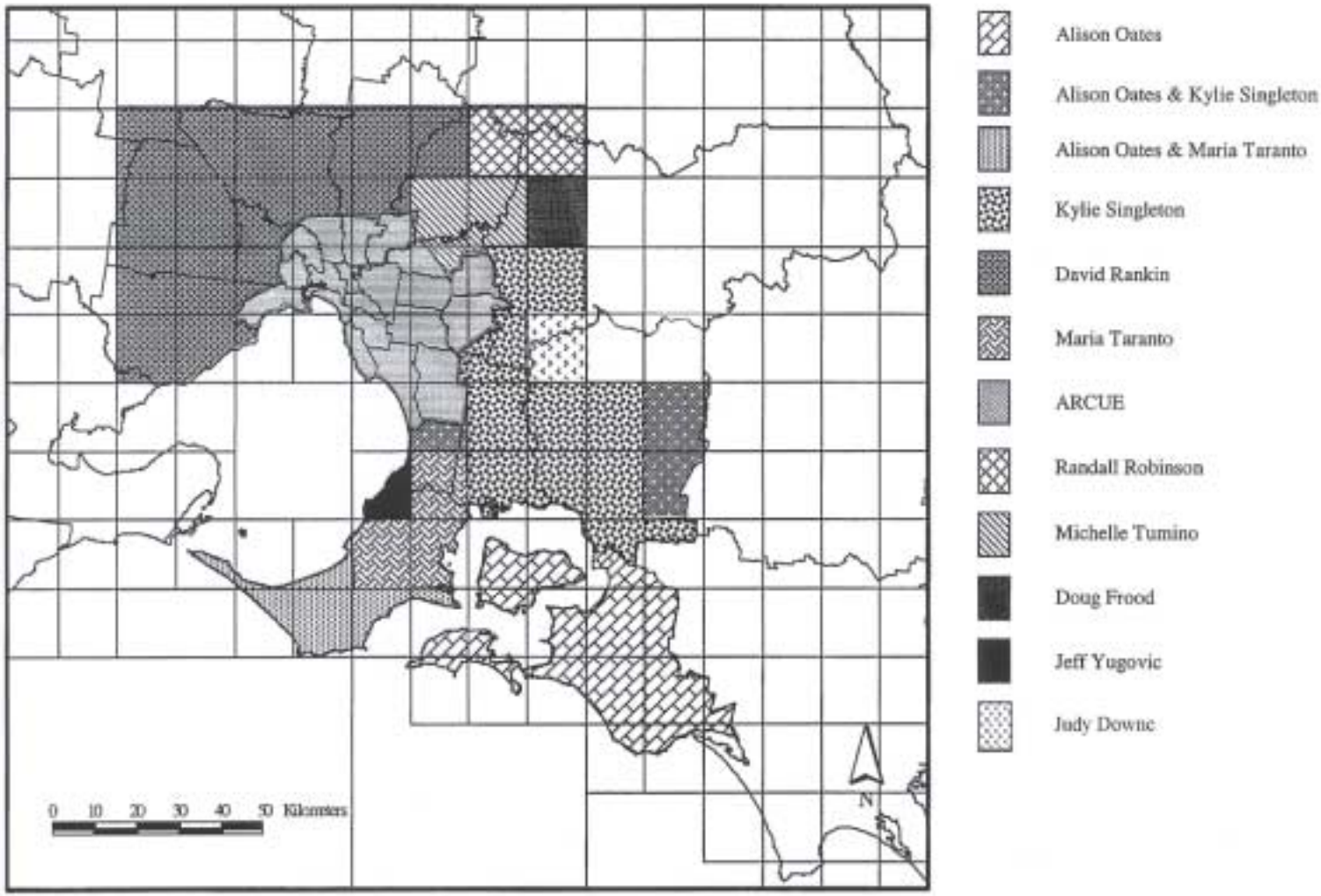
**Figure 4. Allocation of the Study Area to the Mapping Team for Extant Mapping**



## APPENDIX 1: NUMERICAL LISTING OF ECOLOGICAL VEGETATION CLASS (EVC) AND ASSOCIATED FLORISTIC COMMUNITY (FC) NAMEs, MOSAICS, COMPLEXES AND FORMATIONS

| EVC No. | FC No. | Other No. | EVC NAME | FC NAME | OTHER MAPPING UNIT NAME |
|---|---|---|---|---|---|
| | | 1m | | | Coastal Dune Scrub/Coastal Dune Grassland Mosaic |
| 2 | | | Coast Banksia Woodland | | |
| 3 | | | Damp Sands Herb-rich Woodland | | |
| 6 | | | Sand Heathland | | |
| 8 | | | Wet Heathland | | |
| 9 | | | Coastal Saltmarsh | | |
| 16 | | | Lowland Forest | | |
| 18 | | | Riparian Forest | | |
| 20 | | | Heathy Dry Forest | | |
| 21 | | | Shrubby Dry Forest | | |
| 22 | | | Grassy Dry Forest | | |
| 23 | | | Herb-rich Foothill Forest | | |
| 29 | | | Damp Forest | | |
| 30 | | | Wet Forest | | |
| 31 | | | Cool Temperate Rainforest | | |
| 32 | | | Warm Temperate Rainforest | | |
| 32 | 32-07 | | Warm Temperate Rainforest | *Strzeleckis* Warm Temperate Rainforest | |
| 45 | | | Shrubby Foothill Forest | | |
| 47 | | | Valley Grassy Forest | | |

| | | | | | |
|---|---|---|---|---|---|
| 48 | | | Heathy Woodland | | |
| 53 | | | Swamp Scrub | | |
| 53 | 53-03 | | Swamp Scrub | *Estuarine* Swamp Scrub | |
| 55 | | | Plains Grassy Woodland | | |
| 55 | 55-03 | | Plains Grassy Woodland | *Gippsland* Plains Grassy Woodland | |
| 55 | 55-04 | | Plains Grassy Woodland | *Western Basalt* Plains Grassy Woodland | |
| 55 | 55-06 | | Plains Grassy Woodland | *Riverina* Plains Grassy Woodland | |
| 56 | | | Floodplain Riparian Woodland | | |
| 61 | | | Box Ironbark Forest | | |
| 64 | | | Rocky Chenopod Woodland | | |
| 68 | | | Creekline Grassy Woodland | | |
| 71 | | | Hills Herb-rich Woodland | | |
| | | 74f | | | Wetland Formation |
| 83 | | | Swampy Riparian Woodland | | |
| 104 | | | Lignum Wetland | | |
| | | 124c | | | Grey Clay Drainage Line Herbland/Sedgeland Complex |
| 125 | | | Plains Grassy Wetland | | |
| | | 126c | | | Swampy Riparian Complex |
| 127 | | | Valley Heathy Forest | | |
| 128 | | | Grassy Forest | | |
| 132 | | | Plains Grassland | | |
| 132 | 132-05 | | Plains Grassland | *South Gippsland* Plains Grassland | |
| 132 | 132-06 | | Plains Grassland | *Western Basalt* Plains Grassland | |

| | | | | | |
|---|---|---|---|---|---|
| 136 | | | Sedge Wetland | | |
| 140 | | | Mangrove Shrubland | | |
| 154 | | | Bird Colony Shrubland | | |
| 155 | | | Bird Colony Succulent Herbland | | |
| 160 | | | Coastal Dune Scrub | | |
| 161 | | | Coastal Headland Scrub | | |
| | | 162m | | | Coastal Headland Scrub/Coastal Tussock Grassland Mosaic |
| 163 | | | Coastal Tussock Grassland | | |
| 164 | | | Creekline Herb-Rich Woodland | | |
| | | 172c | | | Floodplain Wetland Complex |
| 175 | | | Grassy Woodland | | |
| 191 | | | Riparian Scrub | | |
| 300 | | | Reed Swamp | | |
| | | 302m | | | Coastal Saltmarsh/Mangrove Shrubland Mosaic |
| | | 307m | | | Sand Heathland/Wet Heathland Mosaic |
| 311 | | | Berm Grassy Shrubland | | |
| | | 408c | | | Valley Grassy Forest/Herb-rich Foothill Forest Complex |
| | | 418c | | | Damp Sands Herb-rich Woodland/Heathy Woodland Complex |
| | | | Brackish Lake | | |
| | | 638m | | | Swamp Scrub/Wet Heathland Mosaic |
| | | 639m | | | Swamp Scrub/Plains Grassy Forest Mosaic |
| 641 | | | Riparian Woodland | | |
| 653 | | | Aquatic Herbland | | |

| | | | | | |
|---|---|---|---|---|---|
| 654 | | | Creekline Tussock Grassland | | |
| 656 | | | Brackish Wetland | | |
| 656 | 656-01 | | Brackish Wetland | *Estuarine* Brackish Wetland | |
| 656 | 656-02 | | Brackish Wetland | *Plains* Brackish Wetland | |
| 674 | | | Sandy Stream Woodland | | |
| | | 693m | | | Plains Grassy Woodland/Plains Grassland Mosaic |
| 707 | | | Sedgy Swamp Woodland | | |
| 710 | | | Damp Heathland | | |
| | | 719m | | | Grassy Woodland/Damp Sands Herb-rich Woodland Mosaic |
| 793 | | | Damp Heathy Woodland | | |
| | | 805c | | | Plains Grassland/Plains Grassy Woodland Complex |
| 851 | | | Stream-Bank Shrubland | | |
| 858 | | | Coastal Alkaline Scrub | | |
| 876 | | | Spray-Zone Coastal Shrubland | | |
| | | 878c | | | Damp Sands Herb-rich Woodland/Swamp Scrub Complex |
| 879 | | | Coastal Dune Grassland | | |
| | | 881m | | | Damp Sands Herb-rich Woodland/Heathy Woodland Mosaic |
| | | 892m | | | Heathy Woodland/Sand Heathland Mosaic |
| 894 | | | Scoria Cone Woodland | | |
| 895 | | | Escarpment Shrubland | | |
| | | 900m | | | Coastal Basalt Mosaic |
| | | 901m | | | Estuarine Flats Grassland/Coastal Saltmarsh Mosaic |

| | | | | | |
|---|---|---|---|---|---|
| 902 | | | Gully Woodland | | |
| | | 903m | | | Mangrove Shrubland/Estuarine Flats Grassland Mosaic |
| | | 904m | | | Coast Banksia Woodland/Swamp Scrub Mosaic |
| | | 906m | | | Brackish Grassland/Swamp Scrub Mosaic |
| | | 907m | | | Plains Grassy Woodland/Swamp Scrub Mosaic |
| | | 909m | | | Coastal Dune Scrub/Bird Colony Succulent Herbland Mosaic |
| | | 910m | | | Bird Colony Succulent Herbland/Coastal Tussock Grassland Mosaic |
| | | 911m | | | Coastal Headland Scrub/Swamp Scrub Mosaic |
| 914 | | | Estuarine Flats Grassland | | |
| | | 915m | | | Aquatic Herbland/Swamp Scrub Mosaic |
| | | 919m | | | Coastal Headland Scrub/Coast Banksia Woodland Mosaic |
| | | 921m | | | Coast Banksia Woodland/Coastal Dune Scrub Mosaic |
| | | 922m | | | Coastal Alkaline Scrub/Bird Colony Succulent Herbland Mosaic |
| | | 924m | | | Grassy Woodland/Swamp Scrub Mosaic |
| | | 925m | | | Damp Sands Herb-rich Woodland/Swamp Scrub Mosaic |
| | | 926c | | | Damp Heathy Woodland/Grassy Dry Forest Complex |
| | | 927m | | | Plains Grassy Woodland/Swamp Scrub/Plains Grassy Wetland Mosaic |

| | | | | | |
|---|---|---|---|---|---|
| | | 928m | | | Riparian Woodland/Stream-bank Shrubland Mosaic |
| | | 932m | | | Riparian Woodland/Escarpment Shrubland Mosaic |
| 934 | | | Brackish Grassland | | |
| | | 935m | | | Estuarine Wetland/*Estuarine* Swamp Scrub Mosaic |
| 937 | | | Swampy Woodland | | |
| | 937-01 | | Swampy Woodland | *Plains* Swampy Woodland | |
| 938 | | | Shrubby Gully Forest | | |

m = Mosaic

c = Complex

f = Formation

## APPENDIX 2: ALPHABETICAL LISTING OF ECOLOGICAL VEGETATION CLASS (EVC) AND ASSOCIATED FLORISTIC COMMUNITY (FC) NAMES, MOSAICS, COMPLEXES AND FORMATIONS

| EVC NAME | FC NAME | OTHER MAPPING UNIT NAME | EVC No. | FC No. | Other No. |
|---|---|---|---|---|---|
| Aquatic Herbland | | | 653 | | |
| | | Aquatic Herbland/Swamp Scrub Mosaic | | | 915m |
| Berm Grassy Shrubland | | | 311 | | |
| Bird Colony Shrubland | | | | | |
| Bird Colony Succulent Herbland | | | 155 | | |
| | | Bird Colony Succulent Herbland/Coastal Tussock Grassland Mosaic | | | 910m |
| Box Ironbark Forest | | | 61 | | |
| Brackish Grassland | | | 934 | | |
| | | Brackish Grassland/Swamp Scrub Mosaic | | | 906m |
| Brackish Lake | | | 636 | | |
| Brackish Wetland | | | 656 | | |
| Brackish Wetland | *Estuarine* Brackish Wetland | | 656 | 656-01 | |
| Brackish Wetland | *Plains* Brackish Wetland | | 656 | 656-02 | |
| Coast Banksia Woodland | | | 2 | | |
| | | Coast Banksia Woodland/Coastal Dune Scrub Mosaic | | | 921m |
| | | Coast Banksia Woodland/Swamp Scrub Mosaic | | | 904m |
| Coastal Alkaline Scrub | | | 858 | | |
| | | Coastal Alkaline Scrub/Bird Colony Succulent Herbland Mosaic | | | 922m |

| | | | | | |
|---|---|---|---|---|---|
| | | Coastal Basalt Mosaic | | | 900m |
| Coastal Dune Grassland | | | 879 | | |
| Coastal Dune Scrub | | | 160 | | |
| | | Coastal Dune Scrub/Coastal Dune Grassland Mosaic | | | 1m |
| | | Coastal Dune Scrub/Bird Colony Succulent Herbland Mosaic | | | 909m |
| Coastal Headland Scrub | | | 161 | | |
| | | Coastal Headland Scrub/Coast Banksia Woodland Mosaic | | | 919m |
| | | Coastal Headland Scrub/Coastal Tussock Grassland Mosaic | | | 162m |
| | | Coastal Headland Scrub/Swamp Scrub Mosaic | | | 911m |
| Coastal Saltmarsh | | | 9 | | |
| | | Coastal Saltmarsh/Mangrove Shrubland Mosaic | | | 302m |
| Coastal Tussock Grassland | | | 163 | | |
| Cool Temperate Rainforest | | | 31 | | |
| Creekline Grassy Woodland | | | 68 | | |
| Creekline Herb-Rich Woodland | | | 164 | | |
| Creekline Tussock Grassland | | | 654 | | |
| Damp Forest | | | 29 | | |
| Damp Heathland | | | 710 | | |
| Damp Heathy Woodland | | | 793 | | |
| | | Damp Heathy Woodland/Grassy Dry Forest Complex | | | 926c |
| Damp Sands Herb-rich Woodland | | | 3 | | |
| | | Damp Sands Herb-rich Woodland/Heathy Woodland Complex | | | 418c |
| | | Damp Sands Herb-rich Woodland/Heathy Woodland Mosaic | | | 881m |
| | | Damp Sands Herb-rich Woodland/Swamp Scrub Complex | | | 878c |
| | | Damp Sands Herb-rich Woodland/Swamp Scrub Mosaic | | | 925m |

| | | | | | |
|---|---|---|---|---|---|
| Escarpment Shrubland | | | 895 | | |
| Estuarine Flats Grassland | | | 914 | | |
| | | Estuarine Flats Grassland/Coastal Saltmarsh Mosaic | | | 901m |
| | | Estuarine Wetland/*Estuarine* Swamp Scrub Mosaic | | | 935m |
| Floodplain Riparian Woodland | | | 56 | | |
| | | Floodplain Wetland Complex | | | 172c |
| Grassy Dry Forest | | | 22 | | |
| Grassy Forest | | | 128 | | |
| Grassy Woodland | | | 175 | | |
| | | Grassy Woodland/Damp Sands Herb-rich Woodland Mosaic | | | 719m |
| | | Grassy Woodland/Swamp Scrub Mosaic | | | 924m |
| | | Grey Clay Drainage Line Herbland/Sedgeland Complex | | | 124c |
| Gully Woodland | | | 902 | | |
| Heathy Dry Forest | | | 20 | | |
| Heathy Woodland | | | 48 | | |
| | | Heathy Woodland/Sand Heathland Mosaic | | | 892m |
| Herb-rich Foothill Forest | | | 23 | | |
| Hills Herb-rich Woodland | | | 71 | | |
| Lignum Wetland | | | 104 | | |
| Lowland Forest | | | 16 | | |
| Mangrove Shrubland | | | 140 | | |
| | | Mangrove Shrubland/Estuarine Flats Grassland Mosaic | | | 903m |
| Plains Grassland | | | 132 | | |
| Plains Grassland | *South Gippsland* Plains Grassland | | 132 | 132-05 | |
| Plains Grassland | *Western Basalt* | | 132 | 132-06 | |

| | | | | | |
|---|---|---|---|---|---|
| | Plains Grassland | | | | |
| | | Plains Grassland/Plains Grassy Woodland Complex | | | 805c |
| Plains Grassy Wetland | | | 125 | | |
| Plains Grassy Woodland | | | 55 | | |
| Plains Grassy Woodland | *Gippsland* Plains Grassy Woodland | | 55 | 55-03 | |
| Plains Grassy Woodland | *Western Basalt Plains* Grassy Woodland | | 55 | 55-04 | |
| Plains Grassy Woodland | *Riverina* Plains Grassy Woodland | | 55 | 55-06 | |
| | | Plains Grassy Woodland/Plains Grassland Mosaic | | | 693m |
| | | Plains Grassy Woodland/Swamp Scrub Mosaic | | | 907m |
| | | Plains Grassy Woodland/Swamp Scrub/Plains Grassy Wetland Mosaic | | | 927m |
| Reed Swamp | | | 300 | | |
| Riparian Forest | | | 18 | | |
| Riparian Scrub | | | 191 | | |
| Riparian Woodland | | | 641 | | |
| | | Riparian Woodland/Escarpment Shrubland Mosaic | | | 932m |
| | | Riparian Woodland/Stream-bank Shrubland Mosaic | | | 928m |
| Rocky Chenopod Woodland | | | 64 | | |
| Sand Heathland | | | 6 | | |
| | | Sand Heathland/Wet Heathland Mosaic | | | 307m |
| Sandy Stream Woodland | | | 674 | | |
| Scoria Cone Woodland | | | 894 | | |

| | | | | | |
|---|---|---|---|---|---|
| Sedge Wetland | | | 136 | | |
| Sedgy Swamp Woodland | | | 707 | | |
| Shrubby Dry Forest | | | 21 | | |
| Shrubby Foothill Forest | | | 45 | | |
| Shrubby Gully Forest | | | 938 | | |
| Spray-Zone Coastal Shrubland | | | 876 | | |
| Stream-Bank Shrubland | | | 851 | | |
| Swamp Scrub | | | 53 | | |
| Swamp Scrub | *Estuarine* Swamp Scrub | | 53 | 53-03 | |
| | | Swamp Scrub/Plains Grassy Forest Mosaic | | | 639m |
| | | Swamp Scrub/Wet Heathland Mosaic | | | 638m |
| | | Swampy Riparian Complex | | | 126c |
| Swampy Riparian Woodland | | | 83 | | |
| Swampy Woodland | | | 937 | | |
| Swampy Woodland | *Plains* Swampy Woodland | | 937 | 937-01 | |
| Valley Grassy Forest | | | 47 | | |
| | | Valley Grassy Forest/Herb-rich Foothill Forest Complex | | | 408c |
| Valley Heathy Forest | | | 127 | | |
| Warm Temperate Rainforest | | | 32 | | |
| Warm Temperate Rainforest | *Strzeleckis* Warm Temperate Rainforest | | 32 | 32-07 | |
| Wet Forest | | | 30 | | |
| Wet Heathland | | | 8 | | |

| | | | | | |
|---|---|---|---|---|---|
| | | Wetland Formation | | | 74f |

m = Mosaic

c = Complex

f = Formation

# APPENDIX 3: DESCRIPTIONS OF ECOLOGICAL VEGETATION CLASSES, FLORISTIC COMMUNITIES, MOSAICS, COMPLEXES AND FORMATIONS USED WITHIN THE PORT PHILLIP AND WESTERNPORT STUDY AREA

## Key:

EVC: Ecological Vegetation Class (see definition p. 15).

FC: Floristic Community (see definition p. 15).

subsp.: subspecies, a taxonomic category, in rank below species.

var.: variety, a taxonomic category, in rank below species.

s.s: *sensu stricto*, of a plant name in the narrowest sense.

s.l.: *sensu lato*, of a plant name in the broad sense.

sp.aff.: an unnamed species with affinities to a named species.

sp. agg: a group of closely related species only distinguished in the field with difficulty.

m: mosaic: see definition p.16.

c: complex: see definition p.16.

f: formation (a default EVC label used in this study for wetlands as no comprehensive wetland typology is available for Victoria to date)

"Quotation marks" indicates that the EVC is broadly defined or of uncertain typological status within the study area due to lack of intact remants and quadrat information.

## EVCm 1 Coastal Dune Scrub/Coastal Dune Grassland Mosaic

Refer to descriptions of Coastal Dune Scrub (EVC 160) and Coastal Dune Grassland (EVC 879). The mosaic includes the vegetation succession from grasses and halophytes of the foredune to the closed scrub of Coast Wattle *Acacia longifolia* var. *sophorae* and Coast Tea Tree *Leptospermum laevigatum* on the secondary dunes behind beaches.

Distribution: Coastal areas of Port Phillip (eastern shore) and Westernport Bays, Phillip Island, Bass Coast and the southern coast of Mornington Peninsula.

## EVC 2 Coast Banksia Woodland

Restricted to coastal or near coastal localities inland behind secondary or tertiary dunes or on sand sheets inland from Coastal Dune Scrub and Coastal Dune Grassland. Usually dominated by an overstorey of Coast Banksia *Banksia integrifolia* var. *integrifolia* over tall shrubs of Coast Tea-tree *Leptospermum laevigatum.* Scramblers such as Bower Spinach *Tetragonia implexicoma* are common in the understorey with a groundcover of grasses, forbs and sedges.

The range of floristic and environmental attributes for Coast Banksia Woodland is tabulated below. Where information from published or unpublished reports is included the references are cited.

| | |
|---|---|
| **Altitude:** | <30m. |
| **Topography:** | Secondary or tertiary dunes or sand sheets further inland. |
| **Geology:** | Quaternary or Tertiary sand deposits, especially to the rear of headlands. |
| **Soils:** | Deep calcareous sand/loamy sand with a higher organic content and greater soil horizon development than Coastal Dune Scrub. |
| **Present distribution:** | Coastal areas of Port Phillip and Westernport Bays, Phillip Island, Bass Coast, southern coast of Mornington Peninsula. Examples: Coronet Bay, HMAS Cerberus inland from Sandy Point. |
| **Floristics:** | The overstorey is dominated by Coast Banksia *Banksia integrifolia* var. *integrifoli*a. A shrub layer of varying density includes Sallow Wattle *Acacia longifolia* var. *sophorae*, Common Boobialla *Myoporum insulare* and Coast Tea-tree *Leptospermum laevigatum.*<br><br>Seaberry Saltbush *Rhagodia candolleana* subsp. *candolleana* and |

| | |
|---|---|
| | Bower Spinach *Tetragonia implexicoma* are common in the understorey. Coast Sword-sedge *Lepidosperma gladiatum* may be a prominent feature of the ground layer together with Kidney-weed *Dichondra repens*. Other plants which may be present include Sea Celery *Apium prostratum* subsp. *prostratum*, Jagged Fireweed *Senecio biserratus*, Tangled Bedstraw *Galium australe*, Angled Lobelia *Lobelia anceps*, Hairy Pennywort *Hydrocotyle hirta*, Common Bottle-daisy *Lagenophora stipitata*, Ivy-leaf Violet *Viola hederacea* subsp.*hederacea*, Small-leaved Clematis *Clematis microphylla* and Knobby Club-sedge *Isolepis nodosa*. |
| **Structure:** | Woodland. |
| **References:** | Davies *et. al.* (in prep.). |

**Additional Comments**

In protected areas of coastline such as inland from Bushrangers Bay where Cape Schanck provides protection from the prevailing south-westerly weather, the EVC develops further inland rather than being restricted to the topographically protected sites behind the dunes. Some degree of historical protection from fire is probably also a factor in the distribution of the EVC.

## EVC 3 Damp Sands Herb-Rich Woodland

A woodland with a grassy or bracken-dominated understorey and a ground layer rich in herbs, grasses, and orchids. A component of heathy shrubs may be present. Occurs mainly on flat or undulating areas extending inland from the coast on moderately fertile, relatively well-drained, deep sand or sandy loam.

The range of floristic and environmental attributes for Damp Sands Herb-rich Woodland is tabulated below. Where information from published or unpublished reports is included the references are cited.

| | |
|---|---|
| **Altitude:** | <100m. |
| **Topography:** | Coastal plain. |
| **Geology:** | Quaternary aeolian sands, sometimes on Tertiary soils. |

| | |
|---|---|
| **Soils:** | Fertile, black to grey sand or loam. |
| **Present distribution:** | Inland from Port Phillip Bay, southern areas of the Mornington Peninsula (Rosebud, Greens Bush area), surrounding areas of Inverloch and Wonthaggi, south of Coronet Bay, Quail Island, Hastings area and north-east corner of French Island. |
| **Floristics:** | The overstorey is variously dominated by Coast Manna Gum *Eucalyptus viminalis* subsp. *pryoriana*, Narrow-leaf Peppermint *Eucalyptus radiata* and occasionally Messmate *Eucalyptus obliqua*. Other woody species which may be present include Black Wattle *Acacia mearnsii*, Coast Banksia *Banksia integrifolia* var. *integrifolia*, Silver Banksia *Banksia marginata*, Prickly Tea-tree *Leptospermum continentale*, Coast Tea-tree *Leptospermum laevigatum*, Coast Wattle *Acacia longifolia* var. *sophorae*, Common Heath *Epacris impressa*, Honey-pots *Acrotriche serrulata*, Broom Spurge *Amperea xiphoclada* var. *xiphoclada* and Spike Wattle *Acacia oxycedrus*. The climbers, Common Apple-berry *Billardiera scandens* var. *scandens* and Small - leaved Clematis *Clematis microphylla* are also frequently present.<br><br>Other ground layer species include Stinking Pennywort *Hydrocotyle laxiflora*, Creeping Wood-sorrel *Oxalis corniculata* spp. agg., Kidney-weed *Dichondra repens*, Common Bottle-daisy *Lagenophora stipitata*, Ivy-leaf Violet *Viola hederacea* subsp. *hederacea*, Hairy Pennywort *Hydrocotyle hirta* and Knobby Club-sedge *Isolepis nodosa*. Austral Bracken *Pteridium esculentum* is typically present with the tussock-forming grasses Common Tussock-grass *Poa labillardierei* and Bristly Wallaby-grass *Austrodanthonia setacea* and mats of the widespread Weeping Grass *Microlaena stipoides* var. *stipoides*. Spiny-headed Mat-rush *Lomandra longifolia* subsp. *longifolia* tussocks are also common. |
| **Structure:** | Woodland. |
| **References:** | Davies *et. al.* (in prep.). |

**Additional Comments**

Damp Sands Herb-rich Woodland can resemble degraded Heathy Woodland and is often found in association with this EVC in coastal areas.

## EVC 6 Sand Heathland

A heath occurring on deep infertile sands consisting of a low, dense heathy shrub layer. Emergent low, scattered multi-stemmed eucalypts and banksias are also often present. Herbs and grasses are notably absent or infrequent in the ground layer with sedges and Rope-rush being conspicuous.

The range of floristic and environmental attributes for Sand Heathland is tabulated below. Where information from published or unpublished reports is included the references are cited.

| | |
|---|---|
| **Altitude:** | <160m. |
| **Topography:** | Variable, ranging from coastal plains to lower slopes of hills such as Mt. Wellington, French Island. |
| **Geology:** | Quaternary sand deposits. |
| **Soils:** | Deep, infertile, uniform textured sands (podzols). |
| **Present distribution:** | Wonthaggi heathlands, French Island, Mornington Peninsula- Greens Bush, Stony Point, Langwarrin, Black Rock-Beaumaris area. |
| **Floristics:** | Emergent scattered tall shrubs of Saw Banksia *Banksia serrata* and stunted mallee-like eucalypts including Coast Manna Gum *Eucalyptus viminalis* subsp. *pryoriana*, Narrow-leaf Peppermint *Eucalyptus radiata* and very localised Shining Peppermint *Eucalyptus willisii* at Greens Bush, Mornington Peninsula.<br><br>Major shrubs of the heath vegetation include Heath Tea-tree *Leptospermum myrsinoides*, Prickly Tea-tree *Leptospermum continentale* (in wetter sites), Green Sheoak *Allocasuarina paradoxa*, and Silver Banksia *Banksia marginata*. Other woody species include Common Heath *Epacris impressa*, Showy Bossiaea *Bossiaea cinerea*, Smooth Parrot-pea *Dillwynia glaberrima*, Showy Parrot-pea *Dillwynia sericea*, Spike Wattle *Acacia oxycedrus*, Prickly Broom-heath *Monotoca scoparia*, Wedding Bush *Ricinocarpos pinfiolius*, Broom Spurge *Amperea xiphoclada* var. *xiphoclada*, Sweet Wattle *Acacia suaveolens*, Common Beard-heath *Leucopogon virgatus*, Horny Cone-bush *Isopogon ceratophyllus*, Common Correa *Correa reflexa*, Prickly Guinea-flower *Hibbertia acicularis*, Bundled Guinea-flower *Hibbertia prostrata* and Common Wedge-pea *Gompholobium huegelii*. |

| | |
|---|---|
| | Tassel Rope-rush *Hypolaena fastigiata* and Sand-hill Sword-sedge *Lepidosperma concavum* are frequently conspicuous in the vegetation. Other common species are Dwarf Wire-lily *Laxmannia orientalis,* Tall Sundew *Drosera peltata* subsp. *auriculata,* Hairy Pink-bells *Tetratheca pilosa,* Milkmaids *Burchardia umbellata,* Honey-pots *Acrotriche serrulata,* Austral Grass-tree *Xanthorrhoea australis,* Wattle Mat-rush *Lomandra filiformis* and Thick Twist-rush *Caustis pentandra*. |
| **Structure:** | Open to closed heath (density largely dependent on time since fire). |
| **References:** | Robinson (unpub), Vanderzee (1998). |

**Additional Comments:**

The low height of the emergent eucalypts (often less than 5 m) and the sclerophyllous character of the vegetation reflects the poor fertility of the acidic sandy soils.

Prone to invasion by Coast Tea-tree *Leptospermum laevigatum* (outside its natural range) and loss of floristic diversity in long unburnt sites, (though some heathland flora has long-term persistence in the seed bank beneath the Tea-tree). Remnants of the Sandringham Heathlands are mostly substantially modified in terms of structure and floristics.

## EVC 8 Wet Heathland

Occurs on lower slopes, flats or depressions on infertile soils that are subject to prolonged water logging. The structure is generally a treeless heathland although sometimes scattered eucalypts can be present. Long unburnt sites can attain a taller, closed scrub structure, and resemble Riparian Scrub. Understorey includes epacrid and myrtaceous shrubs, sedges and other sclerophyllous graminoids.

The range of floristic and environmental attributes for Wet Heathland is tabulated below. Where information from published or unpublished reports is included the references are cited.

| | |
|---|---|
| **Altitude:** | <190m. |
| **Topography:** | Plains/undulating plains and occasional lower slopes. |
| **Geology:** | Quaternary deposits of clay, sand and peat. |

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| **Soils:** | Ground water podsols which are subject to winter waterlogging are critical for the development of Wet Heathland. Soils vary from shallow uniform black sand to sandy peat or dark reddish-brown (ironstone) cemented hardpan, through to duplex profiles with a sandy grey-brown topsoil over a sandy clay subsoil or deep peats. |
| **Present distribution:** | Port Phillip Bay-Altona, Wonthaggi heathlands, French Island with some remnants in the Kilsyth-Silvan district. |
| **Floristics:** | The usual dominant shrubs are Scented Paperbark *Melaleuca squarrosa*, sometimes with Woolly Tea-tree *Leptospermum lanigerum*, Prickly Tea-tree *Leptospermum continentale* and Scrub Sheoak *Allocasuarina paludosa*. Characteristic associated epacrids include Blunt-leaf Heath *Epacris obtusifolia,* Ace of Spades *Epacris gunnii* and Pink Swamp-heath *Sprengelia incarnata.*<br><br>Ground cover includes Long Purple-flag *Patersonia occidentalis,* Creeping Raspwort *Gonocarpus micranthus,* Screw Fern *Lindsaea linearis,* Swamp Selaginella *Selaginella uliginosa*, Spreading Rope-rush *Empodisma minus,* Tall Yellow-eye *Xyris operculata,* Button Grass *Gymnoschoenus sphaerocephalus,* Slender Bog-sedge *Schoenus lepidosperma,* Zig-zag Bog-sedge *Schoenus brevifolius*, Red-fruit Saw-sedge *Gahnia sieberiana*, Common Rapier-Sedge *Lepidosperma filiforme*, Pithy Sword-sedge *Lepidosperma longitudinale*, Slender Twine-rush *Leptocarpus tenax,* Bordered Panic *Entolasia marginata* and Slender Dodder-laurel. *Cassytha glabella.* |
| **Structure:** | Open to closed heathland. |
| **References:** | Davies *et. al.* (in prep.), Opie *et al*. (1984). |

## EVC 9 Coastal Saltmarsh

Restricted to flats on low energy coastlines subject to the influence of daily inundation and exposure to salt water and poor drainage. The structure of Coastal Saltmarsh ranges from a low succulent herbland to shrubland, rushland or sedgeland.

The range of floristic and environmental attributes for Coastal Saltmarsh is tabulated below. Where information from published or unpublished reports is included the references are cited.

| | |
|---|---|
| **Altitude:** | Sea level. |
| **Topography:** | Low energy coastal flats. |
| **Geology:** | Quaternary deposits. |
| **Soils:** | Poorly drained soils that are waterlogged for substantial periods of the year with semi-saline to saline water. Highly variable ranging from sand to silt to clay with shell fragments often abundant. Occasional shallow surface peat horizons. |
| **Present distribution:** | Coastal flats of Phillip Island, French Island and Westernport and Port Phillip Bays. |
| **Floristics:** | Coastal Saltmarsh comprises several zones. The lowest and most frequently inundated zones are dominated by Beaded Glasswort *Sarcocornia quinqueflora,* Shrubby Glasswort *Sclerostegia arbuscula* and Austral Seablite *Suaeda australis.* The next most landward zone is dominated by herbs and salt-tolerant grasses including Salt-grass *Distichlis distichophylla,* Creeping Brookweed *Samolus repens,* Shiny Swamp-mat *Selliera radicans,* Rounded Noon-flower *Disphyma crassifolium* subsp. *clavellatum,* Southern Sea-heath *Frankenia pauciflora* var. *gunnii,* Creeping Monkey-flower *Mimulus repens,* Sea Celery *Apium prostratum* and Streaked Arrowgrass *Triglochin striatum.* Taller plants such as a variey of salt-tolerant sedges and similar monocotyledons such as Sea Rush *Juncus krausii*, Chaffy Saw-sedge *Gahnia filum* and Salt Club-sedge *Bolboschoenus caldwellii* dominate the most landward zone**.** Coast Saltbush *Atriplex cinerea* occurs within Coastal Saltmarsh on basalt in the Williamstown area. |
| **Structure:** | Low herbland to shrubland, rushland and sedgeland. |
| **References:** | Davies *et. al.* (in prep.), Cheal *et al.* (unpub). |

## EVC 16 Lowland Forest

This widespread dry forest type grows on soils of moderate fertility on the foothills of the Great Dividing Range through to the foothills of the Strzelecki ranges to Mornington Peninsula. It is characterised by a wide range of plant life-forms although the diversity of grasses and herbs is generally low.

The range of floristic and environmental attributes for Lowland Forest is tabulated below. Where information from published or unpublished reports is included the references are cited.

| | |
|---|---|
| **Altitude:** | 40-460m. |
| **Topography:** | Lowland plains, lower foothill slopes. |
| **Geology:** | Variable, ranging from Tertiary and Quaternary deposits to Devonian granite and Cretaceous sediments. |
| **Soils:** | Highly variable profiles of moderate fertility from clay to loam to sandy topsoil. |
| **Present distribution:** | Lower slopes of Strzelecki ranges, foothills of Central Highlands (Pakenham-Emerald area), upper to lower slopes of Mt. Wellington on French Island, Main Ridge area of Mornington Peninsula and to the east of Westernport Bay (south of Glen Forbes and Kongwak area). |
| **Floristics:** | The overstorey is typically dominated by Messmate *Eucalyptus obliqua* and/or Narrow-leaf Peppermint *Eucalyptus radiata*. |
| | Within the study area, composition of the understorey is variable. Species include Prickly Moses *Acacia verticillata*, Narrow-leaf Wattle *Acacia mucronata* var. *longifolia*, Blackwood *Acacia melanoxylon*, Myrtle Wattle *Acacia myrtifolia*, Silver Banksia *Banksia marginata*, Burgan *Kunzea ericoides*, Bushy Needlewood *Hakea decurrens*, Furze Hakea *Hakea ulicina*, Hop Goodenia *Goodenia ovata*, Common Cassinia *Cassinia aculeata*, Tree Everlasting *Ozothamnus ferrugineus*, Prickly Tea-tree *Leptospermum continentale*, Cherry Ballart *Exocarpos cupressiformis*, Common Heath *Epacris impressa*, Dusty Miller *Spyridium parvifolium*, Common Beard-heath *Leucopogon virgatus*, Common Rice Flower *Pimelea humilis*, Common Apple-berry *Billardiera scandens*, Holly Lomatia *Lomatia ilicifolia*, Erect Guinea-flower *Hibbertia riparia*, Common Flat-pea *Platylobium obtusangulum*, Purple Coral-pea *Hardenbergia violacea*, Common Hovea *Hovea heterophylla*, Blue Pincushion *Brunonia australis*, |

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| | Austral Bracken *Pteridium esculentum,* Honey-pots *Acrotriche serrulata,* Small Grass-tree *Xanthorrhoea minor* subsp. *lutea,* Wire-grass *Tetrarrhena juncea,* Weeping Grass *Microlaena stipoides* var. *stipoides,* Variable Sword-sedge *Lepidosperma laterale,* Spiny-headed Mat-rush *Lomandra longifolia* and Wattle Mat-rush *Lomandra filiformis.*<br><br>Ground layer species include Ivy-leaf Violet *Viola hederacea* subsp. *hederacea,*Variable Stinkweed *Opercularia varia,* Yellow Rush-lily *Tricoryne elatior,* Common Bottle-daisy *Lagenophora stipitata,* Tall Sundew *Drosera peltata* subsp. *auriculata,* Small St John's Wort *Hypericum gramineum,* Milkmaids *Burchardia umbellata,* Wiry Spear-grass *Austrostipa muelleri,* Screw Fern *Lindsaea linearis,* Paroo Lily *Dianella caerulea,* Silvertop Wallaby-grass *Joycea pallida,* Soft Tussock-grass *Poa morrisii* and Reed Bent-grass *Deyeuxia quadriseta.* Thatch Saw-sedge *Gahnia radula* is also found and is sometimes locally dominant. Kangaroo Grass *Themeda triandra* is occasionally present. |
| **Structure:** | Open forest, understorey primarily shrubby with ericoid species, saw-sedges and wire-grasses. |
| **References:** | Frood (in prep.), Davies *et. al.* (in prep.). |

**Additional Comments**

Lowland Forest merges into Grassy Woodland as fertility increases. It merges with Damp Sands Herb-rich Woodland and Heathy Woodland as fertility decreases on the most infertile sands. With increasing topographic protection, it merges into Herb-rich Foothill Forest and then into Damp Forest. With increasing drought susceptibility associated with shallower, rockier soils on dry, stony crests and slopes, it merges into Valley Heathy Forest, Valley Grassy Forest or Grassy Dry Forest in the relatively low rainfall and moderate fertility areas.
At higher elevations, Lowland Forest merges into Shrubby Foothill Forest. With increased topographic protection it can merge into Herb-rich Foothill Forest at lower elevations, or Damp Forest in higher rainfall situations. It can grade into Grassy Forest or Heathy Dry Forest in lower elevations and drier or the most exposed crests of moister areas respectively. The extent of development or persistence of the characteristic sclerophyllous shrub component is influenced by management factors, in particular, fire histories. Disturbance histories can render interpretation of the EVC difficult in some remnant areas.

## EVC 18 Riparian Forest

A tall forest widespread along major river courses and associated alluvial terraces. The soil is derived from fertile alluvium and is subject to inundation. Dominated by tall eucalypts but also has an open to sparse secondary tree layer of Silver Wattle and Blackwood with scattered dense patches of shrubs, ferns, grasses and herbs.

The range of floristic and environmental attributes for Riparian Forest is tabulated below. Where information from published or unpublished reports is included the references are cited.

| | |
|---|---|
| **Altitude:** | 160-500m. |
| **Topography:** | Alluvial flats of larger streams. |
| **Geology:** | Quaternary alluvium. |
| **Soils:** | Deep fertile, moderately well-drained sands, loams and sandy loams. |
| **Present distribution:** | Scattered on larger streams in study area such as Bass River, Diamond Creek, Arthurs Creek and small sections along the Yarra River. |
| **Floristics:** | The overstorey is typically dominated by tall Manna Gum *Eucalyptus viminalis* subsp. *viminalis.* Yellow Box *Eucalyptus melliodora,* Messmate *Eucalyptus obliqua*, Narrow-leaf Peppermint *E. radiata* and Swamp Gum *Eucalyptus ovata* can also be present. A layer of Silver Wattle *Acacia dealbata* and Blackwood *Acacia melanoxylon* is usually present.<br><br>A diverse range of shrubs is common in the understorey. These include Hazel Pomaderris *Pomaderris aspera,* Snow Daisy-bush *Olearia lirata,* Common Cassinia *Cassinia aculeata,* Pricky Currant-bush *Coprosma quadrifida,* Victorian Christmas-bush *Prostanthera lasianthos,* Hop Goodenia *Goodenia ovata,* Tree Everlasting *Ozothamnus ferrugineus,* Tree Violet *Hymenanthera dentata* and Sweet Bursaria *Bursaria spinosa*.<br><br>In more open areas the ground layer is dominated by large tussocks of Common Tussock-grass *Poa labillardierei* or Sword Tussock-grass *Poa ensiformis,* Spiny-headed Mat-rush *Lomandra longifolia* and Tall Sedge *Carex appressa*. Ferns (eg. species of *Blechnum* and *Hypolepis,* occasionally tree-ferns) are a variable component of the vegetation, increasing in importance at higher elevations. Species with distinctive niches may be localised in specific habitats such as stream verges or |

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| | levees. Character species include Common Maidenhair *Adiantum aethiopicum*, Small-leaf Bramble *Rubus parvifolius* and Weeping Grass *Microlaena stipoides* var. *stipoides.* |
| **Structure:** | Open forest to tall woodland, understorey layered, with components of small trees and tall shrubs over a ground layer largely dominated by tussock grasses and sedges. |
| **References:** | Frood (in prep.). |

## EVC 20 Heathy Dry Forest

A dry forest of exposed aspects and crests at higher elevations. The overstorey is often low in height, poor in form with an open crown cover. The understorey is grassy with a low, sparse to dense layer of ericoid shrubs including heaths and peas.

The range of floristic and environmental attributes for Heathy Dry Forest is tabulated below. Where information from published or unpublished reports is included the references are cited.

| | |
|---|---|
| **Altitude:** | Mostly 300-450m (descending to 200m in a few instances). |
| **Topography:** | Ridgelines and exposed upper slopes of generally moderate to high rainfall areas. |
| **Geology:** | Devonian to Ordovician shales and sandstone. |
| **Soils:** | Loams with relatively low fertility or water holding capacity. |
| **Present distribution:** | Restricted to the Pyrete State Forest and ridgelines of the Kinglake Range. |
| **Floristics:** | The overstorey is typically dominated by Broad-leaved Peppermint *Eucalyptus dives*, Bundy *Eucalyptus goniocalyx* and Red Stringybark *Eucalyptus macrorhyncha.* Messmate *Eucalyptus obliqua* is present in some variants.<br><br>The understorey is usually shrubby with a mixture of plants normally associated with heathland. Shrubs include Hedge Wattle *Acacia paradoxa*, Hop Wattle *Acacia stricta*, Common Cassinia *Cassinia aculeata*, Austral Grass-tree *Xanthorrhoea australis*, Woolly Wattle *Acacia lanigera*, Honey-pots *Acrotriche serrulata*, Common Correa |

| | |
|---|---|
| | *Correa reflexa*, Narrow-leaf Bitter-pea *Daviesia leptophylla*, Common Heath *Epacris impressa*, Common Wedge-pea *Gompholobium huegelii*, Common Hovea *Hovea linearis*, Common Beard-heath *Leucopogon virgatus*, Prickly Broom-heath *Monotoca scoparia* and Common Rice-flower *Pimelea humilis.*<br><br>The ground layer consists of a variety of prostrate shrubs and herbs. Grasses (most commonly Silvertop Wallaby-grass *Joycea pallida*) are sparse but may form extensive swards in more protected situations. Other ground layer species include Blue Pincushion *Brunonia australis*, Milkmaids *Burchardia umbellata*, Branched Wallaby-grass *Austrodanthonia racemosa*, Bristly Wallaby-grass *Austrodanthonia setacea*, Black-anther Flax-lily *Dianella revoluta*, Short-hair Plume-grass *Dichelachne micrantha*, Tall Sundew *Drosera peltata* subsp. *auriculata*, Thatch Saw-sedge *Gahnia radula*, Small St. John's Wort *Hypericum gramineum*, Variable Sword-sedge *Lepidosperma laterale*, Wattle Mat-rush *Lomandra filiformis*, Weeping Grass *Microlaena stipoides*, Variable Stinkweed *Opercularia varia*, Grey Tussock-grass *Poa sieberiana*, Small Poranthera *Poranthera microphylla*, Creamy Stackhousia *Stackhousia monogyna*, Veined Spear-grass *Austrostipa rudis* and Grass Trigger-plant *Stylidium graminifolium* s.l. |
| **Structure:** | Open forest but in the driest most exposed situations a woodland or shrubland. |
| **References:** | Robinson (unpubl). |

## EVC 21 Shrubby Dry Forest

Occurs on a range of rock types and is associated with steep rocky slopes often on exposed aspects. Soils are infertile and shallow, often skeletal to non-existent. The slope, aspect and soils combine to create low soil moisture retention. The overstorey is a very low, open forest consisting of a range of eucalypts. The understorey lacks a secondary tree layer but a well-developed medium to low shrub layer is present. The ground layer is often very sparse with tussock-forming graminoids being the dominant life form. The range of floristic and environmental attributes for Shrubby Dry Forest is tabulated below. Where information from published or unpublished reports is included the references are cited.

| | |
|---|---|
| **Altitude:** | 300-380m. |
| **Topography:** | Footslopes and northern and western facing ridges on dry spurs. |
| **Geology:** | Ordovician shales and sandstone. |
| **Soils:** | Shallow, rocky soil. |
| **Present distribution:** | Isolated areas in and around the Pyrete State Forest. |
| **Floristics:** | The overstorey consists of a suite of eucalypts indicative of drier habitats, including Red Stringybark *Eucalyptus macrorhyncha*, Bundy *Eucalyptus goniocalyx*, Red Box *Eucalyptus polyanthemos* subsp. *vestita* and occasionally Red Ironbark *Eucalyptus tricarpa*.<br><br>The understorey features a diverse though sometimes sparse shrub layer, with species indicative of drier habitats. Common species include Golden Wattle *Acacia pycnantha*, Shiny Cassinia *Cassinia longifolia*, Large-leaf Bush-pea *Pultenaea daphnoides*, Prunus Pomaderris *Pomaderris prunifolia*, Shrubby Platysace *Platysace lanceolata*, Diggers Speedwell *Derwentia perfoliata*, Narrow-leaved Bitter-pea *Daviesia leptophylla* and Fragrant Saltbush *Rhagodia parabolica*.<br><br>The ground layer is sparse and low in species richness with tussock-forming graminoids, such as Mat-rush *Lomandra* spp., Silvertop Wallaby-grass *Joycea pallida*, and Black-anther Flax-lily *Dianella revoluta*, often the dominant life forms. Other species include Common Hovea *Hovea heterophylla*, Fireweed Groundsel *Senecio linearis*, Australian Stonecrop *Crassula sieberiana*, Inland Pigface *Carprobrotus modestus* and Pink Purslane *Calandrinia calyptrata*. |
| **Structure:** | A low, open forest to woodland with a well-developed medium to low shrub layer. The ground layer is often very sparse. |
| **References:** | Davies *et. al.* (in prep.), VicRFA (2000). |

**Additional comments**

Shrubby Dry Forest differs from Grassy Dry Forest and Box Ironbark Forest in the low species richness of the ground layer and the dominance of medium-sized shrubs including species of dry, rocky slopes such as Prunus Pomaderris *Pomaderris prunifolia*, Inland Pigface *Carpobrotus modestus*, Fragrant Saltbush *Rhagodia parabolica*

and Pink Purslane *Calandrinia calyptrata*. Vegetation with some similar characteristics occur on less extreme escarpments of the Plenty River. Further sampling and analysis would be desirable to establish whether this vegetation would best be included within this low rainfall and low altitude form of Shrubby Dry Forest, or would be better referred to as a new EVC denoting these escarpment woodlands.

## EVC 22 Grassy Dry Forest

Occurs at low elevations in lower rainfall areas on a range of sedimentary rock types. The structure varies from an open forest to woodland. The understorey usually consists of a sparse shrub layer with a dominant ground layer of drought-tolerant grasses, forbs and resurrection ferns.

The range of floristic and environmental attributes for Grassy Dry Forest is tabulated below. Where information from published or unpublished reports is included the references are cited.

| | |
|---|---|
| **Altitude:** | 40-350m. |
| **Topography:** | Exposed aspects and crests of ridges or on sheltered slopes in the driest areas of the study area. |
| **Geology:** | Devonian and Silurian sedimentary soils north-east of Melbourne and Ordovician sediments west of Melbourne. |
| **Soils:** | Moderately fertile stony loams and clay loams. |
| **Present distribution:** | Mainly in the foothills north-east of Melbourne (eg Christmas Hills-Eltham area) with a few scattered patches west of Melbourne in the Black Hills (north of Toolern Vale) and Sunbury areas, also on the most exposed aspects of the Dandenongs. |
| **Floristics:** | The overstorey is characteristically dominated by mixtures of Red Box *Eucalyptus polyanthemos subsp. vestita*, Red Stringybark *Eucalyptus macrorhyncha* and Bundy *Eucalyptus goniocalyx*. Green Scentbark *Eucalyptus fulgens (Eucalyptus ignorabilis* s.l.) and Messmate *Eucalyptus obliqua* can be present in moister sites with Yellow Box *Eucalyptus melliodora* and occasionally Candlebark *Eucalyptus rubida* on more fertile sites. Scattered tall shrubs/small trees such as Black Wattle *Acacia mearnsii* and Burgan *Kunzea ericoides* may be present.<br><br>The ground layer is usually low and open and dominated by tussock grasses such as Silvertop Wallaby-grass *Joycea pallida* and Grey |

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| | Tussock-grass *Poa sieberiana.* Kangaroo Grass *Themeda triandra* can be conspicuous in sites with relatively fertile soils. Other species present include Yam-daisy *Microseris scapigera* spp. agg., Sprawling Bluebell *Wahlenbergia gracilis,* Common Raspwort *Gonocarpus tetragynus,* Grass Trigger-plant *Stylidium graminifolium,* Variable Stinkweed *Opercularia varia,* Common Rice-flower *Pimelea humilis,* Grey Parrot-pea *Dillwynia cinerascens,* and Common Wedge-pea *Gompholobium huegelii,* Variable Sword-sedge *Lepidosperma laterale,* Soft Tussock-grass *Poa morrisii,* Wallaby-grasses *Austrodanthonia* spp., Blue Pincushion *Brunonia australis,* Bulbine Lily *Bulbine bulbosa,* Weeping Grass *Microlaena stipoides* var. *stipoides,* Button Everlasting *Helichrysum scorpioides,* Small St John's Wort *Hypericum gramineum,* Common Plume-grass *Dichelachne rara,* Wattle Mat-rush *Lomandra filiformis* and a wide range of ground-orchids. |
| **Structure:** | Low open forest/woodland, understorey primarily open and grassy. |
| **References:** | Frood (in prep.). |

**Additional Comments**

At higher elevations the vegetation grades into Heathy Dry Forest and in these situations an increased sclerophyllous component is present and Red Stringybark *Eucalyptus macrorhyncha* and Bundy *Eucalyptus goniocalyx* usually co-dominate the canopy.

Anecdotal information suggests that prior to the disturbances associated with European settlement, the canopy may have often been far more open than it is today.

## EVC 23 Herb-Rich Foothill Forest

Occurs on relatively fertile, well-drained soils on a range of rock types in foothill areas with moderate rainfall. Commonly occupies easterly and southerly aspects and occurs extensively in gullies but in higher rainfall areas it occurs on more exposed aspects. A herb-rich ground layer with a range of forbs and grasses characterises this EVC.

The range of floristic and environmental attributes for Herb-rich Foothill Forest is tabulated below. Where information from published or unpublished reports is included the references are cited.

| | |
|---|---|
| **Altitude:** | 60-520m. |
| **Topography:** | Mainly sheltered slopes of foothills at low to medium elevations, onto less protected slopes at higher elevations and confined to drier aspects within Wet Forest areas. |
| **Geology:** | Variable. |
| **Soils:** | Fertile, well-drained clay loams and loams. |
| **Present distribution:** | Strzelecki Ranges, French Island, Mornington Peninsula and slopes south from the Kinglake Ranges. |
| **Floristics:** | The overstorey is typically dominated by Messmate *Eucalyptus obliqua,* and Narrow-leaf Peppermint *Eucalyptus radiata* but may also include Grey Gum *Eucalyptus cypellocarpa,* Swamp Gum *Eucalyptus ovata* and Manna Gum *Eucalyptus viminalis* subsp. *viminalis*. In drier areas Red Stringybark *Eucalyptus macrorhyncha,* Bundy *Eucalyptus goniocalyx* and Broad-leaf Peppermint *Eucalyptus dives* may be present.<br><br>The understorey typically has a sparse to moderate shrub layer characteristic of relatively moist habitats (eg. Prickly Currant-bush *Coprosma quadrifida,* Common Cassinia *Cassinia aculeata,* Snow Daisy-bush *Olearia lirata,* Burgan *Kunzea ericoides,* Tree Everlasting *Ozothamnus ferrugineus),* with Sweet Bursaria *Bursaria spinosa* sometimes conspicuous in drier variants. Austral Bracken *Pteridium esculentum* is also often conspicuous.<br><br>The ground layer is typically grassy (main species including Weeping Grass *Microlaena stipoides* var. *stipoides,* Tussock-grasses *Poa* spp., Common Hedgehog-grass *Echinopogon ovatus* and sometimes Kangaroo Grass *Themeda triandra)* and rich in forbs. Species include Pink Bells *Tetratheca ciliata*, Ivy-leaf Violet *Viola hederacea* subsp. *hederacea*, Common Bottle-daisy *Lagenophora stipitata*, Hairy Pennywort *Hydrocotyle hirta,* Variable Stinkweed *Opercularia varia,* Hairy Speedwell *Veronica calycina*, Bidgee-widgee *Acaena novae-zelandiae*, Twining Glycine *Glycine clandestina*, Common Apple-berry *Billardiera scandens*, Love Creeper *Comesperma volubile*, Small St John's Wort *Hypericum gramineum*, Small Poranthera *Poranthera microphylla*, Common Raspwort *Gonocarpus tetragynus,* Tick Trefoil |

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| | *Desmodium* spp., Common Maidenhair *Adiantum aethiopicum*, Wattle Mat-rush *Lomandra filiformis*, Spiny-headed Mat-rush *Lomandra. longifolia* and Yellow Wood-sorrel *Oxalis corniculata* spp. agg. |
| **Structure:** | Open forest, understorey with variable component of shrubs and bracken, characteristically grassy and herb-rich. |
| **References:** | Frood (in prep.). |

**Additional Comments**

This EVC covers a broad range of variation in overstorey and understorey floristics.

## EVC 29 Damp Forest

Damp Forest grows on a wide range of fertile parent rock types on a variety of aspects, from sea level to sub-montane elevations. It is more common at the higher elevations, only extending to low elevations in high rainfall areas. Damp Forest is dominated by a tall eucalypt layer over a shrub layer of broad-leaved species typical of wet forest mixed with elements from dry forest types such as prickly or small-leaved shrubs. The ground layer includes forbs and grasses as well as moisture-dependent ferns.

The range of floristic and environmental attributes for Damp Forest is tabulated below. Where information from published or unpublished reports is included the references are cited.

| | |
|---|---|
| **Altitude:** | 40-780m. |
| **Topography:** | Mostly confined to sheltered southerly and easterly slopes. At lower elevations, confined to narrow strips along drainage lines. |
| **Geology:** | Variable. |
| **Soils:** | Deep and well-structured soils with moderate to high levels of humus in the upper soil horizon. |
| **Present distribution:** | Dandenongs-Olinda-Emerald area, Kinglake area, southern flank of Strzelecki Ranges and isolated occurrences on the Mornington Peninsula. |

**Floristics:** The overstorey is typically dominated by Messmate *Eucalyptus obliqua* and Mountain Grey Gum *Eucalyptus cypellocarpa*, variously with Narrow-leaf Peppermint *Eucalyptus radiata*, and sometimes with Mountain Ash *Eucalyptus regnans* in sites marginal to Wet Forest. Manna Gum *E. viminalis* subsp. *viminalis* is sometimes also locally conspicuous particularly close to streams.

Broad-leaved shrub species typical of Wet Forest are present in the understorey, mixed with small-leaved and prickly-leaved shrubs from drier forest types. The broad-leaved species include Hazel Pomaderris *Pomaderris aspera*, Victorian Christmas-bush *Prostanthera lasianthos*, Snow Daisy-bush *Olearia lirata*, Musk Daisy-bush *Olearia argophylla*, Blanket-leaf *Bedfordia arborescens* and Elderberry Panax *Polyscias sambucifolia*. Drier shrubby elements include Prickly Moses *Acacia verticillata*, Narrow-leaf Wattle *Acacia mucronata*, Varnish Wattle *Acacia verniciflua*, Rough Bush-pea *Pultenaea scabra* and Prickly Bush-pea *Pultenaea forsythiana*. Hop Goodenia *Goodenia ovata* and Golden-tip *Goodia lotifolia* may also be present.

The lower stratum has a component of ferns (in particular *Blechnum* spp. and Common Ground-fern *Calochlaena dubia*), but includes more hard-leaved species than does Wet Forest. Where present, tree-ferns within Damp Forest are represented by Rough Tree-fern *Cyathea australis* rather than Soft Tree-fern *Dicksonia antarctica*. Other understorey species include Forest Wire-grass *Tetrarrhena juncea*, Slender Tussock-grass *Poa tenera*, Common Tussock-grass *Poa labillardierei*, Sword Poa *Poa ensiformis*, Fireweed Groundsel *Senecio linearifolius*, Tall Sword-sedge *Lepidosperma elatius*, Forest Starwort *Stellaria flaccida*, Bidgee-widgee *Acaena novae-zelandiae*, Ivy-leaf Violet *Viola hederacea* subsp. *hederacea* and Forest Mint *Mentha laxiflora*. The climbers, Wonga Vine *Pandorea pandorana* and Mountain Clematis *Clematis aristata*, are also common.

**Structure:** Open forest (to tall open forest), understorey shrubby with wire-grass and fern component.

**References:** Frood (in prep.).

## EVC 30 Wet Forest

This EVC occurs on fertile, well-drained loamy soils on a range of parent rock types. It is most extensive in sub-montane elevations, becoming isolated to narrow bands along streams at lower elevations. Wet Forest is extensive over all aspects in the higher rainfall areas such as the Strzelecki Ranges where cloud cover and fog drip increase effective precipitation but is largely restricted to protected gullies and southern aspects in moderate rainfall areas. Wet Forest is characterised by a tall eucalypt overstorey with scattered understorey trees over a tall broad-leaved shrub and treefern understorey with a moist, shaded, ferny ground layer.

The range of floristic and environmental attributes for Wet Forest is tabulated below. Where information from published or unpublished reports is included the references are cited.

| | |
|---|---|
| **Altitude:** | mostly 350-760m. |
| **Topography:** | Sheltered south and south-east gully heads and adjacent sheltered slopes, but more extensive at higher elevations in high rainfall areas such as Toolangi. |
| **Geology:** | Variable. |
| **Soils:** | Relatively fertile deep organic loams. |
| **Present distribution:** | Strzelecki Ranges, Dandenongs, Kinglake-Toolangi area and isolated occurrences on the Mornington Peninsula. |
| **Floristics:** | The overstorey is commonly dominated by Mountain Ash *Eucalyptus regnans* but may also include Messmate *Eucalyptus obliqua*, Manna Gum *Eucalyptus viminalis* subsp. *viminalis* and Mountain Grey Gum *Eucalyptus cypellocarpa.* In eucalypt-free areas, Blackwood *Acacia melanoxylon* or Silver Wattle *Acacia dealbata* may be locally dominant.<br><br>The midstorey typically consists of broad-leaved shrubs, notably Austral Mulberry *Hedycarya angustifolia*, Blanket Leaf *Bedfordia arborescens*, Hazel Pomaderris *Pomaderris aspera*, Musk Daisy-bush *Olearia argophylla* and Tree Lomatia *Lomatia fraseri*. Soft Tree-fern *Dicksonia antartica* is usually conspicuous.<br><br>The ground layer is typically ferny with the major species being Mother Shield-fern *Polystichum proliferum* and Hard Water-fern *Blechnum wattsii*. Ray Water-fern *Blechnum fluviatile* is commonly found associated with watercourses and drainage lines within Wet |

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| | Forest. The epiphytic fern Kangaroo Fern *Microsorum pustulatum* is found in both this EVC and the related Cool Temperate Rainforest. |
| **Structure:** | Tall open forest, sometimes altered to low closed forest with a sparse emergent overstorey as a consequence of previous fire history. Broad-leaved shrubs and ferns are prevalent in the lower strata. |
| **References:** | Davies *et. al.* (in prep.), Frood (in prep.). |

## EVC 31 Cool Temperate Rainforest

Occurs in the most topographically and fire-protected high rainfall areas of Wet Forest. Overstorey is typically dominated by rainforest trees over a dense layer of tree ferns that support a rich epiphytic flora. The ground layer includes a number of "wet gully" species.

The range of floristic and environmental attributes for Cool Temperate Rainforest is tabulated below. Where information from published or unpublished reports is included the references are cited.

| | |
|---|---|
| **Altitude:** | 300m (Sherbrooke Forest Park) to 700m (Toolangi State Forest). |
| **Topography:** | High rainfall gullies on sheltered slopes. |
| **Geology:** | Variable. |
| **Soils:** | Variable, ranging from deep, well-structured krasnozems to deep uniform to gradational textured loams. |
| **Present distribution:** | Toolangi State Forest, Dandenongs (Sherbrooke-Ferntree Gully area). |
| **Floristics:** | Dominant species of the overstorey are Myrtle Beech *Nothofagus cunninghamii* (though absent from the Dandenongs), Southern Sassafras *Atherosperma moschatum* and Blackwood *Acacia melanoxylon.*<br><br>Major species of the lower strata include Austral Mulberry *Hedycarya angustifolia*, Musk Daisy-bush *Olearia argophylla*, Banyalla *Pittosporum bicolor* and Prickly Currant-bush *Coprosma quadrifida*. Soft Tree-fern *Dicksonia antarctica* and Rough Tree-fern *Cyathea australis* are common and are often covered with a diversity of epiphytic ferns such as Kangaroo Fern *Microsorum pustulatum*, Weeping Spleenwort *Asplenium flaccidum*, Veined Bristle-fern |

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|---|---|
| | *Polyphlebium venosum*, Common Finger-fern *Grammitis billardieri*, Austral Filmy Fern *Hymenophyllum australe*, Narrow Filmy Fern *Hymenophyllum rarum*, Shiny Filmy Fern *Hymenophyllum flabellatum* and Common Filmy fern *Hymenophyllum cupressiforme*.<br><br>The ground layer includes "wet gully" species such as Mother Shield-fern *Polystichum proliferum* as well as Leathery Shield-fern *Rumohra adiantiformis* and several *Blechnum* species including Hard Water-fern *Blechnum wattsii*, and ferns that occur along watercourses and seepages such as Lance Water-fern *Blechnum chambersii*, Strap Water-fern *Blechnum patersonii* and Ray Water-fern *Blechnum fluviatile*. |
| **Structure:** | Closed forest with ferny understorey, rich in epiphytes and bryophytes. |
| **References:** | Davies *et. al.* (in prep.), Frood (in prep.). |

**Additional Comments**

The distribution of Cool Temperate Rainforest is limited to sites that are to some extent protected from wildfire. This EVC has a very limited distribution in the study area.

## EVC 32 Warm Temperate Rainforest

Restricted to topographically protected sites in warm temperate climatic zones where it generally occupies gullies and slopes with southerly or easterly aspects from sea level to the foothills and where mean annual rainfall is in excess of 700mm.

The range of floristic and environmental attributes for Warm Temperate Rainforest is tabulated below. Where information from published or unpublished reports is included the references are cited.

**Floristic Community 32-07: *Strzeleckis* Warm Temperate Rainforest**

| | |
|---|---|
| **Altitude:** | 150m. |
| **Topography:** | Protected slopes and gullies. |
| **Geology:** | Mesozoic feldspathic mudstone and arkose sandstone. |
| **Soils:** | Well-structured friable brown clay loam. |

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| **Present distribution:** | One small, isolated occurrence in the Strzelecki foothills near Glen Forbes. |
| **Floristics:** | Dominant species of the overstorey are Blackwood *Acacia melanoxylon*, Muttonwood *Rapanea howittiana*, Sweet Pittosporum *Pittosporum undulatum*.<br><br>Major species of the lower strata are Musk Daisy-bush *Olearia argophylla*, White Elderberry *Sambucus gaudichaudiana*, Elderberry Panax *Polyscias sambucifolia*, Prickly Currant Bush *Coprosma quadrifida*, Shiny Cassinia *Cassinia longifolia*, Tree Lomatia *Lomatia fraseri*, Victorian Christmas Bush *Prostanthera lasianthos*, Kangaroo Apple *Solanum aviculare* and Small-leaf Bramble *Rubus parvifolius*. The vines/lianes are a conspicuous component of this EVC and include Wonga Vine *Pandorea pandorana* and Forest Clematis *Clematis glycinoides*.<br>Ground layer species include Forest Starwort *Stellaria flaccida*, Shade Nettle *Australina pusilla* subsp.*muelleri*, Sickle Fern *Pellaea falcata*, Mother Shield-fern *Polystichum proliferum*, Necklace Fern *Asplenium flabellifolium*, Shiny Shield-fern *Lastreopsis acuminata*, Ground-fern *Hypolepis* spp., Tall Sword-sedge *Lepidosperma elatius*, Soft Tree-fern *Dicksonia antartica* and Common Maidenhair *Adiantum aethiopicum*. |
| **Structure:** | In intact examples, it is a closed forest with a dense growth of climbers in the canopy. The ground layer is sparse, consisting mainly of ferns with few herbs, and grasses being restricted to gaps in the cover above. |
| **References:** | Davies *et. al.* (in prep.), Peel (1999). |

**Additional Comments**

This rainforest community was only recorded from one site in the study area in the foothills of the Strzelecki ranges where it is highly disturbed due to agricultural clearing and invasion by Wandering Jew **Tradescantia albiflora* from dumped garden waste. It is the most westerly occurrence of Warm Temperate Rainforest in Victoria.

## EVC 45 Shrubby Foothill Forest

Occurs on ridges and exposed slopes in association with Damp Forest on moderately fertile soils below 500m. The overstorey consists of eucalypts with an understorey dominated by narrow-leaved and broad-leaved shrubs and scattered ferns, graminoids and herbs.

The range of floristic and environmental attributes for Shrubby Foothill Forest is tabulated below. Where information from published or unpublished reports is included the references are cited.

| | |
|---|---|
| **Altitude:** | 300-620m. |
| **Topography:** | Formerly extensive on fertile soil of the plateau, extending to ridges, spurs and exposed slopes, mainly northerly and westerly aspects in highest rainfall areas. |
| **Geology:** | Variable. |
| **Soils:** | Fertile, well-drained, grey-brown loam and clay loam. |
| **Present distribution:** | Kinglake, Toolangi, Dandenongs (eg. Monbulk-Emerald area, Mt Dandenong). |
| **Floristics:** | The overstorey is typically dominated by Messmate *Eucalyptus obliqua*, usually with Mountain Grey Gum *Eucalyptus cypellocarpa* and sometimes Narrow-leaf Peppermint *Eucalyptus radiata*.<br><br>Understorey shrub species variously include Mueller's Bush-pea *Pultenaea muelleri*, Hop Goodenia *Goodenia ovata*, Dusty Miller *Spyridium parvifolium*, Mountain Hickory Wattle *Acacia obliquinervia*, Rough Bush-pea *Pultenaea scabra*, Narrow-leaf Wattle *Acacia mucronata* var. *longifolia*, Gorse Bitter-pea *Daviesia ulicifolia*, Prickly Moses *Acacia verticillata*, Common Heath *Epacris impressa*, Prickly Currant-bush *Coprosma quadrifida* and Bootlace Bush *Pimelea axiflora*.<br><br>The ground layer includes Austral Bracken *Pteridium esculentum*, Trailing Ground-berry *Acrotriche prostrata*, Soft Tussock-grass *Poa morrisii*, Prickly Woodruff *Asperula scoparia*, Weeping Grass *Microlaena stipoides* var. *stipoides*, Pink-bells *Tetratheca ciliata*, Ivy-leaf Violet *Viola hederacea* subsp. *hederacea*, Grass Trigger-plant *Stylidium* sp.2, Forest Wire-grass *Tetrarrhena juncea*, Kidney-weed *Dichondra repens*, Bidgee-widgee *Acaena novae-zelandiae*, and |

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|---|---|
| | Mountain Clematis *Clematis aristata.* |
| **Structure:** | Open forest to tall open forest, understorey shrubby, variously with grass and herb component. |
| **References:** | Frood (in prep.). |

**Additional Comments**

Shrubby Foothill Forest grades into Lowland Forest at lower elevations, especially on less fertile soils. It typically occurs on drier aspects and plateaus, in association with broad areas of Damp Forest. Most of the more fertile soils of plateaus (where the EVC reached optimal development) have been cleared.

## EVC 47 Valley Grassy Forest

Occurs under moderate rainfall regimes of 700-800 mm per annum on fertile, well-drained, colluvial or alluvial soils, mostly on gently undulating lower slopes and valley floors. The tall, open overstorey consists of a variety of eucalypts, usually species that prefer moister or more fertile conditions, over a sparse shrub cover. In season, a rich array of herbs, lilies, grasses and sedges dominate the ground layer but at the drier end of the spectrum the ground layer may be sparse and slightly less diverse, but with the moisture-loving species still remaining.

The range of floristic and environmental attributes for Valley Grassy Forest is tabulated below. Where information from published or unpublished reports is included the references are cited.

| | |
|---|---|
| **Altitude:** | 40-300m. |
| **Topography:** | Lower slopes and gully floors. |
| **Geology:** | Mostly on Silurian sediments. |
| **Soils:** | Relatively fertile loam to clay loams, sometimes sandy clays. |
| **Present distribution:** | Scattered through Yan Yean, Hurstbridge, Eltham, Warrandyte, Kilsyth, Lysterfield and Beaconsfield areas. |
| **Floristics:** | The overstorey is usually dominated by Candlebark *Eucalyptus rubida* and Yellow Box *Eucalyptus melliodora*, sometimes with Narrow-leaf Peppermint *Eucalyptus radiata* and Messmate *Eucalyptus obliqua* in moister sites (along gradient into Herb-rich Foothill Forest), or Red |

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|---|---|
| | Stringybark *Eucalyptus macrorhyncha* and Bundy *Eucalyptus goniocalyx* in drier sites (along gradient into Grassy Dry Forest). Red Box *Eucalyptus polyanthemos* is usually absent except in narrow ecotonal sites within Grassy Dry Forest.<br><br>A range of *Acacia* species of dry forest/woodland habitats can be present including Black Wattle *Acacia mearnsii,* Golden Wattle *Acacia pycnantha,* Lightwood *Acacia implexa* and Hedge Wattle *Acacia paradoxa*. Blackwood *Acacia melanoxylon,* Cherry Ballart *Exocarpos cupressiformis* and *Cassinia* spp. may also occur.<br><br>The ground layer of relatively intact examples is diverse, grassy, and rich in herbs and geophytes. Dominant grass species include Kangaroo Grass *Themeda triandra,* Weeping Grass *Microlaena stipoides* var. *stipoides,* Veined Spear-grass *Austrostipa rudis,* Wallaby-grasses *Austrodanthonia* spp. and Grey Tussock-grass *Poa sieberiana*. Other species include Grass Lily *Caesia* spp., Sheep's Burr *Acaena echinata,* Milkmaids *Burchardia umbellata,* Chocolate Lily *Arthropodium strictum* s.l., Kidney-weed *Dichondra repens,* Milkmaids *Burchardia umbellata,* Austral Bear's Ears *Cymbonotus preissianus,* Small-leaved Clematis *Clematis microphylla,* Pale Vanilla-lily *Arthropodium milleflorum,* Tall Sundew *Drosera peltata* subsp. *peltata,* Finger Rush *Juncus subsecundus* and Australian Buttercup *Ranunculus lappaceus.*<br><br>A range of species, presumed formerly widespread within this EVC are now rare components eg. Matted Flax-lily *Dianella amoena,* Showy Podolepis *Podolepis jaceoides,* Hound's Tongue *Cynoglossum suaveolens,* Yam Daisy *Microseris scapigera* spp. agg., Variable Billy Buttons *Craspedia variabilis,* Rough Burr-daisy *Calotis scabiosifolia,* Pink Bindweed *Convolvulus erubescens,* Small-leaf Glycine *Glycine microphylla,* Clover Glycine *Glycine latrobeana* and Slender Tick-foil *Desmodium varians*. |
| **Structure:** | Woodland (to open forest), with understorey variously with a component of shrubs and small trees, but primarily grassy and herb-rich in relatively intact remnants. |
| **References:** | Frood (in prep.). |

**Additional Comments**

Valley Grassy Forest has a floristic composition intermediate between Herb-rich Foothill Forest on the damper sites and Grassy Dry Forest on the drier sites.

It has a drier suite of species and a more open canopy than Herb-rich Foothill Forest and more species characteristic of fertile soils than are present in Grassy Dry Forest. Mesic shrubs in Valley Grassy Forest are absent except in atypical situations such as seepage gullies. It has affinities with Plains Grassy Woodland which is normally found on slightly more fertile soils and in less mesic situations.

## EVC 48 Heathy Woodland

Occurs on low hills and rises, plains and slopes in areas of low to moderate rainfall, generally associated with deep, uniform-textured nutrient-poor sands. Eucalypt-dominated low woodland over narrow-leaved shrubs except where frequent fire has reduced the understorey structure to a dense cover of bracken.

The range of floristic and environmental attributes for Heathy Woodland is tabulated below. Where information from published or unpublished reports is included the references are cited.

| | |
|---|---|
| **Altitude:** | Mainly 5-150m (400m in Pyrete State Forest). |
| **Topography:** | Low hills, rises, plains and slopes. |
| **Geology:** | Tertiary and Quaternary sand deposits. |
| **Soils:** | Infertile, deep uniform sands with topsoil a light grey, loose sand, grading into a bleached, greyish-white to yellow-brown sand (sometimes gravelly) subsoil. Sometimes a shallow, gravelly sand surface over a cemented yellow-brown gravelly hardpan. |
| **Present distribution:** | Greens Bush and Hastings area-Mornington Peninsula, Cranbourne-Langwarrin area, Seaford-Keysborough area, French Island, Lang Lang-The Gurdies-Grantville area and Pyrete State Forest. |
| **Floristics:** | The overstorey typically consists of low scattered trees of Messmate *Eucalyptus obliqua*, Narrow-leaf Peppermint *Eucalyptus radiata*, Shining Peppermint *Eucalyptus willisii* and Coast Manna Gum *Eucalyptus viminalis* subsp. *pryoriana.*<br><br>The heathy understorey is characterised by small, often prickly-leaved shrubs of the Myrtaceae, Epacridaceae, Dilleniaceae, Fabaceae and |

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| | Mimosaceae families. Most frequent shrubs are Heath Tea-tree *Leptospermum myrsinoides*, Prickly Tea-tree *Leptospermum continentale*, Common Heath *Epacris impressa*, Showy Bossiaea *Bossiaea cinerea*, Broom Spurge *Amperea xiphoclada* var. *xiphoclada*, Silver Banksia *Banksia marginata* and Prickly Broom-heath *Monotoca scoparia*. Other shrubs present are Smooth Parrot-pea *Dillwynia glaberrima*, Common Beard-heath *Leucopogon virgatus*, Common Aotus *Aotus ericoides*, Horny Cone-bush *Isopogon ceratophyllus*, Wedding Bush *Ricinocarpos pinifolius*, Golden Bush-pea *Pultenaea gunnii*, Narrow-leaf Wattle *Acacia mucronata* var. *longifolia* and Spike Wattle *Acacia oxycedrus.*<br><br>Species present in the ground layer include Wattle Mat-rush *Lomandra filiformis*, Spiny-headed Mat-rush *Lomandra longifolia*, Common Raspwort *Gonocarpus tetragynus*, Ivy-leaf Violet *Viola hederacea* subsp. *hederacea*, Common Bottle-daisy *Lagenophora stipitata* and Tall Sundew *Drosera peltata* subsp. *auriculata.* The ground layer, however, generally lacks herbs and grasses. Small Grass-tree *Xanthorrhoea minor* subsp. *lutea* is also often present. |
| **Structure:** | Woodland over a diverse narrow-leaved shrub layer with a groundcover of scattered herbs and sedges. |
| **References:** | Davies *et. al.* (in prep.), Opie *et al*. (1984). |

**Additional Comments**

Bracken-dominated understoreys can develop in Heathy Woodland probably as a result of a high fire frequency or unsuitable burning regime, leading to the elimination of heathy shrubs and banksias from the understorey. Heathy Woodland merges into Sand Heathland where sites become extremely well-drained, infertile and drought-stressed.

## EVC 53 Swamp Scrub

Closed scrub at low elevations on alluvial deposits along streams or on poorly drained sites with higher nutrient availability. The vegetation characteristically lacks a eucalypt overstorey and is dominated by Swamp Paperbark *Melaleuca ericifolia* (or sometimes Woolly Tea-tree *Leptospermum lanigerum*) which often forms a dense thicket,

out-competing other species. Where light penetrates to ground level, a moss/lichen/liverwort or herbaceous ground cover is often present. Dry variants have a grassy/herbaceous ground layer.

The range of floristic and environmental attributes for Swamp Scrub is tabulated below. Where information from published or unpublished reports is included the references are cited.

| | |
|---|---|
| **Altitude:** | 5-110m. |
| **Topography:** | Flood plains, water courses and drainage basins. |
| **Geology:** | Mainly on Quaternary and Tertiary deposits, rare on basalt. |
| **Soils:** | Variable, ranging from peat on poorly drained sites and on lower slopes prone to periodic seepages, to organic loam on the margins of freshwater wetlands. |
| **Present distribution:** | Found along and adjacent to creeks, drainage lines and water-bodies from just north of Whittlesea south to and including parts of the Mornington Peninsula, Bass Coast and west to Melbourne. |
| **Floristics:** | The tallest stratum typically consists of a dense shrub layer of Swamp Paperbark *Melaleuca ericifolia* (or Woolly Tea-tree *Leptospermum lanigerum*, particularly on basalts). Occasionally there may be emergent Swamp Gum *Eucalyptus ovata*.<br><br>The extent of the development of the ground cover depends on the amount of light reaching the ground. Species at wetter sites include Swamp Club-sedge *Isolepis inundata*, Water Ribbons *Triglochin procerum*, Streaked Arrow-grass *Triglochin striatum*, Swamp Mazus *Mazus pumilo*, Austral Brooklime *Gratiola peruviana*, Centella *Centella cordifolia*, Soft Water-fern *Blechnum minus*, Swamp Goodenia *Goodenia humilis* and Rushes *Juncus* spp. Species at drier sites include Small-leaf Bramble *Rubus parvifolius*, Kidney-weed *Dichondra repens*, Bidgee-widgee *Acaena novae-zelandiae*, Common Tussock-grass *Poa labillardierei*, Slender Tussock-grass *Poa tenera*, Wetland Wallaby-grass *Notodanthonia semiannularis*, Shrubby Groundsel *Senecio minimus*, Austral Bracken *Pteridium esculentum* and Weeping Grass *Microlaena stipoides* var. *stipoides.* |
| **Structure:** | A closed scrub variously with a moss/lichen/liverwort or herbaceous |

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|---|---|
| | ground cover where light penetrates to ground level. |
| **References:** | Davies *et. al.* (in prep.), Cheal *et al.* (unpubl.). |

**Additional Comments**

Swamp Scrub originally occupied large wetlands in the regions such as the Carrum Swamp and Kooweerup Swamp. It had a scattered distribution in the eastern Melbourne area and extended eastward into West and South Gippsland. Today it is much more restricted due to the drainage of the swamps and clearing for agricluture.

## EVC 55 Plains Grassy Woodland

An open, grassy eucalypt woodland in low (mostly <700mm per annum) rainfall areas occurring on fertile soils on flats and gently undulating plains at low elevations. The understorey consists of a few sparse shrubs over a diverse grassy, herb-rich ground layer. Widespread and extensive in the past but has now been largely cleared for agriculture, and more recently for urban development resulting in few relatively intact remnants remaining in the Port Phillip/Westernport area.

Plains Grassy Woodland is a very variable EVC and includes a range of communities. The original floristics of many are now conjectural. Within the study area there are at least three formally recognised floristic communities of Plains Grassy Woodland and undoubtedley others do exist. The range of floristic and environmental attributes for the formally recognised communities is tabulated below. Where information from published or unpublished reports is included the references are cited.

**Floristic Community 55-03 *Gippsland* Plains Grassy Woodland**

| | |
|---|---|
| **Altitude:** | 10-60m. |
| **Topography:** | Undulating to flat plain. |
| **Geology:** | Quaternary sediments. |
| **Soils:** | Fertile, duplex consisting of sand and silt or loam over clay. |
| **Present distribution:** | South-east of Melbourne in the Keysborough-Dandenong-Lyndhurst area. Also on the basalts of Phillip Island, French Island and the Corinella area. |

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| **Floristics:** | The overstorey is dominated by River Red Gum *Eucalyptus camaldulensis* with Black Wattle *Acacia mearnsii* and Blackwood *Acacia melanoxylon* often present. Other trees include Rough-barked Manna Gum *Eucalyptus viminalis* subsp. *pryoriana,* Drooping Sheoak *Allocasuarina verticillata* and Black Sheoak *Allocasuarina littoralis.*<br><br>There may be scattered shrubs of Hedge Wattle *Acacia paradoxa,* with less common occurrences of Grey Parrot-pea *Dillwynia cinerascens* and Prickly Tea-tree *Leptospermum continentale.*<br><br>The ground layer is usually grassy and herbaceous with sedges and lilies also present. Frequent grasses are Weeping Grass *Microlaena stipoides* var. *stipoides,* Kangaroo Grass *Themeda triandra,* Stiped Wallaby-grass *Austrodanthonia racemosa,* Kneed Wallaby-grass *Austrodanthonia geniculata,* Purplish Wallaby-grass *Austrodanthonia tenuior,* Veined Spear-grass *Austrostipa rudis,* Common Tussock-grass *Poa labillardierei,* Common Love-grass *Eragrostis brownii* and Mat Grass *Hemarthria uncinata*. Other species include Common Bog-sedge *Schoenus apogon,* Yellow Rush-lily *Tricoryne elatior,* Twining Fringe-lily *Thysanotus patersonii,* Vanilla-lilies *Arthropodium* spp., Sheep's Burr *Acaena agnipila,* Scaly Buttons *Leptorhynchos squamatus,* Narrow Plantain *Plantago gaudichaudii,* Slender Bottle Daisy *Lagenophora gracilis,* Yellow Pennywort *Hydrocotyle foveolata,* Kidney-weed *Dichondra repens,* Star Cudweed *Euchiton involucratus,* Small Poranthera *Poranthera microphylla* and Trailing Speedwell *Veronica plebeia.* Narrow Rock Fern *Cheilanthes sieberi* is also sometimes present. |
| **Structure:** | Woodland to open woodland over a grassy and herbaceous ground layer. |
| **References:** | Robinson (unpubl.), Cheal *et al* (unpubl.) and Cook (1993). |

**Additional Comments**

Few intact remnants remain due to the pressures of agriculture, housing and industrial development and most sites are highly disturbed.

**Floristic Community 55-04** ***Western Basalt*** **Plains Grassy Woodland**

| | |
|---|---|
| **Altitude:** | 10-260m. |
| **Topography:** | Undulating to flat plain. |
| **Geology:** | Quaternary basalt. |
| **Soils:** | Fertile basalt-derived clays. |
| **Present distribution:** | Restricted to an area just west of the Plenty River from Whittlesea to Craigieburn. |
| **Floristics:** | The overstorey is dominated by River Red Gum *Eucalyptus camaldulensis* with a very open scattered shrub layer of various wattles.<br><br>In relatively intact examples Kangaroo Grass *Themeda triandra* or Common Tussock-grass *Poa labillardierei* dominates the ground layer. Other grasses include Long-hair Plume-grass *Dichelachne crinita*, Wallaby-grasses *Austrodanthonia* spp., and Common Wheat-grass *Elymus scaber*. Kangaroo Grass tends to dominate the herbaceous ground layer in the absence of native grazing animals or frequent firing. Common forbs included Common Everlasting *Chrysocephalum apiculatum*, Yam Daisy *Microseris scapigera* spp. agg., Scaly Buttons *Leptorhynchos squamatus* and Blue-Devil *Eryngium ovinum.* |
| **Structure:** | Woodland to open woodland over a grassy and herbaceous ground layer. |
| **References:** | VicRFA(2000). |

**Additional Comments**

This floristic community was widespread across the western basalt plains of Victoria but has been largely cleared for agriculture. The remnants within the study represent the eastern most extremity (and the drier end) of this community. It is a Flora and Fauna Guarantee listed community.

**Floristic Community 55-06** ***Riverina*** **Plains Grassy Woodland**

| | |
|---|---|
| **Altitude:** | 60-120m. |
| **Topography:** | Undulating to flat plain. |
| **Geology:** | Quaternary basalt. |
| **Soils:** | Fertile basalt derived clays. |
| **Present distribution:** | Restricted to the driest areas of the plains just west of Melbourne, mainly in the Melton/Eynesbury area, also around Sunbury. |
| **Floristics:** | The overstorey is dominated by Grey Box *Eucalyptus microcarpa* with scattered stands of Buloke *Allocasuarina luehmannii*.<br><br>Most remnants have few if any shrubs but it is thought that this community may have been shrubby in character prior to European settlement. Shrubs recorded include Gold-dust Wattle *Acacia acinacea*, Golden Wattle *Acacia pycnantha*, Lightwood *Acacia implexa*, Sweet Bursaria *Bursaria spinosa* and Drooping Cassinia *Cassinia arcuata*.<br><br>The grassy understorey is dominated by Wallaby-grasses and Spear-grasses such as Common Wallaby-grass *Austrodanthonia caespitosa*, Bristly Wallaby-grass *Austrodanthonia setacea*, Stiped Wallaby-grass *Austrodanthonia racemosa*, Rough Spear-grass *Austrostipa scabra* subsp. *falcata* and Kneed Spear-grass *Austrostipa bigeniculata*. Other common species include Windmill Grass *Chloris truncata*, Common Wheat-grass *Elymus scaber*, Kidney-weed *Dichondra repens*, Black-anther Flax-lily *Dianella revoluta* and Small-leaved Clematis *Clematis microphylla*. The presence of chenopods such as Nodding Saltbush *Einadia nutans*, Wingless Bluebush *Maireana enchylaenoides* and Ruby Saltbush *Enchylaena tomentosa* emphasise the dry nature of the community. |
| **Structure:** | Woodland over a grassy and herbaceous ground layer. |
| **References:** | VicRFA (2000). |

**Additional Comments**

This floristic community was extensive across the Northern Plains of Victoria with isolated occurrences in dry rainshadow areas south of the Great Dividing Range. The few remnants within the study area represent the entire range of this community south of the Divide.

## EVC 56 Floodplain Riparian Woodland

Open woodland -dominated over a medium to tall shrub layer with a ground layer consisting mainly of grasses, herbs and sedges. Occurs along the floodplains of the larger meandering rivers, characteristically in conjunction with one or more wetland communities. Elevation and rainfall are relatively low and the soil is a deep, fertile clay or loam/silt alluvium subject to periodic major flooding.

The range of floristic and environmental attributes for Floodplain Riparian Woodland is tabulated below. Where information from published or unpublished reports is included the references are cited.

| | |
|---|---|
| **Altitude:** | 20-170m. |
| **Topography:** | River and stream floodplains. |
| **Geology:** | Quaternary basalt and Recent river alluvium. |
| **Soils:** | Sands, silts and clays often high in organic matter and subject to seasonal inundation. |
| **Present distribution:** | Restricted to the riparian areas of the mainly basalt plains west of Melbourne, and the Plenty and Yarra River floodplains. |
| **Floristics:** | The overstorey is dominated by River Red Gum *Eucalyptus camaldulensis* in the drier areas, replaced by Manna Gum *Eucalyptus viminalis* and Swamp Gum *Eucalyptus ovata* at higher rainfalls (>700mm per annum).<br><br>The variable lower stratum usually has a diversity of small trees, mostly *Acacia* species such as Silver Wattle *Acacia dealbata*, Black Wattle *Acacia mearnsii* and Blackwood *Acacia melanoxylon*. Also present are the shrubs Sweet Bursaria *Bursaria spinosa*, River Bottlebrush *Callistemon sieberi*, Tree Violet *Hymenanthera dentata*, Woolly Tea-tree *Leptospermum lanigerum* and Swamp Paperbark *Melaleuca ericifolia*. |

| | |
|---|---|
| | The groundlayer includes a mixture of perennial and annual herbs capable of withstanding periodic flooding. These variously include Common Blown-grass *Agrostis avenacea*, Water Plantain *Alisma plantago-aquatica*, Lesser Joyweed *Alternanthera denticulata*, Sea Celery *Apium prostratum*, Marsh Club-sedge *Bolboschoenus medianus*, Tall Sedge *Carex appressa*, Swamp Crassula *Crassula helmsii*, Kidney-weed *Dichondra repens*, Nodding Club-sedge *Isolepis cernua*, Loose-flower Rush *Juncus pauciflorus*, Broom Rush *Juncus sarophorus*, Angled Lobelia *Lobelia anceps*, Small Loosestrife *Lythrum hyssopifolia*, Weeping Grass *Microlaena stipoides* var. *stipoides*, Common Reed *Phragmites australis*, Common Tussock-grass *Poa labillardierei*, Slender Knotweed *Persicaria decipiens*, River Club-sedge *Schoenoplectus validus*, Shiny Swamp-mat *Selliera radicans*, Water Ribbons *Triglochin procerum* and Large Bindweed *Calystegia sepium*. |
| **Structure:** | Woodland, open woodland, shrubland, herbfield, sedgeland, reed bed. |
| **References:** | Robinson (unpubl). VicRFA (1997). |

**Additional Comments**

This vegetation includes very distinctive assemblages of plants. The zonation of the various components within it is dictated by the periods of inundation.

## EVC 61 Box Ironbark Forest

Occurs in low rainfall areas on gently undulating rises, low hills and peneplains. Soils ranging from fertile clays to more infertile gravel deposits. An overstorey of Red Ironbark and Red Box is often present over a small tree or shrub mid storey with an open ground layer of herbs and grasses.

The range of floristic and environmental attributes for Box Ironbark Forest is tabulated below. Where information from published or unpublished reports is included the references are cited.

| | |
|---|---|
| **Altitude:** | 120-300m. |
| **Topography:** | Medium to strongly sloping exposed sites. |

| | |
|---|---|
| **Geology:** | Tertiary fan deposits and Devonian, Silurian and Ordovician sediments. |
| **Soils:** | Shallow, infertile, sodic, duplex. |
| **Present distribution:** | Restricted to a few small occurrences along the upper slopes adjacent to the Plenty River, the Christmas Hills-Panton Hill-Diamond Creek area and the Pyrete State Forest/Toolern Vale area. |
| **Floristics:** | The overstorey is variously dominated by Red Ironbark *Eucalyptus tricarpa* or with Red Box *Eucalyptus polyanthemos* subsp. *vestita*, Bundy *Eucalyptus goniocalyx*, Yellow Gum *Eucalyptus leucoxylon* subsp. *connata* and Red Stringybark *E. macrorhyncha*.<br><br>Golden Wattle *Acacia pycnantha* often forms a dense to open small tree layer. Cherry Ballart *Exocarpos cupressiformis* is also frequently present.<br><br>The shrub layer consists of Shiny Cassinia *Cassinia longifolia*, Wedge-leaf Hop-bush *Dodonea viscosa* subsp. *cuneata*, Gold-dust Wattle *Acacia acinacea*, Cranberry Heath *Astroloma humifusum* and Grey Everlasting *Ozothamnus obcordatus*.<br><br>Herbs present in the ground layer include Saloop Saltbush *Einadia hastata*, Common Raspwort *Gonocarpus tetragynus*, Variable Stinkweed *Opercularia varia* and Trailing Speedwell *Veronica plebeia*. Grasses such as Common Blown-grass *Agrostis avenacea*, Soft Tussock-grass *Poa morrisii*, Silvertop Wallaby-grass *Joycea pallida*, Kneed Wallaby-grass *Austrodanthonia geniculata*, Stiped Wallaby-grass *Austrodanthonia racemosa*, Bristly Wallaby-grass *Austrodanthonia setacea* and Purplish Wallaby-grass *Austrodanthonia tenuior* are common. Thatch Saw-sedge *Gahnia radula* is abundant at some sites. |
| **Structure:** | Open forest. |
| **References:** | Robinson (unpubl), Muir *et al*. (1995). |

**Additional comments:**

Ironbark eucalypts occasionally extend into other EVCs such as Shrubby Dry Forest. At times within the study area floristic distinction between the Box Ironbark and Grassy Dry Forest EVCs was difficult. Consequently, in some cases there may be a degree of overlap between these two EVCs.

## EVC 64 Rocky Chenopod Woodland

An open woodland dominated by Bull Mallee, Grey Box or Yellow Gum. A very restricted EVC occurring in the lowest rainfall areas of the study area on infertile soils.

The range of floristic and environmental attributes for Rocky Chenopod Woodland is tabulated below. Where information from published or unpublished reports is included the references are cited.

| | |
|---|---|
| **Altitude:** | 80-180m. |
| **Topography:** | Ridge-tops and upper steep slopes of hills. |
| **Geology:** | Ordovician and Silurian sediments (mapped as slates and sandstones on the 1:250 000 Melbourne geology map). |
| **Soils:** | Infertile laterised clays and skeletal duplex soils that tend to have a high salt content and are fairly porous or impermeable to water, thus further reducing the effective rainfall. |
| **Present distribution:** | Restricted to a few isolated occurrences near the Djerriwarrh Creek west of Melton and Jacksons Creek between Sunbury and Diggers Rest. |
| **Floristics:** | Bull Mallee *Eucalyptus behriana*, Yellow Gum *Eucalyptus leucoxylon* and Grey Box *Eucalyptus microcarpa*.<br><br>Major shrub species include Golden Wattle *Acacia pycnantha,* Shiny Cassinia *Cassinia longifolia*, Moonah *Melaleuca lanceolata* subsp. *lanceolata*, Gold-dust Wattle *Acacia acinacea* and Fragrant Saltbush *Rhagodia parabolica.*<br><br>Ground layer species include Inland Pigface *Carpobrotus modestus*, Bristly Wallaby-grass *Austrodanthonia setacea*, Kidney-weed *Dichondra repens*, Saloop Saltbush *Einadia hastata*, Nodding Saltbush *Einadia nutans*, Ruby Saltbush *Enchylaena tomentosa*, Wood-sorrel *Oxalis perennans* and Rough Spear-grass *Austrostipa scabra*, Feather |

| | |
|---|---|
| | Spear-grass *Austrostipa elegantissima*. Small-leaved Clematis *Clematis microphylla* is a common creeper sometimes completely covering whole groups of shrubs. |
| **Structure:** | Shrubland to woodland or open woodland of stunted or mallee form eucalypts with a salt and drought tolerant medium to low shrub layer over a ground layer of geophytes, ephemerals and salt tolerant perennials. |
| **References:** | Robinson (unpubl). |

**Additional Comments**

Both Rocky Chenopod Woodland and Shrubby Dry Forest are present in harsh, dry sites but Rocky Chenopod Woodland is dominated by chenopods with a mallee and saltbush component which is absent in Shrubby Dry Forest.

## EVC 68 "Creekline Grassy Woodland"

Eucalypt-dominated woodland with occasional scattered shrub layer over a mostly grassy/sedgy to herbaceous ground layer. Occurs on low-gradient ephemeral to intermittent drainage lines, typically on fertile colluvial/alluvial soils, on a wide range of suitably fertile geological substrates, within Plains Grassy Woodland in lower rainfall areas. These minor drainage lines can include a range of graminoid and herbaceous species tolerant of waterlogged soils, and are presumed to have sometimes resembled a linear wetland or system of interconnected small ponds. Formerly widespread in narrow bands within suitable habitat, now almost entirely cleared or eroded as a consequence of altered hydrology.

The range of floristic and environmental attributes for Creekline Grassy Woodland is tabulated below. Where information from published or unpublished reports is included the references are cited.

| | |
|---|---|
| **Altitude:** | 20-120m. |
| **Topography:** | Ephemeral drainage lines of lower slopes of foothills and outlying hills to smaller intermittent creeks of the floodplain. |
| **Geology:** | Minor alluvium within sedimentary or basalt soils. |
| **Soils:** | Sands, silts and clays. |
| **Present distribution:** | Restricted to isolated remnants on creeks and rivers on the plains just north-west of Melbourne such as tributaries of Moonee Ponds Creek, |

| | |
|---|---|
| | Deep Creek and the Maribyrnong River and also in the Mitcham area. |
| **Floristics:** | The overstorey is dominated by Red Gum *Eucalyptus camaldulensis.*<br><br>A scattered shrub layer includes Black Wattle *Acacia mearnsii*, Blackwood *Acacia melanoxylon*, Sweet Bursaria *Bursaria spinosa* and sometimes Swamp Paperbark *Melaleuca ericifolia.*The ground layer is dense with grasses and sedges, most commonly Tall Sedge *Carex appressa*, Common Tussock-grass *Poa labillardierei*, Weeping Grass *Microleana stipoides* var. *stipoides*, Kangaroo Grass *Themeda triandra*, Common Wheat-grass *Elymus scabra*, Common Blown-grass *Agrostis avenacea* and Rushes *Juncus* spp. |
| **Structure:** | Woodland to open woodland over a scattered medium to tall shrub layer and a dense layer of sedges and grasses. Creek banks lined with tall sedges and shrubs. |
| **References:** | Muir *et al* (1995), VicRFA (1999). |

**Additional Comments**

Few intact remnants survive in the study area due to industrial and urban development. This makes it very difficult to distinguish as a separate EVC to Plains Grassy Woodland and further sampling and analysis is required to clarify its status.

## EVC 71 "Hills Herb-rich Woodland"

Grassy or herb-dominated woodland with a variable, but often sparse shrub layer. It commonly occurs on granite, though also on sediments and sandstones with outcropping rock a common feature. Soils are generally free draining and fertile but often shallow to skeletal, creating a seasonally dry to harsh environment that favours annuals and geophytes.

The range of floristic and environmental attributes for Hills Herb-rich Woodland is tabulated below. Where information from published or unpublished reports is included the references are cited.

| | |
|---|---|
| **Altitudinal range:** | Around 500m. |
| **Topography:** | Gentle slopes. |

| | |
|---|---|
| **Geology:** | Devonian granodiorite. |
| **Soils:** | Sandy loams to loams. |
| **Present distribution:** | Gellibrand Hill area, north of Melbourne. |
| **Floristics:** | The overstorey is a woodland of large trees, usually Yellow Box *Eucalyptus melliodora* though Grey Box *Eucalyptus microcarpa* and Bundy *Eucalyptus goniocalyx* can occur.<br><br>The understorey tree/shrub layer is sparse to non-existent. Species can include Drooping Sheoak *Allocasuarina verticillata*, Black Wattle *Acacia mearnsii* and Hedge Wattle *Acacia paradoxa*. Low ericoid shrubs such as Cranberry Heath *Astroloma humifusum* may also be present.<br><br>The ground layer is rich in grasses and forbs, though it is now often dominated by annual weeds. Common species include Wallaby-grasses *Austrodanthonia* spp., Spear-grasses *Austrostipa* spp., Austral Carrot *Daucus glochidiatus*, Black-anther Flax-lily *Dianella revoluta*, Kidney-weed *Dichondra repens*, Green Rock -fern *Cheilanthes austrotenuifolia*, Necklace Fern *Asplenium flabellifolium*, Chocolate Lily *Arthropodium strictum*, Small Vanilla-lily *Arthropodium minus*, Stinking Pennywort *Hydrocotyle laxiflora*, Spreading Crassula *Crassula decumbens*, Tufted Bluebell *Wahlenbergia communis* and Annual Bluebell *Wahlenbergia gracilenta*. |
| **Structure:** | Woodland to open woodland over diverse grassy and herb-rich ground layer. |
| **References:** | VicRFA (2000), Tumino and Roberts (1998). |

**Additional Comments**

Only one degraded site of this EVC was found in the study area and the above description is based on an existing description from a relatively fertile site in an adjacent study area. Hills Herb-rich Woodland has affinities with Valley Grassy Forest but is found on more free-draining, sandier soils. It also has a lower component of ephemeral plants due to the better water-holding capacity of the soils.

Intact examples of this EVC outside the study area such as in the Grampians National Park are considered to be amongst the most species-rich vegetation communities in the world.

## EVCf 74 Wetland Formation

Wetland Formation is a default EVC label used to cover a wide range of freshwater wetlands found scattered throughout the study area. Where possible, wetlands were mapped to EVC level, if accessible and/or data was readily available. Otherwise, they were placed under this default label. The wetlands mapped during this project will need to be reviewed in the future once a completed typology of Victorian wetlands is available.

Wetlands generally occur in topographic depressions associated with standing water ranging from permanent to ephemeral water bodies. Structurally, they can consist of herbland, sedgeland and rushland elements and sometimes can have a shrubby component especially on drier verges. Wetland vegetation is often severely degraded and weed invaded, having suffered a history of disturbance including alteration of drainage patterns, such as upstream damming for water storage or draining and clearing for agriculture or grazing (VicRFA 1999).

EVCs, which could not be identified by field assessment or aerial photographic interpretation and therefore categorised as "Wetland Formation" in this study, include Plains Grassy Wetland, Sedge Wetland, Billabong Wetland, Reed Swamp and Aquatic Herbland.

## EVC 83 Swampy Riparian Woodland

Once a common vegetation type along broad drainage lines with slight gradients and on levees near streams, the EVC Swampy Riparian Woodland has been largely altered, particularly by drainage for agriculture.

The range of floristic and environmental attributes for Swampy Riparian Woodland are tabulated below. Where information from published or unpublished reports is included the references are cited.

| | |
|---|---|
| **Altitude:** | 5-270m. |
| **Topography:** | Riparian zone of low gradient streams, including levees and wetland systems associated with the verges of channels and ponds. |
| **Geology:** | Quaternary alluviums. |
| **Soils:** | Silt-rich river sands and gravels. |
| **Present distribution:** | Low energy streams of the coastal plains and lower foothills inland from Port Phillip (Scotchmans Creek, Gardiners Creek and Ruffey Creek) to the south-east of Melbourne and Westernport Bays, Mornington Peninsula, Pakenham-Cardinia area, Kooweerup Swamp, and north-east of the study area. |

| | |
|---|---|
| **Floristics:** | The overstorey is dominated by Swamp Gum *Eucalyptus ovata* or in higher elevations Mountain Swamp Gum *Eucalyptus camphora.*<br><br>The lower strata are variously locally dominated by Swamp Paperbark *Melaleuca ericifolia,* Woolly Tea-tree *Leptospermum lanigerum* and Common Reed *Phragmites australis.* A range of shrub species occurs on the stream levees (eg. Hop Goodenia *Goodenia ovata*, Sweet Bursaria *Bursaria spinosa*, Victorian Christmas-bush *Prostanthera lasianthos*, Wattles *Acacia* spp. and Hemp Bush *Gynatrix pulchella*), in mixture with Spiny-headed Mat-rush *Lomandra longifolia* and Common Tussock-grass *Poa labillardierei*. |
| **Structure:** | Woodland occurring on stream banks and including riparian elements such as reeds, sedges, rushes, tussock grasses and aquatic herbs. |
| **References:** | Frood (pers. com.). |

**Additional Comments**

This EVC is currently undersampled due to the lack of intact remnants. Swampy Riparian Woodland has some affinities with Riparian Forest but is found on lower gradient streams. The vegetation is almost a linear wetland bound by levees and lacks the tall Manna Gum *Eucalyptus viminalis* subsp. *viminalis* overstorey and broad-leaved shrub component of Riparian Forest.

It is also closely related to Swampy Woodland that occurs on swampy flats, sometimes adjacent to Swampy Riparian Woodland. Most forms of Swampy Woodland are rarely inundated by flood waters, but can be subject to seasonal waterlogging and temporary inundation from surface runoff.

## EVC 104 Lignum Wetland

An open to moderately dense shrubland of Tangled Lignum with a variable understorey depending on the length and frequency of inundation and the levels of salinity.

The range of floristic and environmental attributes for Lignum Wetland is tabulated below. Where information from published or unpublished reports is included the references are cited.

| | |
|---|---|
| **Altitude:** | 5-100m. |
| **Topography:** | Minor depressions in the basalt plain. |
| **Geology:** | Swamp and lagoonal deposits and recent stream alluviums generally over Quaternary basalt. |
| **Soils:** | Heavy grey clays, waterlogged for much of the year but also experiencing periods of extreme dryness. |
| **Present distribution:** | More common on the drier plains north of the Great Divide but restricted in the study area to a few localised patches on the dry rainshadow area of the plains between Little River, Melton and Werribee. |
| **Floristics:** | An overstorey is generally absent but there may be the occasional River Red Gum *Eucalyptus camaldulensis.*<br><br>The tallest stratum generally consists of a sparse to moderately dense layer of Tangled Lignum *Muehlenbeckia florulenta.*<br><br>The ground layer species include Common Spike-sedge *Eleocharis acuta*, Sharp Club-sedge *Schoenoplectus pungens*, Brown-back Wallaby-grass *Austrodanthonia duttoniana*, Yellow Rush *Juncus flavidus*, Large-fruit Tassel *Ruppia megacarpa* and Common Nardoo *Marsilea drummondii.* |
| **Structure:** | Shrubland, sparse to moderately dense. The diversity and composition of the understorey dependent on depth, length and frequency of inundation and levels of salinity/brackishness. |
| **References:** | VicRFA (2000). |

## EVCc 124 Grey Clay Drainage Line Herbland/Sedgeland Complex

This complex occurs as strings of brackish seasonal wetlands associated with ephemeral drainage lines on heavy basalt-derived grey clays. It is separated from Plains Grassy Wetland by the presence of species indicative of salinity.

The range of floristic and environmental attributes for Grey Clay Drainage Line Herbland/Sedgeland Complex is tabulated below. Where information from published or unpublished reports is included the references are cited.

| | |
|---|---|
| **Altitude:** | 100-200m. |
| **Topography:** | Ephemeral drainage lines and swampy basins on flat to gently undulating basalt plains. |
| **Geology:** | Quaternary basalt and Recent alluviums. |
| **Soils:** | Waterlogged heavy grey clays. |
| **Present distribution:** | Very localised on tributaries of the Merri and Darebin Creeks. |
| **Floristics:** | Variously dominated by herbs or sedges. Includes some species indicative of salinity such as Salt Pratia *Lobelia irrigua*, Sea Celery *Apium* spp., Australian Lilaeopsis *Lilaeopsis polyantha*, Lesser River Buttercup *Ranunculus diminutus*, Australian Salt-grass *Distichlis distichophylla* and Shiny Swamp-mat *Selliera radicans*. Other species include Blown Grass *Agrostis* spp., Salt Club-sedge *Bolboschoenus caldwellii*, Common Spike-sedge *Eleocharis acuta*, Common Tussock-grass *Poa labillardierei*, River Club-sedge *Schoenoplectus validus* and Curly Sedge *Carex tasmanica*. |
| **Structure:** | Herbland-sedgeland. |
| **References:** | Frood (1992), VicRFA (1997). |

## EVC 125 Plains Grassy Wetland

The range of floristic and environmental attributes for Plains Grassy Wetland is tabulated below. Where information from published or unpublished reports is included the references are cited.

| | |
|---|---|
| **Altitude:** | 30 –220m. |
| **Topography:** | Margins of shallow freshwater lakes and in swampy drainage lines and seasonally waterlogged wet depressions surrounded by Plains Grassy Woodland or Plains Wetland. |
| **Geology:** | Swamp deposits within basalt and Quaternary and Tertiary sediments. |
| **Soils:** | Heavy black clays. |
| **Present distribution:** | Restricted to Lyndhurst, Mordialloc, Carrum Downs and Cranbourne south-east of Melbourne and the basalt plains north and west of |

| | |
|---|---|
| | Melbourne ie. the Whittlesea-Wallan area and Derrimut. |
| **Floristics:** | This EVC is usually treeless, but in some instances can include sparse River Red Gum *Eucalyptus camaldulensis* or Swamp Gum *Eucalyptus ovata*. A sparse shrub component may also be present.<br><br>The floristics vary geographically (ie with rainfall) and according to management history.<br><br>The characteristic ground cover is dominated by grasses and small sedges and (in relatively intact examples) forbs. The vegetation is typically species-rich on the outer verges but is usually species-poor in the wetter central areas, where Common Spike-sedge *Eleocharis acuta*, or Australian Sweet-grass *Glyceria australis* may form virtually monospecific stands, sometimes in association with aquatic herbs such as Floating Pondweed *Potamogeton tricarinatus* and Water-milfoil *Myriophyllum* spp.<br><br>Major grasses are Brown-back Wallaby-grass *Austrodanthonia duttoniana*, Common Swamp Wallaby-grass *Amphibromus nervosus*, Australian Sweet-grass *Glyceria australis* and Common Tussock-grass *Poa labillardierei* and in rainshadow areas west of Melbourne, Southern Cane-grass *Eragrostis infecunda*. Common herbs include White Purslane *Neopaxia australasica*, Swamp Crassula *Crassula helmsii*, Prickfoot *Eryngium vesiculosum*, Swamp Starwort *Stellaria angustifolia* and River Buttercup *Ranunculus inundatus*. Small Spike-sedge *Eleocharis pusilla* can be a major component of more ephemeral versions which can include Kangaroo Grass *Themeda triandra* and a component of grassland herbs. |
| **Structure:** | Sedgeland to herbfield. |
| **References:** | Frood (1991). |

**Additional Comments**

This EVC consists of a number of floristic communities. Ranges of now threatened species were associated with the outer verges. A floristic community of this EVC, Herb-rich Plains Grassy Wetland (West Gippsland), is listed as threatened under the Flora and Fauna Guarantee Act 1988.

## EVCc 126 Swampy Riparian Complex

Swampy Riparian Complex occurs on poor drainage areas located in topographically protected high rainfall country. The complex consists of emergent eucalypts over a shrub layer with a ground layer primarily ferny to sedgy in character, including mixtures of wet forest and poor-drainage species.

This complex has previously been used in other study areas as a default unit to encompass a number of floristic entities such as Creekline Herb-rich Woodland, Swampy Woodland, Gully Woodland, Shrubby Gully Forest and Swamp Forest. Overall, the composition and ecology of the vegetation types included in Swampy Riparian Complex are poorly defined due to a lack of intact extant examples. For this study, Gully Woodland, Swampy Woodland, Creekline Herb-rich Woodland and Shrubby Gully Forest have been separated out, where possible. Swamp Forest has not been recorded from the study area, but has been mapped (pre-1750) in the higher rainfall country in the Warragul area to the east.

## EVC 127 "Valley Heathy Forest"

A low, open forest with a sedgy/grassy understorey with a component of small ericoid shrubs and grass-trees. It is diverse and somewhat variable in structure and floristics across its range, partially as a result of conservation management history. It is believed to have occupied a large proportion of the low plateau-like area of outer eastern Melbourne. It is now largely cleared with few intact remanants. The range of floristic and environmental attributes for Valley Heathy Forest is tabulated below. Where information from published or unpublished reports is included the references are cited.

| | |
|---|---|
| **Altitude:** | 40-300m. |
| **Topography:** | Gently undulating lower slopes and valley floors. |
| **Geology:** | Silurian and Devonian sediments. |
| **Soils:** | Loams and clays often with underlying impeded drainage, but dry in summer. |
| **Present distribution:** | Isolated remnants scattered throughout eastern Melbourne, mainly from Dandenong through Nunawading and Kilsyth. |
| **Floristics:** | The overstorey comprises various combinations of Yellow Box *Eucalyptus melliodora* or Bundy *Eucalyptus goniocalyx* with Silver-leaf Stringybark *Eucalyptus cephalocarpa*, Messmate *Eucalyptus obliqua* and Narrow-leaf Peppermint *Eucalyptus radiata* (or Red |

| | |
|---|---|
| | Stringybark *Eucalyptus macrorhyncha* and Red Box *Eucalyptus polyanthemos* subsp. *vestita* in drier sites).<br><br>Shrub layer varies and often reflects management history and can be virtually non-existent in some examples. Common species include Black Wattle *Acacia mearnsii*, Spreading Wattle *Acacia genistifolia*, Myrtle Wattle *Acacia myrtifolia* and Prickly Tea-tree *Leptospermum continentale.*<br><br>The ground layer is diverse, and in relatively intact examples, is grassy/sedgy and herb-rich, with a range of ericoid shrubs. Many of the species are shared with Valley Grassy Forest and Grassy Dry Forest, while some have affiliations with Heathy Woodland or Lowland Forest. Common species include Kangaroo Grass *Themeda triandra*, Weeping Grass *Microlaena stipoides* var. *stipoides*, Thatch Saw-sedge *Gahnia radula*, Small Grass-tree *Xanthorrhoea minor*, Cranberry Heath *Astroloma humifusum*, Honey-pots *Acrotriche serrulata*, Silvertop Wallaby-grass *Joycea pallida*, Reed Bent-grass *Deyeuxia quadriseta*, Grass Trigger-plant *Stylidium* sp. *2*, Yam Daisy *Microseris scapigera* spp. agg. and Variable Sword-sedge *Lepidosperma laterale.* |
| **Structure:** | Low open forest, understorey sedgy/grassy, with component of small ericoid shrubs and grass-trees. |
| **References:** | Frood (in prep.). |

**Additional Comments**

Valley Heathy Forest represents vegetation that is transitional between various forms of Lowland Forest or Heathy Woodland and Valley Grassy Forest/Grassy Dry Forest. Soil and moisture factors are critical in delimiting the vegetation. It consists of a combination of ericoid and sclerophyllous species normally associated with lower nutrient sites in EVCs such as Grassy Dry Forest. It also has a diversity of grasses and herbs associated with more fertile soils of Valley Grassy Forest sites. On the higher rainfall eastern edge of the study area, Valley Heathy Forest merges into Lowland Forest. It is much smaller in stature than Lowland Forest and lacks the abundance of wire-grasses and Proteaceae species of the latter.

Further sampling and analysis are required to clarify its status.

## EVC 128 Grassy Forest

Grassy Forest occurs in moderate rainfall areas on relatively infertile soils. The ground layer predominantly contains "dry" species reflecting the infertility of the soils. The range of floristic and environmental attributes for Grassy Forest is tabulated below. Where information from published or unpublished reports is included the references are cited.

| | |
|---|---|
| **Altitude:** | 60-350m. |
| **Topography**: | Gentle lower slopes and foothills. |
| **Geology:** | Sediments. |
| **Soils:** | Infertile pale soils which have poor drainage during the wettest periods of the year. |
| **Present distribution:** | From the Coldstream area south to the Lysterfield-Pakenham area. Also in Toolern Vale to Gisborne area. |
| **Floristics:** | Messmate *Eucalyptus obliqua* and Narrow-leaf Peppermint *Eucalyptus radiata* dominate the overstorey, with associated species sometimes including Candlebark *Eucalyptus rubida*, Bundy *Eucalyptus goniocalyx*, Red Stringybark *Eucalyptus macrorhyncha* or Mealy Stringybark *Eucalyptus cephalocarpa.* Swamp Gum *Eucalyptus ovata* and Manna Gum *Eucalyptus viminalis* subsp. *viminalis* occur around gullies or seepage areas.<br><br>The shrubs/small trees Black Sheoak *Allocasuarina littoralis*, Black Wattle *Acacia mearnsii* and Blackwood *Acacia melanoxylon* can be conspicuous.<br><br>The ground layer includes a diverse array of graminoids such as Silvertop Wallaby-grass *Joycea pallida*, Wallaby Grasses *Austrodanthonia* spp., Veined Spear-grass *Austrostipa rudis*, Weeping Grass *Microlaena stipoides* var. *stipoides*, Soft Tussock-grass *Poa morrisii*, Grey Tussock-grass *Poa sieberiana*, Velvet Tussock-grass *Poa rodwayi* and Variable Sword-sedge *Lepidosperma laterale.* Kangaroo Grass *Themeda triandra* is usually at low levels of abundance, if present. Thatch Saw-sedge *Gahnia radula* is typically prevalent. Forbs and perennial geophytes are also common and can include species such as Creeping Bossiaea *Bossiaea prostrata*, Grass-lily *Caesia* spp., Golden Weather-glass *Hypoxis* spp., Early Nancy |

| | |
|---|---|
| | *Wurmbea* spp., Milkmaids *Burchardia umbellata*, Tall Bluebell *Wahlenbergia stricta*, Tufted Bluebell *Wahlenbergia communis*, Small Poranthera *Poranthera microphylla*, Stinking Pennywort *Hydrocotyle laxiflora*, Grass Trigger-plant *Stylidium* sp. 2, Blue Pincushion *Brunonia australis*, Vanilla Lilies *Arthropodium* spp., Shrubby Fireweed *Senecio minimus*, Annual Fireweed *Senecio glomeratus*, Cotton Fireweed *Senecio quadridentatus* and Bent Goodenia *Goodenia geniculata.* |
| **Structure:** | Open forest. |
| **References:** | VicRFA (1997). |

**Additional Comments**

Grassy Forest occupies an ecological position between the box-stringybark woodlands (Grassy Dry Forest, Valley Grassy Forest) and Herb-rich Foothill Forest. Whilst the overstorey composition can resemble drier forms of Herb-rich Foothill Forest, tree stature is often reduced and the understorey has greater affinities with drier vegetation types. Grassy Forest has species shared with forms of Grassy Dry Forest but lacks a diversity of orchids of drier box-stringybark woodlands and has a denser ground layer than Grassy Dry Forest. Further sampling and analysis are required to clarify the relationships of drier forest types.

## EVC 132 Plains Grassland

Occurs on lowland plains on fertile clay loams of Quaternary and Tertiary origin. The main floristic community of Plains Grassland that occurs in the study area is *Western Basalt* Plains Grassland with one patch of *South Gippsland* Plains Grassland.

The range of floristic and environmental attributes for these communities is tabulated below. Where information from published or unpublished reports is included the references are cited.

**Floristic Community 132-05: *South Gippsland* Plains Grassland**

| | |
|---|---|
| **Altitude:** | 100m. |
| **Topography:** | Lowland plain. |

| | |
|---|---|
| **Geology:** | Tertiary sediments. |
| **Soils:** | Sandy clay-loams. |
| **Present distribution:** | Only one patch of this floristic community was mapped, it is on the more fertile soils on French Island at the old SEC paddocks in the southern part of the island. |
| **Floristics:** | Dominated by Kangaroo Grass *Themeda triandra* or Smooth Wallaby-grass *Austrodanthonia laevis,* with Common Bog-sedge *Schoenus apogon,* Common Love-grass *Eragrostis brownii,* Weeping Grass *Microlaena stipoides* var. *stipoides,* Wetland Wallaby-grass *Notodanthonia semiannularis,* Common Raspwort *Gonocarpus tetragynus,* Pale Sundew *Drosera peltata* subsp.*peltata*, Tiny Sundew *Drosera pygmaea,* Small St John's Wort *Hypericum gramineum,* Dwarf Aphelia *Aphelia pumilo,* Spotted Sun-orchid *Thelymitra ixioides* and Slender Sun-orchid *Thelymitra pauciflora*. There may be scattered shrubs of Prickly Tea-tree *Leptospermum continentale* and Heath Tea-tree *Leptospermum myrsinoides.* |
| **Structure:** | Tussock grassland. |
| **References** | Cameron (1996). |

**Floristic Community 132-06: *Western Basalt* Plains Grassland**

| | |
|---|---|
| **Altitude:** | 0-350m. |
| **Topography:** | Lowland plain. |
| **Geology:** | Quaternary basalt. |
| **Soils:** | Mainly duplex, fertile, silty clay-loams. |
| **Present distribution:** | Scattered occurrences from Craigieburn south to Laverton and west to Rockbank with concentrations in the Deer Park-Laverton area and an isolated occurrence on sandstone at Evans Street, Sunbury. |
| **Floristics:** | Historically, the most significant feature of Plains Grassland was the Kangaroo Grass *Themeda triandra* dominated ground cover. This was associated with a variety of other grasses such as Weeping Grass *Microlaena stipoides* var. *stipoides,* Common Wallaby-grass |

| | |
|---|---|
| | *Austrodanthonia caespitosa*, Brown-back Wallaby-grass *Austrodanthonia duttoniana*, Short Wallaby-grass *Austrodanthonia carphoides*, Velvet Wallaby-grass *Austrodanthonia pilosa*, Hill Wallaby-grass *Austrodanthonia eriantha*, Stiped Wallaby-grass *Austrodanthonia racemosa* var. *racemosa*, Bristly Wallaby-grass *Austrodanthonia setacea*, Common Wheat-grass *Elymus scaber* and Kneed Spear-grass *Austrostipa bigeniculata*. Other species include Rush-lily *Tricoryne elatior*, Blue Devil *Eryngium ovinum*, Pink Bindweed *Convolvulus erubescens*, Lemon Beauty-heads *Calocephalus citreus*, Common Bog-sedge *Schoenus apogon*, Toad Rush *Juncus bufonius* and Common Everlasting *Chrysocephalum apiculatum.* |
| **Structure:** | Tussock grassland. |
| **References:** | Robinson (unpubl). |

**Additional Comments**

Plains Grassland was once common throughout Victoria but today very little remains and of this even less is relatively undisturbed due to extensive clearing of adjacent grassy forests and woodlands. For the pre-1750's mapping, Plains Grassland was often mapped as a mosaic with Plains Grassy Woodland, especially in the Keysborough-Lyndhurst-Clyde-Pakenham area. This reflects both the historical spatial inter-relationship of these two communities as well as a limited knowledge of the past distribution of each. It is difficult to reconcile the differences between Plains Grassland and Plains Grassy Woodland due to management effects and numerous presumed local extinctions.

## EVC 136 Sedge Wetland

A sedge-dominated wetland developed on deep peat. Sedge and rush species dominate, with various aquatic and semi-aquatic herbs also present.

The range of floristic and environmental attributes for Sedge Wetland is tabulated below. Where information from published or unpublished reports is included the references are cited.

| | |
|---|---|
| **Altitude:** | 20-160m. |

| | |
|---|---|
| **Topography:** | Plains with freshwater swamps. |
| **Geology:** | Quaternary and Tertiary deposits of peat, sand and clay. |
| **Soils:** | Deep peat, clay and sand. |
| **Present distribution:** | French Island, Greens Bush-Mornington Peninsula, Royal Botanic Gardens, Cranbourne. |
| **Floristics:** | This EVC is variable in diversity both between and within sites, often containing several zones. The central portions can be almost monospecific with the fringes quite diverse.<br><br>The major zone is dominated by Pithy Sword-sedge *Lepidosperma longitudinale*. The vegetation often includes a number of other sedges such as Twig-sedge *Baumea* spp., Club-sedge *Isolepis* spp. and Bog-sedge *Schoenus* spp.but also includes a range of wetland herbs such as Running Marsh-flower *Villarsia reniformis*, Swamp Goodenia *Goodenia humilis*, Centella *Centella cordifolia* and floating Club-sedge *Isolepis fluitans*. Areas of deeper standing water support Water Ribbons *Triglochin procerum* s.l. |
| **Structure:** | Sedgeland. |
| **References:** | Davies *et. al.* (in prep.). |

**Additional Comments**

On the periphery of this EVC, Swamp Scrub may be found in areas of impeded drainage and deep clay soils with surface peat horizons. Sedge Wetland was mapped if it was easily accessible on the ground or data was available for particular sites, otherwise it was mapped as part of the mapping unit "Wetland Formation".

## EVC 140 Mangrove Shrubland

Confined to protected low energy coastal environments where there is sufficient shelter from strong wave action and currents to allow the accumulation of fine sediments, generally on mud flats within the tidal zone. It is dominated by White Mangrove *Avicennia marina* var. *australasica* and is usually associated with Coastal Saltmarsh.

The range of floristic and environmental attributes for Mangrove Shrubland is tabulated below. Where information from published or unpublished reports is included the references are cited.

| | |
|---|---|
| **Altitude:** | Sea-level. |
| **Topography:** | Poorly drained, low energy coastal flats. |
| **Geology:** | Quaternary deposits with minor examples amongst basalt rocks near Williamstown. |
| **Soils:** | Deep, salt-affected silt, sand and clay. |
| **Present distribution:** | Protected low energy coastal environments of Westernport Bay although it is also found in isolated pockets on Phillip Island, French Island and Anderson Inlet east of Inverloch. |
| **Floristics:** | It is commonly dominated by only one species, White Mangrove *Avicennia marina* subsp. *australasica* that forms dense thickets which are mapped as Mangrove Shrubland whilst stunted scattered individual mangroves in halophyte-dominated areas are mapped as Coastal Saltmarsh. Dwarf Grass-wrack *Zostera muelleri* may also be present. |
| **Structure:** | Shrubland. |
| **References:** | Davies *et. al.* (in prep.), Opie *et al*. (1984 ). |

**Additional Comments:**

Overall, the distribution of Mangrove Shrubland has been severely reduced since the beginning of settlement due to:

1. The physical removal of mangroves to produce drainage channels, jetties etc.
2. Land development resulting in drainage of swamplands such as the Kooweerup Swamp, channel construction and clearing of the hinterlands for agricultural development.
3. The release of toxic pollutants into the bays from industry and agriculture.

Nevertheless, in some areas, Mangrove Shrubland has increased its range and now occurs on newly deposited silts that are derived from man-made drainage channels through inland swamps eg. In Westernport Bay near the Tooradin airfield.

## EVC 154 Bird Colony Shrubland

| | |
|---|---|
| **Altitude:** | Sea-level. |

| | |
|---|---|
| **Topography:** | Low energy coastal regions/undulating sand dunes. |
| **Geology:** | Raised coastal deposits, siliceous and calcareous sand, shell beds and guano. |
| **Soils:** | Sandy soils (sand dunes). |
| **Present distribution:** | Within the study area it only occurs on sand dunes on Mud Island, restricted to the breeding colonies of Silver Gull, Straw-necked Ibis, Australian Ibis and White-faced Storm-petrel. |
| **Floristics:** | The shrubland grows to approximately 2.2 metres in height and is dominated by Coast Hollyhock *Malva* sp. aff. *australiana*, a hardy fibrous species restricted (mainly) to bird-breeding colonies. The understorey is sparse and largely composed of exotic herbs including Barley-grass *Critesion murinum*, Annual Veldt Grass *Ehrharta longifolia*, Broad Nightshade *Solanum furcatum*, Black Nightshade *Solanum nigrum*, Common Sow-thistle *Sonchus oleraceus* and Small Nettle *Urtica urens*. |
| **Structure:** | Shrubland. |
| **References:** | Yugovic (pers. com.). |

**Additional Comments**

The community requires high levels of disturbance and nutrient input from birds in the form of guano, dead birds and nesting detritus.

## EVC 155 Bird Colony Succulent Herbland

Closed herbland formed on nutrient-enriched sandy substrates associated with shearwater and penguin breeding colonies. It is a species- poor EVC dominated by species able to cope with both the nutrient enrichment and the severe disturbance caused by the the large numbers of burrowing birds.

The range of floristic and environmental attributes for Bird Colony Succulent Herbland is tabulated below. Where information from published or unpublished reports is included the references are cited.

| | |
|---|---|
| **Altitude:** | 10-40m. |

| | |
|---|---|
| **Topography:** | Coastal cliffs and sand dunes. |
| **Geology:** | Tertiary basalt. |
| **Soils:** | Nutrient-enriched sandy substrates associated with shearwater and penguin breeding colonies. |
| **Present distribution:** | Breeding grounds of shearwater and penguin colonies on exposed southern coast of Phillip Island, including Seal Rocks. |
| **Floristics:** | A species-poor herbland dominated by the succulent herb Bower Spinach *Tetragonia implexicoma*. Other prominent succulent herbs include Seaberry Saltbush *Rhagodia candolleana* subsp. *candolleana* and Karkalla *Carpobrotus rossii.* Introduced grasses and other herbs are frequent, especially in gaps created by bird disturbance. |
| **Structure:** | Closed herbland. |
| **References:** | Davies *et. al.* (in prep.), VicRFA (1999). |

**Additional Comments**

Succulent herbland is the climax vegetation of many seabird colonies in southern Australia and New Zealand (Yugovic 1998).

## EVC 160 Coastal Dune Scrub

Includes the sparse low shrublands of the foredune to the closed scrub of Coast Wattle *Acacia longifolia* var. *sophorae* and Coast Tea-tree *Leptospermum laevigatum* on the secondary dunes behind beaches.

The range of floristic and environmental attributes for Coastal Dune Scrub is tabulated below. Where information from published or unpublished reports is included the references are cited.

| | |
|---|---|
| **Altitude:** | <50m. |
| **Topography:** | Dunes, swales and sand sheets behind coastal beaches. |
| **Geology:** | Quaternary sand deposits. |

| | |
|---|---|
| **Soils:** | Deep, uniform textured siliceous and calcareous sands subject to high levels of saltspray and wave action and disturbance from onshore winds. |
| **Present distribution:** | Coastal areas of Port Phillip (eastern shore) and Westernport Bays, Phillip Island, Bass Coast and the southern coast of Mornington Peninsula. |
| **Floristics:** | The vegetation is dominated by shrubs (to small trees) of Coast Tea-tree *Leptospermum laevigatum*, Coast Wattle *Acacia longifolia* var. *sophorae* and Drooping Sheoak *Allocasuarina verticillata*. Other major shrub species include Common Beard-heath *Leucopogon parviflorus* and Sweet Bursaria *Bursaria spinosa.*<br><br>Understorey species include Seaberry Saltbush *Rhagodia candolleana* subsp. *candolleana,* Sea Box *Alyxia buxifolia* and Coast Everlasting *Ozothamnus turbinatus.*<br><br>A more diverse ground layer occurs on the hinterdunes and sand sheets. Species include Long-hair Plume-grass *Dichelachne crinita*, Coast Sword-sedge *Lepidosperma gladiatum*, Honey-pots *Acrotriche serrulata*, Common Wheat-grass *Elymus scabrus*, Small-leaved Clematis *Clematis microphylla*, Short-stem Sedge *Carex breviculmis*, Silky Guinea-flower *Hibbertia sericea* s.l., Cinquefoil Cranesbill *Geranium potentilloides*, Spiny-headed Mat-rush *Lomandra longifolia*, and Knobby Club-sedge *Isolepis nodosa*. Other species present are Shady Wood-sorrel *Oxalis exilis*, Common Bottle-daisy *Lagenophora stipitata*, Kidney-weed *Dichondra repens* and Variable Groundsel *Senecio pinnatifolius.* |
| **Structure:** | Variously woodland, scrub, shrubland or open-heath. |
| **References:** | Davies *et. al.* (in prep.), Cheal *et al.* (unpub). |

**Additional Comments**

Often mapped as a mosaic with Coastal Dune Grassland (EVC 879). In these instances the Coastal Dune Scrub generally dominates the mosaic. The native 'grassland' component is now highly localised and infested with the introduced Marram Grass **Ammophila arenaria* and Sea Wheat-grass **Thinopyrum junceiforme* that have been extensively planted as sand-binding species.

## EVC 161 Coastal Headland Scrub

Scrub or shrubland on steep, rocky coastal headlands often associated with cliffs exposed to the stresses of extreme salt-laden winds and salt spray from the south-west.

The range of floristic and environmental attributes for Coastal Headland Scrub is tabulated below. Where information from published or unpublished reports is included the references are cited.

| | |
|---|---|
| **Altitude:** | <40m. |
| **Topography:** | Steep, stony slopes on exposed windswept coastal headlands that are subject to frequent gale-force, salt-laden winds. |
| **Geology:** | Cretaceous sedimentary rock, dune limestone, granite and Tertiary basalt. |
| **Soils:** | Variable from shallow, wind-blown sand to sandy loam. |
| **Present distribution:** | Dune tops and low coastal bluffs, particularly along the southern coast of the Nepean and Mornington Peninsulas, Phillip Island and Bass Coast. |
| **Floristics:** | A wind-pruned scrub of a variety of woody shrubs such as Coast Everlasting *Ozothamnus turbinatus*, Coast Daisy-bush *Olearia axillaris*, Coast Wattle *Acacia longifolia* var.*sophorae*, White Correa *Correa alba*, Sea Box *Alyxia buxifolia*, Common Boobialla *Myoporum insulare*, Coast Tea-tree *Leptospermum laevigatum*, Cushion Bush *Leucophyta brownii*, Coast Banksia *Banksia integrifolia* subsp. *integrifolia*, Bower Spinach *Tetragonia implexicoma*, Seaberry Saltbush *Rhagodia candolleana* subsp. *candolleana* and Coast Beard-heath *Leucopogon parviflorus*.<br><br>The ground layer is usually sparse. Common species include Short-stalk Flax-lily *Dianella brevicaulis*, Blue Tussock-grass *Poa poiformis*, Knobby Club-sedge *Isolepis nodosa*, Coast Sword-sedge *Lepidosperma gladiatum*, Prickly Spear-grass *Austrostipa stipoides*, Long-hair Plume-grass *Dichelachne crinita*, Small-leaved Clematis *Clematis microphylla*, Dune Thistle *Actites megalocarpa*, Angled Lobelia *Lobelia anceps*, Shiny Swamp-mat *Selliera radicans*, Creeping Brookweed *Samolus repens*, Karkalla *Carpobrotus rossii*, Sea Celery |

| | |
|---|---|
| | *Apium prostratum* subsp. *prostratum*, Bidgee-widgee *Acaena novae-zelandiae* and Downy Dodder-laurel *Cassytha pubescens.* |
| **Structure:** | Wind-pruned scrub. |
| **References:** | Davies *et. al.* (in prep.). |

**Additional Comments**

Extensive stretches of low headland along the east coast of Port Phillip Bay (eg. between Brighton and Mordialloc) have apparently been stabilised and re-contoured to a more gentle slope since European settlement. Hence, the EVC has changed from Coastal Headland Scrub to EVCs associated with deeper sands on dunes such as Coastal Dune Scrub.

## EVCm 162 Coastal Headland Scrub/Coastal Tussock Grassland Mosaic

Refer to descriptions of Coastal Headland Scrub (EVC 161) and Coastal Tussock Grassland (EVC 163).

## EVC 163 Coastal Tussock Grassland

A tussock grassland that may contain an emergent shrub component occurring on exposed coastal cliffs and bluffs. Soils are saline and the strong salt-laden winds preclude tree growth.

The range of floristic and environmental attributes for Coastal Tussock Grassland is tabulated below. Where information from published or unpublished reports is included the references are cited.

| | |
|---|---|
| **Altitude:** | <40m. |
| **Topography:** | Steep, stony slopes on exposed windswept coastal cliffs that are subject to frequent gale-force, salt-laden winds. |
| **Geology:** | Variable. |
| **Soils:** | Shallow, stony loam or sand. |
| **Present distribution:** | Coastal cliffs from west of Inverloch to Phillip Island. Also at Cape Schanck and Point Nepean on the Mornington Peninsula. |

| | |
|---|---|
| **Floristics:** | A tussock grassland usually dominated by Blue Tussock-grass *Poa poiformis* with Prickly Spear-grass *Austrostipa stipoides* and Long-hair Plume-grass *Dichelachne crinita* also frequently present. The herbaceous groundcover includes Coast Sow-thistle *Actites megalocarpa*, Coast Groundsel *Senecio spathulatus*, Austral Carrot *Daucus glochidiatus*, *Crassula* spp., Wood-sorrel *Oxalis* spp., Sea Celery *Apium prostratum*, Rounded Noon-flower *Disphyma crassifolium* and Knobby Club-sedge *Isolepis nodosa*. Small-leaved Clematis *Clematis microphylla* is also often present.<br><br>Emergent shrubs, if present, may include the salt-adapted coastal species such as White Correa *Correa alba*, Bower Spinach *Tetragonia implexicoma*, Coast Beard-heath *Leucopogon parviflorus*, Thyme Rice-flower *Pimelea serpyllifolia*, and Coast Tea-tree *Leptospermum laevigatum*. |
| **Structure:** | Tussock grassland. |
| **References:** | Davies *et. al.* (in prep.). |

**Additional Comments**

Coastal Tussock Grassland is closely related to Coastal Headland Scrub and usually occurs on the more exposed parts of the headlands that are unable to support a shrub layer due to the severe environmental conditions.

## EVC 164 "Creekline Herb-rich Woodland"

A woodland of low-gradient swampy gullies with a grassy/sedgy to rushy ground layer including a component of species associated with wetland habitats.

The range of floristic and environmental attributes for Creekline Herb-rich Woodland is tabulated below. Where information from published or unpublished reports is included the references are cited.

| | |
|---|---|
| **Altitude:** | 20-180m. |
| **Topography:** | Low-gradient swampy gullies within relatively open grassy vegetation (usually in association with Valley Grassy Forest). |

| | |
|---|---|
| **Geology:** | Various. |
| **Soils:** | Alluvial sands, silts and clays. |
| **Present distribution:** | Isolated patches at Mt. Martha and in the foothills north-east of Melbourne (eg. Eltham-Hurstbridge area) |
| **Floristics:** | The overstorey is dominated by Swamp Gum *Eucalyptus ovata* or Yarra Gum *Eucalyptus yarraensis*, with Candlebark *Eucalyptus rubida* also frequent in less boggy sites. A range of other eucalypt species such as Red Stringybark *Eucalyptus macrorhyncha*, Yellow Box *Eucalyptus melliodora*, Narrow-leaf Peppermint *Eucalyptus radiata* and Messmate *Eucalyptus obliqua* may also be present.<br><br>The understorey variously includes scattered shrubs such as Blackwood *Acacia melanoxylon*, Silver Wattle *Acacia dealbata*, Sweet Bursaria *Bursaria spinosa*, Prickly Tea-tree *Leptospermum continentale* and Burgan *Kunzea ericoides*.<br><br>Species of the ground layer include Common Tussock-grass *Poa labillardierei*, Soft Tussock-grass *Poa morrisii*, Slender Tussock-grass *Poa tenera*, Common Maidenhair *Adiantum aethiopicum*, Bidgee-widgee *Acaena novae-zelandiae*, Centella *Centella cordifolia*, Austral Brooklime *Gratiola peruviana*, Joint-leaf Rush *Juncus holoschoenus*, Angled Lobelia *Lobelia anceps*, Prickfoot *Eryngium vesiculosum* and Lanky Goodenia *Goodenia elongata*. Thatch Saw-sedge *Gahnia radula* and Austral Bracken *Pteridium esculentum* are present at some sites. |
| **Structure:** | Woodland to open woodland with a variable shrub component, a grassy/sedgy (to rushy) ground layer with a component of species affiliated with wetland habitats. |
| **References:** | Frood (in prep.). |

**Additional Comments**

A range of the component herbaceous flora is now regionally very rare to threatened in this habitat (eg Lanky Goodenia *Goodenia elongata*, Prickfoot *Eryngium vesiculosum*, Pale Swamp Everlasting *Helichrysum* aff. *rutidolepis* (Lowland Swamps) and Billy-buttons (*Craspedia* spp.). Creekline Herb-rich Woodland has become very restricted within the study area. Most sites are very weedy and degraded and the above description is a collective

interpretation based on chance survival of component species. Ecologically, Creekline Herb-rich Woodland is intermediate between Valley Grassy Forest and Riparian Forest/Swampy Riparian Woodland. Further sampling and analysis is required to clarify its status.

## EVCc 172 Floodplain Wetland Complex

This is a complex of a number of formally described and undescribed wetland EVCs including Billabong Wetland (which surrounds deep, often permanent water bodies, typically billabongs on the flood plain of major rivers) and shallow seasonal billabongs. All entities included in this complex are rare within the study area. Where biotic features still exist, the floristic composition has generally been radically altered, making detailed descriptions or on-ground distinctions between them impossible. The range of floristic and environmental attributes for Floodplain Wetland Complex is tabulated below. Where information from published or unpublished reports is included the references are cited.

| | |
|---|---|
| **Altitudinal range:** | 20-70m. |
| **Topography:** | Low lying areas, depressions and billabongs on floodplains of major rivers. |
| **Geology:** | Swamp and lagoonal deposits. |
| **Soils:** | Silts, peats and clays. |
| **Present distribution:** | Yarra River flats (eg. Yering, Bulleen). |
| **Floristics:** | The overstorey typically consists of River Red Gum *Eucalyptus camaldulensis*. The shrub layer is sparse to non-existent.<br><br>The understorey can be diverse or dominated by a few species such as Cumbungi *Typha orientalis*, Rush Sedge *Carex tereticaulis* or Pacific Azolla *Azolla filiculoides*. Other species possibly present include Clove-strip *Ludwigia peploides* subsp. *montevidensis*, Water-milfoil *Myriophyllum* spp, Creeping Knotweed *Persicaria prostrata*, River Buttercup *Ranunculus inundatus*, Thin Duckweed *Spirodela punctata*, Tall Flat-sedge *Cyperus exaltatus*, Hollow Rush *Juncus amabilis*, Green Rush *Juncus gregiflorus*, Giant Rush *Juncus ingens*, Tall Rush *Juncus procerus*, Common Spike-sedge *Eleocharis acuta*, Spiny Mud-grass *Pseudoraphis spinescens*, Lesser Joyweed *Alternanthera denticulata*, Common Blown-grass *Agrostis avenacea* and Tall Spike- |

| | |
|---|---|
| | sedge *Eleocharis sphacelata.* |
| **Structure:** | Woodland to open woodland over varied sedgeland-grassland and/or aquatic herbland. |

**Additional Comments**

Sometimes incorporated into the EVC 'Floodplain Riparian Woodland' of which it is a component and it can be difficult to resolve at smaller scales.

## EVC 175 Grassy Woodland

A variable open eucalypt (or occasionally sheoak) woodland over a diverse ground layer of grasses and herbs. The shrub component is usually sparse. It occurs on sites with moderate fertility on plains or undulating hills on a range of geology. Previously widespread and locally extensive but now largely cleared for agriculture. Remnants are generally heavily grazed or altered by fire regimes.

The range of floristic and environmental attributes for Grassy Woodland is tabulated below. Where information from published or unpublished reports is included the references are cited.

| | |
|---|---|
| **Altitude:** | 20-100m south and east of Melbourne, 200-400m north-east of Melbourne. |
| **Topography:** | Undulating to flat plain. |
| **Geology:** | Mainly Tertiary sediments but also Ordovician and Silurian sediments and granite/granodiorite. |
| **Soils:** | Variable, ranging from duplex soils to humic gley soils to ferruginous sands and sandy clays. |
| **Present distribution:** | The main area of distribution is the Mornington Peninsula and adjacent areas from about Seaford and Braeside southward but also north-west of Melbourne in the Sunbury and Toolern Vale areas, the coastal plain east of Westernport Bay between Lang Lang and Bass, north of Inverloch and Wonthaggi and Phillip Island. Examples of this EVC on the Mornington Peninsula are at Mount Martha Park, Woods Reserve, Moorooduc South and Lorikeet Reserve, Mount Eliza. |

**Floristics:**

The overstorey is variously dominated by Drooping Sheoak *Allocasuarina verticillata* and Black Sheoak *Allocasuarina littoralis* or eucalypt species eg. Narrow-leaf Peppermint *Eucalyptus radiata,* Coast Manna Gum *Eucalyptus viminalis* subsp. *pryoriana,* Snow Gum *Eucalyptus pauciflora,* Swamp Gum *Eucalyptus ovata*. Other eucalypts in more ecotonal habitats include Messmate *Eucalyptus obliqua,* Mealy Stringybark *Eucalyptus cephalocarpa*, Grey Box *Eucalyptus microcarpa* or Bundy *Eucalyptus goniocalyx.*

Other woody species variously include Black Wattle *Acacia mearnsii*, Blackwood *Acacia melanoxylon,* Hedge Wattle *Acacia paradoxa,* Cherry Ballart *Exocarpos cupressiformis,* Prickly Tea-tree *Leptospermum continentale*, Sweet Bursaria *Bursaria spinosa,* Black Sheoak *Allocasuarina littoralis,* Common Flat-pea *Platylobium obtusangulum* and Common Heath *Epacris impressa*.

The very diverse ground cover variously includes Weeping Grass *Microlaena stipoides* var. *stipoides,* Kangaroo Grass *Themeda triandra,* Soft Tussock-grass *Poa morrisii*, Grey Tussock Grass *Poa sieberiana,* Velvet Wallaby-grass *Austrodanthonia pilosa,* Bristly Wallaby-grass *Austrodanthonia setacea,* Wetland Wallaby-grass *Notodanthonia semiannularis,* Reed Bent-grass *Deyeuxia quadriseta,* Veined Spear-grass *Austrostipa rudis,* Milkmaids *Burchardia umbellata,* Tall Sundew *Drosera peltata* subsp. *auriculata,* Ivy-leaf Violet *Viola hederacea* subsp. *hederacea*, Yellow Rush-lily *Tricoryne elatior,* Chocolate Lily *Arthropodium strictum,* Kidney-weed *Dichondra repens,* Shade Raspwort *Gonocarpus humilis*, Common Raspwort *Gonocarpus tetragynus,* Variable Stinkweed *Opercularia varia*, Common Rice-flower *Pimelea humilis*, Small Poranthera *Poranthera microphylla,* Common Apple-berry *Billardieri scandens,* Love Creeper *Comesperma volubile,* Common Bottle-daisy *Lagenophora stipitata*, Annual Fireweed *Senecio glomeratus,* Honey-pots *Acrotriche serrulata,* Spiny-headed Mat-rush *Lomandra longifolia,* Wattle Mat-rush *Lomandra filiformis,* Black-anther Flax-lily *Dianella revoluta,* Small Grass-tree *Xanthorrhoea minor* subsp. *lutea,* Austral Bracken *Pteridium esculentum* and Thatch Saw-sedge *Gahnia radula.* Sweet Pittosporum *Pittosporum undulatum* is also often

| | |
|---|---|
| | present, outside its natural range. |
| **Structure:** | Woodland, open-woodland with grassy/herbaceous understorey. |
| **References:** | Robinson (unpubl). |

**Additional Comments**

Grassy Woodland has affinities with a number of EVCs including Herb-rich Foothill Forest, Valley Grassy Forest, Valley Heathy Forest, Grassy Forest and Plains Grassy Woodland. Compared to Herb-rich Foothill Forest, it is much drier and lower in stature with a more open overstorey and the floristic composition is that of a less mesic environment. Valley Grassy Forest mostly lacks sclerophyllous shrubs other than some *Acacia* species but a range of small sclerophyllous shrubs are typically present in Grassy Woodland (eg. Silky Guinea-flower *Hibbertia sericea* s.l. and Common Flat-pea *Platylobium obtusangulum*). Grassy Woodland occurs on more fertile soils and is more open and not as rich in ericoid species as Valley Heathy Forest. The Grassy Woodland flora is often dominated by Kangaroo Grass *Themeda triandra* and is indicative of more fertile sites compared to Grassy Forest.

Grassy Woodland has been extensively cleared for agriculture and urban development and few intact remnants remain. It is likely that Grassy Woodland in the study area includes a number of floristic communities but disturbance and lack of large intact remnants have made these communities difficult to define.

It appears that at least some of the (now) densely treed remnants in lower rainfall areas were very open (almost grasslands) prior to European settlement. These changes appear to be due to alterations to fire and grazing regimes. More floristic analysis of high quality Grassy Woodland remnants is required. The EVC label has been used to denote presumed prior vegetation on a range of moderately fertile soil types which supported some form of grassy woodland vegetation (but were not on soil types or habitats sufficiently fertile to support Plains Grassy Woodland). Consequently, it has developed as a default unit for sites that do not fit into the EVC Plains Grassy Woodland as well as being used for well-defined vegetation types on fertile Tertiary soils.

## EVC 191 Riparian Scrub

Typically a dense scrub of relatively high rainfall areas that grows on infertile waterlogged substrates often with a peaty surface horizon. Often found along creeks and minor stream tributaries of the lowland plains and adjacent low hills.

The range of floristic and environmental attributes for Riparian Scrub is tabulated below. Where information from published or unpublished reports is included the references are cited.

| | |
|---|---|
| **Altitude:** | Sea level to 150m. |
| **Topography:** | Poor drainage areas along creeks, small rivers and flats. |
| **Geology:** | Quaternary stream alluvium, flood plain and low level terrace deposits of sand, silt, clay and gravel. |
| **Soils:** | Deep acidic, peat, sand or clay. |
| **Present distribution:** | The Gurdies/Lang Lang area and tiny patches at Cranbourne, French Island and Greens Bush on the Mornington Peninsula. |
| **Floristics:** | Trees are not usually present in this EVC though emergent Swamp Gum *Eucalyptus ovata* may occasionally occur.<br><br>The tallest stratum is typically dominated by Scented Paperbark *Melaleuca squarrosa* but Swamp Paperbark *Melaleuca ericifolia,* Prickly Moses *Acacia verticillata,* Prickly Tea-tree *Leptospermum continentale* and Woolly Tea-tree *Leptospermum lanigerum* can also be locally dominant, with sporadic occurrences of Rosemary Everlasting *Ozothamnus rosmarinifolius.* Together with these shrubs are thickets of Red-fruit Sword-sedge *Gahnia sieberiana* and Scrambling Coral-fern *Gleichenia microphylla*. Associated species include Pithy Sword-sedge *Lepidosperma longitudinale,* Spreading Rope-rush *Empodisma minus,* Square Twig-sedge *Baumea tetragona,* Slender Twig-sedge *Baumea gunnii* and Tassel Cord Rush *Baloskion tetraphyllum.* |
| **Structure:** | Closed scrub. |
| **References:** | Davies *et. al.* (in prep.). |

**Additional Comments**

Riparian Scrub often occurs on the margins of wetlands and Wet Heathland and therefore often includes a suite of wetland speices. This EVC tends to occur on the less fertile, more acidic, poor drainage areas compared to Swamp Scrub, which tends to develop in the lower rainfall and more fertile areas.

## EVC 300 Reed Swamp

The range of floristic and environmental attributes for Reed Swamp is tabulated below. Where information from published or unpublished reports is included the references are cited.

| | |
|---|---|
| **Altitude:** | 10-20m. |
| **Topography:** | Sheltered margins of wetland areas in permanent water bodies. |
| **Geology:** | Quaternary sediments. |
| **Soils:** | Peaty, silty clays. |
| **Present distribution:** | Rhyll and Newhaven wetland areas, Phillip Island. |
| **Floristics:** | Dominated by a dense growth of Common Reed *Phragmites australis* to 2-3m tall with or without small clumps of Swamp Paperbark *Melaleuca ericifolia*. Other species that characterise Reed Swamp are Small-river Buttercup *Ranunculus amphitrichus*, Common Duckweed *Lemna disperma*, Scrub Nettle *Urtica incisa*, Willow-herb *Epilobium billardierianum* and Knotweed *Persicaria* spp. |
| **Structure:** | Closed to open grassland/sedgeland. |
| **References:** | Sutter & Downe (2000). |

**Additional Comments**

Reed Swamp was mapped if it was easily accessible on the ground or data was available for particular sites, otherwise it was mapped as part of the mapping unit "Wetland Formation".
Opportunistic species, mostly introduced, are common and include Yorkshire Fog **Holcus lanatus*, Red-Ink Weed **Phytolacca octandra*, Blackberry **Rubus fruticosus* spp. agg., Curled Dock **Rumex crispsus* and Black Nightshade **Solanum nigrum*.

## EVCm 302 Coastal Saltmarsh/Mangrove Shrubland Mosaic

Refer to Coastal Saltmarsh (EVC 9) and Mangrove Shrubland (EVC 140).

## EVCm 307 Sand Heathland/Wet Heathland Mosaic

Refer to Sand Heathland (EVC 6) and Wet Heathland (EVC 8)

## EVC 311 Berm Grassy Shrubland

Occurs in sheltered coastal areas where sand deposits have formed as a result of low energy wave action. It is a low shrubland that includes a number of halophytic species over a ground layer of grasses and forbs.

The range of floristic and environmental attributes for Berm Grassy Shrubland is tabulated below. Where information from published or unpublished reports is included the references are cited.

| | |
|---|---|
| **Altitude:** | <1m. |
| **Topography:** | Sand deposits formed as a result of low energy wave action in coastal inlets. |
| **Geology:** | Unconsolidated undulating Pleistocene marine and aeolian deposits on coastal plains. |
| **Soils:** | Coarse sand. |
| **Present distribution:** | Sheltered coastal areas of Westernport Bay and Port Phillip Bay. |
| **Floristics:** | Major species include the halophytes Coast Saltbush *Atriplex cinerea*, Rounded Noon-flower *Disphyma crassifolium* subsp. *clavellatum*, Beaded Glasswort *Sarcocornia quinqueflora* and Seaberry Saltbush *Rhagodia candolleana* subsp. *candolleana.*<br><br>The ground layer is rarely intact and is often dominated by weeds, particularly the often planted Marram Grass **Ammophila arenaria*. Common native species include Variable Groundsel *Senecio pinnatifolius*, Annual Fireweed *Senecio glomeratus*, Coast Sow-thistle *Actites megalocarpa*, Plume-grasses *Dichelachne* spp, Grey Tussock-grass *Poa sieberiana*, Coast Fescue *Austrofestuca littoralis* and Jersey Cudweed *Pseudognaphalium luteoalbum.* |
| **Structure:** | Low shrubland. |
| **References:** | Davies *et. al.* (in prep.). |

**Additional Comments**

This EVC is very restricted in the study area and little sampling has been carried out to date. If it could be distinguished from aerial photography or from ground-truthing it was mapped separately, but in other cases it was too narrow to map at 1:25 000. Most sites are dominated by weeds, particularly common are Buck's-horn Plantain **Plantago coronopus,* Four-leaved Allseed **Polycarpon tetraphyllum,* Common Mouse-ear Chickweed **Cerastium glomeratum,* White Cudweed **Vellerophyton dealbatum,* Sow-thistle **Sonchus oleraceus,* Hairy Hawkbit **Leontodon taraxacoides* and Coast Barb-grass **Parapholis incurva.*

A similar range of indigenous species occurs in distinctive and very restricted habitats (sheltered very gentle gradient coastal verge within basaltic terrain) at The Jawbones near Williamstown. This may represent remnant flora of an as yet undefined EVC.

## EVCc 408 Valley Grassy Forest/Herb-rich Foothill Forest Complex

Refer to EVC 47 Valley Grassy Forest and EVC 23 Herb-rich Foothill Forest.

## EVCc 418 Damp Sands Herb-rich Woodland/Heathy Woodland Complex

Refer to EVC 3 Damp Sands Herb-rich Woodland and EVC 48 Heathy Woodland.

## EVC 636 Brackish Lake

The range of floristic and environmental attributes for Brackish Lake is tabulated below. Where information from published or unpublished reports is included the references are cited.

| | |
|---|---|
| **Altitude:** | 0-10m. |
| **Topography:** | Shallow lakes within the study area at low elevations near the coast. |
| **Geology:** | Quaternary sediments, estuarine/coastal/littoral origin. |
| **Soils:** | Dark grey sands or silts over clay. |
| **Present distribution:** | Only mapped in pre-1750 mapping for Albert Park Lake and West Melbourne Swamp. |

| | |
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| **Floristics:** | Water-mat *Lepilaena* spp., Tassell *Ruppia* spp. and Floating Pondweed *Potamageton tricarinatus* s.l. have been recorded from Albert Park Lake. Elsewhere in the State, Hooded Water-milfoil *Myriophyllum muelleri*, Australian Lilaeopsis *Lilaeopsis polyantha* have been observed in this EVC. |
| **Structure:** | Herbland (aquatic) to sedgeland. |
| **References:** | VicRFA (2000). |

**Additional Comments**

The verges of Brackish Lake are fringed by saline vegetation with affinities to Brackish Wetland.

## EVCm 638 Swamp Scrub/Wet Heathland Mosaic

Refer to EVC 53 Swamp Scrub and EVC 8 Wet Heathland.

## EVC 641 "Riparian Woodland"

Woodland dominated by River Red Gum *Eucalyptus camaldulensis* over a Common Tussock-grass *Poa labillardierei* dominated understorey. It occurs beside permanent streams, typically on narrow alluvial deposits.

The range of floristic and environmental attributes for Riparian Woodland is tabulated below. Where information from published or unpublished reports is included the references are cited.

| | |
|---|---|
| **Altitude:** | 100-160m. |
| **Topography:** | Adjacent to permanent streams. |
| **Geology:** | Quaternary basalt and recent alluviums with restricted occurrences within sedimentary soils. |
| **Soils:** | Moderately deep, fertile alluvial loams. |
| **Present distribution:** | Restricted to a few occurrences along Deep Creek north-east of Sunbury, and sections of the Yarra River and its tributaries such as |

| | |
|---|---|
| | Ruffy Creek and the Plenty River. |
| **Floristics:** | The overstorey is dominated by River Red Gum *Eucalyptus camaldulensis*, with occasional Manna Gum *Eucalyptus viminalis* subsp. *viminalis*.<br><br>Other major woody species include Black Wattle *Acacia mearnsii*, Swamp Paperbark *Melaleuca ericifolia*, Tree Violet *Hymenanthera dentata*, Sweet Bursaria *Bursaria spinosa*, River Bottlebrush *Callistemon sieberi*, Woolly Tea-tree *Leptospermum lanigerum* and Hemp Bush *Gynatrix pulchella*.<br><br>Ground layer species include Stiped Wallaby-grass *Austrodanthonia racemosa*, Kidney-weed *Dichondra repens*, Saloop Saltbush *Einadia hastata*, Common Tussock-grass *Poa labillardierei*, Slender Dock *Rumex brownii*, Shrubby Groundsel *Senecio minimus* and Trailing Speedwell *Veronica plebeia*. |
| **Structure:** | Woodland. |
| **References:** | Robinson (unpubl), VicRFA (2000). |

**Additional Comments**

Riparian Woodland has affinities with Floodplain Riparian Woodland but the billabongs and former stream channels characteristic of Floodplain Riparian Woodland are absent. The latter EVC consists of an understorey of mixed shrubs but it lacks the clearly defined layer of small trees characteristic of Riparian Woodland, though Black Wattle *Acacia mearnsii* may form small stands.

The ground layer of Riparian Woodland contains many species that are typical of riparian areas but also contains some species that are normally found in drier areas. This suggests that unlike the majority of the vegetation included in Floodplain Riparian Woodland, the soils are more freely draining and not as moist throughout the year. The vegetation on drier banks and levees within Floodplain Riparian Woodland is presumably a form of Riparian Woodland.

While flooding may be common in this EVC, sites are rarely inundated for lengthy periods. High volume seasonal flows may be common. Formerly widespread along major creeks and rivers mostly on the basalt plains within the study area, now greatly reduced due to clearing for agriculture and housing and industrial development.

## EVC 653 Aquatic Herbland

Permanent to semi-permanent wetlands dominated by aquatic herbs and/or sedges (sedges are more likely to dominate the shallower verges). Occurs on fertile paludal soils, typically heavy clays beneath organic accumulations.

The range of floristic and environmental attributes for Aquatic Herbland is tabulated below. Where information from published or unpublished reports is included the references are cited.

| | |
|---|---|
| **Altitude:** | 20-60m. |
| **Topography:** | Deeper, more continuously inundated wetlands and floodplains where creeks and rivers broaden and decrease in flow. |
| **Geology:** | Depressions within Quaternary basalt and stream alluvium. |
| **Soils:** | Heavy clay soils beneath organic layers and deep anaerobic silts. |
| **Present distribution:** | Altona and billabongs on the Yarra floodplain, Lake Stanley, Derrimut/Deer Park and Whittlesea areas. |
| **Floristics:** | Dominated by Tall Spike-sedge *Eleocharis sphacelata*, Water-ribbons *Triglochin procerum* and Water-milfoil *Myriophyllum* spp. Other aquatics such as Floating Pondweed *Potamogeton tricarinatus* and Running Marsh Flower *Villarsia reiformis* are sometimes also conspicuous.<br><br>Other species variously include Common Duckweed *Lemna disperma*, Pacific Azolla *Azolla filiculoides*, Duckweed *Spirodela* spp., Ribbon-weed *Vallisneria americana*, Common Nardoo *Marsilea drummondii* and Yellow Bladderwort *Utricularia australis.* |
| **Structure:** | Herbland or sedgeland, with submerged and floating to emergent aquatic species. |
| **References:** | VicRFA (2000). |

**Additional Comments**

Previously more widespread within the restricted areas of suitable habitat across the study area but now greatly reduced through draining and use for agriculture.

Aquatic Herbland was mapped if it was easily accessible on the ground or data was available for particular sites, otherwise it was mapped as part of the mapping unit “Wetland Formation”.

## EVC 654 "Creekline Tussock Grassland"

A treeless grassland dominated by dense swards of Common Tussock-grass *Poa labillardierei* with herbs and other grasses in the inter-tussock spaces. It occurs along low gradient ephemeral and intermittent drainage lines of the volcanic plains and often includes small areas of sedgeland and/or wetland. Soils are generally fertile heavy dark clays and sometimes with exposed basalt rocks. While always restricted to narrow bands associated with drainage, it is now almost entirely cleared.

The range of floristic and environmental attributes for Creekline Tussock Grassland is tabulated below. Where information from published or unpublished reports is included the references are cited.

| | |
|---|---|
| **Altitude:** | 100-160m. |
| **Topography:** | Shallow drainage lines within the basalt plains. |
| **Geology:** | Quaternary basalt. |
| **Soils:** | Heavy dark clay. |
| **Present distribution:** | Most of the flora is displaced by impacts of land use and relatively intact examples are non-existent. |
| **Floristics:** | Dominated by Common Tussock-grass *Poa labillardierei* with herbs and other grasses in the inter-tussock spaces. Species include Prickfoot *Eryngium vesiculosum,* Poison Lobelia *Lobelia pratioides,* Milky Beauty-heads *Calocephalus lacteus,* Mat Grass *Hemarthria uncinata* var. *uncinata*, Joint-leaf Rush *Juncus holoschoenus,* and other Rush *Juncus* spp. |
| **Structure:** | Tussock Grassland. |
| **References:** | VicRFA (2000). |

**Additional Comments**

A range of wetland species would also have been present within this EVC.

Only one degraded site was found in the study area and the above description is based on an existing description of this EVC from an adjacent study area.

## EVC 656 Brackish Wetland

A treeless EVC dominated by sedges and herbaceous species that are generally indicative of saline conditions. True halophytic species such as samphires, if present, only occur with very low cover. It occurs in estuaries and in small areas along poorly defined drainage lines or is associated with shorelines of saline/brackish lakes. Sites are generally on paludal deposits that are frequently or seasonally inundated. Within the study area, there are two recognised floristic communities of Brackish Wetland.

The range of floristic and environmental attributes for the formally recognised communities is tabulated below. Where information from published or unpublished reports is included the references are cited.

**Floristic Community 656-01 *Estuarine* Brackish Wetland**

| | |
|---|---|
| **Altitude:** | Sea-level to 10m. |
| **Topography:** | Edges of estuarine waterbodies such as creeks, rivers and lagoons. |
| **Geology:** | Quaternary deposits. |
| **Soils:** | Variable from anaerobic sand to silt to clay often with peat surface horizons. |
| **Present distribution:** | Estuarine flats of Phillip Island, French Island and Westernport and Port Phillip Bays. |
| **Floristics:** | Major species include Sea Rush *Juncus krausii* subsp. *australiensis*, Salt Club-sedge *Bolboschoenus caldwellii*, Common Reed *Phragmites australis*, Creeping Monkey-flower *Mimulus repens*, Streaked Arrowgrass *Triglochin striatum*, Small River Buttercup *Ranunculus amphitrichus*, Shiny Swamp-mat *Selliera radicans*, Creeping Brookweed *Samolus repens* and Coast Tussock-grass *Poa poiformis.* |
| **Structure:** | Sedgeland or herbland. |
| **References:** | Davies *et al*. (in prep.). |

**Additional Comments**

As conditions become progressively more waterlogged and saline, Coastal Saltmarsh develops. Few intact remnants remain due to the pressures of agriculture, housing and industrial development and most sites are highly disturbed.

Within the study area, *Estuarine* Brackish Wetland was mapped in most cases as a mosaic with *Estuarine* Swamp Scrub (See EVC No. 935m).

**Floristic Community 656-02 *Plains* Brackish Wetland**

| | |
|---|---|
| **Altitude:** | 10-20m. |
| **Topography:** | Low-lying areas on coastal flats and stream floodplains. |
| **Geology:** | Quaternary. |
| **Soils:** | Usually heavy grey clay, sometimes peaty. |
| **Present distribution:** | Very altered sites only such as along Moonee Ponds Creek. |
| **Floristics:** | Variously dominated or co-dominated by a wide range of sedges, rushes and/or herbs. Species include Sea Rush *Juncus kraussii,* Salt Club-sedge *Bolboschoenus caldwellii,* Sharp Club-sedge *Schoenoplectus pungens,* Common Spike-sedge *Eleocharis acuta,* Streaked Arrowgrass *Triglochin striatum,* Australian Saltmarsh-grass *Puccinellia stricta,* Club-sedges *Isolepis* spp., Coast Blown-grass *Agrostis billardierei,* Chaffy Saw-sedge *Gahnia filum,* Creeping Monkey-flower *Mimulus repens,* Small River Buttercup *Ranunculus amphitrichus,* Creeping Brookweed *Samolus repens,* Australian Lilaeopsis *Lilaeopsis polyantha,* Variable Willow-herb *Epilobium billardierianum* and White Purslane *Neopaxia australasica.* |
| **Structure:** | Sedgeland or herbland. |
| **References:** | VicRFA (2000). |

## EVC 674 Sandy Stream Woodland

Reed, sedge or shrub dominated woodland with a large range of amphibious herbs. Occupies the beds of seasonal creeks where large amounts of coarse sand have been deposited by past flows, often resulting in a distinctive "U" shape to the drainage line.

The range of floristic and environmental attributes for Sandy Stream Woodland is tabulated below. Where information from published or unpublished reports is included the references are cited.

| | |
|---|---|
| **Altitude:** | 60m. |
| **Topography:** | Beds of seasonal creeks where large amounts of coarse sand have been deposited. |

| | |
|---|---|
| **Geology:** | Quaternary gravels and sands. |
| **Soils:** | Coarse gravels and sands that are moist throughout the year. |
| **Present distribution:** | Restricted to one weedy site on Scotts Road, near Lang Lang Golf Course. |
| **Floristics:** | The overstorey is dominated by Swamp Gum *Eucalyptus ovata*.<br><br>The woody species of the understorey include Silver Wattle *Acacia dealbata*, Victorian Christmas *Bush Prostanthera lasianthos*, Prickly Tea-tree *Leptospermum continentale*, Scented Paperbark *Melaleuca squarrosa* and Soft Tree-*fern Dicksonia antarctica*.<br><br>The ground layer is dominated by ferns and sedges, including Fishbone Water-fern *Blechnum nudum*, Ground-ferns *Hypolepis* spp., Tall Rush *Juncus procerum*, Tall Sedge *Carex appressa* and Red-fruit Saw-sedge *Gahnia sieberiana*. Other species present include Slender Tussock-grass *Poa tenera*, Slender Knotweed *Persicaria decipiens* and the weed Blackberry **Rubus fruticosus* spp. agg. |
| **Structure:** | Open-woodland. |
| **References:** | VicRFA (1999). |

**Additional Comments**

Only one degraded site was found in the study area and the above information is based on an existing description of this EVC from the Dundas Tablelands in Western Victoria**.**

## EVC 707 "Sedgy Swamp Woodland"

Woodland with ground layer of sedges and herbs tolerant of seasonal waterlogging. Occurs on seasonally wet flats on Quaternary sandy soils over heavier subsoils.

The range of floristic and environmental attributes for Sedgy Swamp Woodland is tabulated below. Where information from published or unpublished reports is included the references are cited.

| | |
|---|---|
| **Altitudinal range:** | Mostly <20m. |
| **Topography:** | Flats, often fringed by low action dunes. |
| **Geology:** | Quaternary swamp deposits. |
| **Soils:** | Sandy peats, over clay. |
| **Present distribution:** | Very localised, near Sandringham. |
| **Floristics:** | The low, open overstorey is dominated by River Red Gum *Eucalyptus camaldulensis*, or less commonly Swamp Gum *Eucalyptus ovata*.<br><br>The shrub component is variable, though usually sparse, consisting mainly of Prickly Tea-tree *Leptospermum continentale*.<br><br>The ground layer is typically dominated by Pithy Sword-sedge *Lepidosperma longitudinale* with a range of herbs characteristic of wet sites. Species may include Running Marsh-flower *Villarsia reniformis*, Swamp Goodenia *Goodenia humilis*, Centella *Centella cordifolia* and floating Club-sedge *Isolepis fluitans*. |
| **Structure:** | Woodland to open woodland with sedgy/herb-rich ground layer. |
| **References:** | VicRFA (2000). |

**Additional Comments**

Within the study area, possibly reduced to only one small remnant area near Sandringham. Structuarally modified through altered fire regimes (and possibly faunal changes) and inadequately documented. The above information is based on an existing description of this EVC from south-western Victoria. At this stage the floristic differences between this and the slightly wetter EVC, Sedge Wetland, is unclear.

## EVC 710 "Damp Heathland"

A heathland or closed scrub that develops on sites with impeded drainage and typically wet in winter and dry in summer. Floristically, contains components of both Sand Heathland on well-drained substrates and Wet Heathland on poorly drained substrates, but equally nutrient poor. The species though are not indicative of either very wet or very dry sites.

The range of floristic and environmental attributes for Damp Heathland is tabulated below. Where information from published or unpublished reports is included the references are cited.

| | |
|---|---|
| **Altitude:** | 5-200m. |
| **Topography:** | Broad slopes or ridges with gentle gradients or shallow basins and flats. |
| **Geology:** | Tertiary and Quaternary outwash alluviums. |
| **Soils:** | Deep duplex silty or clayey sand overlying mottled yellow clay or deep uniform or gradational clay. |
| **Present distribution:** | Scattered across the study area such as at Grantville, French Island, Greens Bush, Crib Point and Bittern. |
| **Floristics:** | A mixture of sand heathland and wet heathland species dominates the vegetation. The sand heathland species include Heath Tea-tree *Leptospermum myrsinoides*, Sandhill Sword-sedge *Lepidosperma concavum*, Smooth Parrot-pea *Dillwynia glaberrima* and Tassel Rope-rush *Hypolaena fastigata.*<br><br>Common wet heathland species include Scrub Sheoak *Allocasuarina paludosa*, Scented Paperbark *Melaleuca squarrosa*, Zig-zag Bog-sedge *Schoenus brevifolius*, Spreading Rope-rush *Empodisma minus*, Slender Bog-sedge *Schoenus lepidosperma* and Swamp Selaginella *Selaginella uliginosa*.<br><br>Other species present include Common Heath *Epacris impressa*, Silver Banksia *Banksia marginata*, Thatch Saw-sedge *Gahnia radula*, Slender Dodder-laurel *Cassytha glabella*, Shade Raspwort *Gonocarpus humilis*, Common Flat-pea *Platylobium obtusangulum*, Wiry Bauera *Bauera rubioides*, Honey-pots *Acrotriche serrulata*, Austral Bracken *Pteridium esculentum*, Erect Guinea-flower *Hibbertia riparia*, Small Grass-tree *Xanthorrhoea minor* subsp. *lutea*, Screw Fern *Lindsaea linearis* and Forest Wire-grass *Tetrarrhena juncea*. |
| **Structure:** | Heathland or closed scrub if long unburnt. |
| **References:** | VicRFA (1999). |

**Additional Comments**

In Gippsland, this EVC was mapped as Clay Heathland.

## EVCm 719 Grassy Woodland/Damp Sands Herb-rich Woodland Mosaic

Refer to EVC 175 Grassy Woodland and EVC 3 Damp Sands Herb-rich Woodland.

## EVC 793 Damp Heathy Woodland

Woodland with heathy understorey that becomes scrub if long unburnt in high rainfall areas. Develops on sites of intermittent waterlogging generally due to an underlying impeding layer, typically wet in winter and dry in summer.

The range of floristic and environmental attributes for Damp Heathy Woodland is tabulated below. Where information from published or unpublished reports is included the references are cited.

| | |
|---|---|
| **Altitude:** | 5-300m. |
| **Topography:** | Broad slopes or ridges with gentle gradients or shallow basins and flats. |
| **Geology:** | Various. |
| **Soils:** | Deep duplex silty or clayey sands overlying mottled yellow clay or deep uniform or gradational clay. An impeding sub-soil layer is frequently present. |
| **Present distribution:** | Mainly in Grantville area and on northern slopes of Arthurs Seat but also isolated examples at Crib Point, south of Carrum Downs, Yannathan, South Belgrave, Harkaway and Broad Gully at Kinglake. |
| **Floristics:** | The overstorey is variously dominated by Mealy Stringybark *Eucalyptus cephalocarpa*, Narrow-leaf Peppermint *Eucalyptus radiata*, Messmate *Eucalyptus obliqua* and Swamp Gum *Eucalyptus ovata.*<br><br>Woody species of the understorey can include Prickly Tea-tree *Leptospermum continentale*, Common Heath *Epacris impressa*, Common Flat-pea *Platylobium obtusangulum*, Silver Banksia *Banksia* |

| | |
|---|---|
| | *marginata*, Furze Hakea *Hakea ulicina*, Honey-pots *Acrotriche serrulata*, Myrtle Wattle *Acacia myrtifolia*, Common Cassinia *Cassinia aculeata*, Yellow Hakea *Hakea nodosa*, Golden Bush-pea *Pultenaea gunnii*, Heath Tea-tree *Leptospermum myrsinoides*, Scrub Sheoak *Allocasuarina paludosa*, Bushy Needlewood *Hakea decurrens*, Common Wedge-pea *Gompholobium huegelii*, Drooping Mistletoe *Amyema pendula* and Common Hovea *Hovea heterophylla*.<br><br>Within the ground layer the monocots, Wiry Spear-grass *Austrostipa muelleri*, Thatch Saw-sedge *Gahnia radula* and Small Grass-tree *Xanthorrhoea minor* subsp. *lutea*, can be structurally significant. Other species include Common Raspwort *Gonocarpus tetragynus*, Trailing Ground-berry *Acrotriche prostrata*, Reed Bent-grass *Deyeuxia quadriseta*, Common Apple-berry *Billardieri scandens*, Weeping Grass *Microlaena stipoides* var. *stipoides*, Milkmaids *Burchardia umbellata*, Erect Guinea-flower *Hibbertia riparia*, Variable Sword-sedge *Lepidosperma laterale*, Screw Fern *Lindsaea linearis*, Wattle Mat-rush *Lomandra filiformis*, Kangaroo Grass *Themeda triandra* and Common Bog-sedge *Schoenus apogon*. |
| **Structure:** | Woodland to open woodland typically with a low shrubby-sedgy ground layer. |
| **References:** | VicRFA (1999). |

**Additional Comments**

Damp Heathy Woodland has affinites with Sand Heathland, Damp Heathland, Wet Heathland and Heathy Woodland.

Damp Heathy Woodland has some floristic affinities with Sand Heathland but lacks the indicator speices of Sand Heathland such as Green Sheoak *Allocasuarina paradoxa*, Heath Tea-tree *Leptospermum myrsinoides* and Tassel Rope-rush *Hypolaena fastigiata* and does not occur on deep, infertile sands.

This EVC occurs in less impeded drainage than Damp Heathland which results in tree growth not being inhibited. Species that grow in association with trees such as Thatch Saw-sedge *Gahnia radula* and Wiry Spear-grass *Austrostipa muelleri* are not found in Damp Heathland.

Heathy Woodland occurs on drier, free-draining sands and has more affinities with Sand Heathland than Damp Heathy Woodland.

A wide range of character species of Wet Heathland are absent from Damp Heathy Woodland such as Scented Paperbark *Melaleuca squarrosa* (minor in Damp Heathy Woodland), Pink Swamp-heath *Sprengelia incarnata*, Button Grass *Gymnoschoenus sphaerocephalus*, Blunt-leaf Heath *Epacris obtusifolia* and Forked Sundew *Drosera binata.*

## EVCc 805 Plains Grasland/Plains Grassy Woodland Complex

Refer to EVC 132 Plains Grassland and EVC 55 Plains Grassy Woodland.

## EVC 851 Stream-bank Shrubland

Shrubland or occasionally a low open woodland, occuring on the rocky banks and beds of creeks and major rivers that have cut deeply into the plains.

The range of floristic and environmental attributes for Stream-bank Shrubland is tabulated below. Where information from published or unpublished reports is included the references are cited.

| | |
|---|---|
| **Altitude:** | 20-200m. |
| **Topography:** | Rocky river banks, flat, rocky stream beds and broad gravel banks of larger rivers that are often dry but subject to regular flooding by fast-flowing waters. |
| **Geology:** | Basalt or on sediments, often where the watercourse has cut through the basalt into the underlying rock. |
| **Soils:** | Skeletal sedimentary soil or alluvial sands and gravels. |
| **Present distribution:** | On creeks on the plains just north and west of Melbourne eg. Deep Creek, Jacksons Creek, Merri Creek, Djerriwarrh Creek, Werribee and Maribyrnong Rivers. |
| **Floristics:** | The overstorey is generally sparse, usually consisting of Manna Gum *Eucalyptus viminalis* subsp. *viminalis* or Red Gum *Eucalyptus camaldulensis,* though Swamp Gum *Eucalyptus ovata* has also been recorded in the Midlands.<br><br>The shrub layer is dominant and can include Woolly Tea-tree |

| | |
|---|---|
| | *Leptospermum lanigerum* and River Bottlebrush *Callistemon sieberi* amongst the rocks on the stream bed and Sweet Bursaria *Bursaria spinosa*, Tree Violet *Hymenanthera dentata*, Shiny Cassinia *Cassinia longifolia* and Hop Goodenia *Goodenia ovata* occupying the stream banks.<br><br>Common species among the rocks and gravel on the stream bed are Bidgee-widgee *Acaena novae-zelandiae*, Willow-herbs *Epilobium* spp., and Spiny-headed Mat-rush *Lomandra longifolia*. Broader fringing flood-prone terraces can include herbs such as Centella *Centella cordifolia*, Shield Pennywort *Hydrocotyle verticillata*, Slender Knotweed *Persicaria decipiens* and Swamp Crassula *Crassula helmsii*. |
| **Structure:** | Open shrubland. |
| **References:** | VicRFA (2000). |

**Additional Comments**

Where watercourses cut deeply into basalt, the upper banks (beyond the reach of floodwaters) often support Escarpment Shrubland. Where they cut deeply into sediments, the upper banks often support Shrubby Dry Forest. Although there are some floristic affinities with Floodplain Riparian Woodland, Stream-bank Shrubland occurs on scoured rocky streams rather than on broad alluvial floodplains.

Areas mapped as Stream-bank Shrubland in this study can include a fine-scale mosaic of this EVC with Riparian Woodland.

## EVC 858 Coastal Alkaline Scrub

An open woodland confined to the alkaline sand dunes and swales and dominated by Moonah *Melaleuca lanceolata* subsp. *lanceolata*.

The range of floristic and environmental attributes for Coastal Alkaline Scrub is tabulated below. Where information from published or unpublished reports is included the references are cited.

| | |
|---|---|
| **Altitude:** | 5-100m. |

| | |
|---|---|
| **Topography:** | Sand dunes and swales. |
| **Geology:** | Quaternary calcareous and siliceous sand deposits. |
| **Soils:** | Deep, alkaline sands, now stable but wind-blown in pre-historic times (aeolian deposits). |
| **Present distribution:** | Restricted to coastal and near coastal calcareous sands of Mornington Peninsula from Point Nepean to Rye and south to Cape Schanck as well as isolated pockets on Phillip Island such as Forrest Caves. |
| **Floristics:** | The overstorey is dominated by Moonah *Melaleuca lanceolata* subsp. *lanceolata* over a shrub layer including Coast Beard-heath *Leucopogon parviflorus,* Drooping Sheoak *Allocasuarina verticillata,* Silky Guinea-flower *Hibbertia sericea* s.l.and the VROTs Coast Wirilda *Acacia retinodes* var. *uncifolia* and Rare Bitter-bush *Adriana quadripartita* s.s. (glabrous form). The weeds, African Box-thorn **Lycium ferocissimum* and Myrtle-leaf Milkwort **Polygala myrtifolia* are also often present.<br><br>The ground layer includes a number of grasses such as Stiped Wallaby-grass *Austrodanthonia racemosa* var. *racemosa,* Common Tussock-grass *Poa labillardierei*, Coast Tussock-grass *Poa poiformis*, Weeping grass *Microlaena stipoides* var. *stipoides* and the weedy grasses Toowoomba Canary-grass **Phalaris aquatica* and Annual Veldt Grass **Ehrharta longiflora*. Other common species are Coast Sword-sedge *Lepidosperma gladiatum*, Coast Swainson-pea *Swainsona lessertifolia* and Small-flower Flax-lily *Dianella breviculmis*. |
| **Structure:** | Woodland or shrubland to closed scrub. |
| **References:** | VicRFA (1999). |

**Additional Comments**

This EVC was formerly termed Moonah Woodland and Calcarenite Dune Woodland in previous studies. The Flora and Fauna Guarantee listed community Moonah Woodland is a floristic community of this EVC. Further research is required to distinguish floristic communities within this EVC such as Moonah Woodland.

Coastal Alkaline Scrub is closely related to Coastal Dune Scrub Mosaic (deep, acidic sands) and Coastal Headland Scrub (coastal cliffs with bedrock exposure and shallow sands).

## EVC 876 Spray-zone Coastal Shrubland

A wind-pruned salt-affected shrubland that occurs on the most exposed coastal areas.

The range of floristic and environmental attributes for Spray-zone Coastal Shrubland is tabulated below. Where information from published or unpublished reports is included the references are cited.

| | |
|---|---|
| **Altitude:** | 10-40m. |
| **Topography:** | Extremely exposed, wind-swept, south and west-facing rocky sites subject to salt-spray and run-off at crest of sea cliff. |
| **Geology:** | Variable. |
| **Soils:** | Skeletal gravelly loam to loam or non-existent. |
| **Present distribution:** | Seal Rocks and south-western coast of Phillip Island, Cape Schanck. |
| **Floristics:** | The tallest stratum of the vegetation consists of a very low shrub layer of Seaberry Saltbush *Rhagodia candolleana* subsp. *candolleana*, Sea Box *Alyxia buxifolia*, Bower Spinach *Tetragonia implexicoma*, White Correa *Correa alba*, Coast Everlasting *Ozothamnus turbinatus* and Cushion Bush *Leucophyta brownii.*<br><br>Most other species occur between, rather than under the shrubs. Species include Toothed Groundsel *Senecio pinnatifolius*, Jersey Cudweed *Pseudognaphalium luteoalbum*, Karkalla *Carpobrotus rossii*, Rounded Noon-flower *Disphyma crassifolium* subsp. *clavellatum*, Pink Purslane *Calandrinia calyptrata*, Coast Sow-thistle *Actites megalocarpa*, Prickly Spear-grass *Austrostipa stipoides* and Blue Tussock-grass *Poa poiformis.* |
| **Structure:** | Stunted open shrubland. |
| **References:** | Davies *et. al.* (in prep.), VicRFA (1999). |

**Additional Comments**

This EVC usually occurs in association with Coastal Headland Scrub and where it could be distinguished separately from ground truthing or aerial photography, it was mapped separately.

## EVC 879 Coastal Dune Grassland

Coastal Dune Grassland consists of grasses and halophytes that colonise the foredunes of ocean beaches. The soils are siliceous sands that have very low humus content. The range of floristic and environmental attributes for Coastal Dune Grassland is tabulated below. Where information from published or unpublished reports is included the references are cited.

| | |
|---|---|
| **Altitude:** | 1-5m. |
| **Topography:** | Primary coastal dune. |
| **Geology:** | Quaternary sand deposits. |
| **Soils:** | Siliceous sand with a low humus content. |
| **Present distribution:** | Coastal beaches of Bass Coast, Mornington Peninsula, Westernport and Port Phillip Bays. |
| **Floristics:** | The most conspicuous plants of these foredunes are the grasses, Hairy Spinifex *Spinifex sericeus*, Marram Grass **Ammophila arenaria* and Coast Fescue *Austrofestuca littoralis.* Herbs include Coast Sow-thistle *Actites megalocarpa*, Coast Groundsel *Senecio spathulatus* and Coast Candles *Stackhousia spathulata*. Other halophytes present include Sea Rocket **Cakile maritima* and Karkalla *Carpobrotus rossii.* |
| **Structure:** | Open grassland. |
| **References:** | Davies *et. al.* (in prep.). |

**Additional Comments**

This EVC is confined to narow linear patches along the coastline and if it was unable to be distinguished on an aerial photograph or from ground truthing it was mapped as part of EVC1m Coastal Dune Scrub/Coastal Dune Grassland Mosaic. The native 'grassland' component is now highly localised and infested with the introduced Marram Grass **Ammophila arenaria* and Sea Wheat-grass **Thinopyrum junceiforme* that have been extensively planted as sand-binding species.

## EVCm 881 Damp Sands Herb-rich Woodland/Heathy Woodland Mosaic

Refer to EVC 3 Damp Sands Herb-rich Woodland and EVC 48 Heathy Woodland.

## EVCm 892 Heathy Woodland/Sand Heathland Mosaic

Refer to EVC 48 Heathy Woodland and EVC 6 Sand Heathland.

## EVC 894 Scoria Cone Woodland

A woodland or open shrubland occurring on the slopes of free-draining scoria cones but now almost entirely cleared with only weedy remnants remaining.

The range of floristic and environmental attributes for Scoria Cone Woodland is tabulated below. Where information from published or unpublished reports is included the references are cited.

| | |
|---|---|
| **Altitude:** | 500-640m. |
| **Topography:** | On slopes of free-draining scoria cones. |
| **Geology:** | Quaternary basalt. |
| **Soils:** | Free-draining fertile, stony soils. |
| **Present distribution:** | A few patches on Mt. Gisborne. |
| **Floristics:** | Probably dominated by various associations of Manna Gum *Eucalyptus viminalis* subsp. *viminalis*, Blackwood *Acacia melanoxylon*, Drooping Sheoak *Allocasuarina verticillata*, Sweet Bursaria *Bursaria spinosa*, Common Tussock-grass *Poa labillardierei* and Austral Bracken *Pteridium esculentum*. The vegetation appears to have been at least moderately herb-rich. |
| **Structure:** | Woodland or shrubland to open shrubland, grassy to bracken dominated with a range of herbs. |
| **References:** | VicRFA (2000). |

**Additional Comments**

Floristics uncertain due to a lack of intact remnants. Previously localised and restricted habitat, now almost entirely cleared.

## EVC 895 Escarpment Shrubland

An open shrubland generally associated with steep embankments beside major watercourses in low rainfall areas.

The range of floristic and environmental attributes for Escarpment Shrubland is tabulated below. Where information from published or unpublished reports is included the references are cited.

| | |
|---|---|
| **Altitude:** | 140-200m. |
| **Topography:** | Escarpments associated with the edges of basalt flows or where watercourses have cut deeply into the bedrock. |
| **Geology:** | Mainly Quaternary basalt, with some Silurian sedimentary sites. |
| **Soils:** | Fertile, skeletal. |
| **Present distribution:** | Scattered along the escarpment of Deep Creek from Bulla north to Kongaderra, Merri Creek in Somerton area and small occurrences along the Yarra and Plenty Rivers. |
| **Floristics:**<br>**(on basalt)** | Apart from the occasional Drooping Sheoak *Allocasuarina verticillata* along the escarpment rim, the tallest stratum is the shrub layer. Common shrub species include Tree Violet *Hymenanthera dentata*, Black Wattle *Acacia mearnsii*, Lightwood *Acacia implexa*, Hedge Wattle *Acacia paradoxa*, Sweet Bursaria *Bursaria spinosa* and Sticky Hop-bush *Dodoanea viscosa*.<br><br>Other species recorded include White Cypress Pine *Callitris glaucophylla*, Cassia *Senna artemisioides*, Myoporum *Myoporum viscosum*, Rock Correa *Correa glabra* and Rosemary Grevillea *Grevillea rosmarinifolia*. Many of these species are now extremely rare in the study area.<br><br>The ground layer consists of a few grasses and herbs such as Stiped Wallaby-grass *Austrodanthonia racemosa* var. *racemosa*, Weeping Grass *Microlaena stipoides* var. *stipoides*, Kidney-weed *Dichondra repens*, Kangaroo Grass *Themeda triandra* and Nodding Saltbush *Einadia nutans* subsp. *nutans*. In sheltered rocky sites the ferns Necklace Fern *Asplenium flabellatum*, Annual Fern *Anogramma leptophylla* and Sickle Fern *Pellaea falcata* may be found. |
| **Floristics:** | There are often scattered eucalypts, variously River Red Gum *Eucalyptus camaldulensis*, Bundy *Eucalyptus goniocalyx*, Yellow Gum |

| | |
|---|---|
| **(on Silurian sediments)** | *Eucalyptus leucoxylon*, Red Stringybark *Eucalyptus macrorhyncha*, Yellow Box *Eucalyptus melliodora* or Manna Gum *Eucalyptus viminalis* subsp. *viminalis*.<br><br>The shrub layer is dominant and includes Black Wattle *Acacia mearnsii*, Lightwood *Acacia implexa*, Hedge Wattle *Acacia paradoxa*, Golden Wattle *Acacia pycnantha*, Spreading Wattle *Acacia genistifolia*, Black Sheoak *Allocasuarina littoralis*, Cassinia spp., Tree Violet *Hymenanthera dentata*, Tree Everlasting *Ozothamnus ferrugineus*, Burgan *Kunzea ericoides* and Prunus Pomaderris *Pomaderris prunifolia*.<br><br>Ground layer species in more intact remnants include Pink Bindweed *Convolvulus erubescens*, Shiny Everlasting *Bracteantha viscosa*, Prickly Starwort *Stellaria pungens*, Bedstraw *Galium* spp.,Variable Sword-sedge *Lepidosperma laterale*, Weeping Grass *Microlaena stipoides* var. *stipoides*, Spiny-headed Mat-rush *Lomandra longifolia* subsp. *longifolia*, Saloop *Einadia hastata* and Nodding Saltbush *Einadia nutans* subsp. *nutans.* |
| **Structure:** | Open-shrubland. |
| **References:** | VicRFA (2000). |

**Additional Comments**

The floristics of Escarpment Shrubland vary according to whether they are occurring on sheltered or exposed aspects. Sheltered types may include ferns and sometimes broad-leaved shrubs.

Previously localised and restricted habitat in the study area and now almost entirely cleared.

## EVCm 897 Plains Grassland/Plains Grassy Woodland Mosaic

Refer to EVC 132 Plains Grassland and EVC 55 Plains Grassy Woodland.

## EVCm 900 Coastal Basalt Mosaic

Coastal Basalt Mosaic consists of a mosaic of distinctive components due to the underlying basaltic soils. These components are Coastal Saltmarsh on the shoreline, Coastal Dune Grassland on the primary dune, Coastal Dune Scrub on the secondary dune and Coastal Headland Scrub on the more exposed cliffs.

The range of floristic and environmental attributes for this mosaic is tabulated below. Where information from published or unpublished reports is included the references are cited.

| | |
|---|---|
| **Altitude:** | <20m. |
| **Topography:** | Coastal, from high tide mark to primary and occasionally secondary dunes to the basalt cliffs. |
| **Geology:** | Tertiary basalt. |
| **Soils:** | Neutral to alkaline brown sandy to clay loam. |
| **Present distribution:** | Scattered along the sheltered northern basalt cliffs of Phillip Island, Churchill Island, San Remo and Corinella. |
| **Floristics:** | On the wave platform/foredune common species include Beaded Glasswort *Sarcocornia quinqeflora*, Australian Salt-grass *Distichlis distichophylla*, Karkalla *Carpobrotus rossii*, Shiny Swamp-mat *Selliera radicans*, Blue Tussock-grass *Poa poiformis*, Hairy Spinifex *Spinifex sericeus*, Prickly Spear-grass *Stipa stipoides*, Knobby Club-sedge *Isolepis nodosa*, Beach Rocket **Cakile maritima* and Sea Celery *Apium prostratum*.<br><br>Species of the secondary dunes/cliff tops include Coast Tea-tree *Leptospermum laevigatum*, Bower Spinach *Tetragonia implexicoma*, Seaberry Saltbush *Rhagodia candolleana* subsp. *candolleana*, Small-leaved Clematis *Clematis microphylla*, Coast Wattle *Acacia sophorae*, Hedge Wattle *Acacia paradoxa*, Coast Beard-heath *Leucopogon parviflorus*, Coast Banksia *Banksia integrifolia*, Moonah *Melaleuca lanceolata* subsp. *lanceolata*, Common Boobialla *Myoporum insulare*, Sticky Hop-bush *Dodonaea viscosa*, Drooping Sheoak *Allocasuarina verticillata*, Small-flower Flax-lily *Dianella brevicaulis*, Bidgee-widgee *Acaena novae-zelandiae*, Sea-box *Alyxia buxifolia*, Cushion Bush *Lecophyta brownii*, White Correa *Correa alba*, Coast Everlasting *Ozothamnus turbinatus*, Coast Daisy-bush *Olearia axillaris*, and Coast |

| | |
|---|---|
| | Sword-sedge *Lepidosperma gladiatum*. |
| **Structure:** | Herbfield to closed scrub, open woodland. |
| **References:** | Robinson (unpubl.). |

**Additional Comments**

This mosaic ranges from patches of Coastal Saltmarsh on the outcropping basalt platforms on the shoreline to low, sparse vegetation colonising the primary dune to dense scrub in the lee of the dune to scrub upslope occupying the basalt coastal cliff. It equates to Robinson's Coastal Dune Scrub (Robinson, unpubl.) found on coastal limestone cliffs.

## EVCm 901 Estuarine Flats Grassland/Coastal Saltmarsh Mosaic

Refer to descriptions of Estuarine Flats Grassland (EVC 914) and Coastal Saltmarsh (EVC 9).

## EVC 902 "Gully Woodland"

A highly restricted woodland to open forest confined to narrow bands along low-gradient gullies of non-perennial streams. Dominated by relatively broad-leaved shrubs, with a component of ferns, sedges and herbs, including species affiliated with wetland or stream pond habitats.

The range of floristic and environmental attributes for Gully Woodland is tabulated below. Where information from published or unpublished reports is included the references are cited.

| | |
|---|---|
| **Altitude:** | 5-300m. |
| **Topography:** | Low-gradient gullies of non-perennial streams. |
| **Geology:** | Variable, ranging from Quaternary fan deposits to Tertiary sandstone to Devonian granodiorite and Silurian sediments. |
| **Soils:** | Sandy-silty loams to sandy clay loams. |
| **Present distribution:** | Minor gullies near the coast at Grantville, west of Inverloch, and Mornington Peninsula along Main Creek south of Greens Bush and Mount Martha-Mt. Eliza area and along a few streams in the Kinglake National Park. |

**Floristics:** The overstorey is dominated by Manna Gum *Eucalyptus viminalis* subsp. *viminalis* and Swamp Gum *Eucalyptus ovata.* A range of other eucalypt species can also be present, but Messmate *Eucalyptus obliqua* and Narrow-leaf Peppermint *Eucalyptus radiata* are the most common.

The shrubby understorey includes Hazel Pomaderris *Pomaderris aspera,* Silver Wattle *Acacia dealbata,* Sweet Bursaria *Bursaria spinosa,* Black Sheoak *Allocasuarina littoralis,* Snow Daisy-bush *Olearia lirata,* Musk Daisy-bush *Olearia argophylla,* Prickly Tea-tree *Leptospermum continentale,* Hop Goodenia *Goodenia ovata,* Prickly Currant-bush *Coprosma quadrifida,* Rough Tree-fern *Cyathea australis,* Soft Tree-fern *Dicksonia antarctica* and Common Cassinia *Cassinia aculeata.*

The ground layer is diverse with ground ferns, sedges and herbs although ferns do not form a large component of the biomass. Common species include Mountain Clematis *Clematis aristata,* Common Maidenhair *Adiantum aethiopicum,* Necklace Fern *Asplenium flabellifolium,* Common Ground Fern *Calochlaena dubia,* Tender Brake *Pteris tremula,* Mother Shield-fern *Polystichum proliferum,* Common Rasp-fern *Doodia media* subsp. *australis,* Austral Bracken *Pteridium esculentum,* Soft Water-fern *Blechnum minus,* Bidgee-widgee *Acaena novae-zelandiae,* Sea Celery *Apium prostratum,* Kidney-weed *Dichondra repens,* Northern Cranesbill *Geranium homeanum,* Austral Brooklime *Gratiola peruviana,* Shrubby Fireweed *Senecio minimus,* Angled Lobelia *Lobelia anceps,* Swamp Club-sedge *Isolepis inundata,* Mountain Club-sedge *Isolepis subtilissima,* Spiny-headed Mat-rush *Lomandra longifolia,* Thatch Saw-sedge *Gahnia radula,* Tall Sedge *Carex appressa,* Pale Rush *Juncus pallidus,* Loose-flower Rush *Juncus pauciflorus,* Pale Flax-lily *Dianella longifolia,* Common Tussock-grass *Poa labillardierei,* Weeping Grass *Microlaena stipoides* var. *stipoides,* Slender Tussock-grass *Poa tenera* and Sword Tussock-grass *Poa ensiformis.*

**Structure:** Woodland (to open forest). The lower stratum is usually shrubby with a component of ferns, sedges and herbs.

**References:** Frood (in prep.), Yugovic (1999).

**Additional Comments**

Currently undersampled in the study area with additional sampling of higher quality examples highly desirable to clarify the relationships between Gully Woodland, the extension of Damp Forest along streamlines at lower elevations, Riparian Forest and Creekline Herb-rich Woodland.

## EVCm 903 Mangrove Shrubland/Estuarine Flats Grassland Mosaic

Refer to descriptions of Mangrove Shrubland (EVC 140) and Estuarine Flats Grassland (EVC 914).

## EVCm 904 Coast Banksia Woodland/Swamp Scrub Mosaic

Refer to descriptions of EVC 2 Coast Banksia Woodland and EVC 53 Swamp Scrub.

## EVCm 906 Brackish Grassland/Swamp Scrub Mosaic

The range of floristic and environmental attributes for Brackish Grassland/Swamp Scrub Mosaic is tabulated below. Where information from published or unpublished reports is included the references are cited.

| | |
|---|---|
| **Altitude:** | <10m. |
| **Topography:** | Saltpan. |
| **Geology:** | Tertiary basalt. |
| **Soils:** | Poorly drained, salt-affected soils that are waterlogged for parts of the year and dry in the hotter months. Occasional shallow surface peat horizons. |
| **Present distribution:** | One patch north of Forrest Caves Reserve, Phillip Island that was mapped as a mosaic with Swamp Scrub. |
| **Floristics:** | Swamp Scrub (drier form): Low stature Swamp Paperbark *Melaleuca ericifolia*, Common Boobialla *Myoporum insulare*, Prickly Moses *Acacia verticillata* and Coast Beard-heath *Leucopogon parviflorus.*<br><br>Grassland: Includes Chaffy Saw-sedge *Gahnia filum*, Coast Saw-sedge *Gahnia trifida*, Blue Tussock-grass *Poa poiformis*, Australian Salt- |

| | |
|---|---|
| | grass *Distichlis distichophylla*, Milky Beauty-heads *Calocephalus lacteus*, Wallaby Grasses *Austrodanthonia* spp. and in open spaces in the salt pan Australian Salt-grass *Distichlis distichophylla*, Creeping Brookweed *Samolus repens*, Shiny Swamp-mat *Selliera radicans* and Beaded Glasswort *Sarcocornia quinqueflora*. |
| **Structure:** | Closed-scrub/Grassland. |

## EVCm 907 Plains Grassy Woodland/Swamp Scrub Mosaic

Refer to descriptions of Plains Grassy Woodland (EVC 55) and Swamp Scrub (EVC 53).

## EVCm 909 Coastal Dune Scrub/Bird Colony Succulent Herbland Mosaic

Refer to descriptions of Coastal Dune Scrub (EVC 160) and Bird Colony Succulent Herbland (EVC 155).

## EVCm 910 Bird Colony Succulent Herbland/Coastal Tussock Grassland Mosaic

Refer to descriptions of Bird Colony Succulent Herbland (EVC 155) and Coastal Tussock Grassland (EVC 163).

## EVCm 911 Coastal Headland Scrub/Swamp Scrub Mosaic

Refer to descriptions of Coastal Headland Scrub (EVC 161) and Swamp Scrub (EVC 53).

## EVC 914 Estuarine Flats Grassland

A tussock grassland occurring on well-drained sandy flats in sheltered estuaries often adjacent to saltmarsh.

The range of floristic and environmental attributes for Estuarine Flats Grassland is tabulated below. Where information from published or unpublished reports is included the references are cited.

| | |
|---|---|
| **Altitude:** | Sea level. |
| **Topography:** | Estuarine flats often associated with current or old beach berms or sand |

| | |
|---|---|
| | sheets. |
| **Geology:** | Quaternary deposits of sand, silt, clay and peat. |
| **Soils:** | Deep sand horizon subject to occasional tidal inundation. |
| **Present distribution:** | Estuarine flats from Anderson Inlet and Powlett River estuary in the Wonthaggi-Inverloch area to Phillip Island, French Island, Westernport Bay to Port Phillip Bay in the Point Cook-Altona area. |
| **Floristics:** | The large tussock grasses, Prickly Spear-grass *Austrostipa stipoides* and Blue Tussock-grass *Poa poiformis* usually dominate, together with Hairy Spinifex *Spinifex sericeus* and the halophyte Coast Saltbush *Atriplex cinerea*, are the main character species for this EVC. Other common species include Chaffy Saw-sedge *Gahnia filum*, Variable Groundsel *Senecio pinnatifolius*, Austral Seablite *Suaeda australis*, Rounded Noon-flower *Disphyma crassifolium* subsp. *clavellatum*, Karkalla *Carpobrotus rossii*, Salt-grass *Distichlis distichophylla*, Creeping Brookweed *Samolus repens*, Beach Rocket **Cakile maritima* subsp. *maritima*, Seaberry Saltbush *Rhagodia candolleana* subsp. *candolleana* and Knobby Club-sedge *Isolepis nodosa*. |
| **Structure:** | Closed-grassland. |
| **References:** | Davies *et. al.* (in prep.). |

**Additional Comments**

Estuarine Flats Grassland typically occurs on marginally higher ground inland from Coastal Saltmarsh. It is subject to inundation by brackish water during high tides and to some degree of seepage but is not as waterlogged as Estuarine Wetland.

This EVC was formerly a floristic community of EVC 163 Tussock Grassland but has now been recognised as an EVC in its own right.

## EVCm 915 Aquatic Herbland/Swamp Scrub Mosaic

Refer to descriptions of Aquatic Herbland (EVC 653) and Swamp Scrub (EVC 53).

## EVCm 919 Coastal Headland Scrub/Coast Banksia Woodland Mosaic

Refer to descriptions of Coastal Headland Scrub (EVC 161) and Coast Banksia Woodland (EVC 2).

## EVCm 921 Coast Banksia Woodland/Coastal Dune Scrub Mosaic

Refer to descriptions of Coast Banksia Woodland (EVC 2) and Coastal Dune Scrub (EVC 160).

### EVCm 922 Coastal Alkaline Scrub/Bird Colony Succulent Herbland Mosaic

Refer to descriptions of Coastal Alkaline Scrub (EVC 858) and Bird Colony Succulent Herbland (EVC 155).

### EVCm 924 Grassy Woodland/Swamp Scrub Mosaic

Refer to descriptions of Grassy Woodland (EVC 175) and Swamp Scrub (EVC 53).

## EVCm 925 Damp Sands Herb-rich Woodland/Swamp Scrub Mosaic

Refer to descriptions of Damp Sands Herb-rich Woodland (EVC 3) and Swamp Scrub (EVC 53).

## EVCc 926 Damp Heathy Woodland/Grassy Dry Forest Complex

Refer to descriptions of Damp Heathy Woodland (EVC 793) and Grassy Dry Forest (EVC 22).

## EVCm 927 Plains Grassy Woodland/Swamp Scrub/Plains Grassy Wetland Mosaic

Refer to descriptions of Plains Grassy Woodland (EVC 55), Swamp Scrub (EVC 53) and Plains Grassy Wetland (EVC 125).

## EVCm 928 Riparian Woodland/Stream-bank Shrubland Mosaic

Refer to descriptions of Riparian Woodland (EVC 641) and Stream-bank Shrubland (EVC 851).

## EVCm 932 Riparian Woodland/Escarpment Shrubland Mosaic

Refer to descriptions of Riparian Woodland (EVC 641) and Escarpment Shrubland (EVC 895).

## EVC 934 Brackish Grassland

Grassland to open sedgeland, occurring on silts in low-lying areas within river floodplains; often in association with small patches of Brackish Wetland.

The range of floristic and environmental attributes for Brackish Grassland is tabulated below. Where information from published or unpublished reports is included the references are cited.

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| **Altitude:** | 5-10m. |
| **Topography:** | Low-lying areas within near-coastal sections of river foodplains. |
| **Geology:** | Quaternary deposits. |
| **Soils:** | Poorly drained, salt-affected soils that are waterlogged for parts of the year and dry in the hotter months. Occasional shallow surface peat horizons. |
| **Present distribution:** | Occurs on the pre-1750 mapping, along the lower Yarra and Maribyrnong Rivers. Also one extant patch mapped as a mosaic with a drier form of Swamp Scrub on Phillip Island. |
| **Floristics:**<br>**(Phillip Is. site)** | Species include Chaffy Saw-sedge *Gahnia filum*, Coast Saw-sedge *Gahnia trifida*, Blue Tussock-grass *Poa poiformis,* Milky Beauty-heads *Calocephalus lacteus,* Wallaby Grasses *Austrodanthonia* spp. and in open spaces in the salt pan Australian Salt-grass *Distichlis distichophylla*, Creeping Brookweed *Samolus repens*, Shiny Swamp-mat *Selliera radicans* and Beaded Glasswort *Sarcocornia quinqueflora.* |
| **Floristics:** | Species include Common Tussock-grass *Poa labillardierei* which |

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| **(pre-1750)** | would have been dominant together with possibly Kangaroo Grass *Themeda triandra* and Wallaby Grasses *Austrodanthonia* spp., Salt Pratia *Lobelia irrigua*, Australian Salt-grass *Distichlis distichophylla*, Milky Beauty-heads *Calocephalus lacteus*, Shiny Bog-sedge *Schoenus nitens* and *Sebaea* spp. Other species, now exceedingly rare, if not extinct, in the study area such as Spiny Peppercress *Lepidium aschersonii* and Yam Daisy *Microseris* sp.1 are presumed to have occurred in this EVC. |
| **Structure:** | Grassland to open sedgeland. |

**Additional Comments**

Poorly known EVC, now virtually extinct in the study area. Better known from a few tiny remnants in Western Victoria such as Derrinallum, but previously unmapped.

Brackish Grassland has a range of salt-tolerant herbs (and sometimes sedges), in addition to species shared with Plains Grassland. Brackish Grassland occupies drier and less saline soils than Coastal Saltmarsh or Brackish Wetland.

## EVCm 935 *Estuarine* Brackish Wetland/*Estuarine* Swamp Scrub Mosaic

Grows on the edges of estuarine waterbodies such as creeks, rivers and lagoons with intermediate salinity and poor drainage conditions. Vegetation is determined by fluctuating salinity and drainage, which varies in time from occasionally fresh to brackish or occasionally saline, according to river flow and marine tidal events. The swamp scrub component is dominated by Swamp Paperbark *Melaleuca ericifolia* with a halophytic ground cover typically dominated by graminoids and herbs, whereas the estuarine wetland component is dominated by a mixture of salt-tolerant sedges, rushes, reeds and other herbs.

The range of floristic and environmental attributes for this mosaic is tabulated below. Where information from published or unpublished reports is included the references are cited.

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|---|---|
| **Altitude:** | <5m. |
| **Topography:** | Edges of estuarine waterbodies such as creeks, rivers and lagoons. |

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| **Geology:** | Quaternary deposits |
| **Soils:** | Variable from anaerobic sand to silt to clay often with peat surface horizons. |
| **Present distribution:** | Estuarine flats of Phillip Island, French Island and Westernport and Port Phillip Bays. |
| **Floristics:** | The scrub vegetation often includes salt-adapted, succulent species such as Shiny Swamp-mat *Selliera radicans*, Seaberry Saltbush *Rhagodia candolleana* subsp. *candolleana*, Creeping Brookweed *Samolus repens*, Coast Saltbush *Atriplex cinerea*, Sea Celery *Apium prostratum*, Glaucous Goosefoot *Chenopodium glaucum* and Beaded Glasswort *Sarcocornia quinqueflora*. The grasses, Australian Salt-grass *Distichlis distichophylla*, Blue Tussock-grass *Poa poiformis* and Common Tussock-grass *Poa labillardierei* may also be found.<br><br>Major species of Estuarine Wetland include Sea Rush *Juncus krausii* subsp. *australiensis*, Salt Club-sedge *Bolboschoenus caldwellii*, Common Reed *Phragmites australis*, Creeping Monkey-flower *Mimulus repens*, Streaked Arrowgrass *Triglochin striatum*, Small River Buttercup *Ranunculus amphitrichus*, Shiny Swamp-mat *Selliera radicans*, Creeping Brookweed *Samolus repens* and Coast Tussock-grass *Poa poiformis.* |
| **Structure:** | Open to closed scrub, sedgeland/herbland. |
| **References:** | Davies *et. al.* (in prep.) |

**Additional Comments**

This mosaic is found in areas of poor drainage with intermediate salinity conditions, inland from saltmarsh. The shrubby component is the estuarine equivalent of Swamp Scrub.

## EVC 937 Swampy Woodland

Swampy Woodland occurs in low gradient habitat on seasonally waterlogged soils. This waterlogging is caused by seepage or surface run-off but not inundation from active floodplains. It has a large component of damp site species but overall lacks the obligate wetland flora.

One floristic community, *Plains* Swampy Woodland, was formerly treated as a separate EVC, whereas other forms of Swampy Woodland were incorporated in Swampy Riparian Woodland or Swampy Riparian Complex.

The range of floristic and environmental attributes for Swampy Woodland is tabulated below. Where information from published or unpublished reports is included the references are cited.

| | |
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| **Altitude:** | 5-270m. |
| **Topography:** | Wet flats, extending into valley floors in wet areas to the rear of stream levees. |
| **Geology:** | Quaternary alluviums. |
| **Soils:** | Silts to clays. |
| **Present distribution:** | Stream and river flats inland from Port Phillip and Westernport Bays, Mornington Peninsula, Pakenham-Cardinia area, Lang Lang, and north-east of the study area. |
| **Floristics:** | The overstorey is dominated by Swamp Gum *Eucalyptus ovata* (+/- relatively minor Messmate *Eucalyptus obliqua,* Narrow-leaf Peppermint *Eucalyptus radiata,* Yellow Box *Eucalyptus melliodora* or Green Scentbark *Eucalyptus fulgens).*<br><br>The understorey is generally open with small thickets of Swamp Paperbark *Melaleuca ericifolia* or Tea-trees *Leptospermum* spp.<br><br>The ground layer is generally dense with Common Tussock-grass *Poa labillardierei,* Sedges *Carex* spp. and herbs shared with wetland habitats eg. Centella *Centella cordifolia,* Swamp Mazus *Mazus pumilo,* Austral Brooklime *Gratiola peruviana* and Joint-leaf Rush *Juncus holoschoenus.* |
| **Structure:** | Woodland to open woodland which can include treeless areas (variously shrubland, reedbed or herbland). Lower strata variable, with patchy dominance by taller shrubs, reeds, sedges and tussock grasses, and on occasion wetland (to aquatic) herbs. |

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| **References** | Frood (pers. com). |

**Additional Comments**

Swampy Woodland has close affinities with Swamp Scrub which is usually a closed scrub of Swamp Paperbark *Melaleuca ericifolia* or Woolly Tea-tree *Leptospermum lanigerum.* It has a wider range of shrub and grass species and a reduced wetland component compared with Swamp Scrub.

This EVC is currently undersampled due to the lack of intact remnants and may include several other floristic communities.

The range of floristic and environmental attributes for the floristic community *Plains* Swampy Woodland is tabulated below. Where information from published or unpublished reports is included the references are cited.

**Floristic Community 937-01 *Plains* Swampy Woodland**

A eucalypt woodland with the ground layer dominated by tussock grasses and/or sedges and rich in herbs when relatively intact.

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| **Altitude:** | 40-200m. |
| **Topography:** | Seasonally waterlogged flats. |
| **Geology:** | Primarily on paludal deposits on the volcanic plains with restricted occurences within Quaternary and Tertiary sediments. |
| **Soils:** | Poorly drained, seasonally waterlogged heavy soils, normally black clay, sometimes with a silt overlay. |
| **Present distribution:** | Reduced to small, degraded remnants only in Keysborough area south-east of Melbourne and the Whittlesea-Epping area north of Melbourne. |
| **Floristics:** | The overstorey is dominated by Swamp Gum *Eucalyptus ovata* and occasionally River Red Gum *Eucalyptus camaldulensis*. An understorey tree layer of Blackwood *Acacia melanoxylon* is often present.<br><br>Shrubs, if present, can include Tree Everlasting *Ozothamnus ferrugineus*, Prickly Tea-tree *Leptospermum continentale* and Scrub Sheoak *Allocasuarina paludosa*.<br><br>Sedges are frequently conspicuous in the ground layer, most commonly |

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| | *Carex* spp. but also including Coast Saw-sedge *Gahnia trifida*. Grasses (notably Common Tussock-grass *Poa labillardierei*) tolerant of waterlogging and a range of herbs occur in relatively intact sites. |
| **Structure:** | Woodland, stunted in most waterlogged sites, with sedgy/grassy understorey. |
| **References:** | VicRFA (1999). |

**Additional Comments**

*Plains* Swampy Woodland occurs on highly fertile soils in areas that supported Plains Grassy Woodland on more free-draining soils before clearing of the vegetation. The description is limited due to the paucity and the extent of alteration of remnants.

## EVC 938 Shrubby Gully Forest

An open forest to woodland confined to narrow bands along low gradient gullies on minor streams within forested hill country, often associated with granite soils. The understorey is dominated by shrubs, sedges and ferns but lacks the diversity of herbs and grasses associated with drainage-lines on more fertile soils.

The range of floristic and environmental attributes for Shrubby Gully Forest is tabulated below. Where information from published or unpublished reports is included the references are cited.

| | |
|---|---|
| **Altitude:** | 60-100m. |
| **Topography:** | Broad drainage lines with slight gradients, on lower slopes near streams that were directly affected by riparian processes. |
| **Geology:** | Tertiary basalt, Quaternary deposits. |
| **Soils:** | Silt-rich river sands and gravels, deep organic loams and peats. |
| **Present distribution:** | Low gradient gullies in the Lysterfield-Cardinia-Kilsyth areas. |
| **Floristics:** | Swamp Gum *Eucalyptus ovata* and Manna Gum *Eucalyptus viminalis* subsp. *viminalis* dominate the overstorey. |
| | The understorey is variable and includes Blackwood *Acacia melanoxylon* (it rarely reaches tree-form in this community), Swamp |

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| | Paperbark *Melaleuca ericifolia*, Scented Paperbark *Melaleuca squarrosa*, Prickly Tea-tree *Leptospermum continentale*, Prickly Currant-bush *Coprosma quadrifida* and Hop Goodenia *Goodenia ovata.*<br><br>The ground layer is normally dense with graminoids and ground ferns with species including Leafy Flat-sedge *Cyperus lucidus*, Tall Sedge *Carex appressa*, Thatch Saw-sedge *Gahnia radula*, Common Reed *Phragmites australis*, Common Tussock Grasss *Poa labillardierei*, Water-ferns *Blechnum* spp., Mother Shield-fern *Polystichum proliferum* and Common Ground-fern *Calochlaena dubia.* |
| **Structure:** | Woodland to open forest which sometimes forms mosaics with wetter treeless areas dominated by sedges, rushes and many other plants associated with riparian environments. |
| **References:** | VicRFA (1997). |

**Additional Comments**

Once widely scattered in the study area south of the Great Divide but now mainly cleared for agriculture.