciliaris</i>	51K	212927	7410072	Outback Ecology	2008-9	Jimblebar Lease
* <i>Cenchus ciliaris</i>	51K	212927	7410471	Outback Ecology	2008-9	Jimblebar Lease
* <i>Cenchus ciliaris</i>	51K	213158	7412950	Outback Ecology	2008-9	Jimblebar Lease
* <i>Cenchus ciliaris</i>	51K	218376	7411534	Outback Ecology	2008-9	Jimblebar Lease
* <i>Cenchus ciliaris</i>	51K	217523	7411964	Outback Ecology	2008-9	Jimblebar Lease
* <i>Cenchus ciliaris</i>	51K	216394	7413233	Outback Ecology	2008-9	Jimblebar Lease
* <i>Cenchus ciliaris</i>	51K	216255	7410413	Outback Ecology	2008-9	Jimblebar Lease
* <i>Cenchus ciliaris</i>	51K	215209	7411095	Outback Ecology	2008-9	Jimblebar Lease
* <i>Cenchus ciliaris</i>	51K	214940	7409639	Outback Ecology	2008-9	Jimblebar Lease
* <i>Cenchus ciliaris</i>	51K	215045	7413260	Outback Ecology	2008-9	Jimblebar Lease
* <i>Cenchus ciliaris</i>	51K	213840	7409702	Outback Ecology	2008-9	Jimblebar Lease
* <i>Cenchus ciliaris</i>	51K	210444	7411235	Outback Ecology	2008-9	Jimblebar Lease
* <i>Cenchus ciliaris</i>	51K	210055	7410500	Outback Ecology	2008-9	Jimblebar Lease
* <i>Cenchus ciliaris</i>	51K	202679	7410900	Outback Ecology	2008-9	Jimblebar Lease
* <i>Cenchus ciliaris</i>	51K	199019	7409374	Outback Ecology	2008-9	Jimblebar Lease
* <i>Cenchus ciliaris</i>	51K	200368	7411213	Outback Ecology	2008-9	Jimblebar Lease
* <i>Cenchus ciliaris</i>	51K	206973	7409755	EMV	2007	Jimblebar TPG4 Rail loop
* <i>Cenchus ciliaris</i>	51K	207291	7409985	EMV	2007	Jimblebar TPG4 Rail loop
* <i>Cenchus ciliaris</i>	51K	202706	7409606	ecologia	2006	Marra Mamba
* <i>Cenchus ciliaris</i>	51K	199122	7409917	ecologia	2006	Marra Mamba

Species	Zone	GPS E	GPS N	Consultant	Year	Survey Area
* <i>Cenchus ciliaris</i>	51K	203484	7409738	ecologia	2006	Marra Mamba
* <i>Cenchus ciliaris</i>	51K	202012	7409706	ecologia	2006	Marra Mamba
* <i>Cenchus ciliaris</i>	51K	209515	7410329	ecologia	2004	Jimblebar-Wheelarra Hill Expansion
* <i>Cenchus ciliaris</i>	51K	201777	7411133	ecologia	2004	Jimblebar-Wheelarra Hill Expansion
* <i>Cenchus ciliaris</i>	51K	205307	7420681	Syrinx Environmental PL	2011	Orebody 31 - Jimblebar Lease
* <i>Cenchus ciliaris</i>	51K	206635	7418664	Syrinx Environmental PL	2011	Orebody 31 - Jimblebar Lease
* <i>Cenchus ciliaris</i>	51K	202287	7420396	Syrinx Environmental PL	2011	Orebody 31 - Jimblebar Lease
* <i>Cenchus ciliaris</i>	51K	207217	7421208	Syrinx Environmental PL	2011	Orebody 31 - Jimblebar Lease
* <i>Cenchus ciliaris</i>	51K	193874	7407400	Syrinx Environmental PL	2011	South West Jimblebar
* <i>Cenchus ciliaris</i>	51K	202241	7408315	Syrinx Environmental PL	2011	South West Jimblebar
* <i>Cenchus ciliaris</i>	51K	201111	7408958	Syrinx Environmental PL	2011	South West Jimblebar
* <i>Cenchus ciliaris</i>	51K	193665	7407165	Syrinx Environmental PL	2011	South West Jimblebar
* <i>Cenchus ciliaris</i>	51K	202616	7407373	Syrinx Environmental PL	2011	South West Jimblebar
* <i>Cenchus ciliaris</i>	51K	202258	7416615	Syrinx Environmental PL	2011	Wheelarra Hill North
* <i>Cenchus ciliaris</i>	51K	211660	7416245	Syrinx Environmental PL	2011	Wheelarra Hill North
* <i>Cenchus ciliaris</i>	51K	210674	7418097	Syrinx Environmental PL	2011	Wheelarra Hill North
* <i>Cenchus ciliaris</i>	51K	209195	7417791	Syrinx Environmental PL	2011	Wheelarra Hill North
* <i>Cenchus ciliaris</i>	51K	209180	7417860	Syrinx Environmental PL	2011	Wheelarra Hill North
* <i>Cenchus ciliaris</i>	51K	211640	7415780	Syrinx Environmental PL	2011	Wheelarra Hill North
* <i>Cenchus ciliaris</i>	51K	210150	7415150	Syrinx Environmental PL	2011	Wheelarra Hill North
* <i>Cenchus ciliaris</i>	51K	211358	7415220	Syrinx Environmental PL	2011	Wheelarra Hill North
* <i>Cenchus ciliaris</i>	51K	211396	7414817	Syrinx Environmental PL	2011	Wheelarra Hill North
* <i>Cenchus ciliaris</i>	51K	212035	7414209	Syrinx Environmental PL	2011	Wheelarra Hill North
* <i>Cenchus ciliaris</i>	51K	208027	7415139	Syrinx Environmental PL	2011	Wheelarra Hill North
* <i>Cenchus ciliaris</i>	51K	205958	7414899	Syrinx Environmental PL	2011	Wheelarra Hill North
* <i>Cenchus ciliaris</i>	51K	205938	7414783	Syrinx Environmental PL	2011	Wheelarra Hill North
* <i>Cenchus ciliaris</i>	51K	205939	7414696	Syrinx Environmental PL	2011	Wheelarra Hill North
* <i>Cenchus ciliaris</i>	51K	206870	7416020	Syrinx Environmental PL	2011	Wheelarra Hill North
* <i>Cenchus ciliaris</i>	51K	206750	7416170	Syrinx Environmental PL	2011	Wheelarra Hill North
* <i>Cenchus ciliaris</i>	51K	202290	7414463	Syrinx Environmental PL	2011	Wheelarra Hill North
* <i>Cenchus ciliaris</i>	51K	205040	7414363	Syrinx Environmental PL	2011	Wheelarra Hill North
* <i>Cenchus ciliaris</i>	51K	205690	7416256	Syrinx Environmental PL	2011	Wheelarra Hill North
* <i>Cenchus ciliaris</i>	51K	205119	7416257	Syrinx Environmental PL	2011	Wheelarra Hill North
* <i>Cenchus ciliaris</i>	51K	202796	7414817	Syrinx Environmental PL	2011	Wheelarra Hill North
* <i>Cenchus ciliaris</i>	51K	201934	7414962	Syrinx Environmental PL	2011	Wheelarra Hill North

Species	Zone	GPS E	GPS N	Consultant	Year	Survey Area
* <i>Cenchus ciliaris</i>	51K	211440	7417176	Syrinx Environmental PL	2011	Wheelarra Hill North
* <i>Cenchus ciliaris</i>	51K	210783	7418265	Syrinx Environmental PL	2011	Wheelarra Hill North
* <i>Cenchus ciliaris</i>	51K	211595	7417472	Syrinx Environmental PL	2011	Wheelarra Hill North
* <i>Cenchus ciliaris</i>	51K	208444	7417563	Syrinx Environmental PL	2011	Wheelarra Hill North
* <i>Cenchus ciliaris</i>	51K	211143	7416596	Syrinx Environmental PL	2011	Wheelarra Hill North
* <i>Cenchus ciliaris</i>	51K	209314	7417145	Syrinx Environmental PL	2011	Wheelarra Hill North
* <i>Cenchus ciliaris</i>	51K	211434	7414100	Syrinx Environmental PL	2011	Wheelarra Hill North
* <i>Cenchus ciliaris</i>	51K	208563	7414470	Syrinx Environmental PL	2011	Wheelarra Hill North
* <i>Cenchus ciliaris</i>	51K	211367	7414764	Syrinx Environmental PL	2011	Wheelarra Hill North
* <i>Cenchus ciliaris</i>	51K	207921	7414805	Syrinx Environmental PL	2011	Wheelarra Hill North
* <i>Cenchus ciliaris</i>	51K	208369	7414711	Syrinx Environmental PL	2011	Wheelarra Hill North
* <i>Cenchus ciliaris</i>	51K	211358	7415260	Syrinx Environmental PL	2011	Wheelarra Hill North
* <i>Cenchus ciliaris</i>	51K	207835	7416932	Syrinx Environmental PL	2011	Wheelarra Hill North
* <i>Cenchus ciliaris</i>	51K	206054	7415117	Syrinx Environmental PL	2011	Wheelarra Hill North
* <i>Cenchus ciliaris</i>	51K	205716	7414767	Syrinx Environmental PL	2011	Wheelarra Hill North
* <i>Cenchus ciliaris</i>	51K	201798	7414466	Syrinx Environmental PL	2011	Wheelarra Hill North
* <i>Cenchus ciliaris</i>	51K	203589	7415538	Syrinx Environmental PL	2011	Wheelarra Hill North
* <i>Cenchus ciliaris</i>	51K	205527	7416869	Syrinx Environmental PL	2011	Wheelarra Hill North
* <i>Cenchus ciliaris</i>	51K	205127	7416728	Syrinx Environmental PL	2011	Wheelarra Hill North
* <i>Cenchus ciliaris</i>	51K	211678	7416285	Syrinx Environmental PL	2011	Wheelarra Hill North
* <i>Cenchus ciliaris</i>	51K	211722	7415118	Syrinx Environmental PL	2011	Wheelarra Hill North
* <i>Cucumis melo</i>	51K	208436	7410271	Outback Ecology	2008-9	Jimblebar Lease
* <i>Cucumis melo</i>	51K	202846	7407923	Syrinx Environmental PL	2011	South West Jimblebar
* <i>Cucumis myricarpus</i>	51K	205985	7409538	ecologia	2006	Marra Mamba
* <i>Eragrostis cilianensis</i>	51K	213064	7413319	Outback Ecology	2008-9	Jimblebar Lease
* <i>Malvastrum americanum</i>	51K	208714	7409811	ecologia	2006	Marra Mamba
* <i>Malvastrum americanum</i>	51K	208723	7409557	ecologia	2006	Marra Mamba
* <i>Malvastrum americanum</i>	51K	205046	7418679	Syrinx Environmental PL	2011	Orebody 31 - Jimblebar Lease
* <i>Malvastrum americanum</i>	51K	211722	7415118	Syrinx Environmental PL	2011	Wheelarra Hill North
* <i>Malvastrum americanum</i>	51K	202604	7417668	Syrinx Environmental PL	2011	Wheelarra Hill North
* <i>Portulaca oleracea</i>	51K	205046	7418679	Syrinx Environmental PL	2011	Orebody 31 - Jimblebar Lease
* <i>Portulaca oleracea</i>	51K	207514	7417562	Syrinx Environmental PL	2011	Orebody 31 - Jimblebar Lease
* <i>Portulaca oleracea</i>	51K	206635	7418664	Syrinx Environmental PL	2011	Orebody 31 - Jimblebar Lease
* <i>Portulaca oleracea</i>	51K	204511	7421056	Syrinx Environmental PL	2011	Orebody 31 - Jimblebar Lease
* <i>Portulaca oleracea</i>	51K	204040	7421274	Syrinx Environmental PL	2011	Orebody 31 - Jimblebar Lease

Species	Zone	GPS E	GPS N	Consultant	Year	Survey Area
* <i>Portulaca oleracea</i>	51K	198011	7407530	Syrinx Environmental PL	2011	South West Jimblebar
* <i>Portulaca oleracea</i>	51K	198934	7407795	Syrinx Environmental PL	2011	South West Jimblebar
* <i>Portulaca oleracea</i>	51K	198663	7408748	Syrinx Environmental PL	2011	South West Jimblebar
* <i>Portulaca oleracea</i>	51K	194201	7408712	Syrinx Environmental PL	2011	South West Jimblebar
* <i>Portulaca oleracea</i>	51K	193874	7408038	Syrinx Environmental PL	2011	South West Jimblebar
* <i>Portulaca oleracea</i>	51K	193874	7407400	Syrinx Environmental PL	2011	South West Jimblebar
* <i>Portulaca oleracea</i>	51K	195521	7408293	Syrinx Environmental PL	2011	South West Jimblebar
* <i>Portulaca oleracea</i>	51K	202611	7408609	Syrinx Environmental PL	2011	South West Jimblebar
* <i>Portulaca oleracea</i>	51K	202241	7408315	Syrinx Environmental PL	2011	South West Jimblebar
* <i>Portulaca oleracea</i>	51K	201545	7407643	Syrinx Environmental PL	2011	South West Jimblebar
* <i>Portulaca oleracea</i>	51K	202084	7407450	Syrinx Environmental PL	2011	South West Jimblebar
* <i>Portulaca oleracea</i>	51K	202846	7407923	Syrinx Environmental PL	2011	South West Jimblebar
* <i>Portulaca oleracea</i>	51K	201360	7408511	Syrinx Environmental PL	2011	South West Jimblebar
* <i>Portulaca oleracea</i>	51K	201111	7408958	Syrinx Environmental PL	2011	South West Jimblebar
* <i>Portulaca oleracea</i>	51K	196280	7408522	Syrinx Environmental PL	2011	South West Jimblebar
* <i>Portulaca oleracea</i>	51K	197012	7408670	Syrinx Environmental PL	2011	South West Jimblebar
* <i>Portulaca oleracea</i>	51K	199491	7407975	Syrinx Environmental PL	2011	South West Jimblebar
* <i>Portulaca oleracea</i>	51K	198262	7407673	Syrinx Environmental PL	2011	South West Jimblebar
* <i>Portulaca oleracea</i>	51K	199077	7408508	Syrinx Environmental PL	2011	South West Jimblebar
* <i>Portulaca oleracea</i>	51K	202616	7407373	Syrinx Environmental PL	2011	South West Jimblebar
* <i>Portulaca oleracea</i>	51K	201318	7408223	Syrinx Environmental PL	2011	South West Jimblebar
* <i>Portulaca oleracea</i>	51K	207514	7417562	Syrinx Environmental PL	2011	Wheelarra Hill North
* <i>Portulaca oleracea</i>	51K	205336	7415775	Syrinx Environmental PL	2011	Wheelarra Hill North
* <i>Portulaca oleracea</i>	51K	205962	7414503	Syrinx Environmental PL	2011	Wheelarra Hill North
* <i>Portulaca oleracea</i>	51K	206951	7415930	Syrinx Environmental PL	2011	Wheelarra Hill North
* <i>Portulaca oleracea</i>	51K	203876	7415471	Syrinx Environmental PL	2011	Wheelarra Hill North
* <i>Portulaca oleracea</i>	51K	207140	7414650	Syrinx Environmental PL	2011	Wheelarra Hill North
* <i>Portulaca oleracea</i>	51K	205440	7414693	Syrinx Environmental PL	2011	Wheelarra Hill North
* <i>Portulaca oleracea</i>	51K	210747	7418077	Syrinx Environmental PL	2011	Wheelarra Hill North
* <i>Portulaca oleracea</i>	51K	209640	7417215	Syrinx Environmental PL	2011	Wheelarra Hill North
* <i>Portulaca oleracea</i>	51K	209278	7417714	Syrinx Environmental PL	2011	Wheelarra Hill North
* <i>Portulaca oleracea</i>	51K	208782	7413780	Syrinx Environmental PL	2011	Wheelarra Hill North
* <i>Portulaca oleracea</i>	51K	211543	7415224	Syrinx Environmental PL	2011	Wheelarra Hill North
* <i>Portulaca oleracea</i>	51K	211658	7414947	Syrinx Environmental PL	2011	Wheelarra Hill North
* <i>Portulaca oleracea</i>	51K	208194	7415735	Syrinx Environmental PL	2011	Wheelarra Hill North

Species	Zone	GPS E	GPS N	Consultant	Year	Survey Area
* <i>Portulaca oleracea</i>	51K	202593	7418046	Syrinx Environmental PL	2011	Wheelarra Hill North
* <i>Portulaca oleracea</i>	51K	205119	7416257	Syrinx Environmental PL	2011	Wheelarra Hill North
* <i>Portulaca oleracea</i>	51K	210222	7413899	Syrinx Environmental PL	2011	Wheelarra Hill North
* <i>Portulaca oleracea</i>	51K	211440	7417176	Syrinx Environmental PL	2011	Wheelarra Hill North
* <i>Portulaca oleracea</i>	51K	211595	7417472	Syrinx Environmental PL	2011	Wheelarra Hill North
* <i>Portulaca oleracea</i>	51K	208444	7417563	Syrinx Environmental PL	2011	Wheelarra Hill North
* <i>Portulaca oleracea</i>	51K	208559	7416789	Syrinx Environmental PL	2011	Wheelarra Hill North
* <i>Portulaca oleracea</i>	51K	209314	7417145	Syrinx Environmental PL	2011	Wheelarra Hill North
* <i>Portulaca oleracea</i>	51K	211367	7414764	Syrinx Environmental PL	2011	Wheelarra Hill North
* <i>Portulaca oleracea</i>	51K	208369	7414711	Syrinx Environmental PL	2011	Wheelarra Hill North
* <i>Portulaca oleracea</i>	51K	211358	7415260	Syrinx Environmental PL	2011	Wheelarra Hill North
* <i>Portulaca oleracea</i>	51K	207042	7416988	Syrinx Environmental PL	2011	Wheelarra Hill North
* <i>Portulaca oleracea</i>	51K	207974	7415719	Syrinx Environmental PL	2011	Wheelarra Hill North
* <i>Portulaca oleracea</i>	51K	205701	7415778	Syrinx Environmental PL	2011	Wheelarra Hill North
* <i>Portulaca oleracea</i>	51K	206090	7413692	Syrinx Environmental PL	2011	Wheelarra Hill North
* <i>Portulaca oleracea</i>	51K	204806	7413715	Syrinx Environmental PL	2011	Wheelarra Hill North
* <i>Portulaca oleracea</i>	51K	207129	7415571	Syrinx Environmental PL	2011	Wheelarra Hill North
* <i>Portulaca oleracea</i>	51K	205716	7414767	Syrinx Environmental PL	2011	Wheelarra Hill North
* <i>Portulaca oleracea</i>	51K	205140	7415819	Syrinx Environmental PL	2011	Wheelarra Hill North
* <i>Portulaca oleracea</i>	51K	202329	7414227	Syrinx Environmental PL	2011	Wheelarra Hill North
* <i>Portulaca oleracea</i>	51K	203589	7415538	Syrinx Environmental PL	2011	Wheelarra Hill North
* <i>Portulaca oleracea</i>	51K	205527	7416869	Syrinx Environmental PL	2011	Wheelarra Hill North

Appendix 3 Flora Quadrat Data Sheets and Images

(Note: entries highlighted grey were collected during second phase of the survey (October 2011))

FLORA QUADRAT DATA SHEET

Location	WHN-01	Date 17.05.2011 & 04.10.2011 Surveyor K. McCreery, A. Cole & R. Tomanovic
Quadrat Dimension	50x50m	Quadrat Orientation 0°
GPS Location	Easting: 202593 Northing: 7418046	GPS Location Relative to Quadrat NW
Soil Type	Sandy Clay Loam	Soil Colour Red
Topography/Aspect	Hillslope, moderately inclined / 230°	Disturbance Type Fire
Vegetation Condition	Excellent	
Broad Floristic Formation	<i>Triodia</i> Hummock Grassland	
Vegetation Association	5e - Hummock Grassland of <i>Triodia</i> sp. Shovelanna Hill (S.van Leeuwen 3835), <i>Triodia angusta</i> and <i>Triodia epactia</i> with Scattered Shrubs of <i>Acacia tenuissima</i> , <i>Acacia melleodora</i> and <i>Eremophila cuneifolia</i> with Scattered Low Trees of <i>Acacia aptaneura</i> and <i>Acacia pruinocarpa</i>	
Vegetation Sub-association	Scattered Low Trees of <i>Acacia aptaneura</i> and <i>Acacia pruinocarpa</i> over Scattered Shrubs of <i>Acacia tenuissima</i> , <i>Acacia melleodora</i> , <i>Eremophila cuneifolia</i> and <i>Senna glutinosa</i> subsp. <i>pruinosa</i> over Low Open Shrubland of <i>Acacia wanyu</i> , <i>Senna stricta</i> , and <i>Solanum lasiophyllum</i> , over Hummock Grassland of <i>Triodia</i> sp. Shovelanna Hill (S.van Leeuwen 3835), <i>Triodia angusta</i> and <i>Triodia epactia</i> over Scattered Tussock Grass of <i>Aristida inaequiglumis</i> , <i>Cymbopogon obtectus</i> , <i>Aristida holathera</i> var. <i>holathera</i> , <i>Themeda triandra</i> and <i>Paspalidium clementii</i>	

Vascular plant species recorded

Species	Plant Height (m)	Coverage (%)	Flowers	Growth Form
<i>Acacia adsurgens</i>	1.1	<1		Shrub
<i>Acacia aptaneura</i>	3.5	1		Tree
<i>Acacia melleodora</i>	0.9	<1	yellow	Shrub
<i>Acacia pruinocarpa</i>	1	<1		Tree
<i>Acacia synchronicia</i>	0.6	<1		Shrub
<i>Acacia tenuissima</i>	1.3	<1		Shrub
<i>Acacia tetragonophylla</i>	0.9	<1		Shrub
<i>Acacia trudgeniana</i>	0.55	<1		Shrub
<i>Acacia wanyu</i>	0.8	2		Shrub
<i>Amphipogon sericeus</i>	0.35	<1		Grass
<i>Aristida contorta</i>	0.3	<1		Grass
<i>Aristida holathera</i> var. <i>holathera</i>	0.45	<1		Grass
<i>Aristida inaequiglumis</i>	0.9	1		Grass
<i>Brunonia australis</i>	0.35	<1		Herb
<i>Bulbostylis barbata</i>	0.1	1		Sedge
<i>Calytrix carinata</i>	0.4	<1		Shrub
<i>Chrysocephalum pterochaetum</i>	0.3	<1	yellow	Shrub
<i>Codonocarpus cotinifolius</i>	0.6	<1		Shrub
<i>Corchorus sidioides</i>	0.65	<1		Shrub
<i>Cymbopogon ambiguus</i>	0.45	<1		Grass
<i>Cymbopogon obtectus</i>	0.5	<1		Grass
<i>Dichanthium sericeum</i>	0.6	<1		Grass
<i>Digitaria brownie</i>	0.55	<1		Grass
<i>Dodonaea coriacea</i>	0.7	<1		Shrub
<i>Enneapogon lindleyanus</i>	0.3	<1		Grass
<i>Enneapogon polyphyllus</i>	0.35	<1		Grass
<i>Eragrostis eriopoda</i>	0.5	<1		Grass
<i>Eremophila cuneifolia</i>	1.3	<1		Shrub
<i>Eremophila exilifolia</i>	0.4	<1		Shrub
<i>Eremophila latrobei</i> subsp. (indet)	0.65	<1		Shrub
<i>Eremophila latrobei</i> subsp. <i>filiformis</i>	0.65	<1	red	Shrub
<i>Eriachne lanata</i>	0.55	<1		Grass

<i>Eriachne mucronata</i>	0.55	<1		Grass
<i>Eriachne pulchella</i> subsp. <i>dominii</i>	0.7	<1		Grass
<i>Eulalia aurea</i>	0.5	<1		Grass
<i>Evolvulus alsinoides</i> var. (indet)	0.03	<1		Herb
<i>Fimbristylis dichotoma</i>	0.2	<1		Sedge
<i>Gomphrena kanisii</i>	0.3	<1		Herb
<i>Goodenia lamprosperma</i>	0.6	<1		Herb
<i>Goodenia muelleriana</i>	0.3	<1		Herb
<i>Goodenia stobbsiana</i>	0.2	<1		Herb
<i>Goodenia triodophylla</i>	0.35	<1		Herb
<i>Grevillea striata</i>	1	<1		Shrub
<i>Grevillea wickhamii</i> subsp. ? <i>hispidula</i>	1.3	<1		Shrub
<i>Hibiscus burtonii</i>	0.6	<1		Shrub
<i>Hibiscus</i> sp. (indet)	0.1	<1		Shrub
<i>Hybanthus aurantiacus</i>	0.55	<1		Shrub
<i>Keraudrenia</i> sp. (indet)	0.5	<1		Shrub
<i>Lepidium pedicellosum</i>	0.35	<1		Shrub
<i>Maireana georgei</i>	0.35	1		Shrub
<i>Maireana melanocoma</i>	0.3	<1	yellow	Shrub
<i>Maireana thesioides</i>	0.7	<1		Shrub
<i>Maireana tomentosa</i> var. <i>tomentosa</i>	0.25	<1		Shrub
<i>Paspalidium clementii</i>	0.1	<1		Grass
<i>Polycarpaea corymbosa</i>	0.1	<1	white	Herb
* <i>Portulaca oleracea</i>	0.02	<1		Herb
<i>Ptilotus astrolasius</i>	0.5	<1	white	Shrub
<i>Ptilotus calostachyus</i>	0.6	<1	pink	Herb
<i>Ptilotus clementii</i>	0.1	<1		Herb
<i>Ptilotus exaltatus</i>	0.3	<1	purple	Herb
<i>Ptilotus obovatus</i>	0.35	<1	white	Shrub
<i>Salsola ? australis</i>	0.25	<1		Herb
<i>Scaevola parviflora</i> subsp. (indet)	0.25	<1		Herb
<i>Scaevola spinescens</i>	0.55	<1		Shrub
<i>Sclerolaena cornishiana</i>	0.3	<1		Shrub
<i>Sclerolaena eriacantha</i>	0.2	<1		Herb
<i>Senna artemisioides</i> subsp. <i>helmsii</i>	0.4	<1		Shrub
<i>Senna glaucifolia</i>	0.9	<1		Shrub
<i>Senna glutinosa</i> subsp. <i>glutinosa</i>	1.2	<1		Shrub
<i>Senna glutinosa</i> subsp. <i>x leurrssenii</i>	1.2	2.1		Shrub
<i>Senna glutinosa</i> subsp. <i>pruinosa</i>	1.4	<1		Shrub
<i>Senna stricta</i>	0.9	<1		Shrub
<i>Sida cardiophylla</i>	0.5	<1		Shrub
<i>Sida</i> sp. <i>Excedentifolia</i> (J.L. Egan 1925)	0.25	<1		Shrub
<i>Solanum centrale</i>	0.25	<1		Shrub
<i>Solanum ellipticum</i>	0.35	<1		Shrub
<i>Solanum lasiophyllum</i>	0.6	<1	purple	Shrub
<i>Solanum sturtianum</i>	0.6	<1	purple	Shrub
<i>Sporobolus australasicus</i>	0.2	<1	purple	Grass
<i>Themeda triandra</i>	0.6	<1	brown	Grass
<i>Tragus australianus</i>	0.15	<1		Grass
<i>Tribulus suberosus</i>	0.5	<1		Shrub
<i>Triodia angusta</i>	0.95	15		Hummock Grass
<i>Triodia epactia</i>	1	<1		Hummock Grass
<i>Triodia</i> sp. Shovelanna Hill (S.van Leeuwen 3835)	0.65	20		Hummock Grass
<i>Tripogon loliformis</i>	0.1	<1		Grass
Unknown sp. (indet)	0.15	<1		Herb



Site WHN-01

FLORA QUADRAT DATA SHEET

Location	WHN-02	Date 17.05.2011
		Surveyor K. McCreery, A. Cole & R. Tomanovic
Quadrat Dimension	50x50m	Quadrat Orientation 0°
GPS Location	Easting: 201837 Northing: 7416734	GPS Location Relative to Quadrat NW
Soil Type	Sandy Loam	Soil Colour Red
Topography/Aspect	Plain, very gently inclined / 0°	Disturbance Type Weeds
Vegetation Condition	Excellent	
Broad Floristic Formation	<i>Triodia</i> Hummock Grassland	
Vegetation Association	5c - Hummock Grassland of <i>Triodia lanigera</i> and <i>Triodia</i> sp. Shovelanna Hill (S.van Leeuwen 3835) with Open Shrubland of <i>Hakea lorea</i> subsp. <i>lorea</i> , <i>Acacia ancistrocarpa</i> and <i>Acacia adsurgens</i> with Scattered Low Trees of <i>Corymbia hamersleyana</i> and <i>Acacia pruinocarpa</i>	
Vegetation Sub-association	Scattered Low Trees of <i>Corymbia candida</i> subsp. <i>dipsodes</i> over Shrubland of <i>Hakea lorea</i> subsp. <i>lorea</i> , <i>Acacia ancistrocarpa</i> , <i>Acacia citrinoviridis</i> , <i>Acacia adsurgens</i> and <i>Acacia melleodora</i> over Low Scattered Shrubs of <i>Bonamia</i> sp. 1 (indet), <i>Solanum sturtianum</i> , <i>Hibiscus burtonii</i> , <i>Enchylaena tomentosa</i> and <i>Halgania solanacea</i> var. Mt Doreen (G.M. Chippendale 4206) over Hummock Grassland of <i>Triodia lanigera</i> and <i>Triodia</i> sp. Shovelanna Hill (S.van Leeuwen 3835)	

Vascular plant species recorded

Species	Plant Height (m)	Coverage (%)	Flowers	Growth Form
<i>Acacia adsurgens</i>	1.7	<1		Shrub
<i>Acacia ancistrocarpa</i>	1.6	20		Shrub
<i>Acacia citrinoviridis</i>	2	<1		Tree
<i>Acacia melleodora</i>	1.2	<1		Shrub
<i>Acacia pachyacra</i>	1.1	<1		Shrub
<i>Amphipogon sericeus</i>	0.35	<1		Grass
<i>Aristida inaequiglumis</i>	0.8	<1		Grass
* <i>Bidens bipinnata</i>	0.2	<1		Herb
<i>Bonamia</i> sp. (indet)	0.4	<1		Shrub
<i>Cassytha capillaris</i>	0.3	<1		Vine
<i>Corymbia candida</i> subsp. <i>dipsodes</i>	4	<1		Tree
<i>Corymbia deserticola</i> subsp. <i>deserticola</i>	4.5	<1		Tree
<i>Corymbia hamersleyana</i>	6	<1		Tree
<i>Dichanthium sericeum</i>	0.65	<1		Grass
<i>Dodonaea coriacea</i>	0.65	<1		Shrub
<i>Duperreya commixta</i>	1.5	<1		Vine
<i>Enchylaena tomentosa</i>	0.75	<1		Shrub
<i>Eragrostis eriopoda</i>	0.45	<1		Grass
<i>Eremophila forrestii</i> subsp. (indet)	0.8	<1		Shrub
<i>Gossypium australe</i>	0.05	<1		Shrub
<i>Hakea lorea</i> subsp. <i>lorea</i>	2	1		Shrub
<i>Halgania solanacea</i> var. Mt Doreen (G.M. Chippendale 4206)	0.55	<1		Shrub
<i>Hibiscus burtonii</i>	0.75	<1		Shrub
<i>Hibiscus sturtii</i> var. (indet)	0.5	<1		Shrub
<i>Hybanthus aurantiacus</i>	0.3	<1		Shrub
<i>Scaevola parvifolia</i> subsp. (indet)	0.35	<1		Shrub
<i>Senna glutinosa</i> subsp. <i>glutinosa</i>	1.3	<1		Shrub
<i>Senna glutinosa</i> subsp. <i>pruinosa</i>	0.3	<1		Shrub
<i>Sida cardiophylla</i>	0.4	<1		Shrub
<i>Sida</i> sp. Shovelanna Hill (S. van Leeuwen 3842)	0.35	<1		Shrub
<i>Solanum sturtianum</i>	0.8	<1		Shrub
<i>Triodia lanigera</i>	0.75	50		Hummock Grass
<i>Triodia</i> sp. Shovelanna Hill (S.van Leeuwen 3835)	0.65	<1		Hummock Grass



Site WHN-02

FLORA QUADRAT DATA SHEET

Location	WHN-03	Date 17.05.2011 & 04.10.2011 Surveyor K. McCreery, A. Cole & R. Tomanovic
Quadrat Dimension	50x50m	Quadrat Orientation 0°
GPS Location	Easting: 205119 Northing: 7416257	GPS Location Relative to Quadrat NW
Soil Type	Clay Loam	Soil Colour Red
Topography/Aspect	Drainage depression, very gently inclined / 0°	Disturbance Type Cattle
Vegetation Condition	Good	
Broad Floristic Formation	Acacia High Shrubland	
Vegetation Association	4a - High Shrubland of <i>Acacia monticola</i> , <i>Rulingia luteiflora</i> and <i>Gossypium robinsonii</i> with Low Woodland of <i>Corymbia hamersleyana</i> , <i>Eucalyptus victrix</i> and <i>Eucalyptus leucophloia</i> subsp. <i>leucophloia</i> over Very Open Tussock Grassland of <i>Themeda triandra</i> , <i>*Cenchrus ciliaris</i> and <i>Cymbopogon procerus</i>	
Vegetation Sub-association	Low Open Woodland of <i>Corymbia hamersleyana</i> and <i>Acacia aptaneura</i> over High Shrubland of <i>Acacia monticola</i> , <i>Acacia ancistrocarpa</i> <i>Acacia tenuissima</i> , <i>Grevillea wickhamii</i> subsp. <i>hispidula</i> and <i>Acacia wanyu</i> over Shrubland of <i>Acacia pyrifolia</i> , <i>Santalum lanceolatum</i> , <i>Acacia maitlandii</i> , <i>Petalostylis labicheoides</i> and <i>Scaevola spinescens</i> over Closed Tussock Grassland of <i>*Cenchrus ciliaris</i> , and <i>Themeda triandra</i>	

Vascular plant species recorded

Species	Plant Height (m)	Coverage (%)	Flowers	Growth Form
<i>Abutilon lepidum</i>	0.5	<1		Shrub
<i>Acacia adsurgens</i>	1.8	<1	yellow	Shrub
<i>Acacia ancistrocarpa</i>	2.2	2		Shrub
<i>Acacia aptaneura</i>	7	<1		Tree
<i>Acacia bivenosa</i>	2.5	<1		Shrub
<i>Acacia elachantha</i>	2.5	<1	yellow	Shrub
<i>Acacia maitlandii</i>	1.8	1	yellow	Shrub
<i>Acacia monticola</i>	2.5	15	yellow	Shrub
<i>Acacia pyrifolia</i>	2	10		Shrub
<i>Aristida sibirica</i>	2.5	<1		Shrub
<i>Acacia tenuissima</i>	2.3	1	yellow	Shrub
<i>Acacia tetragonophylla</i>	1.5	<1		Shrub
<i>Acacia wanyu</i>	2.1	<1	yellow	Shrub
<i>Amaranthus ? clementii</i>	0.6	<1	green	Herb
<i>Aristida holathera</i> var. <i>holathera</i>	0.4	<1		Grass
<i>Aristida inaequiglumis</i>	0.9	<1		Grass
<i>*Bidens bipinnata</i>	0.3	<1		Herb
<i>Boerhavia coccinea</i>	0.15	<1		Herb
<i>Cassytha capillaris</i>	0.5	<1		Vine
<i>*Cenchrus ciliaris</i>	0.4	75		Grass
<i>Chrysocephalum pterochaetum</i>	0.1	<1		Shrub
? <i>Chrysocephalum</i> sp. (indet)	0.4	<1		Shrub
<i>Chrysopogon fallax</i>	0.1	<1		Grass
<i>Cleome viscosa</i>	0.4	<1		Herb
<i>Clerodendrum tomentosum</i> var. <i>lanceolatum</i>	1.3	<1		Shrub
<i>Corchorus lasiocarpum</i> subsp. <i>lasiocarpus</i>	0.4	<1		Shrub
<i>Corymbia hamersleyana</i>	10	4		Tree
<i>Crotalaria medicaginea</i>	0.8	<1		Shrub
<i>Cullen leucochaites</i>	0.45	<1		Shrub
<i>Cymbopogon obtectus</i>	0.6	<1		Grass
<i>Cymbopogon procerus</i>	1.2	<1		Grass
<i>Duperreya commixta</i>	0.8	<1		Vine

<i>Enneapogon polyphyllus</i>	0.2	<1		Grass
<i>Enneapogon robustissimus</i>	0.3	<1		Grass
<i>Eragrostis cumingii</i>	0.4	<1		Grass
<i>Eragrostis eriopoda</i>	0.3	<1		Grass
<i>Eremophila fraseri</i> subsp. <i>fraseri</i>	0.6	<1		Shrub
<i>Eremophila longifolia</i>	1.8	<1		Shrub
<i>Eriachne tenuiculmis</i>	0.55	<1		Grass
<i>Eulalia aurea</i>	1.1	<1		Grass
<i>Euphorbia alsiniflora</i>	0.55	<1	white	Herb
<i>Evolvulus alsinoides</i> var. (indet)	0.3	<1		Herb
<i>Evolvulus alsinoides</i> var. <i>decumbens</i>	0.3	<1		Herb
<i>Gomphrena kanisii</i>	0.3	<1		Herb
<i>Goodenia muelleriana</i>	0.5	<1		Herb
<i>Gossypium robinsonii</i>	0.5	<1		Shrub
<i>Grevillea wickhamii</i> subsp. <i>hispidula</i>	2.2	<1	red	Shrub
<i>Hibiscus sturtii</i> var. <i>platychlams</i>	0.3	<1		Shrub
<i>Hybanthus aurantiacus</i>	0.4	<1		Shrub
<i>Indigofera monophylla</i>	0.4	<1	pink	Shrub
<i>Ipomoea polymorpha</i>	0.3	<1		Herb
<i>Melhania oblongifolia</i>	0.5	<1	yellow	Shrub
<i>Paraneurachne muelleri</i>	0.4	<1		Grass
<i>Perotis rara</i>	0.25	<1		Grass
<i>Petalostylis labicheoides</i>	1.7	1		Shrub
<i>Phyllanthus erwinii</i>	0.1	<1		Herb
<i>Polycarpaea longiflora</i>	0.45	<1	pink	Herb
* <i>Portulaca oleracea</i>	0.03	<1		Herb
<i>Pterocaulon ? serrulatum</i>	0.7	<1		Herb
<i>Pterocaulon sphacelatum</i>	0.5	<1		Herb
<i>Ptilotus astrolasius</i>	0.35	<1		Shrub
<i>Ptilotus exaltatus</i>	0.5	<1		Herb
<i>Ptilotus obovatus</i>	0.6	<1		Shrub
<i>Rhynchosia minima</i>	0.5	<1		Vine
<i>Rulingia luteiflora</i>	2.3	<1		Shrub
<i>Salsola ? australis</i>	0.4	<1		Herb
<i>Santalum lanceolatum</i>	1.1	3		Shrub
<i>Scaevola spinescens</i>	1.5	1		Shrub
<i>Senna artemisioides</i> subsp. <i>helmsii</i>	0.35	<1		Shrub
<i>Senna artemisioides</i> subsp. <i>oligophylla</i>	1.6	<1		Shrub
<i>Sida arenicola</i>	0.7	<1		Shrub
<i>Sida echinocarpa</i>	0.2	<1		Shrub
<i>Sida</i> sp. spiciform panicles (E. Leyland sn 14/8/90)	0.6	<1		Shrub
<i>Solanum ellipticum</i>	0.2	<1		Shrub
<i>Solanum sturtianum</i>	0.4	<1		Shrub
<i>Tephrosia rosea</i> var. <i>glabrior</i>	0.65	<1		Shrub
<i>Themeda triandra</i>	0.8	5		Grass
<i>Trichodesma zeylanicum</i> var. <i>zeylanicum</i>	0.65	<1		Shrub
<i>Triodia epactia</i>	1	<1		Hummock Grass
<i>Triraphis mollis</i>	0.5	<1		Grass



Site WHN-03

FLORA QUADRAT DATA SHEET

Location	WHN-04	Date 18.05.2011 Surveyor K. McCreery
Quadrat Dimension	50x50m	Quadrat Orientation 0°
GPS Location	Easting: 201775 Northing: 7415472	GPS Location Relative to Quadrat NW
Soil Type	Sandy Clay Loam	Soil Colour Red
Topography/Aspect	Hillcrest, moderately inclined / 0°	Disturbance Type None
Vegetation Condition	Excellent	
Broad Floristic Formation	<i>Triodia</i> Hummock Grassland	
Vegetation Association	5h - Hummock Grassland of <i>Triodia</i> sp. Shovelanna Hill (S.van Leeuwen 3835), <i>Triodia epactia</i> and <i>Triodia brizoides</i> with High Open Shrubland of <i>Acacia bivenosa</i> and <i>Acacia tetragonophylla</i> with Scattered Low Trees of <i>Eucalyptus leucophloia</i> subsp. <i>leucophloia</i> and <i>Acacia aptaneura</i>	
Vegetation Sub-association	Scattered Low Trees of <i>Eucalyptus leucophloia</i> subsp. <i>leucophloia</i> and <i>Acacia pruinocarpa</i> over Scattered Tall Shrubs of <i>Acacia bivenosa</i> over Open Shrubland of <i>Acacia maitlandii</i> , <i>Grevillea wickhamii</i> subsp. <i>aprica</i> and <i>Senna glutinosa</i> subsp. <i>pruinosa</i> over Low Scattered Shrubs of <i>Acacia pachyacra</i> , <i>Eremophila latrobei</i> subsp. <i>latrobei</i> and <i>Senna stricta</i> over Hummock Grassland of <i>Triodia</i> sp. Shovelanna Hill (S.van Leeuwen 3835) and <i>Triodia epactia</i>	

Vascular plant species recorded

Species	Plant Height (m)	Coverage (%)	Flowers	Growth Form
<i>Acacia adsurgens</i>	0.8	<1		Shrub
<i>Acacia ancistrocarpa</i>	1.5	<1		Shrub
<i>Acacia bivenosa</i>	2.2	<1		Shrub
<i>Acacia maitlandii</i>	1.8	2		Shrub
<i>Acacia melleodora</i>	0.5	<1		Shrub
<i>Acacia pachyacra</i>	0.8	1		Shrub
<i>Acacia pruinocarpa</i>	3.5	<1		Tree
<i>Acacia tetragonophylla</i>	1.2	<1		Shrub
<i>Bulbostylis barbata</i>	0.05	<1		Sedge
<i>Eremophila cuneifolia</i>	0.3	<1		Shrub
<i>Eremophila latrobei</i> subsp. (indet)	0.6	<1		Shrub
<i>Eremophila latrobei</i> subsp. <i>latrobei</i>	0.8	<1	red	Shrub
<i>Eriachne mucronata</i>	0.3	<1		Grass
<i>Eriachne pulchella</i> subsp. <i>dominii</i>	0.1	<1		Grass
<i>Eucalyptus leucophloia</i> subsp. <i>leucophloia</i>	4.5	1		Tree
<i>Fimbristylis dichotoma</i>	0.2	<1		Sedge
<i>Goodenia lamprosperma</i>	0.2	<1		Herb
<i>Grevillea wickhamii</i> subsp. <i>aprica</i>	1.5	<1	red	Shrub
<i>Halgania solanacea</i> var. Mt Doreen (G.M. Chippendale 4206)	0.2	<1		Shrub
<i>Hibiscus sturtii</i> var. (indet)	0.2	<1		Shrub
<i>Indigofera monophylla</i>	0.2	<1		Shrub
<i>Keraudrenia</i> sp. (indet)	0.2	<1		Shrub
<i>Maireana melanocoma</i>	0.4	<1		Shrub
<i>Paraneurachne muelleri</i>	0.2	<1		Grass
<i>Paspalidium clementii</i>	0.2	<1		Grass
<i>Ptilotus obovatus</i>	0.8	<1		Shrub
<i>Ptilotus rotundifolius</i>	0.6	<1		Shrub
<i>Scaevola acacioides</i>	0.8	<1		Shrub
<i>Senna glutinosa</i> subsp. <i>glutinosa</i>	1.2	<1		Shrub
<i>Senna glutinosa</i> subsp. <i>pruinosa</i>	1.2	<1		Shrub
<i>Senna stricta</i>	0.8	<1		Shrub
<i>Solanum phlomoides</i>	0.3	<1		Shrub

<i>Triodia epactia</i>	1.2	3	Hummock Grass
<i>Triodia</i> sp. Shovelanna Hill (S.van Leeuwen 3835)	0.8	40	Hummock Grass



Site WHN-04

FLORA QUADRAT DATA SHEET

Location	WHN-05	Date 18.05.2011 Surveyor K. McCreery
Quadrat Dimension	50x50m	Quadrat Orientation 0°
GPS Location	Easting: 202086 Northing: 7415691	GPS Location Relative to Quadrat NW
Soil Type	Loamy sand	Soil Colour Red
Topography/Aspect	Drainage Depression, gently inclined / 0°	Disturbance Type Fire
Vegetation Condition	Excellent	
Broad Floristic Formation	Acacia High Shrubland	
Vegetation Association	4a - High Shrubland of <i>Acacia monticola</i> , <i>Rulingia luteiflora</i> and <i>Gossypium robinsonii</i> with Low Woodland of <i>Corymbia hamersleyana</i> , <i>Eucalyptus victrix</i> and <i>Eucalyptus leucophloia</i> subsp. <i>leucophloia</i> over Very Open Tussock Grassland of <i>Themeda triandra</i> , * <i>Cenchrus ciliaris</i> and <i>Cymbopogon procerus</i>	
Vegetation Sub-association	Low Open Woodland of <i>Eucalyptus gamophylla</i> , <i>Eucalyptus trivalva</i> , <i>Eucalyptus leucophloia</i> subsp. <i>leucophloia</i> and <i>Acacia aptaneura</i> over High Shrubland of <i>Acacia monticola</i> and <i>Acacia bivenosa</i> over Shrubland of <i>Acacia pachyacra</i> , <i>Acacia adsurgens</i> , <i>Rulingia luteiflora</i> , <i>Acacia sibirica</i> and <i>Gossypium robinsonii</i> over Low Scattered Shrubs of <i>Hybanthus aurantiacus</i> , <i>Corchorus sidioides</i> subsp. <i>sidioides</i> and <i>Indigofera monophylla</i> over Open Hummock Grassland of <i>Triodia epactia</i> .	

Vascular plant species recorded

Species	Plant Height (m)	Coverage (%)	Flowers	Growth Form
<i>Acacia adsurgens</i>	1.3	3		Shrub
<i>Acacia aptaneura</i>	3.5	1		Tree
<i>Acacia bivenosa</i>	2.5	<1		Shrub
<i>Acacia monticola</i>	3	25	yellow	Shrub
<i>Acacia pachyacra</i>	1.3	5		Shrub
<i>Acacia pruinocarpa</i>	4.5	<1		Tree
<i>Acacia sibirica</i>	1.5	2		Shrub
<i>Acacia tenuissima</i>	1	<1		Shrub
<i>Acacia tetragonophylla</i>	1.3	<1		Shrub
<i>Aristida holathera</i> var. <i>holathera</i>	0.5	<1		Grass
<i>Aristida inaequiglumis</i>	1.2	<1		Grass
<i>Aristida ? jerichoensis</i> var. <i>subspinulifera</i>	1.2	<1		Grass
<i>Cassytha capillaris</i>	0.5	<1		Vine
<i>Corchorus sidioides</i> subsp. <i>sidioides</i>	0.4	<1		Shrub
<i>Cymbopogon ambiguus</i>	0.9	<1		Grass
<i>Cymbopogon procerus</i>	1.2	<1		Grass
<i>Digitaria brownii</i>	0.4	<1		Grass
<i>Duperreya commixta</i>	2	<1		Vine
<i>Enneapogon polyphyllus</i>	0.3	<1		Grass
<i>Enneapogon robustissimus</i>	0.6	<1		Grass
<i>Eragrostis cumingii</i>	0.4	<1		Grass
<i>Eragrostis eriopoda</i>	0.4	<1		Grass
<i>Eremophila latrobei</i> subsp. <i>latrobei</i>	1.2	<1		Shrub
<i>Eriachne mucronata</i>	0.6	<1		Grass
<i>Eriachne pulchella</i> subsp. <i>dominii</i>	0.1	<1		Grass
<i>Eucalyptus gamophylla</i>	4.5	3		Tree
<i>Eucalyptus leucophloia</i> subsp. <i>leucophloia</i>	5	1		Tree
<i>Eucalyptus trivalva</i>	4	2		Tree
<i>Eulalia aurea</i>	0.6	<1		Grass
<i>Evolvulus alsinoides</i> var. <i>villosicalyx</i>	0.2	<1	blue	Herb
<i>Gompholobium</i> sp. Pilbara (N.F. Norris 908)	0.5	<1		Shrub
<i>Goodenia muelleriana</i>	0.3	<1		Herb
<i>Gossypium robinsonii</i>	1.8	<1		Shrub

<i>Halgania solanacea</i> var. Mt Doreen (G.M. Chippendale 4206)	0.2	<1		Shrub
<i>Hibiscus coatesii</i>	0.8	<1		Shrub
<i>Hibiscus sturtii</i> var. <i>truncatus</i>	0.3	<1		Shrub
<i>Hybanthus aurantiacus</i>	0.4	1		Shrub
<i>Indigofera monophylla</i>	0.3	<1		Shrub
<i>Isotropis atropurpurea</i>	0.4	<1		Shrub
<i>Keraudrenia ? nephrosperma</i>	0.4	<1		Shrub
<i>Panicum effusum</i>	0.2	<1		Grass
<i>Paspalidium clementii</i>	0.1	<1		Grass
<i>Phyllanthus erwinii</i>	0.1	<1		Herb
<i>Pterocaulon ? serrulatum</i>	0.3	<1		Herb
<i>Ptilotus calostachyus</i>	0.4	<1		Herb
<i>Ptilotus exaltatus</i>	0.1	<1		Herb
<i>Rulingia luteiflora</i>	1.5	2		Shrub
<i>Santalum lanceolatum</i>	1.8	1	white	Shrub
<i>Scaevola acacioides</i>	0.6	<1		Shrub
<i>Schizachyrium fragile</i>	0.1	<1		Grass
<i>Senna ? notabilis</i>	0.1	<1		Herb
<i>Senna artemisioides</i> subsp. <i>oligophylla</i> x ? <i>helmsii</i>	0.5	<1		Shrub
<i>Senna artemisioides</i> subsp. <i>oligophylla</i> x ? <i>helmsii</i>	0.4	<1		Shrub
<i>Senna glutinosa</i> subsp. <i>glutinosa</i>	1.3	<1		Shrub
<i>Senna glutinosa</i> subsp. <i>pruinosa</i>	1.2	<1		Shrub
<i>Senna stricta</i>	0.4	<1		Shrub
<i>Solanum ellipticum</i>	0.3	<1		Shrub
<i>Sporobolus australasicus</i>	0.1	<1		Grass
<i>Trichodesma zeylanicum</i> var. <i>zeylanicum</i>	0.3	<1	blue	Shrub
<i>Triodia epactia</i>	0.8	15		Hummock Grass



Site WHN-05

FLORA QUADRAT DATA SHEET

Location	WHN-06	Date 18.05.2011 & 07.10.2011 Surveyor A. Cole & R. Tomanovic
Quadrat Dimension	50x50m	Quadrat Orientation 0°
GPS Location	Easting: 202796 Northing: 7414817	GPS Location Relative to Quadrat NW
Soil Type	Silty Loam	Soil Colour Red
Topography/Aspect	Drainage Depression / 10°	Disturbance Type Weeds
Vegetation Condition	Very good	
Broad Floristic Formation	Acacia High Shrubland	
Vegetation Association	4a - High Shrubland of <i>Acacia monticola</i> , <i>Rulingia luteiflora</i> and <i>Gossypium robinsonii</i> with Low Woodland of <i>Corymbia hamersleyana</i> , <i>Eucalyptus victrix</i> and <i>Eucalyptus leucophloia</i> subsp. <i>leucophloia</i> over Very Open Tussock Grassland of <i>Themeda triandra</i> , * <i>Cenchrus ciliaris</i> and <i>Cymbopogon procerus</i>	
Vegetation Sub-association	Low Open Woodland of <i>Corymbia hamersleyana</i> over Open Scrub of <i>Acacia monticola</i> over Open Shrubland of <i>Acacia pyrifolia</i> , <i>Acacia ancistrocarpa</i> , <i>Petalostylis labicheoides</i> , <i>Hibiscus haynaldii</i> and <i>Grevillea wickhamii</i> subsp. <i>hispidula</i> over Low Scattered Shrubs of <i>Tephrosia rosea</i> var. <i>glabrior</i> , <i>Ptilotus astrolasius</i> , <i>Solanum lasiophyllum</i> , <i>Corchorus sidoides</i> subsp. <i>sidoides</i> and <i>Indigofera monophylla</i> over Very Open Tussock Grassland of <i>Themeda triandra</i> , <i>Cymbopogon obtectus</i> and <i>Eriachne mucronata</i> and Very Open Hummock Grassland of <i>Triodia epactia</i> and <i>Triodia melvillei</i> .	

Vascular plant species recorded

Species	Plant Height (m)	Coverage (%)	Flowers	Growth Form
<i>Abutilon lepidum</i>	0.3	<1		Shrub
<i>Acacia ancistrocarpa</i>	1.9	1		Shrub
<i>Acacia monticola</i>	2.5	45	yellow	Shrub
<i>Acacia monticola</i> hybrid	2.3 (3 wide)	<1		Shrub
<i>Acacia pyrifolia</i>	1.2	2		Shrub
<i>Aristida ? contorta</i>	0.4	<1		Grass
<i>Aristida holathera</i> var. <i>holathera</i>	0.35	<1		Grass
<i>Aristida inaequiglumis</i>	0.8	<1		Grass
<i>Boerhavia coccinea</i>	0.05	<1		Herb
<i>Bonamia</i> sp. (indet)	0.5	<1		Vine
* <i>Cenchrus ciliaris</i>	0.6	<1		Grass
<i>Cleome viscosa</i>	0.45	<1		Herb
<i>Corchorus sidoides</i> subsp. <i>sidoides</i>	0.25	<1		Shrub
<i>Cymbopogon ambiguus</i>	1.1	<1		Grass
<i>Cymbopogon obtectus</i>	0.8	2		Grass
<i>Digitaria brownii</i>	0.55	<1		Grass
<i>Duperreya commixta</i>	0.4	<1		Vine
<i>Enneapogon lindleyanus</i>	0.25	<1		Grass
<i>Enneapogon polyphyllus</i>	0.45	<1		Grass
<i>Enneapogon robustissimus</i>	0.6	<1		Grass
<i>Eragrostis eriopoda</i>	0.2	<1		Grass
<i>Eremophila latrobei</i> subsp. <i>latrobei</i>	1.2	<1		Shrub
<i>Eremophila longifolia</i>	1.7	<1		Shrub
<i>Eriachne aristidea</i>	0.5	<1		Grass
<i>Eriachne mucronata</i>	0.5	1		Grass
<i>Eriachne tenuiculmis</i>	0.65	<1		Grass
<i>Euphorbia alsiniflora</i>	0.35	<1		Herb
<i>Evolvulus alsinoides</i> var. <i>decumbens</i>	0.2	<1		Herb
<i>Evolvulus alsinoides</i> var. <i>villosicalyx</i>	0.03	<1		Herb
<i>Gomphrena kanisii</i>	0.4	<1	white	Herb
<i>Gossypium robinsonii</i>	1.6	<1		Shrub
<i>Grevillea wickhamii</i> subsp. <i>hispidula</i>	0.85	<1	red	Shrub

<i>Hibiscus brachychlaenus</i>	0.3	<1		Shrub
<i>Hibiscus haynaldii</i>	1.7	<1	pink	Shrub
<i>Hybanthus aurantiacus</i>	0.5	<1		Shrub
<i>Indigofera monophylla</i>	0.6	<1	red	Shrub
<i>Isotropis atropurpurea</i>	0.55	<1		Shrub
<i>Jasminum didymum</i> subsp. <i>lineare</i>	0.9	<1		Vine
<i>Paraneurachne muelleri</i>	0.55	<1		Grass
<i>Petalostylis labicheoides</i>	1.3	<1		Shrub
<i>Pterocaulon</i> sp. (indet)	0.6	<1		Herb
<i>Ptilotus astrolasius</i>	0.3	<1	white	Shrub
<i>Ptilotus exaltatus</i>	0.5	<1	purple	Herb
<i>Ptilotus obovatus</i>	0.95	<1		Shrub
<i>Rhynchosia minima</i>	0.3	<1		Vine
<i>Santalum lanceolatum</i>	1.5	<1		Shrub
<i>Scaevola parvifolia</i> subsp. (indet)	0.25	<1		Shrub
<i>Scaevola spinescens</i>	0.75	<1		Shrub
<i>Senna artemisioides</i> subsp. <i>oligophylla</i>	0.2	<1		Shrub
<i>Senna glutinosa</i> subsp. <i>x leurossenii</i>	1	<1		Shrub
<i>Sida</i> ? <i>arenicola</i>	0.3	<1		Shrub
<i>Sida</i> sp. spiciform panicles (E. Leyland sn 14/8/91)	0.35	<1		Shrub
<i>Solanum ellipticum</i>	0.25	<1		Shrub
<i>Solanum lasiophyllum</i>	0.15	<1		Shrub
<i>Solanum sturtianum</i>	0.5	<1		Shrub
<i>Tephrosia rosea</i> var. <i>glabrior</i>	0.3	2		Shrub
<i>Themeda triandra</i>	0.8	3		Grass
<i>Trianthema pilosa</i>	0.05	<1		Herb
<i>Trichodesma zeylanicum</i> var. <i>zeylanicum</i>	0.45	<1	blue	Shrub
<i>Triodia epactia</i>	0.6	1		Hummock Grass
<i>Triodia melvillei</i>	0.75	1		Hummock Grass



Site WHN-06

FLORA QUADRAT DATA SHEET

Location	WHN-07	Date 18.05.2011 & 07.10.2011
		Surveyor A. Cole & R. Tomanovic
Quadrat Dimension	50x50m	Quadrat Orientation 0°
GPS Location	Easting: 202485	GPS Location Relative to Quadrat NW
	Northing: 7414805	
Soil Type	Sandy loam	Soil Colour Orange
Topography/Aspect	Plain, very gently inclined / 280°	Disturbance Type Animal tracks
Vegetation Condition	Very good	
Broad Floristic Formation	<i>Triodia</i> Hummock Grassland	
Vegetation Association	5c - Hummock Grassland of <i>Triodia lanigera</i> and <i>Triodia</i> sp. Shovelanna Hill (S.van Leeuwen 3835) with Open Shrubland of <i>Hakea lorea</i> subsp. <i>lorea</i> , <i>Acacia ancistrocarpa</i> and <i>Acacia adsurgens</i> with Scattered Low Trees of <i>Corymbia hamersleyana</i> and <i>Acacia pruinocarpa</i>	
Vegetation Sub-association	Scattered Low Trees of <i>Acacia pruinocarpa</i> over Open Shrubland of <i>Acacia ancistrocarpa</i> , <i>Acacia adsurgens</i> , <i>Acacia melleodora</i> and <i>Eremophila forrestii</i> subsp. <i>forrestii</i> over Hummock Grassland of <i>Triodia lanigera</i> over Scattered Tussock Grass of <i>Paraneurachne muelleri</i>	

Vascular plant species recorded

Species	Plant Height (m)	Coverage (%)	Flowers	Growth Form
<i>Acacia ancistrocarpa</i>	2.1	<1		Shrub
<i>Acacia melleodora</i>	1.6	2	yellow	Shrub
<i>Acacia pachyacra</i>	3	3		Shrub
<i>Acacia pyrifolia</i>	0.4	<1		Shrub
<i>Aristida holathera</i> var. <i>holathera</i>	0.3	<1		Grass
<i>Aristida</i> ? <i>contorta</i>	0.25	<1		Grass
<i>Bonamia</i> sp. (indet)	0.6	1		Shrub
<i>Cassytha</i> sp. (indet)	0.1	<1		Vine
<i>Cymbopogon ambiguus</i>	0.9	<1		Grass
<i>Cymbopogon oblectus</i>	0.4	<1		Grass
<i>Dicrastylis cordifolia</i>	0.7	<1	pink	Shrub
<i>Dodonaea coriacea</i>	0.65	<1		Shrub
<i>Eriachne aristidea</i>	0.4	<1		Grass
<i>Eulalia aurea</i>	0.4	<1		Grass
<i>Euphorbia</i> aff. <i>Australis</i>	0.15	<1		Herb
<i>Euphorbia tannensis</i> subsp. <i>eremophila</i>	0.7	<1		Herb
<i>Grevillea wickhamii</i> subsp. (indet)	0.05	<1		Shrub
<i>Hakea chordophylla</i>	1.7	<1		Shrub
<i>Hybanthus aurantiacus</i>	0.45	<1		Shrub
<i>Paraneurachne muelleri</i>	0.4	<1		Grass
<i>Paspalidium rarum</i>	0.25	<1		Grass
<i>Ptilotus polystachyus</i>	0.5	<1		Herb
<i>Scaevola parvifolia</i> subsp. (indet)	0.25	<1		Herb
<i>Senna artemisioides</i> subsp. <i>helmsii</i>	0.5	<1		Shrub
<i>Senna glutinosa</i> subsp. <i>x luerssenii</i>	0.8	<1		Shrub
<i>Sida</i> ? <i>arenicola</i>	0.3	<1		Shrub
<i>Sida</i> sp. Golden calyces glabrous (H.N. Foote 32)	1	<1		Shrub
<i>Solanum centrale</i>	0.3	<1		Shrub
<i>Solanum sturtianum</i>	0.65	<1		Shrub
<i>Trichodesma zeylanicum</i> var. <i>zeylanicum</i>	0.2	<1		Shrub
<i>Triodia lanigera</i>	0.75	70		Hummock Grass
<i>Yakirra australiensis</i>	0.15	<1		Grass



Site WHN-07

FLORA QUADRAT DATA SHEET

Location	WHN-08	Date 18.05.2011 & 07.10.2011 Surveyor A. Cole & R. Tomanovic
Quadrat Dimension	50x50m	Quadrat Orientation 0°
GPS Location	Easting: 201934 Northing: 7414962	GPS Location Relative to Quadrat NW
Soil Type	Silty loam	Soil Colour Orange
Topography/Aspect	Drainage Depression, level / 140°	Disturbance Type None
Vegetation Condition	Very good	
Broad Floristic Formation	<i>Triodia</i> Hummock Grassland	
Vegetation Association	5f - Hummock Grassland of <i>Triodia lanigera</i> and <i>Triodia epactia</i> with High Open Shrubland of <i>Acacia bivenosa</i> , <i>Acacia ancistrocarpa</i> and <i>Acacia tenuissima</i> with Very Open Mallee of <i>Eucalyptus gamophylla</i>	
Vegetation Sub-association	Open Woodland of <i>Corymbia hamersleyana</i> over Very Open Mallee of <i>Eucalyptus gamophylla</i> over High Open Shrubland of <i>Acacia bivenosa</i> , <i>Hakea lorea</i> subsp. <i>lorea</i> <i>Acacia ancistrocarpa</i> and <i>Gossypium robinsonii</i> over Open Shrubland of <i>Acacia melleodora</i> , <i>Acacia elachantha</i> and <i>Acacia wanyu</i> over Open Hummock Grassland of <i>Triodia lanigera</i> and <i>Triodia epactia</i>	

Vascular plant species recorded

Species	Plant Height (m)	Coverage (%)	Flowers	Growth Form
<i>Abutilon leucopetalum</i>	0.9	<1		Shrub
<i>Acacia adsurgens</i>	1.3	<1		Shrub
<i>Acacia ancistrocarpa</i>	2	<1		Shrub
<i>Acacia bivenosa</i>	2.5	1		Shrub
<i>Acacia elachantha</i>	1.5	1		Shrub
<i>Acacia melleodora</i>	0.9	2	yellow	Shrub
<i>Acacia tenuissima</i>	1.5	<1		Shrub
<i>Acacia tetragonophylla</i>	0.8	<1		Shrub
<i>Acacia wanyu</i>	1.1	<1		Shrub
<i>Aristida contorta</i>	0.4	<1		Grass
<i>Aristida holathera</i> var. <i>holathera</i>	0.5	<1		Grass
<i>Aristida inaequiglumis</i>	0.9	<1		Grass
<i>Boerhavia coccinea</i>	0.15	<1		Herb
<i>Bonamia</i> sp. (indet)	0.2	<1		Shrub
* <i>Cenchrus ciliaris</i>	0.3	<1		Grass
<i>Chrysopogon fallax</i>	0.75	<1		Grass
<i>Corchorus sidioides</i> subsp. <i>sidioides</i>	0.3	<1		Shrub
<i>Corymbia hamersleyana</i>	6	2		Tree
<i>Cymbopogon ambiguus</i>	0.4	<1		Grass
<i>Dicrastylis cordifolia</i>	0.6	<1		Shrub
<i>Digitaria brownii</i>	0.5	<1		Grass
<i>Duperreya commixta</i>	1	<1		Vine
<i>Enneapogon lindleyanus</i>	0.2	<1		Grass
<i>Enneapogon polyphyllus</i>	0.5	<1		Grass
<i>Eragrostis eriopoda</i>	0.7	<1		Grass
<i>Eriachne mucronata</i>	0.4	<1		Grass
<i>Eucalyptus gamophylla</i>	2.5	7		Tree
<i>Eulalia aurea</i>	0.6	<1		Grass
<i>Euphorbia tannensis</i> subsp. <i>eremophila</i>	0.75	<1		Herb
<i>Evolvulus alsinoides</i> var. <i>villosicalyx</i>	0.6	<1		Herb
<i>Gomphrena kanisii</i>	0.4	<1	pink	Herb
<i>Goodenia vilmoriniae</i>	0.4	<1		Herb
<i>Gossypium robinsonii</i>	1.8	<1		Shrub

<i>Hakea chordophylla</i>	1.6	<1		Shrub
<i>Hakea lorea</i> subsp. <i>lorea</i>	2	<1		Shrub
<i>Hibiscus burtonii</i>	0.5	<1		Shrub
<i>Hibiscus sturtii</i>	0.5	<1		Shrub
<i>Hybanthus aurantiacus</i>	0.3	<1		Shrub
<i>Indigofera</i> ? <i>georgei</i>	0.3	<1		Shrub
<i>Isotropis atropurpurea</i>	0.4	<1		Shrub
<i>Jasminum didymium</i> subsp. <i>lineare</i>	2	<1		Vine
<i>Maireana tomentosa</i> var. <i>tomentosa</i>	0.5	<1		Shrub
<i>Paraneurachne muelleri</i>	0.45	<1		Grass
<i>Ptilotus exaltatus</i>	0.45	<1	purple	Herb
<i>Ptilotus obovatus</i>	0.6	<1		Shrub
<i>Santalum lanceolatum</i>	1.1	<1		Shrub
<i>Scaevola parvifolia</i> subsp. (indet)	0.2	0.5		Herb
<i>Scaevola spinescens</i>	0.9	<1		Shrub
<i>Senna artemisioides</i> subsp. <i>helmsii</i>	0.7	<1		Shrub
<i>Senna artemisioides</i> subsp. <i>oligophylla</i>	1	<1		Shrub
<i>Schizachyrium fragile</i>	0.2	<1		Grass
<i>Senna glaucifolia</i>	0.8	<1		Shrub
<i>Solanum ellipticum</i>	0.25	<1		Shrub
<i>Solanum sturtianum</i>	0.5	<1		Shrub
<i>Swainsona decurrens</i>	0.05	<1		Herb
<i>Themeda triandra</i>	0.7	<1		Grass
<i>Trichodesma zeylanicum</i> var. <i>zeylanicum</i>	0.2	<1		Shrub
<i>Triodia epactia</i>	0.9	15		Hummock Grass
<i>Triodia lanigera</i>	0.9	5		Hummock Grass
<i>Yakirra australiensis</i>	0.15	<1		Grass



Site WHN-08

FLORA QUADRAT DATA SHEET

Location WHN-09 **Date** 19.05.2011 & 05.10.2011
Surveyor K. McCreery

Quadrat Dimension 50x50m **Quadrat Orientation** 0°
GPS Location **Easting:** 203075 **GPS Location Relative to Quadrat** NW
Northing: 7416021

Soil Type Sandy Clay Loam **Soil Colour** Red

Topography/Aspect Hillslope, steep / 340° **Disturbance Type** None

Vegetation Condition Excellent

Broad Floristic Formation *Triodia* Hummock Grassland

Vegetation Association **5b - Hummock Grassland** of *Triodia* sp. Shovelanna Hill (S. van Leeuwen 3835) with **Low Open Shrubland** of *Acacia hilliana*, *Acacia adoxa* var. *adoxa* and *Halgania solanacea* var. Mt Doreen (G.M. Chippendale 4206) with **Scattered Low Trees** of *Eucalyptus leucophloia* subsp. *leucophloia* and *Acacia pruinocarpa*

Vegetation Sub-association Scattered Low Trees of *Eucalyptus leucophloia* subsp. *leucophloia* over Scattered Shrubs of *Hakea chordophylla*, *Senna glutinosa* subsp. *glutinosa*, *Grevillea wickhamii* subsp. ? *hispidula*, *Eremophila latrobei* subsp. *latrobei*, over Hummock Grassland of *Triodia* sp. Shovelanna Hill (S. van Leeuwen 3835) with Low Open Shrubland of *Acacia hilliana*, *Acacia adoxa* var. *adoxa*, *Calytrix carinata* and *Halgania solanacea* var. Mt Doreen (G.M. Chippendale 4206) over Hummock Grassland of *Triodia* sp. Shovelanna Hill (S. van Leeuwen 3835)

Vascular plant species recorded

Species	Plant Height (m)	Coverage (%)	Flowers	Growth Form
<i>Acacia adoxa</i> var. <i>adoxa</i>	0.5	2		Shrub
<i>Acacia bivenosa</i>	1.2	<1		Shrub
<i>Acacia hilliana</i>	0.6	<1		Shrub
<i>Anthobolus leptomerioides</i>	0.5	<1		Shrub
<i>Eremophila latrobei</i> subsp. <i>latrobei</i>	1.2	<1		Shrub
<i>Eriachne mucronata</i>	0.2	<1		Grass
<i>Eriachne pulchella</i> subsp. <i>dominii</i>	0.1	<1		Grass
<i>Eucalyptus leucophloia</i> subsp. <i>leucophloia</i>	3.5	1		Tree
<i>Frankenia setosa</i>	0.1	<1		Shrub
<i>Grevillea wickhamii</i> subsp. ? <i>hispidula</i>	1.6	<1		Shrub
<i>Hakea chordophylla</i>	2	<1		Shrub
<i>Halgania solanacea</i> var. Mt Doreen (G.M. Chippendale 4206)	0.5	<1		Shrub
<i>Keraudrenia</i> sp. (indet)	0.4	<1		Shrub
<i>Ptilotus rotundifolius</i>	0.65	<1		Shrub
<i>Schizachyrium fragile</i>	0.1	<1		Grass
<i>Sclerolaena minuta</i>	0.5	<1		Herb
<i>Senna glutinosa</i> subsp. <i>glutinosa</i>	1.5	<1		Shrub
<i>Senna glutinosa</i> subsp. <i>x leurossenii</i>	1.6	<1		Shrub
<i>Senna glutinosa</i> subsp. <i>pruinosa</i>	1.6	1		Shrub
<i>Solanum centrale</i>	0.1	<1		Shrub
? <i>Stackhousia clementii</i>	0.02	<1		Herb
<i>Tribulus suberosus</i>	1.2	<1		Shrub
<i>Triodia</i> sp. Shovelanna Hill (S. van Leeuwen 3835)	0.8	55		Hummock Grass



Site WHN-09

FLORA QUADRAT DATA SHEET

Location	WHN-10	Date 19.05.2011
		Surveyor A. Cole & R. Tomanovic
Quadrat Dimension	50x50m	Quadrat Orientation 0°
GPS Location	Easting: 202150	GPS Location Relative to Quadrat NW
	Northing: 7416737	
Soil Type	Sandy Loam	Soil Colour Red
Topography/Aspect	Plain, very gently inclined / 340°	Disturbance Type Fire
Vegetation Condition	Very good	
Broad Floristic Formation	Mixed Open Tussock Grassland	
Vegetation Association	9a - Open Tussock Grassland of <i>Themeda triandra</i> , <i>Aristida inaequiglumis</i> and <i>Aristida contorta</i> with Open Shrubland of <i>Acacia monticola</i> , <i>Acacia ancistrocarpa</i> and <i>Grevillea wickhamii</i> subsp. <i>aprica</i> with Scattered Low Trees of <i>Corymbia hamersleyana</i>	
Vegetation Sub-association	Low Open Woodland of <i>Corymbia hamersleyana</i> over Open Shrubland of <i>Acacia monticola</i> , <i>Rulingia luteiflora</i> , <i>Eremophila longifolia</i> , <i>Acacia pyrifolia</i> and <i>Acacia tenuissima</i> over Low Scattered Shrubs of <i>Bonamia</i> sp. 1 (indet), <i>Hibiscus sturtii</i> var. <i>platychlams</i> , <i>Solanum sturtianum</i> and <i>Dicrasyli cordifolia</i> over Open Tussock Grassland of <i>Eulalia aurea</i> , <i>Themeda triandra</i> and <i>Aristida inaequiglumis</i> , <i>Chrysopogon fallax</i> and <i>Aristida holathera</i> var. <i>holathera</i> over Scattered Herbs of <i>Rhynchosia minima</i> , <i>Scaevola parvifolia</i> , <i>Evolvulus alsinoides</i> var. <i>villosicalyx</i> and <i>Chrysocephalum ? apiculatum</i>	

Vascular plant species recorded

Species	Plant Height (m)	Coverage (%)	Flowers	Growth Form
<i>Acacia citrinoviridis</i>	1.6	<1		Tree
<i>Acacia monticola</i>	1.7	2	yellow	Shrub
<i>Acacia pyrifolia</i>	1.1	0.1		Shrub
<i>Acacia tenuissima</i>	1	<1		Shrub
<i>Aristida holathera</i> var. <i>holathera</i>	1	1		Grass
<i>Aristida inaequiglumis</i>	1	5		Grass
<i>Bonamia</i> sp. (indet)	0.45	0.1		Shrub
<i>Chrysocephalum ? apiculatum</i>	0.3	<1	yellow	Herb
<i>Chrysopogon fallax</i>	1.2	1		Grass
<i>Corchorus sidioides</i>	0.25	<1		Shrub
<i>Corymbia hamersleyana</i>	6	5		Tree
<i>Cymbopogon ambiguus</i>	0.7	0.2		Grass
<i>Dicrasyli cordifolia</i>	0.5	<1		Shrub
<i>Digitaria brownii</i>	0.5	<1		Grass
<i>Duperreya commixta</i>	1.2	<1		Vine
<i>Eragrostis eriopoda</i>	0.4	<1		Grass
<i>Eremophila longifolia</i>	1.1	0.1	red	Shrub
<i>Eulalia aurea</i>	0.75	8		Grass
<i>Evolvulus alsinoides</i> var. <i>villosicalyx</i>	0.25	<1		Herb
<i>Gomphrena kanisii</i>	0.3	<1		Herb
<i>Goodenia vilmoriniae</i>	0.45	<1	purple	Herb
<i>Gossypium robinsonii</i>	1.6	<1		Shrub
<i>Hakea lorea</i> subsp. <i>lorea</i>	0.5	<1		Shrub
<i>Hibiscus sturtii</i> var. <i>platychlams</i>	0.3	<1		Shrub
<i>Hybanthus aurantiacus</i>	0.9	0.25		Shrub
<i>Indigofera brevidens</i>	0.25	<1		Shrub
<i>Isotropis atropurpurea</i>	0.5	<1		Shrub
<i>Jasminum didymum</i> subsp. <i>lineare</i>	0.85	<1		Vine
<i>Paraneurachne muelleri</i>	0.5	<1		Grass
<i>Polycarpaea corymbosa</i>	0.05	<1		Herb
<i>Ptilotus exaltatus</i>	0.35	<1		Herb
<i>Ptilotus obovatus</i> (or <i>astrolasius</i>)	0.5	<1		Shrub

<i>Rhynchosia minima</i>	0.2	0.1		Vine
<i>Rulingia luteiflora</i>	1.7	0.5		Shrub
<i>Scaevola parvifolia</i> subsp. (indet)	0.25	1		Herb
<i>Sida arenicola</i>	0.8	<1		Shrub
<i>Sida arsinata</i>	0.25	<1		Shrub
<i>Solanum sturtianum</i>	0.8	<1	purple	Shrub
<i>Tephrosia rosea</i> var. <i>glabrior</i>	0.35	<1		Shrub
<i>Themeda triandra</i>	1.1	6	brown	Grass
<i>Trichodesma zeylanicum</i> var. <i>zeylanicum</i>	0.6	<1		Shrub
<i>Triodia epactia</i>	1.3	<1		Hummock Grass
<i>Triodia lanigera</i>	1	<1		Hummock Grass



Site WHN-10

FLORA QUADRAT DATA SHEET

Location	WHN-11	Date 19.05.2011 & 10.10.2011
		Surveyor K. McCreery
Quadrat Dimension	50x50m	Quadrat Orientation 0°
GPS Location	Easting: 210554 Northing: 7414083	GPS Location Relative to Quadrat NW
Soil Type	Sandy Clay Loam	Soil Colour Red
Topography/Aspect	Hillcrest, steep / 130°	Disturbance Type Exploration track, fire
Vegetation Condition	Excellent	
Broad Floristic Formation	<i>Triodia</i> Open Hummock Grassland	
Vegetation Association	6e - Open Hummock Grassland of <i>Triodia</i> sp. Shovelanna Hill (S.van Leeuwen 3835) and <i>Triodia epactia</i> with Low Open Shrubland of <i>Acacia hilliana</i> , <i>Sida</i> sp. <i>Excedentifolia</i> (J.L. Egan 1925) and <i>Senna glutinosa</i> subsp. <i>pruinosa</i> with Scattered Trees of <i>Eucalyptus leucophloia</i> subsp. <i>leucophloia</i>	
Vegetation Sub-association	Scattered Trees of <i>Eucalyptus leucophloia</i> subsp. <i>leucophloia</i> over Scattered Shrubs of <i>Grevillea wickhamii</i> subsp. <i>aprica</i> , <i>Senna glutinosa</i> subsp. <i>glutinosa</i> and <i>Sida arenicola</i> over Low Open Shrubland of <i>Acacia hilliana</i> , <i>Sida</i> sp. <i>Excedentifolia</i> (J.L. Egan 1925) and <i>Senna glutinosa</i> subsp. <i>pruinosa</i> over Open Hummock Grassland of <i>Triodia</i> sp. Shovelanna Hill (S.van Leeuwen 3835) and <i>Triodia epactia</i>	

Vascular plant species recorded

Species	Plant Height (m)	Coverage (%)	Flowers	Growth Form
<i>Acacia adoxa</i> var. <i>adoxo</i>	0.5	<1		Shrub
<i>Acacia bivenosa</i>	0.2	<1		Shrub
<i>Acacia hilliana</i>	0.5	1		Shrub
<i>Acacia maitlandii</i>	0.5	<1		Shrub
<i>Acacia pruinocarpa</i>	0.8	<1		Tree
<i>Amaranthus</i> ? <i>cuspidifolius</i>	0.2	<1		Herb
<i>Amphipogon sericeus</i>	0.4	<1		Grass
<i>Aristida contorta</i>	0.3	<1		Grass
<i>Aristida holathera</i> var. <i>holathera</i>	0.4	<1		Grass
<i>Aristida inaequiglumis</i>	1	<1		Grass
<i>Bulbostylis barbata</i>	0.1	<1		Sedge
<i>Corchorus lasiocarpus</i> subsp. <i>lasiocarpus</i>	0.3	<1		Shrub
<i>Cymbopogon ambiguus</i>	0.8	<1		Grass
<i>Dampiera candidans</i>	0.6	<1		Shrub
<i>Dodonaea coriacea</i>	0.5	<1		Shrub
<i>Dysphania rhadinostachya</i> subsp. <i>rhadinostachya</i>	0.2	<1		Herb
<i>Enneapogon polyphyllus</i>	0.3	<1		Grass
<i>Eragrostis eriopoda</i>	0.3	<1		Grass
<i>Eriachne aristidea</i>	0.2	<1		Grass
<i>Eriachne mucronata</i>	0.3	<1		Grass
<i>Eriachne pulchella</i> subsp. <i>dominii</i>	0.1	<1		Grass
<i>Eucalyptus leucophloia</i> subsp. <i>leucophloia</i>	5	<1		Tree
<i>Eulalia aurea</i>	0.4	<1		Grass
<i>Fimbristylis simulans</i>	0.2	<1		Sedge
<i>Gompholobium</i> sp. Pilbara (N.F. Norris 908)	0.6	<1		Shrub
<i>Gomphrena kanisii</i>	0.2	<1		Herb
<i>Goodenia lamprosperma</i>	0.2	<1	yellow	Herb
<i>Goodenia ramelii</i>	0.3	<1		Herb
<i>Goodenia stobbsiana</i>	0.4	1		Shrub
<i>Grevillea wickhamii</i> subsp. <i>aprica</i>	1.5	<1	red	Shrub
<i>Hakea lorea</i>	0.6	<1		Shrub
<i>Hibiscus coatesii</i>	0.4	<1		Shrub
<i>Hibiscus sturtii</i> var. <i>truncatus</i>	0.3	<1		Shrub
<i>Indigofera monophylla</i>	0.3	<1		Shrub

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<i>Nicotiana benthamiana</i>	0.3	<1		Herb
<i>Paraneurachne muelleri</i>	0.4	<1		Grass
<i>Paspalidium clementii</i>	0.1	<1		Grass
<i>Ptilotus astrolasius</i>	0.4	<1		Herb
<i>Ptilotus calostachyus</i>	0.5	<1	pink	Herb
<i>Ptilotus exaltatus</i>	0.3	<1		Herb
<i>Scaevola acacioides</i>	0.4	<1		Shrub
<i>Schizachyrium fragile</i>	0.2	<1		Grass
<i>Senna artemisioides</i> subsp. <i>helmsii</i>	0.2	<1		Shrub
<i>Senna glaucifolia</i>	0.3	<1		Shrub
<i>Senna glutinosa</i> subsp. <i>glutinosa</i>	1.2	<1		Shrub
<i>Senna glutinosa</i> subsp. <i>pruinosa</i>	1	1		Shrub
<i>Senna stricta</i>	0.3	<1		Shrub
<i>Senna stricta</i>	0.3	<1		Shrub
<i>Sida arenicola</i>	1	<1		Shrub
<i>Sida</i> sp. <i>Excedentifolia</i> (J.L. Egan 1925)	0.5	1	yellow	Shrub
<i>Sida</i> sp. <i>Pilbara</i> (A.A. Mitchell PRP 1543)	0.4	<1		Shrub
<i>Sida</i> sp. <i>Shovelanna Hill</i> (S. van Leeuwen 3842)	0.3	<1		Shrub
<i>Solanum ellipticum</i>	0.2	<1		Shrub
<i>Solanum phlomoides</i>	0.3	<1	purple	Shrub
<i>Stackhousia</i> sp. <i>swollen gynophore</i> (W.R. Barker 2041)	0.2	<1		Herb
<i>Trachymene oleracea</i> subsp. <i>oleracea</i>	0.1	<1		Herb
<i>Themeda triandra</i>	0.65	<1		Grass
<i>Trianthema glossostigma</i>	0.02	<1		Herb
<i>Tribulus suberosus</i>	0.9	<1		Shrub
<i>Triodia epactia</i>	1.3	2		Hummock Grass
<i>Triodia</i> sp. <i>Shovelanna Hill</i> (S.van Leeuwen 3835)	0.8	10		Hummock Grass
? <i>Vittadinia eremaea</i>	0.1	<1		Herb



Site WHN-11

FLORA QUADRAT DATA SHEET

Location WHN-12 **Date** 19.05.2011
Surveyor A. Cole & R. Tomanovic

Quadrat Dimension 50x50m **Quadrat Orientation** 0°
GPS Location **Easting:** 210222 **GPS Location Relative to Quadrat** NW
Northing: 7413899

Soil Type Silty Loam **Soil Colour** Brown

Topography/Aspect Gully, gently inclined / 180° **Disturbance Type** Fire, cattle

Vegetation Condition Excellent

Broad Floristic Formation *Acacia* Low Woodland

Vegetation Association **2a - Low Woodland** of *Acacia aptaneura*, *Acacia ? pteraneura* and *Acacia pruinocarpa* over **Open Hummock Grassland** of *Triodia epactia* and *Triodia* sp. Shovelanna Hill (S.van Leeuwen 3835) with **Shrubland** of *Acacia wanyu*, *Acacia tetragonophylla* and *Senna stricta*

Vegetation Sub-association Low Woodland of *Acacia aptaneura* over High Open Shrubland of *Eremophila oppositifolia* subsp. *angustifolia*, *Senna glutinosa* subsp. *x luerssenii*, *Acacia tetragonophylla* and *Psydrax suaveolens* Shrubland of *Eremophila cuneifolia*, *Senna stricta*, *Scaevola acacioides*, *Ptilotus obovatus* and *Santalum lanceolatum* over Open Hummock Grassland of *Triodia epactia* and *Triodia* sp. Shovelanna Hill (S.van Leeuwen 3835) over Scattered Tussock Grass of *Paspalidium clementii* and *Eriachne pulchella* subsp. *dominii*

Vascular plant species recorded

Species	Plant Height (m)	Coverage (%)	Flowers	Growth Form
<i>Acacia aptaneura</i>	5	30		Tree
<i>Acacia tetragonophylla</i>	1.8	0.1		Shrub
<i>Anthobolus leptomerioides</i>	0.3	<1		Shrub
<i>Bulbostylis barbata</i>	0.05	<1		Sedge
<i>Dodonaea petiolaris</i>	1.5	<1		Shrub
<i>Enchylaena tomentosa</i>	0.25	<1		Shrub
<i>Eremophila cuneifolia</i>	1.1	23		Shrub
<i>Eremophila oppositifolia</i> subsp. <i>angustifolia</i>	2	3		Shrub
<i>Eriachne pulchella</i> subsp. <i>dominii</i>	0.07	<1		Grass
<i>Evolvulus alsinoides</i> var. <i>decumbens</i>	0.1	<1		Herb
<i>Hibiscus burtonii</i>	0.35	<1		Shrub
<i>Hibiscus</i> sp. (indet)	0.03	<1		Shrub
<i>Maireana georgei</i>	0.2	<1		Shrub
<i>Paspalidium clementii</i>	0.1	1		Grass
* <i>Portulaca oleracea</i>	0.01	<1		Herb
<i>Psydrax latifolia</i>	1	<1		Shrub
<i>Psydrax suaveolens</i>	1.8	<1		Shrub
<i>Ptilotus exaltatus</i>	0.35	<1		Herb
<i>Ptilotus obovatus</i>	1.2	<1		Shrub
<i>Santalum lanceolatum</i>	1.1	<1		Shrub
<i>Scaevola acacioides</i>	0.95	0.1		Shrub
<i>Senna glutinosa</i> subsp. <i>x luerssenii</i>	1.7	0.5		Shrub
<i>Senna stricta</i>	1.1	2		Shrub
<i>Solanum lasiophyllum</i>	0.3	<1		Shrub
<i>Sporobolus australasicus</i>	0.1	<1		Grass
<i>Triodia epactia</i>	0.8	15		Hummock Grass
<i>Triodia</i> sp. Shovelanna Hill (S.van Leeuwen 3835)	0.35	<1		Hummock Grass



Site WHN-12

FLORA QUADRAT DATA SHEET

Location WHN-13 **Date** 20.05.2011
Surveyor K. McCreery

Quadrat Dimension 50x50m **Quadrat Orientation** 0°
GPS Location **Easting:** 211440 **GPS Location Relative to Quadrat** NW
Northing: 7417176

Soil Type Clay Loam **Soil Colour** Red

Topography/Aspect Plain, gently inclined / 50° **Disturbance Type** Cattle

Vegetation Condition Very good

Broad Floristic Formation *Acacia* Low Woodland

Vegetation Association **2c - Low Woodland** of *Acacia aptaneura* and *Corymbia hamersleyana* over **Very Open Shrubland** of *Acacia wanyu*, *Acacia ancistrocarpa* and *Eremophila forrestii* subsp.(indet) over **Very Open Hummock Grassland** of *Triodia epactia* and *Triodia lanigera*

Vegetation Sub-association Low Woodland of *Acacia aptaneura*, *Acacia citrinoviridis* and *Acacia paraneura* over Scattered Tall Shrubs of *Acacia sibirica* and *Eremophila latrobei* subsp. *filiformis* over Open Shrubland of *Acacia wanyu*, *Acacia ancistrocarpa* and *Senna stricta* over Very Open Hummock Grassland of *Triodia epactia* and *Triodia lanigera* over Scattered Tussock Grass of *Aristida inaequiglumis*, *Themeda triandra* and *Eragrostis eriopoda*

Vascular plant species recorded

Species	Plant Height (m)	Coverage (%)	Flowers	Growth Form
<i>Abutilon leucopetalum</i>	0.3	<1		Shrub
<i>Abutilon otocarpum</i>	0.3	<1		Shrub
<i>Acacia ancistrocarpa</i>	1.9	<1		Shrub
<i>Acacia aptaneura</i>	7	10		Tree
<i>Acacia citrinoviridis</i>	3.5	1		Tree
<i>Acacia paraneura</i>	5	4		Tree
<i>Acacia sibirica</i>	3	<1	yellow	Shrub
<i>Acacia wanyu</i>	1.8	1		Shrub
<i>Amyema fitzgeraldii</i>	0.4	<1		Shrub
<i>Aristida contorta</i>	0.3	<1		Grass
<i>Aristida holathera</i> var. <i>holathera</i>	0.4	<1		Grass
<i>Aristida inaequiglumis</i>	0.9	<1		Grass
<i>Boerhavia coccinea</i>	0.01	<1		Herb
<i>Bonamia</i> sp. (indet)	0.3	<1		Shrub
<i>Bulbostylis barbata</i>	0.1	<1		Sedge
* <i>Cenchrus ciliaris</i>	0.5	<1		Grass
<i>Chrysopogon fallax</i>	1.3	<1		Grass
<i>Cleome viscosa</i>	0.3	<1		Herb
<i>Corchorus crozophorifolius</i>	0.6	<1		Shrub
<i>Corchorus sidioides</i> subsp. <i>sidioides</i>	0.4	<1		Shrub
<i>Corymbia hamersleyana</i>	0.3	<1		Tree
<i>Cymbopogon obtectus</i>	0.4	<1		Grass
<i>Digitaria brownii</i>	0.5	<1		Grass
<i>Duperreya commixta</i>	0.8	<1		Vine
<i>Dysphania rhadinostachya</i> subsp. <i>rhadinostachya</i>	0.1	<1		Herb
<i>Enneapogon caeruleascens</i>	0.2	<1		Grass
<i>Eragrostis cumingii</i>	0.2	<1		Grass
<i>Eragrostis eriopoda</i>	0.6	<1		Grass
<i>Eremophila forrestii</i> subsp. (indet)	1.3	<1		Shrub
<i>Eremophila fraseri</i> subsp. <i>fraseri</i>	1	<1		Shrub
<i>Eremophila latrobei</i> subsp. <i>filiformis</i>	2.3	<1	red	Shrub
<i>Eriachne mucronata</i>	0.4	<1		Grass
<i>Euphorbia</i> aff. <i>australis</i>	0.1	<1		Herb
<i>Evolvulus alsinoides</i> var. <i>villosicalyx</i>	0.3	<1		Herb

<i>Glycine canescens</i>	0.4	<1		Vine
<i>Gomphrena kanisii</i>	0.2	<1		Herb
<i>Goodenia prostrata</i>	0.01	<1	yellow	Herb
<i>Heliotropium inexplicitum</i>	0.1	<1		Herb
<i>Hibiscus burtonii</i>	0.3	<1		Shrub
<i>Hibiscus sturtii</i> var. <i>platychlams</i>	0.3	<1		Shrub
<i>Hybanthus aurantiacus</i>	0.4	<1		Shrub
<i>Iseilema dolichotrichum</i>	0.05	<1		Grass
<i>Maireana planifolia</i>	0.3	<1		Shrub
<i>Melhania oblongifolia</i>	0.2	<1		Shrub
<i>Paraneurachne muelleri</i>	0.3	<1		Grass
<i>Paspalidium rarum</i>	0.2	<1		Grass
<i>Polycarpaea corymbosa</i>	0.2	<1		Herb
<i>Polygala isingii</i>	0.01	<1		Herb
* <i>Portulaca oleracea</i>	0.1	<1		Herb
<i>Portulaca pilosa</i>	0.1	<1		Herb
<i>Ptilotus astrolasius</i>	0.4	<1		Shrub
<i>Ptilotus exaltatus</i>	0.1	<1		Herb
<i>Ptilotus obovatus</i>	0.2	<1		Shrub
<i>Ptilotus polystachyus</i>	0.4	<1	green	Herb
<i>Rhagodia eremaea</i>	1.2	<1		Shrub
<i>Salsola ? australis</i>	0.2	<1		Herb
<i>Sclerolaena cornishiana</i>	0.3	<1		Shrub
<i>Senna ? notabilis</i>	0.2	<1		Herb
<i>Senna artemisioides</i> subsp. <i>helmsii</i>	0.2	<1		Shrub
<i>Senna artemisioides</i> subsp. <i>oligophylla</i>	0.8	<1		Shrub
<i>Senna stricta</i>	1.5	<1		Shrub
<i>Sida echinocarpa</i>	0.3	<1		Shrub
<i>Sida fibulifera</i>	0.2	<1		Shrub
<i>Sida platycalyx</i>	0.01	<1		Shrub
<i>Solanum ellipticum</i>	0.2	<1		Shrub
<i>Solanum phlomoides</i>	0.3	<1	purple	Shrub
<i>Solanum sturtianum</i>	0.9	<1		Grass
<i>Tephrosia</i> aff. <i>sphaerospora</i>	0.1	<1		Shrub
<i>Tephrosia rosea</i> var. <i>glabrior</i>	0.6	<1		Shrub
<i>Themeda triandra</i>	0.9	<1		Grass
<i>Tribulus ? forrestii</i> (or ? <i>macrocarpus</i>)	0.01	<1	yellow	Herb
<i>Trichodesma zeylanicum</i> var. <i>zeylanicum</i>	0.3	<1		Shrub
<i>Triodia epactia</i>	1.2	2		Hummock Grass
<i>Triodia lanigera</i>	0.9	2		Hummock Grass
<i>Triumfetta leptacantha</i>	0.3	<1		Shrub
<i>Yakirra australiensis</i>	0.1	<1		Grass



Site WHN-13

FLORA QUADRAT DATA SHEET

Location	WHN-14	Date 20.05.2011 & 06.10.2011 Surveyor A. Cole & R. Tomanovic
Quadrat Dimension	50x50m	Quadrat Orientation 0°
GPS Location	Eastings: 210783 Northing: 7418265	GPS Location Relative to Quadrat NW
Soil Type	Silty Clay Loam	Soil Colour Brown
Topography/Aspect	Drainage Depression, very gently inclined / 180°	Disturbance Type Cattle and/or feral animals
Vegetation Condition	Good	
Broad Floristic Formation	Mixed Tussock Grassland	
Vegetation Association	8a - Tussock Grassland of <i>Eulalia aurea</i> , <i>Themeda triandra</i> and <i>Aristida inaequiglumis</i> with Low Open Woodland of <i>Corymbia hamersleyana</i> , <i>Acacia aptaneura</i> and <i>Acacia citrinoviridis</i> over Open Shrubland of <i>Acacia ancistrocarpa</i> , <i>Gossypium robinsonii</i> and <i>Acacia pyrifolia</i> .	
Vegetation Sub-association	Low Open Woodland of <i>Corymbia hamersleyana</i> over High Shrubland of <i>Acacia citrinoviridis</i> , <i>Acacia ancistrocarpa</i> , <i>Acacia pyrifolia</i> , <i>Acacia maitlandii</i> and <i>Acacia monticola</i> over Low Open Shrubland of <i>Abutilon otocarpum</i> , <i>Acacia sclerosperma</i> subsp. <i>sclerosperma</i> , <i>Bonamia</i> sp. 1 (indet) and <i>Melhania oblongifolia</i> over Open Hummock Grassland of <i>Triodia epactia</i> Very Open Tussock Grassland of <i>*Cenchrus ciliaris</i> and <i>Chrysopogon fallax</i>	

Vascular plant species recorded

Species	Plant Height (m)	Coverage (%)	Flowers	Growth Form
<i>Abutilon macrum</i>	0.7	<1	yellow	Shrub
<i>Abutilon otocarpum</i>	0.25	4		Shrub
<i>Acacia ancistrocarpa</i>	2	3	yellow	Shrub
<i>Acacia aptaneura</i>	1.4	<1		Tree
<i>Acacia citrinoviridis</i>	3	5		Tree
<i>Acacia dictyophleba</i>	0.5	<1		Shrub
<i>Acacia maitlandii</i>	2.5	0.5	yellow	Shrub
<i>Acacia monticola</i>	3	0.1	yellow	Shrub
<i>Acacia pyrifolia</i>	2	3		Shrub
<i>Acacia sclerosperma</i> subsp. <i>sclerosperma</i>	1	2	yellow	Shrub
<i>Acacia tenuissima</i>	2.5	<1		Shrub
<i>Aristida holathera</i> var. <i>holathera</i>	0.3	<1		Grass
<i>Bergia pedicellaris</i>	0.1	<1		Herb
<i>Bonamia</i> sp. (indet)	0.25	<1		Shrub
<i>*Cenchrus ciliaris</i>	0.6	7		Grass
<i>Chrysopogon fallax</i>	0.9	0.5		Grass
<i>Clerodendrum tomentosum</i> var. <i>lanceolatum</i>	1.8	<1		Shrub
<i>Cleome viscosa</i>	0.4	<1		Herb
<i>Corchorus sidioides</i>	0.15	<1		Shrub
<i>Corymbia hamersleyana</i>	5	7		Tree
<i>Cymbopogon obtectus</i>	0.35	<1		Grass
<i>Duperreya commixta</i>	0.2	<1		Vine
<i>Eriachne tenuiculmis</i>	0.65	<1		Grass
<i>Euphorbia tannensis</i> subsp. <i>eremophila</i>	0.03	<1		Herb
<i>Eulalia aurea</i>	0.1	<1		Grass
<i>Evolvulus alsinoides</i> var. <i>decumbens</i>	0.2	<1	purple	Herb
<i>Evolvulus alsinoides</i> var. <i>villosicalyx</i>	0.1	<1		Herb
<i>Gossypium robinsonii</i>	2.3	<1		Shrub
<i>Grevillea wickhamii</i> subsp. (indet)	1.8	<1		Shrub
<i>Hakea lorea</i> subsp. <i>lorea</i>	1.75	<1		Shrub
<i>Heliotropium tenuifolium</i>	0.15	<1		Herb
<i>Hibiscus sturtii</i> var. <i>platyklamys</i>	0.4	<1		Shrub

<i>Hybanthus aurantiacus</i>	0.35	<1		Shrub
<i>Indigofera monophylla</i>	0.25	<1	red	Shrub
<i>Melhania oblongifolia</i>	0.4	<1		Shrub
<i>Paspalidium clementii</i>	0.25	<1		Grass
<i>Perotis rara</i>	0.2	<1		Grass
* <i>Portulaca oleracea</i>	0.01	<1		Herb
<i>Ptilotus exaltatus</i>	5	<1		Herb
<i>Ptilotus obovatus</i>	0.4	<1		Shrub
<i>Ptilotus polystachyus</i>	0.2	<1		Herb
<i>Psyrax latifolia</i>	1.2	<1		Shrub
<i>Rhynchosia minima</i>	0.2	<1		Vine
<i>Rulingia luteiflora</i>	2	<1		Shrub
<i>Santalum lanceolatum</i>	1.2	<1		Shrub
<i>Senna artemisioides</i> subsp. <i>helmsii</i>	0.8	<1		Shrub
<i>Sida</i> sp. <i>spiciform panicles</i> (E. Leyland s.n. 14/8/90)	0.8	<1		Shrub
<i>Tephrosia rosea</i> var. <i>clementii</i>	0.75	<1		Shrub
<i>Tephrosia rosea</i> var. <i>glabrior</i>	0.25	<1		Shrub
<i>Themeda triandra</i>	0.9	<1	brown	Grass
<i>Trianthema pilosa</i>	0.15	<1		Herb
<i>Tribulus</i> ? <i>cistoides</i> (or ? <i>hirsutus</i>)	0.05	<1		Herb
<i>Tribulus occidentalis</i>	0.1	<1		Herb
<i>Trichodesma zeylanicum</i> var. <i>zeylanicum</i>	0.6	<1	blue	Shrub
<i>Triodia epactia</i>	1	10		Hummock Grass
<i>Triodia</i> sp. Shovelanna Hill (S.van Leeuwen 3835)	0.5	<1		Hummock Grass
<i>Triumfetta leptacantha</i>	0.4	<1		Shrub
<i>Urochloa piligera</i>	0.2	<1		Grass
<i>Ventilago viminalis</i>	3	<1		Tree



Site WHN-14

FLORA QUADRAT DATA SHEET

Location	WHN-15	Date 20.05.2011 & 06.10.2011 Surveyor K. McCreery
Quadrat Dimension	50x50m	Quadrat Orientation 0°
GPS Location	Easting: 211595 Northing: 7417472	GPS Location Relative to Quadrat NW
Soil Type	Loamy sand	Soil Colour Orange
Topography/Aspect	Stream channel, moderately inclined ? 40°	Disturbance Type Cattle, weeds
Vegetation Condition	Good	
Broad Floristic Formation	Acacia Woodland	
Vegetation Association	1a - Woodland of <i>Acacia citrinoviridis</i> , <i>Eucalyptus victrix</i> and <i>Acacia coriacea</i> subsp. <i>pendens</i> over Low Open Shrubland <i>Acacia pyrifolia</i> , <i>Corchorus crozophorifolius</i> and <i>Tephrosia rosea</i> var. <i>clementii</i> over Very Open Tussock Grassland of * <i>Cenchrus ciliaris</i> , <i>Cymbopogon procerus</i> and <i>Eulalia aurea</i>	
Vegetation Sub-association	Woodland of <i>Acacia citrinoviridis</i> , <i>Eucalyptus victrix</i> and <i>Acacia coriacea</i> subsp. <i>pendens</i> over Scattered Tall Shrubs of <i>Gossypium robinsonii</i> over Low Open Shrubland <i>Acacia pyrifolia</i> , <i>Corchorus crozophorifolius</i> , <i>Tephrosia rosea</i> var. <i>clementii</i> , <i>Triumfetta leptacantha</i> and over Very Open Tussock Grassland of * <i>Cenchrus ciliaris</i> , <i>Cymbopogon procerus</i> , <i>Eulalia aurea</i> , <i>Aristida inaequiglumis</i> and <i>Themeda triandra</i>	

Vascular plant species recorded

Species	Plant Height (m)	Coverage (%)	Flowers	Growth Form
<i>Abutilon lepidum</i>	0.4	<1		Shrub
<i>Acacia citrinoviridis</i>	10	12	yellow	Tree
<i>Acacia coriacea</i> subsp. <i>pendens</i>	10	2		Tree
<i>Acacia pyrifolia</i>	1.4	2	yellow	Shrub
<i>Amaranthus undulatus</i>	0.15	<1		Herb
<i>Ammannia multiflora</i>	0.2	<1		Herb
<i>Aristida holathera</i> var. <i>holathera</i>	0.6	<1		Grass
<i>Aristida inaequiglumis</i>	0.9	<1		Grass
<i>Aristida pruinosa</i>	0.3	<1		Grass
* <i>Bidens bipinnata</i>	0.2	<1		Herb
* <i>Cenchrus ciliaris</i>	0.9	5		Grass
<i>Centaurium</i> sp. (indet)	0.2	<1		Herb
<i>Centipeda minima</i> subsp. <i>macrocephala</i>	0.05	<1		Herb
<i>Chrysopogon fallax</i>	1.3	<1		Grass
<i>Cleome viscosa</i>	0.3	<1	yellow	Herb
<i>Corchorus crozophorifolius</i>	0.8	3	yellow	Shrub
<i>Cullen leucanthum</i>	0.4	<1		Shrub
<i>Cymbopogon procerus</i>	1.3	3		Grass
<i>Cynanchum floribundum</i>	4	<1		Shrub
<i>Cyperus ixiocarpus</i>	0.3	<1		Sedge
<i>Cyperus squarrosus</i>	0.01	<1		Sedge
<i>Cyperus vaginatus</i>	0.5	<1		Sedge
<i>Dysphania rhadinostachya</i> subsp. <i>rhadinostachya</i>	0.1	<1		Herb
<i>Duperreya commixta</i>	0.8	<1		Vine
<i>Elytrophorus spicatus</i>	0.5	<1		Grass
<i>Eragrostis cumingii</i>	0.3	<1		Grass
<i>Eragrostis eripoda</i>	0.2	<1		Grass
<i>Eragrostis tenellula</i>	0.6	<1		Grass
<i>Eriachne obtusa</i>	0.45	<1		Grass
<i>Eucalyptus camaldulensis</i> subsp. <i>obtusa</i>	12	<1		Tree
<i>Eucalyptus victrix</i>	15	5		Tree
<i>Eulalia aurea</i>	0.8	<1		Grass
<i>Euphorbia australis</i>	0.1	<1		Herb

<i>Euphorbia tannensis</i> subsp. <i>eremophila</i>	0.2	<1		Herb
<i>Evolvulus alsinoides</i> var. <i>decumbens</i>	0.1	<1	purple	Herb
<i>Evolvulus alsinoides</i> var. <i>villosicalyx</i>	0.1	<1		Herb
<i>Glycine canescens</i>	0.6	<1		Vine
<i>Goodenia lamprosperma</i>	0.4	<1	yellow	Herb
<i>Gossypium robinsonii</i>	3	<1		Shrub
<i>Helichrysum luteoalbum</i>	0.2	<1		Herb
<i>Heliotropium tenuifolium</i>	0.2	<1		Herb
<i>Hybanthus aurantiacus</i>	0.3	<1		Shrub
<i>Ipomoea muelleri</i>	0.1	<1	purple	Vine
<i>Isotropis forrestii</i>	0.5	<1		Shrub
<i>Melaleuca glomerata</i>	1.5	<1		Shrub
<i>Phyllanthus erwinii</i>	0.4	<1		Herb
<i>Phyllanthus maderaspatensis</i>	0.4	<1		Herb
<i>Pluchea dentex</i>	0.4	<1		Herb
<i>Pluchea rubelliflora</i>	0.2	<1		Herb
<i>Podolepis</i> sp. Great Victoria Desert (A.S. George 8219)	0.1	<1		Herb
<i>Polycarpaea longiflora</i>	0.2	<1	white	Herb
* <i>Portulaca oleracea</i>	0.2	<1		Herb
<i>Pterocaulon sphaecelatum</i>	0.45	<1		Herb
<i>Solanum phlomoides</i>	0.4	<1	purple	Shrub
<i>Stemodia ? viscosa</i>	0.35	<1		Herb
<i>Stemodia grossa</i>	0.35	<1		Herb
<i>Streptoglossa odora</i>	0.2	<1		Herb
<i>Synaptantha tillaeacea</i> var. <i>tillaeacea</i>	0.01	<1		Herb
<i>Tephrosia rosea</i> var. <i>clementii</i>	0.7	<1		Shrub
<i>Themeda triandra</i>	0.8	<1		Grass
<i>Trianthema triquetra</i>	0.05	<1		Herb
<i>Trichodesma zeylanicum</i> var. <i>zeylanicum</i>	0.5	<1		Herb
<i>Triumfetta leptacantha</i>	0.6	<1		Shrub
<i>Wahlenbergia tumidifruca</i>	0.06	<1		Herb
<i>Waltheria indica</i>	0.3	<1	yellow	Shrub



Site WHN - 15

FLORA QUADRAT DATA SHEET

Location	WHN-16	Date 20.05.2011 & 06.10.2011 Surveyor A. Cole & R. Tomanovic
Quadrat Dimension	50x50m	Quadrat Orientation 0°
GPS Location	Easting: 210160 Northing: 7416938	GPS Location Relative to Quadrat NW
Soil Type	Sandy Loam	Soil Colour Red
Topography/Aspect	Plain, level / 160° SE	Disturbance Type Fire, cattle
Vegetation Condition	Excellent	
Broad Floristic Formation	<i>Triodia</i> Very Open Hummock Grassland	
Vegetation Association	7a - Very Open Hummock Grassland of <i>Triodia lanigera</i> and <i>Triodia</i> sp. Shovelanna Hill (S.van Leeuwen 3835) with Scattered Shrubs of <i>Grevillea wickhamii</i> subsp. (indet), <i>Acacia ancistrocarpa</i> and <i>Hakea lorea</i> subsp. <i>lorea</i> with Scattered Trees of <i>Corymbia hamersleyana</i>	
Vegetation Sub-association	Scattered Trees of <i>Corymbia hamersleyana</i> over Scattered Tall Shrubs of <i>Acacia bivenosa</i> , <i>Grevillea wickhamii</i> subsp. (indet) and <i>Hakea lorea</i> subsp. <i>lorea</i> over Scattered Shrubs of <i>Acacia trudgeniana</i> , <i>Senna glutinosa</i> subsp. <i>glutinosa</i> , <i>Senna glutinosa</i> subsp. <i>x luerssenii</i> , <i>Acacia ancistrocarpa</i> and <i>Acacia pachyacra</i> over Low Scattered Shrubs of <i>Bonamia</i> sp. 1 (indet), <i>Sida arenicola</i> , <i>Sida cardiophylla</i> , <i>Solanum sturtianum</i> and <i>Dicrastylis cordifolia</i> over Hummock Grassland of <i>Triodia lanigera</i> and <i>Triodia</i> sp. Shovelanna Hill (S.van Leeuwen 3835)	

Vascular plant species recorded

Species	Plant Height (m)	Coverage (%)	Flowers	Growth Form
<i>Acacia ancistrocarpa</i>	1.4	<1		Shrub
<i>Acacia atkinsiana</i>	0.2	<1		Shrub
<i>Acacia bivenosa</i>	2.1	0.5		Shrub
<i>Acacia pachyacra</i>	1.1	<1		Shrub
<i>Acacia trudgeniana</i>	1.4	1		Shrub
<i>Amphipogon sericeus</i>	0.5	0.2		Grass
<i>Aristida holathera</i> var. <i>holathera</i>	0.2	<1		Grass
<i>Bonamia erecta</i>	0.25	<1		Shrub
<i>Bonamia</i> sp. (indet)	0.5	0.5		Shrub
<i>Corymbia hamersleyana</i>	6	<1		Tree
<i>Cymbopogon obtectus</i>	0.5	<1		Grass
<i>Dicrastylis cordifolia</i>	0.4	<1		Shrub
<i>Dodonaea coriacea</i>	0.15	<1		Shrub
<i>Dysphania kalpari</i>	0.05	<1		Herb
<i>Eriachne aristidea</i>	0.2	<1		Grass
<i>Eulalia aurea</i>	0.6	<1		Grass
<i>Gomphrena kanisii</i>	0.2	<1		Herb
<i>Goodenia lamprosperma</i>	0.3	<1		Herb
<i>Goodenia ramelii</i>	0.2	0.1		Herb
<i>Goodenia</i> sp. Sandy Creek (R.D. Royce 1653)	0.2	<1		Grass
<i>Grevillea wickhamii</i> subsp. (indet)	2.3	<1		Shrub
<i>Hakea lorea</i> subsp. <i>lorea</i>	3	<1		Shrub
<i>Hybanthus aurantiacus</i>	0.5	<1		Shrub
<i>Indigofera monophylla</i>	0.3	<1		Shrub
<i>Paraneurachne muelleri</i>	0.6	0.2		Grass
<i>Polygala</i> sp. (indet)	0.03	<1		Herb
<i>Ptilotus calostachyus</i>	0.1	<1		Herb
<i>Senna artemisioides</i> subsp. <i>oligophylla</i>	1	<1		Shrub
<i>Senna glutinosa</i> subsp. <i>glutinosa</i>	1.6	<1		Shrub
<i>Senna glutinosa</i> subsp. <i>pruinosa</i>	1.2	<1		Shrub
<i>Senna glutinosa</i> subsp. <i>x luerssenii</i>	1.4	<1		Shrub
<i>Sida arenicola</i>	0.65	0.1		Shrub
<i>Sida cardiophylla</i>	0.4	0.1		Shrub

<i>Solanum centrale</i>	0.2	<1	Shrub
<i>Solanum sturtianum</i>	0.3	<1	Shrub
<i>Trianthema pilosa</i>	0.1	<1	Herb
<i>Triodia lanigera</i>	0.75	30	Hummock Grass
<i>Triodia</i> sp. Shovelanna Hill (S.van Leeuwen 3835)	0.75	3	Hummock Grass
<i>Yakirra australiensis</i> var. <i>australiensis</i>	0.1	<1	Grass



Site WHN-16

FLORA QUADRAT DATA SHEET

Location WHN-17 **Date** 21.05.2011 & 06.10.2011
Surveyor K. McCreery

Quadrat Dimension 50x50m **Quadrat Orientation** 0°
GPS Location **Easting:** 208444 **GPS Location Relative to Quadrat** NW
Northing: 7417563

Soil Type Sandy Clay loam **Soil Colour** Red

Topography/Aspect Plain, gently inclined / 20° **Disturbance Type** Cattle

Vegetation Condition Excellent

Broad Floristic Formation *Acacia* Low Woodland

Vegetation Association **2c - Low Woodland** of *Acacia aptaneura* and *Corymbia hamersleyana* over **Very Open Shrubland** of *Acacia wanyu*, *Acacia ancistrocarpa* and *Eremophila forrestii* subsp.(indet) over **Very Open Hummock Grassland** of *Triodia epactia* and *Triodia lanigera*

Vegetation Sub-association Low Open Woodland of *Acacia aptaneura* over High Open Shrubland of *Eremophila platycalyx* subsp. *pardalota*, *Acacia pruinocarpa* and *Acacia sibirica* over Scattered Shrubs of *Eremophila forrestii* subsp. (indet) over Very Open Hummock Grassland of *Triodia lanigera* and *Triodia epactia* with Scattered Herbs of *Ptilotus exaltatus*, *Ptilotus calostachyus*, *Euphorbia australis*, *Dysphania rhadinostachya* subsp. *rhadinostachya* and *Tribulus macrocarpus*

Vascular plant species recorded

Species	Plant Height (m)	Coverage (%)	Flowers	Growth Form
<i>Abutilon lepidum</i>	0.3	<1		Shrub
<i>Acacia adsurgens</i>	1	<1		Shrub
<i>Acacia ancistrocarpa</i>	0.9	<1		Shrub
<i>Acacia aptaneura</i>	7	8		Tree
<i>Acacia bivenosa</i>	0.35	<1		Shrub
<i>Acacia pruinocarpa</i>	3	1		Tree
<i>Acacia aptaneura</i>	7	8		Tree
<i>Acacia pyrifolia</i>	0.2	<1		Shrub
<i>Acacia synchronicia</i>	2.5	<1		Shrub
<i>Acacia tetragonophylla</i>	1.3	<1		Shrub
<i>Acacia wanyu</i>	2.5	2		Shrub
<i>Aristida contorta</i>	0.2	<1		Grass
<i>Aristida holathera</i> var. <i>holathera</i>	0.4	<1		Grass
<i>Aristida inaequiglumis</i>	0.8	<1		Grass
<i>Boerhavia coccinea</i>	0.1	<1		Herb
<i>Bonamia</i> sp. (indet)	0.5	<1		Shrub
* <i>Cenchrus ciliaris</i>	0.4	<1		Grass
<i>Chrysopogon fallax</i>	1.2	<1		Grass
<i>Cleome viscosa</i>	0.4	<1		Herb
<i>Corchorus sidioides</i> subsp. <i>sidioides</i>	0.4	<1		Shrub
<i>Corymbia hamersleyana</i>	2.5	<1		Tree
<i>Cymbopogon obtectus</i>	0.9	<1		Grass
<i>Dicrastylis cordifolia</i>	0.4	<1		Shrub
<i>Digitaria brownii</i>	0.3	<1		Grass
<i>Duperreya commixta</i>	2	<1		Vine
<i>Dysphania kalpari</i>	0.1	<1		Herb
<i>Dysphania rhadinostachya</i> subsp. <i>rhadinostachya</i>	0.1	<1		Herb
<i>Enneapogon polyphyllus</i>	0.3	<1		Grass
<i>Enneapogon robustissimus</i>	0.4	<1		Grass
<i>Eragrostis eriopoda</i>	0.5	<1		Grass
<i>Eremophila cuneifolia</i>	1.2	<1		Shrub
<i>Eremophila forrestii</i> subsp. (indet)	1.3	1		Shrub
<i>Eremophila latrobei</i> subsp. <i>filiformis</i>	1.5	<1		Shrub

<i>Eremophila platycalyx</i> subsp. <i>pardalota</i>	2	1		Shrub
<i>Eriachne pulchella</i> subsp. <i>dominii</i>	0.1	<1		Grass
<i>Euphorbia</i> aff. <i>australis</i>	0.2	<1		Herb
<i>Evolvulus alsinoides</i> var. <i>decumbens</i>	0.2	<1	red	Herb
<i>Evolvulus alsinoides</i> var. <i>villosicalyx</i>	0.2	<1		Herb
<i>Goodenia lamprosperma</i>	0.2	<1		Herb
<i>Goodenia vilmoriniae</i>	0.3	1	purple	Herb
<i>Hakea lorea</i> subsp. <i>lorea</i>	3	<1	white	Shrub
<i>Haloragis gossei</i> var. <i>gossei</i>	0.2	<1	red	Herb
<i>Hibiscus burtonii</i>	0.3	<1		Shrub
<i>Hibiscus sturtii</i> var. <i>truncatus</i>	0.3	<1		Shrub
<i>Hybanthus aurantiacus</i>	0.2	<1		Shrub
<i>Isotropis atropurpurea</i>	0.5	<1		Shrub
<i>Maireana planifolia</i>	0.4	<1		Shrub
<i>Maireana villosa</i>	0.4	<1		Shrub
<i>Paraneurachne muelleri</i>	0.4	<1		Grass
<i>Paspalidium clementii</i>	0.3	1		Grass
<i>Phyllanthus erwinii</i>	0.2	<1		Herb
<i>Polycarpaea corymbosa</i>	0.1	<1	white	Herb
* <i>Portulaca oleracea</i>	0.02	<1		Herb
<i>Ptilotus calostachyus</i>	0.3	<1		Herb
<i>Ptilotus exaltatus</i>	0.8	1	pink	Herb
<i>Ptilotus obovatus</i>	0.9	<1		Shrub
<i>Ptilotus polystachyus</i>	0.4	<1		Herb
<i>Rhyncharhena linearis</i>	0.6	<1		Vine
<i>Salsola</i> ? <i>australis</i>	0.4	<1		Herb
<i>Sclerolaena cornishiana</i>	0.4	<1		Shrub
<i>Senna artemisioides</i> subsp. <i>oligophylla</i>	0.8	<1		Shrub
<i>Senna glutinosa</i> subsp. <i>glutinosa</i>	0.9	<1		Shrub
<i>Senna glutinosa</i> subsp. <i>x luerssenii</i>	0.6	<1		Shrub
<i>Senna glutinosa</i> subsp. <i>pruinosa</i>	1.3	<1		Shrub
<i>Senna notabilis</i>	0.1	<1		Shrub
<i>Senna</i> sp. Meekatharra (E. Bailey 1-26)	0.4	<1		Shrub
<i>Senna stricta</i>	1.3	<1		Shrub
<i>Sida arenicola</i>	1	<1		Shrub
<i>Sida cardiophylla</i>	0.4	<1		Shrub
<i>Sida echinocarpa</i>	0.8	<1		Shrub
<i>Sida fibulifera</i>	0.3	<1		Shrub
<i>Sida</i> sp. spiciform panicles (E. Leyland sn 14/8/92)	0.9	<1		Shrub
<i>Solanum centrale</i>	0.2	<1		Shrub
<i>Solanum lasiophyllum</i>	0.2	<1		Shrub
<i>Solanum sturtianum</i>	0.5	<1	purple	Shrub
<i>Sporobolus australasicus</i>	0.2	<1		Grass
? <i>Streptoglossa</i> sp. (indet)	0.3	<1		Herb
<i>Stylobasium spathulatum</i>	1.7	<1		Shrub
<i>Trianthema glossostigma</i>	0.01	<1		Herb
<i>Tribulus macrocarpus</i>	0.01	<1	yellow	Herb
<i>Tribulus suberosus</i>	0.3	<1		Shrub
<i>Triodia epactia</i>	0.6	<1		Hummock Grass
<i>Triodia lanigera</i>	0.8	3		Hummock Grass
<i>Yakirra australiensis</i>	0.2	<1		Grass



Site WHN-17

FLORA QUADRAT DATA SHEET

Location	WHN-18	Date 20/05/2011 Surveyor A. Cole & R. Tomanovic
Quadrat Dimension	50x50m	Quadrat Orientation 0°
GPS Location	Easting: 210751 Northing: 7417198	GPS Location Relative to Quadrat NW
Soil Type	Sandy Loam	Soil Colour Orange
Topography/Aspect	Plain, level / 160°S	Disturbance Type Fire
Vegetation Condition	Very good	
Broad Floristic Formation	Triodia Very Open Hummock Grassland	
Vegetation Association	7a - Very Open Hummock Grassland of <i>Triodia lanigera</i> and <i>Triodia</i> sp. Shovelanna Hill (S.van Leeuwen 3835) with Scattered Shrubs of <i>Grevillea wickhamii</i> subsp. (indet), <i>Acacia ancistrocarpa</i> and <i>Hakea lorea</i> subsp. <i>lorea</i> with Scattered Trees of <i>Corymbia hamersleyana</i>	
Vegetation Sub-association	Scattered Shrubs of <i>Acacia ancistrocarpa</i> , <i>Grevillea wickhamii</i> subsp. (indet) and <i>Hakea lorea</i> subsp. <i>lorea</i> over Low Shrubland of <i>Kennedia prorepens</i> , <i>Sida cardiophylla</i> , <i>Bonamia</i> sp. 1 (indet), <i>Hybanthus aurantiacus</i> and <i>Dicrastylis cordifolia</i> over Very Open Hummock Grassland of <i>Triodia lanigera</i> with Very Open Tussock Grassland of <i>Paraneurachne muelleri</i> , <i>Amphipogon sericeus</i> , <i>Aristida holathera</i> var. <i>holathera</i> , <i>Aristida inaequiglumis</i> and <i>Aristida inaequiglumis</i>	

Vascular plant species recorded

Species	Plant Height (m)	Coverage (%)	Flowers	Growth Form
<i>Acacia ancistrocarpa</i>	0.45	1		Shrub
<i>Acacia atkinsiana</i>	0.25	<1		Shrub
<i>Acacia pachyacra</i>	0.35	0.5		Shrub
<i>Amphipogon sericeus</i>	0.45	<1		Grass
<i>Aristida holathera</i> var. <i>holathera</i>	0.3	0.3		Grass
<i>Aristida inaequiglumis</i>	0.3	<1		Grass
<i>Bonamia</i> sp. (indet)	0.55	1.5		Shrub
<i>Bonamia</i> sp. (indet)	0.3	<1		Shrub
<i>Dampiera candidans</i>	0.5	<1		Shrub
<i>Dicrastylis cordifolia</i>	0.3	0.1		Shrub
<i>Dysphania kalpari</i>	0.07	0.1		Herb
<i>Eriachne aristidea</i>	0.3	<1		Grass
<i>Euphorbia</i> aff. <i>australis</i>	0.15	<1		Herb
<i>Goodenia lamprosperma</i>	0.3	<1	yellow	Herb
<i>Goodenia vilmoriniae</i>	0.3	<1		Herb
<i>Grevillea wickhamii</i> subsp. (indet)	1.7	<1		Shrub
<i>Hakea lorea</i> subsp. <i>lorea</i>	0.35	<1		Shrub
<i>Hibiscus sturtii</i>	0.08	<1		Shrub
<i>Hibiscus sturtii</i> var. (indet)	0.25	<1		Shrub
<i>Hibiscus sturtii</i> var. (indet)	0.3	<1		Shrub
<i>Hybanthus aurantiacus</i>	0.55	0.2		Shrub
<i>Indigofera monophylla</i>	0.3	<1		Shrub
<i>Kennedia prorepens</i>	0.3	4		Shrub
<i>Paraneurachne muelleri</i>	0.55	2		Grass
<i>Ptilotus exaltatus</i>	0.25	<1		Herb
<i>Santalum lanceolatum</i>	1	<1	white	Shrub
<i>Senna</i> ? <i>notabilis</i>	0.1	<1		Shrub
<i>Senna artemisioides</i> subsp. <i>oligophylla</i>	0.25	<1		Shrub
<i>Senna glaucifolia</i>	0.65	<1		Shrub
<i>Sida arenicola</i>	1	<1		Shrub
<i>Sida cardiophylla</i>	0.6	4		Shrub
<i>Solanum sturtianum</i>	0.2	<1		Shrub
<i>Trianthema glossostigma</i>	0.03	<1		Herb

<i>Trianthema pilosa</i>	0.03	<1	purple	Herb
<i>Triodia lanigera</i>	0.7	5		Hummock Grass
<i>Yakirra australiensis</i>	0.15	<1		Grass



Site WHN-18

FLORA QUADRAT DATA SHEET

Location	WHN-19	Date 21.05.2011 & 06.10.2011 Surveyor K. McCreery
Quadrat Dimension	50x50m	Quadrat Orientation 0°
GPS Location	Easting: 208633 Northing: 7417356	GPS Location Relative to Quadrat NW
Soil Type	Sandy Clay loam	Soil Colour Pale
Topography/Aspect	Hillslope, gently inclined / 200°	Disturbance Type Fire
Vegetation Condition	Excellent	
Broad Floristic Formation	<i>Triodia</i> Open Hummock Grassland	
Vegetation Association	6c - Open Hummock Grassland of <i>Triodia epactia</i> and <i>Triodia angusta</i> with Scattered Mallees of <i>Eucalyptus socialis</i> subsp. <i>eucentrica</i> over Scattered Shrubs of <i>Acacia bivenosa</i>	
Vegetation Sub-association	Scattered Low Trees of <i>Eucalyptus socialis</i> subsp. <i>eucentrica</i> over Scattered Shrub of <i>Acacia bivenosa</i> over Low Open Shrubland of <i>Scaevola amblyanthera</i> var. <i>centralis</i> , <i>Halgania solanacea</i> var. Mt Doreen (G.M. Chippendale 4206) and <i>Senna</i> sp. Meekatharra (E. Bailey 1-26) over Open Hummock Grassland <i>Triodia epactia</i> and <i>Triodia angusta</i> with Very Open Tussock Grassland of <i>Enneapogon lindleyanus</i> .	

Vascular plant species recorded

Species	Plant Height (m)	Coverage (%)	Flowers	Growth Form
<i>Acacia adsurgens</i>	0.8	<1		Shrub
<i>Acacia bivenosa</i>	1.5	1.5		Shrub
<i>Acacia pruinocarpa</i>	0.1	<1		Tree
<i>Acacia pyrifolia</i>	0.2	<1		Shrub
<i>Acacia sibirica</i>	1	<1		Shrub
<i>Acacia synchronicia</i>	0.3	<1		Shrub
<i>Amphipogon sericeus</i>	0.3	<1		Grass
<i>Aristida contorta</i>	0.2	<1		Grass
<i>Cleome viscosa</i>	0.2	<1		Herb
<i>Corchorus sidioides</i> subsp. <i>sidioides</i>	0.3	<1		Shrub
<i>Dysphania rhadinostachya</i> subsp. <i>rhadinostachya</i>	0.3	<1		Herb
<i>Enneapogon lindleyanus</i>	0.2	0.5		Grass
<i>Eragrostis eriopoda</i>	0.55	<1		Grass
<i>Eriachne mucronata</i>	0.5	<1		Grass
<i>Eucalyptus socialis</i> subsp. <i>eucentrica</i>	1.8	2		Tree
<i>Goodenia</i> ? <i>vilmoriniae</i>	0.3	<1		Herb
<i>Goodenia lamprosperma</i>	0.2	<1	yellow	Herb
<i>Goodenia triodophylla</i>	0.45	<1		Herb
<i>Halgania solanacea</i> var. Mt Doreen (G.M. Chippendale 4206)	0.3	1		Shrub
<i>Hibiscus brachychlaenus</i>	0.2	<1		Shrub
<i>Hybanthus aurantiacus</i>	0.2	<1		Shrub
<i>Indigofera monophylla</i>	0.2	<1		Shrub
<i>Lepidium platypetalum</i>	0.3	<1		Shrub
<i>Paraneurachne muelleri</i>	0.3	<1		Grass
<i>Ptilotus calostachyus</i>	0.2	<1		Herb
<i>Ptilotus clementii</i>	0.4	<1	white	Herb
<i>Ptilotus exaltatus</i>	0.6	<1		Herb
<i>Ptilotus obovatus</i>	0.45	<1		Shrub
<i>Salsola</i> ? <i>australis</i>	0.3	0.5		Herb
<i>Scaevola amblyanthera</i> var. <i>centralis</i>	0.3	1		Shrub
<i>Scaevola spinescens</i>	0.2	<1		Shrub
<i>Sclerolaena ericantha</i>	0.25	<1		Shrub
<i>Senna artemisioides</i> subsp. <i>oligophylla</i>	0.6	<1		Shrub
<i>Senna glutinosa</i> subsp. <i>glutinosa</i>	0.9	<1		Shrub

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<i>Senna glutinosa</i> subsp. <i>x leurossenii</i>	0.15	<1		Shrub
<i>Senna glutinosa</i> subsp. <i>pruinosa</i>	0.6	<1		Shrub
<i>Senna</i> sp. Meekatharra (E. Bailey 1-26)	0.3	0.5		Shrub
<i>Senna stricta</i>	0.1	<1		Shrub
<i>Sida arenicola</i>	0.8	<1		Shrub
<i>Sida echinocarpa</i>	0.4	<1		Shrub
<i>Sida</i> sp. Pilbara (A.A. Mitchell PRP 1543)	0.4	<1		Shrub
<i>Solanum ellipticum</i>	0.2	<1		Shrub
<i>Solanum phlomoides</i>	0.4	<1	purple	Shrub
<i>Triodia angusta</i>	0.6	1		Hummock Grass
<i>Triodia epactia</i>	0.8	15		Hummock Grass



Site WHN-19

FLORA QUADRAT DATA SHEET

Location	WHN-20	Date 20.05.2011 Surveyor A. Cole & R. Tomanovic
Quadrat Dimension	50x50m	Quadrat Orientation 0°
GPS Location	Easting: 211143 Northing: 7416596	GPS Location Relative to Quadrat NW
Soil Type	Loamy Sand	Soil Colour Brown
Topography/Aspect	Drainage Depression / 90°	Disturbance Type Cattle
Vegetation Condition	Very good	
Broad Floristic Formation	Acacia High Open Shrubland	
Vegetation Association	4a - High Shrubland of <i>Acacia monticola</i> , <i>Rulingia luteiflora</i> and <i>Gossypium robinsonii</i> with Low Woodland of <i>Corymbia hamersleyana</i> , <i>Eucalyptus victrix</i> and <i>Eucalyptus leucophloia</i> subsp. <i>leucophloia</i> over Very Open Tussock Grassland of <i>Themeda triandra</i> , <i>Cenchrus ciliaris</i> and <i>Cymbopogon procerus</i>	
Vegetation Sub-association	Scattered Low Trees of <i>Corymbia hamersleyana</i> , <i>Eucalyptus leucophloia</i> subsp. <i>leucophloia</i> and <i>Acacia citrinoviridis</i> over High Open Shrubland <i>Acacia monticola</i> , <i>Rulingia luteiflora</i> and <i>Acacia ancistrocarpa</i> over Scattered Shrubs <i>Gossypium robinsonii</i> , <i>Grevillea wickhamii</i> , <i>Petalostylis cassioides</i> and <i>Keraudrenia velutina</i> over Low Open Shrubland of <i>Triumfetta leptacantha</i> , <i>Corchorus sidoides</i> , <i>Tephrosia rosea</i> var. <i>glabrior</i> , <i>Bonamia</i> sp. 1 (indet) and <i>Indigofera monophylla</i> over Very Open Hummock Grassland of <i>Triodia epactia</i> over Scattered Tussock Grass of <i>Cenchrus ciliaris</i> , <i>Aristida contorta</i> , <i>Chrysopogon fallax</i> and <i>Digitaria brownii</i> .	

Vascular plant species recorded

<u>Species</u>	<u>Plant Height (m)</u>	<u>Coverage (%)</u>	<u>Flowers</u>	<u>Growth Form</u>
<i>Abutilon cunninghamii</i>	0.95	<1		Shrub
<i>Acacia ancistrocarpa</i>	2	0.2		Shrub
<i>Acacia citrinoviridis</i>	1	<1		Tree
<i>Acacia elachantha</i>	1	<1		Shrub
<i>Acacia monticola</i>	3	5		Shrub
<i>Aristida ? holathera</i> var. <i>holathera</i>	0.55	<1		Grass
<i>Aristida contorta</i>	0.4	0.2		Grass
<i>Boerhavia coccinea</i>	0.05	<1		Herb
<i>Bonamia</i> sp. (indet)	0.3	0.2		Shrub
<i>Bulbostylis barbata</i>	0.05	<1		Sedge
* <i>Cenchrus ciliaris</i>	0.6	1		Grass
<i>Chrysocephalum pterochaetum</i>	0.45	<1		Shrub
<i>Chrysopogon fallax</i>	0.25	0.2		Grass
<i>Cleome viscosa</i>	0.6	<1		Herb
<i>Corchorus lasiocarpum</i> subsp. <i>lasiocarpus</i>	0.55	<1		Shrub
<i>Corchorus sidoides</i> subsp. <i>sidoides</i>	0.3	<1		Shrub
<i>Corchorus sidoides</i>	0.6	1		Shrub
<i>Corymbia hamersleyana</i>	6	1		Tree
<i>Cymbopogon procerus</i>	0.95	<1		Grass
<i>Digitaria brownii</i>	0.6	0.1		Grass
<i>Duperreya commixta</i>	2	<1		Vine
<i>Dysphania rhadinostachya</i> subsp. <i>rhadinostachya</i>	0.2	<1		Herb
<i>Enneapogon lindleyanus</i>	0.4	<1		Grass
<i>Eragrostis eriopoda</i>	0.45	<1		Grass
<i>Eriachne mucronata</i>	0.4	<1		Grass
<i>Eriachne pulchella</i> subsp. <i>dominii</i>	0.05	<1		Grass
<i>Eucalyptus leucophloia</i> subsp. <i>leucophloia</i>	2.5	<1		Tree
<i>Euphorbia</i> aff. <i>australis</i>	0.15	<1		Herb
<i>Euphorbia tannensis</i> subsp. <i>eremophila</i>	0.35	<1		Herb
<i>Evolvulus alsinoides</i> var. <i>villosicalyx</i>	0.03	<1		Herb
<i>Gompholobium</i> sp. Pilbara (N.F. Norris 908)	0.4	<1		Shrub
<i>Goodenia muelleriana</i>	0.6	<1		Shrub

<i>Gossypium robinsonii</i>	1.8	1		Shrub
<i>Grevillea wickhamii</i> subsp. (indet)	1.6	0.2		Shrub
<i>Hibiscus haynaldii</i>	0.6	<1		Shrub
<i>Hibiscus strutii</i> var. <i>campylochlamys</i>	0.3	<1		Shrub
<i>Hybanthus aurantiacus</i>	0.25	<1		Shrub
<i>Indigofera monophylla</i>	0.2	0.1	pink	Shrub
<i>Isotropis atropurpurea</i>	0.95	<1		Shrub
<i>Keraudrenia</i> sp. (indet)	1	0.2		Shrub
<i>Keraudrenia velutina</i> subsp. <i>elliptica</i>	0.45	<1		Shrub
<i>Paraneurachne muelleri</i>	0.55	<1		Grass
<i>Paspalidium clementii</i>	0.05	<1		Grass
<i>Paspalidium rarum</i>	0.2	<1		Grass
<i>Petalostylis cassioides</i>	1	0.3		Shrub
<i>Ptilotus astrolasius</i>	0.4	<1		Shrub
<i>Ptilotus calostachyus</i>	0.6	<1		Herb
<i>Ptilotus exaltatus</i>	0.55	<1	purple	Herb
<i>Ptilotus obovatus</i>	0.4	<1	yellow	Shrub
<i>Ptilotus polystachyus</i>	0.3	<1		Herb
<i>Rulingia luteiflora</i>	2.3	3		Shrub
<i>Scaevola browniana</i> subsp. <i>browniana</i>	0.4	<1		Shrub
<i>Scaevola parvifolia</i> subsp. (indet)	0.2	<1		Shrub
<i>Senna</i> ? <i>notabilis</i>	0.15	<1		Shrub
<i>Senna artemisioides</i> subsp. <i>oligophylla</i>	0.45	<1		Shrub
<i>Sida arenicola</i>	1	<1		Shrub
<i>Sida fibulifera</i>	0.25	<1		Shrub
<i>Solanum phlomoides</i>	0.15	<1		Shrub
<i>Stenopetalum decipiens</i>	0.45	<1		Herb
<i>Tephrosia rosea</i> var. <i>glabrior</i>	0.5	1		Shrub
<i>Themeda triandra</i>	0.5	0.2	brown	Grass
<i>Trianthema pilosa</i>	0.7	<1		Herb
<i>Trichodesma zeylanicum</i> var. <i>zeylanicum</i>	0.85	<1		Shrub
<i>Triodia epactia</i>	1.1	2		Hummock Grass
<i>Triumfetta leptacantha</i>	0.5	2	yellow	Shrub



Site WHN-20

FLORA QUADRAT DATA SHEET

Location WHN-21 **Date** 21.05.2011
Surveyor K. McCreery

Quadrat Dimension 50x50m **Quadrat Orientation** 0°
GPS Location **Easting:** 208559 **GPS Location Relative to Quadrat** NW
Northing: 7416789

Soil Type Sandy Loam **Soil Colour** Red

Topography/Aspect Hillcrest, moderately inclined / 180° **Disturbance Type** Fire

Vegetation Condition Excellent

Broad Floristic Formation *Triodia* Open Hummock Grassland

Vegetation Association **6a - Open Hummock Grassland** of *Triodia* sp. Shovelanna Hill (S.van Leeuwen 3835) with **Low Open Shrubland** of *Halgania solanacea* var. Mt Doreen (G.M. Chippendale 4206), *Gompholobium* sp. Pilbara (N.F. Norris 908) and *Acacia adoxa* var. *adoxo*

Vegetation Sub-association Scattered Low Trees of *Eucalyptus leucophloia* subsp. *leucophloia* over Scattered Tall Shrubs of *Hakea chordophylla* over Scattered Shrubs of *Senna glutinosa* subsp. *glutinosa* and *Sida arenicola* Low Open Shrubland of *Acacia hilliana*, *Ptilotus rotundifolius* and *Senna glutinosa* subsp. *pruinosa* over Open Hummock Grassland of *Triodia* sp. Shovelanna Hill (S.van Leeuwen 3835) over Scattered Tussock Grasses of *Amphipogon sericeus* and *Eriachne mucronata*.

Vascular plant species recorded

Species	Plant Height (m)	Coverage (%)	Flowers	Growth Form
<i>Acacia adoxa</i> var. <i>adoxo</i>	0.4	<1		Shrub
<i>Acacia adsurgens</i>	0.6	<1		Shrub
<i>Acacia bivenosa</i>	0.4	<1		Shrub
<i>Acacia hilliana</i>	0.4	2	yellow	Shrub
<i>Amphipogon sericeus</i>	0.3	1		Grass
<i>Aristida holathera</i> var. <i>holathera</i>	0.3	<1		Grass
<i>Cleome viscosa</i>	0.2	<1		Herb
<i>Corchorus lasiocarpum</i> subsp. <i>lasiocarpus</i>	0.6	<1		Shrub
<i>Dysphania rhadinostachya</i> subsp. <i>rhadinostachya</i>	0.2	<1		Herb
<i>Enneapogon polyphyllus</i>	0.2	<1		Grass
<i>Eragrostis eriopoda</i>	0.4	<1		Grass
<i>Eriachne aristidea</i>	0.4	<1		Grass
<i>Eriachne mucronata</i>	0.3	0.2		Grass
<i>Eriachne pulchella</i> subsp. <i>dominii</i>	0.1	<1		Grass
<i>Eucalyptus leucophloia</i> subsp. <i>leucophloia</i>	4	0.2		Tree
<i>Fimbristylis simulans</i>	0.2	1		Sedge
<i>Gompholobium</i> sp. Pilbara (N.F. Norris 908)	0.6	<1		Shrub
<i>Gomphrena kanisii</i>	0.2	<1		Herb
<i>Goodenia lamprosperma</i>	0.3	<1		Herb
<i>Goodenia muelleriana</i>	0.2	<1		Herb
<i>Goodenia ramelii</i>	0.3	0.2		Herb
<i>Grevillea wickhamii</i> subsp. <i>aprica</i>	0.6	<1		Shrub
<i>Hakea chordophylla</i>	3	0.2		Shrub
<i>Halgania solanacea</i> var. Mt Doreen (G.M. Chippendale 4206)	0.4	<1		Shrub
<i>Hibiscus coatesii</i>	0.6	<1		Shrub
<i>Hibiscus strutii</i> var. <i>campylochlamys</i>	0.3	<1	yellow	Shrub
<i>Hibiscus sturtii</i> var. <i>truncatus</i>	0.3	<1		Shrub
<i>Hybanthus aurantiacus</i>	0.4	<1		Shrub
<i>Indigofera monophylla</i>	0.2	<1		Shrub
<i>Keraudrenia</i> sp. (indet)	0.6	<1		Shrub
<i>Paraneurachne muelleri</i>	0.3	<1		Grass
<i>Paspalidium clementii</i>	0.3	<1		Grass
* <i>Portulaca oleracea</i>	0.01	<1		Herb

<i>Ptilotus astrolasius</i>	0.3	<1		Shrub
<i>Ptilotus calostachyus</i>	0.4	<1		Herb
<i>Ptilotus exaltatus</i>	0.6	<1	pink	Herb
<i>Ptilotus obovatus</i>	0.8	<1	pink	Shrub
<i>Ptilotus rotundifolius</i>	0.8	0.2		Shrub
<i>Senna glutinosa</i> subsp. <i>glutinosa</i>	1.2	1		Shrub
<i>Senna glutinosa</i> subsp. <i>pruinosa</i>	0.8	<1		Shrub
<i>Sida arenicola</i>	1.3	0.2		Shrub
<i>Sida</i> sp. <i>Excedentifolia</i> (J.L. Egan 1925)	0.3	<1	yellow	Shrub
<i>Solanum phlomoides</i>	0.3	<1		Shrub
<i>Tephrosia</i> aff. <i>supina</i>	0.1	<1		Herb
<i>Tephrosia</i> sp. Bungaroo Creek (M.E.Trudgen 11601)	0.2	<1		Shrub
<i>Trianthema glossostigma</i>	0.01	<1		Herb
<i>Tribulus suberosus</i>	0.5	<1		Shrub
<i>Triodia</i> sp. Shovelanna Hill (S.van Leeuwen 3835)	0.6	20		Hummock Grass



Site WHN-21

FLORA QUADRAT DATA SHEET

Location WHN-22 **Date** 21.05.2011 & 06.10.2011
Surveyor A. Cole & R. Tomanovic

Quadrat Dimension 50x50m **Quadrat Orientation** 0°
GPS Location **Easting:** 209115 **GPS Location Relative to Quadrat** NW
Northing: 7418094

Soil Type Sandy Loam **Soil Colour** Red

Topography/Aspect Plain, level / 140° **Disturbance Type** Fire, cattle, feral animals

Vegetation Condition Excellent

Broad Floristic Formation *Triodia* Hummock Grassland

Vegetation Association **5c - Hummock Grassland** of *Triodia lanigera* and *Triodia* sp. Shovelanna Hill (S.van Leeuwen 3835) with **Open Shrubland** of *Hakea lorea* subsp. *lorea*, *Acacia ancistrocarpa* and *Acacia adsurgens* with **Scattered Low Trees** of *Corymbia hamersleyana* and *Acacia pruinocarpa*

Vegetation Sub-association Low Open Woodland of *Acacia* ? *macraneura*, *Corymbia hamersleyana* and *Acacia pruinocarpa* over Scattered Tall Shrubland of *Acacia pachyacra*, *Acacia bivenosa*, *Santalum lanceolatum* and *Hakea lorea* subsp. *lorea* over Open Shrubland of *Acacia ancistrocarpa*, *Acacia wanyu*, *Acacia pyrifolia*, *Solanum sturtianum* and *Acacia adsurgens* over Low Scattered Shrubs of *Bonamia* sp. 1 (indet) over Hummock Grassland of *Triodia lanigera* with Scattered Tussock Grasses of *Aristida inaequiglumis* and *Paraneurachne muelleri*.

Vascular plant species recorded

Species	Plant Height (m)	Coverage (%)	Flowers	Growth Form
<i>Abutilon otocarpum</i>	0.6	<1		Shrub
<i>Acacia adsurgens</i>	1.5	0.1		Shrub
<i>Acacia ancistrocarpa</i>	1.8	2		Shrub
<i>Acacia bivenosa</i>	2.3	0.1	yellow	Shrub
<i>Acacia</i> ? <i>macraneura</i>	1.6	2		Tree
<i>Acacia pachyacra</i>	2	1		Shrub
<i>Acacia pruinocarpa</i>	0.95	<1		Tree
<i>Acacia pyrifolia</i>	1.2	0.2		Shrub
<i>Acacia rhodophloia</i>	0.95	<1		Shrub
<i>Acacia wanyu</i>	1.6	1.5	yellow	Shrub
<i>Aristida contorta</i>	0.25	<1		Grass
<i>Aristida holathera</i> var. <i>holathera</i>	0.3	<1		Grass
<i>Aristida inaequiglumis</i>	0.75	0.1		Grass
<i>Bonamia erecta</i>	0.35	<1		Shrub
<i>Bonamia</i> sp. (indet)	0.45	0.1		Shrub
<i>Cleome viscosa</i>	0.7	<1		Herb
<i>Corymbia hamersleyana</i>	5.5	1		Tree
<i>Cymbopogon obtectus</i>	0.8	<1		Grass
<i>Dicrastylis cordifolia</i>	0.25	<1		Shrub
<i>Dysphania kalpari</i>	0.03	<1		Herb
<i>Enchylaena tomentosa</i>	0.4	<1		Shrub
<i>Enneapogon polyphyllus</i>	0.3	<1		Grass
<i>Eragrostis eriopoda</i>	0.35	<1		Grass
<i>Eremophila forrestii</i> subsp. <i>forrestii</i>	0.5	<1	pink	Shrub
<i>Eremophila latrobei</i> subsp. <i>latrobei</i>	1.5	<1	red	Shrub
<i>Eriachne aristidea</i>	0.25	<1		Grass
<i>Eulalia aurea</i>	0.7	<1		Grass
<i>Euphorbia</i> aff. <i>australis</i>	0.2	<1		Herb
<i>Euphorbia tannensis</i> subsp. <i>eremophila</i>	0.85	<1		Herb
<i>Goodenia lamprosperma</i>	0.3	<1		Herb
<i>Hakea lorea</i> subsp. <i>lorea</i>	2	<1		Shrub
<i>Hibiscus brachychlaenus</i>	0.25	<1		Shrub
<i>Hibiscus burtonii</i>	0.6	<1		Shrub

<i>Keraudrenia</i> sp. (indet)	0.7	<1		Shrub
<i>Paraneurachne muelleri</i>	0.5	0.1		Grass
<i>Paspalidium clementii</i>	0.2	<1		Grass
<i>Ptilotus obovatus</i>	0.8	<1		Shrub
<i>Rhagodia eremaea</i>	1.1	<1	cream	Shrub
<i>Santalum lanceolatum</i>	2	<1	cream	Shrub
<i>Scaevola spinescens</i>	1.3	<1		Shrub
<i>Senna ? notabilis</i>	0.1	<1		Shrub
<i>Senna artemisioides</i> subsp. <i>helmsii</i>	0.5	<1		Shrub
<i>Senna artemisioides</i> subsp. <i>oligophylla</i>	1	<1		Shrub
<i>Senna glutinosa</i> subsp. <i>x luerssenii</i>	1	<1		Shrub
<i>Sida cardiophylla</i>	0.5	<1		Shrub
<i>Solanum centrale</i>	0.25	<1		Shrub
<i>Solanum lasiophyllum</i>	0.4	<1	purple	Shrub
<i>Solanum sturtianum</i>	1	0.2	purple	Shrub
<i>Tribulus macrocarpus</i>	0.05	<1		Herb
<i>Trichodesma zeylanicum</i> var. <i>zeylanicum</i>	0.1	<1		Shrub
<i>Triodia lanigera</i>	0.8	40		Hummock Grass
<i>Yakirra australiensis</i>	0.15	<1		Grass



Site WHN-22

FLORA QUADRAT DATA SHEET

Location	WHN-23	Date 22.05.2011 Surveyor K. McCreery
Quadrat Dimension	50x50m	Quadrat Orientation 0°
GPS Location	Eastings: 209225 Northing: 7414180	GPS Location Relative to Quadrat NW
Soil Type	Sandy Clay Loam	Soil Colour Red
Topography/Aspect	Hillslope, moderately inclined / 210°	Disturbance Type Fire
Vegetation Condition	Pristine	
Broad Floristic Formation	<i>Triodia</i> Open Hummock Grassland	
Vegetation Association	6d - Open Hummock Grassland of <i>Triodia</i> sp. Shovelanna Hill (S.van Leeuwen 3835), <i>Triodia epactia</i> and <i>Triodia brizoides</i> with Low Open Woodland of <i>Acacia aptaneura</i> , <i>Acacia ? pteraneura</i> (hybrid?) and <i>Acacia rhodophloia</i> over Open Shrubland of <i>Acacia tetragonophylla</i> , <i>Acacia adsurgens</i> and <i>Senna glutinosa</i> subsp. <i>glutinosa</i>	
Vegetation Sub-association	Scattered Shrubs of <i>Senna artemisioides</i> subsp. <i>oligophylla</i> and <i>Cullen leucochaites</i> over Low Scattered Shrubs of <i>Corchorus lasiocarpum</i> subsp. <i>lasiocarpus</i> and <i>Tribulus suberosus</i> over Hummock Grassland of <i>Triodia epactia</i> over Scattered Tussock Grasses of <i>Enneapogon lindleyanus</i> and <i>Cymbopogon ambiguus</i>	

Vascular plant species recorded

<u>Species</u>	<u>Plant Height (m)</u>	<u>Coverage (%)</u>	<u>Flowers</u>	<u>Growth Form</u>
<i>Abutilon lepidum</i>	0.3	<1		Shrub
<i>Acacia adsurgens</i>	0.8	<1		Shrub
<i>Acacia pruinocarpa</i>	0.9	<1		Tree
<i>Acacia tetragonophylla</i>	0.6	<1		Shrub
<i>Aristida contorta</i>	0.2	<1		Grass
<i>Corchorus lasiocarpum</i> subsp. <i>lasiocarpus</i>	0.5	1		Shrub
<i>Cullen leucochaites</i>	1.2	0.2		Shrub
<i>Cymbopogon ambiguus</i>	0.6	0.2		Grass
<i>Enneapogon lindleyanus</i>	0.2	0.5		Grass
<i>Enneapogon polyphyllus</i>	0.3	<1		Grass
<i>Eremophila fraseri</i> subsp. <i>fraseri</i>	0.6	<1		Shrub
<i>Eremophila latrobei</i> subsp. <i>latrobei</i>	0.4	<1		Shrub
<i>Eriachne mucronata</i>	0.4	<1		Grass
<i>Eriachne pulchella</i> subsp. <i>dominii</i>	0.1	<1		Grass
<i>Euphorbia tannensis</i> subsp. <i>eremophila</i>	0.35	<1		Shrub
<i>Gomphrena kanisii</i>	0.2	<1		Herb
<i>Grevillea ? berryana</i>	0.8	<1		Shrub
<i>Hakea chordophylla</i>	0.8	<1		Shrub
<i>Hakea lorea</i> subsp. <i>lorea</i>	0.8	<1		Shrub
<i>Hibiscus coatesii</i>	0.4	<1		Shrub
<i>Hibiscus strutii</i> var. <i>campylochlamys</i>	0.3	<1		Shrub
<i>Indigofera monophylla</i>	0.3	<1		Shrub
<i>Paspalidium clementii</i>	0.1	<1		Grass
<i>Ptilotus auriculifolius</i>	0.2	<1		Herb
<i>Ptilotus exaltatus</i>	0.1	<1		Herb
<i>Ptilotus obovatus</i>	0.6	<1		Shrub
<i>Senna artemisioides</i> subsp. <i>helmsii</i>	0.3	<1		Shrub
<i>Senna artemisioides</i> subsp. <i>oligophylla</i>	1.3	0.4		Shrub
<i>Senna glutinosa</i> subsp. <i>glutinosa</i>	0.9	<1		Shrub
<i>Sida echinocarpa</i>	0.4	<1		Shrub
<i>Solanum ellipticum</i>	0.2	<1		Shrub
<i>Solanum phlomoides</i>	0.3	<1		Shrub
<i>Tribulus suberosus</i>	0.6	0.2		Shrub

Triodia epactia

0.7

35

Hummock Grass



Site WHN-23

FLORA QUADRAT DATA SHEET

Location	WHN-24	Date 21.05.2011 & 06.10.2011 Surveyor A. Cole & R. Tomanovic
Quadrat Dimension	50x50m	Quadrat Orientation 0°
GPS Location	Easting: 209314 Northing: 7417145	GPS Location Relative to Quadrat NW
Soil Type	Silty Loam	Soil Colour Brown
Topography/Aspect	Hillslope, very steep / 170°	Disturbance Type Fire, cattle and feral animals
Vegetation Condition	Excellent	
Broad Floristic Formation	Acacia Low Open Woodland	
Vegetation Association	3a - Low Open Woodland of <i>Acacia aptaneura</i> and <i>Acacia pruinocarpa</i> over High Open Shrubland of <i>Acacia tetragonophylla</i> and <i>Acacia synchronicia</i> over Very Open Hummock Grassland of <i>Triodia</i> sp. Shovelanna Hill (S.van Leeuwen 3835)	
Vegetation Sub-association	Low Open Woodland of <i>Acacia</i> ? <i>aptaneura</i> over High Open Shrubland of <i>Acacia tetragonophylla</i> , <i>Eremophila latrobei</i> subsp. <i>latrobei</i> , <i>Acacia synchronicia</i> and <i>Senna glutinosa</i> subsp. <i>x luerssenii</i> over Open Shrubland of <i>Eremophila cuneifolia</i> , <i>Scaevola spinescens</i> , <i>Tribulus suberosus</i> and <i>Eremophila latrobei</i> subsp. <i>latrobei</i> over Low Scattered Shrubs of <i>Senna artemisioides</i> subsp. <i>helmsii</i> and <i>Maireana planifolia</i> over Very Open Hummock Grassland of <i>Triodia</i> sp. Shovelanna Hill (S.van Leeuwen 3835) over Scattered Herbs of <i>Sclerolaena eriantha</i>	

Vascular plant species recorded

Species	Plant Height (m)	Coverage (%)	Flowers	Growth Form
<i>Abutilon lepidum</i>	0.6	<1		Shrub
<i>Acacia aptaneura</i>	4	3		Tree
<i>Acacia sibirica</i>	1.8	<1		Shrub
<i>Acacia synchronicia</i>	2	1.5		Shrub
<i>Acacia tetragonophylla</i>	2.3	6		Shrub
<i>Amyema fitzgeraldii</i>	1.5	<1		Shrub
<i>Aristida contorta</i>	0.15	<1		Grass
<i>Bulbostylis barbata</i>	0.05	0.1		Sedge
* <i>Cenchrus ciliaris</i>	0.35	<1		Grass
<i>Cymbopogon oblectus</i>	0.9	<1		Grass
<i>Dodonaea pachyneura</i>	1.6	<1	red	Shrub
<i>Duperreya commixta</i>	0.4	<1		Vine
<i>Enneapogon lindleyanus</i>	0.25	<1		Grass
<i>Enneapogon polyphyllus</i>	0.25	<1		Grass
<i>Eragrostis eriopoda</i>	0.6	<1		Grass
<i>Eremophila cuneifolia</i>	1	4		Shrub
<i>Eremophila latrobei</i> subsp. <i>filiformis</i>	0.35	<1		Shrub
<i>Eremophila latrobei</i> subsp. <i>latrobei</i>	2	2.1	red	Shrub
<i>Eriachne mucronata</i>	0.35	<1		Grass
<i>Eriachne pulchella</i> subsp. <i>dominii</i>	0.15	<1		Grass
<i>Evolvulus alsinoides</i> var. <i>villosicalyx</i>	0.04	<1		Herb
<i>Fimbristylis dichotoma</i>	0.3	<1		Sedge
<i>Frankenia</i> ? <i>setosa</i>	0.3	<1		Shrub
<i>Gomphrena kanisii</i>	0.3	<1	pink	Herb
<i>Lepidium pedicellosum</i>	0.5	<1		Shrub
<i>Lepidium platypetalum</i>	0.45	<1		Shrub
<i>Maireana georgei</i>	0.4	<1		Shrub
<i>Maireana planifolia</i>	0.2	0.5		Shrub
<i>Maireana tomentosa</i> subsp. <i>tomentosa</i>	0.4	<1		Shrub
<i>Paspalidium clementii</i>	0.2	<1		Grass
* <i>Portulaca oleracea</i>	0.05	<1		Herb

<i>Ptilotus exaltatus</i>	0.3	<1	Herb
<i>Ptilotus obovatus</i>	0.8	<1	Shrub
<i>Rhagodia eremaea</i>	0.8	<1	Shrub
<i>Scaevola spinescens</i>	1	0.2	Shrub
<i>Sclerolaena eriacantha</i>	0.35	1	Herb
<i>Senna artemisioides</i> subsp. <i>helmsii</i>	0.6	1	Shrub
<i>Senna glutinosa</i> subsp. <i>x luerssenii</i>	2	0.5	Shrub
<i>Senna stricta</i>	1.2	<1	Shrub
<i>Sida</i> sp. <i>Excedenifolia</i> (J.L. Egan 1925)	0.2	<1	Shrub
<i>Solanum lasiophyllum</i>	0.3	<1	Shrub
<i>Tribulus suberosus</i>	1	0.1	Shrub
<i>Triodia epactia</i>	0.9	<1	Hummock Grass
<i>Triodia</i> sp. Shovelanna Hill (S.van Leeuwen 3835)	0.75	5	Hummock Grass



Site WHN-24

FLORA QUADRAT DATA SHEET

Location	WHN-25	Date 22.05.2011 & 08.10.2011 Surveyor K. McCreery
Quadrat Dimension	50x50m	Quadrat Orientation 0°
GPS Location	Easting: 209227 Northing: 7414894	GPS Location Relative to NW Quadrat
Soil Type	Clay loam, sandy	Soil Colour Red
Topography/Aspect	Drainage Depression, steep / 350°	Disturbance Type Fire
Vegetation Condition	Excellent	
Broad Floristic Formation	Acacia High Shrubland	
Vegetation Association	4a - High Shrubland of <i>Acacia monticola</i> , <i>Rulingia luteiflora</i> and <i>Gossypium robinsonii</i> with Low Woodland of <i>Corymbia hamersleyana</i> , <i>Eucalyptus victrix</i> and <i>Eucalyptus leucophloia</i> subsp. <i>leucophloia</i> over Very Open Tussock Grassland of <i>Themeda triandra</i> , * <i>Cenchrus ciliaris</i> and <i>Cymbopogon procerus</i>	
Vegetation Sub-association	Low Open Woodland of <i>Acacia sibirica</i> , <i>Acacia aptaneura</i> , <i>Eucalyptus leucophloia</i> subsp. <i>leucophloia</i> , <i>Corymbia hamersleyana</i> and <i>Acacia pruinocarpa</i> over High Open Shrubland of <i>Rulingia luteiflora</i> , <i>Gossypium robinsonii</i> , <i>Grevillea wickhamii</i> subsp. <i>aprica</i> and <i>Amyema fitzgeraldii</i> over Scattered Shrubs of <i>Santalum lanceolatum</i> Low Scattered Shrubs of <i>Tephrosia rosea</i> var. <i>glabrior</i> over Very Open Hummock Grassland of <i>Triodia epactia</i> over Very Open Tussock Grassland of <i>Cymbopogon procerus</i> , <i>Themeda triandra</i> and <i>Aristida inaequiglumis</i>	

Vascular plant species recorded

Species	Plant Height (m)	Coverage (%)	Flowers	Growth Form
<i>Acacia ancistrocarpa</i>	1.5	<1		Shrub
<i>Acacia aptaneura</i>	5	1		Tree
<i>Acacia dictyophleba</i>	1.2	<1		Shrub
<i>Acacia maitlandii</i>	1.8	<1		Shrub
<i>Acacia pruinocarpa</i>	1.8	<1		Tree
<i>Acacia monticola</i>	2.5	<1		Shrub
<i>Acacia sibirica</i>	4	2	yellow	Shrub
<i>Acacia tetragonophylla</i>	1.7	<1		Shrub
<i>Acacia wanyu</i>	0.6	<1		Shrub
<i>Alternanthera nodiflora</i>	0.3	<1		Herb
<i>Amyema fitzgeraldii</i>	2	<1		Shrub
<i>Anthobolus leptomerioides</i>	1.2	<1		Shrub
<i>Acacia pruinocarpa</i>	1.8	<1		Tree
<i>Aristida contorta</i>	0.3	<1		Grass
<i>Aristida inaequiglumis</i>	0.8	0.2		Grass
<i>Bonamia</i> sp. Dampier (A.A. Mitchell PRP 217)	0.1	<1		Shrub
<i>Bulbostylis barbata</i>	0.2	<1		Sedge
<i>Cassytha capillaries</i>	0.3	<1		Vine
<i>Cleome viscosa</i>	0.2	<1		Herb
<i>Corchorus lasiocarpum</i> subsp. <i>lasiocarpus</i>	0.9	<1		Shrub
<i>Corymbia hamersleyana</i>	4.5	<1		Tree
<i>Cullen leucochaites</i>	0.7	<1		Shrub
<i>Cymbopogon procerus</i>	1.8	2		Grass
<i>Dodonaea viscosa</i> subsp. <i>angustissima</i>	1.7	<1		Shrub
<i>Duperreya commixta</i>	1	<1		Vine
<i>Dysphania rhadinostachya</i> subsp. <i>rhadinostachya</i>	0.2	<1		Herb
<i>Eragrostis eriopoda</i>	0.4	<1		Grass
<i>Eriachne aristidea</i>	0.2	<1		Grass
<i>Eriachne mucronata</i>	0.4	<1		Grass
<i>Eriachne pulchella</i> subsp. <i>dominii</i>	0.1	<1		Grass
<i>Eucalyptus leucophloia</i> subsp. <i>leucophloia</i>	4.5	0.5		Tree
<i>Euphorbia</i> aff. <i>australis</i>	0.1	<1		Herb

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<i>Evolvulus alsinoides</i> var. <i>villosicalyx</i>	0.2	<1		Herb
<i>Gompholobium</i> sp. Pilbara (N.F. Norris 908)	0.6	<1		Shrub
<i>Gomphrena cunninghamii</i>	0.2	<1		Herb
<i>Goodenia muelleriana</i>	0.3	<1	yellow	Herb
<i>Goodenia stobbsiana</i>	0.3	<1	purple	Shrub
<i>Goodenia ? vilmorinae</i>	0.3	<1		Herb
<i>Gossypium robinsonii</i>	2.4	0.5		Shrub
<i>Grevillea wickhamii</i> subsp. <i>aprica</i>	2.5	0.2	red	Shrub
<i>Goodenia stobbsiana</i>	0.3	<1	purple	Shrub
<i>Haloragis gossei</i>	0.2	<1		Herb
<i>Hibiscus struttii</i> var. <i>campylochlamys</i>	0.3	<1		Shrub
<i>Hybanthus aurantiacus</i>	0.4	<1		Shrub
<i>Indigofera monophylla</i>	0.3	<1		Shrub
<i>Goodenia stobbsiana</i>	0.3	<1	purple	Shrub
<i>Maireana melanocoma</i>	0.2	<1		Shrub
<i>Paraneurachne mulleri</i>	0.4	<1		Grass
<i>Paspalidium rarum</i>	0.1	<1		Grass
<i>Pluchea dentex</i>	0.4	<1		Herb
<i>Pterocaulon sphaecelatum</i>	0.8	<1		Herb
<i>Pterocaulon ? sphaeranthoides</i>	0.3	0.2		Herb
<i>Ptilotus astrolasius</i>	0.2	<1		Shrub
<i>Ptilotus calostachyus</i>	0.5	<1	pink	Herb
<i>Ptilotus exaltatus</i>	0.1	<1		Herb
<i>Rulingia luteiflora</i>	2.5	8		Shrub
<i>Santalum lanceolatum</i>	1.8	0.2		Shrub
<i>Senna ? notabilis</i>	0.2	<1		Herb
<i>Senna artemisioides</i> subsp. <i>helmsii</i>	0.8	<1		Shrub
<i>Senna artemisioides</i> subsp. <i>oligophylla</i>	0.6	<1		Shrub
<i>Senna glaucifolia</i>	0.6	<1		Shrub
<i>Senna glutinosa</i> subsp. <i>glutinosa</i>	0.9	<1		Shrub
<i>Senna glutinosa</i> subsp. <i>x leurrssenii</i>	0.7	<1		Shrub
<i>Senna glutinosa</i> subsp. <i>pruinosa</i>	0.6	<1		Shrub
<i>Senna</i> sp. Meekatharra (E. Bailey 1-26)	0.3	<1		Shrub
<i>Senna stricta</i>	0.8	<1		Shrub
<i>Sida echinocarpa</i>	0.4	<1	yellow	Shrub
<i>Sida</i> sp. Pilbara (A.A. Mitchell PRP 1543)	0.6	<1		Shrub
<i>Solanum ellipticum</i>	0.2	<1		Shrub
<i>Solanum phlomoides</i>	0.4	<1	purple	Shrub
<i>Sporobolus australasicus</i>	0.1	<1		Grass
<i>Streptoglossa adscendens</i>	0.2	<1		Herb
<i>Tephrosia rosea</i> var. <i>glabrior</i>	0.6	0.2		Shrub
<i>Themeda triandra</i>	1.2	1		Grass
<i>Trichodesma zeylanicum</i> var. <i>zeylanicum</i>	0.8	<1		Shrub
<i>Triodia brizoides</i>	0.9	<1		Hummock Grass
<i>Triodia epactia</i>	1.2	5		Hummock Grass
<i>Triumfetta leptacantha</i>	0.8	<1	yellow	Shrub



Site WHN-25

FLORA QUADRAT DATA SHEET

Location	WHN-26	Date 22.05.2011 & 08.10.2011 Surveyor A. Cole & R. Tomanovic
Quadrat Dimension	50x50m	Quadrat Orientation 0°
GPS Location	Eastings: 209078 Northing: 7413688	GPS Location Relative to Quadrat NW
Soil Type	Sandy Loam	Soil Colour Brown
Topography/Aspect	Gully, moderately inclined / 80°	Disturbance Type Cattle, native animals
Vegetation Condition	Excellent	
Broad Floristic Formation	Acacia Low Woodland	
Vegetation Association	2a - Low Woodland of <i>Acacia aptaneura</i> , <i>Acacia ? pteraneura</i> and <i>Acacia pruinocarpa</i> over Open Hummock Grassland of <i>Triodia epactia</i> and <i>Triodia</i> sp. Shovelanna Hill (S.van Leeuwen 3835) with Shrubland of <i>Acacia wanyu</i> , <i>Acacia tetragonophylla</i> and <i>Senna stricta</i>	
Vegetation Sub-association	Low Woodland of <i>Acacia aptaneura</i> , <i>Acacia paraneura</i> , <i>Acacia pruinocarpa</i> with Scattered Mallees of <i>Eucalyptus gamophylla</i> over High Open Shrubland of <i>Acacia wanyu</i> , <i>Acacia tetragonophylla</i> , <i>Acacia rhodophloia</i> , <i>Psydrax suaveolens</i> and <i>Psydrax latifolia</i> over Open Shrubland of <i>Eremophila cuneifolia</i> , <i>Senna glutinosa</i> subsp. <i>x luerssenii</i> , <i>Eremophila oppositifolia</i> subsp. <i>angustifolia</i> and <i>Senna artemisioides</i> subsp. <i>helmsii</i> over Low Scattered Shrubs of <i>Enchylaena tomentosa</i> and <i>Solanum phlomoides</i> over Open Hummock Grassland of <i>Triodia epactia</i> and <i>Triodia</i> sp. Shovelanna Hill (S.van Leeuwen 3835) with Very Open Grassland of <i>Paspalidium clementii</i>	

Vascular plant species recorded

Species	Plant Height (m)	Coverage (%)	Flowers	Growth Form
<i>Acacia aptaneura</i>	6	3.5		Tree
<i>Acacia aptaneura</i>	4.5	2		Tree
<i>Acacia catenulata</i> subsp. <i>occidentalis</i>	4.5	1		Shrub
<i>Acacia paraneura</i>	6	2.5		Tree
<i>Acacia paraneura</i> X <i>aptaneura</i>	3.5	1.5		Tree
<i>Acacia pruinocarpa</i>	7	2		Tree
<i>Acacia rhodophloia</i>	3.5	0.5		Shrub
<i>Acacia subcontorta</i>	4.5	2		Tree
<i>Acacia tetragonophylla</i>	2.5	2		Shrub
<i>Acacia wanyu</i>	2.4	4		Shrub
<i>Amyema fitzgeraldii</i>	0.45	<1		Shrub
<i>Aristida inaequiglumis</i>	0.9	<1		Grass
<i>Bulbostylis barbata</i>	0.03	<1		Sedge
<i>Cymbopogon ambiguus</i>	0.95	<1		Grass
<i>Digitaria brownii</i>	0.2	<1		Grass
<i>Dodonaea pachyneura</i>	1	<1		Shrub
<i>Duperreya commixta</i>	2.5	<1		Vine
<i>Enchylaena tomentosa</i>	0.7	1		Shrub
<i>Eremophila cuneifolia</i>	1.2	2.5		Shrub
<i>Eremophila oppositifolia</i> subsp. <i>angustifolia</i>	1.6	1		Shrub
<i>Eriachne mucronata</i>	0.5	<1		Grass
<i>Eriachne pulchella</i> subsp. <i>dominii</i>	0.05	<1		Grass
<i>Eucalyptus gamophylla</i>	0.45	2		Tree
<i>Eucalyptus leucophloia</i> subsp. <i>leucophloia</i>	4.5	<1		Tree
<i>Euphorbia tannensis</i> subsp. <i>eremophila</i>	0.3	<1		Herb
<i>Evolvulus alsinoides</i> var. <i>villosicalyx</i>	0.2	<1		Herb
<i>Hibiscus burtonii</i>	0.25	<1		Shrub
<i>Hibiscus haynaldii</i>	0.75	<1	pink	Shrub
<i>Hibiscus sturtii</i> var. (indet)	0.2	<1		Shrub
<i>Hibiscus sturtii</i> var. (indet)	0.3	<1		Shrub
<i>Indigofera monophylla</i>	0.45	<1		Shrub

<i>Maireana georgei</i>	0.25	<1		Shrub
<i>Maireana melanocoma</i>	0.3	<1		Shrub
<i>Maireana thesioides</i>	0.2	<1		Shrub
<i>Paspalidium clementii</i>	0.2	2		Grass
<i>Psydrax latifolia</i>	2.5	0.5		Shrub
<i>Psydrax suaveolens</i>	2.8	0.5		Shrub
<i>Ptilotus exaltatus</i>	0.1	<1		Herb
<i>Ptilotus obovatus</i>	0.9	<1		Shrub
<i>Sarcostemma viminalis</i> subsp. <i>australe</i>	0.2	<1		Shrub
<i>Scaevola acacioides</i>	1.4	<1		Shrub
<i>Sclerolaena diacantha</i>	0.25	<1		Shrub
<i>Sclerolaena ericantha</i>	0.1	<1		Shrub
<i>Senna artemisioides</i> subsp. <i>helmsii</i>	1.3	0.1		Shrub
<i>Senna artemisioides</i> subsp. <i>oligophylla</i>	1.3	<1		Shrub
<i>Senna glutinosa</i> subsp. <i>x luerssenii</i>	1.6	1.5	yellow	Shrub
<i>Senna stricta</i>	0.6	<1		Shrub
<i>Sida</i> sp. <i>Excedentifolia</i> (J.L. Egan 1925)	0.2	<1		Shrub
<i>Sida</i> sp. Shovelanna Hill (S. van Leeuwen 3842)	0.2	<1		Shrub
<i>Solanum ellipticum</i>	0.1	<1		Shrub
<i>Solanum phlomoides</i>	0.5	0.5		Shrub
<i>Sporobolus australasicus</i>	0.05	<1		Grass
<i>Trichodesma zeylanicum</i> var. <i>zeylanicum</i>	0.05	<1		Shrub
<i>Triodia epactia</i>	1	15.2		Hummock Grass
<i>Triodia</i> sp. Shovelanna Hill (S. van Leeuwen 3835)	0.5	<1		Hummock Grass



Site WHN-26

FLORA QUADRAT DATA SHEET

Location	WHN-27	Date 22.05.2011 Surveyor K. McCreery
Quadrat Dimension	50x50m	Quadrat Orientation 0°
GPS Location	Easting: 209806 Northing: 7414350	GPS Location Relative to Quadrat NW
Soil Type	Sandy Clay Loam,	Soil Colour Red
Topography/Aspect	Hillslope, moderately inclined / 180°	Disturbance Type None
Vegetation Condition	Excellent	
Broad Floristic Formation	<i>Triodia</i> Open Hummock Grassland	
Vegetation Association	6d - Open Hummock Grassland of <i>Triodia</i> sp. Shovelanna Hill (S.van Leeuwen 3835), <i>Triodia epactia</i> and <i>Triodia brizoides</i> with Low Open Woodland of <i>Acacia aptaneura</i> , <i>Acacia ? pteraneura</i> (hybrid?) and <i>Acacia rhodophloia</i> over Open Shrubland of <i>Acacia tetragonophylla</i> , <i>Acacia adsurgens</i> and <i>Senna glutinosa</i> subsp. <i>glutinosa</i>	
Vegetation Sub-association	Low Woodland of <i>Acacia rhodophloia</i> , <i>Acacia aptaneura</i> and <i>Grevillea ? berryana</i> over High Open Shrubland of <i>Acacia sibirica</i> over Open Shrubland of <i>Acacia tetragonophylla</i> , <i>Senna glutinosa</i> subsp. <i>glutinosa</i> , <i>Eremophila latrobei</i> subsp. <i>latrobei</i> , <i>Dodonaea petiolaris</i> and <i>Senna artemisioides</i> subsp. <i>helmsii</i> over Low Scattered Shrubs of <i>Eremophila exilifolia</i> over Open Hummock Grassland <i>Triodia</i> sp. Shovelanna Hill (S.van Leeuwen 3835) and <i>Triodia epactia</i> over Scattered Tussock Grass of <i>Paspalidium clementii</i>	

Vascular plant species recorded

Species	Plant Height (m)	Coverage (%)	Flowers	Growth Form
<i>Acacia aptaneura</i>	5	1		Tree
<i>Acacia rhodophloia</i>	3.5	15		Shrub
<i>Acacia sibirica</i>	2	3		Shrub
<i>Acacia tetragonophylla</i>	1.8	2		Shrub
<i>Aristida contorta</i>	0.2	<1		Grass
<i>Aristida holathera</i> var. <i>holathera</i>	0.3	<1		Grass
<i>Bulbostylis barbata</i>	0.1	<1		Sedge
<i>Cymbopogon obtectus</i>	0.4	<1		Grass
<i>Dodonaea petiolaris</i>	1.2	<1		Shrub
<i>Duperreya commixta</i>	2	<1		Vine
<i>Enneapogon caeruleus</i>	0.2	<1		Grass
<i>Enneapogon polyphyllus</i>	0.2	<1		Grass
<i>Eragrostis eriopoda</i>	0.3	<1		Grass
<i>Eremophila exilifolia</i>	0.9	1		Shrub
<i>Eremophila latrobei</i> subsp. (indet)	1.5	<1		Shrub
<i>Eremophila latrobei</i> subsp. <i>latrobei</i>	1.8	<1		Shrub
<i>Eriachne mucronata</i>	0.4	<1		Grass
<i>Eriachne pulchella</i> subsp. <i>dominii</i>	0.1	<1		Grass
<i>Euphorbia</i> aff. <i>australis</i>	0.3	<1		Herb
<i>Evolvulus alsinoides</i> var. <i>villosicalyx</i>	0.1	<1		Herb
<i>Fimbristylis dichotoma</i>	0.3	<1		Sedge
<i>Fimbristylis simulans</i>	0.3	0.2		Sedge
<i>Frankenia ? setosa</i>	0.3	<1		Shrub
<i>Goodenia muelleriana</i>	0.1	<1		Herb
<i>Grevillea ? berryana</i>	3	<1		Tree
<i>Hibiscus burtonii</i>	0.3	<1		Shrub
<i>Hibiscus sturtii</i> var. <i>truncatus</i>	0.2	<1		Shrub
<i>Hybanthus aurantiacus</i>	0.3	<1		Shrub
<i>Iseilema dolichotrichum</i>	0.02	<1		Grass
<i>Keraudrenia</i> sp. (indet)	0.2	<1		Shrub
<i>Paspalidium clementii</i>	0.1	0.2		Grass
<i>Ptilotus calostachyus</i>	0.3	<1		Herb

<i>Ptilotus exaltatus</i>	0.4	<1	Herb
<i>Schizachyrium fragile</i>	0.1	<1	Grass
<i>Senna artemisioides</i> subsp. <i>helmsii</i>	1	<1	Shrub
<i>Senna glutinosa</i> subsp. <i>glutinosa</i>	1.3	2	Shrub
<i>Senna stricta</i>	0.3	<1	Shrub
<i>Solanum phlomoides</i>	0.4	<1	Shrub
<i>Streptoglossa ? macrocephala</i>	0.5	<1	Shrub
<i>Triodia epactia</i>	0.9	5	Hummock Grass
<i>Triodia</i> sp. Shovelanna Hill (S.van Leeuwen 3835)	0.6	20	Hummock Grass



Site WHN-27

FLORA QUADRAT DATA SHEET

Location	WHN-28	Date 22.05.2011 & 08.10.2011 Surveyor A. Cole & R. Tomanovic
Quadrat Dimension	50x50m	Quadrat Orientation 0°
GPS Location	Easting: 208579 Northing: 7413846	GPS Location Relative to Quadrat NW
Soil Type	Loamy sand	Soil Colour Brown
Topography/Aspect	Footslope, steep / 10°	Disturbance Type Fire, native animals
Vegetation Condition	Excellent	
Broad Floristic Formation	<i>Triodia</i> Open Hummock Grassland	
Vegetation Association	6d - Open Hummock Grassland of <i>Triodia</i> sp. Shovelanna Hill (S.van Leeuwen 3835), <i>Triodia epactia</i> and <i>Triodia brizoides</i> with Low Open Woodland of <i>Acacia aptaneura</i> , <i>Acacia ? pteraneura</i> (hybrid?) and <i>Acacia rhodophloia</i> over Open Shrubland of <i>Acacia tetragonophylla</i> , <i>Acacia adsurgens</i> and <i>Senna glutinosa</i> subsp. <i>glutinosa</i> .	
Vegetation Sub-association	Low Open Woodland of <i>Acacia ? aptaneura</i> and <i>Acacia pruinocarpa</i> over High Open Shrubland of <i>Acacia wanyu</i> over Open Shrubland of <i>Scaevola acacioides</i> , <i>Acacia tetragonophylla</i> , <i>Senna glutinosa</i> subsp. <i>pruinosa</i> and <i>Senna glutinosa</i> subsp. <i>x luerssenii</i> over Low Open Woodland of <i>Senna stricta</i> and <i>Ptilotus astrolasius</i> over Hummock Grassland of <i>Triodia brizoides</i> with Scattered Tussock Grass of <i>Eriachne pulchella</i> subsp. <i>dominii</i>	

Vascular plant species recorded

Species	Plant Height (m)	Coverage (%)	Flowers	Growth Form
<i>Acacia ? pteraneura</i>	4.5	2		Tree
<i>Acacia pruinocarpa</i>	2.5	1		Tree
<i>Acacia tetragonophylla</i>	1.6	1		Shrub
<i>Acacia wanyu</i>	2	4		Shrub
<i>Aristida contorta</i>	0.15	<1		Grass
<i>Bulbostylis barbata</i>	0.05	<1		Sedge
<i>Corchorus lasiocarpum</i> subsp. <i>lasiocarpus</i>	0.55	<1		Shrub
<i>Cymbopogon ambiguus</i>	0.85	<1		Grass
<i>Dysphania rhadinostachya</i> subsp. <i>rhadinostachya</i>	0.1	<1		Herb
<i>Enchylaena tomentosa</i>	0.45	<1		Shrub
<i>Eremophila cuneifolia</i>	0.9	<1		Shrub
<i>Eriachne pulchella</i> subsp. <i>dominii</i>	0.1	0.25		Grass
<i>Eucalyptus leucophloia</i> subsp. <i>pulcherrima</i>	0.7	<1		Shrub
<i>Fimbristylis dichotoma</i>	0.25	<1		Sedge
<i>Goodenia muelleriana</i>	0.25	<1		Herb
<i>Goodenia stobbsiana</i>	0.25	<1		Shrub
<i>Hakea lorea</i> subsp. <i>lorea</i>	0.5	<1		Shrub
<i>Hibiscus coatesii</i>	0.35	<1		Shrub
<i>Hibiscus sturtii</i> var. (indet)	0.25	<1		Shrub
<i>Maireana georgei</i>	0.25	<1		Shrub
<i>Maireana triptera</i>	0.75	<1		Shrub
<i>Paraneurachne muelleri</i>	0.45	<1		Grass
<i>Paspalidium clementii</i>	0.25	<1		Grass
<i>Ptilotus astrolasius</i>	0.3	0.1	white	Shrub
<i>Ptilotus axillaris</i>	0.05(0.4 wide)	<1		Herb
<i>Ptilotus auriculifolius</i>	0.6	<1	cream	Herb
<i>Ptilotus calostachyus</i>	0.4	<1		Herb
<i>Ptilotus exaltatus</i>	0.2	<1		Herb
<i>Ptilotus obovatus</i>	1	<1		Shrub
<i>Scaevola acacioides</i>	1.8	2		Shrub
<i>Schizachyrium fragile</i>	0.1	<1		Grass
<i>Sclerolaena lanicuspis</i>	0.05	<1		Herb

<i>Senna artemisioides</i> subsp. <i>helmsii</i>	0.5	<1	Shrub
<i>Senna glutinosa</i> subsp. <i>pruinosa</i>	1.5	0.2	Shrub
<i>Senna glutinosa</i> subsp. <i>x luerssenii</i>	1.1	<1	Shrub
<i>Senna stricta</i>	0.9	2.5	Shrub
<i>Sida</i> sp. Pilbara (A.A. Mitchell PRP 1543)	0.3	<1	Shrub
<i>Solanum ellipticum</i>	0.15	<1	Shrub
<i>Solanum phlomoides</i>	0.2	<1	Shrub
<i>Sporobolus australasicus</i>	0.1	<1	Grass
<i>Tribulus suberosus</i>	0.7	<1	Shrub
<i>Triodia brizoides</i>	0.9	35	Hummock Grass



Site WHN-28

FLORA QUADRAT DATA SHEET

Location	WHN-29	Date 23.05.2011 & 10.10.2011 Surveyor K. McCreery
Quadrat Dimension	50x50m	Quadrat Orientation 0°
GPS Location	Easting: 211434 Northing: 7414100	GPS Location Relative to Quadrat NW
Soil Type	Sandy Clay Loam	Soil Colour Red
Topography/Aspect	Drainage Depression, moderately inclined / 70°	Disturbance Type Weeds
Vegetation Condition	Excellent	
Broad Floristic Formation	Acacia High Shrubland	
Vegetation Association	4a - High Shrubland of <i>Acacia monticola</i> , <i>Rulingia luteiflora</i> and <i>Gossypium robinsonii</i> with Low Woodland of <i>Corymbia hamersleyana</i> , <i>Eucalyptus victrix</i> and <i>Eucalyptus leucophloia</i> subsp. <i>leucophloia</i> over Very Open Tussock Grassland of <i>Themeda triandra</i> , * <i>Cenchrus ciliaris</i> and <i>Cymbopogon procerus</i>	
Vegetation Sub-association	Scattered Low Trees of <i>Corymbia hamersleyana</i> over High Open Shrubland of <i>Acacia monticola</i> , <i>Rulingia luteiflora</i> , <i>Gossypium robinsonii</i> , and <i>Grevillea wickhamii</i> subsp. <i>aprica</i> over Open Shrubland of <i>Acacia maitlandii</i> and <i>Acacia ancistrocarpa</i> over Scattered Shrubs of <i>Petalostylis cassioides</i> , <i>Corchorus lasiocarpum</i> subsp. <i>lasiocarpus</i> , <i>Indigofera monophylla</i> , <i>Sida</i> sp. Pilbara (A.A. Mitchell PRP 1543) and <i>Sida fibulifera</i> over Very Open Tussock Grassland of <i>Themeda triandra</i> , <i>Chrysopogon fallax</i> and <i>Paraneurachne muelleri</i> with Very Open Hummock Grassland of <i>Triodia epactia</i>	

Vascular plant species recorded

Species	Plant Height (m)	Coverage (%)	Flowers	Growth Form
<i>Abutilon cunninghamii</i>	0.3	<1		Shrub
<i>Abutilon lepidum</i>	0.3	<1		Shrub
<i>Abutilon macrum</i>	0.3	<1		Shrub
<i>Abutilon otocarpum</i>	0.4	<1		Shrub
<i>Acacia adoxa</i> var. <i>adoxo</i>	0.4	<1		Shrub
<i>Acacia ancistrocarpa</i>	1.8	0.2		Shrub
<i>Acacia maitlandii</i>	1.8	1		Shrub
<i>Acacia monticola</i>	2.3	10		Shrub
<i>Acacia rhodophloia</i>	0.9	<1		Shrub
<i>Alternanthera</i> sp. (indet)	0.2	<1	white	Herb
<i>Aristida</i> ? <i>jerichoensis</i> var. <i>subspinulifera</i>	0.9	<1		Grass
<i>Aristida holathera</i> var. <i>holathera</i>	0.7	<1		Grass
<i>Boerhavia coccinea</i>	0.1	<1		Herb
<i>Bulbostylis barbata</i>	0.1	<1		Sedge
* <i>Cenchrus ciliaris</i>	0.4	<1		Grass
<i>Chrysopogon fallax</i>	1.2	1		Grass
<i>Cleome viscosa</i>	0.4	<1		Herb
<i>Corchorus lasiocarpum</i> subsp. <i>lasiocarpus</i>	0.5	0.2		Shrub
<i>Corchorus sidioides</i> subsp. <i>sidioides</i>	0.4	<1		Shrub
<i>Corchorus tridens</i>	0.2	<1		Herb
<i>Corymbia</i> ? <i>candida</i>	3	<1		Tree
<i>Corymbia hamersleyana</i>	4.5	1		Tree
<i>Cucumis maderaspatanus</i>	0.5	<1		Vine
<i>Cymbopogon ambiguus</i>	0.6	<1		Grass
<i>Digitaria brownii</i>	0.6	<1		Grass
<i>Duperreya commixta</i>	2	0.2		Vine
<i>Dysphania rhadinostachya</i> subsp. <i>rhadinostachya</i>	0.2	<1		Herb
<i>Enneapogon polyphyllus</i>	0.4	<1		Grass
<i>Eragrostis eriopoda</i>	0.4	<1		Grass
<i>Eremophila jucunda</i> subsp. <i>pulcherrima</i>	0.7	<1		Shrub
<i>Eriachne aristidea</i>	0.3	<1		Grass
<i>Eriachne mucronata</i>	0.3	<1		Grass

<i>Euphorbia</i> aff. <i>australis</i>	0.2	<1	Herb
<i>Evolvulus alsinoides</i> var. <i>decumbens</i>	0.2	<1	Herb
<i>Evolvulus alsinoides</i> var. <i>villosicalyx</i>	0.3	<1	Herb
<i>Gomphrena kanisii</i>	0.2	<1	Herb
<i>Goodenia muelleriana</i>	0.2	<1	Herb
<i>Gossypium robinsonii</i>	3	3	Shrub
<i>Grevillea wickhamii</i> subsp. <i>aprica</i>	3	1	Shrub
<i>Hibiscus burtonii</i>	0.3	<1	Shrub
<i>Hibiscus haynaldii</i>	0.4	<1	Shrub
<i>Hibiscus struttii</i> var. <i>campylochlamys</i>	0.3	<1	Shrub
<i>Hibiscus sturtii</i> var. (indet)	0.2	<1	Shrub
<i>Hybanthus aurantiacus</i>	0.4	<1	Shrub
<i>Indigofera monophylla</i>	0.4	0.2	Shrub
<i>Melhania oblongifolia</i>	0.4	<1	Shrub
<i>Paraneurachne muelleri</i>	0.5	0.2	Grass
<i>Paspalidium clementii</i>	0.1	<1	Grass
<i>Petalostylis cassioides</i>	0.9	0.2	Shrub
<i>Phyllanthus erwinii</i>	0.2	<1	Herb
<i>Pterocaulon</i> ? <i>sphaeranthoides</i>	0.4	<1	Herb
<i>Ptilotus calostachyus</i>	0.4	<1	Herb
<i>Ptilotus exaltatus</i>	0.8	0.2	Herb
<i>Rhynchosia minima</i>	0.6	<1	Vine
<i>Rulingia luteiflora</i>	2.4	5	Shrub
<i>Santalum lanceolatum</i>	1.2	<1	Shrub
<i>Schizachyrium fragile</i>	0.4	<1	Grass
<i>Senna</i> ? <i>notabilis</i>	0.2	<1	Herb
<i>Senna glaucifolia</i>	0.6	<1	Shrub
<i>Senna glutinosa</i> subsp. <i>glutinosa</i>	1.2	<1	Shrub
<i>Sida</i> ? sp. spiciform panicles (E. Leyland s.n. 14/8/90)	0.9	<1	Shrub
<i>Sida arenicola</i>	0.9	<1	Shrub
<i>Sida fibulifera</i>	0.3	0.2	Shrub
<i>Sida</i> sp. Pilbara (A.A. Mitchell PRP 1543)	0.4	0.2	Shrub
<i>Solanum ellipticum</i>	0.2	<1	Shrub
<i>Tephrosia rosea</i> var. <i>glabrior</i>	0.4	<1	Shrub
<i>Themeda triandra</i>	0.8	5	Grass
<i>Trichodesma zeylanicum</i> var. <i>zeylanicum</i>	0.5	<1	Shrub
<i>Triodia epactia</i>	0.9	5	Hummock Grass
<i>Triumfetta leptacantha</i>	0.4	<1	Shrub
<i>Yakirra australiensis</i>	0.2	<1	Grass



Site WHN-29

FLORA QUADRAT DATA SHEET

Location	WHN-30	Date 22.05.2011
		Surveyor A. Cole & R. Tomanovic
Quadrat Dimension	50x50m	Quadrat Orientation 0°
GPS Location	Easting: 208563 Northing: 7414470	GPS Location Relative to Quadrat NW
Soil Type	Sandy Loam	Soil Colour Red-brown
Topography/Aspect	Hillslope, very steep / 190°S	Disturbance Type Weeds
Vegetation Condition	Excellent	
Broad Floristic Formation	<i>Triodia</i> Open Hummock Grassland	
Vegetation Association	6d - Open Hummock Grassland of <i>Triodia</i> sp. Shovelanna Hill (S.van Leeuwen 3835), <i>Triodia epactia</i> and <i>Triodia brizoides</i> with Low Open Woodland of <i>Acacia aptaneura</i> , <i>Acacia ? pteraneura</i> (hybrid?) and <i>Acacia rhodophloia</i> over Open Shrubland of <i>Acacia tetragonophylla</i> , <i>Acacia adsurgens</i> and <i>Senna glutinosa</i> subsp. <i>glutinosa</i>	
Vegetation Sub-association	Low Open Woodland of <i>Acacia pruinocarpa</i> , <i>Acacia ? pteraneura</i> (hybrid?) and <i>Eucalyptus leucophloia</i> subsp. <i>leucophloia</i> over High Open Shrubland of <i>Senna glutinosa</i> subsp. <i>pruinosa</i> , <i>Acacia adsurgens</i> and <i>Acacia tetragonophylla</i> over Scattered Shrubs of <i>Senna glutinosa</i> subsp. <i>x luerssenii</i> , <i>Senna glaucifolia</i> , <i>Senna stricta</i> and <i>Senna glutinosa</i> subsp. <i>glutinosa</i> over Low Scattered Shrubs of <i>Acacia maitlandii</i> , <i>Ptilotus obovatus</i> , <i>Solanum phlomoides</i> , <i>Senna stricta</i> and <i>Maireana georgei</i> over Open Hummock Grassland of <i>Triodia</i> sp. Shovelanna Hill (S.van Leeuwen 3835), <i>Triodia brizoides</i> and <i>Triodia epactia</i> with Scattered Tussock Grassland of <i>Cymbopogon ambiguus</i> , <i>Eriachne mucronata</i> , <i>Aristida contorta</i> , <i>Aristida holathera</i> var. <i>holathera</i>	

Vascular plant species recorded

Species	Plant Height (m)	Coverage (%)	Flowers	Growth Form
<i>Acacia adsurgens</i>	2	0.2		Shrub
<i>Acacia maitlandii</i>	0.9	0.3		Shrub
<i>Acacia pruinocarpa</i>	3	2.5		Tree
<i>Acacia ? pteraneura</i> (hybrid?)	3.8	0.3		Tree
<i>Acacia tetragonophylla</i>	2	1		Shrub
<i>Aristida contorta</i>	0.3	0.1		Grass
<i>Aristida holathera</i> var. <i>holathera</i>	0.3	0.1		Grass
<i>Aristida inaequiglumis</i>	0.75	<1		Grass
<i>Bulbostylis barbata</i>	0.2	0.1		Sedge
* <i>Cenchrus ciliaris</i>	0.4	<1		Grass
<i>Corchorus lasiocarpum</i> subsp. <i>lasiocarpus</i>	0.5	<1		Shrub
<i>Cymbopogon ambiguus</i>	0.9	0.2		Grass
<i>Dodonaea coriacea</i>	0.3	<1		Shrub
<i>Dodonaea pachyneura</i>	2.5	<1		Shrub
<i>Dysphania rhadinostachya</i> subsp. <i>rhadinostachya</i>	0.15	<1		Herb
<i>Enchylaena tomentosa</i>	0.45	<1		Shrub
<i>Enneapogon lindleyanus</i>	0.25	<1		Grass
<i>Enneapogon polyphyllus</i>	0.25	<1		Grass
<i>Eragrostis eriopoda</i>	0.65	<1		Grass
<i>Eremophila cuneifolia</i>	0.6	<1		Shrub
<i>Eriachne aristidea</i>	0.25	<1		Grass
<i>Eriachne mucronata</i>	0.3	0.1		Grass
<i>Eriachne pulchella</i> subsp. <i>dominii</i>	0.2	<1		Grass
<i>Eucalyptus leucophloia</i> subsp. <i>leucophloia</i>	3	0.1		Tree
<i>Gomphrena kanisii</i>	0.2	<1		Herb
<i>Goodenia muelleriana</i>	0.3	<1		Herb
<i>Goodenia stobbsiana</i>	0.2	<1		Shrub
<i>Hibiscus burtonii</i>	0.25	<1		Shrub
<i>Hibiscus haynaldii</i>	0.75	<1	pink	Shrub
<i>Indigofera monophylla</i>	0.4	<1		Shrub
<i>Maireana georgei</i>	0.3	0.1		Shrub

<i>Paspalidium clementii</i>	0.2	<1		Grass
<i>Ptilotus astrolasius</i>	0.3	<1		Shrub
<i>Ptilotus auriculifolius</i>	0.45	<1		Herb
<i>Ptilotus calostachyus</i>	0.85	<1		Herb
<i>Ptilotus exaltatus</i>	0.55	<1	purple	Herb
<i>Ptilotus macrocephalus</i>	0.35	<1	green	Herb
<i>Ptilotus obovatus</i>	0.9	0.2		Shrub
<i>Scaevola acacioides</i>	0.85	<1		Shrub
<i>Senna glaucifolia</i>	1	<1		Shrub
<i>Senna glutinosa</i> subsp. <i>glutinosa</i>	1	<1		Shrub
<i>Senna glutinosa</i> subsp. <i>pruinosa</i>	2.1	2.5		Shrub
<i>Senna glutinosa</i> subsp. <i>x luerssenii</i>	1.8	<1		Shrub
<i>Senna stricta</i>	1	<1		Shrub
<i>Sida cardiophylla</i>	0.35	<1	yellow	Shrub
<i>Sida echinocarpa</i>	0.45	0.1		Shrub
<i>Solanum ellipticum</i>	0.1	<1		Shrub
<i>Solanum phlomoides</i>	0.5	0.2		Shrub
<i>Stenopetalum decipiens</i>	0.4	<1		Herb
<i>Tribulus suberosus</i>	0.75	<1		Shrub
<i>Triodia brizoides</i>	0.75	0.25		Hummock Grass
<i>Triodia epactia</i>	1.5	0.2		Hummock Grass
<i>Triodia</i> sp. Shovelanna Hill (S.van Leeuwen 3835)	0.8	15		Hummock Grass



Site WHN-30

FLORA QUADRAT DATA SHEET

Location	WHN-31	Date 23.05.2011
		Surveyor K. McCreery
Quadrat Dimension	50x50m	Quadrat Orientation 0°
GPS Location	Easting: 211367	GPS Location Relative to Quadrat NW
	Northing: 7414764	
Soil Type	Sandy Clay Loam	Soil Colour Red
Topography/Aspect	Hillslope, steep / 230°	Disturbance Type Fire, cattle, weeds
Vegetation Condition	Excellent	
Broad Floristic Formation	Acacia Low Open Woodland	
Vegetation Association	3a - Low Open Woodland of <i>Acacia aptaneura</i> and <i>Acacia pruinocarpa</i> over High Open Shrubland of <i>Acacia tetragonophylla</i> and <i>Acacia synchronicia</i> over Very Open Hummock Grassland of <i>Triodia</i> sp. Shovelanna Hill (S.van Leeuwen 3835)	
Vegetation Sub-association	Low Woodland of <i>Acacia aptaneura</i> and <i>Acacia pruinocarpa</i> over High Open Shrubland of <i>Acacia tetragonophylla</i> over Scattered Shrubs of <i>Dodonaea petiolaris</i> , <i>Senna glutinosa</i> subsp. <i>glutinosa</i> , <i>Rhagodia eremaea</i> and <i>Anthobolus leptomerioides</i> over Low Scattered Shrubs of <i>Maireana planifolia</i> over Very Open Tussock Grassland of <i>Aristida contorta</i> , <i>Digitaria ctenantha</i> and <i>Enneapogon polyphyllus</i> with Scattered Herbs of <i>Amaranthus mitchellii</i> and <i>Gomphrena ? cunninghamii</i>	

Vascular plant species recorded

Species	Plant Height (m)	Coverage (%)	Flowers	Growth Form
<i>Abutilon lepidum</i>	0.3	<1		Shrub
<i>Acacia aptaneura</i>	6	25		Tree
<i>Acacia pruinocarpa</i>	4.5	1		Tree
<i>Acacia tetragonophylla</i>	2.5	2		Shrub
<i>Amaranthus mitchellii</i>	0.2	1		Herb
<i>Anthobolus leptomerioides</i>	1.3	<1		Shrub
<i>Aristida contorta</i>	0.3	3		Grass
<i>Aristida holathera</i> var. <i>holathera</i>	0.5	<1		Grass
<i>Aristida inaequiglumis</i>	0.7	<1		Grass
* <i>Bidens bipinnata</i>	0.2	<1		Herb
<i>Boerhavia coccinea</i>	0.1	<1		Herb
<i>Bulbostylis barbata</i>	0.1	1		Sedge
* <i>Cenchrus ciliaris</i>	0.3	<1		Grass
<i>Cheilanthes brownii</i>	0.1	<1		Herb
<i>Cleome viscosa</i>	0.3	<1		Herb
<i>Cymbopogon ambiguus</i>	0.8	<1		Grass
<i>Digitaria brownii</i>	0.3	<1		Grass
<i>Digitaria ctenantha</i>	0.3	2		Grass
<i>Dodonaea petiolaris</i>	1.2	0.2		Shrub
<i>Duperreya commixta</i>	0.8	<1		Vine
<i>Dysphania rhadinostachya</i> subsp. <i>rhadinostachya</i>	0.2	<1		Herb
<i>Enchylaena tomentosa</i>	0.6	<1		Shrub
<i>Enneapogon caeruleascens</i>	0.2	<1		Grass
<i>Enneapogon polyphyllus</i>	0.3	1		Grass
<i>Eragrostis eriopoda</i>	0.4	<1		Grass
<i>Eremophila latrobei</i> subsp. <i>latrobei</i>	0.4	<1		Shrub
<i>Eriachne aristidea</i>	0.2	<1		Grass
<i>Eriachne mucronata</i>	0.4	<1		Grass
<i>Eriachne pulchella</i> subsp. <i>dominii</i>	0.1	<1		Grass
<i>Euphorbia australis</i>	0.1	<1		Herb
<i>Evolvulus alsinoides</i> var. <i>villosicalyx</i>	0.2	<1		Herb
<i>Gomphrena ? cunninghamii</i>	0.2	0.2		Herb
<i>Gomphrena kanisii</i>	0.2	<1		Herb

<i>Hibiscus burtonii</i>	0.3	<1		Shrub
<i>Hibiscus haynaldii</i>	0.7	<1		Shrub
<i>Hibiscus sturtii</i> var. (indet)	0.3	<1		Shrub
<i>Hibiscus sturtii</i> var. ? <i>truncatus</i>	0.3	<1		Shrub
<i>Hybanthus aurantiacus</i>	0.2	<1		Shrub
<i>Iseilema dolichotrichum</i>	0.1	<1		Grass
<i>Maireana planifolia</i>	0.4	0.2		Shrub
<i>Maireana villosa</i>	0.4	<1		Shrub
<i>Paspalidium clementii</i>	0.1	<1		Grass
<i>Perotis rara</i>	0.1	<1		Grass
<i>Polycarpaea longiflora</i>	0.3	<1		Herb
* <i>Portulaca oleracea</i>	0.1	<1		Herb
<i>Ptilotus aervoides</i>	0.01	<1		Herb
<i>Ptilotus calostachyus</i>	0.6	<1		Herb
<i>Ptilotus exaltatus</i>	0.4	<1	pink	Herb
<i>Ptilotus obovatus</i>	0.9	<1		Shrub
<i>Rhagodia eremaea</i>	1.2	<1		Shrub
<i>Rhynchosia minima</i>	0.2	<1		Vine
<i>Salsola</i> ? <i>australis</i>	0.9	<1		Herb
<i>Sclerolaena cuneata</i>	0.2	<1		Herb
<i>Sclerolaena eriacantha</i>	0.25	0.2		Herb
<i>Senna artemisioides</i> subsp. <i>helmsii</i>	0.8	<1		Shrub
<i>Senna artemisioides</i> subsp. <i>oligophylla</i>	0.8	<1		Shrub
<i>Senna glutinosa</i> subsp. <i>glutinosa</i>	1.4	<1	yellow	Shrub
<i>Sida echinocarpa</i>	0.9	0.2		Shrub
<i>Sida fibulifera</i>	0.2	<1		Shrub
<i>Sida</i> sp. (indet)	1.4	<1		Shrub
<i>Sida</i> sp. Golden calyces glabrous (H.N. Foote 32)	0.3	<1	yellow	Shrub
<i>Solanum ellipticum</i>	0.2	<1		Shrub
<i>Solanum phlomoides</i>	0.4	<1		Shrub
<i>Tragus australianus</i>	0.1	<1		Grass
<i>Tribulus</i> ? <i>cistoides</i> (or ? <i>hirsutus</i>)	0.01	<1	yellow	Herb
<i>Tribulus suberosus</i>	0.8	<1		Shrub
<i>Triodia</i> sp. Shovelanna Hill (S.van Leeuwen 3835)	0.6	1		Hummock Grass
<i>Triumfetta leptacantha</i>	0.6	<1		Shrub



Site WHN-31

FLORA QUADRAT DATA SHEET

Location	WHN-32	Date 23.05.2011 Surveyor A. Cole & R. Tomanovic
Quadrat Dimension	50x50m	Quadrat Orientation 0°
GPS Location	Easting: 210267 Northing: 7415480	GPS Location Relative to Quadrat NW
Soil Type	Silty Loam	Soil Colour Brown
Topography/Aspect	Hillslope, moderately inclined / 210°	Disturbance Type Fire, feral animals, drill tracks
Vegetation Condition	Excellent	
Broad Floristic Formation	<i>Triodia</i> Open Hummock Grassland	
Vegetation Association	6a - Open Hummock Grassland of <i>Triodia</i> sp. Shovelanna Hill (S.van Leeuwen 3835) with Low Open Shrubland of <i>Halgania solanacea</i> var. Mt Doreen (G.M. Chippendale 4206), <i>Gompholobium</i> sp. Pilbara (N.F. Norris 908) and <i>Acacia trudgeniana</i> over Open Hummock Grassland of <i>Triodia</i> sp. Shovelanna Hill (S.van Leeuwen 3835) with Scattered Tussock Grass of <i>Eriachne mucronata</i> , <i>Eriachne lanata</i> and <i>Amphipogon sericeus</i>	
Vegetation Sub-association	Scattered Shrubs of <i>Senna glutinosa</i> subsp. <i>pruinosa</i> over Low Shrubland of <i>Acacia hilliana</i> , <i>Halgania solanacea</i> var. Mt Doreen (G.M. Chippendale 4206) <i>Acacia adoxa</i> var. <i>adoxo</i> , <i>Gompholobium</i> sp. Pilbara (N.F. Norris 908) and <i>Acacia trudgeniana</i> over Open Hummock Grassland of <i>Triodia</i> sp. Shovelanna Hill (S.van Leeuwen 3835) with Scattered Tussock Grass of <i>Eriachne mucronata</i> , <i>Eriachne lanata</i> and <i>Amphipogon sericeus</i>	

Vascular plant species recorded

Species	Plant Height (m)	Coverage (%)	Flowers	Growth Form
<i>Acacia adoxa</i> var. <i>adoxo</i>	0.25	0.5	yellow	Shrub
<i>Acacia hilliana</i>	0.25	10		Shrub
<i>Acacia trudgeniana</i>	0.9	0.5		Shrub
<i>Amphipogon sericeus</i>	0.2	0.1		Grass
<i>Calytrix carinata</i>	0.4	0.1		Shrub
<i>Corchorus lasiocarpus</i> subsp. <i>lasiocarpus</i>	0.3	<1		Shrub
<i>Cymbopogon obtectus</i>	0.35	<1		Grass
<i>Eragrostis eriopoda</i>	0.45	<1		Grass
<i>Eriachne lanata</i>	0.45	0.25		Grass
<i>Eriachne mucronata</i>	0.3	0.3		Grass
<i>Fimbristylis simulans</i>	0.15	0.3		Sedge
<i>Gompholobium</i> sp. Pilbara (N.F. Norris 908)	0.55	2		Shrub
<i>Goodenia</i> ? <i>lamprosperma</i>	0.4	<1		Herb
<i>Goodenia ramelii</i>	0.25	0.2		Herb
<i>Grevillea</i> ? <i>berryana</i>	0.8	<1		Shrub
<i>Grevillea wickhamii</i> subsp. (indet)	0.4	<1		Shrub
<i>Hakea lorea</i> subsp. <i>lorea</i>	4	<1		Shrub
<i>Halgania solanacea</i> var. Mt Doreen (G.M. Chippendale 4206)	0.4	1		Shrub
<i>Keraudrenia</i> sp. (indet)	0.5	<1		Shrub
<i>Paraneurachne muelleri</i>	0.4	<1		Grass
<i>Ptilotus calostachyus</i>	0.65	<1		Herb
<i>Ptilotus exaltatus</i>	0.2	<1		Herb
<i>Scaevola</i> ? <i>browniana</i>	0.25	<1		Shrub
<i>Schizachyrium fragile</i>	0.25	<1		Grass
<i>Senna glutinosa</i> subsp. <i>glutinosa</i>	0.8	<1		Shrub
<i>Senna glutinosa</i> subsp. <i>pruinosa</i>	1	0.1		Shrub
<i>Sida</i> sp. <i>Excedentifolia</i> (J.L. Egan 1925)	0.2	<1		Shrub
<i>Solanum lasiophyllum</i>	0.3	<1		Shrub
<i>Triodia</i> sp. Shovelanna Hill (S.van Leeuwen 3835)	0.6	20		Hummock Grass



Site WHN-32

FLORA QUADRAT DATA SHEET

Location WHN-33 **Date** 24.05.2011
Surveyor K. McCreery

Quadrat Dimension 50x50m **Quadrat Orientation** 0°
GPS Location **Easting:** 207921 **GPS Location Relative to Quadrat** NW
Northing: 7414805

Soil Type Clayey Sand **Soil Colour** Red

Topography/Aspect Drainage Depression, gently inclined / 80° **Disturbance Type** Weeds

Vegetation Condition Excellent

Broad Floristic Formation Acacia High Shrubland

Vegetation Association **4a - High Shrubland** of *Acacia monticola*, *Rulingia luteiflora* and *Gossypium robinsonii* with **Low Woodland** of *Corymbia hamersleyana*, *Eucalyptus victrix* and *Eucalyptus leucophloia* subsp. *leucophloia* over **Very Open Tussock Grassland** of *Themeda triandra*, *Cenchrus ciliaris* and *Cymbopogon procerus*

Vegetation Sub-association Low Woodland of *Eucalyptus victrix*, *Corymbia hamersleyana* and *Eucalyptus xerothermica* over High Shrubland of *Acacia monticola*, *Rulingia luteiflora* and *Gossypium robinsonii* over Scattered Shrubs of *Grevillea wickhamii* subsp. *aprica* and *Santalum lanceolatum* over Low Open Shrubland of *Tephrosia rosea* var. *glabrior*, *Tephrosia rosea* var. *clementii* and *Acacia pyrifolia* over Very Open Tussock Grassland of *Themeda triandra*, *Cymbopogon procerus* and *Cymbopogon ambiguus* with Very Open Hummock Grassland of *Triodia epactia*

Vascular plant species recorded

Species	Plant Height (m)	Coverage (%)	Flowers	Growth Form
<i>Abutilon otocarpum</i>	0.4	<1		Shrub
<i>Acacia maitlandii</i>	0.1	<1		Shrub
<i>Acacia monticola</i>	2.5	15	yellow	Shrub
<i>Acacia pyrifolia</i>	0.8	0.2		Shrub
<i>Acacia tetragonophylla</i>	0.8	<1		Shrub
* <i>Bidens bipinnata</i>	0.2	<1		Herb
<i>Boerhavia coccinea</i>	0.1	<1		Herb
<i>Bulbostylis barbata</i>	0.1	<1		Sedge
* <i>Cenchrus ciliaris</i>	0.4	<1		Grass
<i>Cleome viscosa</i>	0.4	<1		Herb
<i>Corchorus lasiocarpum</i> subsp. <i>lasiocarpus</i>	0.3	<1		Shrub
<i>Corchorus sidioides</i> subsp. <i>sidioides</i>	0.4	<1		Shrub
<i>Corymbia hamersleyana</i>	8	0.5		Tree
<i>Cucumis maderaspatanus</i>	0.6	<1	yellow	Vine
<i>Cullen leucochaites</i>	0.4	<1		Shrub
<i>Cymbopogon ambiguus</i>	0.8	1		Grass
<i>Cymbopogon procerus</i>	1.4	2		Grass
<i>Digitaria brownii</i>	0.4	<1		Grass
<i>Duperreya commixta</i>	1	<1		Vine
<i>Dysphania rhadinostachya</i> subsp. <i>rhadinostachya</i>	0.1	<1		Herb
<i>Enneapogon robustissimus</i>	0.6	<1		Grass
<i>Eragrostis cumingii</i>	0.2	<1		Grass
<i>Eriachne mucronata</i>	0.2	<1		Grass
<i>Eriachne pulchella</i> subsp. <i>dominii</i>	0.1	<1		Grass
<i>Eriachne tenuiculmis</i>	0.7	2		Grass
<i>Eucalyptus victrix</i>	12	2		Tree
<i>Eucalyptus xerothermica</i>	2	<1		Tree
<i>Euphorbia alsiniflora</i>	0.6	<1		Herb
<i>Euphorbia tannensis</i> subsp. <i>eremophila</i>	0.2	<1		Herb
<i>Evolvulus alsinoides</i> var. <i>villosicalyx</i>	0.2	<1		Herb
<i>Glycine canescens</i>	0.4	<1		Vine
<i>Gomphrena kanisii</i>	0.1	<1		Herb
<i>Goodenia muelleriana</i>	0.3	<1	yellow	Herb

<i>Gossypium robinsonii</i>	1.8	2		Shrub
<i>Grevillea wickhamii</i> subsp. <i>aprica</i>	1.8	0.5		Shrub
<i>Hibiscus burtonii</i>	0.4	<1		Shrub
<i>Hibiscus coatesii</i>	0.7	<1		Shrub
<i>Hibiscus struttii</i> var. <i>campylochlamys</i>	0.3	<1		Shrub
<i>Hibiscus struttii</i> var. (indet)	0.3	<1		Shrub
<i>Hybanthus aurantiacus</i>	0.3	<1		Shrub
<i>Melhania oblongifolia</i>	0.4	<1		Shrub
<i>Paraneurachne muelleri</i>	0.4	<1		Grass
<i>Paspalidium clementii</i>	0.2	<1		Grass
<i>Petalostylis labicheoides</i>	0.9	<1		Shrub
<i>Pluchea dentex</i>	0.3	<1		Shrub
<i>Polycarpaea longiflora</i>	0.3	<1		Herb
<i>Pterocaulon</i> ? <i>sphaeranthoides</i>	0.4	<1		Herb
<i>Ptilotus exaltatus</i>	0.4	<1		Herb
<i>Rhynchosia minima</i>	0.8	<1		Vine
<i>Rulingia luteiflora</i>	2	5		Shrub
<i>Santalum lanceolatum</i>	1.3	0.2	white	Shrub
<i>Senna artemisioides</i> subsp. <i>helmsii</i>	1.2	<1		Shrub
<i>Senna artemisioides</i> subsp. <i>oligophylla</i>	0.8	<1		Shrub
<i>Senna glutinosa</i> subsp. <i>glutinosa</i>	0.9	<1		Shrub
<i>Sida</i> ? sp. spiciform panicles (E. Leyland s.n. 14/8/90)	0.8	<1		Shrub
<i>Sida echinocarpa</i>	0.3	<1		Shrub
<i>Sida fibulifera</i>	0.2	<1		Shrub
<i>Sida</i> sp. <i>Excedentifolia</i> (J.L. Egan 1925)	0.3	<1		Shrub
<i>Sida</i> sp. <i>Pilbara</i> (A.A. Mitchell PRP 1543)	0.4	<1		Shrub
<i>Solanum ellipticum</i>	0.2	<1		Shrub
<i>Solanum phlomoides</i>	0.4	<1		Shrub
<i>Tephrosia rosea</i> var. <i>clementii</i>	0.7	1		Shrub
<i>Tephrosia rosea</i> var. <i>glabrior</i>	0.5	1		Shrub
<i>Themeda triandra</i>	0.7	3		Grass
<i>Trichodesma zeylanicum</i> var. <i>zeylanicum</i>	0.6	<1		Shrub
<i>Triodia epactia</i>	0.8	3		Hummock Grass
<i>Triumfetta leptacantha</i>	0.5	<1		Shrub



Site WHN-33

FLORA QUADRAT DATA SHEET

Location WHN-34 **Date** 23.05.2011
Surveyor A. Cole & R. Tomanovic

Quadrat Dimension 50x50m **Quadrat Orientation** 0°
GPS Location **Easting:** 210796 **GPS Location Relative to Quadrat** NW
Northing: 7415286

Soil Type Sandy Loam **Soil Colour** Red

Topography/Aspect Hillslope, gently inclined / 120° **Disturbance Type** Fire

Vegetation Condition Excellent

Broad Floristic Formation *Triodia* Open Hummock Grassland

Vegetation Association **6a - Open Hummock Grassland** of *Triodia* sp. Shovelanna Hill (S.van Leeuwen 3835) with **Low Open Shrubland** of *Halgania solanacea* var. Mt Doreen (G.M. Chippendale 4206), *Gompholobium* sp. Pilbara (N.F. Norris 908) and *Acacia adoxa* var. *adoxoidea*

Vegetation Sub-association Low Shrubland of *Keraudrenia ? nephrosperma*, *Halgania solanacea* var. Mt Doreen (G.M. Chippendale 4206), *Acacia hilliana*, *Gompholobium* sp. Pilbara (N.F. Norris 908) and *Sida arenicola* over Open Hummock Grassland of *Triodia* sp. Shovelanna Hill (S.van Leeuwen 3835) with Scattered Herbs of *Goodenia ramelii*

Vascular plant species recorded

Species	Plant Height (m)	Coverage (%)	Flowers	Growth Form
<i>Acacia adoxa</i> var. <i>adoxoidea</i>	0.2	0.1	yellow	Shrub
<i>Acacia hilliana</i>	0.25	0.1		Shrub
<i>Acacia pruinocarpa</i>	0.9	0.5		Tree
<i>Amphipogon sericeus</i>	0.25	0.1		Grass
<i>Aristida holathera</i> var. <i>holathera</i>	0.2	<1		Grass
<i>Bonamia</i> sp. Dampier (A.A. Mitchell PRP 217)	0.05	<1		Shrub
<i>Calytrix carinata</i>	0.4	<1		Shrub
<i>Corchorus lasiocarpum</i> subsp. <i>lasiocarpus</i>	0.3	<1		Shrub
<i>Corchorus sidioides</i>	0.25	<1		Shrub
<i>Eragrostis eriopoda</i>	0.4	<1		Grass
<i>Eriachne lanata</i>	0.5	0.25		Grass
<i>Eriachne pulchella</i> subsp. <i>dominii</i>	0.05	<1		Grass
<i>Fimbristylis simulans</i>	0.2	<1		Sedge
<i>Gompholobium</i> sp. Pilbara (N.F. Norris 908)	0.25	0.25		Shrub
<i>Gomphrena cunninghamii</i>	0.15	<1		Herb
<i>Goodenia ? lamprosperma</i>	0.4	<1		Herb
<i>Goodenia ramelii</i>	0.35	0.5		Herb
<i>Grevillea ? berryana</i>	0.8	0.1		Shrub
<i>Grevillea wickhamii</i> subsp. (indet)	0.85	0.5	red	Shrub
<i>Halgania solanacea</i> var. Mt Doreen (G.M. Chippendale 4206)	0.25	1		Shrub
<i>Heliotropium tenuifolium</i>	0.15	<1		Herb
<i>Hibiscus sturtii</i> var. <i>truncatus</i>	0.1	<1		Shrub
<i>Hybanthus aurantiacus</i>	0.4	<1		Shrub
<i>Indigofera monophylla</i>	0.15	<1		Shrub
<i>Keraudrenia ? nephrosperma</i>	0.25	10		Shrub
<i>Paraneurachne muelleri</i>	0.45	<1		Grass
<i>Polycarpaea holtzei</i>	0.15	<1		Herb
<i>Ptilotus calostachyus</i>	0.75	<1		Herb
<i>Ptilotus exaltatus</i>	0.1	<1		Herb
<i>Schizachyrium fragile</i>	0.03	<1		Grass
<i>Senna glutinosa</i> subsp. <i>glutinosa</i>	0.75	<1		Shrub
<i>Senna glutinosa</i> subsp. <i>pruinosa</i>	1	<1		Shrub
<i>Sida arenicola</i>	0.6	0.2		Shrub
<i>Sida</i> sp. (indet)	0.15	<1		Shrub

<i>Trianthema glossostigma</i>	0.02	<1	pink	Herb
<i>Triodia</i> sp. Shovelanna Hill (S.van Leeuwen 3835)	0.6	15		Hummock Grass



Site WHN-34

FLORA QUADRAT DATA SHEET

Location	WHN-35	Date 24.05.2011
		Surveyor K. McCreery
Quadrat Dimension	50x50m	Quadrat Orientation 0°
GPS Location	Easting: 208369	GPS Location Relative to Quadrat NW
	Northing: 7414711	
Soil Type	Sandy Clay Loam	Soil Colour Red
Topography/Aspect	Hillslope, gently inclined / 220°	Disturbance Type Fire, weeds
Vegetation Condition	Excellent	
Broad Floristic Formation	<i>Triodia</i> Open Hummock Grassland	
Vegetation Association	6d - Open Hummock Grassland of <i>Triodia</i> sp. Shovelanna Hill (S.van Leeuwen 3835), <i>Triodia epactia</i> and <i>Triodia brizoides</i> with Low Open Woodland of <i>Acacia aptaneura</i> , <i>Acacia ? pteraneura</i> (hybrid?) and <i>Acacia rhodophloia</i> over Open Shrubland of <i>Acacia tetragonophylla</i> , <i>Acacia adsurgens</i> and <i>Senna glutinosa</i> subsp. <i>glutinosa</i>	
Vegetation Sub-association	Low Open Woodland of <i>Acacia ? aptaneura</i> over Scattered Tall Shrubland of <i>Acacia rhodophloia</i> over Scattered Shrubs of <i>Scaevola acacioides</i> over Low Shrubland of <i>Sida echinocarpa</i> , <i>Ptilotus obovatus</i> , <i>Eremophila cuneifolia</i> , <i>Senna stricta</i> and <i>Sclerolaena ericantha</i> over Open Hummock Grassland of <i>Triodia brizoides</i> , <i>Triodia</i> sp. Shovelanna Hill (S.van Leeuwen 3835) and <i>Triodia epactia</i> with Scattered Sedges of <i>Bulbostylis barbata</i>	

Vascular plant species recorded

Species	Plant Height (m)	Coverage (%)	Flowers	Growth Form
<i>Abutilon lepidum</i>	0.4	<1		Shrub
<i>Abutilon macrum</i>	0.4	<1		Shrub
<i>Acacia ? pteraneura</i> (hybrid?)	4	2		Tree
<i>Acacia rhodophloia</i>	3	1		Shrub
<i>Acacia tetragonophylla</i>	0.6	<1		Shrub
<i>Alyogyne pinoniana</i> subsp. (indet)	0.2	0.2		Shrub
<i>Amphipogon sericeus</i>	0.3	<1		Grass
<i>Amyema fitzgeraldii</i>	2	<1		Shrub
<i>Aristida contorta</i>	0.3	0.2		Grass
<i>Aristida holathera</i> var. <i>holathera</i>	0.4	<1		Grass
<i>Bulbostylis barbata</i>	0.1	1		Sedge
* <i>Cenchrus ciliaris</i>	0.4	<1		Grass
<i>Cleome viscosa</i>	0.3	<1		Herb
<i>Corchorus lasiocarpum</i> subsp. <i>lasiocarpus</i>	0.3	0.2		Shrub
<i>Cymbopogon ambiguus</i>	0.9	1		Grass
<i>Digitaria brownii</i>	0.5	<1		Grass
<i>Dysphania rhadinostachya</i> subsp. <i>rhadinostachya</i>	0.2	<1		Herb
<i>Enneapogon caeruleus</i>	0.2	3		Grass
<i>Enneapogon polyphyllus</i>	0.4	<1		Grass
<i>Eragrostis eriopoda</i>	0.3	<1		Grass
<i>Eremophila cuneifolia</i>	0.9	1		Shrub
<i>Eremophila latrobei</i> subsp. <i>latrobei</i>	0.4	<1		Shrub
<i>Eriachne mucronata</i>	0.4	0.2		Grass
<i>Eriachne pulchella</i> subsp. <i>dominii</i>	0.1	0.2		Grass
<i>Goodenia muelleriana</i>	0.3	<1		Herb
<i>Goodenia stobbsiana</i>	0.4	<1		Shrub
<i>Hakea lorea</i> subsp. <i>lorea</i>	0.4	<1		Shrub
<i>Hibiscus coatesii</i>	0.5	<1		Shrub
<i>Hibiscus struttii</i> var. <i>campylochlamys</i>	0.3	0.2		Shrub
<i>Lepidium pedicellosum</i>	0.4	<1		Shrub
<i>Maireana melanocoma</i>	0.6	1		Shrub
<i>Maireana triptera</i>	0.4	<1		Shrub

<i>Paspalidium clementii</i>	0.1	1	Grass
* <i>Portulaca oleracea</i>	0.01	<1	Herb
<i>Psychdrax suaveolens</i>	0.6	<1	Shrub
<i>Ptilotus astrolasius</i>	0.4	0.2	Shrub
<i>Ptilotus auriculifolius</i>	0.4	<1	Herb
<i>Ptilotus calostachyus</i>	0.5	<1	Herb
<i>Ptilotus exaltatus</i>	0.4	<1	Herb
<i>Ptilotus obovatus</i>	0.7	2	Shrub
<i>Rhynchosia minima</i>	0.5	<1	Vine
<i>Salsola ? australis</i>	0.5	<1	Herb
<i>Santalum lanceolatum</i>	0.3	<1	Shrub
<i>Scaevola acacioides</i>	1.4	0.1	Shrub
<i>Schizachyrium fragile</i>	0.2	<1	Grass
<i>Sclerolaena eriacantha</i>	0.2	2	Herb
<i>Senna artemisioides</i> subsp. <i>oligophylla</i>	0.9	<1	Shrub
<i>Senna glutinosa</i> subsp. <i>glutinosa</i>	1.2	<1	Shrub
<i>Senna stricta</i>	0.5	1	Shrub
<i>Sida echinocarpa</i>	0.4	4	Shrub
<i>Sida</i> sp. <i>Excedentifolia</i> (J.L. Egan 1925)	0.3	0.2	Shrub
<i>Solanum ellipticum</i>	0.2	<1	Shrub
<i>Solanum phlomoides</i>	0.4	<1	Shrub
<i>Sporobolus australasicus</i>	0.1	<1	Grass
<i>Tribulus suberosus</i>	0.4	<1	Shrub
<i>Triodia brizoides</i>	0.9	10	Hummock Grass
<i>Triodia epactia</i>	0.9	3	Hummock Grass
<i>Triodia</i> sp. Shovelanna Hill (S.van Leeuwen 3835)	0.8	3	Hummock Grass



Site WHN-35

FLORA QUADRAT DATA SHEET

Location	WHN-36	Date 23.05.2011 & 08.10.2011 Surveyor A. Cole & R. Tomanovic
Quadrat Dimension	50x50m	Quadrat Orientation 0°
GPS Location	Easting: 211358 Northing: 741526	GPS Location Relative to Quadrat NW
Soil Type	Sandy Loam	Soil Colour Red
Topography/Aspect	Hillslope, steep / 170°	Disturbance Type Fire, cattle and feral animals
Vegetation Condition	Good	
Broad Floristic Formation	<i>Triodia</i> Open Hummock Grassland	
Vegetation Association	6b - Open Hummock Grassland of <i>Triodia epactia</i> and <i>Triodia</i> sp. Shovelanna Hill (S.van Leeuwen 3835) with Low Open Shrubland of <i>Senna glutinosa</i> subsp. <i>pruinosa</i> , <i>Acacia synchronicia</i> and <i>Eremophila cuneifolia</i>	
Vegetation Sub-association	Low Open Shrubland of <i>Senna glutinosa</i> subsp. <i>pruinosa</i> , <i>Acacia synchronicia</i> , <i>Eremophila cuneifolia</i> , <i>Indigofera monophylla</i> and <i>Maireana triptera</i> Open Hummock Grassland of <i>Triodia epactia</i> and <i>Triodia</i> sp. Shovelanna Hill (S.van Leeuwen 3835) with Very Open Herbs of <i>Ptilotus exaltatus</i> and <i>Gomphrena kanisii</i>	

Vascular plant species recorded

Species	Plant Height (m)	Coverage (%)	Flowers	Growth Form
<i>Abutilon lepidum</i>	0.3	<1		Shrub
<i>Acacia</i> ? <i>pteraneura</i> (hybrid)	0.1	<1		Tree
<i>Acacia synchronicia</i>	0.35	0.8		Shrub
<i>Acacia tetragonophylla</i>	0.3	<1		Shrub
<i>Amphipogon sericeus</i>	0.35	10		Grass
<i>Aristida contorta</i>	0.25	<1		Grass
<i>Aristida holathera</i> var. <i>holathera</i>	0.35	0.1		Grass
<i>Astrotricha hamptonii</i>	0.6	<1		Shrub
<i>Boerhavia coccinea</i>	0.05	<1		Herb
* <i>Cenchrus ciliaris</i>	0.45	0.5		Grass
<i>Corchorus lasiocarpum</i> subsp. <i>lasiocarpus</i>	0.45	<1		Shrub
<i>Cymbopogon obtectus</i>	0.8	0.1		Grass
<i>Dodonaea pachyneura</i>	1.5	<1		Shrub
<i>Dodonaea petiolaris</i>	0.45	<1		Shrub
<i>Enneapogon lindleyanus</i>	0.25	0.1		Grass
<i>Enneapogon polyphyllus</i>	0.25	0.2		Grass
<i>Eragrostis eriopoda</i>	0.4	0.1		Grass
<i>Eremophila cuneifolia</i>	0.4	0.5		Shrub
<i>Eriachne pulchella</i> subsp. <i>dominii</i>	0.15	<1		Grass
<i>Evolvulus alsinoides</i> var. <i>villosicalyx</i>	0.25	<1		Herb
<i>Gomphrena kanisii</i>	0.2	0.05	white	Herb
<i>Goodenia</i> ? <i>lamprosperma</i>	0.3	<1		Herb
<i>Goodenia muelleriana</i>	0.25	<1		Herb
<i>Gossypium robinsonii</i>	1	<1		Shrub
<i>Hibiscus</i> ? <i>sturtii</i>	0.2	<1		Shrub
<i>Hibiscus burtonii</i>	0.45	<1		Shrub
<i>Hibiscus struttii</i> var. <i>campylochlamys</i>	0.2	0.1		Shrub
<i>Indigofera monophylla</i>	0.2	0.2		Shrub
<i>Maireana triptera</i>	0.3	0.1		Shrub
<i>Maireana villosa</i>	0.25	<1		Shrub
<i>Paraneurachne muelleri</i>	0.5	<1		Grass
<i>Paspalidium clementii</i>	0.25	<1		Grass
* <i>Portulaca oleracea</i>	0.02	<1		Herb
<i>Pterocaulon</i> ? <i>sphaeranthoides</i>	0.25	<1		Shrub

<i>Ptilotus calostachyus</i>	0.3	<1	pink	Herb
<i>Ptilotus exaltatus</i>	0.8	4		Herb
<i>Ptilotus obovatus</i>	0.55	<1		Shrub
<i>Rhagodia eremaea</i>	1	<1		Shrub
<i>Rhodanthe margarethae</i>	0.2	<1		Herb
<i>Sclerolaena densiflora</i>	0.15	<1		Shrub
<i>Sclerolaena eriacantha</i>	0.3	0.1		Herb
<i>Senna artemisioides</i> subsp. <i>helmsii</i>	0.4	<1		Shrub
<i>Senna artemisioides</i> subsp. <i>oligophylla</i>	1	<1		Shrub
<i>Senna glutinosa</i> subsp. <i>pruinosa</i>	1	2		Shrub
<i>Senna glutinosa</i> subsp. <i>x luerssenii</i>	0.5	<1		Shrub
<i>Senna</i> sp. Meekatharra (E. Bailey 1-26)	0.5	<1		Shrub
<i>Senna stricta</i>	0.3	<1		Shrub
<i>Sida</i> ? <i>echinocarpa</i>	0.3	<1		Shrub
<i>Sida arenicola</i>	1	<1		Shrub
<i>Sida cardiophylla</i>	0.25	<1		Shrub
<i>Sida fibulifera</i>	0.05	<1		Shrub
<i>Solanum lasiophyllum</i>	0.03	<1		Shrub
<i>Solanum sturtianum</i>	0.3	<1		Shrub
<i>Stenopetalum decipiens</i>	0.35	<1		Herb
<i>Themeda triandra</i>	0.4	<1		Grass
<i>Tribulus suberosus</i>	0.5	<1		Shrub
<i>Triodia epactia</i>	1	15.1		Hummock Grass
<i>Triodia</i> sp. Shovelanna Hill (S.van Leeuwen 3835)	0.7	<1		Hummock Grass



Site WHN-36

FLORA QUADRAT DATA SHEET

Location	WHN-37	Date 25.05.2011 & 05.10.2011 Surveyor K. McCreery
Quadrat Dimension	50x50m	Quadrat Orientation 0°
GPS Location	Easting: 207835 Northing: 7416935	GPS Location Relative to Quadrat NW
Soil Type	Clayey Sand	Soil Colour Red
Topography/Aspect	Drainage Depression, gently inclined / 0°	Disturbance Type Cattle, weeds
Vegetation Condition	Very good	
Broad Floristic Formation	Acacia High Shrubland	
Vegetation Association	4a - High Shrubland of <i>Acacia monticola</i> , <i>Rulingia luteiflora</i> and <i>Gossypium robinsonii</i> with Low Woodland of <i>Corymbia hamersleyana</i> , <i>Eucalyptus victrix</i> and <i>Eucalyptus leucophloia</i> subsp. <i>leucophloia</i> over Very Open Tussock Grassland of <i>Themeda triandra</i> , <i>*Cenchrus ciliaris</i> and <i>Cymbopogon procerus</i>	
Vegetation Sub-association	Open Woodland of <i>Eucalyptus victrix</i> and <i>Corymbia hamersleyana</i> High Shrubland of <i>Acacia monticola</i> , <i>Gossypium robinsonii</i> and <i>Acacia citrinoviridis</i> over Open Shrubland of <i>Acacia pyrifolia</i> , <i>Grevillea wickhamii</i> subsp. <i>aprica</i> , <i>Santalum lanceolatum</i> and <i>Rulingia luteiflora</i> over Low Open Shrubland of <i>Tephrosia rosea</i> var. <i>glabrior</i> , <i>Sida</i> ? sp. spiciform panicles (E. Leyland s.n. 14/8/90) and <i>Corchorus sidioides</i> subsp. <i>sidioides</i> over Very Open Tussock Grassland of <i>*Cenchrus ciliaris</i> , <i>Themeda triandra</i> , <i>Eriachne tenuiculmis</i> , <i>Aristida contorta</i> and <i>Eulalia aurea</i> with Very Open Hummock Grassland of <i>Triodia epactia</i>	

Vascular plant species recorded

Species	Plant Height (m)	Coverage (%)	Flowers	Growth Form
<i>Abutilon lepidum</i>	0.4	<1		Shrub
<i>Abutilon leucopetalum</i>	0.5	<1		Shrub
<i>Abutilon otocarpum</i>	0.2	<1		Shrub
<i>Acacia aptaneura</i>	0.8	<1		Tree
<i>Acacia citrinoviridis</i>	2.5	0.5		Tree
<i>Acacia maitlandii</i>	1.5	<1		Shrub
<i>Acacia monticola</i>	2.5	15	yellow	Shrub
<i>Acacia pruinocarpa</i>	0.5	<1		Tree
<i>Acacia pyrifolia</i>	1.8	3		Shrub
<i>Acacia tetragonophylla</i>	1.5	<1	yellow	Shrub
<i>Aristida contorta</i>	0.3	0.2		Grass
<i>Aristida holathera</i> var. <i>holathera</i>	0.8	<1		Grass
<i>Boerhavia coccinea</i>	0.2	<1		Herb
<i>Bulbostylis barbata</i>	0.1	<1		Sedge
<i>*Cenchrus ciliaris</i>	0.8	4		Grass
<i>Cleome viscosa</i>	0.3	0.2		Herb
<i>Clerodendrum tomentosum</i> var. <i>lanceolatum</i>	0.9	<1		Shrub
<i>Corchorus lasiocarpum</i> subsp. <i>lasiocarpus</i>	0.5	<1		Shrub
<i>Corchorus sidioides</i> subsp. <i>sidioides</i>	0.4	0.2		Shrub
<i>Corymbia hamersleyana</i>	5	2	white	Tree
<i>Cucumis maderaspatanus</i>	0.6	<1		Vine
<i>Cymbopogon procerus</i>	1.5	0.2		Grass
<i>Digitaria brownii</i>	0.4	0.2		Grass
<i>Duperreya commixta</i>	0.8	0.2		Vine
<i>Enneapogon polyphyllus</i>	0.4	<1		Grass
<i>Enneapogon robustissimus</i>	0.6	<1		Grass
<i>Eragrostis eriopoda</i>	0.3	<1		Grass
<i>Eremophila latrobei</i> subsp. <i>latrobei</i>	1.9	<1		Shrub
<i>Eriachne aristidea</i>	0.3	<1		Grass
<i>Eriachne mucronata</i>	0.4	<1		Grass
<i>Eriachne pulchella</i> subsp. <i>dominii</i>	0.1	<1		Grass
<i>Eriachne tenuiculmis</i>	0.8	2		Grass

<i>Eucalyptus victrix</i>	16	5		Tree
<i>Eulalia aurea</i>	0.4	0.2		Grass
<i>Evolvulus alsinoides</i> var. <i>decumbens</i>	0.3	<1		Herb
<i>Evolvulus alsinoides</i> var. <i>villosicalyx</i>	0.2	<1		Herb
<i>Glycine canescens</i>	0.4	<1		Vine
<i>Gossypium robinsonii</i>	2.5	2		Shrub
<i>Grevillea wickhamii</i> subsp. <i>aprica</i>	1.5	1		Shrub
<i>Hibiscus</i> aff. <i>apodus</i>	0.4	<1		Shrub
<i>Hibiscus sturtii</i> var. (indet)	0.3	<1		Shrub
<i>Hybanthus aurantiacus</i>	0.4	<1		Shrub
<i>Indigofera georgei</i>	0.3	<1		Shrub
<i>Isotropis forrestii</i>	0.5	<1		Shrub
<i>Paraneurachne muelleri</i>	0.6	0.2		Grass
<i>Paspalidium clementii</i>	0.1	<1		Grass
<i>Phyllanthus erwinii</i>	0.1	<1		Herb
<i>Polycarpaea longiflora</i>	0.3	0.2		Herb
<i>Pterocaulon sphaecelatum</i>	0.4	<1		Herb
<i>Pterocaulon</i> ? <i>sphaeranthoides</i>	0.2	<1		Herb
<i>Ptilotus calostachyus</i>	0.4	<1		Herb
<i>Ptilotus exaltatus</i>	0.4	<1	pink	Herb
<i>Ptilotus obovatus</i>	0.4	<1		Shrub
<i>Rhynchosia minima</i>	0.6	<1		Vine
<i>Rulingia luteiflora</i>	1.6	0.5		Shrub
<i>Salsola</i> ? <i>australis</i>	0.3	<1		Herb
<i>Santalum lanceolatum</i>	1.5	1		Shrub
<i>Scaevola spinescens</i>	1.8	<1		Shrub
<i>Schizachyrium fragile</i>	0.15	<1		Grass
<i>Senna glutinosa</i> subsp. <i>glutinosa</i>	0.8	<1		Shrub
<i>Senna glutinosa</i> subsp. <i>x leurrssenii</i>	1.2	<1		Shrub
<i>Sida</i> ? sp. spiciform panicles (E. Leyland s.n. 14/8/90)	0.6	0.2		Shrub
<i>Sida arenicola</i>	0.6	<1		Shrub
<i>Sida</i> sp. <i>Excedentifolia</i> (J.L. Egan 1925)	0.3	<1		Shrub
<i>Sida</i> sp. Panicles (E. Leyland s.n. 14/8/90)	0.7	<1		Shrub
<i>Sida</i> sp. Pilbara (A.A. Mitchell PRP 1543)	0.2	<1		Shrub
<i>Solanum ellipticum</i>	0.2	<1		Shrub
<i>Solanum phlomoides</i>	0.1	<1		Shrub
<i>Synaptantha tillaeacea</i> var. <i>tillaeacea</i>	0.1	<1		Herb
<i>Tephrosia rosea</i> var. <i>clementii</i>	0.9	<1		Shrub
<i>Tephrosia rosea</i> var. <i>glabrior</i>	0.6	2		Shrub
<i>Themeda triandra</i>	1.3	3		Grass
<i>Trichodesma zeylanicum</i> var. <i>zeylanicum</i>	0.6	<1		Shrub
<i>Triodia epactia</i>	0.9	3		Hummock Grass
<i>Triodia lanigera</i>	0.8	<1		Hummock Grass
<i>Triumfetta leptacantha</i>	0.5	<1		Shrub



Site WHN-37

FLORA QUADRAT DATA SHEET

Location	WHN-38	Date 24.05.2011
		Surveyor A. Cole & R. Tomanovic
Quadrat Dimension	50x50m	Quadrat Orientation 0°
GPS Location	Easting: 208366 Northing: 7415957	GPS Location Relative to Quadrat NW
Soil Type	Sandy Loam	Soil Colour Red
Topography/Aspect	Hillcrest, gently inclined / 320°	Disturbance Type Kangaroo poo, fire – Fire regen – most <i>Triodia</i> 's immature
Vegetation Condition	Excellent	
Broad Floristic Formation	<i>Triodia</i> Open Hummock Grassland	
Vegetation Association	6a - Open Hummock Grassland of <i>Triodia</i> sp. Shovelanna Hill (S.van Leeuwen 3835) with Low Open Shrubland of <i>Halgania solanacea</i> var. Mt Doreen (G.M. Chippendale 4206), <i>Gompholobium</i> sp. Pilbara (N.F. Norris 908) and <i>Acacia adoxa</i> var. <i>adoxo</i>	
Vegetation Sub-association	Open Shrubland of <i>Grevillea wickhamii</i> , <i>Hakea lorea</i> subsp. <i>lorea</i> and <i>Grevillea</i> ? <i>berryana</i> over Low Open Shrubland of <i>Halgania solanacea</i> var. Mt Doreen (G.M. Chippendale 4206), <i>Gompholobium</i> sp. Pilbara (N.F. Norris 908), <i>Acacia hilliana</i> , <i>Sida cardiophylla</i> and <i>Acacia adoxa</i> var. <i>adoxo</i> over Open Hummock Grassland of <i>Triodia</i> sp. Shovelanna Hill (S.van Leeuwen 3835) with Scattered Tussock Grass of <i>Amphipogon sericeus</i> and <i>Amphipogon sericeus</i>	

Vascular plant species recorded

Species	Plant Height (m)	Coverage (%)	Flowers	Growth Form
<i>Acacia adoxa</i> var. <i>adoxo</i>	0.25	0.1		Shrub
<i>Acacia hilliana</i>	0.3	0.1		Shrub
<i>Acacia pruinocarpa</i>	1	<1		Tree
<i>Acacia rhodophloia</i>	0.5	<1		Shrub
<i>Amphipogon sericeus</i>	0.35	0.7		Grass
<i>Calytrix carinata</i>	0.45	<1		Shrub
<i>Corchorus sidioides</i>	0.1	<1		Shrub
<i>Eragrostis eriopoda</i>	0.4	<1		Grass
<i>Fimbristylis simulans</i>	0.15	15		Sedge
<i>Gompholobium</i> sp. Pilbara (N.F. Norris 908)	0.2	0.5		Shrub
<i>Goodenia lamprosperma</i>	0.4	<1		Herb
<i>Goodenia ramelii</i>	0.3	1		Herb
<i>Grevillea</i> ? <i>berryana</i>	1	0.5		Shrub
<i>Grevillea wickhamii</i> subsp. (indet)	1.4	1	red	Shrub
<i>Hakea chordophylla</i>	2	<1		Shrub
<i>Hakea lorea</i> subsp. <i>lorea</i>	1.5	0.5		Shrub
<i>Halgania solanacea</i> var. Mt Doreen (G.M. Chippendale 4206)	0.35	1		Shrub
<i>Hibiscus sturtii</i> var. (indet)	0.2	<1		Shrub
<i>Hybanthus aurantiacus</i>	0.4	<1		Shrub
<i>Keraudrenia</i> sp. (indet)	0.45	<1		Shrub
<i>Paraneurachne muelleri</i>	0.4	<1		Grass
<i>Ptilotus calostachyus</i>	0.75	<1	purple	Herb
<i>Ptilotus rotundifolius</i>	0.6	0.1		Shrub
<i>Scaevola</i> ? <i>browniana</i>	0.25	<1		Herb
<i>Senna artemisioides</i> subsp. <i>oligophylla</i>	0.5	<1		Shrub
<i>Senna glutinosa</i> subsp. <i>glutinosa</i>	1	<1		Shrub
<i>Senna glutinosa</i> subsp. <i>pruinosa</i>	0.75	0.1		Shrub
<i>Senna glutinosa</i> subsp. <i>x luerssenii</i>	0.8	<1		Shrub
<i>Sida cardiophylla</i>	0.3	0.2		Shrub
<i>Sida</i> sp. Shovelanna Hill (S. van Leeuwen 3842)	0.5	<1		Shrub
<i>Solanum centrale</i>	0.25	<1		Shrub
<i>Solanum lasiophyllum</i>	0.4	<1		Shrub

<i>Tribulus suberosus</i>	0.6	<1	Shrub
<i>Triodia</i> sp. Shovelanna Hill (S.van Leeuwen 3835)	0.65	20	Hummock Grass



Site WHN-38

FLORA QUADRAT DATA SHEET

Location WHN-39 **Date** 25.05.2011
Surveyor K. McCreery

Quadrat Dimension 50x50m **Quadrat Orientation** 0°
GPS Location **Easting:** 207042 **GPS Location Relative to Quadrat** NW
Northing: 7416988

Soil Type Sandy Clay Loam **Soil Colour** Red

Topography/Aspect Hillcrest, gently inclined / 110° **Disturbance Type** None

Vegetation Condition Pristine

Broad Floristic Formation *Triodia* Hummock Grassland

Vegetation Association **5c - Hummock Grassland** of *Triodia lanigera* and *Triodia* sp. Shovelanna Hill (S.van Leeuwen 3835) with **Open Shrubland** of *Hakea lorea* subsp. *lorea*, *Acacia ancistrocarpa* and *Acacia adsurgens* with **Scattered Low Trees** of *Corymbia hamersleyana* and *Acacia pruinocarpa*

Vegetation Sub-association Scattered Trees of *Corymbia hamersleyana*, and *Acacia pruinocarpa* over Scattered Tall Shrubs of *Acacia pyrifolia* over Scattered Shrubs of *Senna glutinosa* subsp. *glutinosa*, *Acacia adsurgens* and *Acacia wanyu* over Hummock Grassland of *Triodia* sp. Shovelanna Hill (S.van Leeuwen 3835) with Scattered Tussock Grass of *Aristida contorta* and *Eriachne pulchella* subsp. *dominii*

Vascular plant species recorded

Species	Plant Height (m)	Coverage (%)	Flowers	Growth Form
<i>Acacia adsurgens</i>	1.8	0.2	yellow	Shrub
<i>Acacia ancistrocarpa</i>	1.3	<1		Shrub
<i>Acacia ayersiana</i>	1	<1		Tree
<i>Acacia maitlandii</i>	1.8	<1		Shrub
<i>Acacia pruinocarpa</i>	3	<1		Tree
<i>Acacia pyrifolia</i>	2.3	0.2		Shrub
<i>Acacia wanyu</i>	1.9	0.2	yellow	Shrub
<i>Amphipogon sericeus</i>	0.3	<1		Grass
<i>Aristida contorta</i>	0.3	0.2		Grass
<i>Aristida holathera</i> var. <i>holathera</i>	0.4	<1		Grass
<i>Corymbia hamersleyana</i>	0.6	<1		Tree
<i>Cymbopogon ambiguus</i>	0.6	<1		Grass
<i>Eremophila fraseri</i> subsp. <i>fraseri</i>	1	<1		Shrub
<i>Eriachne pulchella</i> subsp. <i>dominii</i>	0.1	0.2		Grass
<i>Eucalyptus gamophylla</i>	1.5	<1		Tree
<i>Grevillea striata</i>	2	<1		Shrub
<i>Grevillea wickhamii</i> subsp. (indet)	1	<1		Shrub
<i>Hakea lorea</i> subsp. <i>lorea</i>	2.5	<1	cream	Shrub
<i>Hybanthus aurantiacus</i>	0.3	<1		Shrub
<i>Keraudrenia</i> sp. (indet)	0.6	<1		Shrub
<i>Paraneurachne muelleri</i>	0.4	<1		Grass
<i>Paspalidium clementii</i>	0.1	<1		Grass
<i>Paspalidium rarum</i>	0.3	<1		Grass
* <i>Portulaca oleracea</i>	0.01	<1		Herb
<i>Ptilotus calostachyus</i>	0.6	<1	purple	Herb
<i>Ptilotus exaltatus</i>	0.4	<1	pink	Herb
<i>Ptilotus obovatus</i>	0.9	<1		Shrub
<i>Rhagodia eremaea</i>	1	<1		Shrub
<i>Schizachyrium fragile</i>	0.3	<1		Grass
<i>Senna</i> ? <i>notabilis</i>	0.2	<1		Herb
<i>Senna artemisioides</i> subsp. <i>oligophylla</i>	0.8	<1		Shrub
<i>Senna glutinosa</i> subsp. <i>glutinosa</i>	1.3	0.2		Shrub
<i>Sida echinocarpa</i>	0.5	<1		Shrub
<i>Solanum phlomoides</i>	0.4	<1	purple	Shrub

<i>Solanum sturtianum</i>	0.4	<1	Shrub
<i>Stemodia grossa</i>	0.3	<1	Herb
<i>Tribulus suberosus</i>	0.8	<1	Shrub
<i>Triodia lanigera</i>	1.2	<1	Hummock Grass
<i>Triodia</i> sp. Shovelanna Hill (S.van Leeuwen 3835)	0.6	55	Hummock Grass



Site WHN-39

FLORA QUADRAT DATA SHEET

Location	WHN-40	Date 24.05.2011 & 08.10.2011 Surveyor A. Cole & R. Tomanovic
Quadrat Dimension	50x50m	Quadrat Orientation 0°
GPS Location	Easting: 207974 Northing: 7415719	GPS Location Relative to Quadrat NW
Soil Type	Sandy Loam	Soil Colour Red
Topography/Aspect	Hillslope, moderately inclined / 150°	Disturbance Type Weeds
Vegetation Condition	Excellent	
Broad Floristic Formation	Acacia Low Woodland	
Vegetation Association	2a - Low Woodland of <i>Acacia aptaneura</i> , <i>Acacia ? pteraneura</i> and <i>Acacia pruinocarpa</i> over Open Hummock Grassland of <i>Triodia epactia</i> and <i>Triodia</i> sp. Shovelanna Hill (S.van Leeuwen 3835) with Shrubland of <i>Acacia wanyu</i> , <i>Acacia tetragonophylla</i> and <i>Senna stricta</i>	
Vegetation Sub-association	Low Open Woodland of <i>Acacia aptaneura</i> , <i>Acacia ? pteraneura</i> and <i>Eucalyptus leucophloia</i> subsp. <i>leucophloia</i> over Open Shrubland of <i>Acacia wanyu</i> , <i>Senna stricta</i> , <i>Senna glutinosa</i> subsp. <i>x luerssenii</i> , <i>Eremophila latrobei</i> subsp. (indet) and <i>Anthobolus leptomerioides</i> over Scattered Shrubs of <i>Eremophila cuneifolia</i> , <i>Maireana melanocoma</i> , <i>Solanum phlomoides</i> , <i>Ptilotus exaltatus</i> and <i>Maireana georgei</i> over Open Tussock Grassland of <i>Triodia</i> sp. Shovelanna Hill (S.van Leeuwen 3835) and <i>Triodia epactia</i> with Scattered Sedges of <i>Bulbostylis barbata</i>	

Vascular plant species recorded

Species	Plant Height (m)	Coverage (%)	Flowers	Growth Form
<i>Acacia ? aptaneura</i>	4	7		Tree
<i>Acacia ? pteraneura</i>	4	4		Tree
<i>Acacia wanyu</i>	2	5		Shrub
<i>Anthobolus leptomerioides</i>	1.8	0.2		Shrub
<i>Aristida contorta</i>	0.3	<1		Grass
<i>Aristida holathera</i> var. <i>holathera</i>	0.25	<1		Grass
<i>Bulbostylis barbata</i>	0.05	1		Sedge
<i>Corchorus lasiocarpum</i> subsp. <i>lasiocarpus</i>	0.55	<1		Shrub
<i>Duperreya commixta</i>	0.7	<1		Vine
<i>Dysphania rhadinostachya</i> subsp. <i>rhadinostachya</i>	0.1	<1		Herb
<i>Enneapogon lindleyanus</i>	0.15	<1		Grass
<i>Enneapogon polyphyllus</i>	0.2	<1		Grass
<i>Eragrostis eriopoda</i>	0.4	<1		Grass
<i>Eremophila cuneifolia</i>	0.9	1		Shrub
<i>Eremophila latrobei</i> subsp. (indet)	1.7	0.2		Shrub
<i>Eriachne pulchella</i> subsp. <i>dominii</i>	0.07	<1		Grass
<i>Eucalyptus leucophloia</i> subsp. <i>leucophloia</i>	0.5	<1		Tree
<i>Duperreya commixta</i>	0.7	<1		Vine
<i>Euphorbia tannensis</i> subsp. <i>eremophila</i>	0.5	<1		Herb
<i>Hibiscus burtonii</i>	0.8	<1		Shrub
<i>Hibiscus sturtii</i> var. (indet)	0.15	<1		Shrub
<i>Indigofera monophylla</i>	0.2	<1		Shrub
<i>Lamarchea sulcata</i>	1.7	<1		Shrub
<i>Maireana georgei</i>	0.2	0.1		Shrub
<i>Maireana melanocoma</i>	0.35	0.2		Shrub
<i>Maireana thesioides</i>	0.35	<1		Shrub
<i>Paraneurachne muelleri</i>	0.5	<1		Grass
<i>Paspalidium clementii</i>	0.15	<1		Grass
* <i>Portulaca oleracea</i>	0.2	<1		Herb
<i>Pterocaulon sphaeacelatum</i>	0.3	<1		Herb
<i>Ptilotus calostachyus</i>	0.25	<1		Herb
<i>Ptilotus exaltatus</i>	0.55	0.1	purple	Herb

<i>Ptilotus obovatus</i>	1.1	0.1	Shrub
<i>Ptilotus polystachyus</i>	0.2	<1	Herb
<i>Scaevola spinescens</i>	1	<1	Shrub
<i>Schizachyrium fragile</i>	0.2	<1	Grass
<i>Sclerolaena ericantha</i>	0.2	0.1	Herb
<i>Senna glutinosa</i> subsp. <i>x luerssenii</i>	1.4	1	Shrub
<i>Senna</i> sp. Meekatharra (E. Bailey 1-26)	0.35	<1	Shrub
<i>Senna stricta</i>	1.2	2	Shrub
<i>Sida arenicola</i>	1.5	<1	Shrub
<i>Sida</i> sp. Pilbara (A.A. Mitchell PRP 1543)	0.6	<1	Shrub
<i>Sida</i> sp. Shovelanna Hill (S. van Leeuwen 3842)	0.2	<1	Shrub
<i>Solanum ellipticum</i>	0.15	<1	Shrub
<i>Solanum</i> ? <i>lasiophyllum</i>	0.35	<1	Shrub
<i>Solanum lasiophyllum</i>	0.35	<1	Shrub
<i>Solanum phlomoides</i>	0.8	0.2	Shrub
<i>Solanum sturtianum</i>	0.2	<1	Shrub
<i>Sporobolus australasicus</i>	5	<1	Grass
<i>Tribulus suberosus</i>	1.5	<1	Shrub
<i>Triodia epactia</i>	0.7	0.25	Hummock Grass
<i>Triodia</i> sp. Shovelanna Hill (S. van Leeuwen 3835)	0.6	10	Hummock Grass



Site WHN-40

FLORA QUADRAT DATA SHEET

Location WHN-41 **Date** 25.05.2011
Surveyor K. McCreery

Quadrat Dimension 50x50m **Quadrat Orientation** 0°
GPS Location **Easting:** 205906 **GPS Location Relative to Quadrat** NW
Northing: 7416156

Soil Type Sandy Clay Loam **Soil Colour** Red

Topography/Aspect Hillslope, moderately inclined / 140° **Disturbance Type** Tracks

Vegetation Condition Excellent

Broad Floristic Formation *Triodia* Hummock Grassland

Vegetation Association **5a - Hummock Grassland** of *Triodia brizoides*, *Triodia epactia* and *Triodia angusta* with **Open Shrubland** of *Acacia tetragonophylla* and *Acacia synchronicia* with **Very Open Woodland** of *Eucalyptus leucophloia* subsp. *leucophloia* and *Acacia ? pteraneura* (hybrid?)

Vegetation Sub-association Low Open Woodland of *Eucalyptus leucophloia* subsp. *leucophloia* and *Acacia ? pteraneura* (hybrid?) over Scattered Tall Shrubs of *Acacia bivenosa* over Scattered Shrubs of *Senna glutinosa* subsp. *pruinosa* and *Acacia tetragonophylla* over Hummock Grassland of *Triodia angusta*, *Triodia brizoides* and *Triodia epactia* with Scattered Sedges of *Bulbostylis barbata*

Vascular plant species recorded

Species	Plant Height (m)	Coverage (%)	Flowers	Growth Form
<i>Acacia adsurgens</i>	1.5	<1		Shrub
<i>Acacia bivenosa</i>	2.5	0.2		Shrub
<i>Acacia ? pteraneura</i> (hybrid?)	0.8	<1		Tree
<i>Acacia tetragonophylla</i>	1.8	0.2		Shrub
<i>Aristida holathera</i> var. <i>holathera</i>	0.3	<1		Grass
<i>Brachyachne prostrata</i>	0.01	<1		Grass
<i>Bulbostylis barbata</i>	0.1	1		Sedge
<i>Cassutha capillaris</i>	0.4	2		Vine
<i>Eriachne pulchella</i> subsp. <i>dominii</i>	0.1	<1		Grass
<i>Eucalyptus leucophloia</i> subsp. <i>leucophloia</i>	5	2		Tree
<i>Goodenia lamprosperma</i>	0.3	<1		Herb
<i>Goodenia muelleriana</i>	0.1	<1		Herb
<i>Hibiscus haynaldii</i>	0.4	<1		Shrub
<i>Iseilema dolichotrichum</i>	0.02	<1		Grass
<i>Maireana melanocoma</i>	0.3	<1		Shrub
<i>Polycarpaea corymbosa</i>	0.1	<1		Herb
<i>Ptilotus calostachyus</i>	0.5	<1	pink	Herb
<i>Ptilotus exaltatus</i>	0.2	<1		Herb
<i>Ptilotus obovatus</i>	0.6	<1		Shrub
<i>Scaevola acacioides</i>	0.8	<1		Shrub
<i>Schizachyrium fragile</i>	0.2	<1		Grass
<i>Senna glutinosa</i> subsp. <i>glutinosa</i>	1.2	<1		Shrub
<i>Senna glutinosa</i> subsp. <i>pruinosa</i>	1.2	0.5		Shrub
<i>Senna stricta</i>	0.6	<1		Shrub
<i>Triodia angusta</i>	0.9	35		Hummock Grass
<i>Triodia brizoides</i>	0.6	5		Hummock Grass
<i>Triodia epactia</i>	1.3	3		Hummock Grass



Site WHN-41

FLORA QUADRAT DATA SHEET

Location WHN-42 **Date** 24.05.2011 & 08.10.2011
Surveyor A. Cole & R. Tomanovic

Quadrat Dimension 50x50m **Quadrat Orientation** 0°
GPS Location **Easting:** 208580 **GPS Location Relative to Quadrat** NW
Northing: 7415279

Soil Type Silty Loam **Soil Colour** Red

Topography/Aspect Hillslope, gently inclined / 180° **Disturbance Type** Fire

Vegetation Condition Excellent

Broad Floristic Formation *Triodia* Open Hummock Grassland

Vegetation Association **6a - Open Hummock Grassland** of *Triodia* sp. Shovelanna Hill (S.van Leeuwen 3835) with **Low Open Shrubland** of *Halgania solanacea* var. Mt Doreen (G.M. Chippendale 4206), *Gompholobium* sp. Pilbara (N.F. Norris 908) and *Acacia adoxa* var. *adoxo*

Vegetation Sub-association Scattered Tall Shrubs of *Acacia pachyacra* over Scattered Shrubs of *Senna glutinosa* subsp. *glutinosa* over Low Open Shrubland of *Gompholobium* sp. Pilbara (N.F. Norris 908), *Calytrix carinata*, *Solanum* ? *Lasiophyllum*, *Sida* sp. ? *excedenifolia* (J.L. Egan 1925) and *Hakea lorea* subsp. *lorea* over Open Hummock Grassland of *Triodia* sp. Shovelanna Hill (S.van Leeuwen 3835) with Scattered Tussock Grass of *Amphipogon sericeus* and *Eriachne lanata*

Vascular plant species recorded

Species	Plant Height (m)	Coverage (%)	Flowers	Growth Form
<i>Acacia adoxa</i> var. <i>adoxo</i>	0.25	<1		Shrub
<i>Acacia bivenosa</i>	0.7	<1		Shrub
<i>Acacia melleodora</i>	0.2	<1		Shrub
<i>Acacia pachyacra</i>	2	0.2		Shrub
<i>Acacia pruinocarpa</i>	0.5	<1		Tree
<i>Amphipogon sericeus</i>	0.3	1.5		Grass
<i>Calytrix carinata</i>	0.6	0.1		Shrub
<i>Dodonaea coriacea</i>	0.3	<1		Shrub
<i>Eriachne lanata</i>	0.5	0.2		Grass
<i>Eriachne mucronata</i>	0.4	<1		Grass
<i>Eucalyptus leucophloia</i> subsp. <i>leucophloia</i>	3	<1		Tree
<i>Fimbristylis simulans</i>	0.2	0.5		Sedge
<i>Gompholobium</i> sp. Pilbara (N.F. Norris 908)	0.3	5		Shrub
<i>Gomphrena kanisii</i>	0.15	<1	pink	Herb
<i>Goodenia lamprosperma</i>	0.45	<1		Herb
<i>Goodenia ramelii</i>	0.2	1		Herb
<i>Goodenia stobbsiana</i>	0.1	<1		Shrub
<i>Hakea lorea</i> subsp. <i>lorea</i>	0.5	0.1		Shrub
<i>Halgania solanacea</i> var. Mt Doreen (G.M. Chippendale 4206)	0.25	<1		Shrub
<i>Hybanthus aurantiacus</i>	0.3	<1		Shrub
<i>Keraudrenia</i> sp. (indet)	0.6	<1		Shrub
<i>Paraneurachne muelleri</i>	0.45	<1		Grass
<i>Ptilotus calostachyus</i>	0.8	0.1	purple	Herb
<i>Scaevola browniana</i> subsp. <i>browniana</i>	0.45	<1		Shrub
<i>Senna glutinosa</i> subsp. <i>glutinosa</i>	1.1	0.1		Shrub
<i>Senna glutinosa</i> subsp. <i>pruinosa</i>	1	<1		Shrub
<i>Senna stricta</i>	0.1	<1		Shrub
<i>Sida arenicola</i>	0.8	<1		Shrub
<i>Sida</i> sp. ? <i>Excedenifolia</i> (J.L. Egan 1925)	0.35	0.3		Shrub
<i>Solanum</i> ? <i>lasiophyllum</i>	0.1	1	purple	Shrub
<i>Solanum centrale</i>	0.25	0.1		Shrub
<i>Solanum ellipticum</i>	0.1	<1		Shrub

<i>Solanum sturtianum</i>	0.1	<1	Shrub
<i>Trianthema glossostigma</i>	0.02	<1	Herb
<i>Triodia</i> sp. Shovelanna Hill (S.van Leeuwen 3835)	0.6	10	Hummock Grass



Site WHN-42

FLORA QUADRAT DATA SHEET

Location WHN-43 **Date** 25.05.2011
Surveyor K. McCreery

Quadrat Dimension 50x50m **Quadrat Orientation** 0°
GPS Location **Easting:** 205701 **GPS Location Relative to Quadrat** NW
Northing: 7415778

Soil Type Loamy sand **Soil Colour** Red

Topography/Aspect Hillslope, moderately inclined / 40° **Disturbance Type** Fire, weeds

Vegetation Condition Excellent

Broad Floristic Formation *Triodia* Open Hummock Grassland

Vegetation Association **6f - Open Hummock Grassland** of *Triodia brizoides* and *Triodia epactia* with **Low Open Shrubland** of *Eremophila fraseri* subsp. *fraseri*, *Senna artemisioides* subsp. *oligophylla* and *Senna artemisioides* subsp. *helmsii*

Vegetation Sub-association Scattered Shrubs of *Acacia sibirica* over Low Open Shrubland of *Eremophila fraseri* subsp. *fraseri*, *Senna artemisioides* subsp. *helmsii*, *Ptilotus astrolasius*, *Ptilotus astrolasius* and *Senna artemisioides* subsp. *oligophylla* over Hummock Grassland of *Triodia brizoides* and *Triodia epactia* with Open Tussock Grassland of *Aristida contorta*, *Cymbopogon ambiguus* and *Enneapogon lindleyanus*

Vascular plant species recorded

Species	Plant Height (m)	Coverage (%)	Flowers	Growth Form
<i>Abutilon lepidum</i>	0.6	0.2		Shrub
<i>Acacia ancistrocarpa</i>	1.5	<1		Shrub
<i>Acacia sibirica</i>	1.3	0.2		Shrub
<i>Aristida contorta</i>	0.3	10		Grass
<i>Boerhavia coccinea</i>	0.1	<1		Herb
<i>Bulbostylis barbata</i>	0.1	<1		Sedge
<i>Cleome viscosa</i>	0.2	<1		Herb
<i>Corchorus lasiocarpum</i> subsp. <i>lasiocarpus</i>	0.4	<1		Shrub
<i>Cymbopogon ambiguus</i>	0.9	1		Grass
<i>Cymbopogon obtectus</i>	0.7	<1		Grass
<i>Duperreya commixta</i>	0.5	<1		Vine
<i>Dysphania rhadinostachya</i> subsp. <i>rhadinostachya</i>	0.2	<1		Herb
<i>Enneapogon lindleyanus</i>	0.3	1		Grass
<i>Enneapogon polyphyllus</i>	0.3	<1		Grass
<i>Eremophila fraseri</i> subsp. <i>fraseri</i>	0.9	3	pink	Shrub
<i>Euphorbia australis</i>	0.3	<1		Herb
<i>Euphorbia tannensis</i> subsp. <i>eremophila</i>	0.2	<1		Herb
<i>Evolvulus alsinoides</i> var. <i>villosicalyx</i>	0.3	<1		Herb
<i>Gomphrena kanisii</i>	0.3	<1	pink	Herb
<i>Goodenia muelleriana</i>	0.2	0.2	yellow	Herb
<i>Grevillea wickhamii</i> subsp. <i>aprica</i>	1.5	<1		Shrub
<i>Hakea chordophylla</i>	1.5	<1		Shrub
<i>Paspalidium clementii</i>	0.3	<1		Grass
<i>Polycarpaea corymbosa</i>	0.2	<1		Herb
* <i>Portulaca oleracea</i>	0.01	<1		Herb
<i>Pterocaulon ? sphaeranthoides</i>	0.5	<1		Herb
<i>Ptilotus aevroides</i>	0.01	<1		Herb
<i>Ptilotus astrolasius</i>	0.4	0.2		Shrub
<i>Ptilotus auriculifolius</i>	0.4	<1		Herb
<i>Ptilotus exaltatus</i>	0.4	<1		Herb
<i>Rhynchosia minima</i>	0.5	0.5		Vine
<i>Salsola ? australis</i>	0.6	2		Herb
<i>Sclerolaena eriacantha</i>	0.6	<1		Herb
<i>Senna artemisioides</i> subsp. <i>helmsii</i>	0.7	1		Shrub

<i>Senna artemisioides</i> subsp. <i>oligophylla</i>	0.9	0.2	Shrub
<i>Sida</i> ? sp. spiciform panicles (E. Leyland s.n. 14/8/90)	0.4	<1	Shrub
<i>Sida echinocarpa</i>	0.3	<1	Shrub
<i>Solanum ellipticum</i>	0.2	<1	Shrub
<i>Solanum phlomoides</i>	0.5	<1	Shrub
<i>Tephrosia</i> aff. <i>sphaerospora</i>	0.2	<1	Shrub
<i>Tribulus hirsutus</i>	0.01	<1	Herb
<i>Tribulus platypterus</i>	0.4	<1	Herb
<i>Tribulus suberosus</i>	0.9	0.2	Shrub
<i>Trichodesma zeylanicum</i> var. <i>zeylanicum</i>	0.6	<1	Shrub
<i>Triodia brizoides</i>	1	35	Hummock Grass
<i>Triodia epactia</i>	1.2	3	Hummock Grass
<i>Tripogon loliformis</i>	0.1	<1	Grass



Site WHN-43

FLORA QUADRAT DATA SHEET

Location	WHN-44	Date 25.05.2011 & 10.10.2011
		Surveyor A. Cole & R. Tomanovic
Quadrat Dimension	50x50m	Quadrat Orientation 0°
GPS Location	Eastings: 206054	GPS Location Relative to Quadrat NW
	Northing: 7415117	
Soil Type	Sandy clay loam	Soil Colour Orange
Topography/Aspect	Drainage Depression, moderately inclined / 120°	Disturbance Type Weeds
Vegetation Condition	Excellent	
Broad Floristic Formation	<i>Acacia</i> Low Woodland	
Vegetation Association	2d - Low Woodland of <i>Acacia</i> ? <i>aptaneura</i> , <i>Acacia mulganeura</i> and <i>Ficus brachypoda</i> over High Open Shrubland of <i>Acacia monticola</i> , <i>Grevillea wickhamii</i> subsp. (indet) and <i>Acacia wanyu</i> over Very Open Tussock Grassland of <i>Eragrostis cumingii</i> , <i>Amphipogon sericeus</i> and <i>Themeda triandra</i>	
Vegetation Sub-association	Low Woodland of <i>Acacia</i> ? <i>aptaneura</i> , <i>Acacia mulganeura</i> , <i>Ficus brachypoda</i> , <i>Eucalyptus leucophloia</i> subsp. <i>leucophloia</i> and <i>Corymbia ferritcola</i> over High Open Shrubland of <i>Acacia monticola</i> , <i>Grevillea wickhamii</i> subsp. (indet), <i>Acacia wanyu</i> , <i>Clerodendrum tomentosum</i> var. <i>lanceolatum</i> and <i>Senna artemisioides</i> subsp. <i>oligophylla</i> over Open Shrubland of <i>Dodonaea pachyneura</i> over Very Open Tussock Grassland of <i>Eragrostis cumingii</i> , <i>Amphipogon sericeus</i> and <i>Themeda triandra</i> with Very Open Hummock Grassland of <i>Triodia epactia</i>	

Vascular plant species recorded

<u>Species</u>	<u>Plant Height (m)</u>	<u>Coverage (%)</u>	<u>Flowers</u>	<u>Growth Form</u>
<i>Abutilon</i> ? <i>macrum</i>	0.75	<1		Shrub
<i>Abutilon otocarpum</i>	0.75	<1		Shrub
<i>Acacia aptaneura</i>	7.5	6		Tree
<i>Acacia ayersiana</i> hybrid	0.25	<1		Shrub
<i>Acacia monticola</i>	3	3.5	yellow	Shrub
<i>Acacia mulganeura</i>	3.5	3		Tree
<i>Acacia pruinoarpa</i>	2.5	0.1		Tree
<i>Acacia pyrifolia</i>	1.2	<1		Shrub
<i>Acacia tetragonophylla</i>	1.2	<1		Shrub
<i>Acacia wanyu</i>	2	0.1		Shrub
<i>Amphipogon sericeus</i>	0.45	0.1		Grass
<i>Bulbostylis barbata</i>	0.15	<1		Sedge
<i>Cassutha capillaris</i>	0.2	<1		Vine
* <i>Cenchrus ciliaris</i>	0.4	<1		Grass
<i>Centipeda minima</i>	0.1	<1		Herb
<i>Cheilanthes lasiophylla</i>	0.05	<1		Herb
<i>Cleome viscosa</i>	0.25	<1		Herb
<i>Clerodendrum tomentosum</i> var. <i>lanceolatum</i>	2.5	<1		Shrub
<i>Corymbia ferritcola</i>	4.5	2		Tree
<i>Corymbia hamersleyana</i>	3	0.2		Tree
<i>Cullen leucochaites</i>	0.2	<1		Herb
<i>Cymbopogon ambiguus</i>	0.8	<1		Grass
<i>Cyperus iria</i>	0.45	<1		Sedge
<i>Digitaria brownii</i>	0.4	<1		Grass
<i>Dodonaea pachyneura</i>	1.2	3		Shrub
<i>Dodonaea viscosa</i> subsp. <i>angustissima</i>	2	<1		Shrub
<i>Duperreya commixta</i>	1.5	<1		Vine
<i>Dysphania rhadinostachya</i> subsp. <i>rhadinostachya</i>	0.2	<1		Herb
<i>Enneapogon robustissimus</i>	0.9	<1		Grass
<i>Eragrostis cumingii</i>	0.6	5		Grass
<i>Eragrostis tenellula</i>	0.35	<1		Grass
<i>Eriachne lanata</i>	0.4	<1		Grass
<i>Eriachne mucronata</i>	0.25	<1		Grass

<i>Eriachne tenuiculmis</i>	0.65	<1	Grass
<i>Eucalyptus leucophloia</i> subsp. <i>leucophloia</i>	8	2	Tree
<i>Eucalyptus victrix</i>	10	<1	Tree
<i>Eulalia aurea</i>	0.4	<1	Grass
<i>Evolvulus alsinoides</i> var. <i>villosicalyx</i>	0.25	<1	Herb
<i>Ficus brachypoda</i>	2.5	3	Tree
<i>Gossypium robinsonii</i>	3	<1	Shrub
<i>Grevillea wickhamii</i> subsp. (indet)	3.5	0.1	Shrub
<i>Hibiscus burtonii</i>	0.4	<1	Shrub
<i>Jasminum didymum</i> subsp. <i>lineare</i>	1	<1	Vine
<i>Nicotiana benthamiana</i>	0.65	<1	Herb
<i>Paspalidium clementii</i>	0.15	<1	Grass
<i>Petalostylis labicheoides</i>	1.5	<1	Shrub
<i>Phyllanthus erwinii</i>	0.05	<1	Herb
<i>Pluchea dentex</i>	0.4	<1	Shrub
<i>Pterocaulon ? sphaeranthoides</i>	0.03	<1	Herb
<i>Ptilotus obovatus</i>	0.65	<1	Shrub
<i>Rhynchosia minima</i>	0.5	<1	Vine
<i>Santalum lanceolatum</i>	1	<1	Shrub
<i>Senna artemisioides</i> subsp. <i>helmsii</i>	1.3	<1	Shrub
<i>Senna artemisioides</i> subsp. <i>oligophylla</i>	2	<1	Shrub
<i>Senna glaucifolia</i>	0.3	<1	Shrub
<i>Setaria surgens</i>	0.3	<1	Grass
<i>Schizachyrium fragile</i>	0.2	<1	Grass
<i>Sida fibulifera</i>	0.1	<1	Shrub
<i>Sida platycalyx</i>	0.1	<1	Shrub
<i>Sida</i> sp. <i>Excedentifolia</i> (J.L. Egan 1925)	0.3	<1	Shrub
<i>Sida</i> sp. Shovelanna Hill (S. van Leeuwen 3842)	0.3	<1	Shrub
<i>Solanum ellipticum</i>	0.3	<1	Shrub
<i>Solanum phlomoides</i>	0.25	<1	Shrub
<i>Stemodia grossa</i>	0.35	<1	Herb
<i>Tephrosia rosea</i> var. <i>glabrior</i>	0.35	<1	Shrub
<i>Themeda triandra</i>	0.75	0.1	Grass
<i>Trachymene oleracea</i> subsp. <i>oleracea</i>	0.03	<1	Herb
<i>Trichodesma zeylanicum</i> var. <i>zeylanicum</i>	0.25	<1	Shrub
<i>Triodia epactia</i>	1.1	3.5	Hummock Grass
<i>Triodia melvillei</i>	0.9	4	Hummock Grass



Site WHN-44

FLORA QUADRAT DATA SHEET

Location	WHN-45	Date 25.05.2011 & 09.10.2011 Surveyor K. McCreery
Quadrat Dimension	50x50m	Quadrat Orientation 0°
GPS Location	Easting: 206090 Northing: 7413692	GPS Location Relative to Quadrat NW
Soil Type	Sandy Clay Loam	Soil Colour Red
Topography/Aspect	Hillcrest, moderately inclined / 10°	Disturbance Type Weeds
Vegetation Condition	Excellent	
Broad Floristic Formation	<i>Triodia</i> Hummock Grassland	
Vegetation Association	5d - Hummock Grassland of <i>Triodia brizoides</i> , <i>Triodia</i> sp. Shovelanna Hill (S.van Leeuwen 3835) and <i>Triodia epactia</i> with Open Shrubland of <i>Acacia tetragonophylla</i> , <i>Eremophila fraseri</i> subsp. <i>fraseri</i> and <i>Senna glutinosa</i> subsp. <i>pruinosa</i>	
Vegetation Sub-association	Scattered Low Trees <i>Eucalyptus leucophloia</i> subsp. <i>leucophloia</i> over Open Shrubland of <i>Acacia tetragonophylla</i> , <i>Acacia trudgeniana</i> , <i>Hakea chordophylla</i> and <i>Senna glutinosa</i> subsp. <i>glutinosa</i> over Low Scattered Shrubs of <i>Tribulus suberosus</i> over Hummock Grassland of <i>Triodia brizoides</i> , <i>Triodia</i> sp. Shovelanna Hill (S.van Leeuwen 3835) and <i>Triodia epactia</i> with Scattered Tussock Grass of <i>Enneapogon caerulescens</i> , <i>Cymbopogon ambiguus</i> , <i>Eriachne pulchella</i> subsp. <i>dominii</i> , <i>Paspalidium clementii</i> and <i>Aristida contorta</i>	

Vascular plant species recorded

Species	Plant Height (m)	Coverage (%)	Flowers	Growth Form
<i>Acacia aptaneura</i>	3.5	<1		Tree
<i>Acacia maitlandii</i>	0.8	<1		Shrub
<i>Acacia pruinocarpa</i>	1.5	<1		Tree
<i>Acacia synchronicia</i>	0.3	<1		Shrub
<i>Acacia tenuissima</i>	0.7	<1		Shrub
<i>Acacia tetragonophylla</i>	1.8	1		Shrub
<i>Acacia trudgeniana</i>	1.8	1		Shrub
<i>Aristida contorta</i>	0.2	0.2		Grass
<i>Aristida holathera</i> var. <i>holathera</i>	0.2	<1		Grass
<i>Bonamia</i> sp. Dampier (A.A. Mitchell PRP 217)	0.01	<1		Shrub
<i>Bulbostylis barbata</i>	0.1	0.2		Sedge
<i>Calytrix carinata</i>	0.7	<1		Shrub
<i>Cleome viscosa</i>	0.3	<1		Herb
<i>Corchorus lasiocarpum</i> subsp. <i>lasiocarpus</i>	0.4	<1		Shrub
<i>Corymbia hamersleyana</i>	6	<1		Tree
<i>Cymbopogon ambiguus</i>	0.7	0.2		Grass
<i>Dysphania rhadinostachya</i> subsp. <i>rhadinostachya</i>	0.1	<1		Herb
<i>Enneapogon caerulescens</i>	0.3	1		Grass
<i>Enneapogon lindleyanus</i>	0.2	<1		Grass
<i>Enneapogon polyphyllus</i>	0.2	<1		Grass
<i>Eremophila cuneifolia</i>	0.4	<1		Shrub
<i>Eremophila latrobei</i> subsp. <i>latrobei</i>	1	<1		Shrub
<i>Eriachne aristidea</i>	0.3	<1		Grass
<i>Eriachne mucronata</i>	0.4	<1		Grass
<i>Eriachne pulchella</i> subsp. <i>dominii</i>	0.1	0.2		Grass
<i>Eucalyptus leucophloia</i> subsp. <i>leucophloia</i>	3	<1		Tree
<i>Goodenia muelleriana</i>	0.3	<1		Herb
<i>Grevillea berryana</i>	1.9	<1		Shrub
<i>Hakea chordophylla</i>	1.2	0.2		Shrub
<i>Hibiscus haynaldii</i>	0.5	<1		Shrub
<i>Hibiscus strutii</i> var. <i>campylochlamys</i>	0.2	<1		Shrub
<i>Indigofera monophylla</i>	0.4	<1		Shrub
<i>Iseilema dolichotrichum</i>	0.02	<1		Grass

<i>Maireana melanocoma</i>	0.3	<1	Shrub
<i>Paspalidium clementii</i>	0.1	0.2	Grass
* <i>Portulaca oleracea</i>	0.01	<1	Herb
<i>Salsola ? australis</i>	0.3	<1	Herb
<i>Schizachyrium fragile</i>	0.2	<1	Grass
<i>Senna artemisioides</i> subsp. <i>helmsii</i>	0.6	<1	Shrub
<i>Senna artemisioides</i> subsp. <i>oligophylla</i>	0.8	<1	Shrub
<i>Senna glutinosa</i> subsp. <i>glutinosa</i>	1.2	0.2	Shrub
<i>Senna glutinosa</i> subsp. <i>x luerssenii</i>	1.2	<1	Shrub
<i>Senna glutinosa</i> subsp. <i>pruinosa</i>	0.5	<1	Shrub
<i>Sida echinocarpa</i>	0.4	<1	Shrub
<i>Solanum phlomoides</i>	0.2	<1	Shrub
<i>Trachymene oleracea</i> subsp. <i>oleracea</i>	0.1	<1	Herb
<i>Tribulus suberosus</i>	0.6	0.2	Shrub
<i>Triodia brizoides</i>	0.8	45	Hummock Grass
<i>Triodia epactia</i>	1.5	<1	Hummock Grass
<i>Triodia</i> sp. Shovelanna Hill (S.van Leeuwen 3835)	0.9	4	Hummock Grass



Site WHN-45

FLORA QUADRAT DATA SHEET

Location	WHN-46	Date 25.05.2011 & 09.10.2011 Surveyor A. Cole & R. Tomanovic
Quadrat Dimension	50x50m	Quadrat Orientation 0°
GPS Location	Easting: 206353 Northing: 7414559	GPS Location Relative to Quadrat NW
Soil Type	Silty Loam	Soil Colour Red
Topography/Aspect	Hillslope, very steep / 350°	Disturbance Type
Vegetation Condition	Pristine	
Broad Floristic Formation	<i>Triodia</i> Hummock Grassland	
Vegetation Association	5h - Hummock Grassland of <i>Triodia</i> sp. Shovelanna Hill (S.van Leeuwen 3835), <i>Triodia epactia</i> and <i>Triodia brizoides</i> with High Open Shrubland of <i>Acacia bivenosa</i> and <i>Acacia tetragonophylla</i> with Scattered Low Trees of <i>Eucalyptus leucophloia</i> subsp. <i>leucophloia</i> and <i>Acacia aptaneura</i>	
Vegetation Sub-association	Low Open Woodland of <i>Acacia aptaneura</i> , <i>Acacia pruinocarpa</i> and <i>Eucalyptus leucophloia</i> subsp. <i>leucophloia</i> over Open Shrubland of <i>Acacia tetragonophylla</i> , <i>Dodonaea pachyneura</i> , <i>Acacia adsurgens</i> , <i>Acacia synchronicia</i> and <i>Senna glutinosa</i> subsp. <i>x luerssenii</i> over Open Shrubland of <i>Ptilotus obovatus</i> , <i>Sclerolaena eriacantha</i> , <i>Maireana triptera</i> , <i>Senna artemisioides</i> subsp. <i>helmsii</i> and <i>Senna glutinosa</i> subsp. <i>pruinosa</i> over Hummock Grassland of <i>Triodia</i> sp. Shovelanna Hill (S.van Leeuwen 3835), <i>Triodia epactia</i> and <i>Triodia brizoides</i>	

Vascular plant species recorded

Species	Plant Height (m)	Coverage (%)	Flowers	Growth Form
<i>Acacia adsurgens</i>	1.1	0.2		Shrub
<i>Acacia aptaneura</i>	4	4		Tree
<i>Acacia bivenosa</i>	2	<1		Shrub
<i>Acacia maitlandii</i>	0.35	<1		Shrub
<i>Acacia pruinocarpa</i>	1.5	3		Tree
<i>Acacia synchronicia</i>	0.9	0.1		Shrub
<i>Acacia tetragonophylla</i>	1.5	2		Shrub
<i>Amphipogon sericeus</i>	0.2	0.8		Grass
<i>Anthobolus leptomerioides</i>	1.2	<1		Shrub
<i>Aristida holathera</i> var. <i>holathera</i>	0.15	<1		Grass
<i>Bulbostylis barbata</i>	0.05	<1		Sedge
<i>Corchorus lasiocarpum</i> subsp. <i>lasiocarpus</i>	0.05	<1		Shrub
<i>Dodonaea pachyneura</i>	1.3	1		Shrub
<i>Enneapogon lindleyanus</i>	0.1	<1		Grass
<i>Eremophila cuneifolia</i>	0.4	<1		Shrub
<i>Eriachne lanata</i>	0.4	<1		Grass
<i>Eriachne pulchella</i> subsp. <i>dominii</i>	0.2	<1		Grass
<i>Eucalyptus leucophloia</i> subsp. <i>leucophloia</i>	4	1.5		Tree
<i>Goodenia muelleriana</i>	0.15	<1		Herb
<i>Hakea chordophylla</i>	0.4	<1		Shrub
<i>Keraudrenia</i> sp. (indet)	0.6	<1		Shrub
<i>Maireana georgei</i>	0.1	<1		Shrub
<i>Maireana triptera</i>	0.25	0.2		Shrub
<i>Paspalidium clementii</i>	0.05	<1		Grass
<i>Ptilotus austrolasius</i>	0.2	<1		Herb
<i>Ptilotus exaltatus</i>	0.02	<1		Herb
<i>Ptilotus obovatus</i>	0.35	1.2		Shrub
<i>Sclerolaena eriacantha</i>	0.25	1		Herb
<i>Senna artemisioides</i> subsp. <i>helmsii</i>	0.4	0.2		Shrub
<i>Senna artemisioides</i> subsp. <i>oligophylla</i>	1.4	<1		Shrub
<i>Senna glaucifolia</i>	0.55	<1		Shrub
<i>Senna glutinosa</i> subsp. <i>glutinosa</i>	1.2	0.1		Shrub
<i>Senna glutinosa</i> subsp. <i>pruinosa</i>	0.75	0.1		Shrub

<i>Senna glutinosa</i> subsp. <i>x luerssenii</i>	1	0.1	Shrub
<i>Senna stricta</i>	0.75	<1	Shrub
<i>Solanum ? lasiophyllum</i>	0.35	<1	Shrub
<i>Solanum phlomoides</i>	0.15	<1	Shrub
<i>Tribulus suberosus</i>	0.25	<1	Shrub
<i>Triodia brizoides</i>	1	3	Hummock Grass
<i>Triodia epactia</i>	0.9	1.5	Hummock Grass
<i>Triodia</i> sp. Shovelanna Hill (S.van Leeuwen 3835)	0.6	30	Hummock Grass



Site WHN-46

FLORA QUADRAT DATA SHEET

Location	WHN-47	Date 26.05.2011 & 09.10.2011
		Surveyor K. McCreery
Quadrat Dimension	50x50m	Quadrat Orientation 0°
GPS Location	Easting: 205359	GPS Location Relative to Quadrat NW
	Northing: 7414103	
Soil Type	Sandy Clay Loam	Soil Colour Red
Topography/Aspect	Hillslope, moderately inclined / 160°	Disturbance Type None
Vegetation Condition	Pristine	
Broad Floristic Formation	<i>Triodia</i> Hummock Grassland	
Vegetation Association	5a - Hummock Grassland of <i>Triodia brizoides</i> , <i>Triodia epactia</i> and <i>Triodia angusta</i> with Open Shrubland of <i>Acacia tetragonophylla</i> and <i>Acacia synchronicia</i> with Very Open Woodland of <i>Eucalyptus leucophloia</i> subsp. <i>leucophloia</i> and <i>Acacia ? pteraneura</i> (hybrid?)	
Vegetation Sub-association	Scattered Low Trees of <i>Eucalyptus leucophloia</i> subsp. <i>leucophloia</i> over High Open Shrubland of <i>Acacia synchronicia</i> and <i>Acacia pruinocarpa</i> over Low Scattered Shrubs of <i>Senna glutinosa</i> subsp. <i>pruinosa</i> over Hummock Grassland of <i>Triodia brizoides</i> and <i>Triodia epactia</i> over Scattered Sedges of <i>Bulbostylis barbata</i>	

Vascular plant species recorded

Species	Plant Height (m)	Coverage (%)	Flowers	Growth Form
<i>Acacia ancistrocarpa</i>	1.6	<1		Shrub
<i>Acacia maitlandii</i>	1.9	<1		Shrub
<i>Acacia melleodora</i>	1.3	<1		Shrub
<i>Acacia pruinocarpa</i>	2	0.2		Tree
<i>Acacia rhodophloia</i>	1.5	<1		Shrub
<i>Acacia synchronicia</i>	2.5	2		Shrub
<i>Acacia tenuissima</i>	1.2	<1		Shrub
<i>Acacia tetragonophylla</i>	0.8	<1		Shrub
<i>Aristida holathera</i> var. <i>holathera</i>	0.3	<1		Grass
<i>Boerhavia coccinea</i>	0.01	<1		Herb
<i>Bulbostylis barbata</i>	0.1	1		Sedge
<i>Corchorus lasiocarpum</i> subsp. <i>lasiocarpus</i>	0.3	<1		Shrub
<i>Cullen leucochaites</i>	0.1	<1		Shrub
<i>Cymbopogon ambiguus</i>	0.8	<1		Grass
<i>Enneapogon polyphyllus</i>	0.2	<1		Grass
<i>Eremophila cuneifolia</i>	0.4	<1		Shrub
<i>Eriachne pulchella</i> subsp. <i>dominii</i>	0.1	<1		Grass
<i>Eucalyptus leucophloia</i> subsp. <i>leucophloia</i>	3	0.2		Tree
<i>Euphorbia tannensis</i> subsp. <i>eremophila</i>	0.4	<1		Herb
<i>Gomphrena ? cunninghamii</i>	0.1	<1		Herb
<i>Goodenia muelleriana</i>	0.2	<1	yellow	Herb
<i>Hakea lorea</i> subsp. <i>lorea</i>	1.8	<1		Shrub
<i>Hibiscus strutii</i> var. <i>campylochlamys</i>	0.2	<1		Shrub
<i>Iseilema dolichotrichum</i>	0.02	<1		Grass
<i>Maireana melanocoma</i>	0.4	<1		Shrub
<i>Paraneurachne muelleri</i>	0.4	<1		Grass
<i>Ptilotus obovatus</i>	0.6	<1		Shrub
<i>Salsola ? australis</i>	0.4	<1		Herb
<i>Schizachyrium fragile</i>	0.1	<1		Grass
<i>Sclerolaena eriacantha</i>	0.1	<1		Herb
<i>Senna artemisioides</i> subsp. <i>helmsii</i>	0.6	<1		Shrub
<i>Senna artemisioides</i> subsp. <i>oligophylla</i>	0.9	<1		Shrub
<i>Senna glutinosa</i> subsp. <i>glutinosa</i>	1.2	<1		Shrub
<i>Senna glutinosa</i> subsp. <i>pruinosa</i>	0.8	0.2		Shrub

<i>Senna stricta</i>	0.4	<1	Shrub
<i>Sida echinocarpa</i>	0.2	<1	Shrub
<i>Stemodia grossa</i>	0.2	<1	Herb
<i>Trachymene oleracea</i> subsp. <i>oleracea</i>	0.01	<1	Herb
<i>Tribulus suberosus</i>	0.4	<1	Shrub
<i>Triodia brizoides</i>	0.9	55	Hummock Grass
<i>Triodia epactia</i>	1.3	3	Hummock Grass



Site WHN-47

FLORA QUADRAT DATA SHEET

Location	WHN-48	Date 25.05.2011 & 09.10.2011 Surveyor A. Cole & R. Tomanovic
Quadrat Dimension	50x50m	Quadrat Orientation 0°
GPS Location	Easting: 207286 Northing: 7414912	GPS Location Relative to Quadrat NW
Soil Type	Silty Loam	Soil Colour Red
Topography/Aspect	Hillslope, steep / 40°	Disturbance Type
Vegetation Condition	Pristine	
Broad Floristic Formation	<i>Triodia</i> Hummock Grassland	
Vegetation Association	5b - Hummock Grassland of <i>Triodia</i> sp. Shovelanna Hill (S. van Leeuwen 3835) with Low Open Shrubland of <i>Acacia hilliana</i> , <i>Acacia adoxa</i> var. <i>adoxo</i> and <i>Halgania solanacea</i> var. Mt Doreen (G.M. Chippendale 4206) with Scattered Low Trees of <i>Eucalyptus leucophloia</i> subsp. <i>leucophloia</i> and <i>Acacia pruinocarpa</i>	
Vegetation Sub-association	Scattered Low Trees of <i>Eucalyptus leucophloia</i> subsp. <i>leucophloia</i> over Scattered Shrubs of <i>Senna glutinosa</i> subsp. <i>pruinosa</i> , <i>Hakea lorea</i> subsp. <i>lorea</i> and <i>Grevillea wickhamii</i> subsp. (indet) over Low Open Shrubland of <i>Acacia hilliana</i> , <i>Acacia adoxa</i> var. <i>adoxo</i> , <i>Acacia maitlandii</i> , <i>Acacia melleodora</i> and <i>Acacia tetragonophylla</i> over Hummock Grassland of <i>Triodia</i> sp. Shovelanna Hill (S. van Leeuwen 3835) and <i>Triodia epactia</i> with Scattered Tussock Grass of <i>Amphipogon sericeus</i>	

Vascular plant species recorded

Species	Plant Height (m)	Coverage (%)	Flowers	Growth Form
<i>Acacia adoxa</i> var. <i>adoxo</i>	0.6	0.2		Shrub
<i>Acacia adsurgens</i>	1.3	<1		Shrub
<i>Acacia hilliana</i>	0.6	5		Shrub
<i>Acacia maitlandii</i>	0.3	1		Shrub
<i>Acacia melleodora</i>	0.85	0.5	yellow	Shrub
<i>Acacia pruinocarpa</i>	1.6	<1		Tree
<i>Acacia</i> ? <i>pteraneura</i> (hybrid?)	1.3	<1		Tree
<i>Acacia synchronica</i>	0.65	0.1		Shrub
<i>Acacia tetragonophylla</i>	0.2	0.1		Shrub
<i>Acacia trudgeniana</i>	0.65	<1		Shrub
<i>Amphipogon sericeus</i>	0.4	0.1		Grass
<i>Bulbostylis barbata</i>	0.03	<1		Sedge
<i>Calytrix carinata</i>	1.2	<1		Shrub
<i>Cymbopogon ambiguus</i>	1	<1		Grass
<i>Dodonaea pachyneura</i>	0.9	<1		Shrub
<i>Eriachne mucronata</i>	0.3	<1		Grass
<i>Eriachne pulchella</i> subsp. <i>dominii</i>	0.15	<1		Grass
<i>Eucalyptus leucophloia</i> subsp. <i>leucophloia</i>	2	1		Tree
<i>Fimbristylis simulans</i>	0.1	0.1		Sedge
<i>Goodenia muelleriana</i>	0.1	<1		Herb
<i>Goodenia stobbsiana</i>	0.35	<1		Shrub
<i>Grevillea wickhamii</i> subsp. (indet)	2	0.1		Shrub
<i>Hakea chordophylla</i>	2.2	<1		Shrub
<i>Hakea lorea</i> subsp. <i>lorea</i>	1.7	0.1		Shrub
<i>Indigofera monophylla</i>	0.5	<1	purple	Shrub
<i>Keraudrenia</i> sp. (indet)	0.35	<1		Shrub
<i>Phyllanthus erwinii</i>	0.1	<1		Herb
<i>Ptilotus calostachyus</i>	0.4	<1	purple	Herb
<i>Schizachyrium fragile</i>	0.05	<1		Grass
<i>Senna glaucifolia</i>	1	<1		Shrub
<i>Senna glutinosa</i> subsp. <i>glutinosa</i>	1.3	<1		Shrub
<i>Senna glutinosa</i> subsp. <i>pruinosa</i>	1.2	0.5		Shrub
<i>Senna glutinosa</i> subsp. <i>x luerssenii</i>	0.75	0.1		Shrub

<i>Senna stricta</i>	0.5	<1	Shrub
<i>Sida platycalyx</i>	0.1	<1	Shrub
<i>Solanum ? lasiophyllum</i>	0.25	<1	Shrub
<i>Stenopetalum decipiens</i>	0.45	<1	Herb
<i>Tribulus suberosus</i>	1.3	<1	Shrub
<i>Triodia epactia</i>	0.9	<1	Hummock Grass
<i>Triodia</i> sp. Shovelanna Hill (S.van Leeuwen 3835)	0.65	50	Hummock Grass



Site WHN-48

FLORA QUADRAT DATA SHEET

Location	WHN-49	Date 26.05.2011
		Surveyor K. McCreery
Quadrat Dimension	50x50m	Quadrat Orientation 0°
GPS Location	Eastings: 204806	GPS Location Relative to Quadrat NW
	Northing: 7413715	
Soil Type	Loamy Sand	Soil Colour Brown
Topography/Aspect	Flood-out, gently inclined / 190°	Disturbance Type Weeds
Vegetation Condition	Excellent	
Broad Floristic Formation	<i>Triodia</i> Hummock Grassland	
Vegetation Association	5g - Hummock Grassland of <i>Triodia epactia</i> , <i>Triodia brizoides</i> and <i>Triodia</i> sp. Shovelanna Hill (S.van Leeuwen 3835), with Low Open Woodland of <i>Acacia aptaneura</i> , <i>Eucalyptus leucophloia</i> subsp. <i>leucophloia</i> and <i>Acacia pruinocarpa</i> over Scattered Shrubs of <i>Acacia tetragonophylla</i> , <i>Scaevola acacioides</i> and <i>Acacia wanyu</i>	
Vegetation Sub-association	Low Open Woodland of <i>Eucalyptus leucophloia</i> subsp. <i>leucophloia</i> and <i>Acacia aptaneura</i> over Scattered Tall Shrubs of <i>Acacia bivenosa</i> over Shrubland of <i>Acacia wanyu</i> , <i>Acacia tetragonophylla</i> , <i>Senna glutinosa</i> subsp. <i>glutinosa</i> , <i>Acacia maitlandii</i> and <i>Acacia atkinsiana</i> over Low Scattered Shrubs of <i>Scaevola acacioides</i> over Hummock Grassland of <i>Triodia epactia</i>	

Vascular plant species recorded

Species	Plant Height (m)	Coverage (%)	Flowers	Growth Form
<i>Acacia adsurgens</i>	1.8	<1		Shrub
<i>Acacia aptaneura</i>	1.5	0.5		Tree
<i>Acacia aptaneura</i>	1.8	0.2		Shrub
<i>Acacia bivenosa</i>	3	0.2		Shrub
<i>Acacia elachantha</i>	1.8	<1		Shrub
<i>Acacia maitlandii</i>	1.8	0.2		Shrub
<i>Acacia melleodora</i>	1.4	<1		Shrub
<i>Acacia monticola</i>	1.7	<1		Shrub
<i>Acacia pruinocarpa</i>	1.8	<1		Tree
<i>Acacia synchronicia</i>	1.3	<1		Shrub
<i>Acacia tetragonophylla</i>	1.5	2		Shrub
<i>Acacia wanyu</i>	1.2	8	yellow	Shrub
<i>Cassyltha capillaris</i>	0.6	<1		Vine
<i>Digitaria brownii</i>	0.3	<1		Grass
<i>Duperreya commixta</i>	0.8	<1		Vine
<i>Enchylaena tomentosa</i>	0.4	<1		Shrub
<i>Eremophila cuneifolia</i>	0.3	<1		Shrub
<i>Eremophila latrobei</i> subsp. (indet)	1.2	<1		Shrub
<i>Eremophila latrobei</i> subsp. <i>latrobei</i>	1.3	<1		Shrub
<i>Eucalyptus leucophloia</i> subsp. <i>leucophloia</i>	6	2		Tree
<i>Hakea chordophylla</i>	0.6	<1		Shrub
<i>Hibiscus burtonii</i>	0.3	<1		Shrub
<i>Keraudrenia</i> sp. (indet)	0.6	<1		Shrub
<i>Maireana melanocoma</i>	0.3	<1		Shrub
<i>Maireana thesioides</i>	0.3	<1		Shrub
<i>Maireana villosa</i>	0.1	<1		Shrub
<i>Petalostylis labicheoides</i>	3	<1		Shrub
* <i>Portulaca oleracea</i>	0.01	<1		Herb
<i>Psyrax suaveolens</i>	1.8	<1		Shrub
<i>Ptilotus exaltatus</i>	0.1	<1		Herb
<i>Rulingia luteiflora</i>	1.8	<1		Shrub
<i>Santalum lanceolatum</i>	1.8	<1		Shrub
<i>Scaevola acacioides</i>	0.8	0.2		Shrub
<i>Sclerolaena eriacantha</i>	0.1	<1		Herb

<i>Senna ? notabilis</i>	0.1	<1		Herb
<i>Senna artemisioides</i> subsp. <i>helmsii</i>	0.4	<1		Shrub
<i>Senna glutinosa</i> subsp. <i>glutinosa</i>	1.2	0.5		Shrub
<i>Senna stricta</i>	0.5	<1		Shrub
<i>Sida</i> sp. <i>Excedentifolia</i> (J.L. Egan 1925)	0.4	<1		Shrub
<i>Solanum centrale</i>	0.3	<1		Shrub
<i>Solanum phlomoides</i>	0.2	<1		Shrub
<i>Solanum sturtianum</i>	0.7	<1	purple	Shrub
<i>Trianthema triquetra</i>	0.01	<1		Shrub
<i>Triodia epactia</i>	1.2	50		Hummock Grass



Site WHN-49

FLORA QUADRAT DATA SHEET

Location WHN-50 **Date** 25.05.2011 & 09.10.2011
Surveyor A. Cole & R. Tomanovic

Quadrat Dimension 50x50m **Quadrat Orientation** 0°
GPS Location **Easting:** 207129 **GPS Location Relative to Quadrat** NW
Northing: 7415571

Soil Type Silty Loam **Soil Colour** Red

Topography/Aspect Swale, moderately inclined / 160° **Disturbance Type** Weeds

Vegetation Condition Excellent

Broad Floristic Formation *Acacia* Low Woodland

Vegetation Association **2a - Low Woodland** of *Acacia aptaneura*, *Acacia ? pteraneura* and *Acacia pruinocarpa* over **Open Hummock Grassland** of *Triodia epactia* and *Triodia* sp. Shovelanna Hill (S.van Leeuwen 3835) with **Shrubland** of *Acacia wanyu*, *Acacia tetragonophylla* and *Senna stricta*

Vegetation Sub-association Low Woodland of *Eucalyptus leucophloia* subsp. *leucophloia*, *Acacia ? paraneura* and *Acacia ? pteraneura* over Scattered Tall Shrubs of *Acacia synchronicia* over Shrubland of *Acacia wanyu*, *Acacia tetragonophylla*, *Senna stricta*, *Eremophila cuneifolia* and *Scaevola spinescens* over Hummock Grassland of *Triodia epactia* and *Triodia* sp. Shovelanna Hill (S.van Leeuwen 3835) with Scattered Tussock Grass of *Eriachne pulchella* subsp. *dominii*

Vascular plant species recorded

Species	Plant Height (m)	Coverage (%)	Flowers	Growth Form
<i>Acacia aptaneura</i>	4	1		Tree
<i>Acacia ? paraneura</i>	5.5	4		Tree
<i>Acacia ? pteraneura</i>	5	5		Tree
<i>Acacia synchronicia</i>	2.5	0.2		Shrub
<i>Acacia tetragonophylla</i>	1.6	3		Shrub
<i>Acacia wanyu</i>	2	12		Shrub
<i>Amphipogon sericeus</i>	0.35	<1		Grass
<i>Bulbostylis barbata</i>	0.03	<1		Sedge
<i>Cymbopogon obtectus</i>	0.6	<1		Grass
<i>Duperreya commixta</i>	0.05	<1		Vine
<i>Eragrostis eriopoda</i>	0.25	<1		Grass
<i>Eremophila cuneifolia</i>	1.2	2		Shrub
<i>Eremophila exilifolia</i>	1.1	1		Shrub
<i>Eremophila latrobei</i> subsp. (indet)	1.6	<1		Shrub
<i>Eremophila oppositifolia</i> subsp. <i>angustifolia</i>	2	2		Shrub
<i>Eriachne mucronata</i>	0.3	<1		Grass
<i>Eriachne pulchella</i> subsp. <i>dominii</i>	0.05	0.1		Grass
<i>Eucalyptus leucophloia</i> subsp. <i>leucophloia</i>	6	<1		Tree
<i>Hibiscus burtonii</i>	0.35	<1		Shrub
<i>Maireana georgei</i>	0.25	<1		Shrub
<i>Maireana melanocoma</i>	0.3	<1		Shrub
<i>Maireana thesioides</i>	1.3	<1		Shrub
<i>Paspalidium clementii</i>	0.25	<1		Grass
* <i>Portulaca oleracea</i>	0.02	<1		Herb
<i>Psyrax suaveolens</i>	2.5	<1		Shrub
<i>Ptilotus exaltatus</i>	0.05	<1		Herb
<i>Scaevola acacioides</i>	2	0.8		Shrub
<i>Scaevola spinescens</i>	1.1	2		Shrub
<i>Sclerolaena ericantha</i>	0.2	<1		Herb
<i>Senna artemisioides</i> subsp. <i>X sturtii X glaucifolia</i>	1.5	<1		Shrub
<i>Senna glutinosa</i> subsp. <i>x luerssenii</i>	1.6	1.5		Shrub
<i>Senna stricta</i>	1.6	2		Shrub
<i>Solanum phlomoides</i>	0.35	<1		Shrub
<i>Sporobolus australasicus</i>	0.25	<1		Grass

<i>Tribulus suberosus</i>	0.5	<1	Shrub
<i>Triodia epactia</i>	1	35	Hummock Grass
<i>Triodia</i> sp. Shovelanna Hill (S.van Leeuwen 3835)	0.6	3	Hummock Grass



Site WHN-50

FLORA QUADRAT DATA SHEET

Location	WHN-51	Date 26.05.2011 Surveyor K. McCreery
Quadrat Dimension	50x50m	Quadrat Orientation 0°
GPS Location	Easting: 204341 Northing: 7413671	GPS Location Relative to Quadrat NW
Soil Type	Sandy Clay loam	Soil Colour Red
Topography/Aspect	Hillcrest, gently inclined / 350°	Disturbance Type None
Vegetation Condition	Pristine	
Broad Floristic Formation	<i>Triodia</i> Hummock Grassland	
Vegetation Association	5b - Hummock Grassland of <i>Triodia</i> sp. Shovelanna Hill (S. van Leeuwen 3835) with Low Open Shrubland of <i>Acacia hilliana</i> , <i>Acacia adoxa</i> var. <i>adoxa</i> and <i>Halgania solanacea</i> var. Mt Doreen (G.M. Chippendale 4206) with Scattered Low Trees of <i>Eucalyptus leucophloia</i> subsp. <i>leucophloia</i> and <i>Acacia pruinocarpa</i>	
Vegetation Sub-association	Scattered Low Trees of <i>Acacia pruinocarpa</i> over Scattered Tall Shrubs of <i>Hakea chordophylla</i> over Low Scattered Shrubs of <i>Acacia hilliana</i> , <i>Acacia adoxa</i> var. <i>adoxa</i> , <i>Halgania solanacea</i> var. Mt Doreen (G.M. Chippendale 4206), and <i>Calytrix carinata</i> over Hummock Grassland of <i>Triodia</i> sp. Shovelanna Hill (S. van Leeuwen 3835)	

Vascular plant species recorded

Species	Plant Height (m)	Coverage (%)	Flowers	Growth Form
<i>Acacia adoxa</i> var. <i>adoxa</i>	0.4	0.2	yellow	Shrub
<i>Acacia atkinsiana</i>	0.8	<1		Shrub
<i>Acacia hilliana</i>	0.4	0.2	yellow	Shrub
<i>Acacia monticola</i>	2.3	<1		Shrub
<i>Acacia pachyacra</i>	1.6	<1		Shrub
<i>Acacia pruinocarpa</i>	1.8	0.5		Tree
<i>Acacia ? rhodophloia</i> X <i>sibirica</i>	1.2	<1		Shrub
<i>Acacia tetragonophylla</i>	0.8	<1		Shrub
<i>Calytrix carinata</i>	0.4	0.5		Shrub
<i>Hakea chordophylla</i>	3.5	1		Shrub
<i>Hakea lorea</i> subsp. <i>lorea</i>	0.8	<1		Shrub
<i>Halgania solanacea</i> var. Mt Doreen (G.M. Chippendale 4206)	0.3	<1		Shrub
<i>Hibiscus sturtii</i> var. (indet)	0.1	<1		Shrub
<i>Petalostylis labicheoides</i>	3	<1		Shrub
<i>Ptilotus obovatus</i>	0.6	<1		Shrub
<i>Senna artemisioides</i> subsp. <i>oligophylla</i>	0.6	<1		Shrub
<i>Senna glutinosa</i> subsp. <i>glutinosa</i>	1.2	<1		Shrub
<i>Solanum centrale</i>	0.2	<1		Shrub
<i>Triodia</i> sp. Shovelanna Hill (S. van Leeuwen 3835)	0.8	55		Hummock Grass



Site WHN-51

FLORA QUADRAT DATA SHEET

Location	WHN-52	Date 26.05.2011 & 09.10.2011 Surveyor A. Cole & R. Tomanovic
Quadrat Dimension	50x50m	Quadrat Orientation 0°
GPS Location	Easting: 206603 Northing: 7413794	GPS Location Relative to Quadrat NW
Soil Type	Silty Loam	Soil Colour Red
Topography/Aspect	Hillslope, steep / 350°	Disturbance Type None
Vegetation Condition	Pristine	
Broad Floristic Formation	<i>Triodia</i> Hummock Grassland	
Vegetation Association	5d - Hummock Grassland of <i>Triodia brizoides</i> , <i>Triodia</i> sp. Shovelanna Hill (S.van Leeuwen 3835) and <i>Triodia epactia</i> with Open Shrubland of <i>Acacia tetragonophylla</i> , <i>Eremophila fraseri</i> subsp. <i>fraseri</i> and <i>Acacia synchronicia</i>	
Vegetation Sub-association	Scattered Tall Shrubs of <i>Acacia adsurgens</i> over Low Shrubland of <i>Eremophila fraseri</i> subsp. <i>fraseri</i> , <i>Senna artemisioides</i> subsp. <i>oligophylla</i> , <i>Senna artemisioides</i> subsp. <i>helmsii</i> X ? <i>cordiosperma</i> and <i>Senna artemisioides</i> subsp. <i>helmsii</i> over Hummock Grassland of <i>Triodia brizoides</i> and <i>Triodia epactia</i> with Scattered Tussock Grass of <i>Paspalidium clementii</i>	

Vascular plant species recorded

Species	Plant Height (m)	Coverage (%)	Flowers	Growth Form
<i>Acacia adsurgens</i>	1.2	0.1		Shrub
<i>Acacia pruinocarpa</i>	1	<1		Tree
<i>Acacia sibirica</i>	1.4	<1		Shrub
<i>Acacia tenuissima</i>	0.95	<1		Shrub
<i>Acacia tetragonophylla</i>	1	<1		Shrub
<i>Acacia trudgeniana</i>	1.2	<1		Shrub
<i>Aristida holathera</i> var. <i>holathera</i>	0.3	<1		Grass
<i>Boerhavia coccinea</i>	0.05	<1		Herb
<i>Bulbostylis barbata</i>	4	0.1		Sedge
<i>Cleome viscosa</i>	0.3	<1		Herb
<i>Corchorus lasiocarpum</i> subsp. <i>lasiocarpus</i>	0.05	<1		Shrub
<i>Cymbopogon ambiguus</i>	0.6	<1		Grass
<i>Dodonaea pachyneura</i>	0.8	<1		Shrub
<i>Enneapogon lindleyanus</i>	0.25	<1		Grass
<i>Enneapogon polyphyllus</i>	0.3	<1		Grass
<i>Eremophila fraseri</i> subsp. <i>fraseri</i>	1	12	pink	Shrub
<i>Eriachne mucronata</i>	0.35	<1		Grass
<i>Euphorbia australis</i>	0.2	<1		Herb
<i>Euphorbia tannensis</i> subsp. <i>eremophila</i>	0.4	<1		Herb
<i>Evolvulus alsinoides</i> var. (indet)	0.1	<1		Herb
<i>Grevillea wickhamii</i> subsp. (indet)	0.9	<1		Shrub
<i>Iseilema dolichotrichum</i>	0.1	<1		Grass
<i>Paraneurachne muelleri</i>	0.4	<1		Grass
<i>Paspalidium clementii</i>	0.2	0.1		Grass
<i>Polycarpaea holtzei</i>	0.01	<1		Herb
<i>Polycarpaea longiflora</i>	0.4	<1	white	Herb
<i>Ptilotus auriculifolius</i>	0.4	<1	white	Herb
<i>Ptilotus obovatus</i>	0.6	<1		Shrub
<i>Rhynchosia minima</i>	0.23	0.1		Vine
<i>Senna artemisioides</i> subsp. <i>helmsii</i>	0.8	0.8		Shrub
<i>Senna artemisioides</i> subsp. <i>helmsii</i> X ?	0.65	0.8		Shrub
<i>Senna artemisioides</i> subsp. <i>oligophylla</i>	0.8	1		Shrub
<i>Senna glutinosa</i> subsp. <i>x luerssenii</i>	0.35	<1		Shrub
<i>Sida echinocarpa</i>	0.3	<1		Shrub

<i>Tribulus suberosus</i>	0.5	<1	Shrub
<i>Triodia brizoides</i>	0.85	55	Hummock Grass
<i>Triodia epactia</i>	1.3	0.8	Hummock Grass



Site WHN-52

FLORA QUADRAT DATA SHEET

Location	WHN-53	Date 27.05.2011 & 07.10.2011
		Surveyor K. McCreery
Quadrat Dimension	50x50m	Quadrat Orientation 0°
GPS Location	Easting: 203471	GPS Location Relative to Quadrat NW
	Northing: 7414318	
Soil Type	Sandy Clay Loam	Soil Colour Red
Topography/Aspect	Hillslope, moderately inclined / 170°	Disturbance Type None
Vegetation Condition	Excellent	
Broad Floristic Formation	<i>Triodia</i> Hummock Grassland	
Vegetation Association	5g - Hummock Grassland of <i>Triodia epactia</i> , <i>Triodia brizoides</i> and <i>Triodia</i> sp. Shovelanna Hill (S.van Leeuwen 3835), with Low Open Woodland of <i>Acacia aptaneura</i> , <i>Eucalyptus leucophloia</i> subsp. <i>leucophloia</i> and <i>Acacia pruinocarpa</i> over Scattered Shrubs of <i>Acacia tetragonophylla</i> , <i>Scaevola acacioides</i> and <i>Acacia wanyu</i>	
Vegetation Sub-association	Low Woodland of <i>Acacia aptaneura</i> , <i>Eucalyptus leucophloia</i> subsp. <i>leucophloia</i> and <i>Acacia pruinocarpa</i> over Scattered Shrubs of <i>Acacia tetragonophylla</i> , <i>Scaevola acacioides</i> and <i>Eremophila latrobei</i> subsp. (indet) over Hummock Grassland of <i>Triodia</i> sp. Shovelanna Hill (S.van Leeuwen 3835), <i>Triodia epactia</i> and <i>Triodia brizoides</i> with Scattered Tussock Grass of <i>Eriachne pulchella</i> subsp. <i>dominii</i> and <i>Eriachne mucronata</i>	

Vascular plant species recorded

Species	Plant Height (m)	Coverage (%)	Flowers	Growth Form
<i>Acacia aptaneura</i>	6	15		Tree
<i>Acacia catenulate</i> subsp. <i>occidentalis</i>	3.5	0.5		Tree
<i>Acacia pruinocarpa</i>	4	<1		Tree
<i>Acacia synchronicia</i>	1.2	<1		Shrub
<i>Acacia tetragonophylla</i>	1.9	0.2		Shrub
<i>Duperreya commixta</i>	1.8	<1		Vine
<i>Eremophila latrobei</i> subsp. (indet)	1.8	0.2		Shrub
<i>Eremophila latrobei</i> subsp. <i>latrobei</i>	1.3	<1		Shrub
<i>Eriachne mucronata</i>	0.3	0.2		Grass
<i>Eriachne pulchella</i> subsp. <i>dominii</i>	0.1	0.2		Grass
<i>Eucalyptus leucophloia</i> subsp. <i>leucophloia</i>	7	1		Tree
<i>Indigofera monophylla</i>	0.3	<1		Shrub
<i>Maireana melanocoma</i>	0.3	<1		Shrub
<i>Mirbelia viminalis</i>	0.1	<1		Shrub
<i>Paspalidium clementii</i>	0.1	<1		Grass
<i>Psyrax latifolia</i>	0.8	<1		Shrub
<i>Psyrax suaveolens</i>	2.3	<1		Shrub
<i>Ptilotus obovatus</i>	0.6	<1		Shrub
<i>Santalum lanceolatum</i>	2.1	<1		Shrub
<i>Scaevola acacioides</i>	1.8	0.2		Shrub
<i>Senna glutinosa</i> subsp. <i>glutinosa</i>	0.9	<1		Shrub
<i>Senna glutinosa</i> subsp. <i>x leurrssenii</i>	1.2	<1		Shrub
<i>Senna stricta</i>	0.4	<1		Shrub
<i>Sida platycalyx</i>	0.2	<1		Shrub
<i>Solanum ? lasiophyllum</i>	0.1	<1		Shrub
<i>Tribulus suberosus</i>	0.9	<1		Shrub
<i>Triodia brizoides</i>	0.9	<1		Hummock Grass
<i>Triodia epactia</i>	1.5	8		Hummock Grass
<i>Triodia</i> sp. Shovelanna Hill (S.van Leeuwen 3835)	0.8	40		Hummock Grass



Site WHN-53

FLORA QUADRAT DATA SHEET

Location	WHN-54	Date 26.05.2011 & 09.10.2011
		Surveyor A. Cole & R. Tomanovic
Quadrat Dimension	50x50m	Quadrat Orientation 0°
GPS Location	Eastings: 206764	GPS Location Relative to Quadrat NW
	Northing: 7414082	
Soil Type	Silty loam	Soil Colour Orange
Topography/Aspect	Hillslope, precipitous / 170°	Disturbance Type
Vegetation Condition	Pristine	
Broad Floristic Formation	<i>Triodia</i> Hummock Grassland	
Vegetation Association	5g - Hummock Grassland of <i>Triodia epactia</i> , <i>Triodia brizoides</i> and <i>Triodia</i> sp. Shovelanna Hill (S.van Leeuwen 3835), with Low Open Woodland of <i>Acacia aptaneura</i> , <i>Eucalyptus leucophloia</i> subsp. <i>leucophloia</i> and <i>Acacia pruinocarpa</i> over Scattered Shrubs of <i>Acacia tetragonophylla</i> , <i>Scaevola acacioides</i> and <i>Acacia wanyu</i>	
Vegetation Sub-association	Low Open Woodland of <i>Acacia aptaneura</i> over High Open Shrubland of <i>Hakea chordophylla</i> and <i>Acacia synchronicia</i> over Open Shrubland of <i>Acacia tetragonophylla</i> , <i>Eremophila fraseri</i> subsp. <i>fraseri</i> and <i>Ptilotus obovatus</i> over Low Scattered Shrubs of <i>Sida echinocarpa</i> , <i>Sida</i> sp. ? spiciform panicles (E. Leyland s.n. 14/8/90) and <i>Senna artemisioides</i> subsp. <i>oligophylla</i> over Open Hummock Grassland of <i>Triodia brizoides</i> and <i>Triodia epactia</i> with Very Open Tussock Grassland of <i>Paspalidium clementii</i> , <i>Aristida contorta</i> , <i>Yakirra australiensis</i> and <i>Cymbopogon ambiguus</i>	

Vascular plant species recorded

Species	Plant Height (m)	Coverage (%)	Flowers	Growth Form
<i>Acacia aptaneura</i>	3.5	10		Tree
<i>Acacia maitlandii</i>	1.8	<1		Shrub
<i>Acacia melleodora</i>	2.2	<1		Shrub
<i>Acacia pruinocarpa</i>	2	<1		Tree
<i>Acacia synchronicia</i>	3	1		Shrub
<i>Acacia tetragonophylla</i>	2	3		Shrub
<i>Amaranthus ? clementii</i>	0.2	<1		Herb
<i>Aristida contorta</i>	0.25	0.8		Grass
<i>Aristida holathera</i> var. <i>holathera</i>	0.15	<1		Grass
<i>Astrotricha hamptonii</i>	0.6	<1		Shrub
<i>Boerhavia coccinea</i>	0.05	<1		Herb
<i>Bulbostylis barbata</i>	0.2	0.5		Sedge
<i>Cheilanthes lasiophylla</i>	0.12	1		Herb
<i>Chrysocephalum ? gilesii</i>	0.35	<1		Shrub
<i>Cleome viscosa</i>	0.5	0.5		Herb
<i>Corchorus lasiocarpum</i> subsp. <i>lasiocarpus</i>	0.1	<1		Shrub
<i>Cullen leucochaites</i>	0.05	<1		Herb
<i>Cymbopogon ambiguus</i>	0.9	0.1		Grass
<i>Dodonaea pachyneura</i>	1.3	<1		Shrub
<i>Dysphania rhadinostachya</i> subsp. <i>rhadinostachya</i>	0.2	<1		Herb
<i>Enneapogon lindleyanus</i>	0.1	<1		Grass
<i>Enneapogon polyphyllus</i>	0.15	<1		Grass
<i>Eremophila fraseri</i> subsp. <i>fraseri</i>	1.6	2.5	pink	Shrub
<i>Eriachne lanata</i>	0.1	<1		Grass
<i>Eriachne mucronata</i>	0.3	<1		Grass
<i>Euphorbia tannensis</i> subsp. <i>eremophila</i>	0.35	<1		Herb
<i>Evolvulus alsinoides</i> var. <i>villosicalyx</i>	0.05	<1		Herb
<i>Goodenia muelleriana</i>	0.12	<1		Herb
<i>Hakea chordophylla</i>	2.5	1		Shrub
<i>Hibiscus coatesii</i>	0.1	<1		Shrub
<i>Iseilema dolichotrichum</i>	0.1	<1		Grass
<i>Nicotiana benthamiana</i>	0.35	<1		Herb

<i>Paraneurachne muelleri</i>	0.25	<1	Grass
<i>Paspalidium clementii</i>	0.55	1	Grass
<i>Phyllanthus erwinii</i>	0.05	<1	Herb
<i>Polycarpaea longiflora</i>	0.2	<1	Herb
<i>Ptilotus obovatus</i>	1.1	1	Shrub
<i>Rhynchosia minima</i>	0.2	0.1	Vine
<i>Senna artemisioides</i> subsp. <i>helmsii</i>	0.4	<1	Shrub
<i>Senna artemisioides</i> subsp. <i>oligophylla</i>	0.6	0.2	Shrub
<i>Senna glutinosa</i> subsp. <i>x leurossenii</i>	1	<1	Shrub
<i>Sida echinocarpa</i>	0.3	0.6	Shrub
<i>Sida</i> sp. ? spiciform panicles (E. Leyland s.n. 14/8/90)	0.5	0.3	Shrub
<i>Solanum ellipticum</i>	0.1	<1	Shrub
<i>Themeda triandra</i>	0.45	<1	Grass
<i>Trachymene oleracea</i> subsp. <i>oleracea</i>	0.03	<1	Herb
<i>Tribulus suberosus</i>	0.5	<1	Shrub
<i>Trichodesma zeylanicum</i> var. <i>zeylanicum</i>	6	<1	Shrub
<i>Triodia brizoides</i>	0.9	15	Hummock Grass
<i>Triodia epactia</i>	0.8	0.1	Hummock Grass
<i>Yakirra australiensis</i>	0.1	0.4	Grass



Site WHN-54

FLORA QUADRAT DATA SHEET

Location	WHN-55	Date 27.05.2011 & 07.10.2011
		Surveyor K. McCreery
Quadrat Dimension	50x50m	Quadrat Orientation 0°
GPS Location	Eastng: 203305	GPS Location Relative to Quadrat NW
	Northing: 7413838	
Soil Type	Clay loam, sandy	Soil Colour Red
Topography/Aspect	Gully, gently inclined / 340°	Disturbance Type None
Vegetation Condition	Excellent	
Broad Floristic Formation	Acacia High Shrubland	
Vegetation Association	4b - High Shrubland of <i>Acacia monticola</i> , <i>Acacia hamersleyensis</i> and <i>Petalostylis labicheoides</i> over Open Hummock Grassland of <i>Triodia melvillei</i> , <i>Triodia epactia</i> and <i>Triodia</i> sp. Shovelanna Hill (S.van Leeuwen 3835) with Low Open Woodland of <i>Corymbia ferritcola</i> and <i>Ficus brachypoda</i>	
Vegetation Sub-association	Low Open Woodland of <i>Corymbia ferritcola</i> and <i>Ficus brachypoda</i> over High Shrubland of <i>Acacia monticola</i> , <i>Acacia hamersleyensis</i> , <i>Petalostylis labicheoides</i> , <i>Gossypium robinsonii</i> and <i>Rulingia luteiflora</i> over Scattered Shrubs of <i>Dodonaea pachyneura</i> over Low Open Shrubland of <i>Tephrosia rosea</i> var. <i>glabrior</i> over Open Hummock Grassland of <i>Triodia melvillei</i> , <i>Triodia epactia</i> and <i>Triodia</i> sp. Shovelanna Hill (S.van Leeuwen 3835) with Very open Tussock Grassland of <i>Themeda triandra</i> , <i>Cymbopogon ambiguus</i> , <i>Paraneurachne muelleri</i> , <i>Eriachne mucronata</i> and <i>Paspalidium clementii</i>	

Vascular plant species recorded

Species	Plant Height (m)	Coverage (%)	Flowers	Growth Form
<i>Acacia hamersleyensis</i>	3.5	2		Shrub
<i>Acacia maitlandii</i>	0.4	<1		Shrub
<i>Acacia monticola</i>	3.5	25	yellow	Shrub
<i>Acacia sibirica</i>	1.2	<1		Shrub
<i>Alternanthera nodiflora</i>	0.6	<1		Herb
<i>Ammannia multiflora</i>	0.1	<1		Herb
<i>Astrotricha hamptonii</i>	2	1		Shrub
<i>Bulbostylis barbata</i>	0.1	<1		Sedge
<i>Cassutha capillaris</i>	0.5	<1		Vine
<i>Centipeda minima</i>	0.1	<1		Herb
<i>Cheilanthes lasiophylla</i>	0.1	<1		Herb
<i>Cheilanthes sieberi</i> subsp. <i>sieberi</i>	0.1	<1		Herb
<i>Clerodendrum tomentosum</i> var. <i>lanceolatum</i>	1.8	<1		Shrub
<i>Corymbia ferritcola</i>	5	2		Tree
<i>Cymbopogon ambiguus</i>	0.9	2		Grass
<i>Cymbopogon procerus</i>	0.8	<1		Grass
<i>Cyperus cunninghamii</i> subsp. <i>cunninghamii</i>	0.4	<1		Sedge
<i>Dodonaea pachyneura</i>	1.8	1		Shrub
<i>Duperreya commixta</i>	2.5	0.2		Vine
<i>Dysphania kalpari</i>	0.2	<1		Herb
<i>Eragrostis cumingii</i>	0.1	<1		Grass
<i>Eragrostis olida</i>	0.5	<1		Grass
<i>Eremophila exilifolia</i>	0.1	<1		Shrub
<i>Eriachne lanata</i>	0.5	0.2		Grass
<i>Eriachne mucronata</i>	0.4	1.2		Grass
<i>Euphorbia australis</i>	0.2	<1		Herb
<i>Evolvulus alsinoides</i> var. <i>villosicalyx</i>	0.1	<1		Herb
<i>Ficus brachypoda</i>	4	1		Tree
<i>Gossypium robinsonii</i>	2.4	0.2		Shrub
<i>Grevillea wickhamii</i> subsp. <i>aprica</i>	2.5	0.2	red	Shrub
<i>Hibiscus brachychlaenus</i>	1.3	<1	purple	Shrub
<i>Indigofera monophylla</i>	0.3	<1	pink	Shrub
<i>Jasminum didymum</i> subsp. <i>lineare</i>	0.8	<1		Vine

<i>Lepidium ? pholidogynum</i>	0.2	<1	Herb
<i>Oldenlandia galioides</i>	0.1	<1	Herb
<i>Paraneurachne muelleri</i>	0.5	1	Grass
<i>Paspalidium clementii</i>	0.3	1	Grass
<i>Petalostylis labicheoides</i>	3	1	Shrub
<i>Polygala isingii</i>	0.05	<1	Herb
<i>Pterocaulon sphaecelatum</i>	0.4	<1	Herb
<i>Pterocaulon ? sphaeranthoides</i>	0.4	<1	Herb
<i>Rulingia luteiflora</i>	2.4	0.2	Shrub
<i>Sida</i> sp. <i>Excedentifolia</i> (J.L. Egan 1925)	0.5	<1	Shrub
<i>Sida</i> sp. Shovelanna Hill (S. van Leeuwen 3842)	0.5	<1	Shrub
<i>Solanum ellipticum</i>	0.2	<1	Shrub
<i>Tephrosia rosea</i> var. <i>glabrior</i>	0.8	3	Shrub
<i>Themeda triandra</i>	1.2	2	Grass
<i>Trichodesma zeylanicum</i> var. <i>zeylanicum</i>	0.8	<1	Shrub
<i>Triodia epactia</i>	1	5	Hummock Grass
<i>Triodia melvillei</i>	1	20	Hummock Grass
<i>Triodia</i> sp. Shovelanna Hill (S. van Leeuwen 3835)	0.6	<1	Hummock Grass
<i>Triumfetta maconochieana</i>	0.6	<1	Shrub



Site WHN-55

FLORA QUADRAT DATA SHEET

Location	WHN-56	Date 26.05.2011 & 09.10.2011
		Surveyor A. Cole & R. Tomanovic
Quadrat Dimension	50x50m	Quadrat Orientation 0°
GPS Location	Easting: 206529	GPS Location Relative to Quadrat NW
	Northing: 7414319	
Soil Type	Silty Loam	Soil Colour Red
Topography/Aspect	Hillslope, steep / 350°	Disturbance Type None
Vegetation Condition	Pristine	
Broad Floristic Formation	<i>Triodia</i> Hummock Grassland	
Vegetation Association	5h - Hummock Grassland of <i>Triodia</i> sp. Shovelanna Hill (S.van Leeuwen 3835), <i>Triodia epactia</i> and <i>Triodia brizoides</i> with High Open Shrubland of <i>Acacia bivenosa</i> and <i>Acacia tetragonophylla</i> with Scattered Low Trees of <i>Eucalyptus leucophloia</i> subsp. <i>leucophloia</i> and <i>Acacia aptaneura</i>	
Vegetation Sub-association	Low Woodland of <i>Eucalyptus leucophloia</i> subsp. <i>leucophloia</i> , <i>Acacia aptaneura</i> and <i>Acacia pruinocarpa</i> over High Open Shrubland of <i>Grevillea wickhamii</i> subsp. (indet) over Shrubland of <i>Eremophila exilifolia</i> , <i>Acacia tetragonophylla</i> and <i>Santalum lanceolatum</i> over Low Open Shrubland of <i>Acacia hilliania</i> and <i>Acacia adoxa</i> var. <i>adoxa</i> over Hummock Grassland of <i>Triodia</i> sp. Shovelanna Hill (S.van Leeuwen 3835) and <i>Triodia epactia</i> with Scattered Tussock Grass of <i>Schizachyrium fragile</i> , <i>Paspalidium clementii</i> and <i>Eragrostis eriopoda</i>	

Vascular plant species recorded

Species	Plant Height (m)	Coverage (%)	Flowers	Growth Form
<i>Acacia adoxa</i> var. <i>adoxa</i>	0.45	0.5	yellow	Shrub
<i>Acacia aptaneura</i>	8	5		Tree
<i>Acacia hilliania</i>	0.3	2	yellow	Shrub
<i>Acacia pruinocarpa</i>	5	<1		Tree
<i>Acacia tetragonophylla</i>	1.3	3	yellow	Shrub
<i>Acacia trudgeniana</i>	2	<1	yellow	Shrub
<i>Anthobolus leptomerioides</i>	0.5	<1		Herb
<i>Bulbostylis barbata</i>	0.1	<1		Sedge
<i>Calytrix carinata</i>	1.2	<1		Shrub
<i>Dodonaea pachyneura</i>	1.5	<1		Shrub
<i>Eragrostis eriopoda</i>	0.3	0.1		Grass
<i>Eremophila exilifolia</i>	1.1	12	purple	Shrub
<i>Eremophila latrobei</i> subsp. (indet)	1.6	<1		Shrub
<i>Eriachne mucronata</i>	0.8	<1		Grass
<i>Eriachne pulchella</i> subsp. <i>dominii</i>	0.15	<1		Grass
<i>Eucalyptus leucophloia</i> subsp. <i>leucophloia</i>	8	7		Tree
<i>Euphorbia tannensis</i> subsp. <i>eremophila</i>	0.35	<1		Herb
<i>Evolvulus alsinoides</i> var. <i>villosicalyx</i>	0.1	<1		Herb
<i>Fimbristylis dichotoma</i>	0.15	<1		Sedge
<i>Goodenia stobbsiana</i>	0.2	<1		Shrub
<i>Grevillea wickhamii</i> subsp. (indet)	2.5	2	red	Shrub
<i>Hakea chordophylla</i>	2.5	<1		Shrub
<i>Hakea lorea</i> subsp. <i>lorea</i>	0.3	<1		Shrub
<i>Indigofera monophylla</i>	0.05	<1		Shrub
<i>Paspalidium clementii</i>	0.2	0.2		Grass
<i>Santalum lanceolatum</i>	1.2	0.5		Shrub
<i>Scaevola acacioides</i>	1.6	<1		Shrub
<i>Schizachyrium fragile</i>	0.12	0.2		Grass
<i>Senna artemisioides</i> subsp. <i>oligophylla</i>	1.8	<1		Shrub
<i>Senna glaucifolia</i>	0.8	<1		Shrub
<i>Senna glutinosa</i> subsp. <i>glutinosa</i>	1	<1		Shrub
<i>Senna glutinosa</i> subsp. <i>x luerssenii</i>	2.1	<1		Shrub
<i>Senna stricta</i>	1.5	<1		Shrub
<i>Solanum ellipticum</i>	0.1	<1		Shrub

<i>Solanum ? lasiophyllum</i>	0.4	<1		Shrub
<i>Solanum phlomoides</i>	0.4	<1	purple	Shrub
<i>Stackhousia intermedia</i>	0.15	<1		Herb
<i>Stackhousia</i> sp. (indet)	0.25	<1		Herb
<i>Trachymene oleracea</i> subsp. <i>oleracea</i>	0.1	<1		Herb
<i>Triodia epactia</i>	0.75	0.1		Hummock Grass
<i>Triodia</i> sp. Shovelanna Hill (S.van Leeuwen 3835)	0.65	35		Hummock Grass



Site WHN-56

FLORA QUADRAT DATA SHEET

Location	WHN-57	Date 27/05/2011 & 07/10/2011
		Surveyor K. McCreery
Quadrat Dimension	50x50m	Quadrat Orientation 0°
GPS Location	Easting: 202727	GPS Location Relative to Quadrat NW
	Northing: 7413744	
Soil Type	Sandy clay loam	Soil Colour Red
Topography/Aspect	Hillslope, gently inclined / 320°	Disturbance Type None
Vegetation Condition	Excellent	
Broad Floristic Formation	<i>Triodia</i> Hummock Grassland	
Vegetation Association	5b - Hummock Grassland of <i>Triodia</i> sp. Shovelanna Hill (S. van Leeuwen 3835) with Low Open Shrubland of <i>Acacia hilliana</i> , <i>Acacia adoxa</i> var. <i>adoxa</i> and <i>Halgania solanacea</i> var. Mt Doreen (G.M. Chippendale 4206) with Scattered Low Trees of <i>Eucalyptus leucophloia</i> subsp. <i>leucophloia</i> and <i>Acacia pruinocarpa</i>	
Vegetation Sub-association	Scattered Low Trees of <i>Acacia pruinocarpa</i> over Scattered Shrubs of <i>Acacia trudgeniana</i> , <i>Hakea chordophylla</i> and <i>Grevillea wickhamii</i> subsp. <i>aprica</i> over Hummock Grassland of <i>Triodia</i> sp. Shovelanna Hill (S. van Leeuwen 3835)	

Vascular plant species recorded

Species	Plant Height (m)	Coverage (%)	Flowers	Growth Form
<i>Acacia adoxa</i> var. <i>adoxa</i>	0.3	<1		Shrub
<i>Acacia hilliana</i>	0.3	0.3		Shrub
<i>Acacia maitlandii</i>	1.8	<1		Shrub
<i>Acacia pruinocarpa</i>	3	0.5		Tree
<i>Acacia trudgeniana</i>	1.5	0.5	yellow	Shrub
<i>Aristida</i> ? <i>jerichoensis</i> var. <i>subspinulifera</i>	0.9	<1		Grass
<i>Cymbopogon ambiguus</i>	0.8	<1		Grass
<i>Digitaria brownii</i>	0.4	<1		Grass
<i>Eriachne lanata</i>	0.5	<1		Grass
<i>Goodenia lamprosperma</i>	0.3	<1		Herb
<i>Goodenia triodiophylla</i>	0.3	<1		Herb
<i>Grevillea berryana</i>	1.3	<1		Shrub
<i>Grevillea wickhamii</i> subsp. <i>aprica</i>	2	0.2		Shrub
<i>Hakea chordophylla</i>	2	0.5		Shrub
<i>Halgania solanacea</i> var. Mt Doreen (G.M. Chippendale 4206)	0.1	<1		Shrub
<i>Lamarchea sulcata</i>	1.5	<1		Shrub
<i>Ptilotus calostachyus</i>	0.6	<1		Herb
<i>Ptilotus obovatus</i>	0.45	<1		Shrub
<i>Senna glutinosa</i> subsp. <i>glutinosa</i>	1	<1		Shrub
<i>Senna glutinosa</i> subsp. <i>x leurssenii</i>	1.2	<1		Shrub
<i>Solanum lasiophyllum</i>	0.4	<1		Shrub
<i>Tribulus suberosus</i>	0.9	<1		Shrub
<i>Triodia epactia</i>	0.6	<1		Hummock Grass
<i>Triodia</i> sp. Shovelanna Hill (S. van Leeuwen 3835)	0.8	45		Hummock Grass



Site WHN-57

FLORA QUADRAT DATA SHEET

Location WHN-58 **Date** 26/05/2011
Surveyor A. Cole & R. Tomanovic
Quadrat Dimension 50x50m **Quadrat Orientation** 0°
GPS Location **Eastings:** 207220 **GPS Location Relative to Quadrat** NW
Northing: 7414647
Soil Type Sandy loam **Soil Colour** Orange
Topography/Aspect Hillslope, steep / 350° **Disturbance Type** None
Vegetation Condition Pristine
Broad Floristic Formation *Acacia* Low Woodland
Vegetation Association **2a - Low Woodland** of *Acacia aptaneura*, *Acacia ? pteraneura* and *Acacia pruinocarpa* over **Open Hummock Grassland** of *Triodia epactia* and *Triodia* sp. Shovelanna Hill (S.van Leeuwen 3835) with **Shrubland** of *Acacia wanyu*, *Acacia tetragonophylla* and *Senna stricta*
Vegetation Sub-association Low Woodland of *Acacia ? pteraneura* and *Acacia pruinocarpa* over High Shrubland of *Acacia wanyu* and *Acacia tetragonophylla* over Open Shrubland of *Senna stricta*, *Eremophila cuneifolia* and *Scaevola acacioides* over Hummock Grassland of *Triodia epactia*, *Triodia brizoides* and *Triodia* sp. Shovelanna Hill (S.van Leeuwen 3835) with Scattered Tussock Grass of *Paspalidium clementii* and *Eriachne pulchella* subsp. *dominii*

Vascular plant species recorded

Species	Plant Height (m)	Coverage (%)	Flowers	Growth Form
<i>Acacia pruinocarpa</i>	3.5	0.5		Tree
<i>Acacia ? pteraneura</i>	5	10		Tree
<i>Acacia tetragonophylla</i>	2.5	1		Shrub
<i>Acacia wanyu</i>	2.5	15		Shrub
<i>Bulbostylis barbata</i>	0.03	0.1		Sedge
<i>Dodonaea pachyneura</i>	0.2	<1		Shrub
<i>Eremophila cuneifolia</i>	1	2		Shrub
<i>Eriachne pulchella</i> subsp. <i>dominii</i>	0.05	0.2		Grass
<i>Eucalyptus leucophloia</i> subsp. <i>leucophloia</i>	5	<1		Tree
<i>Evolvulus alsinoides</i> var. <i>villosicalyx</i>	0.1	<1		Herb
<i>Goodenia muelleriana</i>	0.02	<1		Herb
<i>Hibiscus burtonii</i>	0.5	<1		Shrub
<i>Maireana georgei</i>	0.15	<1		Shrub
<i>Maireana thesioides</i>	0.8	<1		Shrub
<i>Paspalidium clementii</i>	0.25	0.3		Grass
<i>Scaevola acacioides</i>	1.7	0.5		Shrub
<i>Senna glutinosa</i> subsp. <i>x luerssenii</i>	1.8	<1		Shrub
<i>Senna stricta</i>	1.5	4		Shrub
<i>Sporobolus australasicus</i>	0.12	<1		Grass
<i>Triodia brizoides</i>	0.8	3		Hummock Grass
<i>Triodia epactia</i>	0.8	12		Hummock Grass
<i>Triodia</i> sp. Shovelanna Hill (S.van Leeuwen 3835)	0.65	1		Hummock Grass



Site WHN-58

FLORA QUADRAT DATA SHEET

Location	WHN-59	Date 27/05/2011 & 10/11/2011
		Surveyor A. Cole & R. Tomanovic
Quadrat Dimension	50x50m	Quadrat Orientation 0°
GPS Location	Eastings: 204580	GPS Location Relative to Quadrat NW
	Northing: 7413985	
Soil Type	Silty loam	Soil Colour Red
Topography/Aspect	Hillslope, very steep / 230°	Disturbance Type None
Vegetation Condition	Pristine	
Broad Floristic Formation	Acacia Low Woodland	
Vegetation Association	2a - Low Woodland of <i>Acacia aptaneura</i> , <i>Acacia ? pteraneura</i> and <i>Acacia pruinocarpa</i> over Open Hummock Grassland of <i>Triodia epactia</i> and <i>Triodia</i> sp. Shovelanna Hill (S.van Leeuwen 3835) with Shrubland of <i>Acacia wanyu</i> , <i>Acacia tetragonophylla</i> and <i>Senna stricta</i>	
Vegetation Sub-association	Low Open Woodland of <i>Acacia ? pteraneura</i> (hybrid?) and <i>Eucalyptus leucophloia</i> subsp. <i>leucophloia</i> over High Open Shrubland of <i>Acacia wanyu</i> , <i>Acacia tetragonophylla</i> , <i>Eremophila oppositifolia</i> subsp. <i>angustifolia</i> over Open Shrubland of <i>Eremophila oppositifolia</i> subsp. <i>angustifolia</i> , <i>Scaevola acacioides</i> and <i>Dodonaea pachyneura</i> over Low Scattered Shrubs of <i>Acacia adsurgens</i> and <i>Senna stricta</i> over Hummock Grassland of <i>Triodia epactia</i> and <i>Triodia</i> sp. Shovelanna Hill (S.van Leeuwen 3835) with Scattered Tussock Grass of <i>Eriachne mucronata</i> and <i>Paspalidium clementii</i>	

Vascular plant species recorded

Species	Plant Height (m)	Coverage (%)	Flowers	Growth Form
<i>Acacia adsurgens</i>	0.9	0.1		Shrub
<i>Acacia aptaneura</i>	5.5	6		Tree
<i>Acacia bivenosa</i>	2.5	0.1		Shrub
<i>Acacia maitlandii</i>	1.1	<1		Shrub
<i>Acacia ? pteraneura</i> (hybrid?)	5.5	6		Tree
<i>Acacia synchronicia</i>	0.8	<1		Shrub
<i>Acacia tetragonophylla</i>	2	2		Shrub
<i>Acacia wanyu</i>	2.5	4		Shrub
<i>Amyema fitzgeraldii</i>	0.55	<1		Shrub
<i>Anthobolus leptomerioides</i>	1.3	<1		Shrub
<i>Bulbostylis barbata</i>	0.03	0.1		Sedge
<i>Cassytha ? capillaries</i>	0.85	<1		Vine
<i>Dodonaea pachyneura</i>	1.4	0.2		Shrub
<i>Duperreya commixta</i>	2	<1		Vine
<i>Eragrostis eriopoda</i>	0.2	<1		Grass
<i>Eremophila cuneifolia</i>	0.5	<1		Shrub
<i>Eremophila oppositifolia</i> subsp. <i>angustifolia</i>	2	1.5		Shrub
<i>Eriachne mucronata</i>	0.35	0.2		Grass
<i>Eriachne pulchella</i> subsp. <i>dominii</i>	0.12	<1		Grass
<i>Eucalyptus leucophloia</i> subsp. <i>leucophloia</i>	6	4		Tree
<i>Euphorbia tannensis</i> subsp. <i>eremophila</i>	0.2	<1		Herb
<i>Fimbristylis dichotoma</i>	0.15	<1		Sedge
<i>Hakea chordophylla</i>	1	<1		Shrub
<i>Hakea preissii</i>	2.5	0.1		Shrub
<i>Maireana georgei</i>	0.25	<1		Shrub
<i>Paspalidium clementii</i>	0.15	0.1		Grass
<i>Petalostylis labicheoides</i>	1.6	<1		Shrub
<i>Psydrax suaveolens</i>	1.7	<1		Shrub
<i>Ptilotus obovatus</i>	0.85	<1		Shrub
<i>Scaevola acacioides</i>	1.6	1.5		Shrub
<i>Schizachyrium fragile</i>	0.05	<1		Grass
? <i>Sclerolaena</i> sp. (indet)	0.4	<1		Shrub
<i>Senna artemisioides</i> subsp. <i>oligophylla</i>	0.4	<1		Shrub

<i>Senna glutinosa</i> subsp. <i>glutinosa</i>	1.1	<1	Shrub
<i>Senna glutinosa</i> subsp. <i>pruinosa</i>	1.2	<1	Shrub
<i>Senna glutinosa</i> subsp. <i>x luerssenii</i>	0.8	<1	Shrub
<i>Senna stricta</i>	0.5	0.1	Shrub
<i>Solanum ? lasiophyllum</i>	0.3	<1	Shrub
<i>Triodia epactia</i>	0.9	30	Hummock Grass
<i>Triodia</i> sp. Shovelanna Hill (S.van Leeuwen 3835)	0.65	1	Hummock Grass



Site WHN-59

FLORA QUADRAT DATA SHEET

Location	WHN-60	Date 26/05/2011 & 09/10/2011
		Surveyor A. Cole & R. Tomanovic
Quadrat Dimension	50x50m	Quadrat Orientation 0°
GPS Location	Eastings: 207210	GPS Location Relative to Quadrat NW
	Northing: 7413873	
Soil Type	Silty loam	Soil Colour Red
Topography/Aspect	Hillslope, precipitous / 140°	Disturbance Type Weeds
Vegetation Condition	Excellent	
Broad Floristic Formation	<i>Triodia</i> Hummock Grassland	
Vegetation Association	5g - Hummock Grassland of <i>Triodia epactia</i> , <i>Triodia brizoides</i> and <i>Triodia</i> sp. Shovelanna Hill (S.van Leeuwen 3835), with Low Open Woodland of <i>Acacia aptaneura</i> , <i>Eucalyptus leucophloia</i> subsp. <i>leucophloia</i> and <i>Acacia pruinocarpa</i> over Scattered Shrubs of <i>Acacia tetragonophylla</i> , <i>Scaevola acacioides</i> and <i>Acacia wanyu</i>	
Vegetation Sub-association	Low Open Woodland of <i>Acacia aptaneura</i> , <i>Acacia catenulata</i> subsp. <i>occidentalis</i> and <i>Eucalyptus leucophloia</i> subsp. <i>leucophloia</i> over Scattered Tall Shrubs of <i>Acacia rhodophloia</i> over Open Shrubland of <i>Acacia tetragonophylla</i> , <i>Rulingia luteiflora</i> , <i>Scaevola acacioides</i> , <i>Dodonaea pachyneura</i> and <i>Eremophila latrobei</i> subsp. (indet) over Open Hummock Grassland of <i>Triodia brizoides</i> , <i>Triodia</i> sp. Shovelanna Hill (S.van Leeuwen 3835) and <i>Triodia epactia</i> with Scattered Tussock Grass of <i>Eriachne mucronata</i>	

Vascular plant species recorded

Species	Plant Height (m)	Coverage (%)	Flowers	Growth Form
<i>Acacia aptaneura</i>	5	5		Tree
<i>Acacia atkinsiana</i>	1.3	<1		Shrub
<i>Acacia catenulata</i> subsp. <i>occidentalis</i>	4.2	4		Tree
<i>Acacia maitlandii</i>	1.1	<1		Shrub
<i>Acacia pruinocarpa</i>	4	2		Tree
<i>Acacia rhodophloia</i>	3	0.5		Shrub
<i>Acacia tenuissima</i>	1.5	<1		Shrub
<i>Acacia tetragonophylla</i>	1.5	3		Shrub
<i>Acacia trudgeniana</i>	1.3	<1		Shrub
<i>Bulbostylis barbata</i>	0.05	<1		Sedge
* <i>Bidens bipinnata</i>	0.2	<1		Herb
<i>Corchorus</i> sp.	0.1	<1		Shrub
<i>Corymbia hamersleyana</i>	5.5	1		Tree
<i>Cymbopogon ambiguus</i>	0.8	<1		Grass
<i>Dodonaea pachyneura</i>	1.5	0.1		Shrub
<i>Eremophila cuneifolia</i>	0.5	<1		Shrub
<i>Eremophila exilifolia</i>	1.2	<1		Shrub
<i>Eremophila latrobei</i> subsp. (indet)	2	1		Shrub
<i>Eriachne mucronata</i>	0.3	0.5		Grass
<i>Eucalyptus leucophloia</i> subsp. <i>leucophloia</i>	8	3		Tree
<i>Euphorbia tannensis</i> subsp. <i>eremophila</i>	0.25	<1		Herb
<i>Goodenia muelleriana</i>	0.15	<1		Herb
<i>Hybanthus aurantiacus</i>	0.25	<1		Shrub
<i>Indigofera monophylla</i>	0.65	<1		Shrub
<i>Keraudrenia</i> sp. (indet)	0.15	<1		Shrub
<i>Paraneurachne muelleri</i>	0.5	<1		Grass
<i>Paspalidium clementii</i>	0.15	<1		Grass
<i>Psyrax latifolia</i>	1.8	<1		Shrub
<i>Psyrax suaveolens</i>	2.8	<1		Shrub
<i>Ptilotus obovatus</i>	0.6	<1		Shrub
<i>Rulingia luteiflora</i>	1.4	0.25		Shrub
<i>Santalum lanceolatum</i>	1.6	<1		Shrub
<i>Scaevola acacioides</i>	1.5	0.2		Shrub

<i>Senna artemisioides</i> subsp. <i>helmsii</i>	0.4	<1	Shrub
<i>Senna artemisioides</i> subsp. <i>oligophylla</i>	0.45	<1	Shrub
<i>Senna glutinosa</i> subsp. <i>glutinosa</i>	1.3	<1	Shrub
<i>Senna glutinosa</i> subsp. <i>pruinosa</i>	1.3	<1	Shrub
<i>Senna glutinosa</i> subsp. <i>x leurossenii</i>	1.2	<1	Shrub
<i>Solanum phlomoides</i>	0.2	<1	Shrub
<i>Trachymene oleracea</i> subsp. <i>oleracea</i>	0.05	<1	Herb
<i>Trichodesma zeylanicum</i> var. <i>zeylanicum</i>	0.2	<1	Herb
<i>Triodia brizoides</i>	0.7	7	Hummock Grass
<i>Triodia epactia</i>	0.95	2	Hummock Grass
<i>Triodia</i> sp. Shovelanna Hill (S.van Leeuwen 3835)	0.9	6	Hummock Grass



Site WHN-60

FLORA QUADRAT DATA SHEET

Location	WHN-61	Date 27/05/2011 & 10/11/2011
		Surveyor A. Cole & R. Tomanovic
Quadrat Dimension	50x50m	Quadrat Orientation 0°
GPS Location	Easting: 205069	GPS Location Relative to Quadrat NW
	Northing: 7414736	
Soil Type	Loamy Sand	Soil Colour Red
Topography/Aspect	Hillcrest, moderately inclined / 170°	Disturbance Type Fire
Vegetation Condition	Excellent	
Broad Floristic Formation	<i>Triodia</i> Hummock Grassland	
Vegetation Association	5h - Hummock Grassland of <i>Triodia</i> sp. Shovelanna Hill (S.van Leeuwen 3835), <i>Triodia epactia</i> and <i>Triodia brizoides</i> with High Open Shrubland of <i>Acacia bivenosa</i> and <i>Acacia tetragonophylla</i> with Scattered Low Trees of <i>Eucalyptus leucophloia</i> subsp. <i>leucophloia</i> and <i>Acacia aptaneura</i>	
Vegetation Sub-association	Low Open Woodland of <i>Eucalyptus leucophloia</i> subsp. <i>leucophloia</i> and <i>Acacia aptaneura</i> over Scattered Tall Shrubs of <i>Acacia bivenosa</i> over Open Shrubland of <i>Scaevola acacioides</i> , <i>Senna glutinosa</i> subsp. <i>pruinosa</i> , <i>Dodonaea pachyneura</i> and <i>Senna glutinosa</i> subsp. <i>glutinosa</i> over Low Scattered Shrubs of <i>Senna stricta</i> , <i>Acacia tetragonophylla</i> and <i>Maireana georgei</i> over Hummock Grassland of <i>Triodia epactia</i> , <i>Triodia</i> sp. Shovelanna Hill (S.van Leeuwen 3835) and <i>Triodia brizoides</i> with Scattered Tussock Grass of <i>Paspalidium clementii</i>	

Vascular plant species recorded

Species	Plant Height (m)	Coverage (%)	Flowers	Growth Form
<i>Acacia aptaneura</i>	5	<1		Tree
<i>Acacia bivenosa</i>	2.3	0.8		Shrub
<i>Acacia hamersleyensis</i>	0.8	<1		Shrub
<i>Acacia maitlandii</i>	1.5	<1		Shrub
<i>Acacia melleodora</i>	0.5	<1		Shrub
<i>Acacia pruinocarpa</i>	0.55	<1		Tree
<i>Acacia tetragonophylla</i>	0.5	0.1		Shrub
<i>Amphipogon sericeus</i>	0.35	<1		Grass
<i>Aristida holathera</i> var. <i>holathera</i>	0.3	<1		Grass
<i>Bulbostylis barbata</i>	0.1	<1		Sedge
<i>Cymbopogon obtectus</i>	0.4	<1		Grass
<i>Dodonaea pachyneura</i>	1	0.2		Shrub
<i>Duperreya commixta</i>	0.03	<1		Vine
<i>Enneapogon lindleyanus</i>	0.35	<1		Grass
<i>Eragrostis eriopoda</i>	0.35	<1		Grass
<i>Eremophila cuneifolia</i>	0.6	<1		Shrub
<i>Eriachne mucronata</i>	0.35	<1		Grass
<i>Eriachne pulchella</i> subsp. <i>dominii</i>	0.2	<1		Grass
<i>Eucalyptus leucophloia</i> subsp. <i>leucophloia</i>	4	4		Tree
<i>Maireana georgei</i>	0.35	0.1		Shrub
<i>Mirbelia viminalis</i>	1	<1		Shrub
<i>Paspalidium clementii</i>	0.1	0.1		Grass
<i>Ptilotus calostachyus</i>	0.75	<1		Herb
<i>Scaevola acacioides</i>	1.2	3		Shrub
<i>Schizachyrium fragile</i>	0.15	<1		Grass
<i>Senna glutinosa</i> subsp. <i>glutinosa</i>	1.2	0.1		Shrub
<i>Senna glutinosa</i> subsp. <i>pruinosa</i>	1.3	2		Shrub
<i>Senna glutinosa</i> subsp. <i>x luerssenii</i>	1.5	1.5		Shrub
<i>Senna stricta</i>	0.5	0.1		Shrub
<i>Sida</i> ? sp. <i>Excedentifolia</i> (J.L. Egan 1925)	0.05	<1		Shrub
<i>Solanum</i> ? <i>lasiophyllum</i>	0.4	<1		Shrub
<i>Solanum ellipticum</i>	0.15	<1		Shrub
<i>Solanum phlomoides</i>	0.35	<1	purple	Shrub

<i>Trianthema glossostigma</i>	0.02	<1	Herb
<i>Tribulus suberosus</i>	1	<1	Shrub
<i>Triodia brizoides</i>	1.1	<1	Hummock Grass
<i>Triodia epactia</i>	0.7	20	Hummock Grass
<i>Triodia schinzii</i>	1.1	<1	Hummock Grass
<i>Triodia</i> sp. Shovelanna Hill (S.van Leeuwen 3835)	0.65	15	Hummock Grass



Site WHN-61

FLORA QUADRAT DATA SHEET

Location	WHN-62	Date 27/05/2011 & 10/10/2011
		Surveyor A. Cole & R. Tomanovic
Quadrat Dimension	50x50m	Quadrat Orientation 0°
GPS Location	Easting: 205716	GPS Location Relative to Quadrat NW
	Northing: 7414767	
Soil Type	Silty clay loam	Soil Colour Orange
Topography/Aspect	Plain, very gently inclined / 150°	Disturbance Type Weeds, vehicle
Vegetation Condition	Excellent	
Broad Floristic Formation	<i>Triodia</i> Hummock Grassland	
Vegetation Association	5g - Hummock Grassland of <i>Triodia epactia</i> , <i>Triodia brizoides</i> and <i>Triodia</i> sp. Shovelanna Hill (S.van Leeuwen 3835), with Low Open Woodland of <i>Acacia aptaneura</i> , <i>Eucalyptus leucophloia</i> subsp. <i>leucophloia</i> and <i>Acacia pruinocarpa</i> over Scattered Shrubs of <i>Acacia tetragonophylla</i> , <i>Scaevola acacioides</i> and <i>Acacia wanyu</i>	
Vegetation Sub-association	Low Open Woodland <i>Acacia ? pteraneura</i> (hybrid?) and <i>Eucalyptus leucophloia</i> subsp. <i>leucophloia</i> of Very Open Malee of <i>Eucalyptus gamophylla</i> over High Shrubland of <i>Acacia bivenosa</i> , <i>Acacia synchronicia</i> and <i>Acacia wanyu</i> over Open Shrubland of <i>Acacia tenuissima</i> , <i>Acacia ancistrocarpa</i> , <i>Acacia adsurgens</i> , <i>Acacia tetragonophylla</i> and <i>Eremophila cuneifolia</i> over Low Scattered Shrubs of <i>Solanum sturtianum</i> , <i>Maireana triptera</i> and <i>Maireana georgei</i> over Hummock Grassland of <i>Triodia epactia</i>	

Vascular plant species recorded

Species	Plant Height (m)	Coverage (%)	Flowers	Growth Form
<i>Acacia adsurgens</i>	1.3	1		Shrub
<i>Acacia ancistrocarpa</i>	1.6	1		Shrub
<i>Acacia bivenosa</i>	2	15	yellow	Shrub
<i>Acacia maitlandii</i>	2	<1	yellow	Shrub
<i>Acacia melleodora</i>	1.5	0.2	yellow	Shrub
<i>Acacia pruinocarpa</i>	1.6	<1		Tree
<i>Acacia ? pteraneura</i> (hybrid?)	6	0.1		Tree
<i>Acacia synchronicia</i>	2.5	10		Shrub
<i>Acacia tenuissima</i>	1	2		Shrub
<i>Acacia tetragonophylla</i>	1	0.5		Shrub
<i>Acacia wanyu</i>	2.5	1.5		Shrub
<i>Aristida holathera</i> var. <i>holathera</i>	0.3	<1		Grass
<i>Brachyachne prostrata</i>	<0.01	<1		Grass
<i>Bulbostylis barbata</i>	0.1	<1		Sedge
* <i>Cenchrus ciliaris</i>	0.9	<1		Grass
<i>Chrysocephalum gilesii</i>	0.3	<1		Herb
<i>Corchorus sidioides</i> subsp. <i>sidioides</i>	0.45	<1		Shrub
<i>Duperreya commixta</i>	2.5	<1		Vine
<i>Enchylaena tomentosa</i> var. <i>tomentosa</i>	0.6	<1		Shrub
<i>Eremophila cuneifolia</i>	1	0.5		Shrub
<i>Eucalyptus gamophylla</i>	3.5	4		Tree
<i>Eucalyptus leucophloia</i> subsp. <i>leucophloia</i>	9	<1		Tree
<i>Euphorbia tannensis</i> subsp. <i>eremophila</i>	0.1	<1		Herb
<i>Frankenia ? setosa</i>	0.3	<1		Shrub
<i>Grevillea wickhamii</i> subsp. (<i>indet</i>)	0.8	<1		Shrub
<i>Hibiscus burtonii</i>	0.3	<1		Shrub
<i>Indigofera monophylla</i>	0.4	<1	purple	Shrub
<i>Maireana georgei</i>	0.15	0.1		Shrub
<i>Maireana melanocoma</i>	0.4	<1		Shrub
<i>Maireana planifolia</i>	0.9	<1		Shrub
<i>Maireana thesioides</i>	0.5	<1		Shrub
<i>Maireana triptera</i>	0.35	0.1	yellow	Shrub
<i>Paspalidium clementii</i>	0.25	<1		Grass

<i>*Portulaca oleracea</i>	0.02	<1		Herb
<i>Ptilotus exaltatus</i>	0.3	<1		Herb
<i>Ptilotus obovatus</i>	0.9	<1		Shrub
<i>Rulingia luteiflora</i>	1.1	0.1		Shrub
<i>Scaevola acacioides</i>	1.2	<1		Shrub
<i>Sclerolaena densiflora</i>	0.15	<1		Shrub
<i>Sclerolaena eriacantha</i>	0.1	<1		Herb
<i>Senna artemisioides subsp. helmsii</i>	0.1	<1		Shrub
<i>Senna glaucifolia</i>	1.3	<1		Shrub
<i>Senna glutinosa subsp. x luerssenii</i>	1.5	1.5		Shrub
<i>Senna sp. Meekatharra (E. Bailey 1-26)</i>	0.8	<1		Shrub
<i>Senna stricta</i>	0.6	<1		Shrub
<i>Solanum ? lasiophyllum</i>	0.4	<1		Shrub
<i>Solanum sturtianum</i>	0.9	2	purple	Shrub
<i>Sporobolus australasicus</i>	0.3	<1		Grass
<i>Triodia epactia</i>	0.9	45		Hummock Grass



Site WHN-62

FLORA QUADRAT DATA SHEET

Location WHN-63 **Date** 27/05/2011
Surveyor A. Cole & R. Tomanovic
Quadrat Dimension 50x50m **Quadrat Orientation** 0°
GPS Location **Easting:** 205140 **GPS Location Relative to Quadrat** NW
Northing: 7415819
Soil Type Loamy Sand **Soil Colour** Red
Topography/Aspect Footslope, gently inclined / 350° **Disturbance Type** Cattle, weeds
Vegetation Condition Excellent
Broad Floristic Formation *Triodia* Open Hummock Grassland
Vegetation Association 6f - Open Hummock Grassland of *Triodia brizoides* and *Triodia epactia* with Low Open Shrubland of *Eremophila fraseri* subsp. *fraseri*, *Senna artemisioides* subsp. *oligophylla* and *Senna artemisioides* subsp. *helmsii*
Vegetation Sub-association Scattered Tall Shrubs of *Acacia trudgeniana* over Low Open Shrubland of *Ptilotus obovatus*, *Solanum sturtianum*, *Senna artemisioides* subsp. *oligophylla*, *Corchorus lasiocarpum* subsp. *lasiocarpus* and *Senna artemisioides* subsp. *helmsii* over Open Hummock Grassland of *Triodia epactia* and *Triodia* sp. Shovelanna Hill (S.van Leeuwen 3835) with Very Open Tussock Grassland of *Aristida contorta*, *Paraneurachne muelleri*, *Aristida holathera* var. *holathera*, *Eragrostis eriopoda* and *Cymbopogon obtectus*

Vascular plant species recorded

Species	Plant Height (m)	Coverage (%)	Flowers	Growth Form
<i>Acacia adsurgens</i>	0.8	0.1		Shrub
<i>Acacia ancistrocarpa</i>	0.85	<1		Shrub
<i>Acacia maitlandii</i>	1.4	<1		Shrub
<i>Acacia pachyacra</i>	1.5	<1		Shrub
<i>Acacia trudgeniana</i>	2	0.1		Shrub
<i>Amphipogon sericeus</i>	0.15	<1		Grass
<i>Aristida contorta</i>	0.2	3		Grass
<i>Aristida holathera</i> var. <i>holathera</i>	0.2	0.2		Grass
<i>Bulbostylis barbata</i>	0.03	<1		Sedge
<i>Cleome viscosa</i>	0.3	<1		Herb
<i>Corchorus lasiocarpum</i> subsp. <i>lasiocarpus</i>	0.4	0.5		Shrub
<i>Cymbopogon obtectus</i>	0.6	0.1		Grass
<i>Duperreya commixta</i>	2	0.1		Vine
<i>Dysphania rhadinostachya</i> subsp. <i>rhadinostachya</i>	0.15	<1		Herb
<i>Enneapogon caeruleus</i>	0.25	<1		Grass
<i>Enneapogon polyphyllus</i>	0.1	<1		Grass
<i>Eragrostis eriopoda</i>	0.4	0.1		Grass
<i>Eriachne aristidea</i>	0.35	<1		Grass
<i>Eriachne pulchella</i> subsp. <i>dominii</i>	0.15	<1		Grass
<i>Euphorbia</i> aff. <i>australis</i>	0.15	<1		Herb
<i>Evolvulus alsinoides</i> var. <i>villosicalyx</i>	0.2	<1		Herb
<i>Fimbristylis dichotoma</i>	0.3	<1		Sedge
<i>Gomphrena kanisii</i>	0.3	0.2	white	Herb
<i>Goodenia lamprosperma</i>	0.45	<1		Herb
<i>Goodenia muelleriana</i>	0.2	1.5	yellow	Herb
<i>Hakea chordophylla</i>	1.4	<1		Shrub
<i>Haloragis gossei</i> var. <i>gossei</i>	0.12	<1	red	Herb
<i>Heliotropium tenuifolium</i>	0.25	<1	white	Herb
<i>Hybanthus aurantiacus</i>	0.35	<1		Shrub
<i>Indigofera monophylla</i>	0.25	<1		Shrub
<i>Paraneurachne muelleri</i>	0.5	0.8		Grass
<i>Phyllanthus erwinii</i>	0.01	<1		Herb
<i>Polycarpaea corymbosa</i>	0.12	<1		Herb

<i>Polycarpaea holtzei</i>	0.1	<1	white	Herb
* <i>Portulaca oleracea</i>	0.02	0.1		Herb
<i>Ptilotus aervoides</i>	0.03	0.2	cream	Herb
<i>Ptilotus astrolasius</i>	0.2	0.3		Shrub
<i>Ptilotus auriculifolius</i>	0.4	0.1	yellow	Herb
<i>Ptilotus calostachyus</i>	0.6	0.7	purple	Herb
<i>Ptilotus exaltatus</i>	0.6	1	purple	Herb
<i>Ptilotus helipteroides</i>	0.2	0.1	white	Herb
<i>Ptilotus obovatus</i>	1	2		Shrub
<i>Salsola ? australis</i>	0.3	<1		Herb
<i>Schizachyrium fragile</i>	0.12	<1		Grass
<i>Senna artemisioides</i> subsp. <i>helmsii</i>	0.5	0.1		Shrub
<i>Senna artemisioides</i> subsp. <i>oligophylla</i>	0.8	0.1		Shrub
<i>Senna glutinosa</i> subsp. <i>glutinosa</i>	0.4	<1		Shrub
<i>Senna glutinosa</i> subsp. <i>pruinosa</i>	1.3	<1		Shrub
<i>Solanum ? lasiophyllum</i>	0.1	0.1		Shrub
<i>Solanum ellipticum</i>	0.12	<1		Shrub
<i>Solanum sturtianum</i>	0.9	0.2	purple	Shrub
<i>Trachymene oleracea</i> subsp. <i>oleracea</i>	0.03	<1		Herb
<i>Trianthema glossostigma</i>	0.02	<1	purple	Herb
<i>Tribulus suberosus</i>	0.6	0.1		Shrub
<i>Trichodesma zeylanicum</i> var. <i>zeylanicum</i>	0.7	<1	purple	Shrub
<i>Triodia epactia</i>	1	15		Hummock Grass
<i>Triodia</i> sp. Shovelanna Hill (S.van Leeuwen 3835)	0.6	2		Hummock Grass
<i>Yakirra australiensis</i>	0.06	<1		Grass



Site WHN-63

FLORA QUADRAT DATA SHEET

Location	WHN-64	Date 28/05/2011 & 07/10/2011
		Surveyor A. Cole & R. Tomanovic
Quadrat Dimension	50x50m	Quadrat Orientation 0°
GPS Location	Easting: 202329	GPS Location Relative to Quadrat NW
	Northing: 7414227	
Soil Type	Loamy Sand	Soil Colour Red
Topography/Aspect	Footslope, very gently inclined / 340°	Disturbance Type Vehicle, weeds
Vegetation Condition	Excellent	
Broad Floristic Formation	<i>Triodia</i> Open Hummock Grassland	
Vegetation Association	6f - Open Hummock Grassland of <i>Triodia brizoides</i> and <i>Triodia epactia</i> with Low Open Shrubland of <i>Eremophila fraseri</i> subsp. <i>fraseri</i> , <i>Senna artemisioides</i> subsp. <i>oligophylla</i> and <i>Senna artemisioides</i> subsp. <i>helmsii</i>	
Vegetation Sub-association	Scattered Tall Shrubs of <i>Senna glutinosa</i> subsp. <i>x luerssenii</i> over Low Shrubland of <i>Eremophila fraseri</i> subsp. <i>fraseri</i> , <i>Senna artemisioides</i> subsp. <i>oligophylla</i> , <i>Senna artemisioides</i> subsp. <i>helmsii</i> and <i>Tribulus suberosus</i> over Hummock Grassland of <i>Triodia brizoides</i> with Very Open Tussock Grassland of <i>Aristida contorta</i> and <i>Enneapogon lindleyanus</i>	

Vascular plant species recorded

Species	Plant Height (m)	Coverage (%)	Flowers	Growth Form
<i>Acacia ancistrocarpa</i>	1.8	<1		Shrub
<i>Acacia tenuissima</i>	1.4	<1		Shrub
<i>Acacia tetragonophylla</i>	1	<1		Shrub
<i>Aristida contorta</i>	0.3	3		Grass
<i>Aristida ? holathera</i> var. <i>holathera</i>	0.3	<1		Grass
<i>Cleome viscosa</i>	0.2	<1		Herb
<i>Cymbopogon obtectus</i>	0.4	<1		Grass
<i>Dysphania rhadinostachya</i> subsp. <i>rhadinostachya</i>	0.1	<1		Herb
<i>Enneapogon lindleyanus</i>	0.2	1		Grass
<i>Enneapogon polyphyllus</i>	0.15	<1		Grass
<i>Eragrostis eriopoda</i>	0.3	<1		Grass
<i>Eremophila fraseri</i> subsp. <i>fraseri</i>	0.85	8	pink	Shrub
<i>Eriachne pulchella</i> subsp. <i>dominii</i>	0.05	<1		Grass
<i>Eriachne tenuiculmis</i>	0.25	<1		Grass
<i>Gomphrena kanisii</i>	0.2	<1		Herb
<i>Hakea lorea</i> subsp. <i>lorea</i>	1.7	<1		Shrub
<i>Heliotropium inexplicitum</i>	0.2	<1		Herb
<i>Paspalidium clementii</i>	0.05	<1		Grass
Poaceae sp. (indet)	0.25	<1		Grass
* <i>Portulaca oleracea</i>	0.01	<1		Herb
<i>Ptilotus auriculifolius</i>	0.3	<1		Herb
<i>Ptilotus exaltatus</i>	0.04	<1	white	Herb
<i>Ptilotus obovatus</i>	0.5	<1		Shrub
<i>Salsola ? australis</i>	0.2	<1		Herb
<i>Santalum lanceolatum</i>	1.8	<1		Shrub
<i>Sida echinocarpa</i>	0.2	<1		Shrub
<i>Senna artemisioides</i> subsp. <i>helmsii</i>	0.6	0.5		Shrub
<i>Senna artemisioides</i> subsp. <i>oligophylla</i>	0.6	1		Shrub
<i>Senna glutinosa</i> subsp. <i>x luerssenii</i>	1.4	0.5		Shrub
<i>Sida arenicola</i>	0.5	<1		Shrub
<i>Themeda triandra</i>	0.4	<1		Grass
<i>Tribulus suberosus</i>	0.55	0.1		Shrub
<i>Triodia brizoides</i>	0.85	25		Hummock Grass
<i>Triodia epactia</i>	1	0.15		Hummock Grass

Tripogon lolliformis

0.1

<1

Grass



Site WHN-64

FLORA QUADRAT DATA SHEET

Location	WHN-65	Date 28/05/2011 Surveyor K. McCreery
Quadrat Dimension	50x50m	Quadrat Orientation 0°
GPS Location	Easting: 201798 Northing: 7414466	GPS Location Relative to Quadrat NW
Soil Type	Sandy loam	Soil Colour Red
Topography/Aspect	Flood-out, level / 150°	Disturbance Type Cattle
Vegetation Condition	Excellent	
Broad Floristic Formation	Mixed Open Tussock Grassland	
Vegetation Association	9a - Open Tussock Grassland of <i>Themeda triandra</i> , <i>Aristida inaequiglumis</i> and <i>Aristida contorta</i> with Open Shrubland of <i>Acacia monticola</i> , <i>Acacia ancistrocarpa</i> and <i>Grevillea wickhamii</i> subsp. <i>aprica</i> with Scattered Low Trees of <i>Corymbia hamersleyana</i>	
Vegetation Sub-association	Scattered Low Trees of <i>Corymbia hamersleyana</i> over High Open Shrubland of <i>Acacia elachantha</i> , <i>Gossypium robinsonii</i> , <i>Hakea lorea</i> subsp. <i>lorea</i> , <i>Acacia bivenosa</i> and <i>Acacia monticola</i> over Open Shrubland of <i>Acacia ancistrocarpa</i> , <i>Acacia adsurgens</i> , <i>Grevillea wickhamii</i> subsp. <i>aprica</i> , <i>Santalum lanceolatum</i> and <i>Acacia pyrifolia</i> over Low Open Shrubland of <i>Tephrosia rosea</i> var. <i>glabrior</i> , <i>Senna artemisioides</i> subsp. <i>oligophylla</i> , <i>Ptilotus obovatus</i> , <i>Isotropis atropurpurea</i> and <i>Corchorus sidioides</i> subsp. <i>sidioides</i> over Open Tussock Grassland of <i>Themeda triandra</i> , <i>Aristida contorta</i> , <i>Aristida inaequiglumis</i> , <i>Eulalia aurea</i> and <i>Eragrostis eriopoda</i> with Very Open Hummock Grassland of <i>Triodia epactia</i>	

Vascular plant species recorded

Species	Plant Height (m)	Coverage (%)	Flowers	Growth Form
<i>Abutilon otocarpum</i>	0.3	<1		Shrub
<i>Acacia adsurgens</i>	1.8	1	yellow	Shrub
<i>Acacia ancistrocarpa</i>	1.5	5	yellow	Shrub
<i>Acacia aptaneura</i>	1.8	<1		Tree
<i>Acacia bivenosa</i>	2.8	0.2		Shrub
<i>Acacia elachantha</i>	3	1	yellow	Shrub
<i>Acacia melleodora</i>	1.3	0.5	yellow	Shrub
<i>Acacia monticola</i>	2.3	0.2	yellow	Shrub
<i>Acacia ? pteraneura</i> (hybrid?)	2.8	<1		Tree
<i>Acacia pyrifolia</i>	1.5	0.5		Shrub
<i>Acacia tenuissima</i>	2	<1	yellow	Shrub
<i>Aristida contorta</i>	0.4	5		Grass
<i>Aristida holathera</i> var. <i>holathera</i>	0.5	1		Grass
<i>Aristida inaequiglumis</i>	1.2	3		Grass
<i>Aristida ? jerichoensis</i> var. <i>subspinulifera</i>	1	<1		Grass
<i>Boerhavia repleta</i>	0.1	<1		Herb
<i>Bonamia</i> sp. (indet)	0.4	<1		Shrub
<i>Bulbostylis barbata</i>	0.1	<1		Sedge
* <i>Cenchrus ciliaris</i>	0.6	<1		Grass
<i>Chrysocephalum pterochaetum</i>	0.3	<1	yellow	Shrub
<i>Chrysopogon fallax</i>	1.3	0.2		Grass
<i>Cleome viscosa</i>	0.4	<1		Herb
<i>Corchorus sidioides</i> subsp. <i>sidioides</i>	0.5	0.5		Shrub
<i>Corymbia hamersleyana</i>	7	1		Tree
<i>Crotalaria medicaginea</i>	0.3	<1	yellow	Herb
<i>Cymbopogon ambiguus</i>	0.6	<1		Grass
<i>Duperreya commixta</i>	1.8	<1		Vine
<i>Enneapogon caeruleus</i>	0.3	1		Grass
<i>Enneapogon polyphyllus</i>	0.4	1		Grass
<i>Eragrostis eriopoda</i>	0.6	2		Grass
<i>Eremophila forrestii</i> subsp. <i>forrestii</i>	1.6	<1	pink	Shrub

<i>Eremophila longifolia</i>	1.2	<1	pink	Shrub
<i>Eulalia aurea</i>	0.8	2		Grass
<i>Evolvulus alsinoides</i> var. <i>villosicalyx</i>	0.2	0.2		Herb
<i>Glycine canescens</i>	1.5	<1		Vine
<i>Gomphrena kanisii</i>	0.3	0.2		Herb
<i>Goodenia vilmoriniae</i>	0.3	<1		Herb
<i>Gossypium australe</i>	0.6	<1		Shrub
<i>Gossypium robinsonii</i>	3	1		Shrub
<i>Grevillea wickhamii</i> subsp. <i>aprica</i>	2	1	red	Shrub
<i>Hakea chordophylla</i>	1.8	<1		Shrub
<i>Hakea lorea</i> subsp. <i>lorea</i>	3	0.5		Shrub
<i>Hibiscus sturtii</i> var. (indet)	0.3	<1		Shrub
<i>Hybanthus aurantiacus</i>	0.3	0.2		Shrub
<i>Isotropis atropurpurea</i>	0.6	0.2	red	Shrub
<i>Isotropis forrestii</i>	0.6	<1		Shrub
<i>Melhania oblongifolia</i>	0.3	<1	orange	Shrub
<i>Paraneurachne muelleri</i>	0.3	1		Grass
<i>Polygala</i> sp. Prostrate (P.K.Latz 4900)	0.01	<1		Herb
<i>Pterocaulon ? sphaeranthoides</i>	0.2	<1		Herb
<i>Ptilotus exaltatus</i>	0.4	0.2	pink	Herb
<i>Ptilotus obovatus</i>	0.6	0.5		Shrub
<i>Rhynchosia minima</i>	0.4	<1		Vine
<i>Salsola ? australis</i>	0.3	0.2		Herb
<i>Santalum lanceolatum</i>	1.8	1	white	Shrub
<i>Scaevola parvifolia</i> subsp. (indet)	0.3	<1		Shrub
<i>Sclerolaena cornishiana</i>	0.3	<1		Shrub
<i>Senna artemisioides</i> subsp. <i>helmsii</i>	0.6	<1		Shrub
<i>Senna artemisioides</i> subsp. <i>helmsii</i> X <i>oligophylla</i>	0.8	<1		Shrub
<i>Senna artemisioides</i> subsp. <i>oligophylla</i>	0.8	1		Shrub
<i>Sida ?</i> sp. spiciform panicles (E. Leyland s.n. 14/8/90)	0.9	<1		Shrub
<i>Sida echinocarpa</i>	0.2	<1		Shrub
<i>Sida fibulifera</i>	0.3	<1		Shrub
<i>Solanum ellipticum</i>	0.2	<1		Shrub
<i>Solanum sturtianum</i>	0.6	<1	purple	Shrub
<i>Tephrosia rosea</i> var. <i>glabrior</i>	0.8	1		Shrub
<i>Themeda triandra</i>	1.3	5		Grass
<i>Tribulus macrocarpus</i>	0.05	<1	yellow	Herb
<i>Trichodesma zeylanicum</i> var. <i>zeylanicum</i>	0.6	0.2		Shrub
<i>Triodia epactia</i>	1.4	5		Hummock Grass



Site WHN-65

FLORA QUADRAT DATA SHEET

Location	WHN-66	Date 28/05/2011
		Surveyor A. Cole & R. Tomanovic
Quadrat Dimension	50x50m	Quadrat Orientation 0°
GPS Location	Easting: 202445	GPS Location Relative to Quadrat NW
	Northing: 7414051	
Soil Type	Loamy Sand	Soil Colour Red
Topography/Aspect	Hillslope, moderately inclined / 330°	Disturbance Type None
Vegetation Condition	Pristine	
Broad Floristic Formation	<i>Triodia</i> Hummock Grassland	
Vegetation Association	5d - Hummock Grassland of <i>Triodia brizoides</i> , <i>Triodia</i> sp. Shovelanna Hill (S.van Leeuwen 3835) and <i>Triodia epactia</i> with Open Shrubland of <i>Acacia tetragonophylla</i> , <i>Eremophila fraseri</i> subsp. <i>fraseri</i> and <i>Acacia synchronicia</i>	
Vegetation Sub-association	Open Shrubland of <i>Acacia synchronicia</i> , <i>Eremophila fraseri</i> subsp. <i>fraseri</i> , <i>Senna glutinosa</i> subsp. <i>pruinosa</i> , <i>Acacia pachyacra</i> and <i>Acacia melleodora</i> over Low Scattered Shrubs of <i>Tribulus suberosus</i> over Hummock Grassland of <i>Triodia brizoides</i> and <i>Triodia</i> sp. Shovelanna Hill (S.van Leeuwen 3835) with Very Open Tussock Grassland of <i>Paraneurachne muelleri</i> , <i>Aristida contorta</i> , <i>Eragrostis eriopoda</i> , <i>Enneapogon polyphyllus</i> and <i>Cymbopogon ambiguus</i>	

Vascular plant species recorded

Species	Plant Height (m)	Coverage (%)	Flowers	Growth Form
<i>Acacia adsurgens</i>	0.3	<1		Shrub
<i>Acacia melleodora</i>	1.6	0.1		Shrub
<i>Acacia pachyacra</i>	1.2	0.2		Shrub
<i>Acacia synchronicia</i>	1.1	3.5		Shrub
<i>Acacia tenuissima</i>	1.5	<1		Shrub
<i>Acacia trudgeniana</i>	2.3	<1		Shrub
<i>Acacia wanyu</i>	1.3	0.2		Shrub
<i>Amphipogon sericeus</i>	0.35	<1		Grass
<i>Amphipogon sericeus</i>	0.3	<1		Grass
<i>Aristida contorta</i>	0.25	0.8		Grass
<i>Aristida holathera</i> var. <i>holathera</i>	0.25	<1		Grass
<i>Aristida inaequiglumis</i>	0.9	<1		Grass
<i>Bulbostylis barbata</i>	0.03	0.1		Sedge
<i>Cleome viscosa</i>	0.4	<1		Herb
<i>Corchorus lasiocarpum</i> subsp. <i>lasiocarpus</i>	0.4	<1		Shrub
<i>Cymbopogon ambiguus</i>	0.9	0.1		Grass
<i>Enneapogon lindleyanus</i>	0.2	<1		Grass
<i>Enneapogon polyphyllus</i>	0.25	0.1		Grass
<i>Eragrostis eriopoda</i>	0.35	0.1		Grass
<i>Eremophila cuneifolia</i>	0.5	<1		Shrub
<i>Eremophila fraseri</i> subsp. <i>fraseri</i>	1.1	2	pink	Shrub
<i>Eriachne pulchella</i> subsp. <i>dominii</i>	0.2	<1		Grass
<i>Gossypium australe</i>	0.85	<1		Shrub
<i>Hakea lorea</i> subsp. <i>lorea</i>	0.65	<1		Shrub
<i>Hibiscus struttii</i> var. <i>campylochlamys</i>	0.25	<1		Shrub
<i>Paraneurachne muelleri</i>	0.5	0.8		Grass
<i>Paspalidium clementii</i>	0.15	<1		Grass
<i>Polycarpaea longiflora</i>	0.25	<1	pink	Herb
<i>Ptilotus auriculifolius</i>	0.45	0.1		Herb
<i>Ptilotus calostachyus</i>	1.2	<1		Herb
<i>Ptilotus exaltatus</i>	0.5	<1	purple	Herb
<i>Ptilotus obovatus</i>	1	<1		Shrub
<i>Schizachyrium fragile</i>	0.07	<1		Grass
<i>Senna artemisioides</i> subsp. <i>oligophylla</i>	0.6	<1		Shrub

<i>Senna glutinosa</i> subsp. <i>glutinosa</i>	1.3	<1	Shrub
<i>Senna glutinosa</i> subsp. <i>pruinosa</i>	1.6	2	Shrub
<i>Senna glutinosa</i> subsp. <i>x luerssenii</i>	1.3	<1	Shrub
<i>Solanum phlomoides</i>	0.35	<1	Shrub
<i>Tribulus hirsutus</i>	0.02	<1	Herb
<i>Tribulus suberosus</i>	0.8	0.1	Shrub
<i>Trichodesma zeylanicum</i> var. <i>zeylanicum</i>	0.2	<1	Shrub
<i>Triodia brizoides</i>	0.8	40	Hummock Grass
<i>Triodia</i> sp. Shovelanna Hill (S.van Leeuwen 3835)	0.65	3	Hummock Grass



Site WHN-66

FLORA QUADRAT DATA SHEET

Location	WHN-67	Date 28/05/2011 & 04/10/2011
		Surveyor K. McCreery
Quadrat Dimension	50x50m	Quadrat Orientation 0°
GPS Location	Easting: 203518	GPS Location Relative to Quadrat NW
	Northing: 7417156	
Soil Type	Sandy loam	Soil Colour Red
Topography/Aspect	Plain, gently inclined / 0°	Disturbance Type Cattle
Vegetation Condition	Excellent	
Broad Floristic Formation	<i>Triodia</i> Hummock Grassland	
Vegetation Association	5c - Hummock Grassland of <i>Triodia lanigera</i> and <i>Triodia</i> sp. Shovelanna Hill (S.van Leeuwen 3835) with Open Shrubland of <i>Hakea lorea</i> subsp. <i>lorea</i> , <i>Acacia ancistrocarpa</i> and <i>Acacia adsurgens</i> with Scattered Low Trees of <i>Corymbia hamersleyana</i> and <i>Acacia pruinocarpa</i>	
Vegetation Sub-association	Scattered Low Trees of <i>Acacia pruinocarpa</i> over Open Shrubland of <i>Acacia ancistrocarpa</i> , <i>Acacia adsurgens</i> , <i>Acacia melleodora</i> and <i>Eremophila forrestii</i> subsp. <i>forrestii</i> over Hummock Grassland of <i>Triodia lanigera</i> over Scattered Tussock Grass of <i>Paraneurachne muelleri</i>	

Vascular plant species recorded

Species	Plant Height (m)	Coverage (%)	Flowers	Growth Form
<i>Acacia adsurgens</i>	1.8	1		Shrub
<i>Acacia ancistrocarpa</i>	1.8	2		Shrub
<i>Acacia bivenosa</i>	2	<1		Shrub
<i>Acacia melleodora</i>	1.8	0.5		Shrub
<i>Acacia pachyacra</i>	1	<1		Shrub
<i>Acacia pruinocarpa</i>	2	1		Tree
<i>Acacia sibirica</i>	2	1		Shrub
<i>Anthobolus leptomerioides</i>	1.2	<1		Shrub
<i>Aristida holathera</i> var. <i>holathera</i>	0.2	<1		Grass
<i>Bonamia</i> sp. (indet)	0.4	<1		Shrub
<i>Cymbopogon ambiguus</i>	0.2	<1		Grass
<i>Dysphania kalpari</i>	0.1	<1		Herb
<i>Eremophila forrestii</i> subsp. <i>forrestii</i>	1.3	0.5		Shrub
<i>Eulalia aurea</i>	0.45	<1		Grass
<i>Grevillea wickhamii</i>	0.5	<1		Shrub
<i>Hakea lorea</i> subsp. <i>lorea</i>	3	1		Shrub
<i>Isotropis atropurpurea</i>	0.4	<1		Shrub
<i>Paraneurachne muelleri</i>	0.3	0.2		Grass
<i>Psydrax latifolia</i>	0.5	<1		Shrub
<i>Ptilotus calostachyus</i>	0.5	<1		Herb
<i>Senna glaucifolia</i>	0.4	<1		Shrub
<i>Sida cardiophylla</i>	0.4	<1		Shrub
<i>Solanum sturtianum</i>	0.6	<1		Shrub
<i>Triodia lanigera</i>	0.9	55		Hummock Grass



Site WHN-67

FLORA QUADRAT DATA SHEET

Location	WHN-68	Date 28/05/2011
		Surveyor A. Cole & R. Tomanovic
Quadrat Dimension	50x50m	Quadrat Orientation 0°
GPS Location	Easting: 203992	GPS Location Relative to Quadrat NW
	Northing: 7415409	
Soil Type	Loamy Sand	Soil Colour Orange
Topography/Aspect	Hillslope, precipitous / 210°	Disturbance Type None
Vegetation Condition	Pristine	
Broad Floristic Formation	<i>Triodia</i> Hummock Grassland	
Vegetation Association	5h - Hummock Grassland of <i>Triodia</i> sp. Shovelanna Hill (S.van Leeuwen 3835), <i>Triodia epactia</i> and <i>Triodia brizoides</i> with High Open Shrubland of <i>Acacia bivenosa</i> and <i>Acacia tetragonophylla</i> with Scattered Low Trees of <i>Eucalyptus leucophloia</i> subsp. <i>leucophloia</i> and <i>Acacia aptaneura</i>	
Vegetation Sub-association	Low Open Woodland of <i>Eucalyptus leucophloia</i> over High Open Shrubland of <i>Acacia bivenosa</i> and <i>Acacia tetragonophylla</i> over Scattered Shrubs of <i>Acacia maitlandii</i> over Low Scattered Shrubs of <i>Scaevola acacioides</i> over Hummock Grassland of <i>Triodia epactia</i> and <i>Triodia brizoides</i>	

Vascular plant species recorded

Species	Plant Height (m)	Coverage (%)	Flowers	Growth Form
<i>Acacia adsurgens</i>	0.6	<1		Shrub
<i>Acacia bivenosa</i>	2.5	10		Shrub
<i>Acacia hilliana</i>	0.5	<1	yellow	Shrub
<i>Acacia maitlandii</i>	1.2	0.25	yellow	Shrub
<i>Acacia ? rhodophloia</i> X <i>sibirica</i>	0.7	<1		Shrub
<i>Acacia sibirica</i>	1	<1		Shrub
<i>Acacia tetragonophylla</i>	2	2.5		Shrub
<i>Aristida contorta</i>	0.25	<1		Grass
<i>Aristida holathera</i> var. <i>holathera</i>	0.2	<1		Grass
<i>Cassytha capillaris</i>	0.2	0.2		Vine
<i>Cymbopogon ambiguus</i>	0.5	<1		Grass
<i>Dodonaea pachyneura</i>	2	<1		Shrub
<i>Enneapogon polyphyllus</i>	0.15	<1		Grass
<i>Eremophila latrobei</i> subsp. <i>latrobei</i>	1.8	<1	red	Shrub
<i>Eriachne lanata</i>	0.45	<1		Grass
<i>Eriachne mucronata</i>	0.25	<1		Grass
<i>Eriachne pulchella</i> subsp. <i>dominii</i>	0.25	<1		Grass
<i>Eucalyptus leucophloia</i>	4	2		Tree
<i>Euphorbia tannensis</i> subsp. <i>eremophila</i>	0.3	<1		Herb
<i>Fimbristylis simulans</i>	0.2	<1		Sedge
<i>Goodenia cusackiana</i>	0.05	<1		Herb
<i>Goodenia lamprosperma</i>	0.35	<1		Herb
<i>Goodenia muelleriana</i>	0.15	<1		Herb
<i>Hakea lorea</i> subsp. <i>lorea</i>	1	<1		Shrub
<i>Indigofera monophylla</i>	0.2	<1		Shrub
<i>Maireana georgei</i>	0.3	<1		Shrub
<i>Nicotiana benthamiana</i>	0.15	<1		Herb
<i>Paraneurachne muelleri</i>	0.45	<1		Grass
<i>Paspalidium clementii</i>	0.2	<1		Grass
<i>Petalostylis labicheoides</i>	2	<1		Shrub
<i>Polycarpaea holtzei</i>	0.1	<1		Herb
<i>Psyrax suaveolens</i>	0.7	<1		Shrub
<i>Ptilotus obovatus</i>	0.6	<1		Shrub

<i>Ptilotus rotundifolius</i>	0.25	<1	Shrub
<i>Salsola ? australis</i>	0.2	<1	Herb
<i>Scaevola acacioides</i>	0.9	0.5	Shrub
<i>Schizachyrium fragile</i>	0.1	<1	Grass
<i>Senna artemisioides</i> subsp. <i>oligophylla</i>	0.7	<1	Shrub
<i>Senna glutinosa</i> subsp. <i>glutinosa</i>	1.2	<1	Shrub
<i>Senna glutinosa</i> subsp. <i>pruinosa</i>	1.3	<1	Shrub
<i>Senna glutinosa</i> subsp. <i>x luerssenii</i>	1.1	<1	Shrub
<i>Senna stricta</i>	0.65	<1	Shrub
<i>Sida</i> sp. <i>Excedentifolia</i> (J.L. Egan 1925)	0.25	<1	Shrub
<i>Tribulus suberosus</i>	0.45	<1	Shrub
<i>Triodia brizoides</i>	0.9	3	Hummock Grass
<i>Triodia epactia</i>	0.85	45	Hummock Grass



Site WHN-68

FLORA QUADRAT DATA SHEET

Location	WHN-69	Date 28/05/2011
		Surveyor K. McCreery
Quadrat Dimension	50x50m	Quadrat Orientation 0°
GPS Location	Easting: 203506	GPS Location Relative to Quadrat NW
	Northing: 7416373	
Soil Type	Sandy clay loam	Soil Colour Red
Topography/Aspect	Hillslope, moderately inclined / 280°	Disturbance Type None
Vegetation Condition	Excellent	
Broad Floristic Formation	<i>Triodia</i> Hummock Grassland	
Vegetation Association	5b - Hummock Grassland of <i>Triodia</i> sp. Shovelanna Hill (S. van Leeuwen 3835) with Low Open Shrubland of <i>Acacia hilliana</i> , <i>Acacia adoxa</i> var. <i>adoxa</i> and <i>Halgania solanacea</i> var. Mt Doreen (G.M. Chippendale 4206) with Scattered Low Trees of <i>Eucalyptus leucophloia</i> subsp. <i>leucophloia</i> and <i>Acacia pruinocarpa</i>	
Vegetation Sub-association	Scattered Tall Shrubs of <i>Acacia bivenosa</i> over Low Scattered Shrubs of <i>Acacia hilliana</i> and <i>Halgania solanacea</i> var. Mt Doreen (G.M. Chippendale 4206) over Hummock Grassland of <i>Triodia</i> sp. Shovelanna Hill (S. van Leeuwen 3835)	

Vascular plant species recorded

Species	Plant Height (m)	Coverage (%)	Flowers	Growth Form
<i>Acacia bivenosa</i>	3.5	0.2		Shrub
<i>Acacia hilliana</i>	0.4	1		Shrub
<i>Acacia melleodora</i>	1.5	<1		Shrub
<i>Acacia pachyacra</i>	1.2	<1		Shrub
<i>Acacia trudgeniana</i>	0.5	<1		Shrub
<i>Anthobolus leptomerioides</i>	0.6	<1		Shrub
<i>Bonamia</i> sp. (indet)	0.3	<1		Shrub
<i>Bulbostylis barbata</i>	0.1	<1		Sedge
<i>Cymbopogon obtectus</i>	0.4	<1		Grass
<i>Eucalyptus gamophylla</i>	2	<1		Tree
<i>Fimbristylis simulans</i>	0.2	0.5		Sedge
<i>Goodenia lamprosperma</i>	0.4	<1		Herb
<i>Grevillea wickhamii</i> subsp. <i>aprica</i>	2	<1		Shrub
<i>Hakea chordophylla</i>	0.9	<1		Shrub
<i>Hakea lorea</i> subsp. <i>lorea</i>	1	<1		Shrub
<i>Halgania solanacea</i> var. Mt Doreen (G.M. Chippendale 4206)	0.3	<1		Shrub
<i>Paraneurachne muelleri</i>	0.4	<1		Grass
<i>Paspalidium clementii</i>	0.1	<1		Grass
<i>Ptilotus calostachyus</i>	0.4	<1		Herb
<i>Ptilotus exaltatus</i>	0.1	<1		Herb
<i>Ptilotus obovatus</i>	0.6	<1		Shrub
<i>Senna artemisioides</i> subsp. <i>oligophylla</i>	0.8	<1		Shrub
<i>Senna glutinosa</i> subsp. <i>glutinosa</i>	0.8	<1		Shrub
<i>Senna glutinosa</i> subsp. <i>pruinosa</i>	0.8	<1		Shrub
<i>Senna sericea</i>	0.5	<1		Shrub
<i>Trianthema glossostigma</i>	0.01	<1		Herb
<i>Tribulus suberosus</i>	0.9	<1		Shrub
<i>Triodia</i> sp. Shovelanna Hill (S. van Leeuwen 3835)	0.9	45		Hummock Grass



Site WHN-69

FLORA QUADRAT DATA SHEET

Location WHN-70 **Date** 28/05/2011 & 04/10/2011
Surveyor A. Cole & R. Tomanovic
Quadrat Dimension 50x50m **Quadrat Orientation** 0°
GPS Location **Eastings:** 203589 **GPS Location Relative to Quadrat** NW
Northing: 7415538
Soil Type Loamy Sand **Soil Colour** Orange
Topography/Aspect Plain, very gently inclined / 200° **Disturbance Type** Weeds
Vegetation Condition Very Good
Broad Floristic Formation *Triodia* Open Hummock Grassland
Vegetation Association **6f - Open Hummock Grassland** of *Triodia brizoides* and *Triodia epactia* with **Low Open Shrubland** of *Eremophila fraseri* subsp. *fraseri*, *Senna artemisioides* subsp. *oligophylla* and *Senna artemisioides* subsp. *helmsii*
Vegetation Sub-association Scattered Tall Shrubland of *Hakea lorea* subsp. *lorea* over Scattered Shrubs of *Acacia ancistrocarpa* over Low Open Shrubland of *Senna artemisioides* subsp. *oligophylla*, *Senna artemisioides* subsp. *helmsii*, *Eremophila fraseri* subsp. *fraseri*, *Corchorus lasiocarpum* subsp. *lasiocarpus* and *Indigofera rugosa* over Open Hummock Grassland of *Triodia epactia* over Very Open Tussock Grassland of *Paraneurachne muelleri*, **Cenchrus ciliaris*, *Enneapogon lindleyanus*, *Cymbopogon ambiguus* and *Eulalia aurea*

Vascular plant species recorded

Species	Plant Height (m)	Coverage (%)	Flowers	Growth Form
<i>Abutilon otocarpum</i>	0.15	<1		Shrub
<i>Acacia adsurgens</i>	0.8	<1		Shrub
<i>Acacia ancistrocarpa</i>	1.4	0.25		Shrub
<i>Acacia melleodora</i>	0.6	<1		Shrub
<i>Aristida contorta</i>	0.2	5		Grass
<i>Aristida holathera</i> var. <i>holathera</i>	0.35	<1		Grass
<i>Aristida inaequiglumis</i>	1	<1		Grass
<i>Boerhavia coccinea</i>	0.1	<1		Herb
* <i>Cenchrus ciliaris</i>	0.65	1		Grass
<i>Cleome viscosa</i>	0.7	<1		Herb
<i>Corchorus lasiocarpum</i> subsp. <i>lasiocarpus</i>	0.6	1.5		Shrub
<i>Cymbopogon ambiguus</i>	0.7	0.8		Grass
<i>Dysphania rhadinostachya</i> subsp. <i>rhadinostachya</i>	0.1	<1		Herb
<i>Enneapogon lindleyanus</i>	0.75	1		Grass
<i>Enneapogon polyphyllus</i>	0.25	<1		Grass
<i>Eragrostis eriopoda</i>	0.3	0.1		Grass
<i>Eremophila cunneifolia</i> x	0.35	<1		Shrub
<i>Eremophila fraseri</i> subsp. <i>fraseri</i>	1	2.5	pink	Shrub
<i>Eriachne aristidea</i>	0.7	<1		Grass
<i>Eriachne mucronata</i>	0.4	<1		Grass
<i>Eulalia aurea</i>	0.6	0.1		Grass
<i>Euphorbia australis</i>	0.07	<1		Herb
<i>Evolvulus alsinoides</i> var. <i>villosicalyx</i>	0.25	<1		Herb
<i>Fimbristylis simulans</i>	0.3	<1		Sedge
<i>Gomphrena</i> ? <i>leptoclada</i>	0.4	0.1	white	Shrub
<i>Goodenia muelleriana</i>	0.3	<1	yellow	Herb
<i>Gossypium australe</i>	0.4	<1		Shrub
<i>Hakea lorea</i> subsp. <i>lorea</i>	2.5	0.5		Shrub
<i>Heliotropium inexplicitum</i>	0.15	<1		Herb
<i>Hibiscus burtonii</i>	0.3	<1		Shrub
<i>Hibiscus sturtii</i> var. <i>platychlams</i>	0.35	<1		Shrub
<i>Hybanthus aurantiacus</i>	0.5	<1		Shrub
<i>Indigofera monophylla</i>	0.15	<1		Shrub

<i>Indigofera rugosa</i>	0.75	1.5		Shrub
<i>Paraneurachne muelleri</i>	0.7	2		Grass
* <i>Portulaca oleracea</i>	0.02	<1		Herb
<i>Ptilotus aervoides</i>	0.02	<1		Herb
<i>Ptilotus astrolasius</i>	0.35	<1		Shrub
<i>Ptilotus auriculifolius</i>	0.35	<1	white	Herb
<i>Ptilotus exaltatus</i>	0.5	0.1	purple	Herb
<i>Ptilotus helipteroides</i>	0.3	0.6		Herb
<i>Rhynchosia minima</i>	0.25	<1		Vine
<i>Salsola ? australis</i>	0.65	0.25		Herb
<i>Senna artemisioides</i> subsp. <i>helmsii</i>	0.6	3		Shrub
<i>Senna artemisioides</i> subsp. <i>oligophylla</i>	0.7	3		Shrub
<i>Senna glutinosa</i> subsp. <i>x luerssenii</i>	1.1	<1		Shrub
<i>Schizachyrium fragile</i>	0.25	<1		Grass
<i>Sclerolaena cornishana</i>	0.3	<1		Shrub
<i>Sida echinocarpa</i>	0.6	<1		Shrub
<i>Solanum ellipticum</i>	0.25	<1		Shrub
<i>Solanum phlomoides</i>	0.3	<1		Shrub
<i>Tephrosia</i> aff. <i>sphaerospora</i>	0.15	<1		Shrub
<i>Tribulus hirsutus</i>	0.02	<1		Herb
<i>Tribulus suberosus</i>	1	<1		Shrub
<i>Trichodesma zeylanicum</i> var. <i>zeylanicum</i>	0.9	<1		Shrub
<i>Triodia epactia</i>	0.85	22		Hummock Grass
<i>Triraphis mollis</i>	1.1	<1		Grass



Site WHN-70

FLORA QUADRAT DATA SHEET

Location	WHN-71	Date 28/05/2011 & 05/10/2011
		Surveyor K. McCreery
Quadrat Dimension	50x50m	Quadrat Orientation 0°
GPS Location	Easting: 205527	GPS Location Relative to Quadrat NW
	Northing: 7416869	
Soil Type	Sandy loam	Soil Colour Red
Topography/Aspect	Plain, very gently inclined / 0°	Disturbance Type Cattle, weeds
Vegetation Condition	Excellent	
Broad Floristic Formation	Mixed Open Tussock Grassland	
Vegetation Association	9a - Open Tussock Grassland of <i>Themeda triandra</i> , <i>Aristida inaequiglumis</i> and <i>Aristida contorta</i> with Open Shrubland of <i>Acacia monticola</i> , <i>Acacia ancistrocarpa</i> and <i>Grevillea wickhamii</i> subsp. <i>aprica</i> with Scattered Low Trees of <i>Corymbia hamersleyana</i>	
Vegetation Sub-association	Scattered Low Trees of <i>Corymbia hamersleyana</i> over Scattered Shrubs of <i>Acacia ancistrocarpa</i> , <i>Acacia tenuissima</i> , <i>Acacia melleodora</i> , <i>Eremophila forrestii</i> subsp. <i>forrestii</i> and <i>Senna artemisioides</i> subsp. <i>oligophylla</i> over Low Scattered Shrubs of <i>Hibiscus sturtii</i> var. <i>platyklamys</i> , <i>Ptilotus polystchyus</i> , <i>Solanum sturtianum</i> , <i>Hybanthus aurantiacus</i> and <i>Solanum ellipticum</i> over Very Open Tussock Grassland of <i>Aristida contorta</i> , <i>Eragrostis eriopoda</i> , <i>Aristida holathera</i> var. <i>holathera</i> , <i>Enneapogon polyphyllus</i> and <i>Paraneurachne muelleri</i> with Scattered Herbs of <i>Trianthema pilosa</i> and <i>Boerhavia coccinea</i>	

Vascular plant species recorded

Species	Plant Height (m)	Coverage (%)	Flowers	Growth Form
<i>Abutilon macrum</i>	0.4	<1		Shrub
<i>Abutilon otocarpum</i>	0.3	<1		Shrub
<i>Acacia adsurgens</i>	0.9	<1		Shrub
<i>Acacia ancistrocarpa</i>	2	0.2		Shrub
<i>Acacia elachantha</i>	2.1	<1		Shrub
<i>Acacia melleodora</i>	1.5	0.2	yellow	Shrub
<i>Acacia tenuissima</i>	1.8	0.2		Shrub
<i>Acacia tetragonophylla</i>	1.3	<1		Shrub
<i>Acacia trudgeniana</i>	0.8	<1		Shrub
<i>Anthobolus leptomerioides</i>	0.2	<1		Shrub
<i>Aristida contorta</i>	0.3	3		Grass
<i>Aristida holathera</i> var. <i>holathera</i>	0.6	1		Grass
<i>Aristida inaequiglumis</i>	1.3	0.5		Grass
<i>Boerhavia coccinea</i>	0.1	1		Herb
<i>Bonamia</i> sp. (indet)	0.2	<1		Shrub
* <i>Cenchrus ciliaris</i>	0.4	<1		Grass
<i>Chrysocephalum pterochaetum</i>	0.4	<1		Shrub
<i>Chrysopogon fallax</i>	1.2	0.2		Grass
<i>Cleome viscosa</i>	0.4	<1		Herb
<i>Corchorus sidioides</i> subsp. <i>sidioides</i>	0.4	<1		Shrub
<i>Corymbia hamersleyana</i>	6	1		Tree
<i>Cymbopogon obtectus</i>	0.6	0.1		Grass
<i>Dysphania rhadinostachya</i> subsp. <i>rhadinostachya</i>	0.1	<1		Herb
<i>Enneapogon lindleyanus</i>	0.2	<1		Grass
<i>Enneapogon polyphyllus</i>	0.2	0.2		Grass
<i>Eragrostis eriopoda</i>	0.8	2		Grass
<i>Eremophila forrestii</i> subsp. <i>forrestii</i>	1.3	0.2		Shrub
<i>Eriachne aristidea</i>	0.3	<1		Grass
<i>Euphorbia tannensis</i> subsp. <i>eremophila</i>	0.2	<1		Herb
<i>Evolvulus alsinoides</i> var. <i>villosicalyx</i>	0.2	0.2		Herb
<i>Fimbristylis dichotoma</i>	0.3	0.1		Sedge
<i>Gomphrena kanisii</i>	0.3	0.2	pink	Herb
<i>Goodenia muelleriana</i>	0.2	<1		Herb

<i>Goodenia vilmoriniae</i>	0.4	<1		Herb
<i>Gossypium robinsonii</i>	1.3	<1		Shrub
<i>Hakea lorea</i> subsp. <i>lorea</i>	0.9	<1		Shrub
<i>Haloragis gossei</i>	0.2	<1		Herb
<i>Hibiscus sturtii</i> var. (indet)	0.3	0.2		Shrub
<i>Hibiscus sturtii</i> var. <i>platyklamys</i>	0.3	0.5		Shrub
<i>Hybanthus aurantiacus</i>	0.4	0.2		Shrub
<i>Indigofera rugosa</i>	0.9	<1		Shrub
<i>Isotropis atropurpurea</i>	0.4	<1		Shrub
<i>Maireana melanocoma</i>	0.1	<1		Shrub
<i>Melhania oblongifolia</i>	0.5	<1		Shrub
<i>Mollugo molluginea</i>	0.1	<1		Herb
<i>Paraneurachne muelleri</i>	0.4	0.2		Grass
<i>Perotis rara</i>	0.1	<1		Grass
* <i>Portulaca oleracea</i>	0.01	<1		Herb
<i>Ptilotus astrolasius</i>	0.4	<1	white	Shrub
<i>Ptilotus axillaris</i>	0.01	<1		Herb
<i>Ptilotus exaltatus</i>	0.5	0.3	pink	Herb
<i>Ptilotus helipteroides</i>	0.3	<1	pink	Herb
<i>Ptilotus obovatus</i>	0.9	0.2		Shrub
<i>Ptilotus polystachyus</i>	0.4	0.2		Herb
<i>Rhagodia eremaea</i>	0.9	<1		Shrub
<i>Rhynchosia minima</i>	0.6	<1		Vine
<i>Salsola ? australis</i>	0.4	0.2		Herb
<i>Scaevola parvifolia</i> subsp. (indet)	0.3	<1		Shrub
<i>Sclerolaena eriacantha</i>	0.1	<1		Shrub
<i>Senna artemisioides</i> subsp. <i>helmsii</i>	0.4	<1		Shrub
<i>Senna artemisioides</i> subsp. <i>oligophylla</i>	1.3	0.2		Shrub
<i>Sida</i> sp.	0.4	<1		Shrub
<i>Sida ?</i> sp. spiciform panicles (E. Leyland s.n. 14/8/90)	0.8	<1		Shrub
<i>Sida echinocarpa</i>	0.4	<1		Shrub
<i>Sida fibulifera</i>	0.2	<1		Shrub
<i>Solanum ellipticum</i>	0.2	0.2		Shrub
<i>Solanum phlomoides</i>	0.4	<1		Shrub
<i>Solanum sturtianum</i>	0.7	0.2	purple	Shrub
<i>Streptoglossa macrocephala</i>	0.8	<1		Shrub
<i>Tephrosia rosea</i> var. <i>glabrior</i>	0.3	<1		Shrub
<i>Themeda triandra</i>	0.8	<1		Grass
<i>Trianthema pilosa</i>	0.1	2		Herb
<i>Tribulus macrocarpus</i>	0.1	<1		Herb
<i>Triodia lanigera</i>	0.9	3		Hummock Grass
<i>Triraphis mollis</i>	0.9	<1		Grass
<i>Yakirra australiensis</i>	0.1	<1		Grass



Site WHN-71

FLORA QUADRAT DATA SHEET

Location WHN-72 **Date** 29/05/2011
Surveyor K. McCreery, A. Cole & R. Tomanovic

Quadrat Dimension 50x50m **Quadrat Orientation** 0°

GPS Location **Easting:** 205127 **GPS Location Relative to Quadrat** NW
Northing: 7416728

Soil Type Silty Loam **Soil Colour** Orange

Topography/Aspect Plain, Very gently inclined / 0° **Disturbance Type** Weeds

Vegetation Condition Very Good

Broad Floristic Formation *Triodia* Hummock Grassland

Vegetation Association 5f - Hummock Grassland of *Triodia lanigera* and *Triodia epactia* with High Open Shrubland of *Acacia bivenosa*, *Acacia ancistrocarpa* and *Acacia tenuissima* with Very Open Mallee of *Eucalyptus gamophylla*

Vegetation Sub-association Scattered Mallees of *Eucalyptus gamophylla* over High Open Shrubland of *Acacia bivenosa*, *Acacia ancistrocarpa* and *Acacia tenuissima* over Open Shrubland of *Acacia melleodora*, *Hakea lorea* subsp. *lorea*, *Dodonaea coriacea* and *Dicrastylis cordifolia* over Low Scattered Shrubs of *Bonamia* sp. 1 (indet) and *Corchorus sidioides* subsp. *sidioides* over Hummock Grassland of *Triodia lanigera* over Very Open Herbs of *Scaevola parvifolia*

Vascular plant species recorded

Species	Plant Height (m)	Coverage (%)	Flowers	Growth Form
<i>Acacia adoxa</i> var. <i>adoxo</i>	0.45	<1	yellow	Shrub
<i>Acacia adsurgens</i>	2	1	yellow	Shrub
<i>Acacia ancistrocarpa</i>	2.3	3		Shrub
<i>Acacia aptaneura</i>	2	<1		Tree
<i>Acacia bivenosa</i>	3	4	yellow	Shrub
<i>Acacia hilliana</i>	0.6	<1	yellow	Shrub
<i>Acacia melleodora</i>	1.2	2	yellow	Shrub
<i>Acacia pachyacra</i>	1	<1		Shrub
<i>Acacia tenuissima</i>	2	1.5	yellow	Shrub
<i>Acacia trudgeniana</i>	2	1		Shrub
<i>Anthobolus leptomerioides</i>	1	<1		Shrub
<i>Aristida holathera</i> var. <i>holathera</i>	0.65	0.4		Grass
<i>Aristida inaequiglumis</i>	0.95	<1		Grass
<i>Bonamia</i> sp. (indet)	0.5	1		Shrub
<i>Cassutha capillaris</i>	0.25	3		Vine
* <i>Cenchrus ciliaris</i>	0.7	1		Grass
<i>Corchorus sidioides</i> subsp. <i>sidioides</i>	0.6	0.1		Shrub
<i>Cymbopogon ambiguus</i>	1	0.2		Grass
<i>Dicrastylis cordifolia</i>	1.1	0.1		Shrub
<i>Dodonaea coriacea</i>	1.2	0.2		Shrub
<i>Duperreya commixta</i>	0.35	<1		Vine
<i>Eragrostis eriopoda</i>	0.55	<1		Grass
<i>Eriachne aristidea</i>	0.5	<1		Grass
<i>Eucalyptus gamophylla</i>	2.3	3		Tree
<i>Eulalia aurea</i>	0.55	<1		Grass
<i>Euphorbia tannensis</i> subsp. <i>eremophila</i>	0.3	<1		Herb
<i>Gomphrena kanisii</i>	0.3	<1	white	Herb
<i>Gossypium robinsonii</i>	0.4	<1		Shrub
<i>Hakea chordophylla</i>	1.2	<1		Shrub
<i>Hakea lorea</i> subsp. <i>lorea</i>	1.4	1		Shrub
<i>Hibiscus brachychlaenus</i>	1.2	<1		Shrub
<i>Hibiscus struttii</i> var. <i>campylochlamys</i>	0.35	<1		Shrub
<i>Hibiscus sturtii</i> var. <i>truncatus</i>	0.15	<1		Shrub

<i>Hybanthus aurantiacus</i>	0.45	0.5		Shrub
<i>Indigofera monophylla</i>	0.1	<1		Shrub
<i>Isotropis atropurpurea</i>	0.55	<1		Shrub
<i>Melhania oblongifolia</i>	0.4	<1		Shrub
<i>Paraneurachne muelleri</i>	0.55	0.2		Grass
<i>Polygala isingii</i>	0.15	<1		Herb
<i>Ptilotus calostachyus</i>	1.1	<1		Herb
<i>Ptilotus exaltatus</i>	0.1	<1		Herb
<i>Scaevola parvifolia</i> subsp. (indet)	0.25	3		Herb
<i>Schizachyrium fragile</i>	0.5	<1		Grass
<i>Senna ? notabilis</i>	0.1	<1		Herb
<i>Senna artemisioides</i> subsp. <i>oligophylla</i>	1.4	0.1		Shrub
<i>Senna glutinosa</i> subsp. <i>glutinosa</i>	2	<1	yellow	Shrub
<i>Sida arenicola</i>	0.95	<1		Shrub
<i>Sida cardiophylla</i>	0.3	<1		Shrub
<i>Solanum sturtianum</i>	1.1	<1	purple	Shrub
<i>Trichodesma zeylanicum</i> var. <i>zeylanicum</i>	0.7	<1		Shrub
<i>Triodia lanigera</i>	0.8	45		Hummock Grass
<i>Yakirra australiensis</i>	0.15	<1		Grass



Site WHN-72

FLORA QUADRAT DATA SHEET

Location	WHN-73	Date 29/05/2011 & 05/10/2011
		Surveyor K. McCreery, A. Cole & R. Tomanovic
Quadrat Dimension	50x50m	Quadrat Orientation 0°
GPS Location	Eastings: 206518	GPS Location Relative to Quadrat NW
	Northing: 7417560	
Soil Type	Sandy clay loam	Soil Colour Red
Topography/Aspect	Drainage depression, very gently inclined / 120°	Disturbance Type Grazing, trampling
Vegetation Condition	Very Good	
Broad Floristic Formation	Mixed Tussock Grassland	
Vegetation Association	8a - Tussock Grassland of <i>Eulalia aurea</i> , <i>Themeda triandra</i> and <i>Aristida inaequiglumis</i> with Low Open Woodland of <i>Corymbia hamersleyana</i> , <i>Acacia aptaneura</i> and <i>Acacia citrinoviridis</i> over Open Shrubland of <i>Acacia ancistrocarpa</i> , <i>Gossypium robinsonii</i> and <i>Acacia pyrifolia</i>	
Vegetation Sub-association	Low Open Woodland of <i>Corymbia hamersleyana</i> , <i>Acacia aptaneura</i> , <i>Acacia citrinoviridis</i> and <i>Acacia coriacea</i> subsp. <i>pendens</i> over High Shrubland of <i>Acacia ancistrocarpa</i> , <i>Gossypium robinsonii</i> , <i>Acacia tetragonophylla</i> , <i>Acacia adsurgens</i> and <i>Acacia bivenosa</i> over Shrubland of <i>Acacia wanyu</i> , <i>Acacia tenuissima</i> and <i>Grevillea wickhamii</i> over Open Hummock Grassland of <i>Triodia epactia</i> and <i>Triodia lanigera</i> with Tussock Grassland of <i>Eulalia aurea</i> , <i>Themeda triandra</i> , <i>Aristida holathera</i> var. <i>holathera</i> , <i>Paraneurachne muelleri</i> and <i>Cymbopogon obtectus</i>	

Vascular plant species recorded

Species	Plant Height (m)	Coverage (%)	Flowers	Growth Form
<i>Acacia adsurgens</i>	0.9	<1		Shrub
<i>Acacia adsurgens</i>	2.1	0.1		Shrub
<i>Acacia ancistrocarpa</i>	2.2	20		Shrub
<i>Acacia aptaneura</i>	3.5	3		Tree
<i>Acacia bivenosa</i>	2.6	0.3		Shrub
<i>Acacia citrinoviridis</i>	4	1		Tree
<i>Acacia coriacea</i> subsp. <i>pendens</i>	3	0.2		Tree
<i>Acacia melleodora</i>	1	<1		Shrub
<i>Acacia tenuissima</i>	1.7	1.2		Shrub
<i>Acacia tetragonophylla</i>	2.1	0.6		Shrub
<i>Acacia wanyu</i>	1.5	8		Shrub
<i>Anthobolus leptomerioides</i>	0.15	<1		Shrub
<i>Aristida holathera</i> var. <i>holathera</i>	0.5	0.5		Grass
<i>Aristida inaequiglumis</i>	1	<1		Grass
<i>Bonamia</i> sp. (indet)	0.4	<1		Shrub
<i>Chrysopogon fallax</i>	1.2	<1		Grass
<i>Corchorus</i> ? <i>sidoides</i> subsp. (indet)	0.45	0.2		Shrub
<i>Corymbia hamersleyana</i>	7	4		Tree
<i>Cymbopogon obtectus</i>	1	0.1		Grass
<i>Dampiera candidans</i>	0.6	<1		Herb
<i>Gossypium robinsonii</i>	3	1.5		Shrub
<i>Grevillea wickhamii</i>	1	0.1		Shrub
<i>Hibiscus</i> sp. (indet)	0.1	<1		Shrub
<i>Hibiscus</i> sp. (indet)	0.35	<1		Shrub
<i>Hybanthus aurantiacus</i>	0.25	<1		Herb
<i>Isotropis forrestii</i>	0.85	3		Shrub
<i>Kennedia prorepens</i>	0.5	2.5		Herb
<i>Keraudrenia</i> ? <i>velutina</i> subsp. <i>velutina</i>	0.55	<1		Shrub
<i>Macgregoria racemigera</i>	0.1	<1		Herb
<i>Paraneurachne muelleri</i>	0.5	0.1		Grass
<i>Pterocaulon sphaecelatum</i>	0.7	0.1		Herb
<i>Rutidosia helichrysoides</i> subsp.				
<i>helichrysoides</i>	0.45	1.2		Herb
<i>Senna notabilis</i>	0.55	<1		Shrub
<i>Sida</i> sp. spiciform panicles (E. Leyland s.n. 14/8/90)	0.4	<1		Shrub
<i>Solanum ellipticum</i>	0.25	<1		Shrub

<i>Solanum ? phlomoides</i>		0.2	<1	Shrub
<i>Streptoglossa macrocephala</i>		0.45	<1	Herb
<i>Themeda triandra</i>	0.95		3	Grass
<i>Trichodesma zeylanicum</i> var. <i>zeylanicum</i>	0.9		0.5	Herb
<i>Triodia epactia</i>	1.1		15	Hummock Grass
<i>Triodia lanigera</i>	0.9		<1	Hummock Grass



Site WHN-73

FLORA QUADRAT DATA SHEET

Location OB31_P9 **Date** 14/02/2011 **Surveyor** Syrinx Environmental PL
(SD, AC, & RT)

Quadrat Dimension 50 x50m **Quadrat Orientation** 0°

GPS Location Easting: 204189 **GPS Location Relative to Quadrat** NW
Northing: 7417988

Soil Type Sandy loam **Soil Colour** Red

Topography/Aspect Hillslope, moderately inclined/100° **Disturbance Type** Fire

Vegetation Condition Excellent

Broad Floristic Formation *Triodia* Hummock Grassland

Vegetation Association **5b - Hummock Grassland** of *Triodia* sp. Shovelanna Hill (S. van Leeuwen 3835) with **Low Open Shrubland** of *Acacia hilliana*, *Acacia adoxa* var. *adoxa* and *Halgania solanacea* var. Mt Doreen (G.M. Chippendale 4206) with **Scattered Low Trees** of *Eucalyptus leucophloia* subsp. *leucophloia* and *Acacia pruinocarpa*

Vegetation Sub-association Scattered Mallee of *Eucalyptus gamophylla* over Scattered Tall Shrubs of *Grevillea wickhamii* subsp. (indet) over Low Open Shrubland of *Acacia hilliana*, *Keraudrenia velutina* subsp. *elliptica*, *Acacia adoxa* var. *adoxa*, *Halgania solanacea* var. Mt Doreen (G.M. Chippendale 4206) and *Gompholobium* sp. Pilbara (N.F. Norris 908) over Closed Hummock Grassland of *Triodia* ? sp. Shovelanna Hill (S. van Leeuwen 3835)

Vascular plant species recorded

Genus	Species	Height (m)	% Cover	Flower	Form
<i>Acacia</i>	<i>adoxa</i> var. <i>adoxa</i>	0.3	2		Shrub
<i>Acacia</i>	<i>hilliana</i>	0.4	3.5		Shrub
<i>Bonamia</i>	<i>rosea/erecta</i> (indet)	0.3	<1		Herb
<i>Calytrix</i>	<i>carinata</i>	0.5	<1		Shrub
<i>Eriachne</i>	<i>mucronata</i>	0.3	1	green	Grass
<i>Eucalyptus</i>	<i>gamophylla</i>	2	<1		Mallee
<i>Gompholobium</i>	sp. Pilbara (N.F. Norris 908)	0.5	<1		Shrub
<i>Goodenia</i>	sp. Sandy Creek (R.D.Royce 1653)	0.1	<1		Herb
<i>Goodenia</i>	<i>triodiophila</i>	0.4	<1	yellow	Herb
<i>Grevillea</i>	<i>wickhamii</i> subsp. (indet)	2.5	1	red	Shrub
<i>Halgania</i>	<i>solanacea</i> var. Mt Doreen (G.M. Chippendale 4206)	0.4	1		Shrub
<i>Hybanthus</i>	<i>aurantiacus</i>	0.2	<1	orange	Shrub
<i>Keraudrenia</i>	<i>nephrosperma</i>	1	<1	blue	Shrub
<i>Keraudrenia</i>	<i>velutina</i> subsp. <i>elliptica</i>	0.8	2	purple	Shrub
Poaceae	sp. (indet.)	0.17	<1		Grass
<i>Scaevola</i>	<i>browniana</i> subsp. <i>browniana</i>	0.3	<1		Shrub
<i>Senna</i>	<i>glutinosa</i> subsp. x <i>leurssenii</i>	0.6	<1		Shrub
<i>Triodia</i>	? sp. Shovelanna Hill (S. van Leeuwen 3835)	0.15	70		Hummock Grass



Site OB31-9

FLORA QUADRAT DATA SHEET

Location OB31_P10 **Date** 15/02/2011 & **Surveyor** Syrinx Environmental PL
04/10/2011 (K.M.)

Quadrat Dimension 50 x 50m **Quadrat Orientation** 0°

GPS Location Easting: 203965 **GPS Location Relative to Quadrat** NW
Northing: 7417672

Soil Type Sandy clay loam **Soil Colour** Red

Topography/Aspect Plain, level / 180° **Disturbance Type** Cattle and/or Feral animals, weeds

Vegetation Condition Very Good

Broad Floristic Formation *Acacia* Low Woodland

Vegetation Association **2c - Low Woodland** of *Acacia aptaneura* and *Corymbia hamersleyana* over **Very Open Shrubland** of *Acacia wanyu*, *Acacia ancistrocarpa* and *Eremophila forrestii* subsp.(indet) over **Very Open Hummock Grassland** of *Triodia epactia* and *Triodia lanigera*

Vegetation Sub-association Low Woodland of *Acacia aptaneura* and *Corymbia hamersleyana* over Scattered Shrubs of *Acacia ancistrocarpa*, *Acacia pachyacra* and *Rulingia luteiflora* over Low Scattered Shrubs *Eremophila forrestii* subsp.(indet), *Solanum* sp. (indet), and *Hybanthus aurantiacus* over Very Open Tussock Grassland of *Themeda triandra*, *Aristida inaequiglumis*, *Eulalia aurea*, *Digitaria brownii* and *Paraneurachne muelleri* with Very Open Hummock Grassland of *Triodia ? lanigera* and *Triodia ? epactia*

Vascular plant species recorded

Genus	Species	Height (m)	% Cover	Flower	Form
<i>Acacia</i>	<i>ancistrocarpa</i>	2	1		Shrub
<i>Acacia</i>	<i>aptaneura</i>	6	12		Tree
<i>Acacia</i>	<i>pachyacra</i>	1.2	<1		Tree
<i>Aristida</i>	<i>contorta</i>	0.5	<1	brown	Grass
<i>Aristida</i>	<i>inaequiglumis</i>	0.7	2		Grass
* <i>Bidens</i>	<i>bipinnata</i>	0.15	1		Herb
Chenopodiaceae	sp. (indet)	0.4	<1		Chenopod Shrub
<i>Corchorus</i>	<i>sidoides</i> subsp. <i>sidoides</i>	0.4	<1		Shrub
<i>Corymbia</i>	? <i>hamersleyana</i>	6	<1		Tree
<i>Dicrastylis</i>	<i>cordifolia</i>	0.6	<1		Shrub
<i>Digitaria</i>	<i>brownii</i>	0.4	1		Grass
<i>Enneapogon</i>	<i>polyphyllus</i>	0.3	<1	green	Grass
<i>Enneapogon</i>	<i>robustissimus</i>	0.7	<1	blue	Grass
<i>Eremophila</i>	<i>forrestii</i> subsp. (indet)	0.6	<1		Shrub
<i>Eremophila</i>	sp. (indet)	0.35	<1		Shrub
<i>Eriachne</i>	<i>mucronata</i>	0.5	<1	green	Grass
<i>Eulalia</i>	<i>aurea</i>	0.7	1.5	green	Grass
<i>Evolvulus</i>	<i>alsinoides</i> var. <i>villosicalyx</i>	0.25	<1	blue	Herb
Fabaceae	sp. (indet)	0.1	<1		Shrub
<i>Gomphrena</i>	<i>kanisii</i>	0.3	<1	pink	Herb
<i>Goodenia</i>	<i>stobbsiana</i>	0.25	<1		Shrub
<i>Gossypium</i>	<i>robinsonii</i>	3.5	<1		Shrub
<i>Hibiscus</i>	<i>burtonii</i>	0.3	<1	pink	Shrub
<i>Hybanthus</i>	<i>aurantiacus</i>	0.25	<1	orange	Shrub
<i>Indigofera</i>	? <i>brevidens</i>	0.4	<1	pink	Shrub
<i>Indigofera</i>	? <i>brevidens</i>	0.4	<1		Shrub
<i>Isotropis</i>	<i>forrestii</i>	0.35	<1		Shrub
<i>Paraneurachne</i>	<i>muelleri</i>	0.35	1	green	Grass

<i>Rulingia</i>	<i>luteiflora</i>	2	<1		Shrub
<i>Solanum</i>	sp. (indet.)	0.6	<1		Shrub
<i>Solanum</i>	sp. (indet.)	0.35	<1		Shrub
<i>Themeda</i>	<i>triandra</i>	0.7	4	red	Grass
<i>Triodia</i>	? <i>epactia</i>	0.8	1		Hummock Grass
<i>Triodia</i>	? <i>lanigera</i>	0.8	2		Hummock Grass



Site OB31-10

FLORA QUADRAT DATA SHEET

Location OB31_P11 **Date** 15/02/2011 **Surveyor** Syrinx Environmental PL
(SD, AC, & RT)

Quadrat Dimension 50 x 50m **Quadrat Orientation** 0°

GPS Location Easting: 203228 **GPS Location Relative to Quadrat** NW
Northing: 7417845

Soil Type Clay loam, sandy **Soil Colour** Red

Topography/Aspect Plain, level / 0° **Disturbance Type** Fire

Vegetation Condition Excellent

Broad Floristic Formation Mixed Tussock Grassland

Vegetation Association **8a - Tussock Grassland** of *Eulalia aurea*, *Themeda triandra* and *Aristida inaequiglumis* with **Low Open Woodland** of *Corymbia hamersleyana*, *Acacia aptaneura* and *Acacia citrinoviridis* over **Open Shrubland** of *Acacia ancistrocarpa*, *Gossypium robinsonii* and *Acacia pyrifolia*

Vegetation Sub-association Scattered Low Trees of *Corymbia hamersleyana* over Scattered Malee of *Eucalyptus gamophylla* over Scattered Shrubs of *Eremophila forrestii* subsp. (indet), *Acacia ancistrocarpa*, *Senna artemisioides* subsp. *helmsii* x *oligophylla*, *Grevillea wickhamii* and *Acacia bivenosa* over Tussock Grassland of *Aristida inaequiglumis*, *Paraneurachne muelleri* and *Themeda triandra* with Scattered Hummock Grass of *Triodia lanigera* and *Triodia epactia*

Vascular plant species recorded

Genus	Species	Height (m)	% Cover	Flower	Form
<i>Abutilon</i>	sp. (indet)	0.1	<1	green	Shrub
<i>Acacia</i>	<i>ancistrocarpa</i>	1.5	<1		Shrub
<i>Acacia</i>	<i>aptaneura</i>	2.3	<1		Tree
<i>Acacia</i>	<i>bivenosa</i>	1.8	<1		Shrub
<i>Acacia</i>	<i>melleodora</i>	1.7	<1		Shrub
<i>Aristida</i>	<i>inaequiglumis</i>	0.75	30		Grass
<i>Bonamia</i>	<i>rosea/erecta</i> (indet)	0.6	<1		Herb
<i>Corchorus</i>	<i>sidoides</i> subsp. <i>sidoides</i>	0.35	<1		Herb
<i>Corymbia</i>	<i>hamersleyana</i>	6	1		Tree
<i>Duperreya</i>	<i>commixta</i>	1	<1		Vine
<i>Enneapogon</i>	<i>polyphyllus</i>	0.3	<1	green	Grass
<i>Eragrostis</i>	<i>eriopoda</i>	0.33	<1		Grass
<i>Eremophila</i>	<i>forrestii</i> subsp. (indet)	1.1	<1		Shrub
<i>Eucalyptus</i>	<i>gamophylla</i>	4	<1		Mallee
<i>Evolvulus</i>	<i>alsinoides</i> var. <i>villosicalyx</i>	0.1	<1	blue	Herb
<i>Gossypium</i>	<i>robinsonii</i>	3	<1		Shrub
<i>Grevillea</i>	<i>wickhamii</i> subsp. (indet)	1.6	<1	red	Shrub
<i>Hakea</i>	<i>lorea</i>	1.7	<1		Shrub
<i>Hibiscus</i>	<i>sturtii</i> var. <i>platyklamys</i>	0.3	<1		Shrub
<i>Hybanthus</i>	<i>aurantiacus</i>	0.45	<1	orange	Shrub
<i>Indigofera</i>	sp. (indet.)	1	<1		Shrub
<i>Ipomoea</i>	? <i>diamantinensis</i>	0.8	<1		Vine
<i>Isotropis</i>	<i>forrestii</i>	0.75	<1		Shrub
<i>Paraneurachne</i>	<i>muelleri</i>	0.25	1	green	Grass
<i>Ptilotus</i>	<i>exaltatus</i> var. <i>exaltatus</i>	0.05	<1		Herb
<i>Rhynchosia</i>	<i>minima</i>	0.15	<1	yellow	Vine

<i>Sarcostemma</i>	<i>viminale</i> subsp. <i>australe</i>	0.7	<1	white	Shrub
<i>Senna</i>	<i>artemisioides</i> subsp. <i>helmsii</i> x <i>oligophylla</i>	1.2	<1		Shrub
<i>Solanum</i>	sp. (indet.)	0.5	<1		Shrub
<i>Tephrosia</i>	<i>rosea</i> var. <i>glabrior</i>	0.9	<1	red	Shrub
<i>Themeda</i>	<i>triandra</i>	0.7	<1	red	Grass
<i>Triodia</i>	<i>epactia</i>	0.5 - 1.2	<1		Hummock
					Grass
<i>Triodia</i>	<i>lanigera</i>	0.4	1		Hummock
					Grass



Site OB31-11

FLORA QUADRAT DATA SHEET

Location OB31_P12 **Date** 15/02/2011 **Surveyor** Syrinx Environmental PL
(SD, AC, & RT)

Quadrat Dimension 50 x 50 **Quadrat Orientation** 0°

GPS Location Easting: 204045 **GPS Location Relative to Quadrat** NW
Northing: 7417536

Soil Type Sandy loam **Soil Colour** Red

Topography/Aspect Plain, level / 0° **Disturbance Type** Fire

Vegetation Condition Excellent

Broad Floristic Formation *Triodia* Hummock Grassland

Vegetation Association **5c - Hummock Grassland** of *Triodia lanigera* and *Triodia* sp. Shovelanna Hill (S.van Leeuwen 3835) with **Open Shrubland** of *Hakea lorea* subsp. *lorea*, *Acacia ancistrocarpa* and *Acacia adsurgens* with **Scattered Low Trees** of *Corymbia hamersleyana* and *Acacia pruinocarpa*

Vegetation Sub-association Scattered Tall Shrubs of *Acacia ancistrocarpa*, *Acacia bivenosa*, *Hakea lorea*, *Acacia tetragonophylla* and *Acacia pachyacra* over Low Scattered Shrubs of *Bonamia* ? *rosea/erecta* (indet), *Hybanthus aurantiacus*, *Sida* sp. (indet.), *Hibiscus burtonii* and *Ptilotus obovatus* var. *obovatus* Hummock Grassland of *Triodia lanigera* and *Triodia* ? *epactia*

Vascular plant species recorded

Genus	Species	Height (m)	% Cover	Flower	Form
<i>Acacia</i>	<i>adsurgens</i>	1.1	<1		Shrub
<i>Acacia</i>	<i>ancistrocarpa</i>	2.5	<1		Shrub
<i>Acacia</i>	<i>aptaneura</i>	1.3	<1		Tree
<i>Acacia</i>	<i>bivenosa</i>	2.3	<1		Shrub
<i>Acacia</i>	<i>pachyacra</i>	2.2	<1		Tree
<i>Acacia</i>	<i>pruinocarpa</i>	1	<1		Shrub
<i>Acacia</i>	sp. (indet)	2.5	<1		Shrub
<i>Acacia</i>	<i>tetragonophylla</i>	2	<1		Shrub
<i>Bonamia</i>	<i>rosea/erecta</i> (indet)	0.25	<1		Herb
<i>Eremophila</i>	<i>forrestii</i> subsp. (indet)	0.7	<1		Shrub
<i>Hakea</i>	<i>lorea</i>	2.1	<1		Shrub
<i>Hibiscus</i>	<i>burtonii</i>	0.09	<1	pink	Shrub
<i>Hybanthus</i>	<i>aurantiacus</i>	0.3	<1	orange	Shrub
<i>Paraneurachne</i>	<i>muelleri</i>	0.5	<1	green	Grass
Poaceae	sp. (indet)	0.03	<1		Grass
<i>Ptilotus</i>	<i>obovatus</i> var. <i>obovatus</i> <i>artemisioides</i> subsp. x	0.8	<1		Shrub
<i>Senna</i>	<i>sturtii</i>	1.3	<1		Shrub
<i>Sida</i>	sp. (indet)	0.3	<1		Shrub
<i>Tribulus</i>	<i>suberosus</i>	0.6	<1	yellow	Shrub
<i>Triodia</i>	? <i>epactia</i>	0.35	<1		Hummock Grass
<i>Triodia</i>	<i>lanigera</i>	0.9	42	green	Hummock Grass



Site OB31-12

FLORA QUADRAT DATA SHEET

Location OB31_P13 **Date** 15/02/2011 **Surveyor** Syrinx Environmental PL
(SD, AC, & RT)

Quadrat Dimension 50 x 50m **Quadrat Orientation** 0°

GPS Location Easting: 205647 **GPS Location Relative to Quadrat** NW
Northing: 7417773

Soil Type Sandy loam **Soil Colour** Red

Topography/Aspect Hillslope, moderately inclined/ 30° **Disturbance Type** Car and Cattle and/or Feral animals

Vegetation Condition Excellent

Broad Floristic Formation *Triodia* Hummock Grassland

Vegetation Association **5b - Hummock Grassland** of *Triodia* sp. Shovelanna Hill (S. van Leeuwen 3835) with **Low Open Shrubland** of *Acacia hilliana*, *Acacia adoxa* var. *adoxa* and *Halgania solanacea* var. Mt Doreen (G.M. Chippendale 4206) with **Scattered Low Trees** of *Eucalyptus leucophloia* subsp. *leucophloia* and *Acacia pruinocarpa*

Vegetation Sub-association Low Open Shrubland of *Halgania solanacea* var. Mt Doreen (G.M. Chippendale 4206), *Acacia hilliana*, *Acacia adoxa* var. *adoxa*, *Gompholobium* sp. Pilbara (N.F. Norris 908) and *Keraudrenia nephrosperma* over Hummock Grassland of *Triodia* ? sp. Shovelanna Hill (S. van Leeuwen 3835) with Scattered Tussock Grass of *Amphipogon sericeus* and *Eriachne lanata*

Vascular plant species recorded

Genus	Species	Height (m)	% Cover	Flower	Form
<i>Acacia</i>	<i>adoxa</i> var. <i>adoxa</i>	0.3	<1		Shrub
<i>Acacia</i>	<i>hilliana</i>	0.3	1		Shrub
<i>Acacia</i>	<i>melleodora</i>	0.35	<1		Shrub
<i>Acacia</i>	<i>pruinocarpa</i>	0.9	<1		Shrub
<i>Acacia</i>	<i>tenuissima</i>	0.7	<1		Shrub
<i>Amphipogon</i>	<i>sericeus</i>	0.2	<1		Grass
<i>Eriachne</i>	<i>lanata</i>	0.25	<1	purple	Grass
<i>Gompholobium</i>	sp. Pilbara (N.F. Norris 908)	0.4	<1		Shrub
<i>Halgania</i>	<i>solanacea</i> var. Mt Doreen (G.M. Chippendale 4206)	0.4	3		Shrub
<i>Hibiscus</i>	<i>sturtii</i> var. (indet)	0.08	<1		Shrub
<i>Indigofera</i>	<i>monophylla</i>	0.4	<1	red	Shrub
<i>Keraudrenia</i>	<i>nephrosperma</i>	0.7	<1	blue	Shrub
<i>Trianthema</i>	<i>glossostigma</i>	0.03	<1	white	Herb
<i>Triodia</i>	? sp. Shovelanna Hill (S. van Leeuwen 3835)	0.4	30		Hummock Grass



Site OB31-13

FLORA QUADRAT DATA SHEET

Location OB31_P14 **Date** 15/02/2011 **Surveyor** Syrinx Environmental PL (SD, AC, & RT)

Quadrat Dimension 50 x 50m **Quadrat Orientation** 0°

GPS Location Easting: 204976 Northing: 7417718 **GPS Location Relative to Quadrat** NW

Soil Type Sandy loam **Soil Colour** Red

Topography/Aspect Hillslope, gently inclined / 30° **Disturbance Type** Car and Cattle and/or Feral animals

Vegetation Condition Excellent

Broad Floristic Formation *Triodia* Hummock Grassland

Vegetation Association **5b - Hummock Grassland** of *Triodia* sp. Shovelanna Hill (S. van Leeuwen 3835) with **Low Open Shrubland** of *Acacia hilliana*, *Acacia adoxa* var. *adoxa* and *Halgania solanacea* var. Mt Doreen (G.M. Chippendale 4206) with **Scattered Low Trees** of *Eucalyptus leucophloia* subsp. *leucophloia* and *Acacia pruinocarpa*

Vegetation Sub-association Low Open Woodland of *Acacia pruinocarpa* and *Acacia aptaneura* over High Open Shrubland of *Acacia trudgeniana*, *Acacia melleodora* and *Grevillea berryana* over Low Open Shrubland of *Halgania solanacea* var. Mt Doreen (G.M. Chippendale 4206), *Solanum* sp. (indet.), *Eremophila* ? *fraseri* subsp. (indet), *Senna artemisioides* subsp. *helmsii* and *Senna glutinosa* subsp. x *leurssenii* over Hummock Grassland of *Triodia* ? sp. Shovelanna Hill (S. van Leeuwen 3835) with Scattered Tussock Grass of *Paraneurachne muelleri*, *Digitaria brownii*, *Eragrostis eriopoda* and *Eriachne* ? *mucronata*

Vascular plant species recorded

Genus	Species	Height (m)	% Cover	Flower	Form
<i>Acacia</i>	<i>aptaneura</i>	3.5	1		Tree
<i>Acacia</i>	<i>melleodora</i>	2	1		Shrub
<i>Acacia</i>	<i>pruinocarpa</i>	2	1.5		Tree
<i>Acacia</i>	<i>trudgeniana</i>	2.5	1		Shrub
<i>Calytrix</i>	<i>carinata</i>	0.8	<1		Shrub
<i>Corchorus</i>	<i>sidoides</i> subsp. <i>sidoides</i>	0.2	<1		Herb
<i>Digitaria</i>	<i>brownii</i>	0.3	<1		Grass
<i>Duperreya</i>	<i>commixta</i>	2	<1		Vine
<i>Eragrostis</i>	<i>eriopoda</i>	0.3	<1	green	Grass
<i>Eremophila</i>	? <i>fraseri</i> subsp. (indet)	0.9	<1		Shrub
<i>Eremophila</i>	<i>forrestii</i> subsp. (indet)	0.8	<1		Shrub
<i>Eriachne</i>	? <i>mucronata</i>	0.25	<1	green	Grass
<i>Evolvulus</i>	<i>alsinoides</i> var. <i>villosicalyx</i>	0.2	<1	blue	Herb
<i>Goodenia</i>	<i>triodiophila</i>	0.5	<1	yellow	Herb
<i>Grevillea</i>	<i>berryana</i>	2	<1		Shrub
<i>Halgania</i>	<i>solanacea</i> var. Mt Doreen (G.M. Chippendale 4206)	0.7	1		Shrub
<i>Hibiscus</i>	<i>burtonii</i>	0.25	<1	pink	Shrub
<i>Hibiscus</i>	<i>sturtii</i> var. (indet)	0.3	<1		Shrub
<i>Paraneurachne</i>	<i>muelleri</i>	0.25	<1	green	Grass
<i>Petalostylis</i>	<i>cassioides</i>	1	<1		Shrub
<i>Senna</i>	<i>artemisioides</i> subsp. <i>helmsii</i>	0.9	<1		Shrub
<i>Senna</i>	<i>glutinosa</i> subsp. x <i>leurssenii</i>	1.4	<1		Shrub
<i>Solanum</i>	sp. (indet)	0.35	1		Shrub
<i>Triodia</i>	? sp. Shovelanna Hill (S. van Leeuwen 3835)	0.4	45	No	Tussock Grass



Site OB31-14

FLORA QUADRAT DATA SHEET

Location OB31_P15 **Date** 09/03/2011 **Surveyor** Syrinx Environmental PL
(SD, AC & RT)

Quadrat Dimension 50 x 50m **Quadrat Orientation** 0°

GPS Location Easting: 207514 **GPS Location Relative to Quadrat** NW
Northing: 7417562

Soil Type Clay loam, sandy **Soil Colour** Red

Topography/Aspect Hillslope, very steep/160° **Disturbance Type** Fire

Vegetation Condition Excellent

Broad Floristic Formation *Acacia* Low Woodland

Vegetation Association **2a - Low Woodland** of *Acacia aptaneura*, *Acacia ? pteraneura* and *Acacia pruinocarpa* over **Open Hummock Grassland** of *Triodia epactia* and *Triodia* sp. Shovelanna Hill (S. van Leeuwen 3835) with **Shrubland** of *Acacia wanyu*, *Acacia tetragonophylla* and *Senna stricta*

Vegetation Sub-association Low Open Woodland of *Acacia ? pteraneura* hybrid over Scattered Tall Shrubs of *Senna glutinosa* subsp. *leurseanii* over Shrubland of *Senna stricta*, *Eremophila cuneifolia*, *Acacia synchronicia*, *Eremophila platycalyx* and *Acacia tetragonophylla* over Low Scattered Shrubs of *Scaevola spinescens*, *Ptilotus exaltatus* var. *exaltatus*, *Hibiscus leptocladus*, *Hibiscus coatesii* and *Eremophila exilifolia* over Open Hummock Grassland of *Triodia epactia* and *Triodia* sp. Shovelanna Hill (S. van Leeuwen 3835) with Scattered Tussock Grass of *Enneapogon polyphyllus*, *Eriachne mucronata* and *Paspalidium clementii*

Vascular plant species recorded

Genus	Species	Height (m)	% Cover	Flower	Form
<i>Acacia</i>	? <i>pteraneura</i> hybrid	4.5	10		Tree
<i>Acacia</i>	<i>synchronicia</i>	1.5	2		Shrub
<i>Acacia</i>	<i>tetragonophylla</i>	1.9	<1		Shrub
<i>Bulbostylis</i>	<i>barbata</i>	0.06	<1	brown	Sedge
Chenopodiaceae	sp. (indet.)	0.3	<1		Chenopod Shrub
<i>Duperreya</i>	<i>commixta</i>	1.8	<1		Vine
<i>Enneapogon</i>	<i>polyphyllus</i>	0.25	<1	green	Grass
<i>Eremophila</i>	? <i>platycalyx</i> var. (indet.)	0.2	<1		Shrub
<i>Eremophila</i>	? <i>platycalyx</i>	1.5	<1	white	Shrub
<i>Eremophila</i>	<i>cuneifolia</i>	0.55	<1	blue	Shrub
<i>Eremophila</i>	<i>exilifolia</i>	0.55	<1	blue	Shrub
<i>Eriachne</i>	<i>mucronata</i>	0.35	<1	green	Grass
<i>Hibiscus</i>	<i>coatesii</i>	0.5	<1	blue	Shrub
<i>Hibiscus</i>	<i>leptocladus</i>	0.4	<1	pink	Shrub
<i>Paspalidium</i>	<i>clementii</i>	0.15	<1	green	Grass
* <i>Portulaca</i>	<i>oleracea</i>	0.03	<1		Herb
<i>Ptilotus</i>	<i>exaltatus</i> var. <i>exaltatus</i>	0.02	<1		Herb
<i>Ptilotus</i>	<i>obovatus</i> var. <i>obovatus</i>	1	2		Shrub
<i>Scaevola</i>	<i>spinescens</i>	1.1	<1	white	Shrub
<i>Senna</i>	<i>glutinosa</i> subsp. <i>x leurseanii</i>	2	<1		Shrub
<i>Senna</i>	<i>stricta</i>	1.4	25		Shrub
<i>Triodia</i>	<i>epactia</i>	0.9	8		Hummock Grass
<i>Triodia</i>	sp. Shovelanna Hill (S. van Leeuwen 3835)	0.7	2		Hummock Grass



Site OB31-15

FLORA QUADRAT DATA SHEET

Location OB31_P16 **Date** 09/03/2011 & **Surveyor** Syrinx Environmental PL
(SD, AC & RT)

Quadrat Dimension 50 x 50m **Quadrat Orientation** 0°

GPS Location Easting: 207094 **GPS Location Relative to Quadrat** NW
Northing: 7418060

Soil Type Clay loam, sandy **Soil Colour** Red

Topography/Aspect Hillslope, moderately inclined/260° **Disturbance Type** Fire

Vegetation Condition Excellent

Broad Floristic Formation *Triodia* Hummock Grassland

Vegetation Association **5b - Hummock Grassland** of *Triodia* sp. Shovelanna Hill (S. van Leeuwen 3835) with **Low Open Shrubland** of *Acacia hilliana*, *Acacia adoxa* var. *adoxa* and *Halgania solanacea* var. Mt Doreen (G.M. Chippendale 4206) with **Scattered Low Trees** of *Eucalyptus leucophloia* subsp. *leucophloia* and *Acacia pruinocarpa*

Vegetation Sub-association Scattered Tall Shrubs of *Acacia bivenosa*, *Acacia inaequilatera* and *Hakea chordophylla* over Scattered Shrubs of *Grevillea wickhamii* subsp. (indet), *Senna glutinosa* subsp. *leurssenii*, *Eremophila exilifolia*, *Acacia maitlandii* and *Senna stricta* over Low Open Shrubland of *Keraudrenia velutina* subsp. *elliptica*, *Acacia hilliana* and *Acacia adoxa* var. *adoxa* over Hummock Grassland of *Triodia* sp. Shovelanna Hill (S. van Leeuwen 3835) with Scattered Tussock Grass of *Eragrostis eriopoda*, *Eriachne lonata* and *Eriachne mucronata*

Vascular plant species recorded

Genus	Species	Height (m)	% Cover	Flower	Form
<i>Acacia</i>	<i>adoxa</i> var. <i>adoxa</i>	0.4	1.5	yellow	Shrub
<i>Acacia</i>	<i>bivenosa</i>	2	<1		Shrub
<i>Acacia</i>	<i>hilliana</i>	0.4	3	yellow	Shrub
<i>Acacia</i>	<i>inaequilatera</i>	0.6	<1	yellow	Shrub
<i>Acacia</i>	<i>maitlandii</i>	1	<1	yellow	Shrub
<i>Acacia</i>	<i>rhodophloia</i>	0.6	<1		Shrub
<i>Acacia</i>	<i>sibirica</i>	1	<1		Shrub
<i>Calytrix</i>	<i>carinata</i>	0.4	<1		Shrub
<i>Eragrostis</i>	<i>eriopoda</i>	0.35	<1	green	Shrub
<i>Eremophila</i>	<i>exilifolia</i>	1.2	<1	blue	Shrub
<i>Eriachne</i>	<i>lonata</i>	0.2	<1	purple	Grass
<i>Eriachne</i>	<i>mucronata</i>	0.35	<1	green	Grass
<i>Eucalyptus</i>	<i>leucophloia</i> subsp. <i>leucophloia</i>	3	<1		Tree
<i>Fimbristylis</i>	<i>dichotoma</i>	0.2	<1	brown	Sedge
<i>Gompholobium</i>	sp. Pilbara (N.F. Norris 908)	0.6	<1		Shrub
<i>Goodenia</i>	<i>triodiophylla</i>	0.35	<1	yellow	Herb
<i>Grevillea</i>	? berryana	1.2	<1		Shrub
<i>Grevillea</i>	<i>wickhamii</i> subsp. (indet)	1.2	<1	red	Shrub
<i>Hakea</i>	<i>chordophylla</i>	2.3	<1		Shrub
<i>Halgania</i>	<i>solanacea</i> var. Mt Doreen (G.M. Chippendale 4206)	0.4	<1	blue	Shrub
<i>Keraudrenia</i>	<i>velutina</i> subsp. <i>elliptica</i>	0.4	3		Shrub
<i>Ptilotus</i>	<i>calostachyus</i>	0.35	<1	pink	Herb
<i>Senna</i>	<i>glaucifolia</i>	0.15	<1		Shrub
<i>Senna</i>	<i>glutinosa</i> subsp. <i>x leurssenii</i>	1.1	<1		Shrub
<i>Senna</i>	<i>sericea</i>	0.3	<1		Shrub
<i>Senna</i>	<i>stricta</i>	1	<1		Shrub
<i>Tribulus</i>	<i>suberosus</i>	0.6	<1	yellow	Shrub
<i>Triodia</i>	sp. Shovelanna Hill (S. van Leeuwen 3835)	0.6	55		Hummock Grass



Site OB31-16

FLORA QUADRAT DATA SHEET

Location OB31_17 **Date** 09/03/2011 **Surveyor** Syrinx Environmental PL
(SD, AC & RT)

Quadrat Dimension 50 x 50m **Quadrat Orientation** 0°

GPS Location Easting: 206632 **GPS Location Relative to Quadrat** NW
Northing: 7418074

Soil Type Loamy sand **Soil Colour** Red

Topography/Aspect Drainage depression, very gently inclined/260° **Disturbance Type** Cattle and/or Feral animals

Vegetation Condition Excellent

Broad Floristic Formation *Acacia* High Shrubland

Vegetation Association **4a - High Shrubland** of *Acacia monticola*, *Rulingia luteiflora* and *Gossypium robinsonii* with **Low Woodland** of *Corymbia hamersleyana*, *Eucalyptus victrix* and *Eucalyptus leucophloia* subsp. *leucophloia* over **Very Open Tussock Grassland** of *Themeda triandra*, **Cenchrus ciliaris* and *Cymbopogon procerus*

Vegetation Sub-association Very Open Mallee of *Corymbia deserticola* over Closed Scrub of *Acacia monticola* over Open Shrubland of *Santalum lanceolatum*, *Acacia maitlandii* and *Grevillea wickhamii* subsp. (indet), *Senna glutinosa* subsp. *pruinosa* and *Rulingia luteiflora* over Low Scattered Shrubs of *Halgania solanacea* var. Mt Doreen (G.M. Chippendale 4206), *Hibiscus coatesii*, *Abutilon cunninghamii*, *Hybanthus aurantiacus* and *Dodonaea coriacea* over Scattered Hummock Grass of *Triodia epactia* with Scattered Tussock Grass of *Aristida holathera* var. *holathera*, *Digitaria brownii*, *Eriachne mucronata* and *Paraneurachne muelleri*

Vascular plant species recorded

Genus	Species	Height (m)	% Cover	Flower	Form
<i>Abutilon</i>	<i>cunninghamii</i>	0.2	<1	yellow	Shrub
<i>Acacia</i>	<i>ancistrocarpa</i>	1.7	<1	yellow	Shrub
<i>Acacia</i>	<i>maitlandii</i>	1	2	yellow	Shrub
<i>Acacia</i>	<i>monticola</i>	2.5	80	yellow	Shrub
<i>Acacia</i>	<i>tenuissima</i>	1.7	<1		Shrub
<i>Aristida</i>	<i>holathera</i> var. <i>holathera</i>	0.6	<1	yellow	Grass
<i>Clerodendrum</i>	<i>tomentosum</i> var. <i>lanceolatum</i>	1.8	<1	white	Shrub
<i>Corymbia</i>	<i>deserticola</i>	5	2		Tree
<i>Digitaria</i>	<i>brownii</i>	0.6	<1		Grass
<i>Dodonaea</i>	<i>coriacea</i>	1	<1		Shrub
<i>Dodonaea</i>	<i>petiolaris</i>	1.5	<1		Shrub
<i>Duperreya</i>	<i>commixta</i>	1.5	<1		Vine
<i>Eremophila</i>	<i>exilifolia</i>	1	<1	blue	Shrub
<i>Eriachne</i>	<i>mucronata</i>	0.5	<1	green	Grass
<i>Grevillea</i>	<i>wickhamii</i> subsp. (indet)	1.5	2	red	Shrub
<i>Hibiscus</i>	<i>coatesii</i>	0.3	<1	blue	Shrub
<i>Hybanthus</i>	<i>aurantiacus</i>	0.5	<1	orange	Shrub
<i>Paraneurachne</i>	<i>muelleri</i>	0.55	<1	green	Grass
<i>Petalostylis</i>	<i>cassioides</i>	1.5	<1		Shrub
<i>Psydrax</i>	<i>latifolia</i>	1.2	<1	yellow	Shrub
<i>Rulingia</i>	<i>luteiflora</i>	1.5	<1	green	Shrub
<i>Santalum</i>	<i>lanceolatum</i>	1.8	1		Shrub
<i>Senna</i>	<i>artemisioides</i> subsp. <i>oligophylla</i>	1.6	<1		Shrub
<i>Senna</i>	<i>glutinosa</i> subsp. <i>pruinosa</i>	1.7	<1		Shrub
<i>Senna</i>	<i>glutinosa</i> subsp. <i>x leurossenii</i>	1	<1		Shrub
<i>Triodia</i>	<i>epactia</i>	0.9	<1		Hummock Grass



Site OB31-17-R1

FLORA QUADRAT DATA SHEET

Location OB31_P21 **Date** 10/03/2011 **Surveyor** Syrix Environmental PL
(SD, AC & RT)

Quadrat Dimension 50x50m **Quadrat Orientation** 0°

GPS Location Easting: 205494 **GPS Location Relative to Quadrat** NW
Northing: 7418333

Soil Type Sandy loam **Soil Colour** Orange

Topography/Aspect Hillslope, moderately inclined/170° **Disturbance Type** Cattle and/or Feral animals

Vegetation Condition Excellent

Broad Floristic Formation *Triodia* Hummock Grassland

Vegetation Association **5b - Hummock Grassland** of *Triodia* sp. Shovelanna Hill (S. van Leeuwen 3835) with **Low Open Shrubland** of *Acacia hilliana*, *Acacia adoxa* var. *adoxo* and *Halgania solanacea* var. Mt Doreen (G.M. Chippendale 4206) with **Scattered Low Trees** of *Eucalyptus leucophloia* subsp. *leucophloia* and *Acacia pruinocarpa*

Vegetation Sub-association Scattered Tall Shrubs of *Acacia inaequilatera* and *Acacia pruinocarpa* over Scattered Shrubs of *Acacia ancistrocarpa*, *Acacia monticola* and *Hakea lorea* over Low Open Shrubland of *Acacia hilliana*, *Acacia adoxa*, *Keraudrenia velutina* subsp. *elliptica* ms, *Halgania solanacea* var. Mt Doreen (G.M. Chippendale 4206) and *Calytrix carinata* over Hummock Grassland of *Triodia* sp. Shovelanna Hill (S. van Leeuwen 3835)

Vascular plant species recorded

Genus	Species	Height (m)	% Cover	Flower	Form
<i>Acacia</i>	<i>adoxo</i>	0.3	1	yellow	Shrub
<i>Acacia</i>	<i>ancistrocarpa</i>	1.2	<1	yellow	Shrub
<i>Acacia</i>	<i>hilliana</i>	0.3	3	yellow	Shrub
<i>Acacia</i>	<i>inaequilatera</i>	2	<1	yellow	Shrub
<i>Acacia</i>	<i>monticola</i>	1	<1	yellow	Shrub
<i>Acacia</i>	<i>pruinocarpa</i>	1.9	<1		Shrub
<i>Calytrix</i>	<i>carinata</i>	0.15	<1		Shrub
<i>Dodonaea</i>	<i>coriacea</i>	0.5	<1		Shrub
<i>Goodenia</i>	<i>triodiophila</i>	0.25	<1	yellow	Herb
<i>Hakea</i>	<i>lorea</i>	1.5	<1		Shrub
<i>Halgania</i>	<i>solanacea</i> var. Mt Doreen (G.M. Chippendale 4206)	0.4	1	blue	Shrub
<i>Keraudrenia</i>	<i>velutina</i> subsp. <i>elliptica</i>	0.55	4		Shrub
<i>Scaevola</i>	<i>browniana</i> subsp. <i>browniana</i>	0.3	<1	blue	Shrub
<i>Triodia</i>	sp. Shovelanna Hill (S. van Leeuwen 3835)	0.7	55		Tussock Grass



Site OB31-21

FLORA QUADRAT DATA SHEET

Location OB31_P32 **Date** 13/02/2011 & **Surveyor** Syrinx Environmental PL
04/10/2011 (SD, AC & RT)

Quadrat Dimension Easting: 204664 **Quadrat Orientation** 0°
Northing: 7418342

GPS Location Easting: 204664 **GPS Location Relative to Quadrat** NW
Northing: 7418342

Soil Type Silty loam **Soil Colour** Red

Topography/Aspect Plain, Level/80° **Disturbance Type** Cattle and/or Feral animals

Vegetation Condition Excellent

Broad Floristic Formation *Acacia* Low Woodland

Vegetation Association **2b - Low Woodland** of *Acacia paraneura*, *Acacia ? pteraneura* and *Acacia pruinocarpa* over **Open Shrubland** of *Eremophila fraserii* subsp. *fraseri*, *Eremophila forrestii* subsp. *forrestii* and *Acacia tetragonophylla* over **Very Open Hummock Grassland** of *Triodia epactia*, *Triodia* sp. Shovelanna Hill (S. van Leeuwen 3835) and *Triodia lanigera*

Vegetation Sub-association Low Open Woodland of *Acacia ? pteraneura*, *Acacia paraneura*, and *Acacia pruinocarpa* over Open Shrubland of *Eremophila fraserii* subsp. *fraseri*, *Acacia tetragonophylla*, *Eremophila latrobei* subsp. *filiformis* and *Anthobolus leptomerioides* over Very Open Hummock Grassland of *Triodia epactia* and *Triodia* sp. Shovelanna Hill (S. van Leeuwen 3835) and *Triodia lanigera* over Very Open Herbs of *Cleome oxalidea*, *Boerhavia schomburgkiana* and *Evolvulus alsinoides* var. *villosicalyx*

Vascular plant species recorded

Genus	Species	Height	% Cover	Flower	Form
<i>Abutilon</i>	<i>macrum</i>	0.5	<1	yellow	Shrub
<i>Abutilon</i>	<i>otocarpum</i>	0.35	<1	yellow	Shrub
<i>Acacia</i>	? <i>pteraneura</i>	5.5	6		Tree
<i>Acacia</i>	? <i>pteraneura</i> hybrid	4.5	1		Tree
<i>Acacia</i>	<i>paraneura</i>	6	2		Tree
<i>Acacia</i>	<i>pruinocarpa</i>	6	2		Tree
<i>Acacia</i>	<i>tetragonophylla</i>	2	<1		Shrub
<i>Anthobolus</i>	<i>leptomerioides</i>	1.5	<1		Shrub
<i>Aristida</i>	<i>contorta</i>	0.35	<1	brown	Grass
<i>Boerhavia</i>	<i>schomburgkiana</i>	0.02	<1	pink	Herb
<i>Bulbostylis</i>	<i>barbata</i>	0.12	<1	brown	Sedge
Chenopodiaceae	sp. (indet)	0.4	<1		Shrub
<i>Cleome</i>	<i>oxalidea</i>	0.12	2	blue	Herb
<i>Duperreya</i>	<i>commixta</i>	0.4	<1		Vine
<i>Enneapogon</i>	<i>polyphyllus</i>	0.2	<1	green	Grass
<i>Eremophila</i>	<i>fraseri</i> subsp. <i>fraseri</i>	1.4	5	pink	Shrub
<i>Eremophila</i>	<i>latrobei</i> subsp. <i>filiformis</i>	1.6	<1	red	Shrub
<i>Eriachne</i>	<i>pulchella</i> var. <i>dominii</i>	0.02	<1	purple	Grass
<i>Evolvulus</i>	<i>alsinoides</i> var. <i>villosicalyx</i>	0.4	<1	blue	Herb
<i>Hibiscus</i>	<i>leptocladus</i>	0.4	<1	pink	Shrub
<i>Hibiscus</i>	<i>sturtii</i> var. (indet)	0.4	<1		Shrub
<i>Paspalidium</i>	<i>clementii</i>	0.35	<1	green	Grass
<i>Ptilotus</i>	<i>roei</i>	0.2	<1		Herb
<i>Ptilotus</i>	<i>schwartzii</i> var. <i>schwartzii</i>	0.35	<1		Herb
<i>Senna</i>	<i>glutinosa</i> subsp. <i>glutinosa</i>	1.8	<1		Shrub
<i>Solanum</i>	<i>phlomoides</i>	0.35	<1	purple	Shrub
<i>Triodia</i>	<i>epactia</i>	0.8	7		Hummock Grass
<i>Triodia</i>	<i>lanigera</i>	0.75	<1	green	Hummock Grass
<i>Triodia</i>	sp. Shovelanna Hill (S. van Leeuwen 3835)	0.65	1		Hummock Grass



Site OB31-32

FLORA RELEVÉ DATA SHEET

Location	WHN-R1	Date 28/05/2011 & 07/10/2011 Surveyor A. Cole & R. Tomanovic
Relevé Area	~2500m ²	
GPS Location	Easting: 203623 Northing: 7414710	
Soil Type	Silty loam	Soil Colour Orange
Topography/Aspect	Plain, very gently inclined / 200°	Disturbance Type Weeds
Vegetation Condition	Very Good	
Broad Floristic Formation	Acacia High Shrubland	
Vegetation Association	4a - High Shrubland of <i>Acacia monticola</i> , <i>Rulingia luteiflora</i> and <i>Gossypium robinsonii</i> with Low Woodland of <i>Corymbia hamersleyana</i> , <i>Eucalyptus victrix</i> and <i>Eucalyptus leucophloia</i> subsp. <i>leucophloia</i> over Very Open Tussock Grassland of <i>Themeda triandra</i> , * <i>Cenchrus ciliaris</i> and <i>Cymbopogon procerus</i>	
Vegetation Sub-association	Scattered Low Trees of <i>Corymbia hamersleyana</i> over Closed Scrub of <i>Acacia monticola</i> , <i>Rulingia luteiflora</i> , <i>Petalostylis labicheoides</i> , <i>Acacia pyrifolia</i> and <i>Acacia atkinsiana</i> over Scattered Shrubs of <i>Grevillea wickhamii</i> subsp. (indet) and <i>Acacia</i> sp. (indet) over Very Open Hummock Grassland of <i>Triodia epactia</i> with Very Open Tussock Grassland of <i>Paspalidium clementii</i> , <i>Paraneurachne muelleri</i> and <i>Aristida holathera</i> var. <i>holathera</i>	

Vascular plant species recorded

Species	Plant Height (m)	Coverage (%)	Flowers	Growth Form
<i>Abutilon lepidum</i>	0.55	<1		Shrub
<i>Acacia adsurgens</i>	1.7	<1		Shrub
<i>Acacia atkinsiana</i>	2.2	1.5		Shrub
<i>Acacia bivenosa</i>	3.5	<1		Shrub
<i>Acacia maitlandii</i>	1.6	<1	yellow	Shrub
<i>Acacia monticola</i>	3	70		Shrub
<i>Acacia pyrifolia</i>	2	2		Shrub
<i>Acacia</i> sp. (indet)	1	0.2		Shrub
<i>Acacia wanyu</i>	1.6	<1		Shrub
<i>Aristida contorta</i>	0.4	<1		Grass
<i>Aristida holathera</i> var. <i>holathera</i>	0.4	0.1		Grass
<i>Bulbostylis barbata</i>	0.03	<1		Sedge
<i>Corchorus sidioides</i> subsp. <i>sidioides</i>	0.45	<1		Shrub
<i>Corymbia hamersleyana</i>	3	0.5		Tree
<i>Cymbopogon obtectus</i>	0.8	<1		Grass
<i>Digitatia brownii</i>	0.45	<1		Grass
<i>Duperreya commixta</i>	1.5	0.6		Vine
<i>Enneapogon polyphyllus</i>	0.3	<1		Grass
<i>Enneapogon robustissimus</i>	0.15	<1		Grass
<i>Eragrostis eriopoda</i>	0.4	<1		Grass
<i>Eriachne mucronata</i>	0.5	<1		Grass
<i>Eucalyptus gamophylla</i>	1.3	<1		Tree
<i>Eucalyptus leucophloia</i> subsp. <i>leucophloia</i>	3	<1		Tree
<i>Evolvulus alsinoides</i> var. <i>villosicalyx</i>	0.45	<1		Herb
<i>Goodenia muelleriana</i>	0.4	<1		Herb
<i>Gossypium robinsonii</i>	1.5	<1		Shrub
<i>Grevillea wickhamii</i> subsp. (indet)	2.5	<1		Shrub
<i>Hibiscus brachychlaenus</i>	0.4	<1		Shrub
<i>Hibiscus coatesii</i>	0.15	<1		Shrub
<i>Hibiscus sturtii</i>	0.25	<1		Shrub
<i>Hybanthus aurantiacus</i>	0.5	<1		Shrub
<i>Indigofera monophylla</i>	0.45	<1	purple	Shrub
<i>Paraneurachne muelleri</i>	0.55	0.5		Grass
<i>Paspalidium clementii</i>	0.25	2		Grass

<i>Petalostylis labicheoides</i>	2.3	1.5		Shrub
<i>Ptilotus calostachyus</i>	0.6	<1		Herb
<i>Ptilotus exaltatus</i>	0.3	<1		Herb
<i>Ptilotus obovatus</i> var. <i>obovatus</i>	0.6	<1		Shrub
<i>Rulingia luteiflora</i>	2.2	0.5	yellow	Shrub
<i>Rutidosia helichrysoides</i> subsp. <i>helichrysoides</i>	0.2	<1		Herb
<i>Senna artemisioides</i> subsp. <i>oligophylla</i>	0.5	<1		Shrub
<i>Senna glutinosa</i> subsp. <i>x leurossenii</i>	0.5	<1		Shrub
<i>Senna glutinosa</i> subsp. <i>glutinosa</i>	1.6	<1		Shrub
<i>Senna glutinosa</i> subsp. <i>pruinosa</i>	1.4	<1		Shrub
<i>Sida</i> sp. spiciform panicles (E. Leyland sn 14/8/90)	0.7	<1		Shrub
<i>Solanum ellipticum</i>	0.25	<1		Shrub
<i>Solanum</i> ? <i>lasiophyllum</i>	0.45	<1		Shrub
<i>Triodia epactia</i>	1.2	2.5		Hummock Grass
<i>Triodia</i> sp. Shovelanna Hill (S. van leeuwen 3835)	1	<1		Hummock Grass



Site WHN-R1

FLORA RELEVÉ DATA SHEET

Location	WHN-R2	Date 28/05/2011
		Surveyor A. Cole & R. Tomanovic
Relevé Area	~2500m ²	
GPS Location	Easting:	
	Northing:	
Soil Type	Silty loam	Soil Colour Red
Topography/Aspect	Hillslope, moderately inclined / 3300°	Disturbance Type
Vegetation Condition	Very Good	
Broad Floristic Formation	<i>Triodia</i> Hummock Grassland	
Vegetation Association	5h - Hummock Grassland of <i>Triodia</i> sp. Shovelanna Hill (S.van Leeuwen 3835), <i>Triodia epactia</i> and <i>Triodia brizoides</i> with High Open Shrubland of <i>Acacia bivenosa</i> and <i>Acacia tetragonophylla</i> with Scattered Low Trees of <i>Eucalyptus leucophloia</i> subsp. <i>leucophloia</i> and <i>Acacia aptaneura</i>	
Vegetation Sub-association	Scattered Low Trees of <i>Eucalyptus leucophloia</i> subsp. <i>leucophloia</i> over Scattered Tall Shrubs of <i>Acacia wanyu</i> , <i>Acacia tetragonophylla</i> and <i>Acacia bivenosa</i> over Low Scattered Shrubs of <i>Acacia hilliana</i> , <i>Acacia adoxa</i> var. <i>adoxo</i> , <i>Halgania solanacea</i> var. Mt Doreen (G.M. Chippendale 4206) and <i>Senna stricta</i> over Open Hummock Grassland of <i>Triodia</i> sp. Shovelanna Hill (S.van Leeuwen 3835) and <i>Triodia epactia</i> .	

Vascular plant species recorded

Species	Plant Height (m)	Coverage (%)	Flowers	Growth Form
<i>Acacia adoxa</i> var. <i>adoxo</i>	0.3	0.2		Shrub
<i>Acacia atkinsiana</i>	1	<1		Shrub
<i>Acacia bivenosa</i>	2	<1		Shrub
<i>Acacia hilliana</i>	0.45	1		Shrub
<i>Acacia maitlandii</i>	0.75	<1		Shrub
<i>Acacia tetragonophylla</i>	1.7	<1		Shrub
<i>Acacia wanyu</i>	1.8	0.3		Shrub
<i>Dodonaea pachyneura</i>	0.55	<1		Shrub
<i>Eucalyptus leucophloia</i> subsp. <i>leucophloia</i>	3.5	0.3		Tree
<i>Halgania solanacea</i> var. Mt Doreen (G.M. Chippendale 4206)	0.25	<1		Shrub
<i>Ptilotus obovatus</i> var. <i>obovatus</i>	0.7	<1		Shrub
<i>Senna glutinosa</i> subsp. <i>pruinosa</i>	0.8	<1		Shrub
<i>Senna stricta</i>	0.3	<1		Shrub
<i>Tribulus suberosus</i>	0.6	<1		Shrub
<i>Triodia epactia</i>	0.85	1		Hummock Grass
<i>Triodia</i> sp. Shovelanna Hill (S.van Leeuwen 3835)	0.55	30		Hummock Grass

Picture Not Available

Site WHN-R2

FLORA RELEVÉ DATA SHEET

Location	WHN-R3	Date 28/05/2011 & 08/10/2011 Surveyor A. Cole & R. Tomanovic
Relevé Area	~2500m ²	
GPS Location	Easting: 208372 Northing: 7414637	
Soil Type	Loamy Sand	Soil Colour Red
Topography/Aspect	Hillslope, steep / 220°	Disturbance Type Fire
Vegetation Condition	Very Good	
Broad Floristic Formation	<i>Triodia</i> Open Hummock Grassland	
Vegetation Association	6d - Open Hummock Grassland of <i>Triodia</i> sp. Shovelanna Hill (S.van Leeuwen 3835), <i>Triodia epactia</i> and <i>Triodia brizoides</i> with Low Open Woodland of <i>Acacia aptaneura</i> , <i>Acacia ? pteraneura</i> (hybrid?) and <i>Acacia rhodophloia</i> over Open Shrubland of <i>Acacia tetragonophylla</i> , <i>Acacia adsurgens</i> and <i>Senna glutinosa</i> subsp. <i>glutinosa</i>	
Vegetation Sub-association	Low Open Woodland of <i>Acacia ? pteraneura</i> (hybrid?), <i>Acacia rhodophloia</i> <i>Acacia pruinocarpa</i> and <i>Eucalyptus leucophloia</i> subsp. <i>leucophloia</i> over Low Scattered Shrubs of <i>Eremophila exilifolia</i> , <i>Corchorus lasiocarpus</i> subsp. <i>lasiocarpus</i> , <i>Maireana georgei</i> , <i>Senna stricta</i> and <i>Scaevola acacioides</i> over Very Open Hummock Grassland of <i>Triodia</i> sp. Shovelanna Hill (S.van Leeuwen 3835) with Scattered Herbs of <i>Ptilotus exaltatus</i> <i>Ptilotus calostachyus</i> and <i>Goodenia stobbsiana</i> .	

Vascular plant species recorded

Species	Plant Height (m)	Coverage (%)	Flowers	Growth Form
<i>Acacia ? pteraneura</i> (hybrid?)	3.8	2		Tree
<i>Acacia pruinocarpa</i>	3	0.1		Tree
<i>Acacia rhodophloia</i>	3.5	0.1		Tree
<i>Acacia tetragonophylla</i>	2	<1		Shrub
<i>Acacia wanyu</i>	0.1	<1		Shrub
<i>Amphipogon sericeus</i>	0.4	0.1		Grass
<i>Amyema fitzgeraldii</i>	0.5	<1		Shrub
<i>Aristida holathera</i> var. <i>holathera</i>	0.3	<1		Grass
<i>Aristida inaequiglumis</i>	0.75	<1		Grass
<i>Corchorus lasiocarpus</i> subsp. <i>lasiocarpus</i>	0.5	0.1		Shrub
<i>Cymbopogon ambiguus</i>	1	<1		Grass
<i>Dodonaea coriacea</i>	0.3	<1		Shrub
<i>Dodonaea pachyneura</i>	2.5	<1		Shrub
<i>Dodonaea petiolaris</i>	1.5	<1		Shrub
<i>Enchylaena tomentosa</i>	0.45	<1		Shrub
<i>Enneapogon lindleyanus</i>	0.25	<1		Grass
<i>Enneapogon polyphyllus</i>	0.25	<1		Grass
<i>Eragrostis eriopoda</i>	0.65	<1		Grass
<i>Eremophila cuneifolia</i>	0.6	<1		Shrub
<i>Eremophila exilifolia</i>	0.6	0.1		Shrub
<i>Eremophila latrobei</i> subsp. <i>latrobei</i>	1	<1		Shrub
<i>Eriachne pulchella</i> subsp. <i>dominii</i>	0.2	<1		Grass
<i>Eriachne mucronata</i>	0.3	<1		Grass
<i>Eucalyptus leucophloia</i> subsp. <i>leucophloia</i>	3.3	<1		Tree
<i>Euphorbia tannensis</i> subsp. <i>eremophila</i>	0.4	<1		Herb
<i>Goodenia stobbsiana</i>	0.3	<1		Herb
<i>Grevillea wickhamii</i> subsp. (indet)	1.4	<1		Shrub
<i>Hakea lorea</i>	0.45	<1		Shrub
<i>Hibiscus burtonii</i>	0.25	<1		Shrub
<i>Indigofera monophylla</i>	0.4	<1		Shrub

<i>Maireana georgei</i>	0.3	<1	Shrub
<i>Maireana georgei</i>	0.3	<1	Shrub
<i>Paraneurachne muelleri</i>	0.45	<1	Grass
<i>Paspalidium clementii</i>	0.2	<1	Grass
<i>Pterocaulon sphaecelatum</i>	0.4	<1	Herb
<i>Ptilotus calostachyus</i>	0.85	0.1	Herb
<i>Ptilotus exaltatus</i>	0.55	0.1	Herb
<i>Ptilotus obovatus</i>	0.9	<1	Shrub
<i>Ptilotus macrocephalus</i>	0.35	<1	Herb
<i>Scaevola acacioides</i>	0.55	<1	Shrub
<i>Sclerolaena eriacantha</i>	0.35	<1	Shrub
<i>Senna glutinosa</i> subsp. <i>glutinosa</i>	0.4	<1	Shrub
<i>Senna glutinosa</i> subsp. <i>x luerssenii</i>	1.8	<1	Shrub
<i>Senna glutinosa</i> subsp. <i>pruinosa</i>	2.1	0.1	Shrub
<i>Senna stricta</i>	1	<1	Shrub
<i>Sida arenicola</i>	0.4	<1	Shrub
<i>Sida cardiophylla</i>	0.45	<1	Shrub
<i>Sida echinocarpa</i>	0.45	<1	Shrub
<i>Solanum ellipticum</i>	0.1	<1	Shrub
<i>Solanum lasiophyllum</i>	0.3	<1	Shrub
<i>Solanum phlomoides</i>	0.5	<1	Shrub
<i>Tribulus suberosus</i>	0.5	<1	Shrub
<i>Triodia</i> sp. Shovelanna Hill (S.van Leeuwen 3835)	0.7	10	Hummock Grass



Site WHN-R3

FLORA RELEVÉ DATA SHEET

Location	WHN-R4	Date 28/05/2011 & 08/10/2011 Surveyor A. Cole & R. Tomanovic
Relevé Area	~2500m ²	
GPS Location	Easting: 208611 Northing: 7413644	
Soil Type	Silty loam	Soil Colour Red
Topography/Aspect	Hillslope, precipitous / 170°	Disturbance Type
Vegetation Condition	Pristine	
Broad Floristic Formation	<i>Triodia</i> Hummock Grassland	
Vegetation Association	5g - Hummock Grassland of <i>Triodia epactia</i> , <i>Triodia brizoides</i> and <i>Triodia</i> sp. Shovelanna Hill (S.van Leeuwen 3835), with Low Open Woodland of <i>Acacia aptaneura</i> , <i>Eucalyptus leucophloia</i> subsp. <i>leucophloia</i> and <i>Acacia pruinocarpa</i> over Scattered Shrubs of <i>Acacia tetragonophylla</i> , <i>Scaevola acacioides</i> and <i>Acacia wanyu</i>	
Vegetation Sub-association	Low Woodland of <i>Eucalyptus leucophloia</i> subsp. <i>leucophloia</i> over Hummock Grassland of <i>Triodia epactia</i> Very Open Tussock Grassland of <i>Eriachne mucronata</i> , <i>Eriachne pulchella</i> subsp. <i>dominii</i> and <i>Cymbopogon ambiguus</i>	

Vascular plant species recorded

Species	Plant Height (m)	Coverage (%)	Flowers	Growth Form
<i>Acacia mulganeura</i>	3.5	0.1		Tree
<i>Acacia rhodophloia</i>	2.5	<1		Shrub
<i>Acacia sibirica</i>	1.3	<1		Shrub
<i>Acacia tetragonophylla</i>	1	<1		Shrub
<i>Astrotricha hamptonii</i>	1.5	<1		Shrub
<i>Cymbopogon ambiguus</i>	0.9	<1		Grass
<i>Eriachne mucronata</i>	0.3	5		Grass
<i>Eriachne pulchella</i> subsp. <i>dominii</i>	0.05	<1		Grass
<i>Eucalyptus leucophloia</i> subsp. <i>leucophloia</i>	7	20		Tree
<i>Maireana georgei</i>	0.3	<1		Shrub
<i>Maireana melanocoma</i>	0.3	<1		Shrub
<i>Scavola acacioides</i>	0.9	<1		Shrub
<i>Senna glutinosa</i> subsp. <i>glutinosa</i>	1.5	<1		Shrub
<i>Senna glutinosa</i> subsp. <i>x leurssenii</i>	1.1	<1		Shrub
<i>Senna stricta</i>	0.55	<1		Shrub
<i>Sida cardiophylla</i>	0.25	<1		Shrub
<i>Solanum lasiophyllum</i>	0.25	<1		Shrub
<i>Tribulus suberosus</i>	0.7	<1		Shrub
<i>Triodia epactia</i>	0.7	70		Hummock Grass



Site WHN-R4

FLORA RELEVÉ DATA SHEET

Location	WHN-R5	Date 28/05/2011 & 10/10/2011 Surveyor A. Cole & R. Tomanovic
Relevé Area	~2500m ²	
GPS Location	Easting: 204780 Northing: 7414796	
Soil Type	Sandy loam	Soil Colour Red
Topography/Aspect	Hillcrest, gently inclined / 330°	Disturbance Type
Vegetation Condition	Pristine	
Broad Floristic Formation	<i>Triodia</i> Hummock Grassland	
Vegetation Association	5b - Hummock Grassland of <i>Triodia</i> sp. Shovelanna Hill (S. van Leeuwen 3835) with Low Open Shrubland of <i>Acacia hilliana</i> , <i>Acacia adoxa</i> var. <i>adoxa</i> and <i>Halgania solanacea</i> var. Mt Doreen (G.M. Chippendale 4206) with Scattered Low Trees of <i>Eucalyptus leucophloia</i> subsp. <i>leucophloia</i> and <i>Acacia pruinocarpa</i>	
Vegetation Sub-association	Scattered Trees of <i>Acacia pruinocarpa</i> , <i>Eucalyptus leucophloia</i> subsp. <i>leucophloia</i> and <i>Acacia atkinsiana</i> over Scattered Mallees of <i>Eucalyptus kingsmillii</i> subsp. <i>kingsmillii</i> over Scattered Tall Shrubs of <i>Hakea cordophylla</i> over Low Open Shrubland of <i>Acacia hilliana</i> , <i>Acacia adoxa</i> var. <i>adoxa</i> , <i>Mirbelia viminalis</i> , <i>Calytrix carinata</i> and <i>Gompholobium</i> sp. Pilbara (N.F. Norris 908) over Hummock Grassland of <i>Triodia</i> sp. Shovelanna Hill (S. van Leeuwen 3835).	

Vascular plant species recorded

Species	Plant Height (m)	Coverage (%)	Flowers	Growth Form
<i>Acacia adoxa</i> var. <i>adoxa</i>	0.3	3		Shrub
<i>Acacia adsurgens</i>	1	<1		Shrub
<i>Acacia ancistrocarpa</i>	1.5	<1		Shrub
<i>Acacia atkinsiana</i>	1.3	0.1		Tree
<i>Acacia hilliana</i>	0.3	5		Shrub
<i>Acacia maitlandii</i>	1.2	<1		Shrub
<i>Acacia pachyacra</i>	1.6	<1		Shrub
<i>Acacia pruinocarpa</i>	3	1		Tree
<i>Acacia tetragonaphylla</i>	1	<1		Shrub
<i>Amphipogon sericeus</i>	0.25	<1		Grass
<i>Calytrix carinata</i>	0.5	0.2		Shrub
<i>Corymbia</i> ? <i>hamersleyana</i>	2.3	<1		Tree
<i>Eriachne lanata</i>	0.45	<1		Grass
<i>Eucalyptus kingsmillii</i> subsp. <i>kingsmillii</i>	2	<1		Mallee (tree or shrub)
<i>Eucalyptus kingsmillii</i> subsp. <i>kingsmillii</i>	2	<1		Mallee (tree or shrub)
<i>Eucalyptus leucophloia</i> subsp. <i>leucophloia</i>	5	<1		Tree
<i>Gompholobium</i> sp. Pilbara (N.F. Norris 908)	0.3	<1		Shrub
<i>Grevillea wickhamii</i> subsp. (indet)	2	<1		Shrub
<i>Hakea cordophylla</i>	3	0.4		Shrub
<i>Halgania solanacea</i> var. Mt Doreen (G.M. Chippendale 4206)	0.25	<1		Shrub
<i>Keraudrinia velutina</i> subsp. <i>elliptica</i> ms	0.4	<1		Shrub
<i>Mirbelia viminalis</i>	0.6	0.6		Shrub
<i>Ptilotus calostachyus</i>	1	<1		Herb
<i>Senna glutinosa</i> subsp. x <i>leurrssenii</i>	1.2	<1		Shrub
<i>Trianthema glossostigma</i>	0.03	<1		Herb
<i>Triodia</i> sp. Shovelanna Hill (S. van Leeuwen 3835)	0.45	65		Hummock Grass



Site WHN-R5

FLORA RELEVÉ DATA SHEET

Location	WHN-R6	Date 28/05/2011 & 11/10/2011 Surveyor A. Cole & R. Tomanovic
Relevé Area	~2500m ²	
GPS Location	Easting: 211678 Northing: 7416285	
Soil Type	Sandy clay loam	Soil Colour Red
Topography/Aspect	Hillslope, very gently inclined / 310°	Disturbance Type Fire
Vegetation Condition	Excellent	
Broad Floristic Formation	<i>Acacia</i> Low Woodland	
Vegetation Association	2c - Low Woodland of <i>Acacia aptaneura</i> and <i>Corymbia hamersleyana</i> over Very Open Shrubland of <i>Acacia wanyu</i> , <i>Acacia ancistrocarpa</i> and <i>Eremophila forrestii</i> subsp.(indet) over Very Open Hummock Grassland of <i>Triodia epactia</i> and <i>Triodia lanigera</i>	
Vegetation Sub-association	Low Open Woodland of <i>Acacia aptaneura</i> over High Open Shrubland of <i>Acacia wanyu</i> , <i>Eremophila latrobei</i> subsp. <i>filiformis</i> , <i>Acacia synchronicia</i> and <i>Santalum spicatum</i> over Scattered Shrubs of <i>Eremophila cuneifolia</i> , <i>Eremophila forrestii</i> subsp. (indet), <i>Senna glutinosa</i> subsp. <i>x leurossenii</i> and <i>Senna artemisioides</i> subsp. <i>helmsii</i> over Low Scattered Shrubs of <i>Maireana thesioides</i> , <i>Ptilotus obovatus</i> , <i>Rhagodia eremaea</i> , <i>Sclerolaena cornishana</i> and <i>Scaevola spinescens</i> over Very Open Hummock Grassland of <i>Triodia lanigera</i> , <i>Triodia epactia</i> and <i>Triodia angusta</i> with the Scattered Tussock Grass of <i>*Cenchrus ciliaris</i> , <i>Aristida contorta</i> , <i>Eriachne pulchella</i> subsp. <i>dominii</i> , <i>Eriachne mucronata</i> and <i>Enneapogon lindleyanus</i> .	

Vascular plant species recorded

Species	Plant Height (m)	Coverage (%)	Flowers	Growth Form
<i>Acacia aptaneura</i>	6	3		Tree
<i>Acacia synchronicia</i>	2.1	<1		Shrub
<i>Acacia tetragonophylla</i>	1.8	<1		Shrub
<i>Acacia wanyu</i>	2	6		Shrub
<i>Amyema fitzgeraldii</i>	0.6	<1		Mistletoe
<i>Anthobolus leptomerioides</i>	0.6	<1		Shrub
<i>Aristida contorta</i>	0.45	<1		Grass
<i>Brachyachne prostrata</i>	0.02	<1		Herb
<i>Bulbostylis barbata</i>	0.03	<1		Sedge
<i>Cenchrus ciliaris</i> *	0.4	1		Grass
<i>Cheilanthes sieberi</i> subsp. <i>sieberi</i>	0.25	<1		Fern (excluding tree ferns)
<i>Chrysopogon fallax</i>	1	<1		Grass
<i>Duperreya commixta</i>	0.4	<1		Shrub
<i>Enneapogon lindleyanus</i>	0.45	<1		Grass
<i>Enteropogon ramosus</i>	0.4	<1		Grass
<i>Eragrostis dielsii</i>	0.1	<1		Grass
<i>Eragrostis eriopoda</i>	0.25	<1		Grass
<i>Eragrostis xerophila</i>	0.45	<1		Grass
<i>Eremophila cuneifolia</i>	1.1	1		Shrub
<i>Eremophila forrestii</i> subsp. (indet)	1.2	<1		Shrub
<i>Eremophila latrobei</i> subsp. <i>filiformis</i>	2	<1		Shrub
<i>Eriachne mucronata</i>	0.4	<1		Grass
<i>Eriachne pulchella</i> subsp. <i>dominii</i>	0.05	<1		Grass
<i>Evolvulus alsinoides</i> var. <i>villosicalyx</i>	0.15	<1		Herb
<i>Hibiscus burtonii</i>	0.25	<1		Shrub
<i>Lepidium ? muelleri - ferdinandii</i>	0.4	<1		Herb
<i>Maireana georgei</i>	0.05	<1		Shrub
<i>Maireana thesioides</i>	0.8	<1		Shrub
<i>Ptilotus aevroides</i>	0.02	<1		Herb
<i>Ptilotus exaltatus</i>	0.1	<1		Herb
<i>Ptilotus obovatus</i>	0.7	<1		Shrub

<i>Rhagodia eremaea</i>	0.9	<1	Shrub
<i>Santalum spicatum</i>	2	<1	Shrub
<i>Scaevola spinescens</i>	0.7	<1	Shrub
<i>Sclerolaena cornishana</i>	0.3	<1	Shrub
<i>Sclerolaena densiflora</i>	0.04	<1	Herb
<i>Senna artemisioides</i> subsp. <i>helmsii</i>	1.6	<1	Shrub
<i>Senna glutinosa</i> subsp. <i>glutinosa</i>	1.7	<1	Shrub
<i>Senna glutinosa</i> subsp. <i>x leurssenii</i>	1.6	<1	Shrub
<i>Senna</i> sp. Meekatharra (E. Bailey 1-26)	0.4	<1	Shrub
<i>Sida fibulifera</i>	0.2	<1	Shrub
<i>Solanum phlomoides</i>	0.35	<1	Shrub
<i>Sporobolus australasicus</i>	0.05	<1	Grass
<i>Trianthema triquetra</i>	0.01	<1	Herb
<i>Triodia angusta</i>	1	<1	Hummock Grass
<i>Triodia epactia</i>	0.9	<1	Hummock Grass
<i>Triodia lanigera</i>	1	3	Hummock Grass



Site WHN-R6

FLORA RELEVÉ DATA SHEET

Location	WHN-R7	Date 28/05/2011 & 10/10/2011 Surveyor A. Cole & R. Tomanovic
Relevé Area	~2500m ²	
GPS Location	Easting: 211772 Northing: 7415118	
Soil Type	Sandy loam	Soil Colour Red
Topography/Aspect	Plain, very gently inclined / 210°	Disturbance Type Weeds and Fire
Vegetation Condition	Good	
Broad Floristic Formation	Acacia Woodland	
Vegetation Association	1a - Woodland of <i>Acacia citrinoviridis</i> , <i>Eucalyptus victrix</i> and <i>Acacia coriacea</i> subsp. <i>pendens</i> over Low Open Shrubland <i>Acacia pyrifolia</i> , <i>Corchorus crozophorifolius</i> and <i>Tephrosia rosea</i> var. <i>clementii</i> over Very Open Tussock Grassland of <i>*Cenchrus ciliaris</i> , <i>Cymbopogon procerus</i> and <i>Eulalia aurea</i>	
Vegetation Sub-association	Scattered Low Trees of <i>Corymbia hamersleyana</i> , <i>Eucalyptus camaldulensis</i> var. <i>obtusa</i> and <i>Eucalyptus xerothermica</i> over Scattered Tall Shrubs of <i>Acacia sclerosperma</i> subsp. <i>sclerosperma</i> and <i>Clerodendrum tomentosum</i> var. <i>lanceolatum</i> over Open Shrubland of <i>Acacia dictyophleba</i> , <i>Acacia citrinoviridis</i> and <i>Senna artemisioides</i> subsp. <i>filifolia</i> over Tussock Grassland of <i>*Cenchrus ciliaris</i> , <i>Eulalia aurea</i> , <i>Chrysopogon fallax</i> and <i>Themeda triandra</i> with Scattered Herbs of <i>*Malvastrum americanum</i> , <i>Euphorbia tannensis</i> subsp. <i>eremophila</i> , <i>Cleome viscosa</i> , <i>Evolvulus alsinoides</i> var. <i>villosicalyx</i> and <i>Ptilotus exaltatus</i> .	

Vascular plant species recorded

Species	Plant Height (m)	Coverage (%)	Flowers	Growth Form
<i>Abutilon otocarpum</i>	0.4	<1		Shrub
<i>Acacia citrinoviridis</i>	1.6	<1		Shrub
<i>Acacia dictyophleba</i>	1.1	7		Shrub
<i>Acacia sclerosperma</i> subsp. <i>sclerosperma</i>	2.5	<1		Shrub
<i>Aristida holathera</i> var. <i>holathera</i>	0.6	<1		Grass
<i>*Cenchrus ciliaris</i>	0.4	60		Grass
<i>Chrysopogon fallax</i>	0.2	<1		Grass
<i>Cleome viscosa</i>	0.6	<1		Herb
<i>Clerodendrum tomentosum</i> var. <i>lanceolatum</i>	2.5	<1		Shrub
<i>Corchorus crozophorifolius</i>	0.6	<1		Shrub
<i>Corchorus crozophorifolius</i>	0.6	<1		Shrub
<i>Corymbia hamersleyana</i>	8	3		Tree
<i>Enneapogon polyphyllus</i>	0.2	<1		Grass
<i>Eragrostis eriopoda</i>	0.45	<1		Grass
<i>Eucalyptus camaldulensis</i> var. <i>obtusa</i>	7	0.2		Tree
<i>Eucalyptus xerothermica</i>	6	<1		Tree
<i>Eulalia aurea</i>	0.2	1		Grass
<i>Euphorbia australis</i>	0.02	<1		Herb
<i>Euphorbia tannensis</i> subsp. <i>eremophila</i>	0.65	<1		Herb
<i>Evolvulus alsinoides</i> var. <i>villosicalyx</i>	0.2	<1		Herb
<i>Heteropogon contortus</i>	0.85	<1		Grass
<i>Hybanthus aurantiacus</i>	0.3	<1		Shrub
<i>Indigofera linnaei</i>	0.3	<1		Shrub
<i>Ipomoea muelleri</i>	0.02	<1		Vine
<i>*Malvastrum americanum</i>	0.55	1		Herb
<i>Ptilotus exaltatus</i>	0.6	<1		Herb
<i>Rutidosis helichrysoides</i> subsp. <i>helichrysoides</i>	0.1	<1		Herb
<i>Salsola ? australis</i>	0.4	<1		Herb
<i>Senna artemisioides</i> subsp. <i>helmsii</i>	0.4	<1		Shrub
<i>Senna artemisioides</i> subsp. <i>filifolia</i>	1.2	<1		Shrub
<i>Senna notabilis</i>	0.2	<1		Shrub
<i>Sida fibulifera</i>	0.1	<1		Shrub

<i>Sida</i> sp. spiciform panicles (E. Leyland s.n. 14/8/90)	1.7	<1	Shrub
<i>Tephrosia rosea</i> var. <i>glabrior</i>	0.6	<1	Shrub
<i>Themeda triandra</i>	0.5	<1	Grass
<i>Trianthema pilosa</i>	0.15	<1	Herb
<i>Triodia epactia</i>	0.9	<1	Hummock Grass



Site WHN-R7

FLORA RELEVÉ DATA SHEET

Location	WHN-R8	Date 28/05/2011 & 10/10/2011 Surveyor A. Cole & R. Tomanovic
Relevé Area	~2500m ²	
GPS Location	Easting: 202604 Northing: 7417668	
Soil Type	Sandy loam	Soil Colour Red
Topography/Aspect	Plain, level / 150°	Disturbance Type Weeds
Vegetation Condition	Very Good	
Broad Floristic Formation	Mixed Tussock Grassland	
Vegetation Association	8a - Tussock Grassland of <i>Eulalia aurea</i> , <i>Themeda triandra</i> and <i>Aristida ineaquiglumis</i> with Low Open Woodland of <i>Corymbia hamersleyana</i> , <i>Acacia aptaneura</i> and <i>Acacia citrinoviridis</i> over Open Shrubland of <i>Acacia ancistrocarpa</i> , <i>Gossypium robinsonii</i> and <i>Acacia pyrifolia</i>	
Vegetation Sub-association	Low Open Woodland of <i>Corymbia hamersleyana</i> , <i>Acacia aptaneura</i> , <i>Corymbia candida</i> subsp. (indet) and <i>Eucalyptus xerothermica</i> over Scattered Shrubs of <i>Acacia pyrifolia</i> , <i>Hakea lorea</i> , <i>Grevillea wickhamii</i> and <i>Acacia melleodora</i> over Low Scattered Shrubs of <i>Isotropis forrestii</i> , <i>Solanum lasiophyllum</i> <i>Sida fibulifera</i> and <i>Corchorus sidioides</i> Tussock Grassland of <i>Themeda triandra</i> , <i>Aristida ineaquiglumis</i> , <i>Digitaria ? brownii</i> , <i>Aristida contorta</i> and <i>Eulalia aurea</i> with Scattered Herbs of <i>Gomphrena kansii</i> , <i>Ptilotus exaltatus</i> , <i>Dysphania kalpari</i> , <i>Trichodesma zeylanicum</i> var. <i>zeylanicum</i> and <i>Cleome viscosa</i> .	

Vascular plant species recorded

Species	Plant Height (m)	Coverage (%)	Flowers	Growth Form
<i>Acacia aptaneura</i>	2.5	1		Tree
<i>Acacia bivenosa</i>	1.6	<1		Shrub
<i>Acacia melleodora</i>	1.5	<1		Shrub
<i>Acacia pachyacra</i>	0.4	<1		Shrub
<i>Acacia pyrifolia</i>	1.4	<1		Shrub
<i>Acacia tetragonophylla</i>	1.5	<1		Shrub
<i>Aristida contorta</i>	0.25	<1		Grass
<i>Aristida ineaquiglumis</i>	1	15		Grass
<i>Chrysopogon fallax</i>	1	<1		Grass
<i>Cleome viscosa</i>	0.7	<1		Herb
<i>Corchorus sidioides</i>	0.4	<1		Shrub
<i>Corymbia candida</i> subsp. (indet)	7	0.3		Tree
<i>Corymbia hamersleyana</i>	4	2		Tree
<i>Cucumis maderaspatanus</i>	0.6	<1		Herb
<i>Digitaria ? brownii</i>	1.2	10		Grass
<i>Dysphania kalpari</i>	0.05	<1		Herb
<i>Enneapogon polyphyllus</i>	0.2	<1		Grass
<i>Enneapogon robustissimus</i>	0.5	<1		Grass
<i>Eremophila lanceolata</i>	0.5	<1		Shrub
<i>Eremophila longifolia</i>	1.5	<1		Shrub
<i>Eucalyptus xerothermica</i>	3.5	0.3		Tree
<i>Eulalia aurea</i>	0.6	<1		Grass
<i>Euphorbia australis</i>	0.1	<1		Herb
<i>Evolvulus alsinoides</i> var. <i>villosicalyx</i>	0.3	<1		Herb
<i>Gomphrena kansii</i>	0.3	<1		Herb
<i>Goodenia ? prostrata</i>	0.3	<1		Herb
<i>Goodenia vilmorinae</i>	0.55	<1		Herb
<i>Gossypium robinsonii</i>	1.4	<1		Shrub
<i>Grevillea wickhamii</i>	1.8	<1		Shrub
<i>Hakea lorea</i>	1.5	<1		Shrub
<i>Ipomoea diamantinensis</i>	1	<1		Vine
<i>Isotropis forrestii</i>	1.1	<1		Shrub

<i>Malvastrum americanum*</i>	0.4	<1	Herb
<i>Pluchea dentex</i>	0.3	<1	Herb
<i>Ptilotus exaltatus</i>	0.6	<1	Herb
<i>Ptilotus polystachyus</i>	0.35	<1	Herb
<i>Rhodanthe ? humboldtiana</i>	0.1	<1	Herb
<i>Rulingia luteiflora</i>	1.7	<1	Shrub
<i>Rutidosia helichrysoides</i> subsp. <i>helichrysoides</i>	0.6	<1	Herb
<i>Salsola ? australis</i>	0.1	<1	Herb
<i>Senna artemisioides</i> subsp. <i>oligophylla</i> hybrid	1.2	<1	Shrub
<i>Senna artemisioides</i> subsp. <i>oligophylla</i>	0.4	<1	Shrub
<i>Senna glaucifolia</i>	0.6	<1	Shrub
<i>Senna</i> sp. Meekatharra (E. Bailey 1-26)	0.3	<1	Shrub
<i>Sida fibulifera</i>	0.15	<1	Shrub
<i>Sida platycalyx</i>	0.2	<1	Shrub
<i>Solanum ellipticum</i>	0.35	<1	Shrub
<i>Solanum lasiophyllum</i>	0.45	<1	Shrub
<i>Solanum sturtianum</i>	0.7	<1	Shrub
<i>Streptoglossa bubakii</i>	0.35	<1	Herb
<i>Streptoglossa macrocephala</i>	0.5	<1	Shrub
<i>Themeda triandra</i>	0.9	25	Grass
<i>Trichodesma zeylanicum</i> var. <i>zeylanicum</i>	0.6	<1	Herb



Site WHN-R8

FLORA RELEVÉ DATA SHEET

Location	WHN-R9	Date 28/05/2011 & 08/10/2011 Surveyor K. McCreery
Relevé Area	~2500m ²	
GPS Location	Easting: 210142 Northing: 7414631	
Soil Type	Sandy loam	Soil Colour Red
Topography/Aspect	Hillslope, moderately inclined	Disturbance Type Fire
Vegetation Condition	Excellent	
Broad Floristic Formation	<i>Triodia</i> Open Hummock Grassland	
Vegetation Association	6d - Open Hummock Grassland of <i>Triodia</i> sp. Shovelanna Hill (S.van Leeuwen 3835), <i>Triodia epactia</i> and <i>Triodia brizoides</i> with Low Open Woodland of <i>Acacia aptaneura</i> , <i>Acacia ? pteraneura</i> (hybrid?) and <i>Acacia rhodophloia</i> over Open Shrubland of <i>Acacia tetragonophylla</i> , <i>Acacia adsurgens</i> and <i>Senna glutinosa</i> subsp. <i>glutinosa</i>	
Vegetation Sub-association	Scattered Low Trees of <i>Eucalyptus leucophloia</i> subsp. <i>leucophloia</i> over Scattered Shrubs of <i>Senna glutinosa</i> subsp. <i>pruinosa</i> , <i>Senna glutinosa</i> subsp. <i>x luerssenii</i> and <i>Acacia trudgeniana</i> over Low Open Shrubland of <i>Acacia hilliana</i> , <i>Acacia adoxa</i> var. <i>adoxo</i> and <i>Ptilotus obovatus</i> over Open Hummock Grassland of <i>Triodia</i> sp. Shovelanna Hill (S.van Leeuwen 3835) with Scattered Herbs of <i>Goodenia stobbsiana</i> , <i>Ptilotus exaltatus</i> and <i>Ptilotus calostachyus</i> .	

Vascular plant species recorded

Species	Plant Height (m)	Coverage (%)	Flowers	Growth Form
<i>Acacia adoxa</i> var. <i>adoxo</i>	0.3	0.5		Shrub
<i>Acacia hilliana</i>	0.3	2		Shrub
<i>Acacia trudgeniana</i>	1.3	<1		Shrub
<i>Amphipogon sericeus</i>	0.3	<1		Grass
<i>Eucalyptus leucophloia</i> subsp. <i>leucophloia</i>	6	0.5		Tree
<i>Goodenia stobbsiana</i>	0.25	0.5		Herb
<i>Ptilotus calostachyus</i>	0.4	<1		Herb
<i>Ptilotus exaltatus</i>	0.2	<1		Herb
<i>Ptilotus obovatus</i>	0.2	0.5		Shrub
<i>Senna glutinosa</i> subsp. <i>pruinosa</i>	1.5	0.5		Shrub
<i>Senna glutinosa</i> subsp. <i>x luerssenii</i>	1.4	<1		Shrub
<i>Triodia</i> sp. Shovelanna Hill (S.van Leeuwen 3835)	0.9	25		Hummock Grass



Site WHN-R9

FLORA RELEVÉ DATA SHEET

Location	WHN-R10	Date 28/05/2011 & 08/10/2011 Surveyor K. McCreery
Relevé Area	~2500m ²	
GPS Location	Easting: 210632 Northing: 7414879	
Soil Type	Silty loam	Soil Colour Red
Topography/Aspect	Hillslope, steep	Disturbance Type Fire
Vegetation Condition	Excellent	
Broad Floristic Formation	<i>Triodia</i> Open Hummock Grassland	
Vegetation Association	6d - Open Hummock Grassland of <i>Triodia</i> sp. Shovelanna Hill (S.van Leeuwen 3835), <i>Triodia epactia</i> and <i>Triodia brizoides</i> with Low Open Woodland of <i>Acacia aptaneura</i> , <i>Acacia ? pteraneura</i> (hybrid?) and <i>Acacia rhodophloia</i> over Open Shrubland of <i>Acacia tetragonophylla</i> , <i>Acacia adsurgens</i> and <i>Senna glutinosa</i> subsp. <i>glutinosa</i>	
Vegetation Sub-association	Low Open Woodland of <i>Acacia aptaneura</i> and <i>Eucalyptus leucophloia</i> subsp. <i>leucophloia</i> over Open Shrubland of <i>Acacia</i> sp. (indet) over Low Scattered Shrubs of <i>Senna stricta</i> , <i>Maireana melanocoma</i> and <i>Eremophila cuneifolia</i> over Scattered Hummock Grass of <i>Triodia</i> sp. Shovelanna Hill (S.van Leeuwen 3835) with Scattered Herbs of <i>Ptilotus exaltatus</i> .	

Vascular plant species recorded

Species	Plant Height (m)	Coverage (%)	Flowers	Growth Form
<i>Acacia aptaneura</i>	3	3		Tree
<i>Acacia</i> sp. (indet)	2	2		Shrub
<i>Eremophila cuneifolia</i>	0.5	<1		Shrub
<i>Eriachne mucronata</i>	0.4	0.5		Grass
<i>Eucalyptus leucophloia</i> subsp. <i>leucophloia</i>	7	0.5		Tree
<i>Maireana melanocoma</i>	0.3	0.2		Shrub
<i>Ptilotus exaltatus</i>	0.5	1		Herb
<i>Ptilotus obovatus</i>	0.5	<1		Shrub
<i>Senna stricta</i>	0.45	0.5		Shrub
<i>Triodia</i> sp. Shovelanna Hill (S.van Leeuwen 3835)	0.9	1		Hummock Grass



Site WHN-R10

FLORA RELEVÉ DATA SHEET

Location WHN-R11 **Date** 28/05/2011 & 08/10/2011
Surveyor K. McCreery

Relevé Area ~2500m²

GPS Location **Easting:** 210452
Northing: 7415092

Soil Type Silty loam **Soil Colour** Red

Topography/Aspect Hillslope, very gently inclined **Disturbance Type** Fire

Vegetation Condition Excellent

Broad Floristic Formation *Acacia* Low Woodland

Vegetation Association **2a - Low Woodland** of *Acacia aptaneura*, *Acacia ? pteraneura* and *Acacia pruinocarpa* over **Open Hummock** Grassland of *Triodia epactia* and *Triodia* sp. Shovelanna Hill (S.van Leeuwen 3835) with **Shrubland** of *Acacia wanyu*, *Acacia tetragonophylla* and *Senna stricta*

Vegetation Sub-association Low Open Woodland of *Acacia aptaneura* over Low Scattered Shrubs of *Acacia wanyu*, *Eremophila cuneifolia*, *Acacia tetragonophylla* and *Scaevola spinescens* Open Hummock Grassland of *Triodia epactia* and *Triodia* sp. Shovelanna Hill (S.van Leeuwen 3835) with Scattered Herbs of *Ptilotus exaltatus*.

Vascular plant species recorded

Species	Plant Height (m)	Coverage (%)	Flowers	Growth Form
<i>Acacia aptaneura</i>	3	8		Tree
<i>Acacia tetragonophylla</i>	1.8	<1		Shrub
<i>Acacia wanyu</i>	2	3		Shrub
<i>Eremophila cuneifolia</i>	0.5	1		Shrub
<i>Ptilotus exaltatus</i>	0.45	<1		Herb
<i>Scaevola spinescens</i>	1	<1		Shrub
<i>Triodia epactia</i>	0.5	15		Hummock Grass
<i>Triodia</i> sp. Shovelanna Hill (S.van Leeuwen 3835)	0.9	2		Hummock Grass



Site WHN-R11

FLORA RELEVÉ DATA SHEET

Location	WHN-R12	Date 28/05/2011 & 08/10/2011 Surveyor K. McCreery
Relevé Area	~2500m ²	
GPS Location	Easting: 211325 Northing: 7415328	
Soil Type	Silty loam	Soil Colour Red
Topography/Aspect	Hillslope, gently inclined	Disturbance Type Fire
Vegetation Condition	Excellent	
Broad Floristic Formation	<i>Triodia</i> Open Hummock Grassland	
Vegetation Association	6a - Open Hummock Grassland of <i>Triodia</i> sp. Shovelanna Hill (S.van Leeuwen 3835) with Low Open Shrubland of <i>Halgania solanacea</i> var. Mt Doreen (G.M. Chippendale 4206), <i>Gompholobium</i> sp. Pilbara (N.F. Norris 908) and <i>Acacia adoxa</i> var. <i>adoxo</i>	
Vegetation Sub-association	Scattered Low Trees of <i>Acacia pruinocarpa</i> and <i>Corymbia hamersleyana</i> over Scattered Shrubs of <i>Hakea cordophylla</i> and <i>Grevillea wickhamii</i> over Low Open Shrubland of <i>Acacia hilliana</i> , <i>Ptilotus obovatus</i> , <i>Calytrix carinata</i> , <i>Ptilotus rotundifolius</i> and <i>Senna glutinosa</i> subsp. <i>pruinosa</i> over Open Tussock Grassland of <i>Amphipogon sericeus</i> with Open Hummock Grassland of <i>Triodia</i> sp. Shovelanna Hill (S.van Leeuwen 3835).	

Vascular plant species recorded

Species	Plant Height (m)	Coverage (%)	Flowers	Growth Form
<i>Acacia hilliana</i>	0.4	3		Shrub
<i>Acacia pruinocarpa</i>	2	0.5		Tree
<i>Amphipogon sericeus</i>	0.3	30		Grass
<i>Calytrix carinata</i>	0.4	<1		Shrub
<i>Corymbia hamersleyana</i>	5	0.1		Tree
<i>Dampiera candidans</i>	0.4	<1		Herb
<i>Goodenia</i> sp. Sandy Creek (R.D. Royce 1653)	0.4	<1		Herb
<i>Goodenia stobbsiana</i>	0.25	<1		Herb
<i>Grevillea wickhamii</i>	1.5	<1		Shrub
<i>Hakea cordophylla</i>	2	<1		Shrub
<i>Ptilotus calostachyus</i>	1	0.5		Herb
<i>Ptilotus obovatus</i>	0.45	<1		Shrub
<i>Ptilotus rotundifolius</i>	0.65	<1		Shrub
<i>Senna glutinosa</i> subsp. <i>pruinosa</i>	0.5	0.2		Shrub
<i>Triodia</i> sp. Shovelanna Hill (S.van Leeuwen 3835)	0.9	20		Hummock Grass



Site WHN-R12

FLORA RELEVÉ DATA SHEET

Location	WHN-R13	Date 28/05/2011 & 09/10/2011 Surveyor K. McCreery
Relevé Area	~2500m ²	
GPS Location	Easting: 206203 Northing: 7413542	
Soil Type	Silty loam	Soil Colour Red
Topography/Aspect	Hillslope moderately inclined	Disturbance Type
Vegetation Condition	Excellent	
Broad Floristic Formation	<i>Triodia</i> Hummock Grassland	
Vegetation Association	5d - Hummock Grassland of <i>Triodia brizoides</i> , <i>Triodia</i> sp. Shovelanna Hill (S.van Leeuwen 3835) and <i>Triodia epactia</i> with Open Shrubland of <i>Acacia tetragonophylla</i> , <i>Eremophila fraseri</i> subsp. <i>fraseri</i> and <i>Senna glutinosa</i> subsp. <i>pruinosa</i>	
Vegetation Sub-association	Scattered Low Trees of <i>Eucalyptus leucophloia</i> subsp. <i>leucophloia</i> , <i>Acacia pruinocarpa</i> and <i>Acacia aptaneura</i> over Scattered Shrubs of <i>Acacia trudgeniana</i> over Low Scattered Shrubs of <i>Ptilotus obovatus</i> , <i>Eremophila cuneifolia</i> and <i>Senna stricta</i> over Hummock Grassland of <i>Triodia</i> sp. Shovelanna Hill (S.van Leeuwen 3835).	

Vascular plant species recorded

Species	Plant Height (m)	Coverage (%)	Flowers	Growth Form
<i>Acacia aptaneura</i>	3.2	<1		Tree
<i>Acacia pruinocarpa</i>	4	0.5		Tree
<i>Acacia trudgeniana</i>	1.5	<1		Shrub
<i>Eremophila cuneifolia</i>	0.45	<1		Shrub
<i>Eucalyptus leucophloia</i> subsp. <i>leucophloia</i>	5	0.5		Tree
<i>Ptilotus obovatus</i>	0.35	1		Shrub
<i>Senna stricta</i>	0.3	<1		Shrub
<i>Triodia</i> sp. Shovelanna Hill (S.van Leeuwen 3835)	0.7	45		Hummock Grass



Site WHN-R13

FLORA RELEVÉ DATA SHEET

Location WHN-R14 **Date** 28/05/2011 & 09/10/2011
Surveyor K. McCreery

Relevé Area ~2500m²
GPS Location **Easting:** 206457
Northing: 7413626

Soil Type Silty loam **Soil Colour** Red

Topography/Aspect Hillslope, moderately inclined **Disturbance Type**

Vegetation Condition Excellent

Broad Floristic Formation *Triodia Hummock Grassland*

Vegetation Association **5g - Hummock Grassland** of *Triodia epactia*, *Triodia brizoides* and *Triodia* sp. Shovelanna Hill (S.van Leeuwen 3835), with **Low Open Woodland** of *Acacia aptaneura*, *Eucalyptus leucophloia* subsp. *leucophloia* and *Acacia pruinocarpa* over **Scattered Shrubs** of *Acacia tetragonophylla*, *Scaevola acacioides* and *Acacia wanyu*

Vegetation Sub-association Scattered Trees of *Acacia aptaneura* over Scattered Shrubs of *Acacia tetragonophylla* over Low Open Shrubland of *Eremophila cuneifolia*, *Senna stricta*, *Ptilotus obovatus* and *Scaevola acacioides* over Hummock Grassland of *Triodia brizoides*, *Triodia* sp. Shovelanna Hill (S.van Leeuwen 3835) and *Triodia epactia*.

Vascular plant species recorded

Species	Plant Height (m)	Coverage (%)	Flowers	Growth Form
<i>Acacia aptaneura</i>	3.2	0.5		Tree
<i>Acacia tetragonophylla</i>	2	0.5		Shrub
<i>Eremophila cuneifolia</i>	0.5	1		Shrub
<i>Ptilotus obovatus</i>	0.5	1		Shrub
<i>Scaevola acacioides</i>	1	<1		Shrub
<i>Senna stricta</i>	0.5	1		Shrub
<i>Triodia brizoides</i>	0.75	25		Hummock Grass
<i>Triodia epactia</i>	0.6	2		Hummock Grass
<i>Triodia</i> sp. Shovelanna Hill (S.van Leeuwen 3835)	1	10		Hummock Grass



Site WHN-R14

FLORA RELEVÉ DATA SHEET

Location WHN-R15 **Date** 28/05/2011 & 09/10/2011
Surveyor K. McCreery

Relevé Area ~2500m²
GPS Location **Easting:** 206558
Northing: 7413614

Soil Type Silty loam **Soil Colour** Red

Topography/Aspect Hill slope, gently inclined

Vegetation Condition Excellent

Broad Floristic Formation *Triodia* Hummock Grassland

Vegetation Association **5g - Hummock Grassland** of *Triodia epactia*, *Triodia brizoides* and *Triodia* sp. Shovelanna Hill (S.van Leeuwen 3835), with **Low Open Woodland** of *Acacia aptaneura*, *Eucalyptus leucophloia* subsp. *leucophloia* and *Acacia pruinocarpa* over **Scattered Shrubs** of *Acacia tetragonophylla*, *Scaevola acacioides* and *Acacia wanyu*

Vegetation Sub-association Scattered Low Trees of *Eucalyptus leucophloia* subsp. *leucophloia*, *Acacia aptaneura* and *Acacia pruinocarpa* over Scattered Shrubs of *Acacia tetragonophylla* over Low Scattered Shrubs of *Scaevola acacioides*, *Ptilotus obovatus* and *Senna* sp. (indet) over Scattered Hummock Grass of *Triodia brizoides*

Vascular plant species recorded

Species	Plant Height (m)	Coverage (%)	Flowers	Growth Form
<i>Acacia aptaneura</i>	3	<1		Tree
<i>Acacia pruinocarpa</i>	2.5	<1		Tree
<i>Acacia tetragonophylla</i>	1.8	<1		Shrub
<i>Eucalyptus leucophloia</i> subsp. <i>leucophloia</i>	7	1		Tree
<i>Ptilotus obovatus</i>	0.25	0.5		Shrub
<i>Scaevola acacioides</i>	2	0.5		Shrub
<i>Senna</i> sp. (indet)	1.5	0.5		Shrub
<i>Triodia brizoides</i>	0.65	<1		Hummock Grass



Site WHN-R15

FLORA RELEVÉ DATA SHEET

Location WHN-R16 **Date** 28/05/2011 & 10/10/2011
Surveyor K. McCreery

Relevé Area ~2500m²
GPS Location **Easting:** 206345
Northing: 7415201

Soil Type Silty loam **Soil Colour** Red

Topography/Aspect Hillcrest, moderately inclined **Disturbance Type**

Vegetation Condition Excellent

Broad Floristic Formation *Triodia* Hummock Grassland

Vegetation Association **5b - Hummock Grassland** of *Triodia* sp. Shovelanna Hill (S. van Leeuwen 3835) with **Low Open Shrubland** of *Acacia hilliana*, *Acacia adoxa* var. *adoxa* and *Halgania solanacea* var. Mt Doreen (G.M. Chippendale 4206) with **Scattered Low Trees** of *Eucalyptus leucophloia* subsp. *leucophloia* and *Acacia pruinocarpa*

Vegetation Sub-association Scattered Low Trees of *Acacia pruinocarpa* over Scattered Shrubs of *Hakea cordophylla*, *Senna* sp. (indet), *Grevillea wickhamii*, *Acacia trudgeniana* and *Senna glutinosa* subsp. *x leurrssenii* over Low Open Shrubland of *Acacia hilliana* and *Acacia adoxa* var. *adoxa* over Hummock Grassland of *Triodia* sp. Shovelanna Hill (S. van Leeuwen 3835) with Scattered Herbs of *Ptilotus calostachyus* and *Goodenia stobbsiana*

Vascular plant species recorded

Species	Plant Height (m)	Coverage (%)	Flowers	Growth Form
<i>Acacia adoxa</i> var. <i>adoxa</i>	0.2	<1		Shrub
<i>Acacia hilliana</i>	0.4	5		Shrub
<i>Acacia pruinocarpa</i>	2.9	<1		Tree
<i>Acacia trudgeniana</i>	1.5	<1		Shrub
<i>Amphipogon sericeus</i>	0.35	<1		Grass
<i>Goodenia stobbsiana</i>	0.3	<1		Herb
<i>Grevillea wickhamii</i>	1.7	<1		Shrub
<i>Hakea cordophylla</i>	2	1		Shrub
<i>Ptilotus calostachyus</i>	0.5	<1		Herb
<i>Senna glaucifolia</i>	1.2	<1		Shrub
<i>Senna glutinosa</i> subsp. <i>pruinosa</i>	1.2	<1		Shrub
<i>Senna glutinosa</i> subsp. <i>x leurrssenii</i>	1.4	<1		Shrub
<i>Senna</i> sp. (indet)	2	0.5		Shrub
<i>Triodia</i> sp. Shovelanna Hill (S. van Leeuwen 3835)	0.9	35		Hummock Grass



Site WHN-R16

FLORA RELEVÉ DATA SHEET

Location	WHN-R17	Date 28/05/2011 & 10/10/2011 Surveyor K. McCreery
Relevé Area	~2500m ²	
GPS Location	Easting: 206004 Northing: 7414832	
Soil Type	Silty loam	Soil Colour Brown
Topography/Aspect	Footslope, level.	Disturbance Type Weeds
Vegetation Condition	Excellent	
Broad Floristic Formation	<i>Acacia</i> Low Woodland	
Vegetation Association	2a - Low Woodland of <i>Acacia aptaneura</i> , <i>Acacia ? pteraneura</i> and <i>Acacia pruinocarpa</i> over Open Hummock Grassland of <i>Triodia epactia</i> and <i>Triodia</i> sp. Shovelanna Hill (S.van Leeuwen 3835) with Shrubland of <i>Acacia wanyu</i> , <i>Acacia tetragonophylla</i> and <i>Senna stricta</i>	
Vegetation Sub-association	Scattered Shrubs of <i>Acacia synchronicia</i> over Low Open Shrubland of <i>Maireana melanocoma</i> , <i>Sclerolaena eriacantha</i> , <i>Sclerolaena cuneata</i> and <i>Sclerolaena minuta</i> over Very Open Hummock Grassland of <i>Triodia epactia</i> .	

Vascular plant species recorded

Species	Plant Height (m)	Coverage (%)	Flowers	Growth Form
<i>Acacia synchronicia</i>	2	1		Shrub
<i>Maireana melanocoma</i>	0.3	1		Shrub
<i>Sclerolaena cuneata</i>	0.4	1		Shrub
<i>Sclerolaena eriacantha</i>	0.3	1		Shrub
<i>Sclerolaena minuta</i>	0.1	1		Shrub
<i>Triodia epactia</i>	0.7	2		Hummock Grass



Site WHN-R17

Appendix 4 Flora Species Recorded at Wheelarra Hill North

Wheelarra Hill North Species List

Family	Species Name	Conservation Status	Acacia Woodland	Acacia Low Woodland					Acacia Low Open Woodland	Acacia High Shrubland		Triodia Hummock Grassland								Triodia Open Hummock Grassland						Triodia Very Open Hummock Grassland	Mixed Tussock Grassland	Mixed Open Tussock Grassland
			1a	2a	2b	2c	2d	3a	4a	4b	5a	5b	5c	5d	5e	5f	5g	5h	6a	6b	6c	6d	6e	6f	7a	8a	9a	
Malvaceae	<i>Abutilon cunninghamii</i>	Range extension							X																			
Malvaceae	<i>Abutilon lepidum</i>		X					X	X											X		X		X				
Malvaceae	<i>Abutilon leucopetalum</i>					X									X													
Malvaceae	<i>Abutilon macrum</i>				X																X				X	X		
Malvaceae	<i>Abutilon otocarpum</i>		X		X	X	X						X									X		X	X			
Fabaceae	<i>Acacia ? macraneura</i>														X													
Fabaceae	<i>Acacia ? pteraneura</i>			X	X																X							
Fabaceae	<i>Acacia ? pteraneura (hybrid?)</i>				X	X					X						X		X	X	X					X		
Fabaceae	<i>Acacia ? rhodophloia x sibirica</i>											X					X											
Fabaceae	<i>Acacia adoxa var. adoxa</i>											X				X	X			X	X		X					
Fabaceae	<i>Acacia adsurgens</i>					X			X	X	X	X		X	X	X	X	X	X	X		X	X	X	X	X		
Fabaceae	<i>Acacia ancistrocarpa</i>					X			X	X	X	X		X	X	X	X	X	X			X	X	X	X	X		
Fabaceae	<i>Acacia aptaneura</i>			X		X	X	X	X			X	X	X	X	X	X				X				X	X		
Fabaceae	<i>Acacia atkinsiana</i>											X				X	X						X					
Fabaceae	<i>Acacia ayersiana</i>												X															
Fabaceae	<i>Acacia ayersiana (hybrid)</i>						X																					
Fabaceae	<i>Acacia bivenosa</i>					X			X		X	X	X			X	X	X	X	X		X				X		
Fabaceae	<i>Acacia catenulata subsp. occidentalis</i>			X													X											
Fabaceae	<i>Acacia citrinoviridis</i>		X			X									X										X	X		
Fabaceae	<i>Acacia coriacea subsp. pendens</i>		X																						X			
Fabaceae	<i>Acacia dictyophleba</i>		X																						X			
Fabaceae	<i>Acacia elachantha</i>								X							X	X									X		
Fabaceae	<i>Acacia hamersleyensis</i>									X										X								
Fabaceae	<i>Acacia hilliana</i>											X				X		X	X			X	X					
Fabaceae	<i>Acacia inaequilatera</i>											X																
Fabaceae	<i>Acacia maitlandii</i>								X	X	X	X	X	X			X	X	X			X	X	X		X		
Fabaceae	<i>Acacia melleodora</i>										X	X	X	X	X	X	X	X	X	X			X		X	X		
Fabaceae	<i>Acacia monticola</i>						X		X	X		X					X								X	X		
Fabaceae	<i>Acacia monticola (hybrid)</i>								X																			
Fabaceae	<i>Acacia mulganeura</i>						X										X											
Fabaceae	<i>Acacia pachyacra</i>					X			X			X	X	X		X		X	X				X	X	X			
Fabaceae	<i>Acacia paraneura</i>			X	X	X																						
Fabaceae	<i>Acacia paraneura x aptaneura</i>			X																								
Fabaceae	<i>Acacia pruinocarpa</i>			X	X	X	X	X	X		X	X	X	X	X		X	X	X			X	X	X				
Fabaceae	<i>Acacia pyrifolia</i>		X			X	X		X				X								X				X	X		
Fabaceae	<i>Acacia rhodophloia</i>			X					X		X	X	X			X		X				X						
Fabaceae	<i>Acacia sclerosperma subsp. sclerosperma</i>		X																						X			
Fabaceae	<i>Acacia sibirica</i>					X		X	X	X		X	X			X	X			X	X		X					
Fabaceae	<i>Acacia sp. (indet)</i>								X							X						X						
Fabaceae	<i>Acacia subcontorta</i>			X		X																						
Fabaceae	<i>Acacia synchronica</i>			X		X		X			X		X	X		X	X	X	X	X	X							
Fabaceae	<i>Acacia tenuissima</i>								X		X	X	X	X	X							X			X	X		
Fabaceae	<i>Acacia tetragonophylla</i>			X	X	X	X	X	X		X	X	X	X	X	X	X	X	X	X	X		X		X	X		
Fabaceae	<i>Acacia trudgeniana</i>										X		X	X	X	X	X	X	X			X	X			X		
Fabaceae	<i>Acacia wanyu</i>			X		X	X		X				X	X	X	X	X					X			X			

Wheelarra Hill North Species List			Acacia Woodland	Acacia Low Woodland					Acacia Low Open Woodland	Acacia High Shrubland	Triodia Hummock Grassland								Triodia Open Hummock Grassland						Triodia Very Open Hummock Grassland	Mixed Tussock Grassland	Mixed Open Tussock Grassland
Family	Species Name	Conservation Status	1a	2a	2b	2c	2d	3a	4a	4b	5a	5b	5c	5d	5e	5f	5g	5h	6a	6b	6c	6d	6e	6f	7a	8a	9a
Amaranthaceae	<i>Alternanthera nodiflora</i>									X																	
Amaranthaceae	<i>Alternanthera</i> sp. (indet)																										
Malvaceae	<i>Alyogyne pinoniana</i> subsp. (indet)																					X					
Amaranthaceae	<i>Amaranthus ? clementii</i>								X								X										
Amaranthaceae	<i>Amaranthus ? cuspidifolius</i>																						X				
Amaranthaceae	<i>Amaranthus mitchellii</i>							X																			
Amaranthaceae	<i>Amaranthus undulatus</i>		X																								
Lythraceae	<i>Ammannia multiflora</i>	Range extension	X							X																	
Poaceae	<i>Amphipogon sericeus</i>			X			X				X	X	X	X				X	X	X	X	X	x	X	X		
Loranthaceae	<i>Amyema fitzgeraldii</i>			X		X		X	X													X					
Santalaceae	<i>Anthobolus leptomerioides</i>			X	X	X		X	X		X				X	X	X									X	X
Poaceae	<i>Aristida ? jerichoensis</i> var. <i>subspinulifera</i>	P1							X		X																X
Poaceae	<i>Aristida contorta</i>			X	X	X		X	X			X	X	X	X	X	X			X	X	X	X	X		X	X
Poaceae	<i>Aristida holathera</i> var. <i>holathera</i>		X	X		X		X	X		X		X	X	X	X	X		X	X		X	X	X	X	X	X
Poaceae	<i>Aristida inaequiglumis</i>		X	X		X		X	X			X	X	X	X							X	X	X	X	X	X
Poaceae	<i>Aristida pruinosa</i>		X																								
Araliaceae	<i>Astrotricha hamptonii</i>									X							X			X							
Elatinaceae	<i>Bergia pedicellaris</i>					X																				X	
Asteraceae	* <i>Bidens bipinnata</i>	Introduced	X			X		X	X				X				X										
Nyctaginaceae	<i>Boerhavia coccinea</i>					X		X	X		X			X		X	X			X				X			X
Nyctaginaceae	<i>Boerhavia repleta</i>																										X
Nyctaginaceae	<i>Boerhavia schomburgkiana</i>				X																						
Convolvulaceae	<i>Bonamia erecta</i>										X	X													X		X
Convolvulaceae	<i>Bonamia</i> sp. (indet)					X			X		X	X			X										X	X	X
Convolvulaceae	<i>Bonamia</i> sp. Dampier (A.A. Mitchell PRP 217)								X				X						X								
Poaceae	<i>Brachyachne prostrata</i>					X					X						X										
Goodeniaceae	<i>Brunonia australis</i>														X												
Cyperaceae	<i>Bulbostylis barbata</i>			X	X	X	X	X	X		X	X		X	X		X	X	X			X	X	X			X
Myrtaceae	<i>Calytrix carinata</i>											X		X	X				X	X							
Lauraceae	<i>Cassytha capillaris</i>			X			X		X	X	X		X			X	X	X									
Poaceae	* <i>Cenchrus ciliaris</i>	Introduced	X			X	X	X	X		X					X	X			X				X		X	X
Gentianaceae	<i>Centaurium</i> sp. (indet)		X																								
Asteraceae	<i>Centipeda minima</i>						X			X																	
Asteraceae	<i>Centipeda minima</i> subsp. <i>macrocephala</i>		X																								
Pteridaceae	<i>Cheilanthes brownii</i>							X																			
Pteridaceae	<i>Cheilanthes lasiophylla</i>						X			X							X										
Pteridaceae	<i>Cheilanthes sieberi</i> subsp. <i>sieberi</i>				X	X				X																	
Asteraceae	<i>Chrysocephalum ? apiculatum</i>																										X
Asteraceae	<i>Chrysocephalum gilesii</i>																X										
Asteraceae	<i>Chrysocephalum pterochaetum</i>								X						X												X
Poaceae	<i>Chrysopogon fallax</i>		X			X			X							X										X	X
Cleomaceae	<i>Cleome oxalidea</i>				X																						
Cleomaceae	<i>Cleome viscosa</i>		X			X	X	X	X				X	X			X		X		X	X		X		X	X
Lamiaceae	<i>Clerodendrum tomentosum</i> var. <i>lanceolatum</i>		X				X		X	X																	X
Gyrostemonaceae	<i>Codonocarpus cotinifolius</i>														X												

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Malvaceae	<i>Corchorus crozophorifolius</i>		X			X																						
Malvaceae	<i>Corchorus lasiocarpus</i> subsp. <i>lasiocarpus</i>			X					X		X			X			X	X	X	X		X	X	X				
Malvaceae	<i>Corchorus sidoides</i> subsp. (indet)								X						X				X							X	X	
Malvaceae	<i>Corchorus sidoides</i> subsp. <i>sidoides</i>					X			X		X				X	X					X						X	
Malvaceae	<i>Corchorus tridens</i>								X																			
Myrtaceae	<i>Corymbia candida</i> subsp. (indet)								X																	X		
Myrtaceae	<i>Corymbia candida</i> subsp. <i>dipsodes</i>												X															
Myrtaceae	<i>Corymbia deserticola</i>								X																			
Myrtaceae	<i>Corymbia deserticola</i> subsp. <i>deserticola</i>												X															
Myrtaceae	<i>Corymbia ferriticola</i>						X			X																		
Myrtaceae	<i>Corymbia hamersleyana</i>		X			X	X		X		X	X	X		X	X			X						X	X	X	
Fabaceae	<i>Crotalaria medicaginea</i>								X																		X	
Cucurbitaceae	<i>Cucumis maderaspatanus</i>																										X	
Fabaceae	<i>Cullen leucanthum</i>		X																									
Fabaceae	<i>Cullen leucochaites</i>						X		X		X						X					X						
Poaceae	<i>Cymbopogon ambiguus</i>			X		X	X	X		X	X	X	X	X		X	X	X	X	X		X	X	X			X	
Poaceae	<i>Cymbopogon obtectus</i>			X		X		X	X		X	X			X			X	X	X		X		X	X	X		
Poaceae	<i>Cymbopogon procerus</i>		X						X	X																		
Apocynaceae	<i>Cynanchum floribundum</i>		X																									
Cyperaceae	<i>Cyperus ixiocarpus</i>	Range extension	X																									
Cyperaceae	<i>Cyperus squarrosus</i>		X																									
Cyperaceae	<i>Cyperus cunninghamii</i> subsp. <i>cunninghamii</i>									X																		
Cyperaceae	<i>Cyperus iria</i>						X																					
Cyperaceae	<i>Cyperus vaginatus</i>		X																									
Goodeniaceae	<i>Dampiera candidans</i>																		X				X		X	X		
Poaceae	<i>Dichanthium sericeum</i>												X		X													
Lamiaceae	<i>Dicrastylis cordifolia</i>					X							X		X										X	X	X	
Poaceae	<i>Digitaria brownii</i>			X		X	X	X	X		X				X	X	X					X				X	X	
Poaceae	<i>Digitaria ctenantha</i>							X																				
Sapindaceae	<i>Dodonaea coriacea</i>								X		X	X		X	X			X		X		X	X		X			
Sapindaceae	<i>Dodonaea pachyneura</i>						X	X		X			X				X	X	X	X		X						
Sapindaceae	<i>Dodonaea petiolaris</i>			X	X			X	X											X		X						
Sapindaceae	<i>Dodonaea viscosa</i> subsp. <i>angustissima</i>						X																					
Convolvulaceae	<i>Duperreya commixta</i>		X	X	X	X	X	X	X	X		X	X			X	X	X				X		X		X	X	
Chenopodiaceae	<i>Dysphania kalpari</i>					X				X			X												X	X		
Chenopodiaceae	<i>Dysphania rhadinostachya</i> subsp. <i>rhadinostachya</i>		X	X		X	X	X	X				X				X		X		X	X	X	X			X	
Poaceae	<i>Elytrophorus spicatus</i>		X																									
Chenopodiaceae	<i>Enchylaena tomentosa</i>			X				X					X				X					X						
Chenopodiaceae	<i>Enchylaena tomentosa</i> var. <i>tomentosa</i>																X											
Poaceae	<i>Enneapogon caeruleascens</i>					X		X					X									X		X			X	
Poaceae	<i>Enneapogon lindleyanus</i>					X		X	X				X	X		X	X			X	X	X		X			X	
Poaceae	<i>Enneapogon polyphyllus</i>		X	X	X	X		X	X		X		X	X	X	X	X	X	X	X		X	X	X		X	X	
Poaceae	<i>Enneapogon robustissimus</i>					X	X		X																		X	
Poaceae	<i>Enteropogon ramosus</i>					X																						
Poaceae	<i>Eragrostis cumingii</i>		X			X	X		X	X																	X	

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Poaceae	<i>Eragrostis dielsii</i>					X																						
Poaceae	<i>Eragrostis eriopoda</i>		X			X		X	X			X	X	X	X	X	X	X	X	X	X	X	X	X			X	
Poaceae	<i>Eragrostis olida</i>	Range extension								X																		
Poaceae	<i>Eragrostis tenellula</i>		X				X																					
Poaceae	<i>Eragrostis xerophila</i>					X																						
Scrophulariaceae	<i>Eremophila ? fraseri</i> subsp. (indet)											X																
Scrophulariaceae	<i>Eremophila cuneifolia</i>			X		X		X			X			X	X		X	X		X		X		X				
Scrophulariaceae	<i>Eremophila exilifolia</i>			X					X	X		X			X		X	X				X						
Scrophulariaceae	<i>Eremophila forrestii</i> subsp. <i>forrestii</i>				X	X						X	X														X	
Scrophulariaceae	<i>Eremophila fraseri</i> subsp. <i>fraseri</i>				X	X			X				X	X			X					X		X				
Scrophulariaceae	<i>Eremophila jucunda</i> subsp. <i>pulcherrima</i>								X																			
Scrophulariaceae	<i>Eremophila lanceolata</i>																										X	
Scrophulariaceae	<i>Eremophila latrobei</i> subsp. (indet)			X										X			X	X				X						
Scrophulariaceae	<i>Eremophila latrobei</i> subsp. <i>filiformis</i>				X	X		X							X													
Scrophulariaceae	<i>Eremophila latrobei</i> subsp. <i>latrobei</i>							X	X			X	X	X			X	X				X						
Scrophulariaceae	<i>Eremophila longifolia</i>								X																	X	X	
Scrophulariaceae	<i>Eremophila oppositifolia</i> subsp. <i>angustifolia</i>			X													X											
Scrophulariaceae	<i>Eremophila platycalyx</i> subsp. <i>pardalota</i>					X																						
Scrophulariaceae	<i>Eremophila</i> sp. (indet)				X																							
Poaceae	<i>Eriachne aristidea</i>							X	X				X	X		X			X			X	X	X	X		X	
Poaceae	<i>Eriachne lanata</i>						X			X		X			X		X	X	X									
Poaceae	<i>Eriachne mucronata</i>			X		X	X	X	X	X		X		X	X	X	X	X	X		X	X	X	X				
Poaceae	<i>Eriachne obtusa</i>		X																									
Poaceae	<i>Eriachne pulchella</i> subsp. <i>dominii</i>			X	X	X		X	X		X	X	X	X	X		X	X	X	X		X	X	X				
Poaceae	<i>Eriachne tenuiculmis</i>						X		X															X		X		
Myrtaceae	<i>Eucalyptus camaldulensis</i> subsp. <i>obtusa</i>		X																									
Myrtaceae	<i>Eucalyptus kingsmillii</i> subsp. <i>kingsmillii</i>											X																
Myrtaceae	<i>Eucalyptus gamophylla</i>			X					X			X	X			X											X	
Myrtaceae	<i>Eucalyptus leucophloia</i> subsp. <i>leucophloia</i>			X			X		X		X	X		X			X	X	X			X	X					
Myrtaceae	<i>Eucalyptus socialis</i> subsp. <i>eucentrica</i>																				X							
Myrtaceae	<i>Eucalyptus trivalva</i>								X																			
Myrtaceae	<i>Eucalyptus victrix</i>		X				X		X																			
Myrtaceae	<i>Eucalyptus xerothermica</i>		X						X																		X	
Poaceae	<i>Eulalia aurea</i>		X			X	X		X				X		X	X						X	X	X	X	X	X	
Euphorbiaceae	<i>Euphorbia</i> aff. <i>australis</i>		X			X		X	X	X			X									X		X	X			
Euphorbiaceae	<i>Euphorbia alsiniflora</i>								X																			
Euphorbiaceae	<i>Euphorbia australis</i>		X										X													X		
Euphorbiaceae	<i>Euphorbia tannensis</i> subsp. <i>eremophila</i>		X	X					X		X		X	X	X	X	X	X				X		X		X	X	
Convolvulaceae	<i>Evolvulus alsinoides</i> var. (indet)								X				X	X														
Convolvulaceae	<i>Evolvulus alsinoides</i> var. <i>decumbens</i>	Range extension	X	X					X																		X	
Convolvulaceae	<i>Evolvulus alsinoides</i> var. <i>villosicalyx</i>		X	X	X	X	X	X	X	X	X				X	X	X	X		X		X		X		X	X	
Moraceae	<i>Ficus brachypoda</i>						X			X																		
Cyperaceae	<i>Fimbristylis dichotoma</i>							X				X			X		X	X				X		X			X	
Cyperaceae	<i>Fimbristylis simulans</i>											X						X	X			X	X	X				
Frankeniaceae	<i>Frankenia setosa</i>							X				X										X						

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Fabaceae	<i>Glycine canescens</i>		X			X			X																		X	
Fabaceae	<i>Gompholobium</i> sp. Pilbara (N.F. Norris 908)								X			X						X				X						
Amaranthaceae	<i>Gomphrena ? leptoclada</i>																						X					
Amaranthaceae	<i>Gomphrena cunninghamii</i>							X	X		X							X										
Amaranthaceae	<i>Gomphrena kanisii</i>				X			X	X					X	X	X		X	X		X	X	X	X	X	X	X	
Goodeniaceae	<i>Goodenia cusackiana</i>																X											
Goodeniaceae	<i>Goodenia lamprosperma</i>		X			X					X	X	X		X		X	X	X		X	X	X	X				
Goodeniaceae	<i>Goodenia muelleriana</i>			X					X		X		X	X		X	X	X		X		X					X	
Goodeniaceae	<i>Goodenia prostrata</i>				X	X																						
Goodeniaceae	<i>Goodenia ramelii</i>																	X				X						
Goodeniaceae	<i>Goodenia</i> sp. Sandy Creek (R.D. Royce 1653)											X						X						X				
Goodeniaceae	<i>Goodenia stobbsiana</i>			X		X				X		X					X	X					X	X				
Goodeniaceae	<i>Goodenia triodiophila</i>											X			X					X								
Goodeniaceae	<i>Goodenia vilmoriniae</i>					X			X						X					X				X	X	X		
Malvaceae	<i>Gossypium australe</i>											X	X									X					X	
Malvaceae	<i>Gossypium robinsonii</i>		X			X	X		X	X					X						X				X	X	X	
Proteaceae	<i>Grevillea berryana</i>											X	X							X								
Proteaceae	<i>Grevillea striata</i>											X	X	X						X								
Proteaceae	<i>Grevillea wickhamii</i> subsp. (indet)				X	X			X		X	X	X				X	X			X			X	X	X		
Proteaceae	<i>Grevillea wickhamii</i> subsp. <i>aprica</i>									X		X					X	X				X	X				X	
Proteaceae	<i>Grevillea wickhamii</i> subsp. <i>hispidula</i>								X		X		X															
Proteaceae	<i>Hakea chordophylla</i>										X	X	X		X	X	X	X			X		X				X	
Proteaceae	<i>Hakea lorea</i>										X	X								X	X				X	X		
Proteaceae	<i>Hakea lorea</i> subsp. <i>lorea</i>				X					X	X	X		X		X	X			X		X	X	X	X	X		
Proteaceae	<i>Hakea preissii</i>			X																								
Boraginaceae	<i>Halgania solanacea</i> var. Mt Doreen (G.M. Chippendale 4206)			X					X			X	X				X	X		X								
Haloragaceae	<i>Haloragis gossei</i> var. <i>gossei</i>				X				X													X					X	
Asteraceae	<i>Helichrysum luteoalbum</i>		X																									
Boraginaceae	<i>Heliotropium inexplicitum</i>					X																X						
Boraginaceae	<i>Heliotropium tenuifolium</i>		X															X				X			X			
Poaceae	<i>Heteropogon contortus</i>		X																									
Malvaceae	<i>Hibiscus</i> aff. <i>apodus</i>	Range extension							X																			
Malvaceae	<i>Hibiscus brachychlaenus</i>								X	X		X			X					X								
Malvaceae	<i>Hibiscus burtonii</i>			X		X	X	X				X	X		X	X	X			X								
Malvaceae	<i>Hibiscus coatesii</i>			X					X								X											
Malvaceae	<i>Hibiscus haynaldii</i>			X				X	X		X		X															
Malvaceae	<i>Hibiscus leptocladus</i>				X	X																						
Malvaceae	<i>Hibiscus</i> sp. (indet)			X										X												X		
Malvaceae	<i>Hibiscus sturtii</i>								X											X					X			
Malvaceae	<i>Hibiscus sturtii</i> var. (indet)			X	X			X	X		X	X					X	X						X			X	
Malvaceae	<i>Hibiscus sturtii</i> var. <i>campylochlamys</i>								X		X		X				X	X		X								
Malvaceae	<i>Hibiscus sturtii</i> var. <i>platychlamys</i>					X			X													X			X	X		
Malvaceae	<i>Hibiscus sturtii</i> var. <i>truncatus</i>							X	X								X			X	X	X						
Violaceae	<i>Hybanthus aurantiacus</i>		X			X		X	X			X	X		X	X	X			X		X	X	X	X	X	X	
Fabaceae	<i>Indigofera ?georgei</i>								X																			

Wheelarra Hill North Species List			Acacia Woodland	Acacia Low Woodland					Acacia Low Open Woodland	Acacia High Shrubland		Triodia Hummock Grassland								Triodia Open Hummock Grassland						Triodia Very Open Hummock Grassland	Mixed Tussock Grassland	Mixed Open Tussock Grassland
Family	Species Name	Conservation Status	1a	2a	2b	2c	2d	3a	4a	4b	5a	5b	5c	5d	5e	5f	5g	5h	6a	6b	6c	6d	6e	6f	7a	8a	9a	
Fabaceae	<i>Indigofera brevidens</i>					X																					X	
Fabaceae	<i>Indigofera linnaei</i>		X																									
Fabaceae	<i>Indigofera monophylla</i>			X					X	X		X		X			X	X	X	X	X	X	X	X	X	X		
Fabaceae	<i>Indigofera rugosa</i>																						X				X	
Convolvulaceae	<i>Ipomoea diamantinensis</i>																									X	X	
Convolvulaceae	<i>Ipomoea muelleri</i>		X																									
Convolvulaceae	<i>Ipomoea polymorpha</i>								X																			
Poaceae	<i>Iseilema dolichotrichum</i>					X		X			X			X			X						X					
Fabaceae	<i>Isotropis atropurpurea</i>								X				X			X											X	
Fabaceae	<i>Isotropis forrestii</i>		X			X			X				X			X										X	X	
Oleaceae	<i>Jasminum didymum subsp. lineare</i>						X		X	X						X											X	
Fabaceae	<i>Kennedia prorepens</i>																								X	X		
Malvaceae	<i>Keraudrenia ? velutina subsp. velutina</i>																									X		
Malvaceae	<i>Keraudrenia nephrosperma</i>								X			X							X									
Malvaceae	<i>Keraudrenia sp. (indet)</i>								X			X	X		X		X	X	X			X						
Malvaceae	<i>Keraudrenia velutina subsp. elliptica ms</i>								X			X																
Myrtaceae	<i>Lamarchea sulcata</i>			X									X															
Brassicaceae	<i>Lepidium ? muelleri - ferdinandii</i>					X																						
Brassicaceae	<i>Lepidium ? pholidogynum</i>									X																		
Brassicaceae	<i>Lepidium pedicellosum</i>							X							X								X					
Brassicaceae	<i>Lepidium platypetalum</i>							X													X							
Celastraceae	<i>Macgregoria racemigera</i>																									X		
Chenopodiaceae	<i>Maireana georgei</i>			X		X		X							X		X	X					X					
Chenopodiaceae	<i>Maireana melanocoma</i>			X					X		X			X	X		X	X					X				X	
Chenopodiaceae	<i>Maireana planifolia</i>					X		X																				
Chenopodiaceae	<i>Maireana thesioides</i>			X		X									X		X											
Chenopodiaceae	<i>Maireana tomentosa subsp. tomentosa</i>							X							X	X												
Chenopodiaceae	<i>Maireana triptera</i>																			X		X						
Chenopodiaceae	<i>Maireana villosa</i>				X	X		X									X			X								
Myrtaceae	<i>Melaleuca glomerata</i>		X																									
Malvaceae	* <i>Malvastrum americanum</i>	Introduced	X																							X		
Malvaceae	<i>Melhania oblongifolia</i>					X			X							X										X	X	
Fabaceae	<i>Mirbelia viminalis</i>											X					X	X										
Molluginaceae	<i>Mollugo molluginea</i>																										X	
Solanaceae	<i>Nicotiana benthamiana</i>						X										X	X					X					
Rubiaceae	<i>Oldenlandia crouchiana</i>								X																			
Rubiaceae	<i>Oldenlandia galioides</i>	Range extension								X																		
Poaceae	<i>Panicum effusum</i>								X																			
Poaceae	<i>Paraneurachne muelleri</i>			X	X	X			X	X	X	X	X	X		X	X	X	X	X	X	X	X	X	X	X	X	
Poaceae	<i>Paspalidium clementii</i>			X	X		X	X	X	X		X	X	X		X	X	X	X	X	X	X	X	X	X	X	X	
Poaceae	<i>Paspalidium rarum</i>					X			X				X															
Poaceae	<i>Perotis rara</i>							X	X																	X	X	
Fabaceae	<i>Petalostylis cassioides</i>								X			X																
Fabaceae	<i>Petalostylis labicheoides</i>						X		X	X		X					X	X										
Phyllanthaceae	<i>Phyllanthus erwinii</i>	Range extension	X			X	X		X								X		X					X				

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Phyllanthaceae	<i>Phyllanthus maderaspatensis</i>	Range extension	X																									
Asteraceae	<i>Pluchea rubelliflora</i>		X																									
Asteraceae	<i>Pluchea dentex</i>		X				X		X																	X		
Poaceae	<i>Poaceae</i> sp. (indet)											X	X											X				
Asteraceae	<i>Podolepis</i> sp. Great Victoria Desert (A.S. George 8219)		X																									
Caryophyllaceae	<i>Polycarpaea corymbosa</i>					X					X				X									X		X		
Caryophyllaceae	<i>Polycarpaea holtzei</i>												X					X	X					X				
Caryophyllaceae	<i>Polycarpaea longiflora</i>		X					X	X				X				X											
Polygalaceae	<i>Polygala</i> sp.(indet)																								X			
Polygalaceae	<i>Polygala isingii</i>					X				X						X												
Polygalaceae	<i>Polygala</i> sp. Prostrate (P.K.Latz 4900)																										X	
Portulacaceae	* <i>Portulaca oleracea</i>	Introduced	X	X		X		X	X				X	X	X		X		X	X				X	X	X	X	
Portulacaceae	<i>Portulaca pilosa</i>					X																			X			
Rubiaceae	<i>Psydrax latifolia</i>			X					X				X				X									X		
Rubiaceae	<i>Psydrax suaveolens</i>			X													X	X										
Asteraceae	<i>Pterocaulon ? serrulatum</i>								X																			
Asteraceae	<i>Pterocaulon ? sphaeranthoides</i>						X			X										X				X			X	
Asteraceae	<i>Pterocaulon</i> sp. (indet)								X																			
Asteraceae	<i>Pterocaulon sphaecelatum</i>			X					X	X												X				X		
Amaranthaceae	<i>Ptilotus aevroides</i>					X		X																X				
Amaranthaceae	<i>Ptilotus astrolasius</i>					X			X						X			X	X			X	X	X			X	
Amaranthaceae	<i>Ptilotus auriculifolius</i>												X									X	X					
Amaranthaceae	<i>Ptilotus axillaris</i>																					X					X	
Amaranthaceae	<i>Ptilotus calostachyus</i>			X		X		X	X		X	X	X	X	X	X		X	X	X	X	X	X	X	X	X		
Amaranthaceae	<i>Ptilotus clementii</i>														X							X						
Amaranthaceae	<i>Ptilotus exaltatus</i>		X	X		X		X	X		X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	
Amaranthaceae	<i>Ptilotus exaltatus</i> var. <i>exaltatus</i>			X																							X	
Amaranthaceae	<i>Ptilotus helipteroides</i>																							X			X	
Amaranthaceae	<i>Ptilotus macrocephalus</i>																					X						
Amaranthaceae	<i>Ptilotus obovatus</i>			X		X	X	X	X		X	X	X	X	X	X	X	X	X	X	X	X	X	X		X	X	
Amaranthaceae	<i>Ptilotus obovatus</i> var. <i>obovatus</i>				X				X									X										
Amaranthaceae	<i>Ptilotus polystachyus</i>			X		X			X				X			X										X	X	
Amaranthaceae	<i>Ptilotus roei</i>				X																							
Amaranthaceae	<i>Ptilotus rotundifolius</i>											X						X	X									
Amaranthaceae	<i>Ptilotus schwartzii</i> var. <i>schwartzii</i>				X																							
Chenopodiaceae	<i>Rhagodia eremaea</i>					X		X					X							X							X	
Asteraceae	<i>Rhodanthe ? humboldtiana</i>																									X		
Asteraceae	<i>Rhodanthe margarethae</i>																			X								
Apocynaceae	<i>Rhyncharhena linearis</i>					X																						
Fabaceae	<i>Rhynchosia minima</i>					X	X	X	X				X				X					X		X		X	X	
Malvaceae	<i>Rulingia luteiflora</i>					X			X	X							X									X	X	
Asteraceae	<i>Rutidosia helichrysoides</i> subsp. <i>helichrysoides</i>		X						X																	X		
Chenopodiaceae	<i>Salsola ? australis</i>		X			X		X	X		X		X	X				X			X	X		X		X	X	
Santalaceae	<i>Santalum lanceolatum</i>			X			X		X				X			X	X	X				X		X	X	X	X	
Santalaceae	<i>Santalum spicatum</i>	Range extension				X																						

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Apocynaceae	<i>Sarcostemma viminale</i> subsp. <i>australe</i>			X																							X	
Goodeniaceae	<i>Scaevola ? browniana</i>																		X									
Goodeniaceae	<i>Scaevola acacioides</i>			X					X		X						X	X				X	X					
Goodeniaceae	<i>Scaevola amblyanthera</i> var. <i>centralis</i>																				X							
Goodeniaceae	<i>Scaevola browniana</i> subsp. <i>browniana</i>								X			X							X									
Goodeniaceae	<i>Scaevola parvifolia</i> subsp. (indet)								X				X		X	X											X	
Goodeniaceae	<i>Scaevola spinescens</i>			X		X		X	X						X	X					X							
Poaceae	<i>Schizachyrium fragile</i>			X			X		X		X	X		X		X	X	X	X	X			X	X	X			
Chenopodiaceae	<i>Sclerolaena cornishiana</i>					X									X												X	
Chenopodiaceae	<i>Sclerolaena cuneata</i>			X				X																				
Chenopodiaceae	<i>Sclerolaena densiflora</i>											X					X				X							
Chenopodiaceae	<i>Sclerolaena diacantha</i>			X																								
Chenopodiaceae	<i>Sclerolaena eriacantha</i>			X				X			X				X		X	X		X	X	X		X			X	
Chenopodiaceae	<i>Sclerolaena lanicuspis</i>																					X						
Chenopodiaceae	<i>Sclerolaena minuta</i>	Range extension		X								X																
Fabaceae	<i>Senna artemisioides</i> subsp. <i>filifolia</i>		X																									
Fabaceae	<i>Senna artemisioides</i> subsp. <i>helmsii</i>		X	X		X	X	X	X		X	X	X	X	X	X	X	X		X		X	X	X		X	X	
Fabaceae	<i>Senna artemisioides</i> subsp. <i>helmsii</i> (? hybrid)												X															
Fabaceae	<i>Senna artemisioides</i> subsp. hybrid (<i>helmsii</i> x <i>oligophylla</i>)								X																		X	
Fabaceae	<i>Senna artemisioides</i> subsp. hybrid ?(<i>sturtii</i> x <i>glaucifolia</i>)			X																								
Fabaceae	<i>Senna artemisioides</i> subsp. <i>oligophylla</i>			X	X	X	X	X	X		X	X	X	X		X	X	X	X	X	X	X		X	X	X	X	
Fabaceae	<i>Senna artemisioides</i> subsp. <i>x sturtii</i>												X															
Fabaceae	<i>Senna glaucifolia</i>				X		X		X			X	X		X		X	X				X	X				X	
Fabaceae	<i>Senna glutinosa</i> subsp. <i>glutinosa</i>				X	X		X	X		X	X	X	X	X	X	X	X	X		X	X	X	X	X			
Fabaceae	<i>Senna glutinosa</i> subsp. <i>pruinosa</i>					X			X		X	X		X	X		X	X	X	X	X	X	X	X	X			
Fabaceae	<i>Senna glutinosa</i> subsp. <i>x luerssenii</i>			X		X		X	X			X	X	X	X		X	X	X	X	X	X		X	X			
Fabaceae	<i>Senna notabilis</i>		X			X			X				X			X	X								X	X		
Fabaceae	<i>Senna sericea</i>											X																
Fabaceae	<i>Senna</i> sp. Meekatharra (E. Bailey 1-26)			X		X											X			X	X						X	
Fabaceae	<i>Senna stricta</i>			X		X		X	X		X	X		X	X		X	X		X		X	X					
Poaceae	<i>Setaria surgens</i>						X																					
Malvaceae	<i>Sida arenicola</i>			X		X			X				X			X			X	X	X	X	X	X	X		X	
Malvaceae	<i>Sida arsiniata</i>																										X	
Malvaceae	<i>Sida cardiophylla</i>					X							X		X	X	X		X	X		X		X				
Malvaceae	<i>Sida echinocarpa</i>					X		X	X		X		X				X			X	X	X		X			X	
Malvaceae	<i>Sida fibulifera</i>		X		X	X	X	X	X											X							X	
Malvaceae	<i>Sida platycalyx</i>					X	X										X		X								X	
Malvaceae	<i>Sida</i> sp. (indet)							X					X						X									
Malvaceae	<i>Sida</i> sp. Excedentifolia (J.L. Egan 1925)			X			X	X	X	X					X		X	X	X			X	X					
Malvaceae	<i>Sida</i> sp. Golden calyces glabrous (H.N. Foote 32)							X					X															
Malvaceae	<i>Sida</i> sp. Pilbara (A.A. Mitchell PRP 1543)			X					X												X	X	X					
Malvaceae	<i>Sida</i> sp. Shovelanna Hill (S. van Leeuwen 3842)			X			X			X			X						X				X					
Malvaceae	<i>Sida</i> sp. spiciform panicles (E. Leyland s.n. 14/8/90)		X			X			X								X							X		X	X	
Solanaceae	<i>Solanum lasiophyllum</i>			X		X		X	X				X				X	X	X	X		X		X				
Solanaceae	<i>Solanum centrale</i>					X						X	X		X		X		X						X			

Wheelarra Hill North Species List

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Family	Species Name	Conservation Status	1a	2a	2b	2c	2d	3a	4a	4b	5a	5b	5c	5d	5e	5f	5g	5h	6a	6b	6c	6d	6e	6f	7a	8a	9a	
Solanaceae	<i>Solanum ellipticum</i>			X		X	X	X	X	X					X	X	X	X	X		X	X	X	X		X	X	
Solanaceae	<i>Solanum lasiophyllum</i>								X			X			X													
Solanaceae	<i>Solanum phlomoides</i>		X	X	X	X	X	X	X				X				X	X	X		X	X	X	X		X		
Solanaceae	<i>Solanum sp. (indet)</i>					X						X															X	
Solanaceae	<i>Solanum sturtianum</i>					X			X			X		X	X	X			X	X				X	X	X	X	
Poaceae	<i>Sporobolus australasicus</i>			X		X			X						X		X					X						
Celastraceae	<i>Stackhousia intermedia</i>											X						X					X					
Plantaginaceae	<i>Stemodia ? viscosa</i>		X																									
Plantaginaceae	<i>Stemodia grossa</i>		X				X				X		X															
Brassicaceae	<i>Stenopetalum decipiens</i>								X										X	X		X						
Asteraceae	<i>Streptoglossa adscendens</i>								X																			
Asteraceae	<i>Streptoglossa bubakii</i>																									X		
Asteraceae	<i>Streptoglossa macrocephala</i>																					X				X	X	
Asteraceae	<i>Streptoglossa odora</i>		X																									
Surianaceae	<i>Stylobasium spathulatum</i>					X																						
Fabaceae	<i>Swainsona decurrens</i>															X												
Rubiaceae	<i>Synaptantha tillaeacea var. tillaeacea</i>		X						X																			
Fabaceae	<i>Tephrosia aff. sphaerospora</i>	Range extension				X																		X				
Fabaceae	<i>Tephrosia aff. supina</i>																		X									
Fabaceae	<i>Tephrosia rosea var. clementii</i>		X																							X		
Fabaceae	<i>Tephrosia rosea var. glabrior</i>		X			X	X		X	X																X	X	
Fabaceae	<i>Tephrosia sp. Bungaroo Creek (M.E.Trudgen 11601)</i>																		X									
Poaceae	<i>Themeda triandra</i>		X			X	X		X	X					X	X	X			X			X	X		X	X	
Araliaceae	<i>Trachymene oleracea subsp. oleracea</i>						X				X			X			X	X					X	X				
Poaceae	<i>Tragus australianus</i>							X							X													
Aizoaceae	<i>Trianthema glossostigma</i>					X						X						X	X				X	X	X			
Aizoaceae	<i>Trianthema pilosa</i>		X						X			X													X	X	X	
Aizoaceae	<i>Trianthema triquetra</i>		X			X											X											
Zygophyllaceae	<i>Tribulus hirsutus</i>													X										X		X		
Zygophyllaceae	<i>Tribulus macrocarpus</i>					X							X														X	
Zygophyllaceae	<i>Tribulus occidentalis</i>																									X		
Zygophyllaceae	<i>Tribulus platypterus</i>																							X				
Zygophyllaceae	<i>Tribulus suberosus</i>			X		X		X			X	X	X	X	X		X	X	X	X		X	X	X				
Boraginaceae	<i>Trichodesma zeylanicum var. zeylanicum</i>		X	X		X	X		X	X			X	X		X	X							X		X	X	
Poaceae	<i>Triodia angusta</i>					X					X				X						X							
Poaceae	<i>Triodia brizoides</i>			X					X		X			X			X	X				X		X				
Poaceae	<i>Triodia epactia</i>		X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X		X	X	
Poaceae	<i>Triodia lanigera</i>				X	X							X			X									X	X	X	
Poaceae	<i>Triodia melvillei</i>						X		X	X																		
Poaceae	<i>Triodia schinzii</i>																		X									
Poaceae	<i>Triodia sp. Shovelanna Hill (S. van Leeuwen 3835)</i>			X	X			X	X	X		X	X	X	X		X	X	X	X		X	X	X	X	X		
Poaceae	<i>Tripogon loliiformis</i>				X																	X		X			X	
Poaceae	<i>Triraphis mollis</i>								X																			
Malvaceae	<i>Triumfetta leptacantha</i>		X					X	X																		X	
Malvaceae	<i>Triumfetta maconochieana</i>									X																		

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Poaceae	<i>Urochloa piligera</i>																										X	
Rhamnaceae	<i>Ventilago viminalis</i>																										X	
Asteraceae	? <i>Vittadinia eremaea</i>																						X					
Campanulaceae	<i>Wahlenbergia tumidifruca</i>		X																									
Malvaceae	<i>Waltheria indica</i>		X																									
Poaceae	<i>Yakirra australiensis</i> var. <i>australiensis</i>								X				X			X	X							X	X		X	

Appendix 5 Species recorded within Wheelarra Hill North and the adjacent Jimblebar Lease areas from 1994 – 2011

Family	Species	Conservation Status			Wheeler Hill North (Syrinx, 2012)	South West Jimblebar (Syrinx 2011)	Orebody 31 (Syrinx, 2011)	Jimblebar (Outback Ecology, 2010)	Hashimoto (ecologia, 2007)	Marra Mamba (ecologia, 2006)	Jimblebar Biological Survey (BHP Iron Ore, 1994)	Jimblebar Flora and Soils Survey (ecologia, 1999)	Jimblebar-Wheeler Hill Expansion (ecologia, 2004)	Jimblebar-Wheeler Hill 3 (Biota, 2004)
		WC Act	DEC Priority Species	EPBC Act										
Polygonaceae	* <i>Acetosa vesicaria</i>									X			X	
Asteraceae	* <i>Bidens bipinnata</i>				X	X	X	X	X					
Poaceae	* <i>Cenchrus ciliaris</i>				X	X	X	X	X		X	X		
Cucurbitaceae	* <i>Cucumis melo</i>					X								
Cucurbitaceae	* <i>Cucumis myriocarpus</i>								X					
Asteraceae	* <i>Flaveria trinervia</i>							X						
Asteraceae	* <i>Lactuca serriola</i>										X			
Malvaceae	* <i>Malvastrum americanum</i>				X		X		X		X			
Portulacaceae	* <i>Portulaca oleracea</i>				X	X	X	X	X				X	
Asteraceae	* <i>Sonchus oleraceus</i>							X			X			
Zygophyllaceae	* <i>Tribulus terrestris</i>							X						
Poaceae	? <i>Dichanthium fecundum</i>										X			
Malvaceae	<i>Abutilon cryptopetalum</i>							X						
Malvaceae	<i>Abutilon cunninghamii</i>				X		X		X			X		
Malvaceae	<i>Abutilon dioicum</i>													
Malvaceae	<i>Abutilon lepidum</i>				X	X		X		X	X			
Malvaceae	<i>Abutilon leucopetalum</i>				X			X						
Malvaceae	<i>Abutilon macrum</i>				X	X	X	X	X					
Malvaceae	<i>Abutilon otocarpum</i>				X	X	X	X	X	X				
Malvaceae	<i>Abutilon oxycarpum</i>							X	X	X				
Malvaceae	<i>Abutilon trudgenii</i>							X						
Fabaceae	<i>Acacia acradenia</i>				X									
Fabaceae	<i>Acacia adoxa</i>				X		X	X		X	X			
Fabaceae	<i>Acacia adoxa</i> var. <i>adoxo</i>					X	X	X	X			X	X	
Fabaceae	<i>Acacia adsurgens</i>				X	X	X	X	X		X		X	
Fabaceae	<i>Acacia</i> aff. <i>ayersiana</i>							X						
Fabaceae	<i>Acacia ancistrocarpa</i>				X	X	X	X	X		X	X	X	
Fabaceae	<i>Acacia aneura</i>							X	X	X	X	X	X	
Fabaceae	<i>Acacia aneura</i> aff. var. <i>longicarpa</i>											X		
Fabaceae	<i>Acacia aneura</i> var. <i>aneura</i>							X	X			X		
Fabaceae	<i>Acacia aneura</i> var. <i>intermedia</i>							X	X					
Fabaceae	<i>Acacia aptaneura</i>				X	X	X	X	X					
Fabaceae	<i>Acacia atkinsiana</i>				X		X				X		X	
Fabaceae	<i>Acacia ayersiana</i>				X	X	X	X	X				X	
Fabaceae	<i>Acacia balsamea</i>							X						
Fabaceae	<i>Acacia bivenosa</i>				X		X	X	X	X	X	X	X	
Fabaceae	<i>Acacia catenulata</i>				X			X						
Fabaceae	<i>Acacia catenulata</i> subsp. <i>occidentalis</i>					X	X							
Fabaceae	<i>Acacia citrinoviridis</i>				X		X	X	X		X			
Fabaceae	<i>Acacia colei</i> var. <i>colei</i>								X			X	X	
Fabaceae	<i>Acacia coriacea</i>				X			X						
Fabaceae	<i>Acacia coriacea</i> subsp. <i>pendens</i>							X	X		X	X		
Fabaceae	<i>Acacia dictyophleba</i>				X			X	X	X	X	X		
Fabaceae	<i>Acacia elachantha</i>				X		X						X	
Fabaceae	<i>Acacia eriopoda</i>							X		X				
Fabaceae	<i>Acacia hamersleyensis</i>				X					X		X	X	
Fabaceae	<i>Acacia hilliiana</i>				X	X	X	X	X	X	X	X	X	
Fabaceae	<i>Acacia inaequilatera</i>				X		X	X	X	X	X	X		
Fabaceae	<i>Acacia incurvaneura</i>							X						
Fabaceae	<i>Acacia kempeana</i>							X			X			
Fabaceae	<i>Acacia macraneura</i>				X	X	X	X	X					
Fabaceae	<i>Acacia maitlandii</i>				X		X			X	X	X	X	
Fabaceae	<i>Acacia marramamba</i>					X		X	X	X	X	X	X	
Fabaceae	<i>Acacia melleodora</i>				X	X	X	X	X				X	
Fabaceae	<i>Acacia monticola</i>				X		X	X	X	X	X	X	X	
Fabaceae	<i>Acacia mulganeura</i>				X									
Fabaceae	<i>Acacia oswaldii</i>								X					
Fabaceae	<i>Acacia pachyacra</i>				X	X	X	X	X	X	X	X	X	
Fabaceae	<i>Acacia paraneura</i>				X	X	X	X					X	
Fabaceae	<i>Acacia paraneura</i> X <i>aptaneura</i>				X									
Fabaceae	<i>Acacia pruinocarpa</i>				X	X	X	X	X	X	X	X	X	
Fabaceae	<i>Acacia pteraneura</i>					X	X							
Fabaceae	<i>Acacia Ptychophylla</i>									X				
Fabaceae	<i>Acacia pyrifolia</i>				X	X		X	X		X	X		
Fabaceae	<i>Acacia pyrifolia</i> var. <i>morrisonii</i>							X						
Fabaceae	<i>Acacia rhodophloia</i>				X	X	X	X		X	X	X	X	
Fabaceae	<i>Acacia sclerosperma</i>				X			X			X			
Fabaceae	<i>Acacia sclerosperma</i> subsp. <i>sclerosperma</i>					X		X	X					
Fabaceae	<i>Acacia sericophylla</i>					X								
Fabaceae	<i>Acacia sibirica</i>				X		X	X	X		X	X	X	
Fabaceae	<i>Acacia subcontorta</i>				X									
Fabaceae	<i>Acacia synchronicia</i>				X	X	X	X					X	
Fabaceae	<i>Acacia tenuissima</i>				X	X	X	X	X	X	X	X	X	
Fabaceae	<i>Acacia tetragonophylla</i>				X	X	X	X	X	X	X	X	X	
Fabaceae	<i>Acacia trachycarpa</i>											X		
Fabaceae	<i>Acacia trudgeniana</i>				X		X	X						
Fabaceae	<i>Acacia tumida</i>												X	
Fabaceae	<i>Acacia victoriae</i>					X		X			X			
Fabaceae	<i>Acacia wanyu</i>				X	X	X	X	X		X		X	
Euphorbiaceae	<i>Adriana tomentosa</i>													
Fabaceae	<i>Aenictophyton reconditum</i>													
Poaceae	<i>Alloteropsis cimicina</i>					X								
Amaranthaceae	<i>Altermanthera denticulata</i>							X						

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		WC Act	DEC Priority Species	EPBC Act										
Amaranthaceae	<i>Alternanthera nana</i>							X	X					
Amaranthaceae	<i>Alternanthera nodiflora</i>				X				X					
Malvaceae	<i>Alyogyne pinoniana</i> subsp. (indet)				X									
Amaranthaceae	<i>Amaranthus clementii</i>				X		X							
Amaranthaceae	<i>Amaranthus ? cuspidifolius</i>				X									
Amaranthaceae	<i>Amaranthus mitchellii</i>				X			X						
Amaranthaceae	<i>Amaranthus undulatus</i>				X			X		X				
Lythraceae	<i>Ammannia baccifera</i>											X		
Lythraceae	<i>Ammannia multiflora</i>				X				X					
Poaceae	<i>Amphipogon sericeus</i>				X		X	X		X	X	X	X	
Loranthaceae	<i>Amyema bifurcata</i>										X			
Loranthaceae	<i>Amyema fitzgeraldii</i>				X		X	X				X	X	
Loranthaceae	<i>Amyema gibberula</i> var. <i>gibberula</i>										X			
Loranthaceae	<i>Amyema hilliana</i>							X					X	
Loranthaceae	<i>Amyema miquelii</i>						X							
Santalaceae	<i>Anthobolus leptomerioides</i>				X	X	X	X	X		X	X		
Poaceae	<i>Aristida aff. inaequiglumis</i>						X							
Poaceae	<i>Aristida contorta</i>				X	X	X	X	X	X	X	X	X	
Poaceae	<i>Aristida holathera</i>				X		X							
Poaceae	<i>Aristida holathera</i> var. <i>holathera</i>				X		X	X	X			X	X	
Poaceae	<i>Aristida inaequiglumis</i>				X	X	X		X				X	
Poaceae	<i>Aristida ingrata</i>						X							
Poaceae	<i>Aristida ? jerichoensis</i> var. <i>subspinulifera</i>		P1		X	X	X							
Poaceae	<i>Aristida latifolia</i>							X					X	
Poaceae	<i>Aristida obscura</i>							X						
Araliaceae	<i>Astrotricha hamptonii</i>				X						X	X	X	
Chenopodiaceae	<i>Atriplex codonocarpa</i>						X	X						
Elatinaceae	<i>Bergia pedicellaris</i>				X									
Asteraceae	<i>Blumea tenella</i>					X								
Nyctaginaceae	<i>Boerhavia coccinea</i>				X	X		X						
Nyctaginaceae	<i>Boerhavia gardneri</i>					X	X							
Nyctaginaceae	<i>Boerhavia repleta</i>				X		X							
Nyctaginaceae	<i>Boerhavia schomburgkiana</i>				X		X							
Convolvulaceae	<i>Bonamia media</i> var. <i>villosa</i>							X				X	X	
Convolvulaceae	<i>Bonamia erecta</i>				X	X								
Convolvulaceae	<i>Bonamia rosea</i>					X	X	X	X	X	X	X	X	
Convolvulaceae	<i>Bonamia</i> sp. Dampier (A.A. Mitchell PRP 217)				X									
Poaceae	<i>Brachyachne prostrata</i>				X	X	X						X	
Asteraceae	<i>Brachyscome ciliaris</i> var. <i>ciliaris</i>					X								
Asteraceae	<i>Brachyscome cilioarpa</i>							X						
Asteraceae	<i>Brachyscome iberidifolia</i>							X						
Goodeniaceae	<i>Brunonia australis</i>				X				X					
Cyperaceae	<i>Bulbostylis barbata</i>				X	X	X	X	X				X	
Cyperaceae	<i>Bulbostylis turbinata</i>						X							
Orchidaceae	<i>Caladenia reticulata</i>						X							
Portulacaceae	<i>Calandrinia balonensis</i>													
Portulacaceae	<i>Calandrinia polyandra</i>					X								
Portulacaceae	<i>Calandrinia pumila</i>								X					
Portulacaceae	<i>Calandrinia ? quadrivalvis</i>					X								
Portulacaceae	<i>Calandrinia cf translucens</i>													
Asteraceae	<i>Calocephalus beardii</i>													
Asteraceae	<i>Calotis hispidula</i>							X						
Myrtaceae	<i>Calytrix carinata</i>				X	X	X	X	X	X	X	X	X	
Lauraceae	<i>Cassytha capillaris</i>				X		X	X			X	X		
Lauraceae	<i>Cassytha filliformis</i>						X						X	
Gentianaceae	<i>Centaurium</i> sp. (indet)				X									
Asteraceae	<i>Centipeda minima</i> subsp. <i>macrocephala</i>				X							X		
Asteraceae	<i>Centipeda thespidioides</i>								X					
Pteridaceae	<i>Cheilanthes brownii</i>				X					X			X	
Pteridaceae	<i>Cheilanthes lasiophylla</i>				X			X			X	X		
Pteridaceae	<i>Cheilanthes sieberi</i>				X		X			X	X			
Pteridaceae	<i>Cheilanthes sieberi</i> subsp. <i>sieberi</i>					X	X	X	X					
Poaceae	<i>Chloris pectinata</i>					X		X	X					
Asteraceae	<i>Chrysocephalum apiculatum</i>				X		X	X	X		X	X		
Asteraceae	<i>Chrysocephalum eremaeum</i>							X						
Asteraceae	<i>Chrysocephalum gilesii</i>				X			X	X					
Asteraceae	<i>Chrysocephalum pterochaetum</i>				X	X	X	X	X				X	
Poaceae	<i>Chrysopogon fallax</i>				X	X	X	X	X					
Cleomaceae	<i>Cleome oxalidea</i>				X	X	X	X						
Cleomaceae	<i>Cleome viscosa</i>				X	X	X	X	X		X	X		
Lamiaceae	<i>Clerodendrum floribundum</i>									X			X	
Lamiaceae	<i>Clerodendrum floribundum</i> var. <i>?angustifolium</i>											X		
Lamiaceae	<i>Clerodendrum tomentosum</i>				X						X			
Lamiaceae	<i>Clerodendrum tomentosum</i> var. <i>lanceolatum</i>						X							
Gyrostemonaceae	<i>Codonocarpus cotinifolius</i>				X			X	X		X	X	X	
Convolvulaceae	<i>Convolvulus remotus</i>								X					
Malvaceae	<i>Corchorus crozophorifolius</i>				X			X	X					
Malvaceae	<i>Corchorus incanus</i> subsp. <i>lithophilus</i>												X	
Malvaceae	<i>Corchorus lasiocarpus</i>				X			X						
Malvaceae	<i>Corchorus lasiocarpus</i> subsp. <i>lasiocarpus</i>													
Malvaceae	<i>Corchorus sidoides</i>								X			X		
Malvaceae	<i>Corchorus sidoides</i> subsp. <i>sidoides</i>				X		X	X					X	
Malvaceae	<i>Corchorus tridens</i>				X	X	X	X						

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		WC Act	DEC Priority Species	EPBC Act										
Myrtaceae	<i>Corymbia aspera</i>					X	X	X	X		X	X		
Myrtaceae	<i>Corymbia candida</i>													
Myrtaceae	<i>Corymbia candida</i> subsp. <i>dipsodes</i>				X									
Myrtaceae	<i>Corymbia deserticola</i>						X	X		X	X	X	X	
Myrtaceae	<i>Corymbia deserticola</i> subsp. <i>deserticola</i>				X	X		X				X		
Myrtaceae	<i>Corymbia ferritcola</i>				X			X		X	X	X	X	
Myrtaceae	<i>Corymbia hamersleyana</i>						X	X	X		X	X	X	
Fabaceae	<i>Crotalaria medicaginea</i>				X						X			
Rhamnaceae	<i>Cryptandra monticola</i>										X	X	X	
Cucurbitaceae	<i>Cucumis maderaspatanus</i>				X	X		X	X				X	
Fabaceae	<i>Cullen lachnostachys</i>												X	
Fabaceae	<i>Cullen leucanthum</i>				X			X						
Fabaceae	<i>Cullen leucochaites</i>				X			X						
Poaceae	<i>Cymbopogon ambiguus</i>				X			X	X		X	X	X	
Poaceae	<i>Cymbopogon obtectus</i>				X	X		X	X			X	X	
Poaceae	<i>Cymbopogon procerus</i>				X					X		X		
Apocynaceae	<i>Cynanchum floribundum</i>				X			X			X			
Cyperaceae	<i>Cyperus cunninghamii</i>							X					X	
Cyperaceae	<i>Cyperus cunninghamii</i> subsp. <i>cunninghamii</i>				X			X						
Cyperaceae	<i>Cyperus iria</i>				X	X			X					
Cyperaceae	<i>Cyperus ixiocarpus</i>				X			X				X		
Cyperaceae	<i>Cyperus squarrosus</i>				X			X						
Cyperaceae	<i>Cyperus vaginatus</i>				X			X						
Poaceae	<i>Dactyloctenium radulans</i>					X	X	X	X					
Goodeniaceae	<i>Dampiera candidans</i>				X			X	X	X		X	X	
Poaceae	<i>Dichanthium sericeum</i> subsp. <i>humilius</i>					X		X	X					
Poaceae	<i>Dichanthium sericeum</i> subsp. <i>polystachyum</i>								X					
Poaceae	<i>Dichanthium sericeum</i> subsp. <i>sericeum</i>					X								
Lamiaceae	<i>Dicrastylis cordifolia</i>				X	X	X	X	X		X	X	X	
Poaceae	<i>Digitaria brownii</i>				X			X	X			X		
Poaceae	<i>Digitaria ctenantha</i>				X	X		X						
Sapindaceae	<i>Diplopeltis stuartii</i> var. <i>stuartii</i>								X					
Chenopodiaceae	<i>Dissocarpus paradoxus</i>							X						
Sapindaceae	<i>Dodonaea coriacea</i>				X		X	X	X		X	X	X	
Sapindaceae	<i>Dodonaea pachyneura</i>				X	X		X				X	X	
Sapindaceae	<i>Dodonaea petiolaris</i>				X	X	X	X	X		X	X		
Sapindaceae	<i>Dodonaea viscosa</i>									X				
Sapindaceae	<i>Dodonaea viscosa</i> subsp. <i>angustissima</i>				X						X			
Sapindaceae	<i>Dodonaea viscosa</i> subsp. <i>spatulata</i>													
Droseraceae	<i>Drosera indica</i>													
Convolvulaceae	<i>Duperreya commixta</i>				X	X	X	X	X	X		X	X	
Chenopodiaceae	<i>Dysphania kalpari</i>				X	X			X				X	
Chenopodiaceae	<i>Dysphania melanocarpa</i>					X			X				X	
Chenopodiaceae	<i>Dysphania rhadinostachya</i>										X		X	
Chenopodiaceae	<i>Dysphania rhadinostachya</i> subsp. <i>rhadinostachya</i>				X			X	X					
Chenopodiaceae	<i>Dysphania saxatilis</i>								X					
Poaceae	<i>Elytrophorus spicatus</i>				X									
Chenopodiaceae	<i>Enchylaena tomentosa</i>							X			X		X	
Chenopodiaceae	<i>Enchylaena tomentosa</i> var. <i>tomentosa</i>				X			X						
Poaceae	<i>Enneapogon caeruleus</i>				X			X	X				X	
Poaceae	<i>Enneapogon lindleyanus</i>				X									
Poaceae	<i>Enneapogon polyphyllus</i>				X	X	X	X	X				X	
Poaceae	<i>Enneapogon robustissimus</i>				X	X	X							
Poaceae	<i>Enteropogon ramosus</i>				X	X	X	X						
Poaceae	<i>Eragrostis cumingii</i>				X	X		X	X				X	
Poaceae	<i>Eragrostis dielsii</i>				X			X						
Poaceae	<i>Eragrostis elongata</i>							X						
Poaceae	<i>Eragrostis eriopoda</i>				X	X	X	X	X	X	X	X	X	
Poaceae	<i>Eragrostis exigua</i>								X					
Poaceae	<i>Eragrostis falcata</i>							X						
Poaceae	<i>Eragrostis laniflora</i>							X						
Poaceae	<i>Eragrostis lanipes</i>							X						
Poaceae	<i>Eragrostis leptocarpa</i>					X		X						
Poaceae	<i>Eragrostis olida</i>				X									
Poaceae	<i>Eragrostis pergracilis</i>							X						
Poaceae	<i>Eragrostis setifolia</i>					X		X						
Poaceae	<i>Eragrostis tenellula</i>				X							X		
Poaceae	<i>Eragrostis xerophila</i>				X			X						
Scrophulariaceae	<i>Eremophila cuneifolia</i>				X	X	X	X	X		X	X	X	
Scrophulariaceae	<i>Eremophila exilifolia</i>				X	X	X	X				X	X	
Scrophulariaceae	<i>Eremophila forrestii</i>				X	X		X			X			
Scrophulariaceae	<i>Eremophila forrestii</i> subsp. <i>forrestii</i>				X		X	X	X			X		
Scrophulariaceae	<i>Eremophila fraseri</i>				X		X	X	X		X			
Scrophulariaceae	<i>Eremophila fraseri</i> subsp. <i>fraseri</i>				X	X		X				X		
Scrophulariaceae	<i>Eremophila galeata</i>					X		X						
Scrophulariaceae	<i>Eremophila jucunda</i>													
Scrophulariaceae	<i>Eremophila jucunda</i> subsp. <i>pulcherrima</i>				X			X						
Scrophulariaceae	<i>Eremophila lanceolata</i>				X	X		X	X					
Scrophulariaceae	<i>Eremophila latrobei</i>							X	X	X	X		X	
Scrophulariaceae	<i>Eremophila latrobei</i> subsp. <i>filiformis</i>				X	X	X	X	X					
Scrophulariaceae	<i>Eremophila latrobei</i> subsp. <i>glabra</i>							X				X		
Scrophulariaceae	<i>Eremophila latrobei</i> subsp. <i>latrobei</i>				X	X	X	X	X					
Scrophulariaceae	<i>Eremophila longifolia</i>						X	X	X	X	X	X	X	

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		WC Act	DEC Priority Species	EPBC Act										
Scrophulariaceae	<i>Eremophila margarethae</i>													
Scrophulariaceae	<i>Eremophila oppositifolia</i>						X						X	
Scrophulariaceae	<i>Eremophila oppositifolia</i> subsp. <i>angustifolia</i>				X		X							
Scrophulariaceae	<i>Eremophila platycalyx</i> subsp. <i>pardalota</i>				X		X							
Poaceae	<i>Eriachne aristidea</i>				X	X		X	X			X	X	
Poaceae	<i>Eriachne ciliata</i>						X							
Poaceae	<i>Eriachne flaccida</i>						X					X		
Poaceae	<i>Eriachne helmsii</i>						X	X	X			X		
Poaceae	<i>Eriachne lanata</i>				X	X	X	X				X	X	
Poaceae	<i>Eriachne mucronata</i>				X		X	X		X	X	X	X	
Poaceae	<i>Eriachne obtusa</i>				X	X		X						
Poaceae	<i>Eriachne pulchella</i>					X					X		X	
Poaceae	<i>Eriachne pulchella</i> subsp. <i>dominii</i>				X		X	X	X					
Poaceae	<i>Eriachne pulchella</i> subsp. <i>pulchella</i>						X		X					
Poaceae	<i>Eriachne tenuiculmis</i>				X									
Geraniaceae	<i>Erodium cygnorum</i>						X							
Myrtaceae	<i>Eucalyptus camaldulensis</i>						X							
Myrtaceae	<i>Eucalyptus camaldulensis</i> subsp. <i>obtusa</i>				X	X		X						
Myrtaceae	<i>Eucalyptus gamophylla</i>				X		X	X	X	X	X	X	X	
Myrtaceae	<i>Eucalyptus kingsmillii</i>									X		X		
Myrtaceae	<i>Eucalyptus kingsmillii</i> subsp. <i>kingsmillii</i>				X						X		X	
Myrtaceae	<i>Eucalyptus leucophloia</i>						X	X	X	X	X	X	X	
Myrtaceae	<i>Eucalyptus leucophloia</i> subsp. <i>leucophloia</i>				X	X	X	X				X		
Myrtaceae	<i>Eucalyptus odontocarpa</i>					X		X						
Myrtaceae	<i>Eucalyptus socialis</i> subsp. <i>eucentrica</i>				X									
Myrtaceae	<i>Eucalyptus trivalva</i>				X									
Myrtaceae	<i>Eucalyptus victrix</i>				X			X			X	X		
Myrtaceae	<i>Eucalyptus xerothermica</i>				X			X			X			
Poaceae	<i>Eulalia aurea</i>				X	X	X	X	X			X	X	
Euphorbiaceae	<i>Euphorbia alsiniflora</i>				X	X		X	X					
Euphorbiaceae	<i>Euphorbia australis</i>				X			X	X	X				
Euphorbiaceae	<i>Euphorbia biconvexa</i>								X		X			
Euphorbiaceae	<i>Euphorbia boophthona</i>							X	X					
Euphorbiaceae	<i>Euphorbia drummondii</i>						X							
Euphorbiaceae	<i>Euphorbia drummondii</i> subsp. <i>drummondii</i>					X								
Euphorbiaceae	<i>Euphorbia tannensis</i>									X				
Euphorbiaceae	<i>Euphorbia tannensis</i> subsp. <i>eremophila</i>				X	X	X	X				X	X	
Convolvulaceae	<i>Evolvulus alsinoides</i>						X				X			
Convolvulaceae	<i>Evolvulus alsinoides</i> var. <i>decumbens</i>				X	X		X						
Convolvulaceae	<i>Evolvulus alsinoides</i> var. <i>villosicalyx</i>				X	X	X	X	X				X	
Santalaceae	<i>Exocarpos aphyllus</i>						X							
Santalaceae	<i>Exocarpos sparteus</i>						X							
Moraceae	<i>Ficus brachypoda</i>				X							X	X	
Cyperaceae	<i>Fimbristylis dichotoma</i>					X	X	X	X				X	
Cyperaceae	<i>Fimbristylis simulans</i>				X		X	X					X	
Frankeniaceae	<i>Frankenia setosa</i>				X	X	X							
Fabaceae	<i>Glycine canescens</i>				X		X						X	
Asteraceae	<i>Gnephosis brevifolia</i>							X						
Fabaceae	<i>Gompholobium karjini</i>		P2					X	X	X				
Fabaceae	<i>Gompholobium polyzygum</i>							X		X	X	X	X	
Fabaceae	<i>Gompholobium</i> sp. <i>Pilbara</i> (N.F. Norris 908)				X		X							
Amaranthaceae	<i>Gomphrena affinis</i> subsp. <i>pilbarensis</i>						X							
Amaranthaceae	<i>Gomphrena canescens</i>								X					
Amaranthaceae	<i>Gomphrena canescens</i> subsp. <i>canescens</i>							X						
Amaranthaceae	<i>Gomphrena cunninghamii</i>				X			X					X	
Amaranthaceae	<i>Gomphrena kanisii</i>				X		X	X						
Amaranthaceae	<i>Gomphrena lanata</i>					X		X						
Amaranthaceae	<i>Gomphrena ? leptoclada</i>				X									
Amaranthaceae	<i>Gomphrena leptoclada</i> subsp. <i>leptoclada</i>								X					
Goodeniaceae	<i>Goodenia armitiana</i>								X					
Goodeniaceae	<i>Goodenia azurea</i>								X				X	
Goodeniaceae	<i>Goodenia cusackiana</i>				X									
Goodeniaceae	<i>Goodenia hartiana</i>		P2					X				X		
Goodeniaceae	<i>Goodenia lamprosperma</i>				X	X		X		X	X			
Goodeniaceae	<i>Goodenia microptera</i>					X	X	X						
Goodeniaceae	<i>Goodenia muelleriana</i>				X		X	X	X				X	
Goodeniaceae	<i>Goodenia nuda</i>		P4			?X	X	X	X					
Goodeniaceae	<i>Goodenia prostrata</i>				X	X	X	X	X					
Goodeniaceae	<i>Goodenia ramelii</i>				X									
Goodeniaceae	<i>Goodenia scaevolina</i>								X					
Goodeniaceae	<i>Goodenia</i> sp. <i>Sandy Creek</i>				X		X	X						
Goodeniaceae	<i>Goodenia stobbsiana</i>				X		X	X	X		X	X	X	
Goodeniaceae	<i>Goodenia tenuiloba</i>					X							X	
Goodeniaceae	<i>Goodenia triodiophila</i>				X		X	X	X			X	X	
Goodeniaceae	<i>Goodenia vilmorinae</i>				X	X	X	X	X				X	
Malvaceae	<i>Gossypium australe</i>				X				X					
Malvaceae	<i>Gossypium robinsonii</i>				X		X	X	X	X	X	X	X	
Proteaceae	<i>Grevillea berryana</i>				X	X	X	X	X			X	X	
Proteaceae	<i>Grevillea juncifolia</i> subsp. <i>juncifolia</i>						X		X				X	
Proteaceae	<i>Grevillea stenobotrya</i>									X	X			
Proteaceae	<i>Grevillea striata</i>				X	X	X						X	
Proteaceae	<i>Grevillea wickhamii</i>				X	X	X	X		X	X	X		
Proteaceae	<i>Grevillea wickhamii</i> subsp. <i>aprica</i>				X							X		

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Proteaceae	<i>Grevillea wickhamii</i> subsp. <i>hispidula</i>				X		X	X	X				X	
Proteaceae	<i>Hakea chordophylla</i>				X		X	X	X		X	X	X	
Proteaceae	<i>Hakea loranthifolia</i>						X							
Proteaceae	<i>Hakea lorea</i>					X	X						X	
Proteaceae	<i>Hakea lorea</i> subsp. <i>lorea</i>				X		X	X	X	X	X	X		
Proteaceae	<i>Hakea preissii</i>				X	X		X						
Boraginaceae	<i>Halgania solanacea</i>						X	X			X	X		
Boraginaceae	<i>Halgania solanacea</i> var. <i>Mt Doreen</i>				X	X	X	X	X				X	
Boraginaceae	<i>Halgania solanacea</i> var. <i>solanacea</i>								X					
Haloragaceae	<i>Haloragis gossei</i>												X	
Haloragaceae	<i>Haloragis gossei</i> var. <i>gossei</i>				X	X								
Haloragaceae	<i>Haloragis trigonocarpa</i>							X						
Asteraceae	<i>Helichrysum luteoalbum</i>				X			X						
Boraginaceae	<i>Heliotropium ? ovalifolium</i>											X		
Boraginaceae	<i>Heliotropium heteranthum</i>					X			X					
Boraginaceae	<i>Heliotropium inexplicitum</i>				X			X						
Boraginaceae	<i>Heliotropium tanythrix</i>					X		X						
Boraginaceae	<i>Heliotropium tenuifolium</i>				X			X	X					
Poaceae	<i>Heteropogon contortus</i>				X							X		
Malvaceae	<i>Hibiscus brachychlaenus</i>				X									
Malvaceae	<i>Hibiscus burtonii</i>				X	X	X	X	X					
Malvaceae	<i>Hibiscus coatesii</i>				X	X	X	X	X	X		X	X	
Malvaceae	<i>Hibiscus gardneri</i>													
Malvaceae	<i>Hibiscus haynaldii</i>				X									
Malvaceae	<i>Hibiscus leptocladus</i>				X		X		X					
Malvaceae	<i>Hibiscus sturtii</i>				X	X			X					
Malvaceae	<i>Hibiscus sturtii</i> var. <i>campylochlamys</i>				X		X	X	X				X	
Malvaceae	<i>Hibiscus sturtii</i> var. <i>platyklamys</i>				X		X	X	X					
Malvaceae	<i>Hibiscus sturtii</i> var. <i>truncatus</i>				X			X	X				X	
Violaceae	<i>Hybanthus aurantiacus</i>				X		X	X	X		X	X	X	
Fabaceae	<i>Indigofera brevidens</i>				X		X	X						
Fabaceae	<i>Indigofera fractiflexa</i>													
Fabaceae	<i>Indigofera georgei</i>				X			X	X					
Fabaceae	<i>Indigofera linifolia</i>							X						
Fabaceae	<i>Indigofera linnaei</i>				X			X	X					
Fabaceae	<i>Indigofera monophylla</i>				X	X	X	X	X	X	X	X	X	
Fabaceae	<i>Indigofera rugosa</i>				X									
Convolvulaceae	<i>Ipomoea calobra</i>					X		X						
Convolvulaceae	<i>Ipomoea diamantinensis</i>				X		X							
Convolvulaceae	<i>Ipomoea lonchophylla</i>							X						
Convolvulaceae	<i>Ipomoea muelleri</i>				X	X		X						
Convolvulaceae	<i>Ipomoea plebeia</i>							X						
Convolvulaceae	<i>Ipomoea polymorpha</i>				X			X						
Poaceae	<i>Iseilema dolichotrichum</i>				X			X						
Poaceae	<i>Iseilema eremaeum</i>							X						
Poaceae	<i>Iseilema membranaceum</i>					X								
Fabaceae	<i>Isotropis atropurpurea</i>				X		X	X						
Fabaceae	<i>Isotropis forrestii</i>				X	X	X	X	X					
Oleaceae	<i>Jasminum didymum</i>				X						X			
Oleaceae	<i>Jasminum didymum</i> subsp. <i>lineare</i>						X		X	X		X	X	
Fabaceae	<i>Kennedia prorepens</i>				X	X	X	X	X		X	X		
Malvaceae	<i>Keraudrenia nephrosperma</i>				X	X	X	X					X	
Malvaceae	<i>Keraudrenia velutina</i>							X						
Malvaceae	<i>Keraudrenia velutina</i> subsp. <i>elliptica</i> ms				X		X	X	X			X		
Malvaceae	<i>Keraudrenia velutina</i> subsp. <i>velutina</i>				X			X						
Myrtaceae	<i>Lamarchea sulcata</i>				X			X		X	X	X	X	
Brassicaceae	<i>Lepidium echinatum</i>								X					
Brassicaceae	<i>Lepidium muelleri-ferdinandii</i>				X			X						
Brassicaceae	<i>Lepidium oxytrichum</i>							X					X	
Brassicaceae	<i>Lepidium pedicellosum</i>				X							X	X	
Brassicaceae	<i>Lepidium phlebopetalum</i>					X	X	X					X	
Brassicaceae	<i>Lepidium pholidogynum</i>				X									
Brassicaceae	<i>Lepidium platypetalum</i>						X	X						
Loranthaceae	<i>Lysiana casuarinae</i>							X			X			
Loranthaceae	<i>Lysiana murrayi</i>								X					
Celastraceae	<i>Macgregoria racemigera</i>				X									
Chenopodiaceae	<i>Maireana georgei</i>				X		X	X				X	X	
Chenopodiaceae	<i>Maireana melanocoma</i>				X		X	X	X	X			X	
Chenopodiaceae	<i>Maireana planifolia</i>				X			X		X			X	
Chenopodiaceae	<i>Maireana planifolia</i> x <i>villosa</i>							X	X					
Chenopodiaceae	<i>Maireana platycarpa</i>													
Chenopodiaceae	<i>Maireana thesioides</i>				X	X	X	X						
Chenopodiaceae	<i>Maireana tomentosa</i> subsp. <i>tomentosa</i>				X		X		X					
Chenopodiaceae	<i>Maireana trichoptera</i>													
Chenopodiaceae	<i>Maireana triptera</i>				X		X	X						
Chenopodiaceae	<i>Maireana villosa</i>				X		X	X	X			X		
Apocynaceae	<i>Marsdenia australis</i>							X						
Myrtaceae	<i>Melaleuca glomerata</i>				X	X		X				X		
Myrtaceae	<i>Melaleuca lasiandra</i>							X						
Malvaceae	<i>Melhania oblongifolia</i>				X			X						
Asteraceae	<i>Minuria ? integerrima</i>										X			
Fabaceae	<i>Mirbelia viminalis</i>				X			X		X	X	X	X	
Molluginaceae	<i>Mollugo molluginea</i>				X	X	X	X	X					

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Poaceae	<i>Monachather paradoxus</i>							X						
Solanaceae	<i>Nicotiana benthamiana</i>				X			X	X				X	
Solanaceae	<i>Nicotiana occidentalis</i> subsp. <i>obliqua</i>							X	X					
Rubiaceae	<i>Oldenlandia crouchiana</i>				X								X	
Rubiaceae	<i>Oldenlandia galioides</i>				X									
Poaceae	<i>Panicum effusum</i>				X		X	X						
Poaceae	<i>Paraneurachne muelleri</i>				X	X	X	X	X	X	X	X	X	
Poaceae	<i>Paspalidium clementii</i>				X		X	X	X				X	
Poaceae	<i>Paspalidium rarum</i>				X		X	X						
Asteraceae	<i>Peripleura virgata</i>											X	X	
Poaceae	<i>Perotis rara</i>				X	X	X	X	X					
Fabaceae	<i>Petalostylis cassioides</i>				X		X	X						
Fabaceae	<i>Petalostylis labicheoides</i>				X		X	X	X	X	X	X	X	
Phyllanthaceae	<i>Phyllanthus erwinii</i>				X				X				X	
Phyllanthaceae	<i>Phyllanthus maderaspatensis</i>				X		X							
Asteraceae	<i>Pluchea dentex</i>				X	X	X						X	
Asteraceae	<i>Pluchea dunlopii</i>						X	X				X	X	
Asteraceae	<i>Pluchea ferdinandi-muelleri</i>											X		
Asteraceae	<i>Pluchea tetranthera</i>													
Asteraceae	<i>Podolepis capillaris</i>										X		X	
Asteraceae	<i>Podolepis</i> sp. Great Victoria Desert												X	
Caryophyllaceae	<i>Polycarpaea corymbosa</i>				X	X			X	X				
Caryophyllaceae	<i>Polycarpaea corymbosa</i> var. <i>corymbosa</i>								X	X				
Caryophyllaceae	<i>Polycarpaea holtzei</i>				X					X				
Caryophyllaceae	<i>Polycarpaea longiflora</i>				X									
Polygalaceae	<i>Polygala insingii</i>				X	X								
Polygalaceae	<i>Polygala</i> sp. Prostrate (P.K.Latz 4900)				X		X							
Portulacaceae	<i>Portulaca intraterranea</i>								X					
Portulacaceae	<i>Portulaca pilosa</i>				X	X	X	X						
Rubiaceae	<i>Psyrax latifolia</i>				X	X	X	X	X	X	X	X	X	
Rubiaceae	<i>Psyrax suaveolens</i>				X		X	X				X	X	
Asteraceae	<i>Pterocaulon serrulatum</i>				X		X							
Asteraceae	<i>Pterocaulon sphacelatum</i>				X		X		X	X	X		X	
Asteraceae	<i>Pterocaulon sphaeranthoides</i>				X		X	X	X			X		
Amaranthaceae	<i>Ptilotus aevoides</i>				X	X	X	X						
Amaranthaceae	<i>Ptilotus astrolasius</i>				X		X	X	X		X	X	X	
Amaranthaceae	<i>Ptilotus auriculifolius</i>				X								X	
Amaranthaceae	<i>Ptilotus axillaris</i>				X									
Amaranthaceae	<i>Ptilotus calostachyus</i>				X		X	X	X	X	X	X	X	
Amaranthaceae	<i>Ptilotus clementii</i>				X			X					X	
Amaranthaceae	<i>Ptilotus drummondii</i>										X			
Amaranthaceae	<i>Ptilotus exaltatus</i>					X	X	X		X	X		X	
Amaranthaceae	<i>Ptilotus exaltatus</i> var. <i>exaltatus</i>				X		X	X	X					
Amaranthaceae	<i>Ptilotus gaudichaudii</i> var. <i>gaudichaudii</i>					X			X					
Amaranthaceae	<i>Ptilotus gomphrenoides</i>						X							
Amaranthaceae	<i>Ptilotus helipteroides</i>				X	X		X	X					
Amaranthaceae	<i>Ptilotus incanus</i>						X							
Amaranthaceae	<i>Ptilotus latifolius</i>						X							
Amaranthaceae	<i>Ptilotus macrocephalus</i>				X			X	X					
Amaranthaceae	<i>Ptilotus obovatus</i>					X	X	X	X	X	X	X	X	
Amaranthaceae	<i>Ptilotus obovatus</i> var. <i>obovatus</i>				X	X	X							
Amaranthaceae	<i>Ptilotus polystachyus</i>				X	X	X	X	X	X			X	
Amaranthaceae	<i>Ptilotus roei</i>				X	X	X	X	X					
Amaranthaceae	<i>Ptilotus rotundifolius</i>				X		X	X	X			X	X	
Amaranthaceae	<i>Ptilotus schwartzii</i>						X				X			
Amaranthaceae	<i>Ptilotus schwartzii</i> var. <i>schwartzii</i>				X	X	X	X	X					
Chenopodiaceae	<i>Rhagodia eremaea</i>				X	X	X	X	X		X	X	X	
Chenopodiaceae	<i>Rhagodia</i> sp. Hamersley		P3					X						
Asteraceae	<i>Rhodanthe charsleyae</i>													
Asteraceae	<i>Rhodanthe ? humboldtiana</i>				X									
Asteraceae	<i>Rhodanthe margarethae</i>				X			X					X	
Apocynaceae	<i>Rhyncharrhena linearis</i>				X		X	X						
Fabaceae	<i>Rhynchosia minima</i>				X		X	X	X		X		X	
Malvaceae	<i>Rulingia loxophylla</i>								X					
Malvaceae	<i>Rulingia luteiflora</i>				X	X	X	X	X		X	X		
Asteraceae	<i>Rutidosis helichrysoides</i>								X					
Asteraceae	<i>Rutidosis helichrysoides</i> subsp. <i>helichrysoides</i>				X		X	X					X	
Chenopodiaceae	<i>Salsola ? australis</i>				X									
Chenopodiaceae	<i>Salsola tragus</i>						X	X	X		X		X	
Chenopodiaceae	<i>Salsola tragus</i> subsp. <i>tragus</i>								X					
Santalaceae	<i>Santalum acuminatum</i>											X		
Santalaceae	<i>Santalum lanceolatum</i>				X		X	X	X	X	X	X	X	
Santalaceae	<i>Santalum spicatum</i>				X		X				X			
Apocynaceae	<i>Sarcostemma viminalis</i> subsp. <i>australe</i>				X		X	X	X		X			
Goodeniaceae	<i>Scaevola acacioides</i>				X						X		X	
Goodeniaceae	<i>Scaevola amblyanthera</i> var. <i>amblyanthera</i>							X						
Goodeniaceae	<i>Scaevola amblyanthera</i> var. <i>centralis</i>				X									
Goodeniaceae	<i>Scaevola browniana</i>						X	X						
Goodeniaceae	<i>Scaevola browniana</i> subsp. <i>browniana</i>				X		X		X				X	
Goodeniaceae	<i>Scaevola parvifolia</i>				X	X	X	X	X		X			
Goodeniaceae	<i>Scaevola parvifolia</i> subsp. <i>pilbarae</i>						X	X	X	X		X	X	
Goodeniaceae	<i>Scaevola spinescens</i>				X		X	X	X			X		
Poaceae	<i>Schizachyrium fragile</i>				X	X			X				X	

Family	Species	Conservation Status			Wheeler Hill North (Syrinx, 2012)	South West Jimblebar (Syrinx 2011)	Orebody 31 (Syrinx, 2011)	Jimblebar (Outback Ecology, 2010)	Hashimoto (ecologia, 2007)	Marra Mamba (ecologia, 2006)	Jimblebar Biological Survey (BHP Iron Ore, 1994)	Jimblebar Flora and Soils Survey (ecologia, 1999)	Jimblebar-Wheeler Hill Expansion (ecologia, 2004)	Jimblebar-Wheeler Hill 3 (Biota, 2004)
		WC Act	DEC Priority Species	EPBC Act										
Asteraceae	<i>Schoenia cassiniana</i>								X					
Chenopodiaceae	<i>Sclerolaena convexula</i>													
Chenopodiaceae	<i>Sclerolaena cornishiana</i>				X				X		X	X		
Chenopodiaceae	<i>Sclerolaena costata</i>							X						
Chenopodiaceae	<i>Sclerolaena cuneata</i>				X		X							
Chenopodiaceae	<i>Sclerolaena densiflora</i>				X									
Chenopodiaceae	<i>Sclerolaena deserticola</i>								X					
Chenopodiaceae	<i>Sclerolaena diacantha</i>				X									
Chenopodiaceae	<i>Sclerolaena eriacantha</i>				X		X						X	
Chenopodiaceae	<i>Sclerolaena lanicuspis</i>				X									
Chenopodiaceae	<i>Sclerolaena minuta</i>				X									
Chenopodiaceae	<i>Sclerolaena tetragona</i>								X					
Fabaceae	<i>Senna artemisioides</i>						X							
Fabaceae	<i>Senna artemisioides</i> subsp. <i>filifolia</i>						X							
Fabaceae	<i>Senna artemisioides</i> subsp. <i>helmsii</i>				X	X	X	X	X	X	X	X	X	
Fabaceae	<i>Senna artemisioides</i> subsp. <i>oligophylla</i>				X		X	X	X	X	X	X	X	
Fabaceae	<i>Senna artemisioides</i> subsp. <i>oligophylla</i> x <i>helmsii</i>				X		X		X				X	
Fabaceae	<i>Senna artemisioides</i> subsp. x <i>artemisioides</i>						X	X		X	X		X	
Fabaceae	<i>Senna artemisioides</i> subsp. x <i>sturtii</i>				X		X		X	X				
Fabaceae	<i>Senna artemisioides</i> subsp. <i>sturtii</i> x <i>glaucifolia</i>				X									
Fabaceae	<i>Senna cf sericea</i>													
Fabaceae	<i>Senna charlesiana</i>									X				
Fabaceae	<i>Senna ferraria</i>						X	X					X	
Fabaceae	<i>Senna glaucifolia</i>				X	X	X		X			X	X	
Fabaceae	<i>Senna glutinosa</i>									X				
Fabaceae	<i>Senna glutinosa</i> subsp. <i>glutinosa</i>				X		X	X	X		X	X	X	
Fabaceae	<i>Senna glutinosa</i> subsp. <i>oligophylla</i> x <i>luerssenii</i>						X							
Fabaceae	<i>Senna glutinosa</i> subsp. <i>pruinosa</i>				X		X	X	X		X	X	X	
Fabaceae	<i>Senna glutinosa</i> subsp. x <i>luerssenii</i>				X	X	X	X	X	X	X	X	X	
Fabaceae	<i>Senna hamersleyensis</i>										X			
Fabaceae	<i>Senna notabilis</i>				X	X	X	X	X	X	X	X	X	
Fabaceae	<i>Senna sericea</i>				X		X						X	
Fabaceae	<i>Senna</i> sp. Meekatharra (E. Bailey 1-26)				X	X		X					X	
Fabaceae	<i>Senna stricta</i>				X	X	X	X			X	X	X	
Fabaceae	<i>Senna venusta</i>												X	
Poaceae	<i>Setaria surgens</i>				X									
Malvaceae	<i>Sida arenicola</i>				X			X	X	X		X	X	
Malvaceae	<i>Sida arsinata</i>				X									
Malvaceae	<i>Sida brownii</i>					X								
Malvaceae	<i>Sida cardiophylla</i>				X			X	X					
Malvaceae	<i>Sida</i> cf. sp. <i>Excedentifolia</i>							X						
Malvaceae	<i>Sida clementii</i>							X						
Malvaceae	<i>Sida echinocarpa</i>				X			X					X	
Malvaceae	<i>Sida ectogama</i>						X	X						
Malvaceae	<i>Sida fibulifera</i>				X	X	X	X	X		X			
Malvaceae	<i>Sida platycalyx</i>				X	X		X	X					
Malvaceae	<i>Sida</i> sp. dark green fruits					X		X						
Malvaceae	<i>Sida</i> sp. <i>Excedentifolia</i> (J.L. Egan 1925)				X			X	X		X	X	X	
Malvaceae	<i>Sida</i> sp. Golden calyces glabrous (H.N. Foote 32)				X		X	X						
Malvaceae	<i>Sida</i> sp. Pilbara (A.A. Mitchell PRP 1543)				X			X					X	
Malvaceae	<i>Sida</i> sp. Shovelanna Hill (S.van Leeuwen 3842)				X							X	X	
Malvaceae	<i>Sida</i> sp. spiciform panicles (E. Leyland s.n. 14/8/90)				X			X						
Malvaceae	<i>Sida</i> sp. tiny glabrous fruit (A.A. Mitchell PRP1152)					X								
Solanaceae	<i>Solanum centrale</i>				X	X	X	X	X		X	X	X	
Solanaceae	<i>Solanum</i> cf. <i>lasiophyllum</i>													
Solanaceae	<i>Solanum ellipticum</i>				X		X				X			
Solanaceae	<i>Solanum horridum</i>					X		X	X			X		
Solanaceae	<i>Solanum lasiophyllum</i>				X	X		X	X	X	X	X	X	
Solanaceae	<i>Solanum phlomoides</i>				X		X		X			X	X	
Solanaceae	<i>Solanum sturtianum</i>				X		X	X						
Rubiaceae	<i>Spermacoce brachystema</i>					X			X					
Poaceae	<i>Sporobolus australasicus</i>				X	X	X		X				X	
Celastraceae	<i>Stackhousia intermedia</i>				X			X			X	X	X	
Celastraceae	<i>Stackhousia muricata</i>							X						
Celastraceae	<i>Stackhousia</i> ? sp. swollen gynophore (W.R. Baker 2041)				X									
Plantaginaceae	<i>Stemodia grossa</i>				X			X					X	
Plantaginaceae	<i>Stemodia viscosa</i>				X	X								
Brassicaceae	<i>Stenopetalum anfractum</i>							X						
Brassicaceae	<i>Stenopetalum decipiens</i>				X									
Brassicaceae	<i>Stenopetalum pedicellare</i>							X						
Asteraceae	<i>Streptoglossa bubakii</i>				X									
Asteraceae	<i>Streptoglossa ?liatroides</i>										X			
Asteraceae	<i>Streptoglossa bubakii</i>													
Asteraceae	<i>Streptoglossa cylindriceps</i>													
Asteraceae	<i>Streptoglossa decurrens</i>							X					X	
Asteraceae	<i>Streptoglossa macrocephala</i>				X			X	X		X	X	X	
Asteraceae	<i>Streptoglossa odora</i>							X						
Stylidiaceae	<i>Stylidium desertorum</i>								X					
Surianaceae	<i>Stylobasium spathulatum</i>				X		X							
Fabaceae	<i>Swainsona decurrens</i>				X				X					
Fabaceae	<i>Swainsona formosa</i>							X						
Rubiaceae	<i>Synaptantha tillaeacea</i> var. <i>tillaeacea</i>				X			X					X	
Chenopodiaceae	<i>Tecticornia disarticulata</i>					X	?	X						

Family	Species	Conservation Status			Wheeler Hill North (Syrinx, 2012)	South West Jimblebar (Syrinx 2011)	Orebody 31 (Syrinx, 2011)	Jimblebar (Outback Ecology, 2010)	Hashimoto (ecologia, 2007)	Marra Mamba (ecologia, 2006)	Jimblebar Biological Survey (BHP Iron Ore, 1994)	Jimblebar Flora and Soils Survey (ecologia, 1999)	Jimblebar-Wheeler Hill Expansion (ecologia, 2004)	Jimblebar-Wheeler Hill 3 (Biota, 2004)
		WC Act	DEC Priority Species	EPBC Act										
Fabaceae	<i>Tephrosia aff. supina</i>						X							
Fabaceae	<i>Tephrosia clementii</i>							X						
Fabaceae	<i>Tephrosia rosea</i>						X				X		X	
Fabaceae	<i>Tephrosia rosea</i> var. <i>rosea</i>					X								
Fabaceae	<i>Tephrosia rosea</i> var. <i>clementii</i>				X			X						
Fabaceae	<i>Tephrosia rosea</i> var. <i>glabrior</i>				X		X	X	X			X		
Fabaceae	<i>Tephrosia</i> sp. Bungaroo Creek				X								X	
Fabaceae	<i>Tephrosia</i> sp. Cathedral Gorge												X	
Fabaceae	<i>Tephrosia sphaerospora</i>				X	X								
Fabaceae	<i>Tephrosia supina</i>				X				X					
Poaceae	<i>Themeda avenacea</i>							X						
Poaceae	<i>Themeda triandra</i>				X	X	X	X	X		X	X	X	
Poaceae	<i>Thyridolepis xerophila</i>						X							
Araliaceae	<i>Trachymene oleracea</i>						?	X				X	X	
Araliaceae	<i>Trachymene oleracea</i> subsp. <i>oleracea</i>				X									
Poaceae	<i>Tragus australianus</i>				X	X		X						
Aizoaceae	<i>Trianthema glossostigma</i>				X		X	X	X	X	X	X	X	
Aizoaceae	<i>Trianthema oxycalyptra</i>							X	X					
Aizoaceae	<i>Trianthema pilosa</i>				X	X		X	X					
Aizoaceae	<i>Trianthema triquetra</i>				X	X	X							
Zygophyllaceae	<i>Tribulopsis angustifolia</i>					X		X	X					
Zygophyllaceae	<i>Tribulus astrocarpus</i>					X		X						
Zygophyllaceae	<i>Tribulus hirsutus</i>				X			X						
Zygophyllaceae	<i>Tribulus macrocarpus</i>				X	X	X	X	X					
Zygophyllaceae	<i>Tribulus occidentalis</i>				X									
Zygophyllaceae	<i>Tribulus platypterus</i>									X	X			
Zygophyllaceae	<i>Tribulus suberosus</i>				X	X	X	X	X			X	X	
Boraginaceae	<i>Trichodesma zeylanicum</i>						X	X		X		X	X	
Boraginaceae	<i>Trichodesma zeylanicum</i> var. <i>grandiflorum</i>						X							
Boraginaceae	<i>Trichodesma zeylanicum</i> var. <i>zeylanicum</i>				X		X	X	X			X		
Poaceae	<i>Triodia angusta</i>				X	X		X						
Poaceae	<i>Triodia basedowii</i>					X		X	X	X	X	X		
Poaceae	<i>Triodia bitextura</i>												X	
Poaceae	<i>Triodia brizoides</i>				X								X	
Poaceae	<i>Triodia epactia</i>				X	X	X							
Poaceae	<i>Triodia lanigera</i>				X		X							
Poaceae	<i>Triodia melvillei</i>				X									
Poaceae	<i>Triodia pungens</i>					X		X	X	X	X	X	X	
Poaceae	<i>Triodia schinzii</i>				X	X	X	X	X				X	
Poaceae	<i>Triodia</i> sp. Shovelanna Hill (S.van Leeuwen 3835)				X	X	X	X						
Poaceae	<i>Triodia wiseana</i>									X				
Poaceae	<i>Tripogon loliformis</i>				X	X		X						
Poaceae	<i>Triraphis mollis</i>				X									
Malvaceae	<i>Triumfetta chaetocarpa</i>						X	X						
Malvaceae	<i>Triumfetta leptacantha</i>				X				X					
Malvaceae	<i>Triumfetta maconochieana</i>				X			X			X		X	
Poaceae	<i>Urochloa holosericea</i> subsp. <i>holosericea</i>								X					
Poaceae	<i>Urochloa piligeriae</i>				X									
Poaceae	<i>Urochloa subquadripara</i>							X						
Goodeniaceae	<i>Velleia connata</i>								X					
Rhamnaceae	<i>Ventilago viminalis</i>				X									
Asteraceae	<i>Vittadinia eremaea</i>				X				X					
Campanulaceae	<i>Wahlenbergia tumidiflora</i>				X			X	X					
Malvaceae	<i>Waltheria indica</i>				X					X				
Malvaceae	<i>Waltheria virgata</i>						X					X	X	
Colchicaceae	<i>Wurmbea deserticola</i>						X		X					
Poaceae	<i>Yakirra australiensis</i>					X	X	X	X					
Poaceae	<i>Yakirra australiensis</i> var. <i>australiensis</i>				X			X						
Zygophyllaceae	<i>Zygophyllum eichleri</i>							X						
Zygophyllaceae	<i>Zygophyllum iodocarpum</i>						X							

New species recorded by Syrinx 2011

**Appendix 6 Threatened and Priority Flora Report Forms including species vouchered
with the Western Australian Herbarium**

Threatened and Priority Flora Report Form

Version 1.0 January 2010

Please complete as much of the form as possible, with emphasis on those sections bordered in black.

TAXON: <u>Aristida ? jerichoensis var. subspinulifera</u>	TPFL Pop. No.: _____
OBSERVATION DATE: <u>18/05/2011</u>	CONSERVATION STATUS: <u>P1</u> New population <input checked="" type="checkbox"/>
OBSERVER/S: <u>Kelly McCreery</u>	PHONE: <u>(08) 9227 9355</u>
ROLE: <u>Botanist</u>	ORGANISATION: <u>Syrinx Environmental PL</u>

DESCRIPTION OF LOCATION (Provide at least nearest town/named locality, and the distance and direction to that place):
Wheelarra Hill North within Jimblebar Lease AML7000244 held by BHPBIO
41 kilometres (km) east of Newman

DEC DISTRICT: <u>Pilbara Region</u>	LGA: <u>Shire of East Pilbara</u>	Reserve No.: _____	Land manager present: <input type="checkbox"/>
DATUM: GDA94 / MGA94 <input checked="" type="checkbox"/> AGD84 / AMG84 <input type="checkbox"/> WGS84 <input type="checkbox"/> Unknown <input type="checkbox"/>	COORDINATES: (If UTM coords provided, Zone is also required) DecDegrees <input checked="" type="checkbox"/> DegMinSec <input type="checkbox"/> UTM <input type="checkbox"/> Lat / Northing: <u>-23.341334</u> Long / Easting: <u>120.086486</u> ZONE: _____	METHOD USED: GPS <input checked="" type="checkbox"/> Differential GPS <input type="checkbox"/> Map <input type="checkbox"/> No. satellites: <u>7</u> Map used: _____ Boundary polygon captured: <input type="checkbox"/> Map scale: <u>1:8000</u>	
LAND TENURE:			
Nature reserve <input type="checkbox"/>	Timber reserve <input type="checkbox"/>	Private property <input type="checkbox"/>	Rail reserve <input type="checkbox"/>
National park <input type="checkbox"/>	State forest <input type="checkbox"/>	Pastoral lease <input type="checkbox"/>	MRWA road reserve <input type="checkbox"/>
Conservation park <input type="checkbox"/>	Water reserve <input type="checkbox"/>	UCL <input type="checkbox"/>	SLK/Pole _____ to _____
			Shire road reserve <input type="checkbox"/>
			Other Crown reserve <input checked="" type="checkbox"/>
			Specify other: <u>BHP Mineral Lease</u>

AREA ASSESSMENT: Edge survey <input type="checkbox"/> Partial survey <input checked="" type="checkbox"/> Full survey <input type="checkbox"/>	Area observed (m ²): <u>2500</u>
EFFORT: Time spent surveying (minutes): <u>40</u>	No. of minutes spent / 100 m ² : <u>1.6</u>
POP'N COUNT ACCURACY: Actual <input type="checkbox"/> Extrapolation <input type="checkbox"/> Estimate <input checked="" type="checkbox"/>	Count method: _____ (Refer to field manual for list)
WHAT COUNTED: Plants <input checked="" type="checkbox"/> Clumps <input type="checkbox"/> Clonal stems <input type="checkbox"/>	
TOTAL POP'N STRUCTURE:	
	Mature: Juveniles: Seedlings: Totals:
Alive	2 1 2 2
Dead	1
	Area of pop (m ²): <u>5</u>
	Note: Pls record count as numbers (not percentages) for database.
QUADRATS PRESENT: No. <u>4</u> Size <u>2500</u> Data attached <input checked="" type="checkbox"/>	Total area of quadrats (m ²): <u>10000</u>
Summary Quad. Totals: Alive	7 2 9
REPRODUCTIVE STATE: Clonal <input type="checkbox"/> Vegetative <input checked="" type="checkbox"/> Flowerbud <input type="checkbox"/> Flower <input checked="" type="checkbox"/>	Immature fruit <input type="checkbox"/> Fruit <input type="checkbox"/> Dehisced fruit <input checked="" type="checkbox"/> Percentage in flower: <u>30%</u>

CONDITION OF PLANTS: Healthy Moderate Poor Senescent

COMMENT: _____

THREATS - type, agent and supporting information:	Current impact (N-E)	Potential Impact (L-E)	Potential Threat Onset (S-L)
Eg clearing, too frequent fire, weed, disease. Refer to field manual for list of threats & agents. Specify agent where relevant. Rate current and potential threat impact: N=Nil, L=Low, M=Medium, H=High, E=Extreme Estimate time to potential impact: S=Short (<12mths), M=Medium (<5yrs), L=Long (5yrs+)			
• Clearing of vegetation for mining activities	<u>L</u>	<u>H</u>	<u>S</u>
• Weeds	<u>L</u>	<u>H</u>	<u>M</u>
• Fire	<u>L</u>	<u>E</u>	<u>M</u>

Please return completed form to DEC, Locked Bag 104, BENTLEY DELIVERY CENTRE WA 6983

RECORDS: Please forward to Administrative Officer, Flora, Species and Communities Branch.

Record entered by: _____ Sheet No.: _____ Record Entered in Database

Threatened and Priority Flora Report Form

Version 1.0 January 2010

HABITAT INFORMATION:

LANDFORM:	ROCK TYPE:	LOOSE ROCK:	SOIL TYPE:	SOIL COLOUR:	DRAINAGE:
Crest <input type="checkbox"/>	Granite <input type="checkbox"/>	(on soil surface; eg gravel, quartz fields)	Sand <input type="checkbox"/>	Red <input checked="" type="checkbox"/>	Well drained <input checked="" type="checkbox"/>
Hill <input type="checkbox"/>	Dolerite <input type="checkbox"/>		Sandy loam <input checked="" type="checkbox"/>	Brown <input type="checkbox"/>	Seasonally inundated <input type="checkbox"/>
Ridge <input type="checkbox"/>	Laterite <input type="checkbox"/>	0-10% <input checked="" type="checkbox"/>	Loam <input type="checkbox"/>	Yellow <input type="checkbox"/>	Permanently inundated <input type="checkbox"/>
Outcrop <input type="checkbox"/>	Ironstone <input checked="" type="checkbox"/>	10-30% <input type="checkbox"/>	Clay loam <input type="checkbox"/>	White <input type="checkbox"/>	Tidal <input type="checkbox"/>
Slope <input type="checkbox"/>	Limestone <input type="checkbox"/>	30-50% <input type="checkbox"/>	Light clay <input type="checkbox"/>	Grey <input type="checkbox"/>	
Flat <input checked="" type="checkbox"/>	Quartz <input type="checkbox"/>	50-100% <input type="checkbox"/>	Peat <input type="checkbox"/>	Black <input type="checkbox"/>	
Open depression <input checked="" type="checkbox"/>	Specify other: _____		Specify other: _____	Specify other: _____	
Drainage line <input type="checkbox"/>					
Closed depression <input type="checkbox"/>					
Wetland <input type="checkbox"/>					
CONDITION OF SOIL:	Dry <input type="checkbox"/>	Moist <input type="checkbox"/>	Waterlogged <input type="checkbox"/>	Inundated <input type="checkbox"/>	

VEGETATION

CLASSIFICATION*:

Eg: 1. Banksia woodland (B. attenuata, B. ilicifolia);
2. Open shrubland (Hibbertia sp., Acacia spp.);
3. Isolated clumps of sedges (Mesomelaena tetragona)

1. Low Open Woodland of Eucalyptus gamophylla, Eucalyptus trivalva, Eucalyptus leucophloia subsp. leucophloia and Acacia aptaneura
2. High Shrubland of Acacia monticola and Acacia bivenosa over Shrubland of Acacia pachyacra, Acacia adsurgens, Rulingia luteiflora, Acacia sibirica and Gossypium robinsonii
3. Low Scattered Shrubs of Hybanthus aurantiacus, Corchorus sidioides subsp. sidioides and Indigofera monophylla
4. Open Hummock Grassland of Triodia epactia

ASSOCIATED SPECIES:

Other (non-dominant) spp _____

* Please record up to four of the most representative vegetation layers (with up to three dominant species in each layer). Structural Formations should follow 2009 Australian Soil and Land Survey Field Handbook guidelines – refer to field manual for further information and structural formation table.

CONDITION OF HABITAT: Pristine Excellent Very good Good Degraded Completely degraded

COMMENT:

FIRE HISTORY: Last Fire: Season/Month: _____ Year: 2001 Fire Intensity: High Medium Low No signs of fire

FENCING: Not required Present Replace / repair Required Length req'd: _____

ROADSIDE MARKERS: Not required Present Replace / reposition Required Quantity req'd: _____

OTHER COMMENTS: (Please include recommended management actions and/or implemented actions - include date. Also include details of additional data available, and how to locate it.)

Steven Dillon a WAH Botanist, has examined the specimens and observed the following: " The glumes are unequal by up to 3 mm, some glumes are longer than the description, most of the (mature) lemma have tubercles not only lining the groove but also on other parts (not seen on any of the main collection) and the overall size of some specimens is much larger than usual. The specimens sit somewhere between Aristida inaequiglumis and Aristida jerichoensis var. subspinulifera. Unsure if it is just due to the good rainfall or typical variation" .

Recommendations:

Perform a focused search for the species during next flowering season

Prevent or minimise any vegetation clearing in areas supporting these species until such time taxonomy of the species is resolved

Please return completed form to DEC, Locked Bag 104, BENTLEY DELIVERY CENTRE WA 6983

RECORDS: Please forward to **Administrative Officer, Flora, Species and Communities Branch.**

Record entered by: _____ Sheet No.: _____ Record Entered in Database

Threatened and Priority Flora Report Form

Version 1.0 January 2010

SPECIMEN:	Collectors No: <u>SL009079</u>	WA Herb. <input checked="" type="checkbox"/>	Regional Herb. <input type="checkbox"/>	District Herb. <input type="checkbox"/>	Other: _____	
ATTACHED:	Map <input checked="" type="checkbox"/>	Mudmap <input type="checkbox"/>	Photo <input type="checkbox"/>	GIS data <input type="checkbox"/>	Field notes <input type="checkbox"/>	Other: _____
COPY SENT TO:	Regional Office <input type="checkbox"/>	District Office <input type="checkbox"/>	Other: <u>WAH</u>			

Submitter of Record: Rada Tomanovic Role: Environmental Scientist Signed: _____ Date: 03/11/2011

Please return completed form to DEC, Locked Bag 104, BENTLEY DELIVERY CENTRE WA 6983

RECORDS: Please forward to **Administrative Officer, Flora**, Species and Communities Branch.

Record entered by: _____ Sheet No.: _____ Record Entered in Database

Determined Name: *Cyperus ixiocarpus*

Field Name:

Plant Description

Habit & Life-form: Perennial Sedge

Height: 30cm

Width: na

Other notes (flower colour etc):

Site Description

Landform: Stream channel (bank of Jimblebar Creek)

Soil surface: Mixed colluvial

Soil Colour: Orange

Soil Type: Loamy sand

Underlying Geology: Alluvium

Fire history: Year 2007

Woodland of *Acacia citrinoviridis*, *Eucalyptus victrix* and *Acacia coriacea* subsp. *pendens* over Low Open Shrubland *Acacia pyrifolia*, *Corchorus crozophorifolius* and *Tephrosia rosea* var. *clementii* over Very Open Tussock Grassland of *Cenchrus*

Vegetation: *ciliaris*, *Cymbopogon procerus* and *Eulalia aurea*

Woodland of *Acacia citrinoviridis*, *Eucalyptus victrix* and *Acacia coriacea* subsp. *pendens* over Scattered Tall Shrubs of *Gossypium robinsonii* over Low Open Shrubland *Acacia pyrifolia*, *Corchorus crozophorifolius*, *Tephrosia rosea* var. *clementii*, *Triumfetta leptacantha* and over Very Open Tussock Grassland of *Cenchrus ciliaris*, *Cymbopogon procerus*, *Eulalia aurea*, *Aristida inaequiglumis* and *Themeda triandra*

Frequency: One 50m x 50m quadrat of 83 quadrats and 18 releves

Other Notes:

Location

Locality: Wheelarra Hill North

Nearest Named Place: 40km east of Newman

GPS?: | N Datum: GDA 94 | AGD 84 | WGS 84 | AGD 66

Latitude: -23.325431 S Longitude: 120.139879 E Altitude: m

Zone: 50 Easting: Northing:

Collector(s): Kelli McCreery (SL009079)

No: WHN_Opp15.04 Date: 06.10.2011

Record Basis: Specimen | Fruit | Wood | Seed | Spirit

Voucher for: Photo | Other:

Phenology: Sterile | Fertile | Bud | Flowering | Fruiting

Determined Name: *Eragrostis olida*

Field Name:

Plant Description

Habit & Life-form: Perennial Grass

Height: 50cm

Width: na

Other notes (flower colour etc):

Site Description

Landform: Gully

Soil surface: Banded ironstone

Soil Colour: Red

Soil Type: Clay loam, sandy

Underlying Geology: Marra Mumba Iron Formation

Fire history: Year 2000

High Shrubland of *Acacia monticola*, *Acacia hamersleyensis*, and *Petalostylis labicheoides* over Open Hummock Grassland of *Triodia melvillei*, *Triodia epactia* and *Triodia* sp. Shovelanna Hill (S.van Leeuwen 3835) with Low Open Woodland of *Corymbia*

Vegetation: *ferritcola* and *Ficus brachypoda*

Associated Species: Low Open Woodland of *Corymbia ferritcola* and *Ficus brachypoda* over High Shrubland of *Acacia monticola*, *Acacia hamersleyensis*, *Petalostylis labicheoides*, *Gossypium robinsonii* and *Rulingia luteiflora* over Scattered Shrubs of *Dodonaea pachyneura* over Low Open Shrubland of *Tephrosia rosea* var. *glabrior* over Open Hummock Grassland of *Triodia melvillei*, *Triodia epactia* and *Triodia* sp. Shovelanna Hill (S.van Leeuwen 3835) with Very open Tussock Grassland of *Themeda triandra*, *Cymbopogon ambiguus*, *Paraneurachne muelleri*, *Eriachne mucronata* and *Paspalidium clementii*

Frequency: One 50m x 50m quadrat of 83 quadrats and 18 relevés

Other Notes:

Location

Locality: Wheelarra Hill North

Nearest Named Place: 40km east of Newman

GPS?: Y | N Datum: GDA 94 | AGD 84 | WGS 84 | AGD 66

Latitude: -23.3582719449 S Longitude: 120.098032022 E Altitude: m

Zone: 50 Easting: Northing:

Collector(s): Kelli McCreery (SL009079)

No: WHN_55.07 Date: 20.07.2011

Record Basis: Specimen | Fruit | Wood | Seed | Spirit

Voucher for: Photo | Other:

Phenology: Sterile | Fertile | Bud | Flowering | Fruiting

Determined Name: *Evolvulus alsinoides* var. *decumbens*

Field Name:

Plant Description

Habit & Life-form: Perennial Herb

Height: 30cm

Width: na

Other notes (flower colour etc):

Site Description

Landform: Drainage Depression

Soil surface:

Soil Colour: Red

Soil Type: Clay loam

Underlying Geology: Colluvium and minor alluvium

Fire history: Year 2001

Vegetation: High Shrubland of *Acacia monticola*, *Rulingia luteiflora* and *Gossypium robinsonii* with Low Woodland of *Corymbia hamersleyana*, *Eucalyptus victrix* and *Eucalyptus leucophloia* subsp. *leucophloia* over Very Open Tussock Grassland of *Themeda triandra*, **Cenchrus ciliaris* and *Cymbopogon procerus*

Associated Species: Low Open Woodland of *Corymbia hamersleyana* and *Acacia aptaneura* over High Shrubland of *Acacia monticola*, *Acacia ancistrocarpa*, *Acacia tenuissima*, *Grevillea wickhamii* subsp. *hispidula* and *Acacia wanyu* over Shrubland of *Acacia pyrifolia*, *Santalum lanceolatum*, *Acacia maitlandii*, *Petalostylis labicheoides* and *Scaevola spinescens* over Closed Tussock Grassland of *Cenchrus ciliaris*, and *Themeda triandra*

Frequency: Eight 50m x 50m quadrats of 83 quadrats and 18 relevés

Other Notes:

Location

Locality: Wheelarra Hill

Nearest Named Place: 40km east of Newman

GPS?: Y | N Datum: GDA 94 | AGD 84 | WGS 84 | AGD 66

Latitude: -23.3367767183 S Longitude: 120.11622914 E Altitude: m

Zone: 50 Easting: Northing:

Collector(s): Radmila Tomanovic (SL009262)

No: WHN_3.45 Date: 17.12.2011

Record Basis: Specimen | Fruit | Wood | Seed | Spirit

Voucher for: Photo | Other:

Phenology: Sterile | Fertile | Bud | Flowering | Fruiting

Determined Name: Oldenlandia galioides

Field Name:

Plant Description

Habit & Life-form: Annual herb

Height: 10cm

Width: na

Other notes (flower colour etc):

Site Description

Landform: Gully

Soil surface: Banded ironstone

Soil Colour: Red

Soil Type: Clay loam, sandy

Underlying Geology: Weeli- Wollie Formation

Fire history: Year 2007

Vegetation: High Shrubland of Acacia monticola, Acacia hamersleyensis, and Petalostylis labicheoides over Open Hummock Grassland of Triodia melvillei, Triodia epactia and Triodia sp. Shovelanna Hill (S.van Leeuwen 3835) with Low Open Woodland of Corymbia ferritcola and Ficus brachypoda

Associated Species: Low Open Woodland of Corymbia ferritcola and Ficus brachypoda over High Shrubland of Acacia monticola, Acacia hamersleyensis, Petalostylis labicheoides, Gossypium robinsonii and Rulingia luteiflora over Scattered Shrubs of Dodonaea pachyneura over Low Open Shrubland of Tephrosia rosea var. glabrior over Open Hummock Grassland of Triodia melvillei, Triodia epactia and Triodia sp. Shovelanna Hill (S.van Leeuwen 3835) with Very open Tussock Grassland of Themeda triandra, Cymbopogon ambiguus, Paraneurachne muelleri, Eriachne mucronata and Paspalidium clementii

Frequency: One 50m x 50m quadrat of 72 quadrats

Other Notes:

Location

Locality: Wheelarra Hill North

Nearest Named Place: 40km east of Newman

GPS?: Y | N Datum: GDA 94 | AGD 84 | WGS 84 | AGD 66

Latitude: -23.3582719449 S Longitude: 120.098032022 E Altitude: m

Zone: 50 Easting: Northing:

Collector(s): Kelli McCreery (SL 009079)

No: WHN_KBM-23 Date: 20.07.2011

Record Basis: Specimen | Fruit | Wood | Seed | Spirit

Voucher for: Photo | Other:

Phenology: Sterile | Fertile | Bud | Flowering | Fruiting

Determined Name: *Phyllanthus erwinii*

Field Name:

Plant Description

Habit & Life-form: Herb

Height: 0.15m

Width: 0.05m

Other notes (flower colour etc):

Site Description

Landform: Drainage Depression

Soil surface:

Soil Colour: Red

Soil Type: Loamy Sand

Underlying Geology: Marra Mamba iron formation

Fire history:

Vegetation: High Shrubland of *Acacia monticola*, *Rulingia luteiflora* and *Gossypium robinsonii* with Low Woodland of *Corymbia hamersleyana*, *Eucalyptus victrix* and *Eucalyptus leucophloia* subsp. *leucophloia* over Very Open Tussock Grassland of *Themeda triandra*, **Cenchrus ciliaris* and *Cymbopogon procerus*

Associated Species: Low Open Woodland of *Eucalyptus gamophylla*, *Eucalyptus trivalva*, *Eucalyptus leucophloia* subsp. *leucophloia* and *Acacia aptaneura* over High Shrubland of *Acacia monticola* and *Acacia bivenosa* over Shrubland of *Acacia pachyacra*, *Acacia adsurgens*, *Rulingia luteiflora*, *Acacia sibirica* and *Gossypium robinsonii* over Low Scattered Shrubs of *Hybanthus aurantiacus*, *Corchorus sidioides* subsp. *sidioides* and *Indigofera monophylla* over Open Hummock Grassland of *Triodia epactia*.

Frequency: Found in 10 50 x 50m quadrats out of 83 quadrats and 18 relevés

Other Notes:

Location

Locality: Wheelarra Hill North

Nearest Named Place: approximately 40km east of Newman.

GPS?: Y | N Datum: GDA 94 | AGD 84 | WGS 84 | AGD 66

Latitude: -23.3413 S Longitude: 120.0864 E Altitude: m

Zone: 50 Easting: Northing:

Collector(s): Kelly McCreery (SL 009079)

No: WHN_5.27 Date: 18/05/2011

Record Basis: Specimen | Fruit | Wood | Seed | Spirit

Voucher for: Photo | Other:

Phenology: Sterile | Fertile | Bud | Flowering | Fruiting

Determined Name: *Phyllanthus maderaspatensis*

Field Name:

Plant Description

Habit & Life-form: Perennial Herb

Height: 40cm

Width: na

Other notes (flower colour etc):

Site Description

Landform: Stream Channel (STC)- Jimblebar Creek

Soil surface: Mixed colluvial

Soil Colour: Orange

Soil Type: Loamy Sand

Underlying Geology: Alluvium

Fire history: Year 2007

Vegetation: Woodland of *Acacia citrinoviridis*, *Eucalyptus victrix* and *Acacia coriacea* subsp. *pendens* over Low Open Shrubland *Acacia pyrifolia*, *Corchorus crozophorifolius* and *Tephrosia rosea* var. *clementii* over Very Open Tussock Grassland of *Cenchrus ciliaris*, *Cymbopogon procerus* and *Eulalia aurea*

Associated Species: Woodland of *Acacia citrinoviridis*, *Eucalyptus victrix* and *Acacia coriacea* subsp. *pendens* over Scattered Tall Shrubs of *Gossypium robinsonii* over Low Open Shrubland *Acacia pyrifolia*, *Corchorus crozophorifolius*, *Tephrosia rosea* var. *clementii*, *Triumfetta leptacantha* and over Very Open Tussock Grassland of **Cenchrus ciliaris*, *Cymbopogon procerus*, *Eulalia aurea*, *Aristida inaequiglumis* and *Themeda triandra*

Frequency: One 50m x 50m quadrat of 83 quadrats and 18 relevés

Other Notes:

Location

Locality: Wheelarra Hill North

Nearest Named Place: 40km east of Newman

GPS?: | N Datum: GDA 94 | AGD 84 | WGS 84 | AGD 66

Latitude: -23.3269679977 S Longitude: 120.179732314 E Altitude: na m

Zone: 50 Easting: Northing:

Collector(s): Kelli McCreery (SL 009079)

No: WHN_15.06 Date: 20.07.2011

Record Basis: Specimen | Fruit | Wood | Seed | Spirit

Voucher for: Photo | Other:

Phenology: Sterile | Fertile | Bud | Flowering | Fruiting

Determined Name: Sclerolaena minuta

Field Name:

Plant Description

Habit & Life-form: Annual Herb

Height: 20cm

Width: na

Other notes (flower colour etc):

Site Description

Landform: Stony depression at the rocky range foothill with deeper somewhat saline soils

Soil surface: Ironstone pebbles

Soil Colour: Brown

Soil Type: Sandy loam

Underlying Geology: Brockman Iron Formation

Fire history: Year 2007

Vegetation: Scattered Shrubs of Acacia synchronicia over Low Open Shrubland of Maireana melanocoma, Sclerolaena eriacantha, Sclerolaena cuneata and Sclerolaena minuta over Very Open Hummock Grassland of Triodia epactia.

Associated Species: Sclerolaena eriacantha, Frankenia setosa

Frequency: One 50m x 50m quadrat of 83 quadrats and one releve out of 18

Other Notes:

Location

Locality: Wheelarra Hill North

Nearest Named Place: 40km east of Newman

GPS?: | N Datum: GDA 94 | AGD 84 | WGS 84 | AGD 66

Latitude: -23.349791

S Longitude: 120.124598

E Altitude: m

Zone: 50

Easting:

Northing:

Collector(s): Kelli McCreery (SL 009079)

No: KBM_08.03 Date: 10.10.2011

Record Basis: Specimen | Fruit | Wood | Seed | Spirit

Voucher for: Photo | Other:

Phenology: Sterile | Fertile | Bud | Flowering | Fruiting

Determined Name: *Sclerolaena minuta*

Field Name:

Plant Description

Habit & Life-form: Annual Herb

Height: 20cm

Width: na

Other notes (flower colour etc):

Site Description

Landform: Stony saddles between rocky hills (McKay Land System)

Soil surface: ironstone pebbles

Soil Colour: Dark Brown - red

Soil Type: Sandy loam

Underlying Geology: Brockman and Marra Mamba Iron Formation Fire history: Year 2001

Hummock Grassland of *Triodia* sp. Shovelanna Hill (S. van Leeuwen 3835) with Low Open Shrubland of *Acacia hilliana*, *Acacia*

Vegetation: *Adoxa* var. *adoxo* and *Halgania solanacea* var. *Mt Doreen* (G.M. Chippendale 4206) with Scattered Low Trees of *Eucalyptus leucophloia* subsp. *leucophloia* and *Acacia pruinocarpa*

Associated Species: *Maireana melanocoma*, *Sclerolaena eriacantha*, *Frankenia setosa*.

Frequency: One 50m x 50m quadrat of 83 quadrats and one out of 18 relevés

Other Notes:

Location

Locality: Wheelarra Hill North

Nearest Named Place: 40km east of Newman

GPS?: | N Datum: GDA 94 | AGD 84 | WGS 84 | AGD 66

Latitude: -23.337563

S Longitude: 120.096801

E Altitude: m

Zone: 50

Easting:

Northing:

Collector(s): Rada Tomanovic

No: WHN_Opp9.02 Date: 05.10.2011

Record Basis: Specimen | Fruit | Wood | Seed | Spirit

Voucher for: Photo | Other:

Phenology: Sterile | Fertile | Bud | Flowering | Fruiting

Determined Name: Santalum spicatum

Field Name:

Plant Description

Habit & Life-form: Perennial Shrub

Height: 20cm

Width: na

Other notes (flower colour etc):

Site Description

Landform: Foothlope - very gently inclined hillslope the outermost edge of the Juimblebar Creek Floodplain

Soil surface: patchy ironstone pebbles and rocks

Soil Colour: Red

Soil Type: Sandy clay loam

Underlying Geology: Alluvium

Fire history: Year 2001

Vegetation: Low Woodland of Acacia aptaneura and Corymbia hamersleyana over Very Open Shrubland of Acacia wanyu, Acacia ancistrocarpa and Eremophila forrestii subsp. (indet) over Very Open Hummock Grassland of Triodia epactia and Triodia lanigera

Associated Species: Low Open Woodland of Acacia aptaneura over High Open Shrubland of Acacia wanyu, Eremophila latrobei subsp. filiformis, Acacia synchronicia and Santalum spicatum over Scattered Shrubs of Eremophila cuneifolia, Eremophila forrestii subsp. (indet), Senna glutinosa subsp. x leurssenii and Senna artemisioides subsp. helmsii over Low Scattered Shrubs of Maireana thesioides, Ptilotus obovatus, Rhagodia eremaea, Sclerolaena cornishana and Scaevola spinescens over Very Open Hummock Grassland of Triodia lanigera, Triodia epactia and Triodia angusta with the Scattered Tussock Grass of *Cenchrus ciliaris, Aristida contorta, Eriachne pulchella subsp. dominii, Eriachne mucronata and Enneapogon lindleyanus

Frequency: One location (releve) out of 83 quadrats and 18 releves surveyed.

Other Notes:

Location

Locality: Wheelarra Hill North

Nearest Named Place: 40km east of Newman

GPS?: | N Datum: GDA 94 | AGD 84 | WGS 84 | AGD 66

Latitude: -23.337691

S Longitude: 120.180316

E Altitude: m

Zone: 50

Easting:

Northing:

Collector(s): Anita Cole (SL 009269)

No: WHN_R6.01 Date: 11.10.2011

Record Basis: Specimen | Fruit | Wood | Seed | Spirit

Voucher for: Photo | Other:

Phenology: Sterile | Fertile | Bud | Flowering | Fruiting

Vouchered Specimens that are not listed as significant flora

(vouchered upon request as specimens are of good quality and have low number of collections for the Pilbara)

Determined Name: *Ammannia multiflora*

Field Name:

Plant Description

Habit & Life-form: Annual Herb

Height: 20cm

Width: na

Other notes (flower colour etc):

Site Description

Landform: Stream channel (banks of Jimblebar Creek)

Soil surface: Mixed colluvial

Soil Colour: Orange

Soil Type: Loamy sand

Underlying Geology: Alluvium

Fire history: Year 2007

Woodland of *Acacia citrinoviridis*, *Eucalyptus victrix* and *Acacia coriacea* subsp. *pendens* over Low Open Shrubland *Acacia pyrifolia*, *Corchorus crozophorifolius* and *Tephrosia rosea* var. *clementii* over Very Open Tussock Grassland of *Cenchrus*

Vegetation: *ciliaris*, *Cymbopogon procerus* and *Eulalia aurea*

Associated Species: Woodland of *Acacia citrinoviridis*, *Eucalyptus victrix* and *Acacia coriacea* subsp. *pendens* over Scattered Tall Shrubs of *Gossypium robinsonii* over Low Open Shrubland *Acacia pyrifolia*, *Corchorus crozophorifolius*, *Tephrosia rosea* var. *clementii*, *Triumfetta leptacantha* and over Very Open Tussock Grassland of **Cenchrus ciliaris*, *Cymbopogon procerus*, *Eulalia aurea*, *Aristida inaequiglumis* and *Themeda triandra*

Frequency: One 50m x 50m quadrat of 83 quadrats and 18 releves

Other Notes:

Location

Locality: Wheelarra Hill North

Nearest Named Place: 40km east of Newman

GPS?: Y | N Datum: GDA 94 | AGD 84 | WGS 84 | AGD 66

Latitude: -23.325431 S Longitude: 120.139879 E Altitude: m

Zone: 50 Easting: Northing:

Collector(s): Kelli McCreery (SL009079)

No: WHN_Opp15.01 Date: 06.10.2011

Record Basis: Specimen | Fruit | Wood | Seed | Spirit

Voucher for: Photo | Other:

Phenology: Sterile | Fertile | Bud | Flowering | Fruiting

Determined Name: Eremophila oppositifolia subsp. angustifolia

Field Name:

Plant Description

Habit & Life-form: Perennial Shrub

Height: 1.5m

Width: na

Other notes (flower colour etc):

Site Description

Landform: Gully

Soil surface: Rocky ironstone outcrops

Soil Colour: Brown

Soil Type: Sandy loam

Underlying Geology: Brockman Iron Formation

Fire history: Year 2007

Vegetation: Low Woodland of Acacia aptaneura, Acacia ? pteraneura and Acacia pruinocarpa over Open Hummock Grassland of Triodia epactia and Triodia sp. Shovelanna Hill (S.van Leeuwen 3835) with Shrubland of Acacia wanyu, Acacia tetragonophylla and Senna stricta

Associated Species: Low Woodland of Acacia aptaneura, Acacia paraneura, Acacia pruinocarpa with Scattered Mallees of Eucalyptus gamophylla over High Open Shrubland of Acacia wanyu, Acacia tetragonophylla, Acacia rhodophloia, Psydrax suaveolens and Psydrax latifolia over Open Shrubland of Eremophila cuneifolia, Senna glutinosa subsp. x luerssenii, Eremophila oppositifolia subsp. angustifolia and Senna artemisioides subsp. helmsii over Low Scattered Shrubs of Enchylaena tomentosa and Solanum phlomoides over Open Hummock Grassland of Triodia epactia and Triodia sp. Shovelanna Hill (S.van Leeuwen 3835) with Very Open Grassland of Paspalidium clementii

Frequency: Three 50m x 50m quadrat of of 83 quadrats and 18 relevés

Other Notes:

Location

Locality: Wheelarra Hill North

Nearest Named Place: 40km east of Newman

GPS?: Y | N Datum: GDA 94 | AGD 84 | WGS 84 | AGD 66

Latitude: -23.3606618275 S Longitude: 120.15441425 E Altitude: m

Zone: 50 Easting: Northing:

Collector(s): Rada Tomanovic

No: WHN_26.30 Date: 08.10.2011

Record Basis: Specimen | Fruit | Wood | Seed | Spirit

Voucher for: Photo | Other:

Phenology: Sterile | Fertile | Bud | Flowering | Fruiting

Determined Name: *Eremophila oppositifolia* subsp. *angustifolia*

Field Name:

Plant Description

Habit & Life-form: Perennial Shrub

Height: 2m

Width: na

Other notes (flower colour etc):

Site Description

Landform: Gully

Soil surface: Rocky ironstone outcrops

Soil Colour: Brown

Soil Type: Silty loam

Underlying Geology: Brockman Iron Formation

Fire history: Year 2007

Vegetation: Low Woodland of *Acacia aptaneura*, *Acacia ? pteraneura* and *Acacia pruinocarpa* over Open Hummock Grassland of *Triodia epactia* and *Triodia* sp. Shovelanna Hill (S.van Leeuwen 3835) with Shrubland of *Acacia wanyu*, *Acacia tetragonophylla* and *Senna stricta*

Associated Species: Low Woodland of *Acacia aptaneura* over High Open Shrubland of *Eremophila oppositifolia* subsp. *angustifolia*, *Senna glutinosa* subsp. *x luerssenii*, *Acacia tetragonophylla* and *Psydrax suaveolens* Shrubland of *Eremophila cuneifolia*, *Senna stricta*, *Scaevola acacioides*, *Ptilotus obovatus* and *Santalum lanceolatum* over Open Hummock Grassland of *Triodia epactia* and *Triodia* sp. Shovelanna Hill (S.van Leeuwen 3835) over Scattered Tussock Grass of *Paspalidium clementii* and *Eriachne pulchella* subsp. *dominii*

Frequency: Three 50m x 50m quadrat of 83 quadrats and 18 releves

Other Notes:

Location

Locality: Wheelarra Hill North

Nearest Named Place: 40km east of Newman

GPS?: Y | N Datum: GDA 94 | AGD 84 | WGS 84 | AGD 66

Latitude: -23.3589612224 S Longitude: 120.165633869 E Altitude: m

Zone: 50 Easting: Northing:

Collector(s): Anita Cole (SL009269)

No: WHN_12.02 Date: 17.12.2011

Record Basis: Specimen | Fruit | Wood | Seed | Spirit

Voucher for: Photo | Other:

Phenology: Sterile | Fertile | Bud | Flowering | Fruiting

Determined Name: Frankenia setosa

Field Name:

Plant Description

Habit & Life-form: Perennial Shrub

Height: 30cm

Width: na

Other notes (flower colour etc): white

Site Description

Landform: Stony saddles between rocky hills (McKay Land System)

Soil surface: ironstone pebbles

Soil Colour: Dark Brown - red

Soil Type: Sandy loam

Underlying Geology: Brockman and Marra Mamba Iron Formation Fire history: Year 2001

Hummock Grassland of Triodia sp. Shovelanna Hill (S. van Leeuwen 3835) with Low Open Shrubland of Acacia hilliana, Acacia

Vegetation: adoxa var. adoxa and Halgania solanacea var. Mt Doreen (G.M. Chippendale 4206) with Scattered Low Trees of Eucalyptus leucophloia subsp. leucophloia and Acacia pruinocarpa

Associated Species: Maireana melanocoma, Sclerolaena eriacantha, Sclerolaena minuta

Frequency: Four opportunistic collections 50m x 50m quadrat of 83 quadrats and one out of 18 relevés

Other Notes:

Location

Locality: Wheelarra Hill North

Nearest Named Place: 40km east of Newman

GPS?: | N Datum: GDA 94 | AGD 84 | WGS 84 | AGD 66

Latitude: -23.337563

S Longitude: 120.096801

E Altitude: m

Zone: 50

Easting:

Northing:

Collector(s): Rada Tomanovic

No: WHN_Opp9.01 Date: 05.10.2011

Record Basis: Specimen | Fruit | Wood | Seed | Spirit

Voucher for: Photo | Other:

Phenology: Sterile | Fertile | Bud | Flowering | Fruiting

Determined Name: *Helichrysum luteoalbum*

Field Name:

Plant Description

Habit & Life-form: Annual herb

Height: 20cm

Width: na

Other notes (flower colour etc):

Site Description

Landform: Stream channel (bank of Jimblebar Creek)

Soil surface: Mixed colluvial

Soil Colour: Orange

Soil Type: Loamy sand

Underlying Geology: Alluvium

Fire history: Year 2007

Woodland of *Acacia citrinoviridis*, *Eucalyptus victrix* and *Acacia coriacea* subsp. *pendens* over Low Open Shrubland *Acacia pyrifolia*, *Corchorus crozophorifolius* and *Tephrosia rosea* var. *clementii* over Very Open Tussock Grassland of *Cenchrus*

Vegetation: *ciliaris*, *Cymbopogon procerus* and *Eulalia aurea*

Associated Species: Woodland of *Acacia citrinoviridis*, *Eucalyptus victrix* and *Acacia coriacea* subsp. *pendens* over Scattered Tall Shrubs of *Gossypium robinsonii* over Low Open Shrubland *Acacia pyrifolia*, *Corchorus crozophorifolius*, *Tephrosia rosea* var. *clementii*, *Triumfetta leptacantha* and over Very Open Tussock Grassland of *Cenchrus ciliaris*, *Cymbopogon procerus*, *Eulalia aurea*, *Aristida inaequiglumis* and *Themeda triandra*

Frequency: One 50m x 50m quadrat of of 83 quadrats and 18 releves

Other Notes:

Location

Locality: Wheelarra Hill North

Nearest Named Place: 40km east of Newman

GPS?: Y | N Datum: GDA 94 | AGD 84 | WGS 84 | AGD 66

Latitude: -23.325431 S Longitude: 120.139879 E Altitude: m

Zone: 50 Easting: Northing:

Collector(s): Kelli McCreery (SL009079)

No: WHN_Opp15.11 Date: 06.10.2011

Record Basis: Specimen | Fruit | Wood | Seed | Spirit

Voucher for: Photo | Other:

Phenology: Sterile | Fertile | Bud | Flowering | Fruiting

Determined Name: Rutidosis helichrysoides subsp. helichrysoides

Field Name:

Plant Description

Habit & Life-form: Perennial Herb

Height: 20cm

Width: na

Other notes (flower colour etc): yellow

Site Description

Landform: Drainage depression.

Soil surface:

Soil Colour: Red

Soil Type: Sandy clay loam

Underlying Geology: Alluvium

Fire history: Year 2001

Vegetation: Tussock Grassland of Eulalia aurea, Themeda triandra and Aristida inaequiglumis with Low Open Woodland of Corymbia hamersleyana, Acacia aptaneura and Acacia citrinoviridis over Open Shrubland of Acacia ancistrocarpa, Gossypium robinsonii and Acacia pyrifolia

Associated Species: Low Open Woodland of Corymbia hamersleyana, Acacia aptaneura, Acacia citrinoviridis and Acacia coriacea subsp. pendens over High Shrubland of Acacia ancistrocarpa, Gossypium robinsonii, Acacia tetragonophylla, Acacia adsurgens and Acacia bivenosa over Shrubland of Acacia wanyu, Acacia tenuissima and Grevillea wickhamii over Open Hummock Grassland of Triodia epactia and Triodia lanigera with Tussock Grassland of Eulalia aurea, Themeda triandra, Aristida holathera var. holathera, Paraneurachne muelleri and Cymbopogon obtectus

Frequency: One 50m x 50m quadrat of 83 quadrats and three relevés out of 18

Other Notes: Evidence of trampling and grazing by feral animals

Location

Locality: Wheelarra Hill North

Nearest Named Place: 40km east of Newman

GPS?: Y | N Datum: GDA 94 | AGD 84 | WGS 84 | AGD 66

Latitude: -23.325272

S Longitude: 120.130149

E Altitude: m

Zone: 50

Easting:

Northing:

Collector(s): Anita Cole (SL 009269)

No: WHN_73.09 Date: 10.10.2011

Record Basis: Specimen | Fruit | Wood | Seed | Spirit

Voucher for: Photo | Other:

Phenology: Sterile | Fertile | Bud | Flowering | Fruiting

Determined Name: Podolepis sp. Great Victoria Desert (A.S. George 8219)

Field Name:

Plant Description

Habit & Life-form: Annual herb

Height: 10cm

Width: na

Other notes (flower colour etc): yellow

Site Description

Landform: Stream channel (bank of Jimblebar Creek)

Soil surface: Mixed colluvial

Soil Colour: Orange

Soil Type: Loamy sand

Underlying Geology: Alluvium

Fire history: Year 2007

Woodland of *Acacia citrinoviridis*, *Eucalyptus victrix* and *Acacia coriacea* subsp. *pendens* over Low Open Shrubland *Acacia pyrifolia*, *Corchorus crozophorifolius* and *Tephrosia rosea* var. *clementii* over Very Open Tussock Grassland of *Cenchrus*

Vegetation: *ciliaris*, *Cymbopogon procerus* and *Eulalia aurea*

Associated Species: Woodland of *Acacia citrinoviridis*, *Eucalyptus victrix* and *Acacia coriacea* subsp. *pendens* over Scattered Tall Shrubs of *Gossypium robinsonii* over Low Open Shrubland *Acacia pyrifolia*, *Corchorus crozophorifolius*, *Tephrosia rosea* var. *clementii*, *Triumfetta leptacantha* and over Very Open Tussock Grassland of **Cenchrus ciliaris*, *Cymbopogon procerus*, *Eulalia aurea*, *Aristida inaequiglumis* and *Themeda triandra*

Frequency: One 50m x 50m quadrat of of 83 quadrats and 18 releves

Other Notes:

Location

Locality: Wheelarra Hill North

Nearest Named Place: 40km east of Newman

GPS?: Y | N Datum: GDA 94 | AGD 84 | WGS 84 | AGD 66

Latitude: -23.325431 S Longitude: 120.139879 E Altitude: m

Zone: 50 Easting: Northing:

Collector(s): Kelli McCreery (SL009079)

No: WHN_Opp15.08 Date: 06.10.2011

Record Basis: Specimen | Fruit | Wood | Seed | Spirit

Voucher for: Photo | Other:

Phenology: Sterile | Fertile | Bud | Flowering | Fruiting

Determined Name: *Stenopetalum decipiens*

Field Name:

Plant Description

Habit & Life-form: Perennial herb

Height: 30cm

Width: na

Other notes (flower colour etc):

Site Description

Landform: Hillslope

Soil surface:

Soil Colour: Red

Soil Type: Sandy loam

Underlying Geology: Boolgeda iron formation

Fire history: Year 2007

Vegetation: Open Hummock Grassland of *Triodia epactia* and *Triodia* sp. Shovelanna Hill (S.van Leeuwen 3835) with Low Open Shrubland of *Senna glutinosa* subsp. *pruinosa*, *Acacia synchronicia* and *Eremophila cuneifolia*

Associated Species: Low Open Shrubland of *Senna glutinosa* subsp. *pruinosa*, *Acacia synchronicia*, *Eremophila cuneifolia*, *Indigofera monophylla* and *Maireana triptera* Open Hummock Grassland of *Triodia epactia* and *Triodia* sp. Shovelanna Hill (S.van Leeuwen 3835) with Very Open Herbs of *Ptilotus exaltatus* and *Gomphrena kanisii*

Frequency: Three out of 83 quadrats and 18 relevés surveyed.

Other Notes: Growing in a shade of a ironstone rock outcrop / overhang (south facing)

Location

Locality: Wheelarra Hill North

Nearest Named Place: 40km east of Newman

GPS?: | N Datum: GDA 94 | AGD 84 | WGS 84 | AGD 66

Latitude: -23.346883 S Longitude: 120.176995 E Altitude: m

Zone: 50 Easting: Northing:

Collector(s): Anita Cole (SL 009269)

No: WHN_36opp Date: 08.10.2011

Record Basis: Specimen | Fruit | Wood | Seed | Spirit

Voucher for: Photo | Other:

Phenology: Sterile | Fertile | Bud | Flowering | Fruiting

Determined Name: *Streptoglossa macrocephala*

Field Name:

Plant Description

Habit & Life-form: Perennial Shrub

Height: 45cm

Width: na

Other notes (flower colour etc): pink

Site Description

Landform: Drainage depression.

Soil surface:

Soil Colour: Red

Soil Type: Sandy clay loam

Underlying Geology: Alluvium

Fire history: Year 2001

Vegetation: Tussock Grassland of *Eulalia aurea*, *Themeda triandra* and *Aristida inaequiglumis* with Low Open Woodland of *Corymbia hamersleyana*, *Acacia aptaneura* and *Acacia citrinoviridis* over Open Shrubland of *Acacia ancistrocarpa*, *Gossypium robinsonii* and *Acacia pyrifolia*

Associated Species: Low Open Woodland of *Corymbia hamersleyana*, *Acacia aptaneura*, *Acacia citrinoviridis* and *Acacia coriacea* subsp. *pendens* over High Shrubland of *Acacia ancistrocarpa*, *Gossypium robinsonii*, *Acacia tetragonophylla*, *Acacia adsurgens* and *Acacia bivenosa* over Shrubland of *Acacia wanyu*, *Acacia tenuissima* and *Grevillea wickhamii* over Open Hummock Grassland of *Triodia epactia* and *Triodia lanigera* with Tussock Grassland of *Eulalia aurea*, *Themeda triandra*, *Aristida holathera* var. *holathera*, *Paraneurachne muelleri* and *Cymbopogon obtectus*

Frequency: Two 50m x 50m quadrats of 83 quadrats and one releve out of 18

Other Notes: Evidence of trampling and grazing by feral animals

Location

Locality: Wheelarra Hill North

Nearest Named Place: 40km east of Newman

GPS?: | N Datum: GDA 94 | AGD 84 | WGS 84 | AGD 66

Latitude: -23.325272

S Longitude: 120.130149

E Altitude: m

Zone: 50

Easting:

Northing:

Collector(s): Rada Tomanovic (SL 009262)

No: WHN_73.08 Date: 10.10.2011

Record Basis: Specimen | Fruit | Wood | Seed | Spirit

Voucher for: Photo | Other:

Phenology: Sterile | Fertile | Bud | Flowering | Fruiting

Determined Name: *Ventilago viminalis*

Field Name:

Plant Description

Habit & Life-form: Tree

Height: 3 m

Width: na

Other notes (flower colour etc):

Site Description

Landform: Drainage Depression (bank of a small creek)

Soil surface:

Soil Colour: Brown - red

Soil Type: Silty Clay Loam

Underlying Geology: Alluvium

Fire history: Year 2007

Tussock Grassland of *Eulalia aurea*, *Themeda triandra* and *Aristida inaequalis* with Low Open Woodland of *Corymbia hamersleyana*, *Acacia aptaneura* and *Acacia citrinoviridis* over Open Shrubland of *Acacia ancistrocarpa*, *Gossypium robinsonii*

Vegetation: and *Acacia pyrifolia*

Associated Species: Low Open Woodland of *Corymbia hamersleyana* over High Shrubland of *Acacia citrinoviridis*, *Acacia ancistrocarpa*, *Acacia pyrifolia*, *Acacia maitlandii* and *Acacia monticola* over Low Open Shrubland of *Abutilon otocarpum*, *Acacia sclerosperma* subsp. *sclerosperma*, *Bonamia* sp. 1 (indet) and *Melhania oblongifolia* over Open Hummock Grassland of *Triodia epactia* Very Open Tussock Grassland of *Cenchrus ciliaris* and *Chrysopogon fallax*

Frequency: One 50m x 50m quadrat of 83 quadrats and 18 relevés

Other Notes: on the banks of a tributary to Jimblebar Creek

Location

Locality: Wheelarra Hill North

Nearest Named Place: 40km east of Newman

GPS?: | N Datum: GDA 94 | AGD 84 | WGS 84 | AGD 66

Latitude: -23.3196704256 S Longitude: 120.171950895 E Altitude: m

Zone: 50 Easting: Northing:

Collector(s): Kelli McCreery (SL009079)

No: WHN_Opp14.01 Date: 06.10.2011

Record Basis: Specimen | Fruit | Wood | Seed | Spirit

Voucher for: Photo | Other:

Phenology: Sterile | Fertile | Bud | Flowering | Fruiting

Appendix 7 Results of the Vegetation Statistical Analysis

Wheellarra Hill North Flora and Vegetation Data Analysis

December 2011

Prepared for
Syrinx Environmental Pty Ltd



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Report Reference: 21024-11SRV2RevB_111220

Wheellarra Hill North Flora and Vegetation Data Analysis

Prepared for
Syrinx Environmental Pty Ltd



Job Number: 21024-11

Reference: 21024-11SRV2RevB_111220

Revision Status

Rev	Date	Description	Author(s)	Reviewer
A	15/12/2011	Draft Issued For Client Review	D. Jarvis	M. Garkaklis
B	20/12/2011	Draft Issued for Client Review	M. Garkaklis	M. Garkaklis

Approval

Rev	Date	Issued to	Authorised by	
			Name	Signature
A	15/12/2011	A. Cole	M. Garkaklis	
B	20/12/2011	A. Cole	M. Garkaklis	



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1 Background

Syrinx Environmental Pty Ltd (Syrinx) has conducted vegetation and flora surveys for BHP Billiton Iron Ore Pty Ltd (BHPBIO) at their Wheellarra Hill North site near Newman. Syrinx engaged Astron Environmental Services (Astron) to undertake a numerical analysis of vegetation survey data collected at the site. The objective of the data analysis is to assist with defining and grouping vegetation communities, and to determine the local significance of the vegetation from a numerical perspective.

2 Data Analysis Methodology

The purpose of the data analysis was to determine if there are groupings of similar quadrats and to examine if Land Systems could explain the quadrat groupings. The analyses used were multivariate techniques commonly used in vegetation survey and sometimes known as 'Pattern Analysis'.

The main analytical techniques used were:

- Classification – this produces a 'link-tree' diagram showing the groupings of quadrats. The diagram is called a dendrogram.
- Ordination – this produces a plot that shows the relationship between samples.

Prior to undertaking classification or ordination, data transformation and calculations of quadrat resemblance or similarity are required. These techniques are further described below.

2.1 Data Transformation and the Resemblance Matrix

Data transformations in multivariate analyses allow a better interpretation of changes in floristics due to the loss or increase in the occurrence of species (Clarke and Green, 1988). In this current report, both a Presence-Absence (P/A) transformation and a 4th Root transformation were used. The P/A transformation is in accordance with the recommendations of the Department of Environment and Conservation for analyses undertaken in the Pilbara (S. van Leeuwen, Pers. Comm.). Presence-Absence transformations allow an interpretation of the importance of plant species that occur rarely or at very low cover values. The 4th Root transformed data analysis was also included to assess the dominant species occurring within the quadrats.

Classification and ordination are two analytical methods that test the relationships between each individual quadrats similarity (or dissimilarity) in comparison to all other quadrats. The data are organised as a resemblance matrix and several indices can be used to generate measures of similarity. In this current study, the Bray Curtis metric was used to generate the resemblance matrix (Clarke and Gorley, 2006).

2.2 Classification

The purpose of classification is to produce a figure called a dendrogram that allows patterns in the data to be identified. In their simplest form, dendrograms are a visual aid and they allow obvious groups of quadrats to be identified. On their own they are not a test of the groups.

Tests for significant groups of survey points (e.g. quadrat) in this current analysis use a technique called Similarity Profile Analysis (SIMPROF). The test indicates if groups of quadrats are significantly associated. This is indicated by a test statistic (P_i) and a 'p-value', which for significant groups using this technique should be less than 0.01 (Clarke and Gorley, 2006).

2.3 Ordination and Analysis of Similarity

The purpose of ordination is to show the relationship between individual samples rather than the groupings of individual samples, which is the outcome of classification. The output of an ordination analysis is called an ordination plot, which is similar to a scatter plot. The intention of undertaking an ordination analysis in this project is to display the relationship between quadrats and to examine if Land Systems appear to explain some of the patterns. On its own, ordination is not a test of significance of a grouping, or change. This requires a specific test called Analysis of Similarity (ANOSIM). Ordination plots should be viewed along with this test of significance to help in the interpretation of the pattern seen.

The purpose of undertaking an ANOSIM is to test for the significance of groupings of quadrats based on identified categories (*a priori* factors in the data). In this current analysis, one-way ANOSIM was used to test the hypothesis that quadrats surveyed within one Land System are significantly different from quadrats surveyed in another. The significance of the test is indicated by a 'Global R value' and a 'p-value'. For strongly significant associations the Global-R value should close to 0.5 and the p-value should be less than 0.01 (Clarke and Gorley, 2006). A Global-R value greater than 0.2 indicates a moderately significant association. If the ANOSIM is significant, then each individual Land System can be compared to identify which pairs are significantly different. This final analysis is called pairwise testing.

All pattern analyses were carried out using the appropriate modules of *Primer v6* software (Clarke and Gorley, 2006).

3 Data Analysis Results

3.1 Vegetation Survey Data Analyses

3.1.1 Presence/Absence Transformed Data

Classification analysis of the quadrat similarity matrix indicated that there were 23 groups of two or more quadrats (Figure 1) and six ungrouped quadrats; the latter occurred in Newman (3), Boolgeeda (2) and Mackay (1) land systems. The groupings are identified in the dendrogram by vertical black lines that change to red and the ungrouped quadrats remain as black vertical lines. Similarity Profile Analysis (SIMPROF) that generates these groupings was highly significant for Presence/Absence transformed data ($P_i = 6.224$, $p < 0.001$) (Table 1).

The associations of groups of quadrats to Land Systems can, in the first instance, be assessed in Figure 1. There is a broad division between the quadrats occurring in the Newman Land System to the left side of the dendrogram and all other quadrats (Figure 1). Most of the Boolgeeda quadrats are in the right portion of the dendrogram with five occurring in one significant grouping on the extreme right of the dendrogram. The quadrats sampled from the Washplain and River Land Systems do not group together. This indicates a degree of overlap in their species occurrences across a number of Land Systems.

One outlier quadrat was identified. This quadrat WHN-R17 and had a Similarity value of less than 10% to all other quadrats (Figure 1). The remaining 5 un-grouped quadrats are 'within' close Similarity distances to groups of quadrats within the dendrogram (for example, WHN-69 is closely associated with groups that contains quadrats WHN-11 and WHN-21; and WHN-34, WHN-32, WHN-38 and WHN-42 (Figure 1)).

Analysis of Similarity (ANOSIM) is weakly significant and confirms vegetation community differences between some of the quadrats surveyed in some of the six different land systems (Global $R = 0.200$, $p < 0.001$). Pairwise comparisons of the six land systems (i.e. ten pairs) indicates that only Newman and Boolgeeda are significantly different from each other ($R = 0.258$, $p < 0.01$), with all other pairwise comparisons not significant ($p > 0.01$) (Table 1). It confirms that vegetation species occurrences are broad and occur across a number of Land Systems sampled based on Presence-Absence.

The relationship between land systems is further examined by ordination (Figure 2). The broad division between the Newman and Boolgeeda land systems is demonstrated by the groupings of Boolgeeda quadrats and Newman quadrats in different portions of the ordination plot (left to right).

3.1.2 4th Root Transformed Data

Classification analysis of the quadrat similarity matrix indicated that there were 20 groups of two or more quadrats (Figure 3) and 12 ungrouped quadrats; Newman (9), Boolgeeda (2) and Washplain (1). These groupings are identified in the dendrogram by vertical black lines that change to red. Similarity Profile Analysis (SIMPROF) that generates these groupings was highly significant for 4th Root transformed data ($P_i = 4.320$, $p < 0.001$) (Table 1). Similarly to the Presence-Absence analyses, one outlier quadrat was identified. This quadrat, WHN-R17 had a Similarity value of less than 10% to all other quadrats (Figure 3).

The correlation of Land Systems to quadrat groupings for 4th Root transformed data can be initially assessed by observing the groupings that are evident in Figure 3. These groupings are similar to those identified in the dendrogram for the P/A transformed data (similar to Figure 1, except with

Boolgeeda to the left and Newman to the right). The difference in those quadrats identified as “ungrouped” is the most apparent difference in the analysis using the 4th root data transformation. A 12% similarity line is included on the graph to broadly show the two main groupings.

Analysis of Similarity (ANOSIM) is significant and confirms vegetation community differences between the quadrats surveyed within some of the six different land systems (Global R = 0.296, $p < 0.01$). Pairwise comparisons of the six land systems (i.e. ten pairs) indicates that Newman land system is significantly different from the Boolgeeda system (R = 0.394, $p < 0.001$), the Washplain system (R=0.33, $p < 0.001$) and the River system (R= 0.445, $p = 0.004$). However, the sample replication for the River system, although sufficient for the survey, is relatively low. This can affect the power of this test. All other pairwise comparisons not significant ($p > 0.01$) (Table 1).

The relationship between land systems is further examined by ordination (Figure 4). The broad division between the Newman and Boolgeeda land systems is demonstrated by the groupings of Boolgeeda quadrats and Newman quadrats in different portions of the ordination plot (left to right). The distribution of the other three land systems with respect to these two broad divisions can also be qualitatively assessed. This is similar to the ordination analysis for the P/A transformed data. A 12% similarity contour is included on the plot to broadly show the two main groupings.

Table 1: SIMPROF and ANOSIM Pairwise Comparisons and Significance tests for quadrats surveyed in six land systems within the Wheellarra North survey area.

SIMPROF - Presence/Absence Transform			SIMPROF - 4th Root Transform		
Sample statistic (Pi): 6.224			Sample statistic (Pi): 4.32		
Significance level of sample statistic: 0.1%			Significance level of sample statistic: 0.1%		
ANOSIM - Presence/Absence Transform			ANOSIM - 4th Root Transform		
Sample statistic (Global R): 0.200			Sample statistic (Global R): 0.296		
Significance level of sample statistic: 0.1%			Significance level of sample statistic: 0.1%		
Pairwise Tests - Presence/Absence Transform			Pairwise Tests - 4th Root Transform		
Groups	R Statistic	Significance Level (p)	Groups	R Statistic	Significance Level (p)
Newman, Boolgeeda	0.258	0.002	Newman, Boolgeeda	0.394	0.001
Newman, McKay	-0.022	0.578	Newman, McKay	0.052	0.276
Newman, Washplain	0.298	0.012	Newman, Washplain	0.33	0.001
Newman, River	0.457	0.14	Newman, River	0.445	0.004
Boolgeeda, McKay	0.203	0.036	Boolgeeda, McKay	0.217	0.019
Boolgeeda, Washplain	0.167	0.082	Boolgeeda, Washplain	0.176	0.049
Boolgeeda, River	0.466	0.017	Boolgeeda, River	0.423	0.034
McKay, Washplain	0.272	0.016	McKay, Washplain	0.294	0.025
McKay, River	0.313	0.067	McKay, River	0.289	0.085
Washplain, River	0.33	0.095	Washplain, River	0.352	0.071

Groups in Bold Text: significant i.e. $p < 0.01$

Groups in Grey Text: not significant

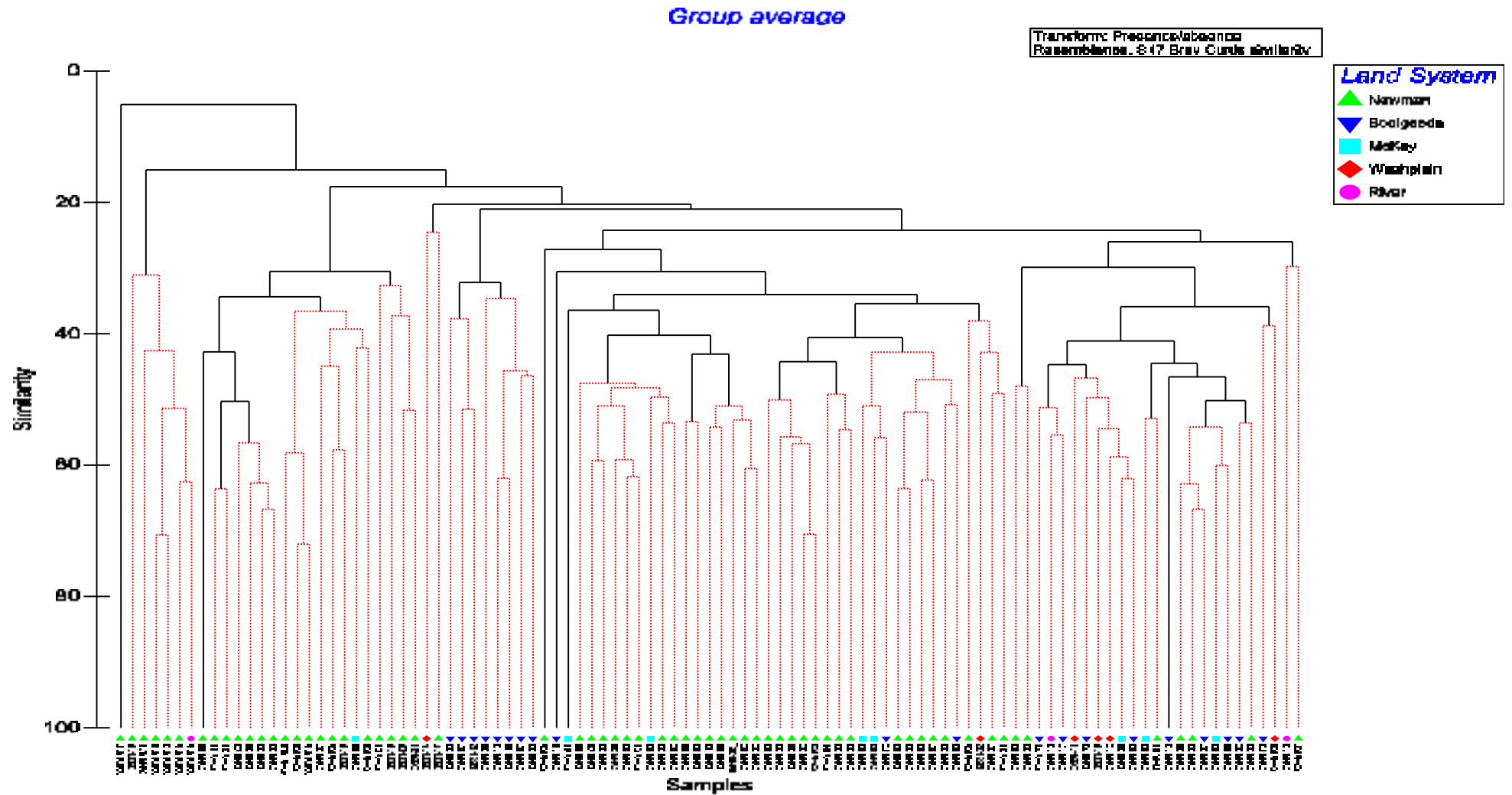


Figure 1: Dendrogram showing quadrat groupings for P/A Transformed Data, Similarity Profile Analysis and Land System Labels for the Wheelarra Hill North survey quadrats.

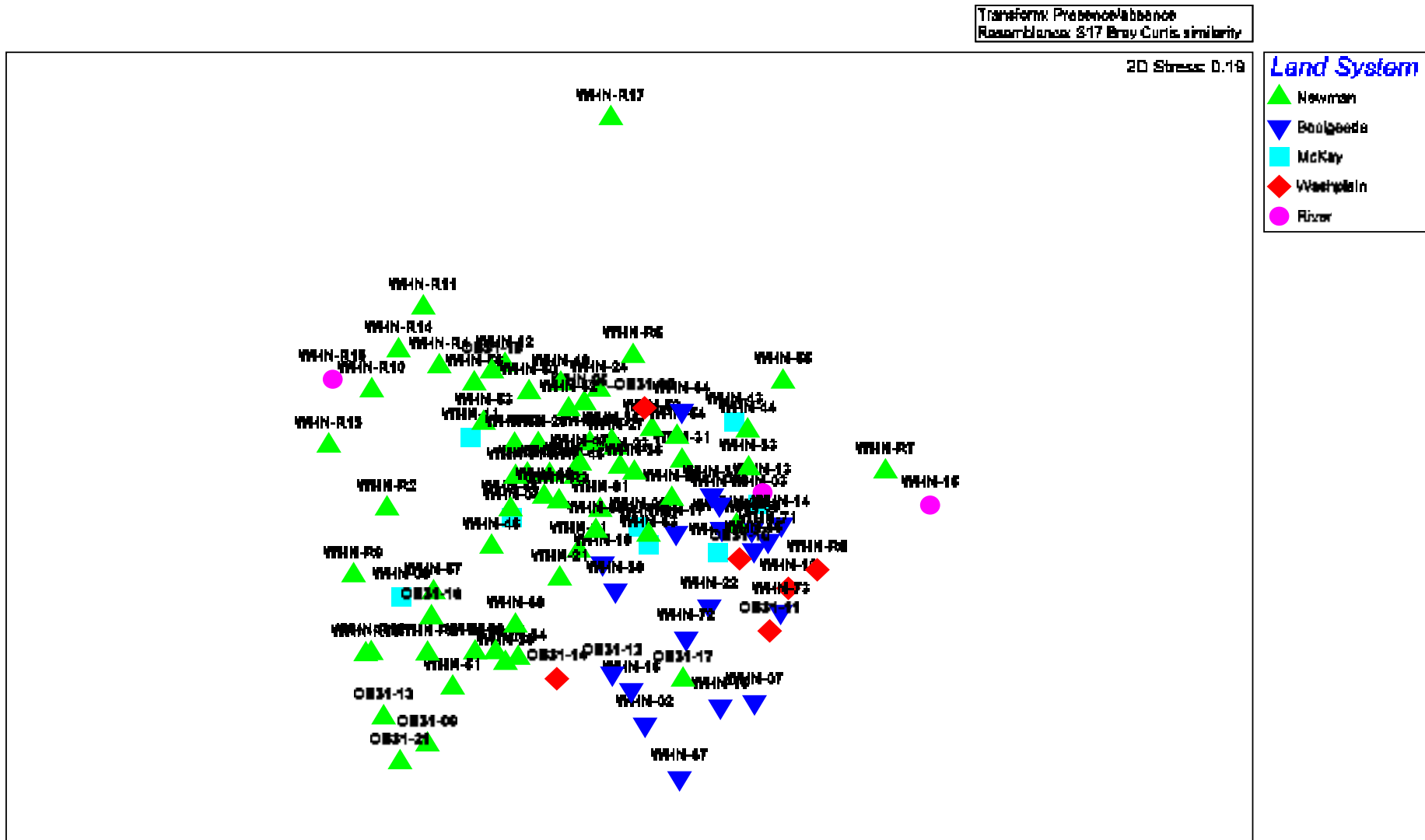


Figure 2: Ordination Plot showing the relationship between all quadrats for P/A Transformed Data for the Wheelarra Hill North survey quadrats.

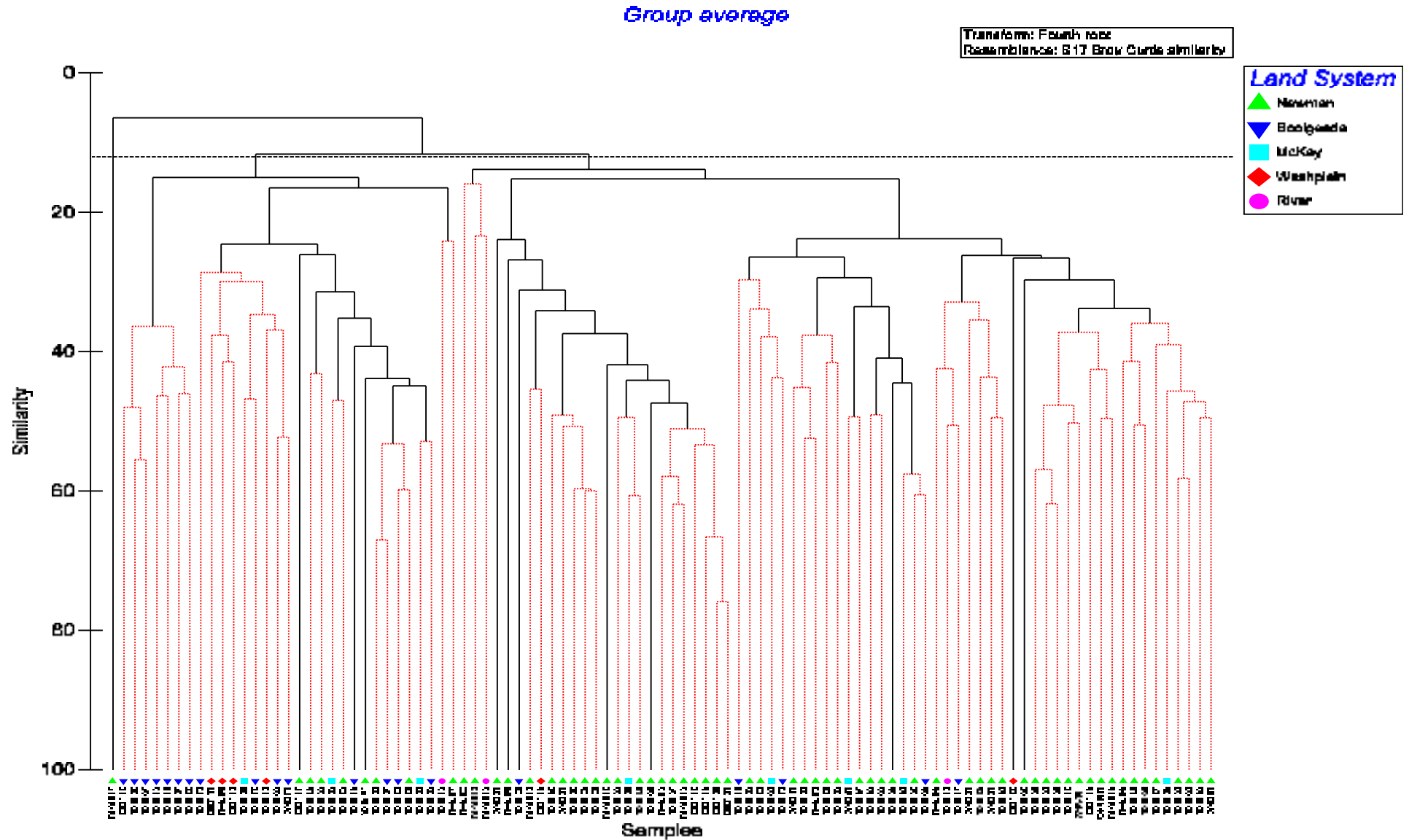


Figure 3: Dendrogram showing quadrat groupings for 4th Root Transformed Data, Similarity Profile Analysis and Land System labels for the Wheelarra Hill North survey quadrats.

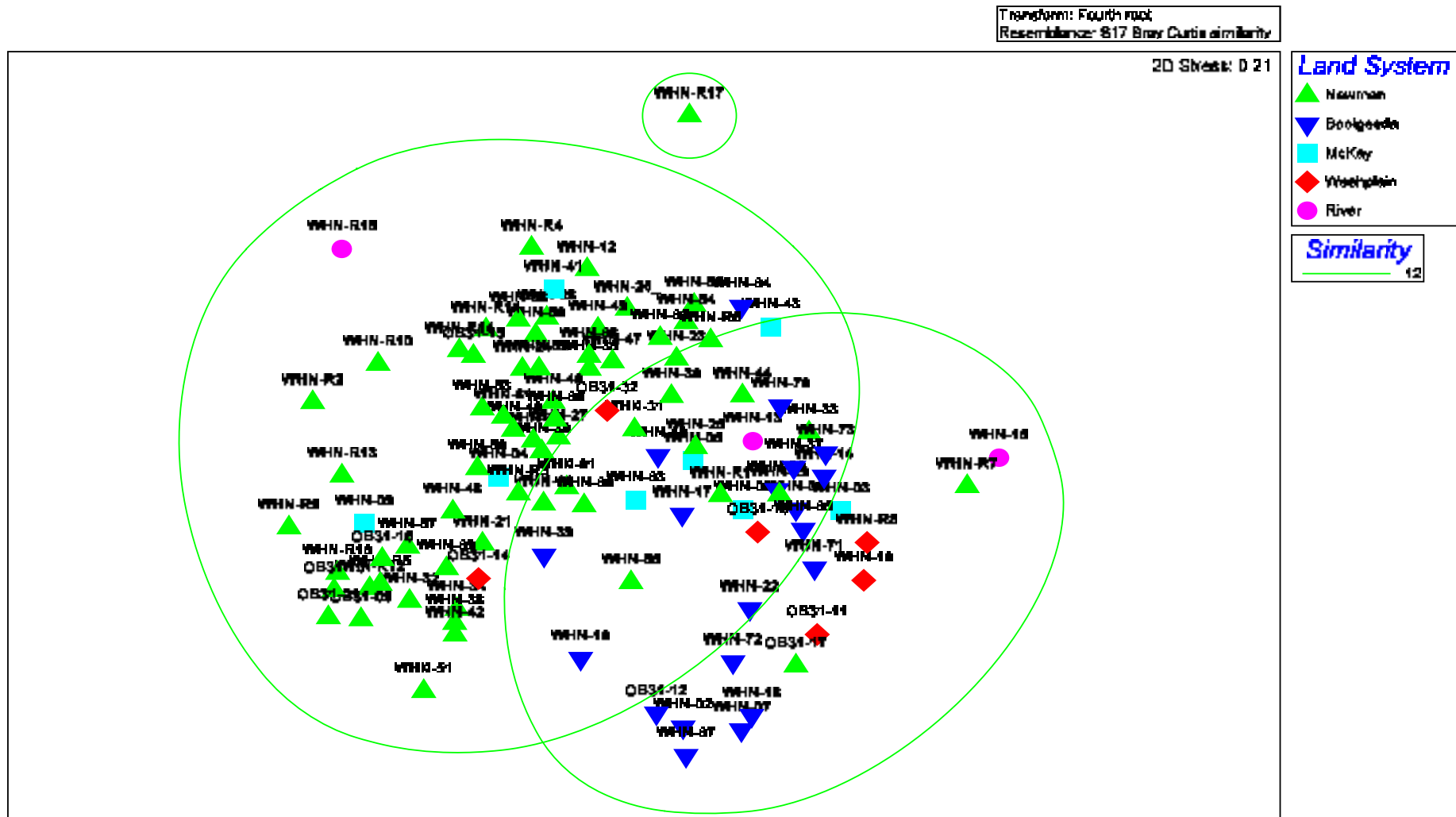


Figure 4: Ordination Plot showing the relationship between all quadrats for 4th-root Transformed Data for the Wheelarra Hill North survey quadrats.

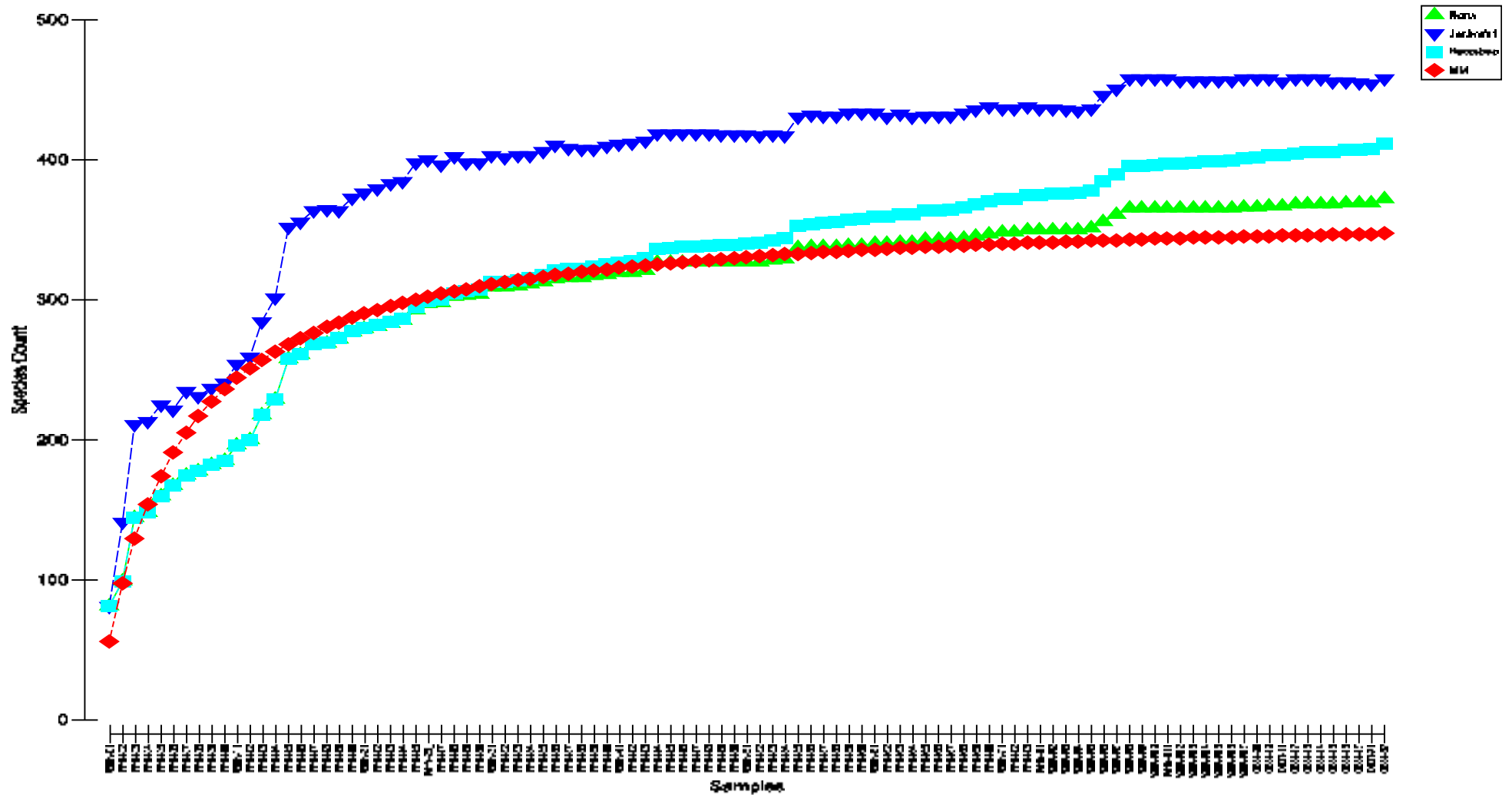


Figure 5: Species accumulation plots. Green symbols - counts of species observed; Blue symbols - Jackknife; Light blue symbols – Bootstrap; Red symbols - Michaelis-Menton Estimators.

3.2 Species Accumulation and Sampling Effort

Sampling effort for this survey was assessed by species accumulation plots and estimators of species accumulation (Figure 5). Adequate sampling for observed species is deemed to be appropriate when the species accumulation curve ‘flattens out’. For example, for the observed species (green symbols in Figure 5), sufficient sampling is indicated after approximately 80 samples (quadrat label WHN-R11). This is indicated by the limited increase in species observed after this sampling occasion.

Estimators of species accumulation provide modelled or estimated numbers of species that could occur within the survey area. Each estimator ‘weighs’ different occurrences of individual species. For example, the Jackknife estimator models the likelihood of total species numbers if a large number of rare species occur in the sampling area. The Bootstrap estimator models species numbers based on the proportion of quadrats containing each species. Full descriptions of each estimator are provided in Clarke and Gorely (2006).

4 Discussion and Recommendations

The purpose of the data analysis was to determine if there are groupings of similar quadrats and to examine if Land Systems could explain the quadrat groupings.

The ANOSIM analysis, while globally significant, identified a significant differences between Newman land system quadrats (i.e. differences were significant only for the two broad divisions of Boolgeeda and Newman in the Presence Absence analysis and differences between the Newman land system in comparison to Boolgeeda, Washplain and River systems). Apart from Newman, the data analysis suggests that vegetation species sampled within the other Land Systems are quite cosmopolitan and are not generally restricted to one system.

The influence of these factors on ANOSIM pairwise comparisons could be expected to diminish following additional survey events. This is true for all vegetation surveys.

Non-parametric methods such as those used in this report require that sufficient permutations of data are possible. Land System categories represented by only a few quadrats (e.g. River – 3, Washplain – 6) do not allow a sufficient number of permutations for realistic pairwise comparisons (The Washplain-River pairwise comparison has only 84 possible permutations. A higher number of permutations are generally analogous to higher statistical power). However, vegetation surveys are stratified towards the project 'area of interest'. It is this factor which determines quadrat placement.

Species accumulation based on counts of observed species as a function of the number of quadrats surveyed indicates sufficient sampling effort after approximately 80 quadrats.

Most of the survey area falls within the Newman and Boolgeeda land systems and the numerical analysis conducted in this report indicate that sufficient sampling of these systems has been undertaken.

Additional analyses that could be conducted in future surveys are tests of relationships between the surveyed quadrats and the vegetation communities identified by vegetation mapping. This would be useful for on-going monitoring of vegetation condition if required.

5 References

- Clarke, K.R. and Gorley, R.N. (2006). Primer v6: User and Tutorial Manual . PRIMER-E Ltd. Plymouth. UK.
- Clarke, K.R. and Green, R.H. 1988. Statistical design and analysis for a 'biological effects' study. Marine Ecology Progress Series 92: 205-219.