

Appendix eight: GRFVS plant communities

The following plant communities have been identified from within the GRFVS area, and are described below:

- 1. Estuarine: *Casuarina obesa* / *Tecticornia* / *Sarcocornia* (Co/Te/Sa)
- 2. Riparian: *Eucalyptus camaldulensis* / *Casuarina obesa* / *Melaleuca raphiophylla* (Ec/Co/Mr)
- 3. Fore-dune: *Atriplex isatidea* / *Spinifex longifolius* (Ati/Spl)
- 4. Swale: *Ficinia nodosa* (Fin)
- 5. Swale: *Frankenia pauciflora* (Frp)
- 6. Coastal: *Thryptomene baeckeacea* (Thb)
- 7. Coastal: *Melaleuca cardiophylla* (cMc)
- 8. Coastal: *Acacia rostellifera* low shrubland (cAr)
- 9. Coastal: *Acacia rostellifera* / *Eucalyptus* spp. (Ar/Espp)
- 10. Near Coastal: *Acacia rostellifera* shrubland (ncAr)
- 11. Limestone ridge: *Melaleuca cardiophylla* / *Eucalyptus* spp. (Mc/Espp)
- 12. Limestone ridge: *Melaleuca cardiophylla* (rMc)
- 13. Sandplain: *Banksia prionotes* / *Acacia rostellifera* (Bp/Ar)
- 14. Chapman River Reserve: *Acacia rostellifera* / *Melaleuca* spp (Ar/Mspp)
- 15. Thicket: *Melaleuca* spp. / mixed spp. (Mspp/mx)
- 16. Woodland: *Acacia acuminata* / *A. tetragonophylla* / *Hakea preissii* (Aa/At/Hp)
- 17. Woodland: *Eucalyptus loxophleba* (El).

The Moresby Range shrublands were identified from the Wokatherra Gap quadrat (GRV0864). As this floristic community is not within the GRFVS project area and is based on only one quadrat of a large and diverse area, it would be inappropriate to assign a community description.

Note that in relation to NVIS, Keighery and Muir community descriptions:

- data was recorded in NVIS format, which records dominant stratum on basis of biomass, and characteristic species/lifeforms within stratum;
- Keighery and Muir descriptions are both described in terms of tallest stratum, and dominant species within stratum; and
- there may be anomalies and inconsistencies between these due to the method of collecting data

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1. Estuarine: *Casuarina obesa* / *Tecticornia* / *Sarcocornia* (Co/Te/Sa)

The estuarine *Casuarina obesa*/samphire plant community occupies wet saline alluvial soil at river mouths and along saline river edges close to the coast.

Area in GRFVS:	% of GRFVS area:	Quadrats:	GRV0859, 60
33.22 ha	0.54	(2)	
NVIS description:	Open Woodland, Isolated Trees, Closed Samphire Shrubland, Sparse Rushland, Open Grassland, Sparse Shrubland		
Keighery description:	Low Open Woodland, Closed Low Heath		
Muir description:	Open Low Woodland A, Dense Low Heath D		

The following common species were recorded:

Trees:	<i>Casuarina obesa</i>		
Low shrubs:	<i>Enchylaena tomentosa</i> , <i>Sarcocornia quinqueflora</i> , <i>Tecticornia indica</i> , <i>Tecticornia pergranulata</i>		
Sedges and rushes:	* <i>Juncus acutus</i> , <i>Juncus kraussii</i>		
Grasses:	<i>Sporobolus virginicus</i>		
Herbs:	<i>Wilsonia rotundifolia</i> , * <i>Melilotus indicus</i> , * <i>Reichardia tingitana</i>		
Landform:	Flat: wetland, watercourse, floodplain		
Geology:	Quindalup and Tamala soil systems. The Quindalup soil system is Aeolian calcareous sands and minor limestone, with the Tamala soil system being lithified Pleistocene calcareous dune deposits and recent calcareous soil.		
Surface rock:	None		
Soil:	Grey or brown clay		
% Cover leaf litter:	5-70	% Cover bare ground:	<5
% Weed cover:	<5		

Notes:	<p>This plant community is most extensive at the mouth of the Chapman River and Rudds Gully near Devlin Pool. It also occurs along the Greenough River edge near the river mouth, and in small areas near the mouths of other rivers.</p> <p>A variant occurs on Oakajee Nature Reserve, and would be described as 'saltmarsh' rather than 'estuarine' (Plate A8.1.4).</p> <p><i>Melaleuca lanceolata</i> occurs as an upslope fringing vegetation along Brand Highway, Rudds Gully. Although <i>Melaleuca lanceolata</i> is not a component of this plant community, the area is too narrow to map as a separate unit.</p>		
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Plate A8.1.1: Photo direction: SE
Location: GRV0859, Chapman River
Photographer: C. Krens



Plate A8.1.2: Photo direction: SE
Location: GRV0860, Rudds Gully
Photographer: C. Krens



Plate A8.1.3: Photo direction: E
Location: 270297 E, 6805058 N,
Greenough River mouth
Photographer: J. Nelson



Plate A8.1.4: Photo direction: NE
Location: 269512 E, 6837321 N,
Oakajee Nature Reserve
Photographer: J. Nelson

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2. Riparian: *Eucalyptus camaldulensis* / *Casuarina obesa* / *Melaleuca raphiophylla* (Ec/Co/Mr)

The riparian plant community is variously dominated by *Eucalyptus camaldulensis* subsp. *obtusa*, *Casuarina obesa* and *Melaleuca raphiophylla*, or a combination of these, and follows the drainage lines through their entire length, until merging with the saline estuarine plant community

Area in GRFVS:	% of GRFVS area:	Quadrats:	GRV0806, 07, 08, 09, 15, 24, 45, 71, 72, 80
388.36 ha	6.30	(10)	

NVIS description: Open Woodland, Open Forest, Woodland, Sparse Shrubland

Keighery description: Open Forest, Low Open Woodland, Open Woodland, Tall Open Shrubland

Muir description: Low Forest A, Low Woodland B, Open Low Woodland B, Low Woodland A, Open Scrub

The following common species were recorded:

Trees:	<i>Casuarina obesa</i> , <i>Eucalyptus camaldulensis</i> subsp. <i>obtusa</i> , <i>Melaleuca raphiophylla</i> , * <i>Tamarix aphylla</i>
Tall shrubs:	<i>Acacia rostellifera</i> , <i>Acacia tetragonophylla</i> , <i>Grevillea pinaster</i> , <i>Hakea preissii</i> , * <i>Lycium ferocissimum</i>
Mid shrubs:	<i>Pimelea microcephala</i> subsp. <i>microcephala</i>
Low shrubs:	<i>Enchylaena tomentosa</i> , <i>Rhagodia preissii</i> subsp. <i>obovata</i> , <i>Threlkeldia diffusa</i>
Sedges and rushes:	<i>Cyperus gymnocaulos</i>
Grasses:	* <i>Avena barbata</i> , * <i>Bromus diandrus</i> , * <i>B. hordeaceus</i> , * <i>Cynodon dactylon</i> , * <i>Ehrharta longiflora</i> , * <i>Hordeum leporinum</i> , * <i>Lolium rigidum</i>
Herbs:	* <i>Arctotheca calendula</i> , * <i>Echium plantagineum</i> , * <i>Fumaria capreolata</i> , * <i>Oxalis pes-caprae</i> , * <i>Reichardia tingitana</i> , * <i>Sonchus oleraceus</i>
Landform:	Flat, gentle or steep, plains, valleys, watercourses and riverbanks. The geology depends on the substrate the drainage line passes through: therefore the major soil units of the GRFVS area are represented within this plant community, and include:
Geology:	<ul style="list-style-type: none"> Northampton soil system, of alluvium or granulites dominate with dolerite dykes and remnants of some Jurassic sediments in areas Tamala soil system, of lithified Pleistocene calcareous dune deposits and recent calcareous sand Greenough soil system, of recent alluvial deposits.
Surface rock:	Usually none, but may have sandstone or limestone.
Soil:	Red, red-brown, orange or grey. Sand, clayey sand, loamy sand, sandy clay, sandy clay loam or clay

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% Cover leaf litter: 0-100

% Cover bare ground: 0-70

% Weed cover: 1-100

Notes:

Somewhat saline areas show affinity with the estuarine plant community and are dominated by *Casuarina obesa*, at times with scattered samphire (*Tecticornia* and *Sarcocornia* spp). Rum Jungle, which is a discontinuous drainage line with no exit to the ocean through the coastal dunes, is included in this plant community despite not appearing to have flowing water at any time.

All rivers and streams have, or had, a fringe of this vegetation on the banks. *Melaleuca raphiophylla* occurs in the more fresh-water and wetter reaches of the rivers, but *Eucalyptus camaldulensis* and *Casuarina obesa* occur along the length of the rivers. There is often a fringe of *Acacia rostellifera* on the top of the river bank, or in raised areas within the drainage lines.

In the upper reaches of the Oakajee and Buller Rivers, the vegetation in the drainage lines is a continuation of the surrounding vegetation, and is not mapped as riparian vegetation. *Melaleuca* species, possibly including *Melaleuca acuminata* and *M. viminea*, occur in the drainage lines of the Oakajee River.



Plate A8.2.1: Photo direction: SE
Location: GRV0808 Rum Jungle
Photographer: L. Atkins



Plate A8.2.2: Photo direction: Approximately SE
Location: GRV0871, Chapman River
Moonyoonooka
Photographer: L. Atkins

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3. Foredune: *Atriplex isatidea* / *Spinifex longifolius* (Ati/Spl)

The *Atriplex isatidea* / *Spinifex longifolius* plant community occurs on the foredunes along the coast. *Atriplex isatidea* is only found on the foredunes, with the other species also occurring in the low coastal shrubland (plant community 8: Coastal *Acacia rostellifera* low shrubland) behind the primary dunes, with which this community merges.

Area in GRFVS:	% of GRFVS area:	Quadrats:	GRV0804, 26
96.52 ha	4.57	(2)	

NVIS description: Open Chenopod Shrubland, Tussock Grassland

Keighery description: Shrubland

Muir description: Low Scrub B

The following common species were recorded:

Medium shrubs: *Atriplex isatidea*, *Nitraria billardiarei*

Low shrubs: *Olearia axillaris*, *Threlkeldia diffusa*

Grasses: **Ehrharta brevifolia* var. *cuspidata*, *Spinifex longifolius*

Herbs: **Mesembryanthemum crystallinum*, *Salsola tragus*, **Tetragonia decumbens*

Landform: Steep dune

Quindalup soil system :

Geology:

- Quindalup Central stable parabolic dune Phase1 soil subsystem: 221Qu_1Qp1, low stable parabolic dunes with relief 5-15 m. Calcareous deep sand. Geology: Aeolian calcareous sands and minor limestone.
- Quindalup Central 1 frontal plain Phase soil subsystem: 221Qu_1Qs1, low lying plain adjoining foredune or beach. Calcareous deep sand. Geology: Aeolian calcareous sands and minor limestone.

Surface rock: None

Soil: White sand

% Cover leaf litter:	0-25	% Cover bare ground:	30-85
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% Weed cover:	0-40
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Notes: Occurs on primary dunes along the coast.

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Plate A8.3: Photo direction: SE
Location: GRV0804, Glenfield Beach
Photographer: L. Atkins

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4. Swale: *Ficinia nodosa* (Fin)

Ficinia nodosa plant community occurs in a small pocket in the deflation basin swale behind an advancing dune field.

Area in GRFVS:	% of GRFVS area:	Quadrats:	GRV0814
0.58 ha	0.01	(1)	

NVIS description: Sedgeland

Keighery description: Shrubland

Muir description: Low Scrub B

The following common species were recorded:

Mid shrubs: *Acacia rostellifera*

Low shrubs: *Olearia axillaris*

Climbers: *Cassytha flava*

Sedges and rushes: *Ficinia nodosa*

Herbs: *Kennedia prostrata*

Landform: Flat dune (swale)

Geology: Quindalup Central mobile parabolic dune Phase soil subsystem: 221Qu_1Qm, active parabolic dunes and blowouts. Calcareous deep sand. Geology: Aeolian calcareous sands and minor limestone

Surface rock: None

Soil: White sand

% Cover leaf litter: 1 **% Cover bare ground:** 60

% Weed cover: 0

Notes: The only occurrence of this plant community is south of the Oakajee River mouth, although, as a species, *Ficinia nodosa* is scattered sparsely throughout the shallow sand areas behind advancing dunes (including other dune fields between Drummonds Cove and the Oakajee River) and is widespread throughout the southwest of Western Australia, where it sometimes occurs as a dominant species.

Plate 8.4.2 illustrates the more common, sparsely distributed occurrence of the species *Ficinia nodosa* (foreground), where the density of the plants is not sufficient to form a plant community.

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Plate A8.4.1: Photo direction: SE
Location: GRV0814, Oakajee
Photographer: L. Atkins



Plate A8.4.2: Photo direction: N
Location: 263694 E, 6835411N,
near Buller River
Photographer: J. Nelson

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5. Swale: *Frankenia pauciflora* (Frp)

Frankenia pauciflora Low Open Shrubland occurs in a single peat-soil swale in the GRFVS area.

Area in GRFVS:	% of GRFVS area:	Quadrats:	GRV0818, 58
4.78 ha	0.08	(2)	

NVIS description: Sparse Shrubland, Shrubland

Keighery description: Low Open Shrubland, Low Open Heath

Muir description: Open Dwarf Scrub D, Low Heath D

The following common species were recorded:

Tall shrubs: *Acacia rostellifera*, **Lycium ferocissimum*

Mid shrubs: *Stylobasium spathulatum*

Low shrubs: *Frankenia pauciflora*, *Tetragonia implexicoma*, *Threlkeldia diffusa*, *Zygophyllum fruticosum*

Grasses: *Vulpia myuros*

Herbs: **Hypochaeris glabra*, **Mesembryanthemum nodiflorum*

Landform: Gentle slope or flat: valley (swale)

Geology: Tamala South 5 grey-brown sand Phase soil subsystem: 221Ta_5Tb, mid to lower slopes of Tamala Limestone ridges and some isolated rises. Calcareous deep and shallow sands. Geology: lithified Pleistocene calcareous dune deposits and recent calcareous sand

Surface rock: None

Soil: Grey peaty clayey loam or peaty sand.

% Cover leaf litter: <2 **% Cover bare ground:** 50-100

% Weed cover: <5

Notes: The only known occurrence of this community is near Buller in a peat-soil swale, of the Tamala soil system. This swale is reported to have become more saline in recent years, perhaps as a result of groundwater extraction causing saline water to enter the watertable. The peaty soil would make the area unsuitable for construction.

This plant community is visually unspectacular and has been degraded by grazing, weed invasion and rubbish dumping.

In other areas, *Frankenia pauciflora* is often the dominant species in vegetation surrounding salt lakes, or on shallow saline soils near the coast.

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Plate A8.5: Photo direction: SE
Location: GRV0858, Buller
Photographer: C. Krens

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6. Coastal: *Thryptomene baeckeacea* (Thb)

Thryptomene baeckeacea shrubland occurs on coastal dunes, reaching greater height in protected swales than on exposed dunes. Floristically it shows affinities with plant community 8 Coastal: *Acacia rostellifera* low shrubland (and occupies a similar landscape position) and plant community 7 Coastal: *Melaleuca cardiophylla* thickets, both of which occur nearby. This plant community is separated from the more common Coastal *Acacia rostellifera* community on the basis that *Thryptomene baeckeacea* is very much the dominant species.

Area in GRFVS:	% of GRFVS area:	Quadrats:	GRV0849
11.08 ha	0.18	(1)	

NVIS description: Shrubland

Keighery description: Open Heath

Muir description: Heath B

The following common species were recorded:

Mid shrubs: *Pittosporum ligustrifolium*, *Thryptomene baeckeacea*

Low shrubs: *Ptilotus divaricatus*, *Rhagodia latifolia* subsp. *recta*, *Tetragonia implexicoma*, *Zygophyllum fruticosum*

Grasses: **Ehrharta longiflora*

Herbs: **Anagallis arvensis*, *Calandrinia brevipedata*, *Carpobrotus virescens*, **Euphorbia peplus*, **Euphorbia terracina*, *Senecio pinnatifolius*

Landform: Gentle dune

Geology: Quindalup Central stable parabolic dune Phase2 soil subsystem: 221Qu_1Qp2, large scale parabolic dunes with relief 20-40 m. Calcareous deep sand. Geology: Aeolian calcareous sands and minor limestone.

Surface rock: None

Soil: white sand

% Cover leaf litter:	40	% Cover bare ground:	25
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% Weed cover:	5
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Notes: The only occurrence of *Thryptomene baeckeacea* in the GRFVS project area is south of Cape Burney.

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Plate A8.6: Photo direction: SE
Location: GRV0849, Cape Burney
Photographer: L. Atkins

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7. Coastal: *Melaleuca cardiophylla* (cMc)

Coastal *Melaleuca cardiophylla* thickets occur in patches on shallow coastal sands south of Cape Burney, close to the Greenough River. Floristically this group shows similarities with plant community 6: Coastal *Thryptomene baeckeacea* shrubland and plant community 8: Coastal *Acacia rostellifera* low shrubland.

Area in GRFVS:	% of GRFVS area:	Quadrats:	GRV0847
62.71 ha	1.02	(1)	

NVIS description: Shrubland

Keighery description: Tall Open Scrub

Muir description: Thicket

The following common species were recorded:

Tall shrubs: *Melaleuca cardiophylla*

Mid shrubs: *Alyxia buxifolia*, *Pimelea gilgiana*, *Rhagodia latifolia* subsp. *recta*

Low shrubs: *Chenopodium gaudichaudianum*, *Threlkeldia diffusa*, *Zygophyllum fruticosum*

Grasses: *Austrostipa elegantissima*, **Lolium rigidum*

Herbs: *Calandrinia brevipedata*, *Calandrinia liniflora*, *Eriochilus dilatatus* subsp. *undulatus*, **Sonchus oleraceus*

Landform: Flat, dune

Geology: Quindalup Central stable parabolic dune Phase1 soil subsystem: 221Qu_1Qp1, low stable parabolic dunes with relief 5-15 m. Calcareous deep sand. Geology: Aeolian calcareous sands and minor limestone.

Surface rock: None

Soil: Grey loamy sand

% Cover leaf litter:	50	% Cover bare ground:	15
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% Weed cover:	5
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Notes: This plant community occurs on shallow sands with little or no exposed limestone, usually in a mosaic associated with plant communities 8 Coastal: *Acacia rostellifera* low shrubland and 10 Near Coastal: *Acacia rostellifera* shrubland, illustrated in Plate 8.7.2.

Plant community 12 Limestone Ridge: *Melaleuca cardiophylla* can be differentiated by the characteristic limestone capping, and by the other characteristic species including *Diplolaena grandiflora* and *Grevillea argyrophylla*.

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Plate A8.7.1: Photo direction: SE
Location: GRV0847, Greenough River
Photographer: L. Atkins



Plate A8.7.2: Photo direction: NW
Location: 270823 E, 6803896 N,
Greenough River
Photographer: J. Nelson