

# Index of Wetland Condition

Assessment of wetland vegetation

Update – September 2009



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## Assessment of wetland vegetation

### Update – September 2009

#### **Acknowledgments**

Doug Frood of Pathways Bushland & Environment reviewed EVCs and undertook the following tasks for this project: identification of wetland Ecological Vegetation Classes (EVCs) of relevance to the Index of Wetland Condition; revision of existing wetland EVC descriptions and preparation of additional descriptions, where required; development of guidance for identifying EVCs at individual wetlands; development of the assessment method; preparation of benchmarks for each of the wetland EVCs and preparation of the project report. The following Department of Sustainability and Environment staff assisted with the project. David Parkes, Alison Oates, Michelle Kohout and Phil Papas provided valuable advice. Fiona Ferwerda prepared the MS-Access database to store information on wetland EVCs. Alison Oates, Michelle Kohout and Merryn Kelly undertook data validation and entry. Heather Anderson formatted the wetland EVC benchmarks for publication on the DSE website. Janet Holmes managed the project.



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# **1 Introduction**

## **1.1 Status and purpose of the document**

This document is an updated version of 'Index of Wetland Condition. Assessment of Wetland Vegetation' (Department of Sustainability 2005a). It includes additional ecological vegetation classes (EVCs) that can occur in wetlands but were not documented in the original report. It also contains minor revisions and corrections.

This document has been prepared for a project that has developed 'Core indicators for biodiversity for wetland ecosystem extent and distribution and wetland ecosystem condition'. The project was undertaken by the Department of Sustainability and Environment with funding assistance from the National Action Plan for Salinity and Water Quality and the Natural Heritage Trust. The principal outcome of the project was an index of wetland condition (IWC) to assess the condition and extent of wetlands in Victoria. The IWC is designed for wetlands with static water and without a marine hydrological influence. The IWC is described in Department of Sustainability and Environment (2005b).

Wetland vegetation quality assessment is one of several measures of wetland condition included in the index of wetland condition (IWC). The assessment is based on EVCs that occur in wetlands. This document describes the approach to the assessment of wetland vegetation condition in wetlands covered by the IWC. It describes EVCs that occur in wetlands, provides guidance on the identification of EVCs at individual wetlands and describes the method for assessing wetland vegetation condition.

## **2 Wetland vegetation in Victoria**

Victorian wetland vegetation communities were very poorly understood and documented prior to statewide wetland surveys during the early 1990s during which approximately 800 quadrats were sampled. Data from these surveys were supplemented with the miscellaneous relevant data obtained from various local to regional studies. The data set was subjected to floristic analysis, however, conventional floristic analyses proved unsatisfactory in the resolution of wetland plant communities. It became clear that a different perspective was required to interpret patterns within wetland vegetation.

Variation within wetland vegetation can occur as very tightly zoned and fine-scale patterns. These vegetation variations reflect ecological variations, principally site-specific inundation patterns. Hence an individual wetland can support a sequence of plant communities from the centre (the deepest part of the wetland which retains water the longest) to the peripheral verges, which are subject to only intermittent and temporary inundation events. The vegetation variations can also be difficult to define, both along ecological gradients within an individual wetland (most notably elevational or hydrological gradients), and between the most comparable zones of other wetlands. This further confuses the ready resolution of workable numbers or types of plant communities.

Species-richness can be extremely low within wetland vegetation, particularly within the more inundation prone central zones. This can occur due to competition under optimal growth-conditions from robust wetland species, or as a consequence of the requirement for specific adaptation to and tolerance of extreme environments (e.g. high salinity or turbidity-prone wetland soils). Within species-poor data sets, the high statistical influence of the presence or absence of individual species hinders meaningful floristic analyses. By contrast the vegetation of the peripheral or more ephemeral zones can be extremely diverse in some wetland habitats.

Rather than viewing plants as wetland species or otherwise, it is more useful to regard the species as representing ranges of tolerance to inundation. At one extreme are obligate aquatic species or wetland habitat-specific opportunistic species (e.g. species occupying drying mud). The variation ranges through species which are more amphibious in their relevant habitat zones, to species which have some tolerance for intermittent inundation and/or waterlogging, but whose distributions are not characterised by such habitat features.

For the IWC, wetland vegetation is considered to be that which is found in naturally-occurring, waterbodies with static water and without a marine hydrological influence. References to ‘wetlands’ in the report apply to wetlands covered by the IWC.

### **3 Assessment of wetland vegetation condition**

The approach to developing a method for assessing the quality of wetland vegetation in Victoria for the IWC included the following steps:

1. development of a wetland vegetation typology and description of EVCs that occur in wetlands;
2. preparation of guidance on the identification of EVCs at individual wetlands;
3. development of a method for the assessment of wetland vegetation quality; and
4. preparation of benchmark descriptions for each EVC that occurs in wetlands.

#### **3.1 Wetland vegetation typology and methodology**

##### **3.1.1 EVCs that occur in wetlands**

Victoria’s Framework for the Native Vegetation Management (Department of Natural Resources and Environment 2002) utilises the notion of EVCs. The framework defines an EVC as follows: ‘An EVC is a type of native vegetation classification that is described through a combination of its floristic, life form, and ecological characteristics, and through an inferred fidelity to particular environmental attributes. Each EVC includes a collection of floristic communities (i.e. a lower level in the classification that is based solely on groups of the same species) that occur across a biogeographic range, and although differing in species, have similar habitat and ecological processes operating’.

To date, regional vegetation surveys have not generally provided reliable resolution of wetland vegetation communities. In line with using EVCs as the Victorian standard for vegetation classification, an EVC typology has been developed for Victorian wetland vegetation as part of this project. This builds primarily on the wetland vegetation surveys of the 1990s.

An EVC is regarded as relevant to wetlands if the ecological impacts of at least intermittent inundation or extreme waterlogging are expressed within the floristic composition. The implication is that the relevant vegetation is occurring in sites where this wetness of the land is sufficiently frequent and sustained to influence the composition of the associated vegetation (both in terms of presences or absences of relevant species). This determination has been based on the ecological attributes and habitat preferences of the component species. Some EVCs are restricted to unambiguous wetland contexts. Others occur in more marginal contexts (e.g. Wet Heathland) where only the wettest variants of the EVC may possibly occupy wetland habitats, or the EVC predominantly occurs in a drier context, but can occupy the outer verge zones of some wetlands (e.g. Riverine Chenopod Woodland).

Development of the EVC typology for wetlands commenced with an audit and review of the existing EVC descriptions relevant to wetland vegetation. Additional EVCs were developed for wetland vegetation not adequately described and, where required, existing EVCs were redefined and more concise descriptions provided. The EVC typology for wetlands was then tested to ensure that quadrats can realistically be allocated to an EVC (or appropriate complexes or mosaics), at least in the instances of relatively intact wetlands, and to designate reliability levels to potential indicator species.

The typology includes 127 EVCs (Appendix 1) covering vegetation of those wetlands within the scope of the IWC project. These vary from vegetation indicative of permanent inundation, through to EVCs occupying semi-permanent or temporary wetlands.

##### **3.1.2 Defining characteristics of EVCs occurring in wetlands**

EVCs are required to repeatedly and reliably resolve useful elements of the variation in wetland vegetation. This variation expresses both structurally and floristically. The EVCs for wetlands are

principally based on the reliability of one to many indicator species within particular lifeform groupings being present. These species are not necessarily specific to a single EVC; however these species associations, or the structural performances of the respective species, are viewed as functioning as pragmatic indicators for the delineation of EVCs.

EVCs are designated on the basis of characteristics of the overall vegetation structure. More species-rich zones generally occur in draw-down zones or in areas that are intermittently or ephemerally wet. In these situations, designated EVCs generally include a range of indicator species that are general to the habitat. Where species-richness decreases, the structural performance of individual species is increasingly regarded as being indicative of ecological conditions.

While presence or absence of a particular species can often be a useful indicator of habitats, the performance of such a species may vary greatly within the range of habitats in which it occurs. For example, Tangled Lignum *Muehlenbeckia florulenta* and Southern Cane-grass *Eragrostis infecunda* range from individual dominants in extremely species-poor, structurally distinctive wetland communities, through to incidental components of less inundation-prone relatively species-rich peripheral vegetation. While there are ecological similarities between sites where such species respectively dominate, there are no simple terms to describe the regime formed by combinations of ecological conditions relating to hydrology and soil conditions. In both cases, the species names are used to indicate vegetation dominated by them, but their presence or absence at the extremes of their respective environmental tolerances is not necessarily particularly informative.

While the floristic analyses of quadrat data do not provide clear or satisfactory resolutions of plant communities, they do provide indications of various species associations (species groups), and can indicate portions of species clines in the vegetation.

The implications of associations of species (species-groups) within wetlands require an acceptance that more than one plant community may occupy a site. This may be due to ecologically intermediate conditions, where (mostly variously reduced) components of the relevant EVCs overlap, and the vegetation cline (a spatial cline) is regarded as representing a complex between the relevant EVCs.

Alternatively, consistent perennial components may not be evident. More than one plant community at once may be occupying a site due to overlap of occupation of vegetation representing different phases of a wetland (spatial overlap but temporal distinction). In some instances, the components of two such cycles can both be in visible expression over at least parts of their respective growth-phases, whereas in others they are comprehensively mutually exclusive and clearly represent distinct EVCs. These situations are regarded as representing temporal mosaics.

If representation from a species group appears as the sole vegetation of a zone at a particular wetland, then the species-group represents an EVC, even if it commonly occurs in association with another species-group in more diverse vegetation (e.g. Dwarf Floating Aquatic Herbland).

The defining characteristics, indicator species and notes on the distribution of each EVC are presented in Appendix 2. The EVC typology for wetlands, while demonstrably functional, is provisional. Quadrat field data are sparsely scattered for wetlands in many areas of the State and rarely include re-sampling under varying seasonal conditions. Some wetland habitats remain extremely poorly documented or understood. It is anticipated that revisions will be warranted as more data are collected and interpreted.

### **3.2 Identifying EVCs at individual wetlands**

Vegetation mapping in wetlands in Victoria pre-dates the EVC typology for wetlands outlined in this report. Therefore, existing vegetation mapping is of limited assistance in identifying EVCs present in a wetland. Given the relatively large number of EVCs found in wetlands identified for the project (127), guidance is required to assist in the identification of EVCs at individual wetlands.

Guidance is based on potential wetland habitats in Victoria (Appendix 3). A number of sub-habitats are identified for each of the 16 potential wetland habitats defined. These are illustrated on landscape

profile diagrams to show graphically the location of the sub-habitats in the landscape. The EVCs associated with each sub-habitat are listed (Appendix 3). Once potential EVCs have been determined for a wetland with the aid of landscape profile diagrams in Appendix 3, the defining characteristics and indicator species for those EVCs can be checked to confirm identification of the EVC or EVCs present at the wetland.

### **3.3 Assessment of wetland vegetation quality**

#### **3.3.1 Benchmarks and attributes**

The EVC typology for wetlands provides a means of mapping the variation present within wetland vegetation into a conceptual framework. This then allows evaluation of the floristic and structural representation observed at a site against that which would be expected in a relatively intact example of the EVC, making allowance for the natural internal variability (both spatial and temporal) present within a given EVC. In general, wetland vegetation varies greatly in structure and composition. Without some reference framework against which to evaluate structure and composition, there are very few criteria by which the quality or condition of the vegetation can be assessed.

In the assessment method presented, vegetation quality is evaluated by comparison with a relatively undisturbed system, as described in a benchmark for each EVC. This is consistent with the use of benchmarks in the habitat hectares approach, which is used to assess the quality of terrestrial native vegetation in Victoria (Parkes et al. 2003). For habitat hectares, benchmarks are the average characteristics of a mature and apparently long-undisturbed state for the same vegetation type (Parkes et al. 2003).

The habitat hectares method was assessed for its usefulness in determining wetland vegetation quality. The attributes assessed in the habitat hectares method for terrestrial native vegetation include site condition attributes (large trees, tree (canopy) cover, understorey (non-tree) strata, lack of weeds, recruitment, organic litter and logs) and landscape context attributes (patch size, neighbourhood and distance to core area) (Department of Sustainability and Environment 2004, Parkes et al. 2003). EVC benchmark descriptions specify the benchmarks for each attribute. These attributes were considered to be unsuitable for the assessment of wetland vegetation quality, with the exception of lack of weeds. This is largely due to the high degree of variation in wetland vegetation and the frequent domination by non-woody species.

It was considered that a similar approach to habitat hectares was required for wetland vegetation but that, with the exception of the lack of weeds, different attributes were required. The method outlined here uses the following attributes to assess the quality of wetland vegetation: critical lifeform groupings, lack of weeds, indicators of altered processes and vegetation structure and health. Conditions where vegetation cannot be reliably assessed were also defined. These are typically extremes of inundation such as conditions of recent flooding when the vegetation has not sufficiently developed or severe drought.

Benchmark descriptions were prepared for each of the 127 EVCs occurring in wetlands covered by the project. These specify the benchmark for each of the attributes for each EVC. See Appendix 4 for an example of an EVC benchmark description. The full set of benchmarks is stored on a database held by the Department of Sustainability and Environment. Individual benchmarks are available on the department's website.

The assessment method is designed for assessors with limited botanical knowledge. The method involves assessment and scoring of each of the attributes with reference to the benchmark description. The assessment of each attribute is described below. The assessment and scoring framework is shown in Appendix 5. The field assessment sheet for the IWC, which includes the assessment of wetland vegetation quality is included in the IWC manual (Department of Sustainability and Environment unpublished).

### ***Critical lifeform groupings***

Benchmark descriptions specify the critical lifeform groupings which are expected to be present in each EVC. The benchmark also specifies minimum species diversity and cover levels for each lifeform grouping. Scoring is based on the presence of lifeform groupings and whether or not they are substantially modified (i.e. fail to meet the benchmark thresholds for species numbers or cover) (Appendix 5). The focus is to avoid underscoring apparently naturally species-poor variants of the respective EVCs. Therefore, the scoring does not distinguish species-rich variants. In the absence of high-level understanding of wetland vegetation, diversity losses in relatively species-rich vegetation could only be detected by evaluation against high-quality historical data.

### ***Weeds***

This attribute assesses the extent of impact of invasion by introduced plant species, with consideration of the ecological competitiveness of the relevant species within the respective EVC. The scoring is based on assessing the proportional cover of weeds, and whether the relevant species are assessed as being of high or low threat (Appendix 5). This follows the same process as the habitat hectares method (Parkes et al. 2003). The recognised 'high threat' weed species are specified on the respective EVC benchmark. The assessor can also record on the scoring sheet additional species considered as being of high threat. The benchmark also specifies instances where it is appropriate to overlook low-threat weeds, for example when these are opportunistic species occurring out of phase with the EVC being assessed, and, consequently, not impacting the indigenous species representing the EVC. This does not imply that these species are not impacting another EVC representing a different phase of the wetland; however such cases are generally rare.

### ***Indicators of altered processes***

This attribute assesses the extent of major changes occurring in the structure and composition of the vegetation, which are recognisable as simple indicators of ecological change. The assessment focuses on invasions of habitat by key indigenous indicator species or lifeforms. As the method is designed for use by operators of limited botanical experience, the assessment potential is restricted to a range of coarse indicators, in particular invasion by River Red Gum *Eucalyptus camaldulensis* seedlings, Tangled Lignum *M. florulenta*, Cumbungi *Typha* spp. or Samphires, which are indicative of hydrological or hydrogeological changes. There may be potential, in the future, for addition of more sensitive indicators to further refine or customise assessments. The scoring is outlined in Appendix 5.

### ***Vegetation structure and health***

This attribute assesses the condition of the structurally predominant species or group of species within the relevant lifeform. The assessment utilises a cover value benchmark and visual assessment of proportion of health. Allowance is made for herbaceous species where major fluctuations of cover or seasonal die-back are normal. The approach provides some assessment of indicators of poor health of the predominant cover species for lifeforms other than trees where the latter are absent or incidental. The scoring is outlined in Appendix 5. Where more than one structurally dominant lifeform is present as a dominant of respective zones within an EVC (especially in the case of aggregates), an overall score is obtained by averaging the values obtained for each zone, regardless of their relative extent.

## **3.3.2 Scoring**

An attempt has been made to minimise the potential for the system to underscore wetland vegetation. The method is designed as a relatively coarse method with the capacity to detect some key issues within the attributes which are assessed. The scoring system is not sensitive to many issues which might be recognised by an experienced field biologist.

Each of these attributes is scored and the score added. The potential maximum score for each attribute contributes equally to the total score. The most useful information is contained in the assessments of the components of the scoring system, not the total score. Such a system does not substitute for

detailed ecological assessment, but if correctly interpreted, it is anticipated that the issues identified under the component attributes can provide some ecological indications to guide management of wetlands.

## 4 References

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## Appendix 1. EVCs for wetlands covered by the index of wetland condition.

IWC EVC Number	IWC EVC name
1111	Alkaline Basaltic Wetland Aggregate
239	Alpine Creekline Herbland
806	Alluvial Plains Semi-arid Grassland
171	Alpine Fen
288	Alpine Heath Peatland
1011	Alpine Hummock Peatland
905	Alpine Short Herbland
306	Aquatic Grassy Wetland
653	Aquatic Herbland
308	Aquatic Sedgeland
334	Billabong Wetland Aggregate
369	Black Box Wetland
875	Blocked Coastal Stream Swamp
537	Brackish Aquatic Herbland
934	Brackish Grassland
538	Brackish Herbland
636	Brackish Lake Aggregate
539	Brackish Lake Bed Herbland
947	Brackish Lignum Swamp
13	Brackish Sedgeland
1114	Brackish Sedgy Shrubland
973	Brackish Shrubland
656	Brackish Wetland Aggregate
591	Calcareous Wet Herbland
291	Cane Grass Wetland
602	Cane Grass Wetland/Aquatic Herbland Complex
606	Cane Grass Wetland/Brackish Herbland Complex
284	Claypan Ephemeral Wetland
976	Coastal Ephemeral Wetland
11	Coastal Lagoon Wetland
9	Coastal Saltmarsh Aggregate
673	Dune Soak Woodland
949	Dwarf Floating Aquatic Herbland
678	Ephemeral Drainage-line Grassy Wetland
914	Estuarine Flats Grassland
952	Estuarine Reedbed
953	Estuarine Scrub
10	Estuarine Wetland
721	Fern Swamp
809	Floodplain Grassy Wetland
56	Floodplain Riparian Woodland
280	Floodplain Thicket
172	Floodplain Wetland Aggregate
810	Floodway Pond Herbland
945	Floodway Pond Herbland/Riverine Swamp Forest Complex
723	Forest Bog
728	Forest Creekline Sedge Swamp
718	Freshwater Lake Aggregate
657	Freshwater Lignum Shrubland
954	Freshwater Lignum-Cane Grass Swamp
968	Gahnia Sedgeland
1112	Granite Rock-pool Wetland
106	Grassy Riverine Forest
811	Grassy Riverine Forest/Floodway Pond Herbland Complex
812	Grassy Riverine Forest/Riverine Swamp Forest Complex

## Appendix 1. Continued.

IWC EVC Number	IWC EVC name
124	Grey Clay Drainage-line Aggregate
708	Hypersaline Inland Saltmarsh Aggregate
813	Intermittent Swampy Woodland
822	Intermittent Swampy Woodland/Riverine Grassy Woodland Complex
107	Lake Bed Herbland
808	Lignum Shrubland
104	Lignum Swamp
823	Lignum Swampy Woodland
140	Mangrove Shrubland
41	Montane Riparian Thickett
40	Montane Riparian Woodland
966	Montane Bog
148	Montane Sedgeland
318	Montane Swamp
185	Perched Boggy Shrubland Aggregate
125	Plains Grassy Wetland
755	Plains Grassy Wetland/Aquatic Herbland Complex
767	Plains Grassy Wetland/Brackish Herbland Complex
958	Plains Grassy Wetland/Calcareous Wet Herbland Complex
959	Plains Grassy Wetland/Sedge-rich Wetland Complex
960	Plains Grassy Wetland/Spike-sedge Wetland Complex
961	Plains Rushy Wetland
888	Plains Saltmarsh
647	Plains Sedgy Wetland
1010	Plains Sedgy Wetland/Sedge Wetland Complex
283	Plains Sedgy Woodland
651	Plains Swampy Woodland
784	Plains Swampy Woodland/Lignum Swamp Complex
292	Red Gum Swamp
191	Riparian Scrub
103	Riverine Chenopod Woodland
975	Riverine Ephemeral Wetland
814	Riverine Swamp Forest
815	Riverine Swampy Woodland
804	Rushy Riverine Swamp
842	Saline Aquatic Meadow
717	Saline Lake Aggregate
648	Saline Lake-verge Aggregate
676	Salt Paperbark Woodland
101	Samphire Shrubland
845	Sea-grass Meadow
195	Seasonally Inundated Shrubby Woodland
196	Seasonally Inundated Sub-saline Herbland
136	Sedge Wetland
963	Sedge Wetland/Aquatic Sedgeland Complex
1113	Sedge Wetland/Brackish Herbland Complex
883	Sedge Wetland/Calcareous Wet Herbland Complex
281	Sedge-rich Wetland
816	Sedgy Riverine Forest
817	Sedgy Riverine Forest/Riverine Swamp Forest Complex
707	Sedgy Swamp Woodland
964	Shell Beach Herbland
908	Sink-hole Wetland Aggregate
819	Spike-sedge Wetland
80	Spring Soak Woodland
857	Stony Rises Pond Aggregate
210	Sub-alpine Wet Heathland

## Appendix 1. Continued.

<b>IWC EVC Number</b>	<b>Wetland EVC name</b>
917	Sub-alpine Wet Sedgeland
918	Submerged Aquatic Herbland
820	Sub-saline Depression Shrubland
49	Swamp Heathland Aggregate
53	Swamp Scrub
83	Swampy Riparian Woodland
937	Swampy Woodland
920	Sweet Grass Wetland
821	Tall Marsh
999	Unknown/Unclassified
990	Unvegetated (open water/bare soil/mud)
8	Wet Heathland
931	Wet Heathland/Sedge Wetland Complex
12	Wet Swale Herbland
932	Wet Verge Sedgeland

## **Appendix 2. Descriptions for EVCs that occur in inland and near coastal wetlands to accompany landscape profile diagrams.**

(Note: Rare is used as a generalised label relative solely to the context of wetlands - i.e. rare within the generally very restricted wetland habitats. This usage of the word rare should not be interpreted as a conservation status applying to the landscape as a whole. Consequently a wetland EVC noted as rare below may actually be confined to very few extant sites, or even a single wetland, and with confirming data warrant a conservation status of critically endangered)

### **Alkaline Basaltic Wetland Aggregate [EVC # 1111]**

Defining characteristics: Structurally and floristically diverse wetlands, with the following main component elements: Aquatic Herbland (EVC 653), Wet Verge Sedgeland (EVC 932), Plains Grassy Wetland / Aquatic Herbland Complex (EVC 955), Tall Marsh (EVC 821) and Sedge Wetland / Calcareous Wet Herbland Complex (EVC 883). Highly localised, on heavy alkaline soils of relatively recent basalt flows in the vicinity of Portland.

Indicator Species: Component species variously include *Carex appressa*, *Juncus procerus*, *Phragmites australis*, *Glyceria australis*, *Amphibromus neesii*, *Amphibromus sinuatus*, *Lachnagrostis filiformis*, *Eleocharis acuta*, *Carex gaudichaudiana*, *Triglochin alcockiae*, *Villarsia reniformis*, *Crassula helmsii*, *Lilaeopsis polyantha*, *Ranunculus amphitrichus*, *Neopaxia australasica*, *Rumex bidens*, *Stellaria angustifolia*, *Myriophyllum simulans*, *Isolepis fluitans*, *Asperula subsimplex*, *Potamogeton cheesemanii*, *Urtica incisa*, *Hydrocotyle tripartita*, *Hydrocotyle sibthorpioides*, *Lobelia beaugleholei*, *Senecio psilocarpus*, *Persicaria decipiens*, *Leptinella reptans* and *Senecio pinnatifolius* var. *pinnatifolius*

### **Alpine Creekline Herbland [EVC #239]**

Defining Characteristics: Dense herbland vegetation, dominated by *Celmisia sericophylla*, occurring along heads of alpine drainage-lines. Rare, confined to Bogong High Plains.

Indicator Species: *Celmisia sericophylla*, variously with *Luzula atrata*, *Luzula modesta*, *Juncus falcatus*, *Carpha alpina*, *Myriophyllum pedunculatum*, *Epacris* spp., *Schoenus* spp., *Poa* spp., *Oreomyrrhis pulvinifera*, *Caltha introloba* and *Plantago* spp. in gaps or more open stands.

### **Alluvial Plains Semi-arid Grassland [EVC #806]**

Defining characteristics: Turf grassland (to herbland) of low-lying areas within relatively elevated riverine terraces. Shrubs incidental if present. Flood-promoted flora that potentially includes a wide range of opportunistic ephemeral/annual species. Localised to riverine areas in north-western Victoria.

Indicator species: *Sporobolus mitchelli*, *Calocephalus sonderi*, *Sclerochlamys brachyptera*, *Plantago cunninghamii*, *Brachyscome* spp.

### **Alpine Fen [EVC #171]**

Defining characteristics: Sedgeland vegetation of high elevation wetland basins subject to cold-air ponding, often in shallow ponds occurring in association with *Sphagnum* dominated bogs. Localised within higher mountains.

Indicator species: *Carex gaudichaudiana*, *Myriophyllum pedunculatum*, *Isolepis crassiuscula*

### **Alpine Heath Peatland [EVC #288]**

Defining Characteristics: Dwarf heathland of high altitude valley floors. Typically dominated by *Epacris glacialis* and growing on former peatland on the margins of alpine wetlands, streams and bogs. Rare, on higher mountains.

Indicator Species: *Epacris glacialis*, *Empodisma minus*, *Poa costiniana*, also variously *Carex breviculmis*, *Ranunculus gunnianus*, *Astelia alpina* var. *novae-hollandiae*, *Stackhousia pulvinaris*, *Gentianella* spp., *Oreobolus distichus*.

### **Alpine Hummock Peatland [EVC # 1011]**

Defining characteristics: The vegetation (at least in relatively intact sites) is characterised by elevated hummocks of Sphagnum moss in association with peat soils. A small range of low ericoid shrubs are typically immersed within the moss bed. Where mounds are less developed, floristic richness can be higher, potentially including a diverse range of small herbs and sedges. Localised to alpine and sub-alpine zones within higher mountains.

Indicator species: *Sphagnum* spp., *Richea continentalis*, *Baeckea* spp. *Epacris* spp., *Callistemon ptyoides*, *Empodisma minus*, *Carex* spp., *Astelia alpina*, *Carpha* spp., *Lobelia surrepens*, *Ranunculus* spp. (notably *R. pimpinellifolius* and *R. gunnianus*), *Hypericum japonicum*, *Epilobium* spp.

### **Alpine Short Herbland [EVC #905]**

Defining characteristics: Dwarf herbland of wet alpine soils, in sites with a short growing season. Often found in areas of late-lying snow.

Indicator species: *Caltha introloba*, *Oreobolus* spp., *Oreomyrrhis pulvinifica*, *Juncus antarcticus*, *Parantennaria uniceps*, *Deyeuxia affinis*, *Plantago muelleri*, *Utricularia monanthos*, *Isolepis* spp.

### **Aquatic Grassy Wetland [EVC #306]**

Defining characteristics: Seasonal wetland on plains, dominated by rhizomatous to stoloniferous floating grasses, in association with mainly aquatic species. Turf grassland under drier conditions. Treeless or with scattered River Red Gum *Eucalyptus camaldulensis* present. Scattered, mainly in central southern to north-central areas.

Indicator species: Turf-forming species of *Lachnagrostis* (with affinities to *L. filiformis* var. 2) or *Amphibromus* spp. of similar growth-form (*A. sinuatus* and *A. fluitans*); with *Pseudoraphis paradoxa* very localised in East Gippsland as a component of Wet Swale Herbland. Associated species include *Crassula helmsii*, *Myriophyllum* spp. and *Eleocharis acuta*.

### **Aquatic Herbland [EVC #653]**

Defining characteristics: Semi-permanent to seasonal wetland vegetation, treeless (or nearly so), dominated by herbaceous aquatic species (typically with at least rootstocks tolerant of dry periods). Widespread, but rare in mountains and north-west.

Indicator species: *Myriophyllum* spp., *Triglochin procera* s.l., variously with e.g. *Villarsia reniformis*, *Ludwigia peploides* subsp. *montevidensis*, *Nymphoides* spp., *Ranunculus inundatus* (or related aquatic species). Often occurs in mosaic or complex with other wetland EVCs.

### **Aquatic Sedgeland [EVC #308]**

Defining characteristics: Very species-poor vegetation dominated by one to several species of robust inundation-tolerant rhizomatous sedges, typically with culms septate or otherwise including large air-spaces, with vegetative growth extending into virtually permanent water. Widespread, but rare in mountains and drier north.

Indicator species: Various combinations of one or more of *Eleocharis sphacelata*, *Chorizandra australis* (or sometimes *Chorizandra cymbaria* s.l.), *Baumea articulata* and robust forms of *Baumea rubiginosa* s.l. Often occurs in association with Aquatic Herbland.

### **Billabong Wetland Aggregate [EVC #334]**

Defining Characteristics: Collective label for the various zones of vegetation associated with lagoons/billabongs on floodplains. Relevant EVCs are Floodplain Wetland Aggregate; and terrestrial EVCs Floodplain Riparian Woodland; Floodplain Riparian Woodland/Floodplain Wetland Mosaic; Floodplain Riparian Woodland/Billabong Wetland Aggregate. Recognisable components of Billabong Wetland Aggregate include Aquatic Herbland, Aquatic Sedgeland, Tall Marsh, Dwarf Floating Aquatic Herbland and Floodway Pond Herbland. Major river systems, principally cooler areas.

Indicator species: See descriptions of component wetland EVCs.

### **Black Box Wetland [EVC #369]**

Defining characteristics: Black Box *Eucalyptus largiflorens* with sedgy - herbaceous understorey including species indicative of wetland habitats (seasonally swampy woodland, aquatics present within Black Box dominated vegetation). Rare, lower Loddon - Avoca area and Wimmera.

Indicator species: *E. largiflorens*, (open) *Muehlenbeckia florulenta*, *Amphibromus* spp. (mainly *A. nervosus*), *Lachnagrostis filiformis* var. 1, *Eleocharis acuta*, *Marsilea drummondii*, *Lobelia concolor*, *Ranunculus inundatus*, *Potamogeton tricarinatus* s.l.

### **Blocked Coastal Stream Swamp [EVC #875]**

Defining characteristics: Dense sedgeland, dominated by *Cladium procerum*, associated with blocked streams of calcareous coastal habitats. Rare in Victoria - Wilson's Promontory and south-western Victoria.

Indicator species: *Cladium procerum*, variously with *Typha domingensis* and scattered *Leptospermum lanigerum*.

### **Brackish Aquatic Herbland [EVC #537]**

Defining characteristics: Submerged (to weakly emergent) herbland, including more salt-tolerant aquatic species in semi-attached floating mats. Scattered in inland and near-coastal areas.

Indicator species: *Myriophyllum* spp. (*M. verrucosum* and *M. muelleri*), *Ruppia polycarpa*, *Lepilaena* spp. and *Lilaeopsis polyantha*, Stoneworts (Family Characeae), *Mimulus repens*, *Potamogeton pectinatus* and *Triglochin striata*.

### **Brackish Grassland [EVC #934]**

Defining characteristics: Grassland on sub-saline heavy soils, including dominants of Plains Grassland (and a portion of associated herbaceous species) in association with herbaceous species indicative of saline soils. Sometimes occurring as a fringing community on the verges of saline lakes. Scattered in southern lowland and plains areas, including coastal sites, most communities critically endangered.

Indicator species: *Poa labillardierei* (*Poa poiformis* some coastal sites) and / or *Themeda triandra* and *Austrodanthonia* spp., with e.g. *Distichlis distichophylla*, *Calocephalus lacteus*, *Selliera radicans*, *Sebaea* spp., *Wilsonia rotundifolia*, *Lobelia irrigua*.

### **Brackish Herbland [EVC #538]**

Defining characteristics: Low herbland dominated by species tolerant of mildly saline conditions and intermittent inundation. Scattered in inland and near-coastal areas, including estuarine sites.

Indicator species: Variously *Lobelia irrigua*, *Sebaea* spp., *Ranunculus diminutus* or *R. amphitrichus*, *Apium annuum*, *Lachnagrostis* spp., *Isolepis cernua*, *Schoenus nitens*, *Wilsonia rotundifolia*, *Selliera radicans*, *Distichlis distichophylla* and/or *Samolus repens*.

### **Brackish Lake Aggregate [EVC #636]**

Defining characteristics: Collective label for the various zones of vegetation associated with the floors and verges of brackish lakes. Identifiable components of the aggregate variously include Brackish Aquatic Herbland, Brackish Lake Bed Herbland, Brackish Herbland and Brackish Wetland Aggregate. Mainly drier west and north of State.

Indicator species: See descriptions of component EVCs.

### **Brackish Lake Bed Herbland [EVC #539]**

Defining characteristics: Low herbland of salt-tolerant species developing on drying lake beds. Floristics can vary seasonally (and can be in temporal phase with the unvegetated (open water/bare soil/mud) unit). Localized in north and west, very rare in near coastal sites (e.g. Bellarine Peninsula).

Indicator species: Variously *Cressa australis*, *Heliotropium curassavicum*, *Glycyrrhiza acanthocarpa*, *Mimulus repens*, *Chenopodium glaucum*, *Sporobolus* spp. (*S. mitchellii* and *S. virginicus*) and *Atriplex*

*suberecta*, *Myriophyllum verrucosum*. Scattered living veteran trees of *Eucalyptus camaldulensis* can be present around outer fringes, and dead stags may be extensive through the vegetation.

#### **Brackish Lignum Swamp [EVC #947]**

Defining characteristics: Wetland dominated by *Muehlenbeckia florulenta* (variously with *Eragrostis infecunda*), with a component or patches of salt-tolerant herbs (at least at low to moderate levels of salinity) and usually also with some species common to freshwater habitats. Can be very species-poor apart from introduced annuals. Sites with a higher diversity of salt-tolerant native species, at least around the drier outer verges, are generally presumed to have been somewhat saline prior to European settlement. However, species-poor character does not necessarily imply that the site is degraded or highly modified. Rare, lower rainfall plains in north and west.

Indicator species: *Muehlenbeckia florulenta*, variously with *Eragrostis infecunda*, *Samolus repens*, *Isolepis cernua*, *Triglochin striata*, *Chenopodium glaucum*, *Myriophyllum verrucosum*, *Selliera radicans*, *Mimulus repens*, *Distichlis distichophylla*, *Lobelia irrigua*, *Wilsonia rotundifolia*, *Lachnagrostis* spp. and/or *Gahnia filum*.

#### **Brackish Sedgeland [EVC #13]**

Defining characteristics: Medium to tall sedgeland, dominated by salt-tolerant sedges in association with low grassy / herbaceous ground-layer with a halophytic component. Scattered in near-coastal and western inland areas.

Indicator species: *Gahnia trifida* (less commonly *Gahnia filum*) or *Baumea juncea*; with *Bolboschoenus caldwelli* and/or *Schoenoplectus pungens* in some wetter versions (but note also EVC 656 Brackish Wetland).

#### **Brackish Sedgy Shrubland [EVC #1114]**

Defining characteristics: Sedgy shrubland vegetation with minor component of halophytic species, occurring on faintly brackish sandy coastal swales and flats with grey peaty sand subject to occasional shallow inundation. Rare, recorded with certainty only from far East Gippsland.

Indicator Species: *Melaleuca armillaris* with *Apodasmia brownii*, *Baumea juncea*, *Gonocarpus micranthus* and *Linum marginale*. A diverse range of species at lower covers includes *Lachnagrostis filiformis*, *Brachyscome graminea*, *Centella cordifolia*, *Notodanthonia semiannularis*, *Deyeuxia densa*, *Drosera pygmaea*, *Hemarthria uncinata*, *Imperata cylindrica*, *Lobelia anceps*, *Samolus repens*, *Schoenus apogon*, *Schoenus nitens*, *Selaginella uliginosa*, *Senecio glomeratus* and *Viminaria juncea*.

#### **Brackish Shrubland [EVC #973]**

Defining characteristic: Shrubland vegetation fringing claypans and shallow salt lakes, with dominant species tolerant of lower levels of salinity, but ground-layer with sparse grassy - herbaceous ground-layer with few if any halophytic species. Ephemerals are prevalent and indicative of seasonal water-logging. Rare, Little Desert and nearby far south-west.

Indicator species: *Melaleuca brevifolia*, variously with *Acacia farinosa*, *Austrodanthonia* spp. (*A. geniculata* and *A. setacea*), *Austrostipa scabra*, *Notodanthonia semiannularis*, *Gahnia filum*, *Lepidosperma viscidum*, *Dichelachne crinita*, *Hypolaena fastigiata* and *Baumea juncea*, *Centrolepis* spp. (*C. polygyna* and *C. strigosa* subsp. *strigosa*), *Daucus glochidiatus*, *Millotia muelleri*, *Pogonolepis muelleriana*, *Sebaea ovata* and *Wahlenbergia gracilentia* s.l.

#### **Brackish Wetland Aggregate [EVC #656]**

Defining characteristics: Collective label for the various zones of sedgy-herbaceous vegetation associated with sub-saline wetlands. Components variously include wetter versions of Brackish Sedgeland, Brackish Herbland and Saline Aquatic Meadow. Mainly western and northern areas, but also scattered sites on coastal plains.

Indicator species: See descriptions of component EVCs.

### **Calcareous Wet Herbland [EVC #591]**

Defining characteristics: Low wetland vegetation dominated by inundation tolerant herbs. The floristics are indicative of calcareous conditions. Rare, southern lowland areas, mostly in the south-west.

Indicator species: *Hydrocotyle* spp. (*H. sibthorpioides*, *H. muscosa*, *H. pterocarpa*), *Lilaeopsis polyantha*, *Ranunculus* spp., *Isolepis fluitans*, *Asperula subsimplex*, *Villarsia* spp., *Amphibromus recurvatus* and *Goodenia humilis*. Sparse emergent *Baumea arthropphylla* and/or *Juncus procerus* are sometimes present.

### **Cane Grass Wetland [EVC #291]**

Defining characteristics: Species-poor vegetation dominated by Southern Cane-grass *Eragrostis infecunda* occurring in association with seasonal wetlands of low rainfall plains areas, typically on extremely heavy, grey clay soils. Scattered in drier plains areas in the west and north of the State.

Indicator species: *Eragrostis infecunda*, species-poor - variously with e.g. *Eleocharis acuta*, *Potamogeton tricarinatus* s.l., *Lachnagrostis filiformis* var. 1.

### **Cane Grass Wetland/Aquatic Herbland Complex [EVC #602]**

Defining characteristics: Wetland vegetation with open Southern Cane-grass in association with freshwater aquatic herbs. Rare, scattered localities in the west and north of the State.

Indicator species: *Eragrostis infecunda*, *Myriophyllum* spp., *Rumex bidens*, *Potamogeton tricarinatus* s.l., *Triglochin procera*, *Lilaeopsis polyantha*, variously including *Lachnagrostis filiformis* var. 1, *Lachnagrostis filiformis* var. 2, *Crassula helmsii*, *Ranunculus* spp., *Stellaria angustifolia*, *Amphibromus nervosus*, *Glyceria australis* and *Juncus holoschoenus*.

### **Cane Grass Wetland/Brackish Herbland Complex [EVC #606]**

Defining characteristics: Wetland dominated by open Southern Cane-grass in association with herbaceous species characteristic of inundation-prone brackish sites. Scattered in western areas.

Indicator species: *Eragrostis infecunda* variously with *Lilaeopsis polyantha*, *Triglochin striata*, *Samolus repens*, *Lobelia irrigua*, *Puccinellia stricta* var. *perlaxa*, *Mimulus repens*, *Sebaea albidiflora*, *Selliera radicans*, *Myriophyllum verrucosum*, *Agrostis* s.l. spp. and *Lachnagrostis* spp., with *Sporobolus virginicus*, *Stellaria angustifolia* and *Calocephalus lacteus* in marginal sites.

### **Claypan Ephemeral Wetland [EVC #284]**

Defining characteristics: Herb-dominated vegetation, in shallow seasonally inundated habitat on cracking silty clays (within Alluvial Terraces Herb-rich Woodland), with a range of small herbs indicative of wetness, in particular ephemeral monocots. Localised in further west.

Indicator species: *Eucalyptus camaldulensis* (marginal), *Leptospermum scoparium* (sparse), *Goodenia humilis*, *Myriocephalus rhizocephalus*, *Brachyscome perpusilla*, *Centrolepis* spp., *Aphelia* spp., *Stylidium* spp., *Austrodanthonia geniculata* and *Eragrostis brownii*.

### **Coastal Ephemeral Wetland [EVC #976]**

Defining characteristics: Range of moisture requiring herbs in association with species of moister dryland grassy vegetation. Extremely rare, known only from Mornington Peninsula.

Indicator species: *Eucalyptus ovata*, *Acacia melanoxylon*, *Leptospermum continentale*, *Ozothamnus ferrugineus*, *Acaena novae-zelandiae*, *Notodanthonia semiannularis*, *Deyeuxia quadriseta*, *Eragrostis brownii*, *Poa clelandii*, *Poa labillardierei*, *Schoenus apogon*, *Amphibromus archeri*, *Centella cordifolia*, *Elatine gratioloides*, *Gratiola peruviana*, *Haloragis heterophylla*, *Hemarthria uncinata* var. *uncinata*, *Isolepis cernua* var. *platycarpa*, *Isotoma axillaris*, *Juncus holoschoenus* and *Mazus pumilio*.

### **Coastal Lagoon Wetland [EVC #11]**

Defining characteristics: Collective label for the various zones of vegetation associated with sedge-fringed aquatic vegetation of near coastal lagoons. Components include Aquatic Sedgeland, Aquatic Herbland and Swamp Scrub. Rare, further eastern Victoria, but possibly elsewhere along coast.

Indicator species: *Baumea rubiginosa*, *Eleocharis sphacelata*, *Triglochin procera* s.l., *Melaleuca squarrosa* and *Gahnia clarkei*.

### **Coastal Saltmarsh Aggregate [EVC #9]**

Defining characteristics: Various low shrubby or herbaceous (to grassy or sedgy) vegetation of salinised coastal soils, in or adjacent to tidally influenced wetland. Coastal Saltmarsh can include a number of zones of varying structure and floristics, reflecting the regimen of tidal inundation and substrate character. Scattered distribution in sheltered embayments and estuaries from Portland area to East Gippsland.

Indicator species: Various *Sclerostegia arbuscula*, *Sarcocornia quinqueflora*, *Suaeda australis* and *Samolus repens*, sometimes with *Frankenia pauciflora* and/or *Triglochin striata* locally conspicuous. *Gahnia filum*, *Austrostipa stipoides*, *Disphyma clavellatum* and *Distichlis distichophylla* can variously be locally prominent in more peripheral zones.

### **Dune-soak Woodland [EVC #673]**

Defining characteristics: Low diversity shrubby-sedgy woodland, lacking obligate aquatic flora, occurring on damp soils associated with dune swales, mostly at the interface between Quaternary aeolian and paludal deposits. Rare, apparently localised in far south-west Victoria.

Indicator species: *Eucalyptus ovata*, *Leptospermum continentale* and *Lepidosperma longitudinale*.

### **Dwarf Floating Aquatic Herbland [EVC #949]**

Defining characteristics: Surface layer of dwarf free-floating plants, usually as component of more diverse aquatic systems, but sometimes comprising the only life-form present, and potentially expanding over broad areas during inundation. Widespread in lowland areas, but rarely as sole component of wetland.

Indicator species: *Lemna* spp., *Landoltia punctata*., *Wolffia* spp., *Azolla* spp. and the liverwort *Ricciocarpus natans*.

### **Ephemeral Drainage-line Grassy Wetland [EVC #678]**

Defining characteristics: Ephemeral wetlands in gilgai systems along poorly defined drainage lines within native grassland, with patchy local variation of the balance between wetland and dryland elements of flora. Localised and endangered, volcanic plains west of Melbourne.

Indicator species: Relatively open *Themeda triandra* and/or *Austrodanthonia duttoniana*, *Eryngium vesiculosum*, *Helichrysum* sp. aff. *rutidolepis*, *Eleocharis acuta*, *Marsilea drummondii*, *Amphibromus nervosus* and *Lachnagrostis filiformis* var. 2, *Eleocharis pusilla* and *Haloragis heterophylla*, *Calotis* spp., *Calocephalus citreus*, *Eryngium ovinum*, *Minuria leptophylla*, *Walwhalleya proluta* and *Chloris truncata*.

### **Estuarine Flats Grassland [EVC #914]**

Defining characteristic: Tussock grassland of low-lying coastal sites, beyond zone of normal tidal inundation but sometimes subject to seasonal waterlogging or rarely brief intermittent inundation (e.g. at the rear of salt marshes and around drainage-line swamps behind barrier dunes).

Indicator species: *Poa poiformis* and *Ficinia nodosa*, sometimes with *Austrostipa stipoides* in marginal sites in Gippsland (but see EVC 9, Coastal Saltmarsh Aggregate); also variously *Senecio pinnatifolius*, *Clematis microphylla*, *Distichlis distichophylla*, *Acaena novae-zelandiae* and/or *Apium prostratum*.

### **Estuarine Reedbed [EVC #952]**

Defining characteristic: Vegetation dominated by tall reeds (usually c. 2 -3 m or more in height), in association with a sparse ground-layer of salt tolerant herbs. Distinguished from Estuarine Wetland by the vigour and total dominance of the reeds, as well as the absence or low abundance of samphires in the ground layer. Sub-saline situations of coastal estuaries (sometimes periodically blocked by sand bars), localised in scattered near coastal sites between the Otways and East Gippsland.

Indicator species: *Phragmites australis*, with associated species variously including *Samolus repens*, *Juncus kraussii*, *Triglochin striatum*, *Bolboschoenus caldwellii*, *Suaeda australis*, *Gahnia filum* and *Crassula helmsii*.

### **Estuarine Scrub [EVC #953]**

Defining characteristic: Shrubland to scrub of myrtaceous shrub species of sub-saline habitat, occurring in association with ground-layer dominated by halophytic herbs, notably on the verges of Estuarine Wetland (EVC 10), where peripheral or further upstream), or at the rear of Coastal Saltmarsh Aggregate (EVC 9). Scattered in suitable habitat along the coast, but rare in western Victoria and of restricted total extent, reduced by clearing

Indicator species: *Melaleuca ericifolia* (in eastern Victoria), with other *Melaleuca* spp. (e.g. *M. lanceolata*, rarely *M. gibbosa* or *M. halmaturorum*) or *Leptospermum lanigerum* in western Victoria. The major species of the ground-layer include *Samolus repens*, *Triglochin striatum* and *Selliera radicans*, variously with *Sarcocornia quinqueflora*, *Gahnia filum*, *Poa poiformis*, *Juncus kraussii*, *Disphyma crassifolium* and *Distichlis distichophylla*. Species such as *Isolepis nodosa*, *Tetragonia implexicoma*, *Rhagodia candolleana* and *Myoporum insulare* can occur on the drier verges, but are not characteristic of the vegetation. While the vegetation is frequently relatively species-poor, some sites can be rich in small herbs.

### **Estuarine Wetland [EVC #10]**

Defining characteristic: Rushland / sedgeland vegetation, variously with component of small halophytic herbs, occurring in regularly-inundated wetlands of estuarine flats. Distinguished from Estuarine Reedbed by the smaller stature and reduced dominance of *Phragmites australis* (and greater diversity), from Coastal Saltmarsh Aggregate by the dominance of medium-sized graminoids (other than *Austrostipa stipoides* in the latter), and from Estuarine Scrub by the general absence of woody species. Scattered along the coast in estuarine situations, also at rear of saltmarshes where there is seepage, but most extensive in association with larger estuarine floodplains.

Indicator species: *Juncus kraussii*, sometimes with *Bolboschoenus caldwellii*, *Schoenoplectus pungens* and/or (stunted and sub-dominant) *Phragmites australis*; with *Samolus repens*, *Ranunculus amphitrichus*, *Distichlis distichophylla*, *Isolepis cernua*, *Selliera radicans*, *Apium prostratum*, *Triglochin striata*, *Leptinella* spp., *Mimulus repens*, *Sarcocornia quinqueflora* and/or *Suaeda australis*. Woody species are generally absent, but scattered stunted shrubs (variously including *Leptospermum lanigerum*, *Melaleuca ericifolia* or *Myoporum insulare*) can occasionally be present on drier margins.

### **Fern Swamp [EVC #721]**

Defining characteristics: Ferny (to sedgy-ferny) swampy drainage line vegetation of high-rainfall areas (mostly occurring along drainage systems which support Riparian Thicket or Cool Temperate Rainforest in more free-draining areas). Woody species are generally confined to sparse emergent tall shrubs /small trees, but sparse emergent *Eucalyptus ovata* are sometimes present. Rare, higher rainfall areas (Central Highlands, South Gippsland, Otways).

Indicator species: Sparse *Melaleuca squarrosa*, *Leptospermum lanigerum*/*Leptospermum grandifolium*, *Atherosperma moschatum* and/or *Acacia melanoxylon*; variously with *Todea barbara*, *Blechnum nudum*, *Blechnum minus*, *Blechnum wattsi*, *Dicksonia antarctica*, *Gleichenia microphylla*, *Carex appressa*, *Isolepis inundata*, *Persicaria hydropiper*, *Parsonsia brownii* and *Coprosma quadrifida*. On the drier edges, conspicuous species variously include *Tetrarrhena juncea*, *Austrocynoglossum latifolium*, *Lepidosperma elatius*, *Cyathea australis*, *Hydrocotyle hirta*,

*Histiopteris incisa* and *Stellaria flaccida*. *Astelia australiana* can be an extremely localised component species (near Powelltown).

#### **Floodplain Grassy Wetland [EVC #809]**

Defining characteristics: Wetland dominated by floating aquatic grasses (which persist to some extent as turf during drier periods), occurring in the most flood-prone riverine areas. Typically treeless, but sometimes with thickets of saplings or scattered more mature specimens of River Red Gum *Eucalyptus camaldulensis*. Restricted, Murray River floodplain, primarily within Barmah Forest.

Indicator species: *Pseudoraphis spinescens* and/or sometimes *Amphibromus fluitans*, *Cynodon dactylon* var. *pulchellus*, with associated species variously including *Azolla filiculoides*, *Myriophyllum crispatum*, *Eleocharis acuta*, *Persicaria prostrata*, *Lachnagrostis filiformis*, *Ludwigia peploides* subsp. *montevidensis*, *Nymphoides crenata*, *Stellaria caespitosa*, *Juncus ingens* and *Centipeda* spp. (and towards the ecological limits to distribution of Floodplain Grassy Wetland, *Sporobolus mitchellii* in association with *P. spinescens*).

#### **Floodplain Riparian Woodland [EVC #56]**

Defining characteristics: Eucalypt woodland of well developed floodplains of less arid areas, often with treeless wetland areas (see Floodplain Wetland Aggregate). At maximum development, Floodplain Riparian Woodland represents the vegetation of a mosaic of terraces, active floodways and former channels and consequently a number of communities indicative of a range of hydrological conditions. Parts of the floodplain which typically lack obligate wetland species (e.g. levees which are only intermittently and briefly subject to flooding if at all) may support vegetation referable to Riparian Woodland). This internal variation within the EVC has led to the additional labels Floodplain Riparian Woodland/Billabong Wetland Mosaic and Floodplain Riparian Woodland/Floodplain Wetland Mosaic. It is rare that the more distinctive wetland components within Floodplain Riparian Woodland are at a sufficient scale to allow comprehensive separation. In functional terms all three potential labels are usually equivalent, though in instances it may be possible to distinguish the larger areas of better developed wetland within the relevant area of floodplain. Floodplains of less arid southern and eastern parts.

Indicator species: *Eucalyptus camaldulensis*, *Eucalyptus viminalis* (sometimes with *Eucalyptus ovata* and/or *Eucalyptus radiata*), *Acacia mearnsii*, *Acacia dealbata*, *Acacia melanoxylon*. *Poa labillardierei*, *Carex* spp.

#### **Floodplain Thicket [EVC #280]**

Defining characteristics: Dense shrubby vegetation of braided channel systems of poorly-drained broad alluvial flats associated with floodplain habitats in the vicinity of the Grampians. Characterised by the diversity of *Melaleuca* and *Leptospermum* spp. present. Floodplain Thicket has floristic affinities with forms of Riparian Scrub and Swamp Scrub. As well as indicator species (listed), aquatics are present in channels. Localised to the vicinity of the Grampians.

Indicator species: Mixtures of *Melaleuca* spp. (*M. squarrosa*, *M. squamea*, *M. gibbosa*, *M. decussata*) and *Leptospermum* spp. (*L. continentale*, *L. scoparium*, *L. obovatum*, *L. lanigerum*), variously with *Hakea nodosa*, *Acacia retinodes*, *Acacia verticillata*, *Callistemon rugosulus*, *Gahnia sieberiana*, *Baumea tetragona*, *Empodisma minus* and aquatics in channels.

#### **Floodplain Wetland Aggregate [EVC #172]**

Defining characteristics: Collective label for the various zones of vegetation associated with wetlands of riparian floodplains, best developed in association with Floodplain Riparian Woodland. Potentially includes mosaics of scrub/shrubland, reedbed, sedgeland, rushland, grassland and/or herbland zones. The following components are variously recognisable within Floodplain Wetland: Aquatic Herbland, Aquatic Sedgeland, Tall Marsh, Swamp Scrub, Wet Verge Sedgeland, Floodway Pond Herbland and Dwarf Floating Aquatic Herbland. Billabong Wetland is also an aggregate EVC including many of these components. Floodplains of major streams, principally in less arid areas.

Indicator species: See descriptions of component EVCs.

### **Floodway Pond Herbland [EVC #810]**

Defining characteristics: Low herbland on the drying mud of floors of ponds on floodway systems (mainly riverine floodplains). The floristics (and diversity) can be quite variable (both spatially and temporally), according to the traits of the relevant individual pond. The floristics also vary in temporal cycles with the 'unvegetated' unit and probably between seasons at some locations. Widely dispersed along major riparian floodplains, especially of Murray River and tributaries.

Indicator species: *Centipeda* spp., *Stellaria caespitosa*, *Dysphania glomulifera* ssp. *glomulifera*, *Fimbristylis* spp., *Polygonum plebeium*, *Glinus* spp., *Persicaria* spp., *Alternanthera* spp., *Lachnagrostis filiformis* var. 1; sometimes with narrow fringes of *Pseudoraphis spinescens*, *Eleocharis acuta* and/or *Carex gaudichaudiana*. Semi-arid versions can include an increased component of species shared with the lacustrine habitat (notably *Glycyrrhiza acanthocarpa*, *Heliotropium* spp. and *Glossostigma elatinoides*).

### **Floodway Pond Herbland/Riverine Swamp Forest Complex [EVC #945]**

Defining characteristics: Ground-layer dominated by herbaceous species largely shared with floodway ponds (Floodway Pond Herbland/Aquatic Herbland), or virtually absent (due to thick accumulations of forest litter or persistence of black water, or sometimes excluded by dense thickets of young *Eucalyptus camaldulensis* regeneration). The abundance of annual species can be highly variable between seasons (and equivalent seasons in different years). Dispersed on floodplains of Murray River and major tributaries, also some lake verges in the Wimmera.

Indicator species:

Murray Mallee - *E. camaldulensis* with *Lachnagrostis filiformis* var. 1 and *Centipeda cunninghamii*, *Alternanthera* spp. and *Persicaria* spp. - especially *P. prostrata* (sparse *Eleocharis acuta* or *Pseudoraphis spinescens*; variously *Gnaphalium polycaulon*, *Cynodon dactylon* var. *pulchellus*, *Centipeda minima* s.l. and *Eclipta platyglossa*).

Mid-Murray (e.g. Barmah) - *E. camaldulensis* with *Lachnagrostis filiformis* var. 1, *Lachnagrostis filiformis* var. 2, *Stellaria caespitosa*, *Centipeda* spp., especially *C. cunninghamii*, *Alternanthera denticulata* s.s., *Persicaria* spp. (*P. prostrata*, *P. decipiens*, *P. hydropiper*), *Myriophyllum crispatum*, *Eleocharis acuta* (sometimes with a component of *Juncus ingens*, *Cyperus gunnii* or *Typha* spp.).

### **Forest Bog [EVC #723]**

Defining characteristics: Wetland comprising an open, frequently pedestalled shrubland with open clumps of large graminoids (notably restiads), and with the lower strata dominated by semi-aquatic herbs or sphagnum moss. Very rare, localised variants in South Gippsland and south-west of the State.

Indicator species:

South Gippsland - *Melaleuca squarrosa*, *Baloskion tetraphyllum* subsp. *tetraphyllum*, *Sphagnum* spp., *Isolepis fluitans*, with *Goodenia humilis*, *Amphibromus recurvatus*, *Myriophyllum simulans*, *Carex appressa*, *Eleocharis acuta* and *Triglochin procerus* s.l..

South-west Victoria - *Melaleuca squarrosa*, *Baloskion tetraphyllum* subsp. *tetraphyllum*, *Juncus procerus* and *Lepidosperma longitudinale*, with *Villarsia exaltata*, *Myriophyllum simulans*, *Isolepis fluitans* and *Baumea tetragona*.

### **Forest Creekline Sedge Swamp [EVC #728]**

Defining characteristics: Sedge-dominated wetlands of drainage line terraces within moist to wet forest areas. Very restricted occurrences, eastern highlands.

Indicator species: *Carex appressa*, *Carex fascicularis*, *Cyperus lucidus* and *Phragmites australis*, with herbs such as *Epilobium pallidiflorum*, *Gratiola* spp., *Lythrum salicaria*, and other associated species variously including *Acacia melanoxydon*, *Kunzea ericoides* spp. agg., *Rubus parviflorus*, *Stellaria flaccida*, *Gleichenia microphylla*, *Hypolepis rugosula*, *Blechnum minus*, *Juncus gregiflorus* and *Persicaria decipiens*. *Lepidosperma elatius* can be dominant on the drier verges.

### **Freshwater Lake Aggregate [EVC #718]**

Defining characteristics: Collective label for the various zones of vegetation associated with the floors and verges of freshwater lakes. Central deeper areas can support Aquatic Herbland, Submerged Aquatic Herbland or open water (and bare earth or Lake Bed Herbland when dry). A range of communities can occur on the fringes (see landscape profile key). Variants of Tall Marsh (e.g. Reed Swamp) are often present in more sheltered verges. Scattered, mainly western areas.

Indicator species: See descriptions of component EVCs.

### **Freshwater Lignum - Cane Grass Swamp [EVC #954]**

Defining characteristics: Open shrubland to grassy shrubland of *Muehlenbeckia florulenta* and *Eragrostis infecunda* dominated wetland, usually very species-poor in central deeper areas, but potentially diverse and herb-rich on the outer fringes. Scattered on drier plains of the north and west of the State.

Indicator species: *Muehlenbeckia florulenta*, *Eragrostis infecunda*, *Eleocharis acuta*, *Marsilea drummondii* and *Lachnagrostis filiformis* var. 1, *Potamogeton tricarinatus* s.l., *Rumex* spp. Additional species from the richer outer verges include *Austrodanthonia duttoniana*, *Amphibromus nervosus*, *Carex tereticaulis*, *Centipeda cunninghamii*, *Eryngium vesiculosum*, *Eclipta platyglossa*, *Asperula conferta*, *Goodenia heteromera*, *Haloragis aspera*, *Juncus flavidus*, *Lobelia concolor*, *Teucrium racemosum* s.l., *Senecio* spp.

### **Freshwater Lignum Shrubland [EVC #657]**

Defining characteristics: Open shrubland on fringes of wetlands (typically shallow lakes) on basalt, potentially in intermittently damp sites but above normal inundation levels and lacking obligate wetland flora. Highly restricted, scattered remnants in lower-rainfall areas of the western volcanic plain

Indicator species: *Muehlenbeckia florulenta*, with associated species including *Austrodanthonia duttoniana*, *Poa labillardierei*, *Haloragis aspera*, *Epilobium billardierianum*, *Juncus flavidus*, *Oxalis exilis* and *Rumex brownii*.

### **Gahnia Sedgeland [EVC #968]**

Defining characteristics: Species-poor, tall and usually dense sedgeland vegetation of near-coastal soaks. Rare, south-west Victoria and Gippsland.

Indicator species: *Gahnia trifida* and/or *Gahnia clarkei*, variously with *Schoenus carsei*, *Baumea juncea* and robust forms of *Triglochin striata*.

### **Granite Rock-pool Wetland [EVC #1112]**

Defining characteristics: Herbland of seasonal ponds on granite exposures, generally dominated by annual species. Extremely restricted extent, in scattered locations on outcropping granite in northern Victoria

Indicator species: Variously including *Myriophyllum striatum*, *Myriophyllum porcatum*, *Isoetes muelleri*, *Glossostigma cleistanthum*, *Myriocephalus rhizocephalus*, *Crassula closiana*, *Limosella australis*, *Montia fontana*, *Isolepis* spp., *Aphelia gracilis*, *Lythrum hyssopifolium* and *Callitriche umbonata*, largest and deepest examples with *Eleocharis acuta* and *Amphibromus nervosus*; *Crassula decumbens* on margins.

### **Grassy Riverine Forest [EVC #106]**

Defining characteristics: Open eucalypt forest (to woodland) with grassy understorey, dominated by species indicative of at least occasional flooding (notably *Paspalidium jubiflorum*), but also tolerant of sustained dry periods. Murray River system downstream from Hume Weir.

Indicator species: *E. camaldulensis* with *Paspalidium jubiflorum* dominant in the ground-layer, associated species include *Centipeda cunninghamii*, *Brachyscome basaltica* var. *gracilis*,

*Wahlenbergia fluminalis*, *Chamaesyce drummondii*, *Senecio quadridentatus*, *Rumex brownii* and *Cynodon dactylon* var. *pulchellus*; with *Eleocharis acuta* relatively minor if present.

#### **Grassy Riverine Forest/Floodway Pond Herbland Complex [EVC #811]**

Defining characteristics: Grassy Riverine Forest - Floodway Pond Herbland Complex describes eucalypt forest or woodland of flood-prone areas, where herbaceous species characteristic of drying mud within wetlands (Floodway Pond Herbland or in part Lake Bed Herbland) are conspicuous in association or fine-scale mosaic with *Paspalidium jubiflorum* and other species characteristic of Grassy Riverine Forest. Restricted extent, Murray River system mainly in far north-west, but upstream at least as far as Barmah Forest.

Indicator species: *Paspalidium jubiflorum* conspicuous in association or mosaic with *Persicaria* spp. (in particular *P. decipiens*), *Centipeda cunninghamii* and/or *Glycyrrhiza acanthocarpa*. Other conspicuous species variously include *Senecio* spp., *Stemmodia florulenta*, *Eclipta platyglossa*, *Chamaesyce drummondii*, *Lachnagrostis filiformis*, *Alternanthera denticulata* s.l., *Cynodon dactylon* var. *pulchellus*, *Euchiton sphaericus*, *Poa fordeana* and *Cardamine moirensis*.

#### **Grassy Riverine Forest/Riverine Swamp Forest Complex [EVC #812]**

Defining characteristics: Eucalypt forest of flood-prone areas, where the understorey dominants (e.g. *Eleocharis acuta* and/or *Pseudoraphis spinescens*) of Riverine Swamp Forest are conspicuous in association or fine-scale mosaic with the larger tussock species (principally *Paspalidium jubiflorum*) characteristic of Grassy Riverine Forest. Murray River system, very restricted outside of Barmah Forest.

Indicator species: *E. camaldulensis*, with *Paspalidium jubiflorum*, in association or mosaic with *Eleocharis acuta* and/or *Pseudoraphis spinescens*. Other conspicuous species variously include *Persicaria* spp. (in particular *P. prostrata*), *Cynodon dactylon* var. *pulchellus*, *Centipeda cunninghamii*, *Eclipta platyglossa*, *Cardamine moirensis*, *Alternanthera denticulata* s.l., *Lachnagrostis filiformis*, *Centipeda minima* s.l. and *Wahlenbergia fluminalis*.

#### **Grey Clay Drainage-line Aggregate [EVC #124]**

Defining characteristics: Collective label for the various zones of vegetation associated with the inundation-prone habitat of slightly mineralised drainage lines in more elevated parts of the basalt plains. The EVC is rare and localised, identified from very few locations, and includes habitat of the extremely localised *Carex tasmanica*. The vegetation of associated grassy terraces, subject to occasional inundation, has affinities with Creekline Tussock Grassland. The components of Brackish Herbland and Brackish Aquatic Herbland are also variously recognisable within the vegetation aggregate. Rare, western Volcanic Plains.

Indicator species: Various associations of *Carex tasmanica*, *Lachnagrostis adamsonii*, *Isolepis cernua*, *Ranunculus diminitis*, *Lobelia irrigua*, *Eleocharis acuta*, *Distichlis distichophylla*, *Juncus kraussii* subsp. *australiensis*, *Apium* spp., *Poa labillardierei*, *Calocephalus lacteus* and forms of *Asperula conferta*.

#### **Hypersaline Inland Saltmarsh Aggregate [EVC #708]**

Defining characteristics: Collective label for the various zones of vegetation associated with the floors and verges of hypersaline lakes. Typically comprising salt pan areas (sometimes occupied by aquatic halophytic monocots during wet phases), fringed by a mono-specific (or nearly so) low shrubland of stunted succulent chenopods. Drier western and north-western Victoria.

Indicator species: *Halosarcia* spp., *Lepilaena/Ruppia* spp.

#### **Intermittent Swampy Woodland [EVC #813]**

Defining characteristics: Eucalypt (- Acacia) woodland with (variously shrubby) rhizomatous sedgy - turf grass understorey, at best development dominated by flood-stimulated species in association with flora tolerant of inundation. The floristics are variable and often appear skewed by disturbance. Riverine floodplains of north-west and lake verges of Wimmera and southern Mallee.

Indicator species: *Eucalyptus camaldulensis* with *Acacia stenophylla* (+/- *Eucalyptus largiflorens* and relatively open *Muehlenbeckia florulenta*). Major species include *Sporobolus mitchellii*, *Cyperus gymnocaulos*, *Cressa australis*, *Haloragis aspera*, *Centipeda cunninghamii*, *Sphaeromorphaea australis*, *Stemodia florulenta*, *Lachnagrostis filiformis* var. 1, *Wahlenbergia fluminalis* and *Calocephalus sonderi*, with *Paspalidium jubiflorum* typically a very minor species if present. In an extremely localised variant of flood-prone sandy terraces connected to the river or major floodway creeks, *Eragrostis* spp. and *Cynodon dactylon* var. *pulchellus* can be locally dominant - this variant is considered transitional towards Riverine Swamp Forest.

#### **Intermittent Swampy Woodland/Riverine Grassy Woodland Complex [EVC #822]**

Defining characteristics: Eucalypt (- Acacia) woodland with (variously shrubby) rhizomatous sedgy - turf grass understorey, including mixtures of flood stimulated species in association with species characteristic of drier riverine woodlands. Rare, riverine floodplains of further north-west.

Indicator species: *Eucalyptus camaldulensis* (+/- *Eucalyptus largiflorens*) with *Sporobolus mitchellii*, *Cyperus gymnocaulos* and species including *Austrodanthonia* spp., *Lobelia concolor*, *Wahlenbergia fluminalis*, *Brachyscome basaltica* var. *gracilis*, *Brachyscome dentata*, *Vittadinia* spp. and *Cymbonotus lawsonianus*.

#### **Lake Bed Herbland [EVC #107]**

Defining characteristics: Herbland dominated by species adapted to drying mud within lake beds. Some evade periods of prolonged inundation as seed, others as dormant tuberous rootstocks. Less saline lakes of north-western areas.

Indicator species: Various including *Glycyrrhiza acanthocarpa*, *Malva australasica* s.l., *Glossostigma* spp., *Solanum simile*, *Chenopodium pumilio*; also localised species including *Mukia micrantha*, *Nicotiana goodspeedii* and *Cullen* spp.

#### **Lignum Shrubland [EVC #808]**

Defining characteristics: Relatively open shrubland of species of twiggy growth-form. The ground-layer is typically herbaceous or a turf grassland, rich in annual/ephemeral herbs and small chenopods. North-western areas of Victoria, mainly riverine.

Indicator species: *Muehlenbeckia florulenta* and/or *Chenopodium nitrariaceum* (sometimes *Eragrostis australasica*) with diverse ground-layer of small chenopods and annual herbs in far north-west, more grassy-herbaceous in character in the southern Mallee. Associated species as follows -

Riverine Lignum Shrubland:

*Sclerochlamys brachyptera*, *Plantago cunninghamii*, *Goodenia* spp., *Bulbine semibarbata*, *Brachyscome lineariloba*, *Brachyscome ciliaris*, *Isoetopsis graminifolia*, *Rhodanthe corymbiflora*, *Senecio glossanthus*, *Tetragonia eremaea* s.l., *Atriplex leptocarpa*, *Calotis hispidula*, *Calocephalus sonderi* and *Sporobolus mitchellii*.

Tall Cane Grass Lignum Shrubland:

Further north-west: *Eragrostis australasica*, *Lachnagrostis filiformis* var. 1, *Asperula gemella*, *Chenopodium nitrariaceum*, *Eleocharis pallens* and *Senecio runcinifolius*.

Birchip (Chirrup Swamp): *Eragrostis australasica*, *Amphibromus nervosus*, *Senecio runcinifolius*, *Lachnagrostis filiformis* var. 1 and *Epilobium billardierianum*.

#### **Lignum Swamp [EVC #104]**

Defining characteristics: A relatively heterogenous group of species-poor wetlands dominated by robust and often dense lignum. Scattered in lower rainfall areas of north and west, including rain-shadow areas on basalt.

Indicator species: *Muehlenbeckia florulenta*, with species variously including *Eleocharis acuta*, *Marsilea drummondii*, *Eragrostis infecunda*, *Lachnagrostis filiformis* var. 1, *Senecio runcinifolius*, *Senecio glossanthus*, *Austrodanthonia duttoniana*, *Asperula gemella* and *Scleroblitum atriplicinum*.

### **Lignum Swampy Woodland [EVC #823]**

Defining characteristics: Tall, mostly dense shrub layer, dominated by Tangled Lignum, in association with a eucalypt/acacia low woodland. The ground-layer includes a component of obligate wetland flora that is able to persist (even if dormant) over dry periods. Lower rainfall northern and western areas.

Indicator species: *Muehlenbeckia florulenta*, with *Eucalyptus largiflorens*, *Acacia stenophylla* and sometimes stunted *Eucalyptus camaldulensis*.

### **Mangrove Shrubland [EVC #140]**

Defining characteristics: Extremely species-poor shrubland vegetation of inter-tidal zone, dominated by mangroves. Sheltered embayments and tidal creeks east from Lake Connemara to Corner Inlet, with most extensive development within Corner Inlet and Westernport Bay.

Indicator species: Characteristically occurs as mono-specific stands of *Avicennia marina*. In some stands, species from adjacent Coastal Saltmarsh Aggregate or Sea-grass Meadow can also be present.

### **Montane Bog [EVC #966]**

Defining characteristics: Low heathy, sedgy-mossy shrubland of boggy montane to sub-montane valley habitats. Can be fringed by or include sparse eucalypts - variously *E. pauciflora*, *E. stellulata*, *E. dalrympleana*, *E. rubida* and *E. delegatensis*. Rare, Central Highlands and East Gippsland.

Indicator species:

East Gippsland - *Baeckea utilis* s.l. and/or *Leptospermum myrtifolium* with *Epacris microphylla* s.l., *Epacris breviflora* and *Hakea microcarpa*. The ground layer includes a diverse range of sedges, grasses, forbs and ferns. Species include *Sphagnum* spp., *Schoenus apogon*, *Empodisma minus*, *Baloskion australe*, *Baumea gunnii*, *Carex appressa*, *Isolepis subtilissima*, *Festuca asperula*, *Poa costiniana*, *Leptinella filicula*, *Asperula conferta* and *Blechnum penna-marina* subsp. *alpina*, *Hypericum japonicum*, *Myriophyllum pedunculatum*, *Eleocharis gracilis*, *Lobelia surrepens* and *Stylidium montanum*.

Central Highlands - *Baeckea utilis*, *Epacris* spp. (notably *E. paludosa*), *Sphagnum* spp. and *Empodisma minus*, with associated species including *Richea victoriana*, *Oxalis magellanica*, *Wittsteinia vaccinacea* and *Blechnum penna-marina*. *Nothofagus cunninghamii* and/or *Leptospermum grandifolium* can be present on the verges or scattered through the vegetation.

### **Montane Riparian Thicket [EVC #41]**

Defining Characteristics: Closed shrubland vegetation of low-gradient drainage lines and sheltered soaks in gully-heads at montane to sub-alpine elevations, with a sparse but potentially diverse ground-layer including a range of species tolerant of shading and water-logging. Restricted to small areas of suitable habitat on higher mountain ranges.

Indicator species: *Leptospermum grandifolium* (sometimes with stunted *Nothofagus cunninghamii* in highest rainfall areas), *Carex appressa*, *Carex alsophila*, *Isolepis subtilissima*, *Blechnum nudum*, *Blechnum minus*, *Blechnum penna-marina*, *Olearia phlogopappa*, *Tasmania lanceolata*, *Gaultheria appressa*, *Chiloglottis* spp., *Leptinella filicula*, *Mentha laxiflora*, *Dianella tasmanica*, *Polystichum proliferum*.

### **Montane Riparian Woodland [EVC #40]**

Defining Characteristics: Low open woodland on peat-rich soils of stream flats at montane elevations, with ground layer comprising a dense sward of grasses, herbs and sedges. A dense riparian shrub layer can also be present. Restricted distribution in eastern Victoria, principally on tablelands of East Gippsland.

Indicator species: *Eucalyptus camphora*, *Eucalyptus stellulata* (sometimes with *Eucalyptus radiata* or *Eucalyptus rubida*), *Poa labillardierei*, *Elymus scaber*, *Carex gaudichaudiana*, *Carex appressa*, *Hypericum japonicum*, *Deyeuxia quadriseta*, *Epilobium gunnianum*, *Gratiola peruviana*, *Ranunculus*

*Ippocrepis*, *Blechnum penna-marina*, *Blechnum minus*, *Leptospermum grandifolium*, *Leptospermum myrtifolium*, *Rubus parvifolius*, *Geranium potentilloides*, *Veronica gracilis*.

#### **Montane Sedgeland [EVC #148]**

Defining characteristics: Sedgy-herbaceous wetland communities around springs, soaks and low-gradient drainage-lines at montane elevations. Very localised distribution in high rainfall areas of Central Highlands and East Gippsland, occurring in association with Montane Riparian Thicket or Montane Riparian Woodland.

Indicator species: *Carex gaudichaudiana*, *Carex appressa*, *Sphagnum* spp., *Epilobium* spp. and *Hydrocotyle* spp., variously in association with *Poa labillardierei*, *Eleocharis gracilis*, *Veronica gracilis* s.l., *Gonocarpus micranthus*, *Austrofestuca hookeriana*, *Hydrocotyle tripartita*, *Hypericum japonicum*, *Lobelia surrepens*, *Geranium potentilloides*, *Acaena novae-zelandiae*, *Luzula modesta*, *Oreomyrrhis eriopoda*, *Blechnum penna-marina*, *Juncus alexandri*, *Hierochloa redolens* and *Deyeuxia innominata*.

#### **Montane Swamp [EVC #318]**

Defining characteristics: Sedgy-herbaceous montane wetland communities (e.g. Morass Creek near Benambra). The relevant low, shrubby vegetation of boggy flats (as previously included within Montane Swamp) is referred to Montane Bog. Rare, East Gippsland.

Indicator species: *Myriophyllum* spp., *Hydrocotyle tripartita*, *Carex appressa*, *Ranunculus* spp.

#### **Perched Boggy Shrubland Aggregate [EVC #185]**

Defining characteristics: Dense mosaic of shrubland in association with a grassy/sedgy ground-layer in which mosses are abundant, occurring on reliably saturated soils associated with impeding layers, soaks and springs. Swampy Riparian Woodland occurs in similar habitats to Perched Boggy Shrubland, but the former is associated with flowing water. Perched Boggy Shrubland Complex is reported as always surrounded by Herb-rich Foothill Forest [EVC 23]. Very restricted extent, confined to north-east.

Indicator species: *Baeckea utilis*, *Sphagnum* spp., *Epacris breviflora*, *Leptospermum continentale*, *Acacia verticillata*, *Gonocarpus micranthus*, *Ranunculus* spp., *Gahnia* spp., *Baumea* spp.

#### **Plains Grassy Wetland [EVC #125]**

Defining characteristics: Grassy-herbaceous shallow seasonal wetlands of lowland plains, characteristically species-rich (at least on verges) when relatively intact. Zones interpreted as representing complexes between Plains Grassy Wetland and several other wetland EVCs are frequently present. Formerly widespread in lowland plains areas.

Indicator species: *Amphibromus* spp. (notably *A. nervosus*), *Austrodanthonia duttoniana*, *Glyceria australis*, *Poa labillardierei*, *Lachnagrostis filiformis* var. 2, *Eleocharis acuta*, *Eleocharis pusilla*. *Eragrostis infecunda* occurs as an associated (but not dominant) species in drier versions (e.g. Wimmera and rainshadow basalt plains west of Melbourne). Herbs of verge zones of relatively intact sites variously include *Eryngium vesiculosum*, *Neopaxia australasica*, *Brachyscome cardiocarpa*, *Craspedia paludicola*, *Microseris* sp. 1, *Potamogeton tricarinatus* s.l., *Helichrysum* aff. *rutidolepis* and *Villarsia reniformis*.

#### **Plains Grassy Wetland/Aquatic Herbland Complex [EVC #755]**

Defining characteristics: Structural dominants of Plains Grassy Wetland, with Aquatic Herbland component prevalent. Scattered on western basalt plains, especially in cooler areas.

Indicator species: *Glyceria australis* with *Myriophyllum* spp (notably *M. variifolium*), *Rumex bidens*/*Potamogeton tricarinatus* s.l., *Neopaxia australasica*, *Triglochin procera* s.l.

### **Plains Grassy Wetland/Brackish Herbland Complex [EVC #767]**

Defining characteristics: Structural dominants of Plains Grassy Wetland in association with the species of Brackish Herbland. Very restricted and scattered occurrences on western basalt plains, with disjunct outlier at Lake Omeo.

Indicator species:

Western Volcanic Plains - *Glyceria australis*, *Poa labillardierei* and/or *Austrodanthonia duttoniana*, with *Lobelia irrigua*, *Ranunculus diminutis*, *Isolepis cernua* etc. (e.g. *Triglochin striata*, *Wilsonia rotundifolia*, *Samolus repens*, *Selliera radicans*).

Montane community (Lake Omeo) - *Glyceria australis*, *Lachnagrostis filiformis* var. 1, *Schoenus nitens*, *Isolepis cernua* and *Ranunculus diminutis*.

### **Plains Grassy Wetland/Calcareous Wet Herbland Complex [EVC #958]**

Defining characteristics: Structural dominants (and some of key indicator dicot herbs) of Plains Grassy Wetland in association with a low mat of herbs indicative of wet calcareous conditions. Extremely rare, in south-west (near Casterton).

Indicator species: *Glyceria australis*, *Hydrocotyle muscosa*, *Asperula subsimplex*, *Isolepis fluitans* and *Senecio psilocarpus*, with associated species including *Lachnagrostis filiformis* var. 2, *Eleocharis acuta*, *Potamogeton tricarinatus* s.l. and *Triglochin procera* s.l.

### **Plains Grassy Wetland/Sedge-rich Wetland Complex [EVC #959]**

Defining characteristics: Treeless seasonal wetland with association of Black Bristle-sedge (indicative of Sedge-rich Wetland) with species characteristic of Plains Grassy Wetland. Very rare, scattered sites on western basalt plains, also Wimmera (State Forest north of White Lake).

Indicator species: *Chorizandra enodis*, *Craspedia paludicola* dominant, associated species include *Lachnagrostis aemula* s.l., *Lachnagrostis filiformis* var. 2, *Amphibromus nervosus*, *Brachyscome cardiocarpa*, *Austrodanthonia duttoniana*, *Eleocharis acuta*, *Eleocharis pusilla*, *Eryngium vesiculosum*, *Glyceria australis*, *Microseris* sp. 1, *Pentapogon quadrifidus* var. *quadrifidus*, *Potamogeton tricarinatus* s.l., *Schoenus apogon* and *Villarsia reniformis*.

### **Plains Grassy Wetland/Spike-sedge Wetland Complex [EVC #960]**

Defining characteristics: Low open wetland vegetation dominated by spike-sedge with a sparse floristic component of Plains Grassy Wetland. Scattered sites in western Victoria.

Indicator species: The main species include *Glyceria australis*, *Eleocharis acuta*, *Lachnagrostis filiformis* var. 1 and var. 2 and *Amphibromus nervosus*, sometimes with *Neopaxia australasica* and *Potamogeton tricarinatus* s.l.

### **Plains Rushy Wetland [EVC #961]**

Defining characteristics: Rush-dominated wetlands with floristic affinities to Plains Grassy Wetland. Scattered on plains of central western and north-central areas of Victoria.

Indicator species: *Juncus flavidus*, *Juncus semisolidus*, *Eleocharis acuta*, *Lachnagrostis filiformis* var. 1. Ephemeral component noted at some locations.

### **Plains Saltmarsh [EVC #888]**

Defining characteristics: Low, primarily herbaceous (to grassy) vegetation of salinised heavy soils in seasonally or intermittently waterlogged shallow depressions on lowland plains, dominated by species of *Sarcocornia* and *Suaeda* (rather than species of *Halosarcia* (and/ or *Frankenia*) as in Samphire Shrubland. Plains Saltmarsh is frequently included (and mapped) as a component of Saline Lake Aggregate. Scattered in less arid western areas.

Indicator species: *Sarcocornia quinqueflora*, *Suaeda australis*, *Samolus repens*, *Puccinellia stricta* var. *perlaxa*.

### **Plains Sedgy Wetland [EVC #647]**

Defining characteristics: Sedge-dominated wetland vegetation of lowland plains, with conspicuous and potentially diverse herbaceous component, including species characteristically associated with wet sites on fertile soils. Moisture supply appears to be more reliable (e.g. associated with springs/seepage) than for sites supporting Plains Grassy Wetland. Scattered on plains and tablelands on and south of the Divide.

Indicator species: *Carex tereticaulis* [or sometimes *Baumea arthropphylla*], *Eleocharis acuta* and *Amphibromus* spp., *Neopaxia australasica*, *Stellaria angustifolia* (and in highest quality sites, species including *Craspedia paludicola*, *Senecio psilocarpus*, *Microseris* sp. 1, *Brachyscome cardiocarpa* and *Xerochrysum palustre*). Plains Sedgy Wetland can occur in mosaic or complex with Plains Grassy Wetland and Aquatic Herbland. Some variants attributed to Plains Sedgy Wetland approach Sedge Wetland but can be distinguished by the herb-rich component shared with Plains Grassy Wetland.

### **Plains Sedgy Wetland/Sedge Wetland Complex [EVC #1010]**

Defining characteristics: Sedge-dominated wetland vegetation of cooler lowland plains, with structural characteristics of Sedge Wetland, but including herbaceous species characteristically associated with wet sites on fertile soils (i.e. structurally and floristically intermediate between the two EVCs). Rare, disjunct sites in southern Victoria.

Indicator species: *Lepidosperma longitudinale* and/or *Baumea arthropphylla*, often with *Schoenus* spp. (*S. tesquorum*, *S. apogon*); diversity variable (within wetland), with associated species variously including *Craspedia paludicola*, *Senecio psilocarpus*, *Brachyscome cardiocarpa* and *Xerochrysum palustre*.

### **Plains Sedgy Woodland [EVC #283]**

Defining characteristics: Woodland of seasonally inundated shallow depressions on broad plains, within floodplains and fringing dunes. The most similar EVCs are Seasonally Inundated Shrubby Woodland, or for wettest forms, Red Gum Wetland or Sedge-rich Wetland. Typically species-rich (at least in drier sites/on verges) with many species (notably geophytes) at low frequencies. South-western areas of Victoria, principally in the vicinity of the Grampians.

Indicator species: *Eucalyptus camaldulensis* (sometimes with *E. leucoxylon*, *E. melliodora* and/or *E. microcarpa*), *Leptospermum* spp. (sparse), *Lepidosperma* spp. (variously *L. longitudinale*, *L. lineare* and *L. congestum*), *Chorizandra enodis*, *Schoenus tesquorum*, *Villarsia reniformis*, *Isolepis fluitans*, *Potamogeton tricarinatus* s.l. etc.

### **Plains Swampy Woodland [EVC #651]**

Defining characteristics: Woodland with tussocky (grassy/sedgy) ground-layer, which includes herbs characteristic of poorly-drained seasonally water-logged dark clay soils of paludal deposits on cooler lowland plains. Context appears to have been mainly dampland, but extending into marginal wetland situations, wetland verges or as a dampland-wetland mosaic. Formerly scattered on southern plains of Victoria but now much depleted.

Indicator species: *Eucalyptus ovata* (occasionally *E. camaldulensis*), *Acacia melanoxylon*, *Poa labillardierei*, *Carex* spp., *Lachnagrostis* spp., with e.g. *Lobelia* spp., *Eryngium vesiculosum*, *Centella cordifolia*. Shrubs (*Ozothamnus ferrugineus*, *Leptospermum continentale*, *Allocasuarina paludosa*) in highest rainfall plains areas.

### **Plains Swampy Woodland/Lignum Swamp Complex [EVC #784]**

Defining characteristics: Individualistic assemblage with a mixture of structural components of Plains Swampy Woodland and Lignum Swamp (without floristic attributes of Red Gum Swamp). Extremely rare, volcanic plains of rainshadow area to the west of Melbourne.

Indicator species: *Eucalyptus camaldulensis*, *Muehlenbeckia florulenta*, *Poa labillardierei*, *Lachnagrostis filiformis* var. 1, *Ottelia ovalifolia* subsp. *ovalifolia*, *Schoenus apogon*, *Persicaria prostrata*, *Lythrum hyssopifolia*, *Amphibromus* spp., and *Austrodanthonia* spp.

### **Red Gum Swamp [EVC #292]**

Defining characteristics: Woodland of swampy depressions of lowland plains, with sedgy-herbaceous understorey including aquatic species. Scattered on lowland plains, principally in the Riverina and south-west of Wimmera, extremely rare on the western volcanics.

Indicator species: *Eucalyptus camaldulensis*, *Carex tereticaulis*, *Eleocharis acuta*, *Marsilea drummondii*, *Myriophyllum crispatum*.

### **Riparian Scrub [EVC #191]**

Defining characteristics: Dense shrubby vegetation associated with waterlogged ground along poorly-defined drainage-lines, often in areas with sandy (or granite-derived) soils, in less fertile but similarly wet sites to Swamp Scrub. Higher rainfall southern areas, with *Leptospermum lanigerum* dominated variant on Mt Disappointment and in Strathbogie Ranges.

Indicator species: *Melaleuca squarrosa* (sometimes alternatively *Leptospermum lanigerum*), *Gleichenia microphylla*, *Baumea tetragona*, *Baumea gunnii*, *Gahnia sieberiana*, *Lepidosperma elatius*

### **Riverine Chenopod Woodland [EVC #103]**

Defining characteristics: Eucalypt woodland of most elevated (current) riverine terraces, intact examples with a diverse shrubby-grassy understorey which can be rich in annual species. The habitat was at least formerly prone to irregular shallow flooding, and constitutes intermittent wetland. Floodplains of the north-west of the State .

Indicator species: *Eucalyptus largiflorens*, *Muehlenbeckia florulenta*, *Chenopodium nitrariaceum*, *Austroanthonia setacea*, *Eremophila* spp., *Pittosporum angustifolium*, *Exocarpos aphyllus*, *Calocephalus sonderi*, *Goodenia* spp., *Brachyscome* spp., *Lepidium* spp. (and general diversity of annual herbs).

### **Riverine Ephemeral Wetland [EVC #975]**

Defining characteristics: Herbland of floor of riverine depression, with a mixture of species from less inundation-prone riverine forest/woodland and species of shallow ephemeral wetland. Rare, recorded from Barmah Forest.

Indicator species: Partially with scattered or overhanging *Eucalyptus camaldulensis*, but primarily without woody species. The structurally dominant species are *Isolepis fluitans*, *Geranium* spp. and *Acaena novae-zelandiae*. Species diversity is relatively low.

### **Riverine Swamp Forest [EVC #814]**

Defining characteristics: Tall open eucalypt forest (to woodland), to 30 - 40 m or more in height with (generally species-poor) understorey dominated by obligate wetland species (or opportunistic annuals during sustained dry periods). Murray River floodplain, restricted outside of Barmah Forest.

Indicator species: *Eucalyptus camaldulensis*, variously with *Pseudoraphis spinescens*, *Eleocharis acuta*, (locally) *Amphibromus fluitans*, or sometimes bare (leaf-litter/mud). Where present, associated species variously include *Lachnagrostis filiformis*, *Cardamine moirensis*, *Ranunculus pumilio*, *Triglochin procera* s.l. and *Centipeda cunninghamii*. On localised areas of flood-prone sandy terraces, connected to the river or major floodway creeks, *Eragrostis* spp. and *Cynodon dactylon* var. *pulchellus* can be locally dominant. This vegetation is transitional to Intermittent Swampy Woodland and was treated as a variant of the latter along the lower Murray.

### **Riverine Swampy Woodland [EVC #815]**

Defining characteristics: Eucalypt woodland to open woodland, ground-layer grassy to sedgy to herbaceous, with species indicative of periodic water-logging (and with floristic affinities to Plains Grassy Wetland). Depleted and rare, most extensive at Barmah Forest.

Indicator species:

Riverina Plains - *Eucalyptus microcarpa*, or sparse *E. camaldulensis* in wetter central areas. Species include *Pycnosorus globosus*, *Amphibromus nervosus*, *Austrodanthonia duttoniana*, *Lachnagrostis filiformis* var. 1, *Eleocharis acuta*, *Juncus* spp. (*J. flavidus*, *J. amabilis*, *J. subsecundus*, *J. pallidus*), *Walwhalleya prolata*, *Isolepis* spp., *Alternanthera denticulata* s.l., *Lythrum hyssopifolia*, *Swainsona procumbens*, *Asperula conferta*, *Haloragis aspera*, *Calotis scapigera*, *Marsilea* spp., *Lobelia concolor* and *Rumex* spp.

Riverine Floodplain - *E. camaldulensis* (sometimes with scattered *E. largiflorens*), with species including *Austrodanthonia duttoniana*, *Amphibromus nervosus*, *Eleocharis acuta*, *Eleocharis pusilla*, *Lobelia concolor*, *Wahlenbergia fluminalis*, *Goodenia* spp., *Calotis* spp., *Marsilea* spp. and *Brachyscome basaltica* var. *gracilis*. Sparse tussocks of *Carex tereticaulis* or *Paspalidium jubiflorum* can also be present.

#### **Rushy Riverine Swamp [EVC #804]**

Defining characteristics: Collective label for the various zones of vegetation associated with semi-permanent wetlands with (turf/aquatic) grassy species co-dominating in mosaic or association with components of tall rushland and aquatic herbs. Concentrically zoned wetland with lawn-like grassy centres during drier periods or as patchy structural mosaic. Can be viewed as an aggregate or a set of variously represented components, variously including species poor components of Tall Marsh, Floodplain Grassy Wetland, Aquatic Sedgeland, Aquatic Herbland and Dwarf Floating Aquatic Herbland. Scattered and restricted, floodplains in less arid parts of the Riverina, upstream from Gunbower Island.

Indicator species: Dominated by *Amphibromus fluitans* and/or *Pseudoraphis spinescens*, with *Stellaria caespitosa* and/or *Myriophyllum* spp. (mostly *M. variifolium* or *M. crispatum*), and ringed by/in mosaic with *Juncus ingens*. *Eucalyptus camaldulensis* is present around the verges. Additional aquatics which can be present include *Azolla filiculoides*, *Eleocharis sphacelata*, *Ludwigia peploides* subsp. *montevicensis*, *Potamogeton tricarinatus* s.l., *Landoltia punctata*, *Ricciocarpus natans*, *Vallisneria americana* var. *americana* and *Stellaria caespitosa*.

#### **Saline Aquatic Meadow [EVC #842]**

Defining characteristics: Submerged herbland of thin grass-like plants, occurring within brackish to hyper-saline waterbodies (shallow lakes and swamps and intermittent wetland ponds). The vegetation is characteristically extremely species-poor, comprising one or more species of *Lepilaena* or *Ruppia*. Widespread in lowlands (within restricted habitat), principally in the Wimmera, western volcanics and coastal areas.

Indicator species: Variously *Ruppia megacarpa*, *Ruppia polycarpa*, *Lepilaena* spp. (e.g. *L. priessii*, *L. bilocularis*, *L. cylindrocarpa*), *Ruppia maritima* (confined to north-west of the State).

#### **Saline Lake Aggregate [EVC #717]**

Defining characteristics: Collective label for the various zones of vegetation associated with the floors and verges of saline waterbodies. Components of the aggregate variously include Saline Aquatic Meadow, Plains Saltmarsh, Brackish Herbland, Brackish Sedgeland and (on drier verges) Brackish Grassland. Mainly western and northern areas, but also scattered sites on coastal plains.

Indicator species: See descriptions of component EVCs.

#### **Saline Lake-verge Aggregate [EVC #648]**

Defining characteristics: Collective label for the various zones of vegetation associated with the verges of saline waterbodies. Potential components of the saline lake aggregate variously include Saline Aquatic Meadow, Plains Saltmarsh, Brackish Herbland, Brackish Sedgeland, Brackish Wetland Aggregate and (on drier verges) Brackish Grassland and Brackish Shrubland. Mainly western and northern areas, but also scattered sites on coastal plains.

Indicator species: See descriptions of component EVCs.

### **Salt Paperbark Woodland [EVC #676]**

Defining characteristics: Melaleuca woodland with halophytic understorey, occurring on seasonally waterlogged heavy clay soils on saline flats and lake verges of inland semi-arid areas. Restricted, drier northern and western areas of the State.

Indicator species: *Melaleuca halmaturorum* subsp. *halmaturorum*, with *Halosarcia* spp., *Sarcocornia quinqueflora* subsp. *quinqueflora* and halophytic herbs - e.g. variously *Triglochin striata*, *Mimulus repens*, *Selliera radicans*.

### **Samphire Shrubland [EVC #101]**

Defining characteristics: Low halophytic shrubland of drier inland areas, dominated by succulent-stemmed chenopods (samphires). Lower rainfall western and northern areas.

Indicator species: *Halosarcia* spp., *Frankenia* spp.; potentially more diverse with a range of small annual herbs (e.g. *Brachyscome lineariloba*, *Crassula sieberiana* s.l., *Hymenobolus procumbens*, *Senecio glossanthus*, *Triglochin* spp.) on outer verges and mounds.

### **Sea-grass Meadow [EVC #845]**

Defining characteristic: Sward-forming aquatic herbland of sheltered marine shallows, intertidal flats and lower estuarine habitats. Scattered along Victorian coast, with most extensive development within Corner Inlet and Westernport Bay.

Indicator species: *Zostera* and / or *Heterozostera* spp., often monospecific and sometimes in close proximity to stands of *Avicennia marina*. *Zostera muelleri* extends into lower estuarine habitats, with *Heterozostera tasmanica* conspicuous on intertidal mud flats. A localised variant of inter-tidal mud-flats of western Port Phillip Bay includes *Lepilaena marina* and *Ruppia tuberosa*.

### **Seasonally Inundated Shrubby Woodland [EVC #195]**

Defining characteristics: Woodland of broad drainage lines and poorly-drained flats (e.g. recent Quaternary swamp deposits, seasonally waterlogged depression between dunes), in habitat that is usually inundated (or at least water-logged) for extensive periods over winter. The EVC is characteristically rich in geophytes, sedges and annual herbs. Principally in south-west, but extending into north-central areas of the State and central Gippsland.

Indicator species: *Eucalyptus* spp. (notably *E. camaldulensis*, also *E. leucoxylon* and *E. melliodora*; *E. ovata* in Gippsland) with *Callistemon* spp. (*C. rugosulus* in western Victoria; *C. citrinus* in Gippsland) and *Melaleuca* spp. in wetter sites (notably *M. decussata* and *M. gibbosa*; *M. parvistaminea* in Gippsland). *Melaleuca brevifolia* dominated shrubland/heath in sub-saline sites is described as Brackish Shrubland.

### **Seasonally Inundated Sub-saline Herbland [EVC #196]**

Defining characteristic: Very species-poor low herbland of seasonal saline wetland within relicts of former tidal lagoons, dominated by *Wilsonia* spp. The habitat is not inundated tidally, but by overland flows. Extremely localised (mostly Bellarine Peninsula, small areas in the Gippsland Lakes)

Indicator species: *Wilsonia humilis* and/or *W. backhousei*.

### **Sedge Wetland [EVC #136]**

Defining characteristics: Seasonally inundated freshwater sedgeland of depressions, typically within swales amidst soils with a substantial sandy component, clearly dominated by tall sedges, lacking the diversity of broad-leaved herbs associated with relatively intact Plains Sedgy Wetland (and occurring within relatively less-fertile land-types than the latter). Widespread in southern and higher rainfall western areas.

Indicator species: *Lepidosperma longitudinale*, *Baumea arthrophylla* and/or *Baumea juncea* diversity variable, associated species variously including *Schoenus* spp. (variously *S. tesquorum*, *S. apogon*, *S. brevifolius*), *Baumea juncea*, *Goodenia humilis* and *Patersonia* spp.

### **Sedge Wetland/Aquatic Sedgeland Complex [EVC #963]**

Defining characteristics: Tall sedgeland, with a component of septate, hollow-leaved sedges and aquatic herbs. Outer fringes are typically richer, with species characteristic of Sedge Wetland. Restricted, principally in south-west but with disjunct outliers further east (e.g. Dereel, Brisbane Ranges).

Indicator species: *Baumea articulata*, *Chorizandra australis* (or possibly on occasion *C. cymbaria*), *Lepidosperma longitudinale*, *Baumea arthrophylla*, *Villarsia reniformis*, *Myriophyllum* spp. (*M. crispatum* and *M. simulans*), *Triglochin procera* s.l. and *Isolepis fluitans*. The outer drier verges are much more species-rich (see Sedge Wetland).

### **Sedge Wetland/Brackish Herbland Complex [EVC #1113]**

Defining characteristics: Sedgeland of near coastal depressions, with the structural dominant species of Sedge Wetland occurring in association with a component of halophytic herbs. Very rare, recorded from sub-saline sandy soils with a high organic content on the Mornington Peninsula, but potentially at least previously more widespread in coastal areas.

Indicator Species: *Baumea arthrophylla*, *Baumea juncea* and/or *Lepidosperma longitudinale*, variously with e.g. *Lobelia irrigua*, *Isolepis cernua*, *Schoenus nitens*, *Selliera radicans*, *Distichlis distichophylla* and/or *Samolus repens*.

### **Sedge Wetland/Calcareous Wet Herbland Complex [EVC #883]**

Defining characteristics: Open sward of sedge species characteristic of Sedge Wetland, in association with herbaceous species of wet calcareous habitats. Rare with variants from near-coastal Western Victoria and South Gippsland.

Indicator species:

Western Victoria: *Baumea arthrophylla*, *Lachnagrostis filiformis* var. 2, *Centella cordifolia*, *Hydrocotyle muscosa*, *Isolepis fluitans*, *Myriophyllum simulans*, *Goodenia humilis*, *Schoenus tesquorum* and *Villarsia reniformis*, with a wide range of associated species at low frequencies on more species-rich outer verges.

South Gippsland: *Baumea arthrophylla*, *Baumea juncea*, *Carex appressa*, *Poa labillardierei*, *Hydrocotyle* spp. (*H. sibthorpioides* s.l., *H. pterocarpa*, *H. muscosa*), *Mentha diemenica*, with a wide range of associated species at low frequencies on more species-rich outer verges. *Gahnia trifida* appears to have been greatly reduced by grazing following burning.

### **Sedge-rich Wetland [EVC #281]**

Defining characteristics: Treeless (or nearly so) vegetation of small swamps on seasonal drainage lines, characterised by a diversity of small sedges, the extent of bare earth and lack of shrubs. Habitat prone to shallow seasonal inundation and extreme summer dryness. Typically species-rich, with many seasonal species present at very low frequencies. Restricted, south-western areas.

Indicator species: *Chorizandra enodis*, diversity of small plants (especially sedges), e.g. *Isolepis fluitans*, *Schoenus latelaminatus*, *Juncus holoschoenus*, *Juncus bufonius*, *Gratiola pumilo*, *Schoenus tesquorum*, *Lilaeopsis polyantha*, *Neopaxia australasica*, *Goodenia humilis* and *Villarsia reniformis*.

### **Sedgy Riverine Forest [EVC #816]**

Defining characteristics: Eucalypt forest (to woodland) with understorey dominated by larger sedges (to sedgy-herbaceous or sedgy-grassy), floristics with some affinities to Red Gum Swamp. Floodplains of less arid Riverina and Wimmera (absent from further north-west).

Indicator species:

Murray River Floodplain: *E. camaldulensis* with *Carex tereticaulis*, variously with *Bolboschoenus medianus*, *Paspalidium jubiflorum*, *Eleocharis acuta*, *Juncus amabilis*, *Lobelia concolor*, *Brachyscome basaltica* var. *gracilis*, *Amphibromus nervosus*, *Lachnagrostis filiformis* var. 1 and

*Calotis* spp., *Stellaria angustifolia*, *Phragmites australis* and *Craspedia paludicola*, with *Eleocharis pusilla* on drier margins.

Wimmera: *E. camaldulensis* with *Carex tereticaulis* and associated species including *Cyperus* spp., *Isolepis* spp., *Juncus* spp., *Centipeda cunninghamii*, *Calotis scapigera*, *Crassula helmsii*, *Triglochin* spp. and *Myriophyllum* spp.

### **Sedgy Riverine Forest/Riverine Swamp Forest Complex [EVC #817]**

Defining characteristics: Understorey dominants of Riverine Swamp Forest conspicuous in association or fine-scale mosaic with larger tussock or rhizomatous species characteristic of Sedgy Riverine Forest. Floodplains of less arid Riverina, but mainly within Barmah Forest.

Indicator species: *E. camaldulensis*, with *Carex tereticaulis* and, variously *Bolboschoenus medianus*, *Phragmites australis* and *Paspalidium jubiflorum* in association or mosaic with *Eleocharis acuta* and/or *Pseudoraphis spinescens* (also *Amphibromus nervosus*, *Persicaria* spp. - in particular *P. prostrata*, *Centipeda cunninghamii*, *Eclipta platyglossa* and *Lobelia concolor*.

### **Sedgy Swamp Woodland [EVC #707]**

Defining characteristics: Woodland with ground layer typically dominated by *Lepidosperma longitudinale* (or rarely *Lepidosperma congestum*) with a range of herbs characteristic of seasonally wet sites. Occurs on seasonally wet flats of coastal plains, on Quaternary sandy soils over heavier sub-soils. Rare, south-west Victoria and Mornington Peninsula.

Indicator species: *Eucalyptus ovata*, *Lepidosperma longitudinale* (or rarely *Lepidosperma congestum*), *Goodenia humilis*, *Gratiola pubescens*, *Villarsia reniformis*, *Centella cordifolia*.

### **Shell-beach Herbland [EVC #964]**

Defining characteristics: Turf grassland/herbland mounds within largely unvegetated areas, occurring on shell deposits on saline lake verge, over grey clay soils. Rare, Lake Corangamite.

Indicator species: *Convolvulus* sp. and *Wilsonia backhousei*, with *Cuscuta* sp., *Distichlis distichophylla*, *Geranium retrorsum* s.l. and a range of introduced annuals and biennials.

### **Sink-hole Wetland Aggregate [EVC #908]**

Defining characteristics: Collective label for the various zones of wetland vegetation associated with near-coastal sink-holes in limestone. The central 'sink-hole' portions of the relevant wetlands are species-poor, with mats of aquatics. This inner zone is fringed by a sedgy verge, which is fringed by Swamp Scrub at the few known sites. Rare, far south-west.

Indicator species: *Myriophyllum salsugineum* and *Nitella* spp. (Characeae), *Baumea arthrophylla*, *Baumea juncea*, *Schoenoplectus pungens*, *Typha* spp., *Triglochin procera* s.l., *Leptospermum lanigerum* (outer verges).

### **Spike-sedge Wetland [EVC #819]**

Defining characteristics: Low sedgy vegetation of seasonal or intermittent wetlands, dominated by spike-sedges and usually species-poor. Typically treeless, but sparse eucalypts (mostly *E. camaldulensis*) can be present in marginal sites. Scattered in drier lowlands, including western volcanics, Riverina floodplains and Wimmera.

Indicator species: *Eleocharis acuta* (or rarely *E. pusilla*), monospecific or with *Lachnagrostis filiformis* var. 1 and incidental opportunistic species (e.g. *Crassula helmsii*, *Triglochin procera* s.l., *Lythrum hyssopifolia*, *Glyceria australis*, *Stellaria* spp). The verges can be more species-rich and grade into other EVCs, notably Plains Grassy Wetland.

### **Spring Soak Woodland [EVC #80]**

Defining characteristics: Herbland to woodland with shrubby-herbaceous understorey, herb-rich wetland vegetation associated with soaks and springs. Rare, north-east Victoria.

Indicator species: *Eucalyptus* spp. (variously *E. blakelyi*, *E. goniocalyx* or *E. nortonii*), *Leptospermum continentale*, with *Goodenia macbarronii*, *Schoenus apogon* and a range of associated herbs, sedges and rushes – e.g. *Aphelia gracilis*, *Glossostigma elatinooides*, *Drosera peltata* ssp. *peltata*, *Centrolepis strigosa* subsp. *strigosa*, *Hypericum japonicum*, *Isotoma fluviatilis* subsp. *australis*, *Eragrostis brownii*, *Juncus* spp.

#### **Stony Rises Pond Aggregate [EVC #857]**

Defining characteristics: Collective label for the various zones of wetland vegetation associated with more permanent ponds of basaltic stony rises. Components include Dwarf Floating Aquatic Herbland and Wet Verge Sedgeland/Tall Marsh. Rare, stony rises of most recent volcanics (notably near Camperdown).

Indicator species: Various associations of *Lemna disperma*, *Lemna trisulca*, *Wolffia australiana*, *Azolla filiculoides*, *Carex appressa*, *Crassula helmsii*, *Myriophyllum* spp., *Persicaria decipiens* and *Typha domingensis*.

#### **Sub-alpine Wet Heathland [EVC #210]**

Defining characteristics: Wet treeless heathland habitat of sub-alpine soaks or flats along streams. Part of the sub-alpine (to alpine) bog aggregates. Some communities are difficult to interpret as a consequence of degradation of bogs arising from cattle grazing. Localised within higher mountains. Often more shrubby than alpine systems.

Indicator species: *Baeckea* spp., *Epacris* spp. (notably *E. paludosa*), *Empodisma minus*.

#### **Sub-alpine Wet Sedgeland [EVC #917]**

Defining characteristics: Treeless tussocky (grassy-sedgy) vegetation of wet plains on sub-alpine (apparently to alpine) creek flats, with patchy inter-tussock matting of *Sphagnum* spp. (with few large *Sphagnum* hummocks, and patchy *Callistemon* shrubland, both primarily on upper margins). Relatively species-poor when tussock or sward density is moderate to high. Rare, lower elevation snowfields.

Indicator species: *Carex gaudichaudiana* and/or *Carex appressa*, *Poa* spp., notably *P. helmsii*, with *Caltha introloba*, *Sphagnum* spp. and (patchy) *Callistemon pityoides*.

#### **Submerged Aquatic Herbland [EVC #918]**

Defining characteristics: Extensive submerged beds of Eel Grass (*Vallisneria americana*) in lakes and watercourse ponds. Restricted, mainly in west to north-west, apparently depleted by carp.

Indicator species: *Vallisneria americana* var. *americana* is typically dominant as a submerged sward. *Myriophyllum* spp. may also be present. Submerged Aquatic Herbland can occur in association with a range of wetland components (Tall Marsh, Aquatic Herbland, Brackish Aquatic Herbland and (rarely) Saline Aquatic Meadow).

#### **Sub-saline Depression Shrubland [EVC #820]**

Defining characteristics: Low open shrubland/herbland of the highest terraces of the former (i.e. pre 1750) Murray River floodplain in far north-west, dominated by chenopods and succulents, occupying semi-saline treeless pans within the drier (more elevated) Black Box - Chenopod Woodland zone. Rare, far north-west of the State.

Indicator species: The major species include *Sclerolaena tricuspis*, *Malacocera tricornis* and *Disphyma crassifolium* subsp. *clavellatum*, variously with *Maireana pentagona* and *Cressa australis*, *Frankenia* spp. or *Sarcocornia* spp.

#### **Swamp Heathland Aggregate [EVC #49]**

Defining characteristics: Collective label for the various zones of densely shrubby vegetation associated with water-logged flats on acidic soils of the Central Highlands. Considered to include three component EVCs (Riparian Scrub, Wet Heathland and Damp Heathy Woodland). Confined to lower elevations of central highlands east of Melbourne.

Indicator species: *Melaleuca squarrosa*, *Gleichenia* spp., *Baumea tetragona*, *Gahnia sieberiana*, *Epacris lanuginosa*, *Pultenaea weindorferi*, *Empodisma minus*, *Chorizandra cymbaria* s.l., typically fringed by *Eucalyptus cephalocarpa* -dominated Damp Heathy Woodland.

### **Swamp Scrub [EVC #53]**

Defining characteristics: Dense (and potentially up to 10-15 m) shrubby vegetation of swampy flats, dominated by Myrtaceous shrubs (to small trees), ground-layer often sparse, aquatic species conspicuous, sphagnum and/or water-logging tolerant ferns sometimes present. Formerly widespread in cooler lowland southern areas of Victoria.

Indicator species: *Melaleuca ericifolia*, *Leptospermum lanigerum*, *Isolepis inundata*, *Triglochin procera* s.l., *Villarsia* spp. Swamp Scrub can interface with Riparian Forest, Swampy Woodland, Swampy Riparian Woodland, Riparian Scrub and Seasonally Inundated Shrubby Woodland, and local floristics can reflect these transitions.

### **Swampy Riparian Woodland [EVC #83]**

Defining characteristics: Woodland vegetation (in mosaic with scrub/reed-beds) associated with very low-gradient streams within areas subject to riparian processes. Typically constitutes linear wetland, but includes drier banks and levees, as for Floodplain Riparian Woodland. Scattered in moister lowland areas.

Indicator species: *Eucalyptus ovata* or *Eucalyptus camphora* subsp. *humeana*, variously *Leptospermum lanigerum*, *Melaleuca ericifolia* (southern Victoria only), *Phragmites australis*, *Persicaria decipiens*, *Calystegia sepium* subsp. *roseata*, *Acacia melanoxylon*, *Poa labillardierei* and *Poa ensiformis*.

### **Swampy Woodland [EVC #937]**

Defining characteristics: Swampy Woodland is a poorly understood vegetation type of poorly drained, seasonally waterlogged heavy soils. In the strict sense the label applies to at least seasonally waterlogged vegetation of wet flats, not subject to direct flooding from major streams, but receiving water through seepage or surface run-off. In some instances Swampy Woodland can occur to the rear of current levees on floodplains, receiving water via minor side streams rather than direct flooding from the main watercourse. The distinctions between Swampy Riparian Woodland and Swampy Woodland become more difficult where the habitats occur in narrow bands along low gradient valleys in more dissected terrain. Swampy Woodland occurs as an outer zone to some wetland systems. Formerly widespread in cooler southern areas, mainly in the east, extending into margins of the highlands.

Indicator species: Typically dominated by *Eucalyptus ovata*, but a range of other eucalyptus spp. can be present, especially in drier versions (including *E. fulgens*, *E. ignorabilis* s.l., *E. yarraensis*, *E. camphora* subsp. *humeana*, *E. obliqua*, *E. radiata* s.l.), variously with *Melaleuca ericifolia* (of reduced vigour relative to occurrences within Swamp Scrub and Swampy Riparian Woodland), *Acacia* spp. (including *A. melanoxylon*, *A. verticillata*), *Goodenia ovata*, *Coprosma quadrifida*, *Ozothamnus ferrugineus*, *Poa* spp., *Carex* spp. and *Lepidosperma* spp.

### **Sweet Grass Wetland [EVC #920]**

Defining characteristics: Very species-poor wetland vegetation, dominated by Sweet Grass (distinguished from Plains Grassy Wetland by extremely low diversity - it is frequently mono-specific or virtually so). Sweet Grass Wetland can form an inner zone to Plains Grassy Wetland and in some (but not all) instances a pragmatic approach may treat Sweet Grass dominated wetland cores as a very species-poor phase of Plains Grassy Wetland. Scattered on western volcanics, also recorded from the less-arid Wimmera.

Indicator species: *Glyceria australis*, sometimes mono-specific or with sparse associated species including *Eleocharis acuta*, *Rumex bidens* and *Lachnagrostis filiformis* var. 2. *Poa labillardierei* and *Eryngium vesiculosum* are frequently present on drier verges. In some cases a diverse seasonal flora

(with affinities to Plains Grassy Wetland) can be expressed as inundation retreats, whereas in others the vegetation remains very species-poor.

### **Tall Marsh [EVC #821]**

Defining characteristics: Wetland dominated by tall emergent graminoids, typically in thick species-poor swards. Rushland, sedgeland or reedbed - locally closed or in association or fine-scale mosaic with Aquatic Herbland (e.g. along floodway lagoons). At optimum development, the vegetation is treeless, but sparse *Eucalyptus camaldulensis* (or in higher rainfall areas, *E. ovata*) are dispersed through some sites where sufficient dry periods occur to allow their survival. Scattered across lowland Victoria.

Indicator species: Various with *Phragmites australis*, *Typha* spp., *Juncus ingens*, *Schoenoplectus tabernaemontanii* and in more marginal sites sometimes also *Bolboschoenus* spp., *Cyperus* spp. or (locally) *Cladium procerum*. Associated species are quite variable and can include aquatics such as *Potamogeton* spp., *Myriophyllum* spp., *Rumex bidens*, *Stellaria caespitosa*, *Amphibromus fluitans* and *Pseudoraphis spinescens*, *Wolffia* spp., *Azolla* spp., *Landoltia punctata* and *Lemna* spp. In cooler or more reliably irrigated areas, frequent associate species include *Calystegia sepium* subsp. *roseata* and *Urtica incisa*.

### **Unknown/Unclassified [EVC #999]**

Defining characteristics: Applicable where vegetation cannot be allocated to a defined EVC and the unvegetated descriptor is not relevant. This can apply in wetlands which have been dry for protracted periods, resulting in colonization by opportunistic dryland species. In some cases this cover may be temporary, while in others it may be indicative of long-term modification.

Indicator species: The composition of the flora is variable, according to the landscape context of the relevant wetland. It can include a range of chenopods in lower rainfall areas (e.g. *Atriplex semibaccata*, *Einadia nutans*, *Enchylaena tomentosa*, *Sclerolaena* spp.), grasses (e.g. *Austrodanthonia* spp., *Austrostipa* spp., *Chloris truncata*, *Enteropogon acicularis*, *Lachnagrostis filiformis* var. 1) and herbs, notably daisies (e.g. *Senecio* spp., *Vittadinia* spp., *Cassinia* spp.). The composition will change according to the length of time since inundation, with the potential for progressive colonisation of a range of less opportunistic species from adjacent dryland communities.

Of the above species, *Lachnagrostis filiformis* var. 1 represents a special case. It can form a dense but temporary cover in some wetlands during briefer dry phases. In some instances, there will be evidence of other EVCs (e.g. incidental *Centipeda cunninghamii* or *Glycyrrhiza acanthocarpa*, being indicative of Floodway Pond Herbland or Lake Bed Herbland respectively), and the wetland zone can be assessed according to the relevant EVC. In the absence of such evidence, it will generally be best to refer dense swards of *L. filiformis* var. 1 to EVC 999, even if it may be a transitory phase following the unvegetated condition (EVC 990). It should be noted that a species-poor cover dominated by stoloniferous to rhizomatous perennial plants currently included within *Lachnagrostis filiformis* var. 1 constitutes clearly representative wetland vegetation, and is referable to EVC 306 (Aquatic Grassy Wetland).

Note: There is no benchmark provided for EVC 999. Where EVC 999 has developed due to sustained drought, and future inundation events are still possible, the vegetation can generally only be assessed if it is known what EVC the current vegetation has developed from, or a sensible estimation of representation of likely prior flora can be made (e.g. the minimum life-form score applied for residual River Red Gums, and the structural component based on an assessment of evidence of previous abundance). However, the allocation of the descriptor EVC 999 will generally imply that the wetland is outside of the range where the condition can sensibly be assessed. In instances where the EVC has arisen through environmental degradation such as wetland drainage, it may be desired to apply a provisional score in the absence of certainty about prior EVCs at the site. In communities lacking residual structural dominants or other representative wetland flora, the only attribute which may score other than zero will be the lack of weeds component, and the initial vegetation score will thus be somewhere in the range of 0 to 25 out of 100.

### **Unvegetated (open water/bare soil/mud) [EVC #990]**

Defining characteristics: Low lying areas which are unvegetated (or nearly so), at least in relation to vascular flora, including relevant habitat on intertidal mudflats. Widespread wetland component, which may or may not alternate across time with various vegetated EVCs.

Indicator species: Lacking vascular flora (but sometimes with sparse opportunistic species).

### **Wet Heathland [EVC #8]**

Defining characteristics: Low shrubby (to sedgy) vegetation associated with impeded drainage on wet flats at lower (sub-montane) elevations. Scattered across less fertile soils of cooler southern and south-western Victoria.

Indicator species: *Melaleuca squarrosa*, *Leptospermum continentale*, *Xanthorrhoea* spp., *Gymnoschoenus sphaerocephalus*, *Lepyrodia* spp., *Leptocarpos* spp. s.l., *Empodisma minus* and including species restricted to water-logged habitats, e.g. *Sprengelia incarnata*, *Drosera binata*, *Gonocarpus micranthus*.

### **Wet Heathland/Sedge Wetland Complex [EVC #931]**

Defining characteristics: Sedgy open heathland, transitional in structure and floristics between Wet Heathland and Sedge Wetland. Rare, recorded with certainty only from south-west Victoria.

Indicator species: *Leptospermum continentale*, *Lepidosperma longitundinale*, *Lepyrodia* spp and *Schoenus tesquorum*, with associated species including *Amphibromus recurvatus*, *Notodanthonia semiannularis*, *Mazus pumilio*, *Melaleuca squarrosa*, *Lobelia pedunculata* s.l., *Centella cordifolia* and *Villarsia reniformis*.

### **Wet Swale Herbland [EVC #12]**

Defining characteristics: Wetland vegetation of coastal barrier lagoons, including mixture of aquatic grasses, sedges and herbs. Rare, East Gippsland.

Indicator species: *Pseudoraphis paradoxa*, *Eleocharis sphacelata*, *Villarsia reniformis*, *Myriophyllum* spp.

### **Wet Verge Sedgeland [EVC #932]**

Defining characteristics: Tussock Sedge wetland component of cooler areas, occasionally occurring as main wetland vegetation present, typically dominated by *Carex appressa*. Scattered, mostly in south but extending (as a component of aggregate EVCs) to montane elevations in East Gippsland.

Indicator species: *Carex appressa*, with associated species variously including *Carex fascicularis*, *Juncus* spp. (notably *J. amabilis*, *J. gregiflorus*, *J. holoschoenus*), *Poa labillardierei*, *Glyceria australis* (pale green less upright forms), *Amphibromus nervosus*, *Crassula helmsii* and *Persicaria* spp. (e.g. *P. decipiens*, *P. lapathifolia*, *P. praetermissa*, *P. prostrata*), *Centella cordifolia*, *Eleocharis acuta*, *Epilobium billardierianum*, *Epilobium hirtigerum*, *Goodenia humilis*, *Lobelia pratioides* and *Hemarthria uncinata* var. *uncinata*.

### **Appendix 3. Wetland landscape profiles and components with wetland EVC lists.**

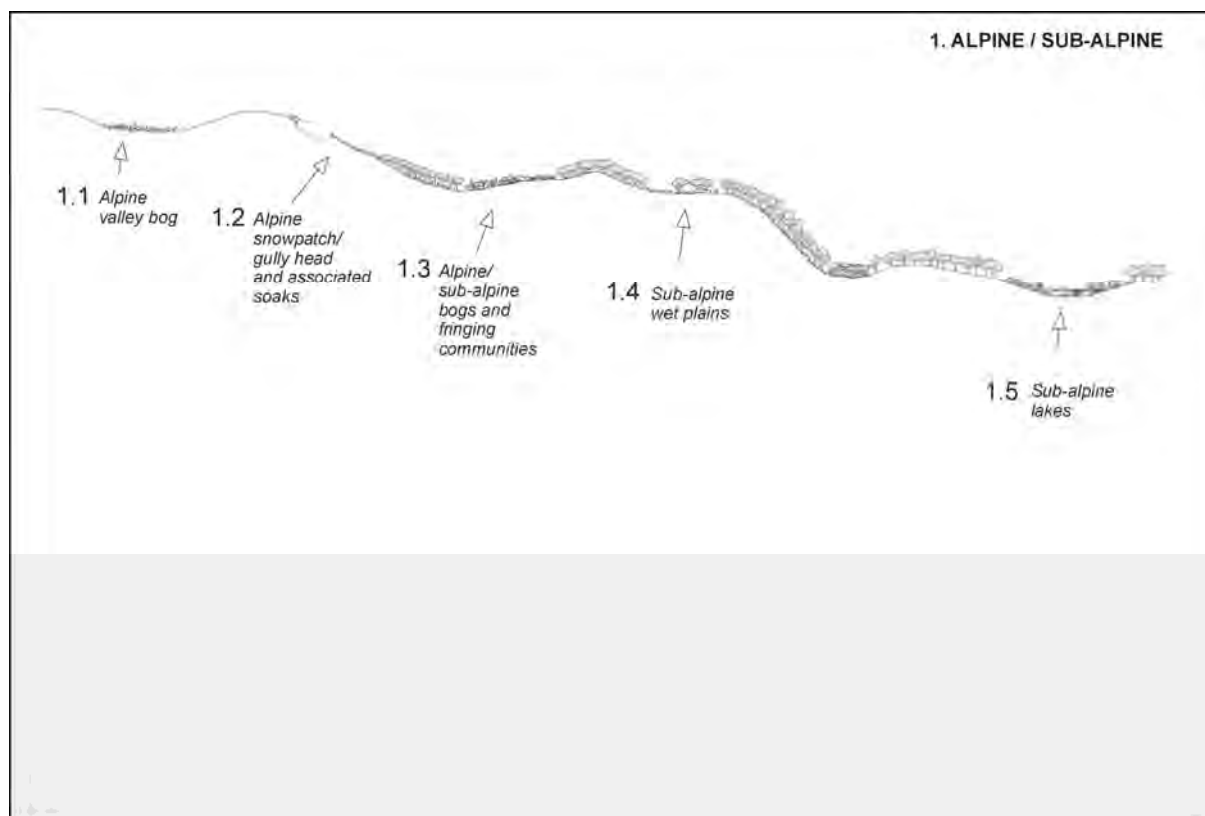
The ecological contexts described under these headings are not necessarily mutually exclusive. In instances where the ecological context of a given wetland overlaps more than one of these headings it is intended that the relevant ecological vegetation class (EVC) can be identified through any of the potentially relevant headings.

1. **ALPINE/SUB-ALPINE:** Wetlands associated with higher mountain areas of eastern Victoria, within areas subject to sustained winter snow (generally above 1200 m elevation, but sometimes extending lower with cool air drainage).
2. **MONTANE:** Wetlands associated with high elevation areas (generally within 700 – 1200 m elevation) of eastern Victoria below sub-alpine zone. Subject to cold air drainage, but below zone of sustained winter snow.
3. **LOWER MONTANE TO FOOTHILL/WET FOREST:** Wetlands of gullies and drainage lines within taller, denser forest country (e.g. East Gippsland, South Gippsland, Central Highlands, Otways).
4. **HILLS: FOOTHILLS, INLAND SLOPES AND HILLY NEAR-COASTAL:** Wetlands associated with drainage lines and wet flats of at least moderate rainfall foothill country (south of divide and moister inland slopes, generally >650 mm rainfall per annum).
5. **DRIER WESTERN HILLS, TABLELANDS AND NORTHERN SLOPES:** Wetlands associated with drainage lines, swales and wet flats of lower rainfall hilly areas (specifically north-east hills, drier Midlands of north-central Victoria and Dundas Tablelands, generally <650 mm rainfall per annum).
6. **LOWLAND GRASSY PLAINS - WESTERN VOLCANICS:** Wetland systems associated with basaltic terrain of (southern) western to central Victoria.
7. **LOWLAND GRASSY PLAINS - RIVERINA PLAINS (sedimentary):** Wetland systems associated with sedimentary alluvial plains of northern Victoria (within basin of Murray River and tributaries, approximately east of Loddon River).
8. **LOWLAND GRASSY PLAINS -: WIMMERA (TO SOUTHERN MALLEE):** Wetland systems associated with inland sedimentary alluvial plains of further western to northern-western Victoria (approximately west of Loddon River).
9. **LOWLAND GRASSY PLAINS - COASTAL/SOUTHERN PLAINS):** Wetland systems associated with relatively fertile (mostly clay) sedimentary plains south of the Divide.
10. **LOWLAND HEATHY/SANDY:** Wetland systems associated with relatively less fertile (mostly acidic sandy) sedimentary soils (e.g. sand sheets and dune swales), mostly south of the Divide but extending inland in south-west Victoria (e.g. Grampians, Little Desert).
11. **MALLEE - NON-RIVERINE:** Wetlands associated with mallee country of further north-west Victoria.
12. **RIVERINE - MID-MURRAY:** Wetlands associated with the riverine floodplain of Murray River and Tributaries (approximately above Wakool Junction)
13. **RIVERINE - MALLEE:** Wetlands associated with the riverine floodplain of Murray River and Tributaries (approximately below Wakool Junction)
14. **NEAR COASTAL:** Wetlands associated with near-coastal situations but outside of tidal or estuarine influences (especially calcareous dune systems and blocked drainage lines).
15. **LOWLAND RIPARIAN FLOODPLAIN:** Wetlands associated with floodplains of major streams outside of Victorian Riverina.
16. **LACUSTRINE:** Vegetation associated with lakes.

## Wetland landscape profiles, wetland components and wetland EVC lists

### 1. Alpine/Sub-alpine

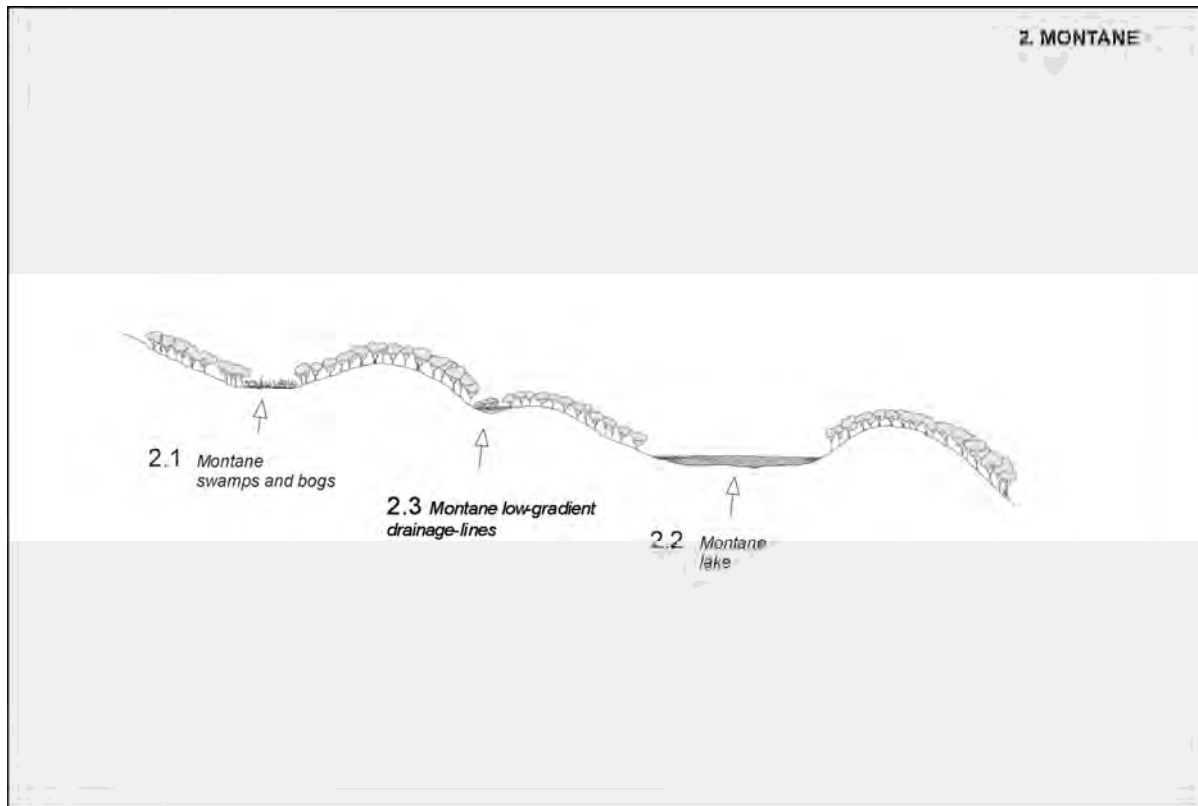
Wetlands associated with higher mountain areas of eastern Victoria, within areas subject to sustained winter snow (generally above 1200 m elevation, but sometimes extending lower with cool air drainage).



Component	EVC
1.1 Alpine valley bog	<ul style="list-style-type: none"> <li>• 171. Alpine Fen</li> <li>• 288. Alpine Heath Peatland</li> <li>• 1011. Alpine Hummock Peatland</li> </ul>
1.2 Alpine snow-patch/gully head and associated soaks	<ul style="list-style-type: none"> <li>• 905. Alpine Short Herbland</li> <li>• 288. Alpine Heath Peatland</li> <li>• 210. Sub-alpine Wet Heathland</li> <li>• 239. Alpine Creekline Herbland</li> </ul>
1.3 Alpine/sub-alpine bogs and fringing communities	<ul style="list-style-type: none"> <li>• 41. Montane Riparian Thickett</li> <li>• 171. Alpine Fen</li> <li>• 210. Sub-alpine Wet Heathland</li> <li>• 1011. Alpine Hummock Peatland</li> </ul>
1.4 Sub-alpine wet plains	<ul style="list-style-type: none"> <li>• 917. Sub-alpine Wet Sedgeland</li> </ul>
1.5 Sub-alpine lakes	<ul style="list-style-type: none"> <li>• 308. Aquatic Sedgeland</li> <li>• Verge communities - see 1.3 above.</li> </ul>

## 2. Montane

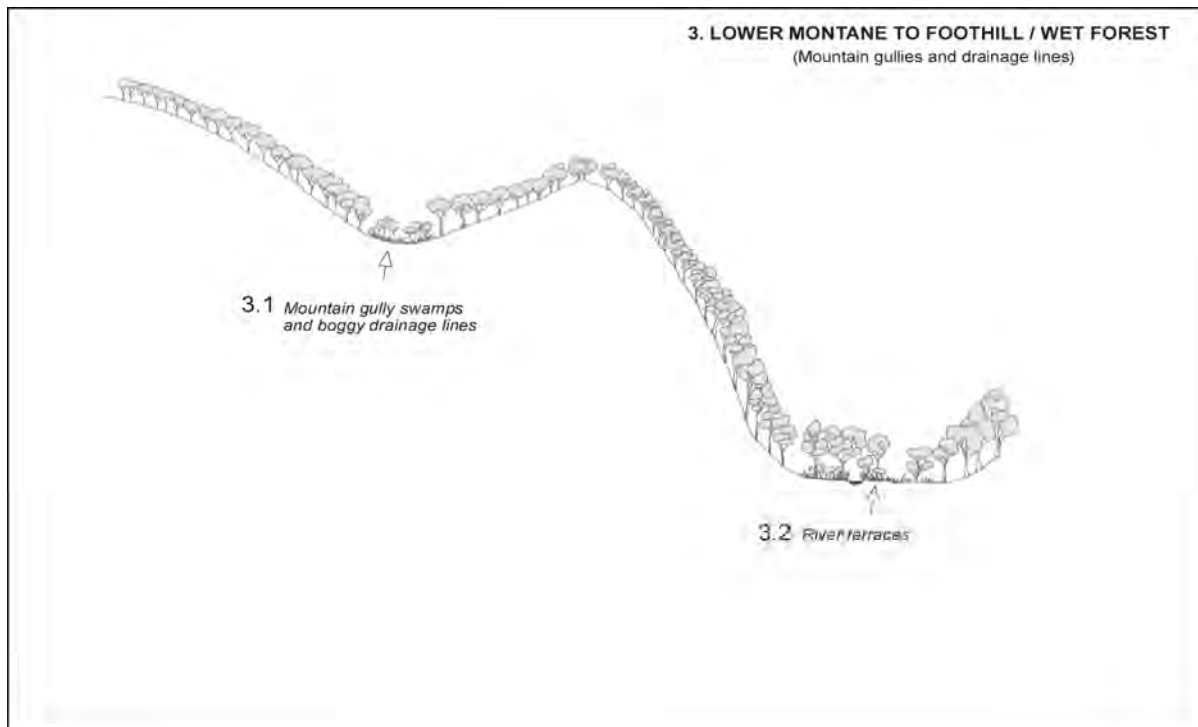
Wetlands associated with high elevation areas (generally within 700 – 1200 m elevation) of eastern Victoria below sub-alpine zone. Subject to cold air drainage, but below zone of sustained winter snow.



Component	EVC
2.1 Montane swamps and bogs	<ul style="list-style-type: none"> <li>• 653. Aquatic Herbland</li> <li>• 308. Aquatic Sedgeland</li> <li>• 966. Montane Bog</li> <li>• 318. Montane Swamp</li> <li>• 210 Sub-alpine Wet Heathland</li> <li>• 148. Montane Sedgeland</li> </ul>
2.2 Montane lake	<ul style="list-style-type: none"> <li>• 767. Plains Grassy Wetland/Brackish Herbland Complex</li> </ul>
2.3 Montane low-gradient drainage lines	<ul style="list-style-type: none"> <li>• 41. Montane Riparian Thickett</li> <li>• 148. Montane Sedgeland</li> <li>• 40. Montane Riparian Thickett</li> </ul>

### 3. Lower montane to foothill/Wet forest

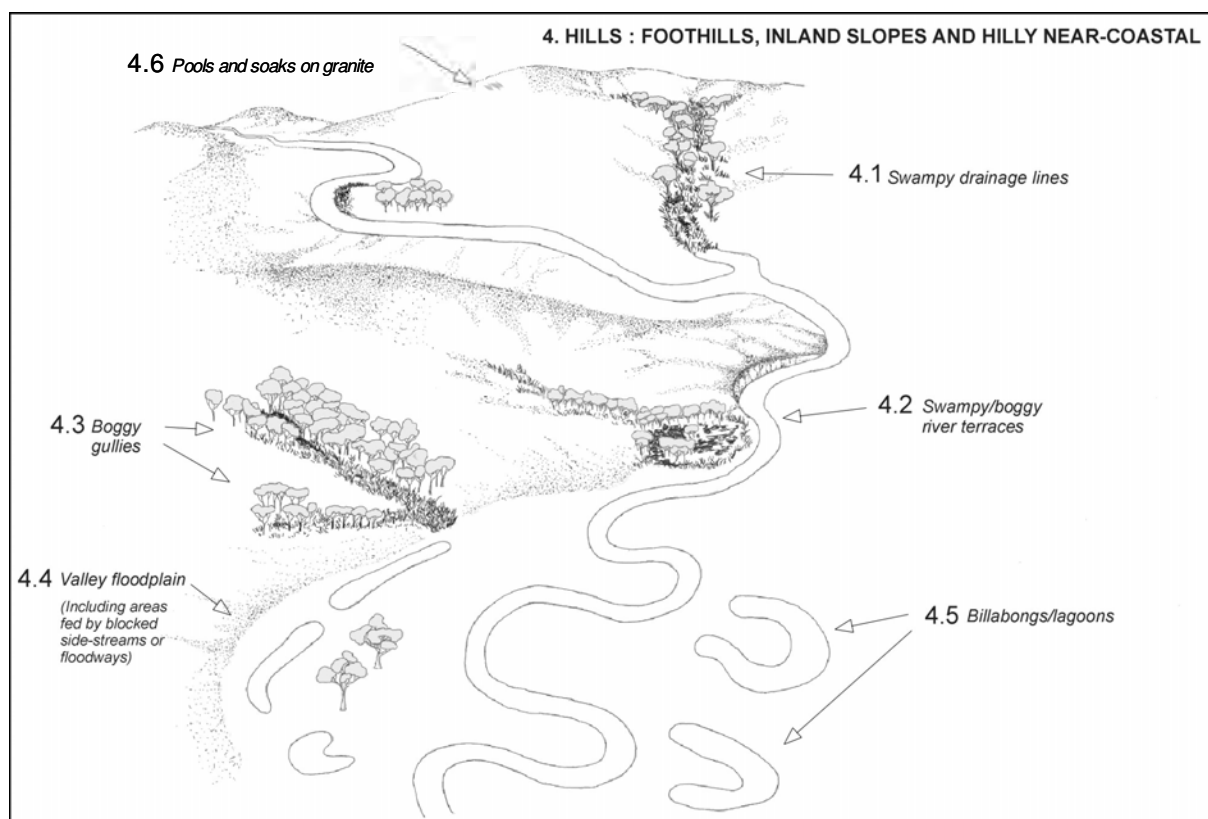
Wetlands of gullies and drainage lines within taller, denser forest country (e.g. East Gippsland, South Gippsland, Central Highlands, Otways).



Component	EVC
3.1 Mountain gully swamps and boggy drainage lines	<ul style="list-style-type: none"> <li>• 721. Fern Swamp</li> <li>• 728. Forest Creekline Sedge Swamp</li> <li>• 185. Perched Boggy Shrubland</li> <li>• 191. Riparian Scrub</li> </ul>
3.2. River terraces	<ul style="list-style-type: none"> <li>• 191. Riparian Scrub</li> <li>• 83. Swampy Riparian Woodland</li> </ul>

#### 4. Hills: Foothills, inland slopes and hilly near-coastal

Wetlands associated with drainage lines and wet flats of at least moderate rainfall foothill country (south of divide and moister inland slopes, generally >650 mm rainfall per annum).



Component	EVC
4.1 Swampy drainage lines	<ul style="list-style-type: none"> <li>937. Swampy Woodland</li> <li>83. Swampy Riparian Woodland</li> </ul>
4.2 Swampy/boggy river terraces	<ul style="list-style-type: none"> <li>83. Swampy Riparian Woodland</li> <li>53. Swamp Scrub</li> <li>937. Swampy Woodland</li> <li>932. Wet Verge Sedgeland</li> </ul>
4.3 Boggy gullies	<ul style="list-style-type: none"> <li>723. Forest Bog</li> <li>185. Perched Boggy Shrubland</li> <li>191. Riparian Scrub</li> <li>195. Seasonally Inundated Shrubby Woodland (dry north-central to south-west)</li> <li>80. Spring-soak Woodland (dry north-east)</li> </ul>
4.4 Valley floodplain (Including areas fed by blocked side-streams or floodways)	<ul style="list-style-type: none"> <li>56. Floodplain Riparian Woodland</li> <li>56. Floodplain Riparian Woodland/334. Billabong Wetland Aggregate</li> <li>56. Floodplain Riparian Woodland/172. Floodplain Wetland Aggregate</li> </ul>

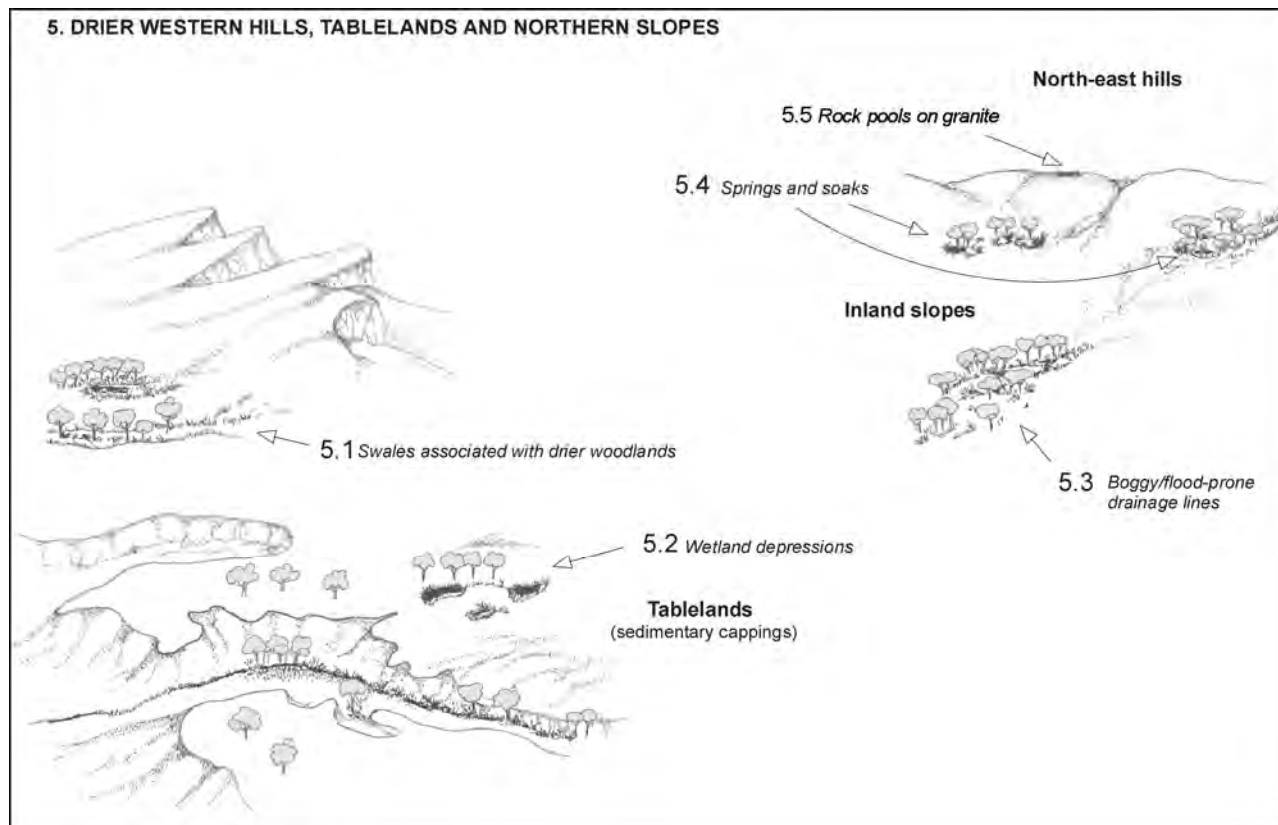
Components continued overleaf

#### 4. Hills: Foothills, inland slopes and hilly near-coastal (continued)

Component	EVC
4.5 Billabongs/lagoons	334. Billabong Wetland Aggregate/172. Floodplain Wetland Aggregate with potential components: 653. Aquatic Herbland 308. Aquatic Sedgeland 949. Dwarf Floating Aquatic Herbland 809. Floodplain Grassy Wetland, 810. Floodway Pond Herbland 918. Submerged Aquatic Herbland 53. Swamp Scrub 821. Tall Marsh 990. Unvegetated 932. Wet Verge Sedgeland
4.6 Pools and soaks on granite	1112. Granite Rock-pool Wetland 80. Spring-soak Woodland 185. Perched Boggy Shrubland (far north-east)

## 5. Drier western hills, tablelands and northern slopes

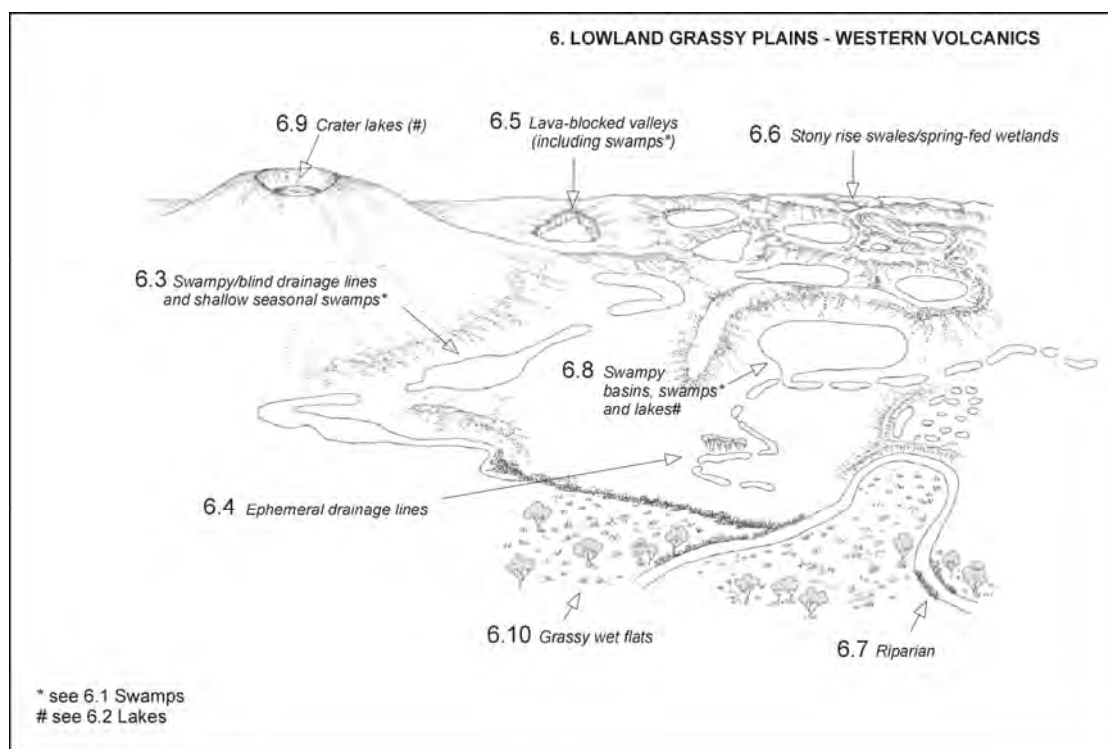
Wetlands associated with drainage lines, swales and wet flats of lower rainfall hilly areas (specifically north-east hills, drier Midlands of north-central Victoria and Dundas Tablelands, generally <650 mm rainfall per annum). On sandy (notably tertiary) soils. Also see 10. Lowland Heathy/Sandy.



Component	EVC
5.1 Swales associated with drier woodlands	<ul style="list-style-type: none"> <li>• 284. Claypan Ephemeral Wetland</li> <li>• 195. Seasonally Inundated Shrubby Woodland</li> <li>• 281. Sedge-rich Wetland</li> </ul>
5.2 Wetland depressions	<ul style="list-style-type: none"> <li>• 306. Aquatic Grassy Wetland</li> <li>• 653. Aquatic Herbland</li> <li>• 308. Aquatic Sedgeland</li> <li>• 125. Plains Grassy Wetland</li> <li>• 647. Plains Sedgy Wetland</li> <li>• 1010. Plains Sedgy Wetland/Sedge Wetland Complex</li> <li>• 963. Sedge Wetland/Aquatic Sedgeland Complex</li> </ul>
5.3 Boggy/flood-prone drainage lines (inland slopes)	<ul style="list-style-type: none"> <li>• 83. Swampy Riparian Woodland</li> <li>• 195. Seasonally Inundated Shrubby Woodland</li> </ul>
5.4 Springs and soaks (North-east hills)	<ul style="list-style-type: none"> <li>• 80. Spring Soak Woodland</li> </ul>
5.5 Rock pools on granite	<ul style="list-style-type: none"> <li>• 1112. Granite Rock-pool Wetland</li> </ul>

## 6. Lowland grassy plains – western volcanics

Wetland systems associated with basaltic terrain of (southern) western to central Victoria.



Component	EVC
6.1 Swamps	<ul style="list-style-type: none"> <li>• 306. Aquatic Grassy Wetland</li> <li>• 653. Aquatic Herbland</li> <li>• 308. Aquatic Sedgeland</li> <li>• 291. Cane Grass Wetland</li> <li>• 104. Lignum Swamp</li> <li>• 125. Plains Grassy Wetland</li> <li>• 755. Plains Grassy Wetland/Aquatic Herbland Complex</li> <li>• 960. Plain Grassy Wetland/Spike-sedge Wetland Complex</li> <li>• 961. Plains Rushy Wetland (low rainfall areas)</li> <li>• 647. Plains Sedgy Wetland</li> <li>• 1010. Plains Sedgy Wetland/Sedge Wetland Complex</li> <li>• 784. Plains Swampy Woodland/Lignum Swamp Complex</li> <li>• 292. Red Gum Swamp (rare on basalt)</li> <li>• 819. Spike-sedge Wetland</li> <li>• 920. Sweet Grass Wetland</li> <li>• 1111. Alkaline Basaltic Wetland Aggregate, components variously including: <ul style="list-style-type: none"> <li>– 821. Tall Marsh</li> <li>– 932. Wet Verge Sedgeland</li> <li>– 883. Sedge Wetland/Calcareous Wet Herbland Complex</li> </ul> </li> </ul>

Components continued overleaf

## 6. Lowland grassy plains – western volcanics (continued)

Component	EVC
6.2 Lakes	<ul style="list-style-type: none"> <li>• 718. Freshwater Lake Aggregate, components variously including:               <ul style="list-style-type: none"> <li>– 306. Aquatic Grassy Wetland</li> <li>– 653. Aquatic Herbland</li> <li>– 308. Aquatic Sedgeland</li> <li>– 949. Dwarf Floating Aquatic Herbland</li> <li>– 755. Plains Grassy Wetland/Aquatic Herbland Complex</li> <li>– 647. Plains Sedgy Wetland</li> <li>– 651. Plains Swampy Woodland</li> <li>– 918. Submerged Aquatic Herbland</li> <li>– 821. Tall Marsh</li> <li>– 932. Wet Verge Sedgeland</li> <li>– 657. Freshwater Lignum Shrubland</li> <li>– 990. Unvegetated</li> </ul> </li> <li>• 636. Brackish Lake Aggregate, components variously including:               <ul style="list-style-type: none"> <li>– 537. Brackish Aquatic Herbland</li> <li>– 947. Brackish Lignum Swamp</li> <li>– 538. Brackish Herbland</li> <li>– 656. Brackish Wetland Aggregate</li> <li>– 842. Saline Aquatic Meadow</li> <li>– 918. Submerged Aquatic Herbland</li> <li>– 657. Freshwater Lignum Shrubland</li> <li>– 821. Tall Marsh</li> <li>– 990. Unvegetated</li> </ul> </li> <li>• 717. Saline Lake Aggregate, components variously including:               <ul style="list-style-type: none"> <li>– 538. Brackish Herbland</li> <li>– 947. Brackish Lignum Swamp</li> <li>– 842. Saline Aquatic Meadow</li> <li>– 888. Plains Saltmarsh</li> <li>– 648. Saline Lake-verge Aggregate</li> <li>– 964. Shell-beach Herbland (extremely localised)</li> <li>– 990. Unvegetated</li> </ul> </li> </ul>
6.3 Swampy/blind drainage lines and shallow seasonal swamps	<ul style="list-style-type: none"> <li>• 947. Brackish Lignum Swamp</li> <li>• 656. Brackish Wetland Aggregate</li> <li>• 291. Cane Grass Wetland</li> <li>• 767. Plains Grassy Wetland/Brackish Herbland Complex</li> <li>• 959. Plains Grassy Wetland/Sedge-rich Wetland Complex</li> <li>• 960. Plains Grassy Wetland/Spike-sedge Wetland Complex</li> </ul>
6.4 Ephemeral drainage lines	<ul style="list-style-type: none"> <li>• 538. Brackish Herbland</li> <li>• 656. Brackish Wetland Aggregate</li> <li>• 678. Ephemeral Drainage-line Grassy Wetland (rainshadow areas west of Melbourne)</li> <li>• 124. Grey Clay Drainage-line Aggregate</li> <li>• 767. Plains Grassy Wetland/Brackish Herbland Complex</li> <li>• 53. Swamp Scrub</li> </ul>
6.5 Lava-blocked valleys	<ul style="list-style-type: none"> <li>• see 6.1 Swamps and 6.2 Lakes</li> </ul>

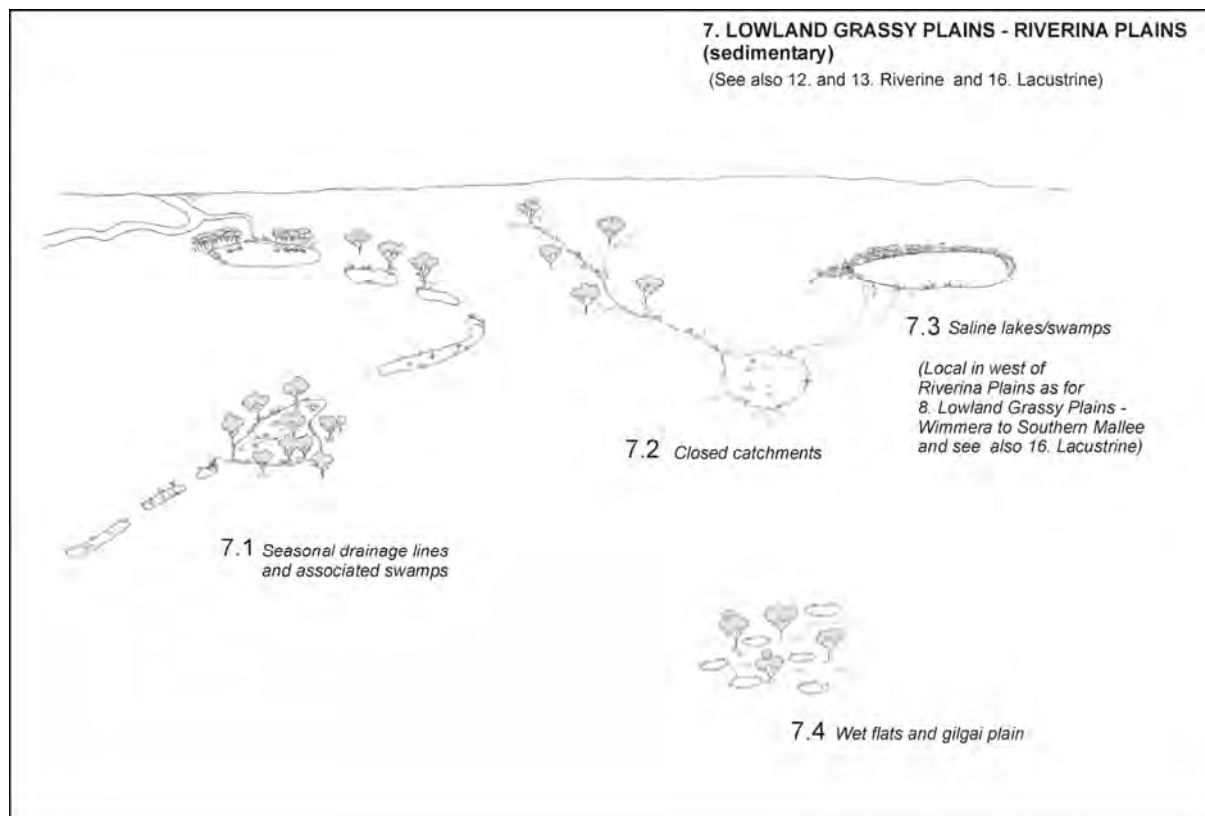
### Components continued overleaf

## 6. Lowland grassy plains – western volcanics (continued)

Component	EVC
6.6 Stony rise swales/spring-fed wetlands	<ul style="list-style-type: none"> <li>• 306. Aquatic Grassy Wetland</li> <li>• 653. Aquatic Herbland</li> <li>• 949. Dwarf Floating Aquatic Herbland</li> <li>• 755. Plains Grassy Wetland/Aquatic Herbland Complex</li> <li>• 647. Plains Sedgy Wetland</li> <li>• 857. Stony Rises Pond Aggregate</li> <li>• 932. Wet Verge Sedgeland</li> <li>• 920. Sweet-grass Wetland</li> <li>• 767. Plains Grassy Wetland/Brackish Herbland Complex</li> <li>• 538. Brackish Herbland</li> </ul>
6.7 Riparian	<ul style="list-style-type: none"> <li>• 56. Floodplain Riparian Woodland</li> <li>• 172. Floodplain Wetland Aggregate</li> <li>• mosaic of 56. Floodplain Riparian Woodland and 172. Floodplain Wetland Aggregate</li> </ul>
6.8 Swampy basins, swamps and lakes	<ul style="list-style-type: none"> <li>• see 6.1 Swamps and 6.2 Lakes</li> </ul>
6.9 Crater lakes	<ul style="list-style-type: none"> <li>• see 6.2 Lakes</li> </ul>
6.10 Grassy wet flats	<ul style="list-style-type: none"> <li>• 125. Plains Grassy Wetland</li> <li>• 651 Plains Swampy Woodland</li> </ul>

## 7. Lowland grassy plains – Riverina plains

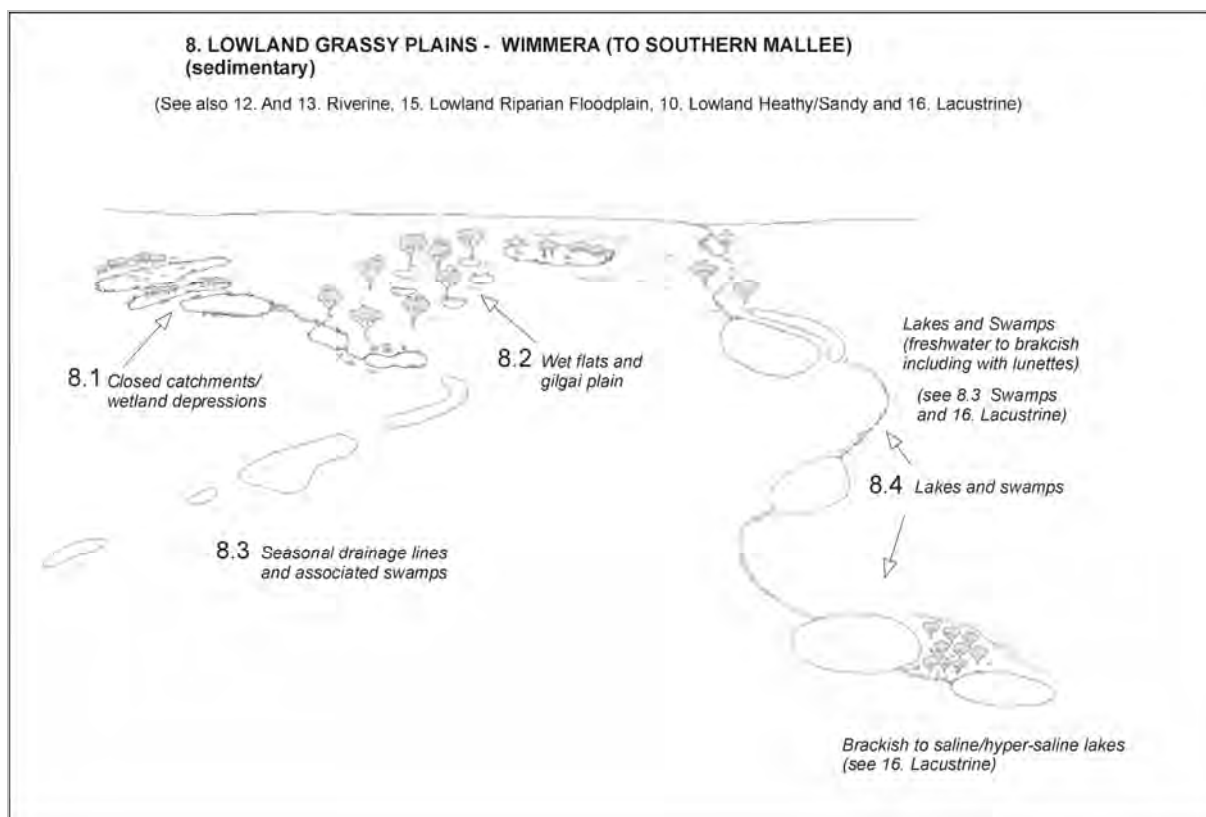
Wetland systems associated with sedimentary alluvial plains of northern Victoria (within basin of Murray River and tributaries, approximately east of Loddon River). See also 12. Riverine – Mid-Murray for systems associated with tributaries of the Murray River.



Component	EVC
7.1 Seasonal drainage lines and associated swamps	<ul style="list-style-type: none"> <li>• 653. Aquatic Herbland</li> <li>• 104. Lignum Swamp</li> <li>• 823. Lignum Swampy Woodland</li> <li>• 125. Plains Grassy Wetland</li> <li>• 292. Red Gum Swamp</li> <li>• 819. Spike-sedge Wetland</li> </ul>
7.2 Closed catchments	<ul style="list-style-type: none"> <li>• 291. Cane Grass Wetland</li> <li>• 104. Lignum Swamp</li> <li>• 961. Plains Rushy Wetland</li> </ul>
7.3 Saline lakes/swamps  Localised, in west of Riverina : also see 8. Lowland Grassy Plains – Wimmera (to Southern Mallee) and 16. Lacustrine diagrams	<ul style="list-style-type: none"> <li>• 537. Brackish Aquatic Herbland</li> <li>• 538. Brackish Herbland</li> <li>• 636. Brackish Lake Aggregate</li> <li>• 539. Brackish Lake Bed Herbland</li> <li>• 947. Brackish Lignum Swamp</li> <li>• 656. Brackish Wetland Aggregate</li> <li>• 842. Saline Aquatic Meadow</li> <li>• 717. Saline Lake Aggregate</li> <li>• 648. Saline Lake-verge Aggregate</li> <li>• 101. Samphire Shrubland (mainly adventive, species-poor)</li> <li>• 990. Unvegetated</li> </ul>
7.4 Wet flats and gilgai plains	<ul style="list-style-type: none"> <li>• 815. Riverine Swampy Woodland</li> </ul> <p>smaller gilgai systems within box woodland may be 235. Plains Woodland/Herb-rich Gilgai Wetland Mosaic, which is outside the scope of the IWC and should be assessed using the Habitat Hectares method.</p>

## 8. Lowland grassy plains – Wimmera (to southern Mallee)

Wetland systems associated with inland sedimentary alluvial plains of further western to northern-western Victoria (approximately west of Loddon River).



Component	EVC
8.1 Closed catchments/wetland depressions	<ul style="list-style-type: none"> <li>• 369. Black Box Wetland</li> <li>• 947. Brackish Lignum Swamp</li> <li>• 606. Cane Grass Wetland/Brackish Herbland Complex</li> <li>• 808. Lignum Shrubland (Tall Cane Grass community)</li> <li>• 104. Lignum Swamp</li> <li>• 125. Plains Grassy Wetland</li> </ul>
8.2 Wet flats and gilgai plain	<ul style="list-style-type: none"> <li>• 125. Plains Grassy Wetland</li> <li>• 283. Plains Sedgy Woodland (also see 'Lowland Heathy/Sandy' diagram)</li> </ul>
8.3 Seasonal drainage lines and associated swamps (also see 6.1 Swamps)	<ul style="list-style-type: none"> <li>• 653. Aquatic Herbland</li> <li>• 291. Cane Grass Wetland</li> <li>• 606. Cane Grass Wetland/Brackish Herbland Complex</li> <li>• 954. Freshwater Lignum -Cane Grass Swamp</li> <li>• 104. Lignum Swamp</li> <li>• 125. Plains Grassy Wetland</li> <li>• 292. Red Gum Swamp</li> <li>• 819. Spike-sedge Wetland</li> <li>• 920. Sweet Grass Wetland</li> </ul>

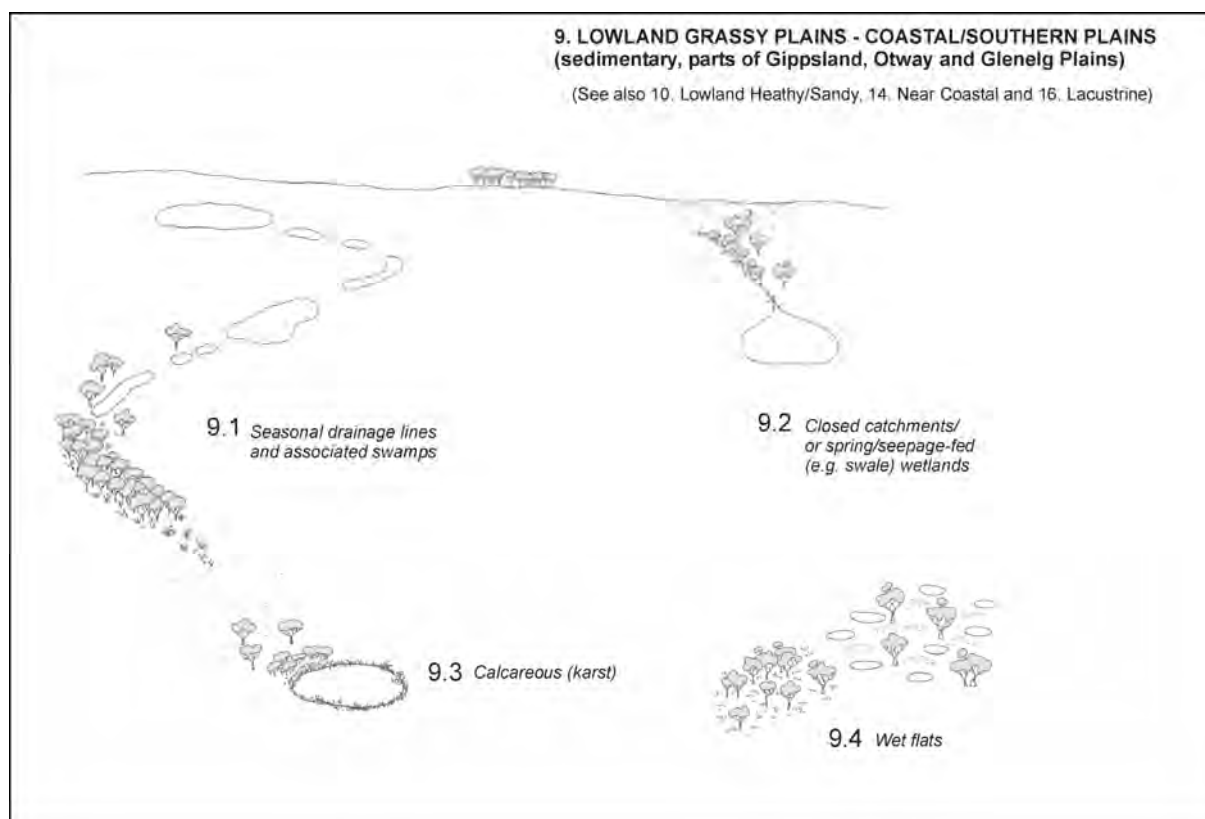
**Components continued overleaf**

## 8. Lowland grassy plains – Wimmera (to southern Mallee) (continued)

Component	EVC
8.4 Lakes and swamps	<ul style="list-style-type: none"><li>• 718. Freshwater Lake Aggregate, components variously including:<ul style="list-style-type: none"><li>– 653. Aquatic Herbland</li><li>– 602. Cane Grass Wetland/Aquatic Herbland Complex</li><li>– 954. Freshwater Lignum -Cane Grass Swamp</li><li>– 813. Intermittent Swampy Woodland</li><li>– 107. Lake Bed Herbland</li><li>– 823. Lignum Swampy Woodland</li><li>– 814. Riverine Swamp Forest/292. Red Gum Swamp (verge communities)</li><li>– 918. Submerged Aquatic Herbland</li><li>– 821. Tall Marsh</li><li>– 949. Dwarf Floating Aquatic Herbland</li><li>– 990. Unvegetated</li></ul></li></ul>
See also 8.3 Swamps and 16. Lacustrine diagrams	<ul style="list-style-type: none"><li>• 636. Brackish Lake Aggregate, components variously including:<ul style="list-style-type: none"><li>– 537. Brackish Aquatic Herbland</li><li>– 538. Brackish Herbland</li><li>– 539. Brackish Lake Bed Herbland</li><li>– 947. Brackish Lignum Swamp</li><li>– 656. Brackish Wetland Aggregate</li><li>– 606. Cane Grass Wetland/Brackish Herbland Complex</li><li>– 934. Brackish Grassland</li><li>– 990. Unvegetated</li></ul></li></ul>
	<ul style="list-style-type: none"><li>• 717. Saline (to hypersaline) Lake Aggregate , components variously including:<ul style="list-style-type: none"><li>– 538. Brackish Herbland</li><li>– 947. Brackish Lignum Swamp</li><li>– 708. Hypersaline Inland Saltmarsh Aggregate</li><li>– 842. Saline Aquatic Meadow</li><li>– 648. Saline Lake-verge Aggregate</li><li>– 676 Salt Paperbark Woodland</li><li>– 101. Samphire Shrubland</li><li>– 934. Brackish Grassland</li><li>– 973. Brackish Shrubland</li><li>– 990. Unvegetated</li></ul></li></ul>

## 9. Lowland grassy plains – coastal/southern plains

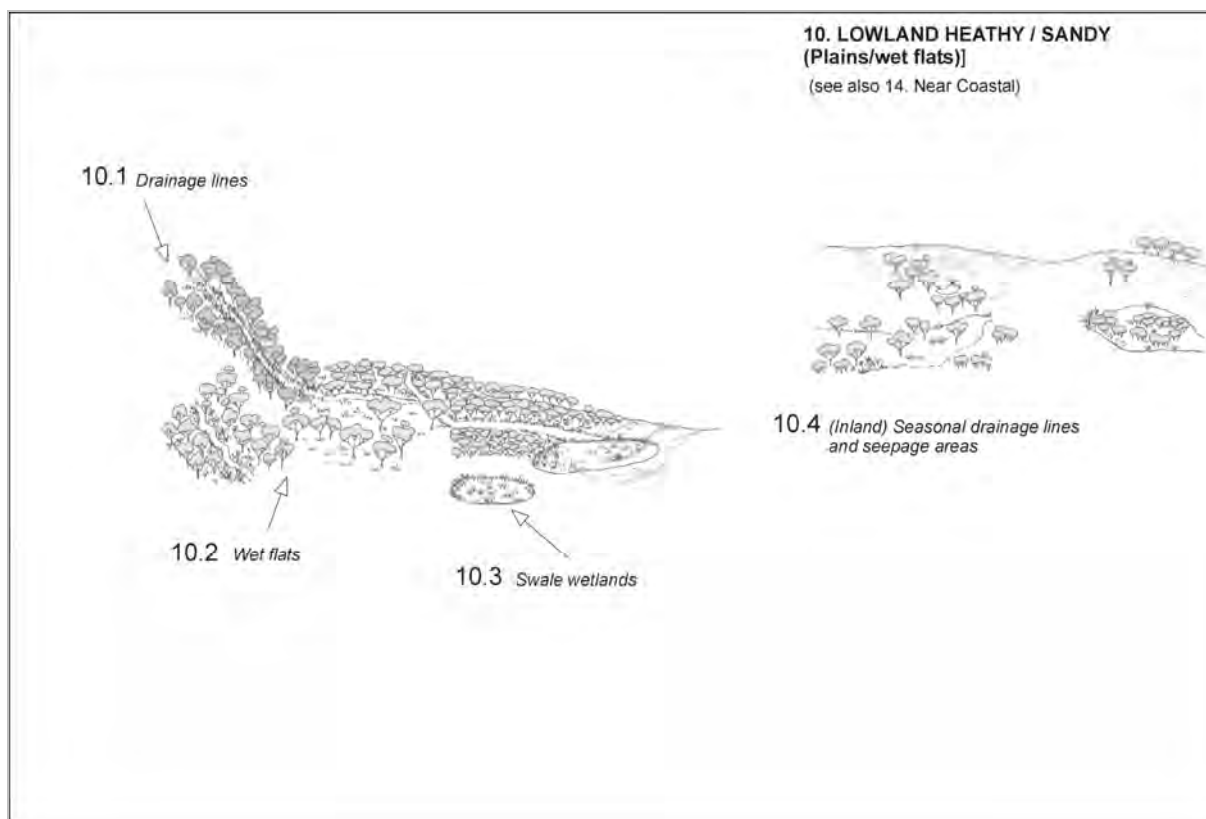
Wetland systems associated with relatively fertile (mostly clay) sedimentary plains south of the Divide.



Component	EVC
9.1 Seasonal drainage lines and associated swamps	<ul style="list-style-type: none"> <li>• 653. Aquatic Herbland</li> <li>• 308. Aquatic Sedgeland</li> <li>• 125. Plains Grassy Wetland</li> <li>• 651 Plains Swampy Woodland</li> <li>• 819. Spike-sedge Wetland</li> <li>• 53. Swamp Scrub</li> <li>• 821. Tall Marsh</li> <li>• 932. Wet Verge Sedgeland</li> </ul>
9.2 Closed catchments or spring/seepage-fed (e.g. swale) wetlands	<ul style="list-style-type: none"> <li>• 306. Aquatic Grassy Wetland</li> <li>• 653. Aquatic Herbland</li> <li>• 308. Aquatic Sedgeland</li> <li>• 647. Plains Sedgy Wetland</li> <li>• 647. Plains Sedgy Wetland/653. Aquatic Herbland Complex (and various additional complexes and mosaics of above)</li> </ul>
9.3 Calcareous ('karst')	<ul style="list-style-type: none"> <li>• 591. Calcareous Wet Herbland</li> <li>• 958. Plains Grassy Wetland/Calcareous Wet Herbland Complex</li> <li>• 136. Sedge Wetland</li> <li>• 883. Sedge Wetland/Calcareous Wet Herbland Complex</li> <li>• 908. Sink-hole Wetland Aggregate</li> <li>• 53. Swamp Scrub (calcareous community)</li> <li>• 990. Unvegetated</li> </ul>
9.4 Wet flats	<ul style="list-style-type: none"> <li>• 976. Coastal Ephemeral Wetland</li> <li>• 125. Plains Grassy Wetland</li> <li>• 651. Plains Swampy Woodland</li> </ul>

## 10. Lowland heathy/sandy

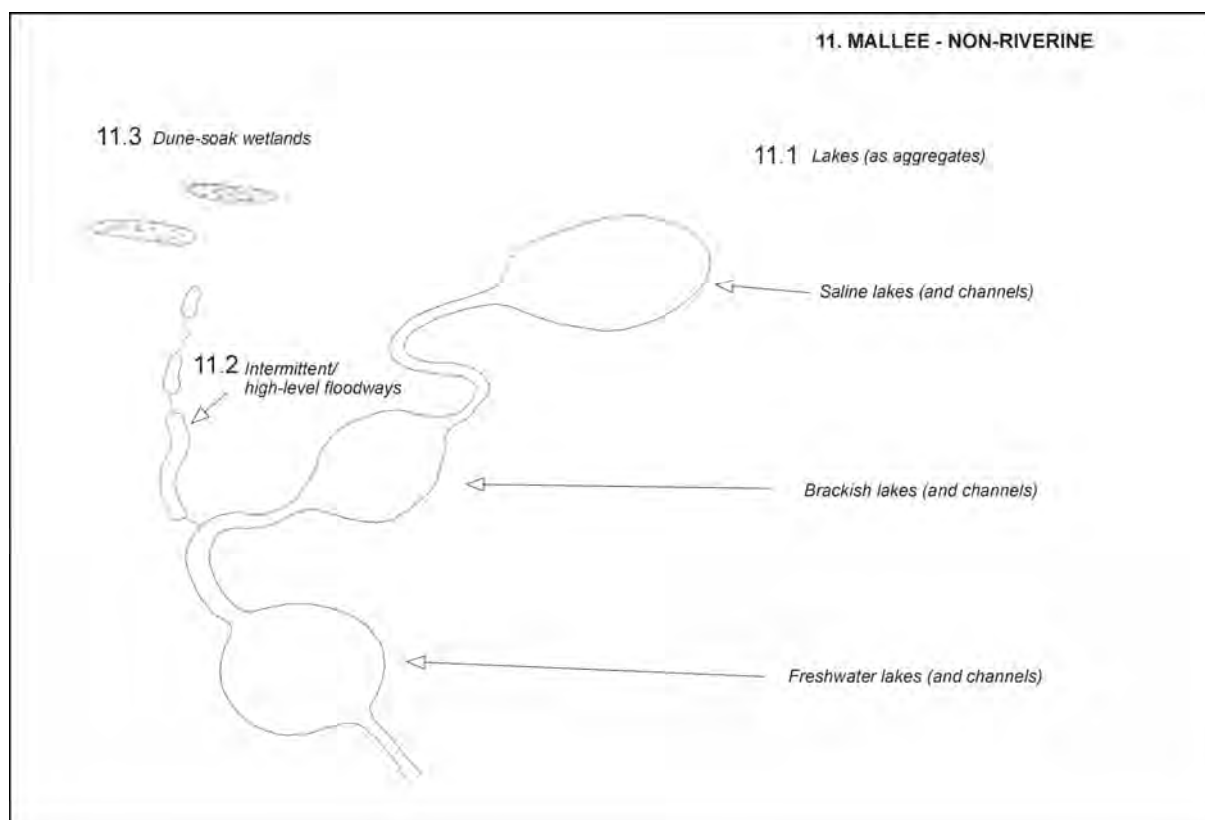
Wetland systems associated with relatively less fertile (mostly acidic sandy) sedimentary soils (e.g. sand sheets and dune swales), mostly south of the Divide but extending inland in south-west Victoria (e.g. Grampians, Little Desert) and occasional foothill elevations (e.g. Dereel, northern Brisbane Ranges).



Component	EVC
10.1 Drainage lines	<ul style="list-style-type: none"> <li>• 191. Riparian Scrub</li> <li>• 53. Swamp Scrub</li> <li>• 49. Swamp Heathland Aggregate</li> </ul>
10.2 Wet flats	<ul style="list-style-type: none"> <li>• 13. Brackish Sedgeland (very localised)</li> <li>• 707. Sedgy Swamp Woodland (rare)</li> <li>• 937. Swampy Woodland</li> <li>• 53. Swamp Scrub</li> <li>• 8. Wet Heathland</li> <li>• 931. Wet Heathland/Sedge Wetland Complex</li> </ul>
10.3 Swale wetlands	<ul style="list-style-type: none"> <li>• 653. Aquatic Herbland</li> <li>• 308. Aquatic Sedgeland</li> <li>• 723. Forest Bog</li> <li>• 1010. Plains Sedgy Wetland/Sedge Wetland Complex</li> <li>• 136. Sedge Wetland</li> <li>• 136. Sedge Wetland/653. Aquatic Herbland complex</li> <li>• 963. Sedge Wetland/Aquatic Sedgeland Complex</li> <li>• 707. Sedgy Swamp Woodland (rare)</li> </ul>
10.4 (Inland) Seasonal drainage lines and seepage areas	<ul style="list-style-type: none"> <li>• 973. Brackish Shrubland</li> <li>• 673. Dune-soak Woodland</li> <li>• 195. Seasonally Inundated Shrubby Woodland</li> </ul>

## 11. Mallee – non-riverine

Wetlands associated with mallee country of further north-west Victoria.



### Component

11.1 Lakes (and channels) as aggregates

See also 'Lacustrine', diagram 16.

### EVC

- 718. Freshwater Lake Aggregate, components variously including:
  - 653. Aquatic Herbland (riverine/artificial only)
  - 813. Intermittent Swampy Woodland
  - 107. Lake Bed Herbland
  - 103. Riverine Chenopod Woodland
  - 821. Tall Marsh
  - 990. Unvegetated

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- 636. Brackish Lake Aggregate, components variously including:
  - 539. Brackish Lake Bed Herbland
  - 808. Lignum Shrubland
  - 104. Lignum Swamp
  - 823. Lignum Swampy Woodland
  - 842. Saline Aquatic Meadow
 (outer verges can be as for 718. Freshwater Lake Aggregate)
  - 990. Unvegetated

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- 717. Saline (to hypersaline) Lake Aggregate, components variously including:
  - 708. Hypersaline Inland Saltmarsh Aggregate
  - 842. Saline Aquatic Meadow
  - 676. Salt Paperbark Woodland
  - 101. Samphire Shrubland (and gradients into 102. Low Chenopod Shrubland)
  - 990. Unvegetated

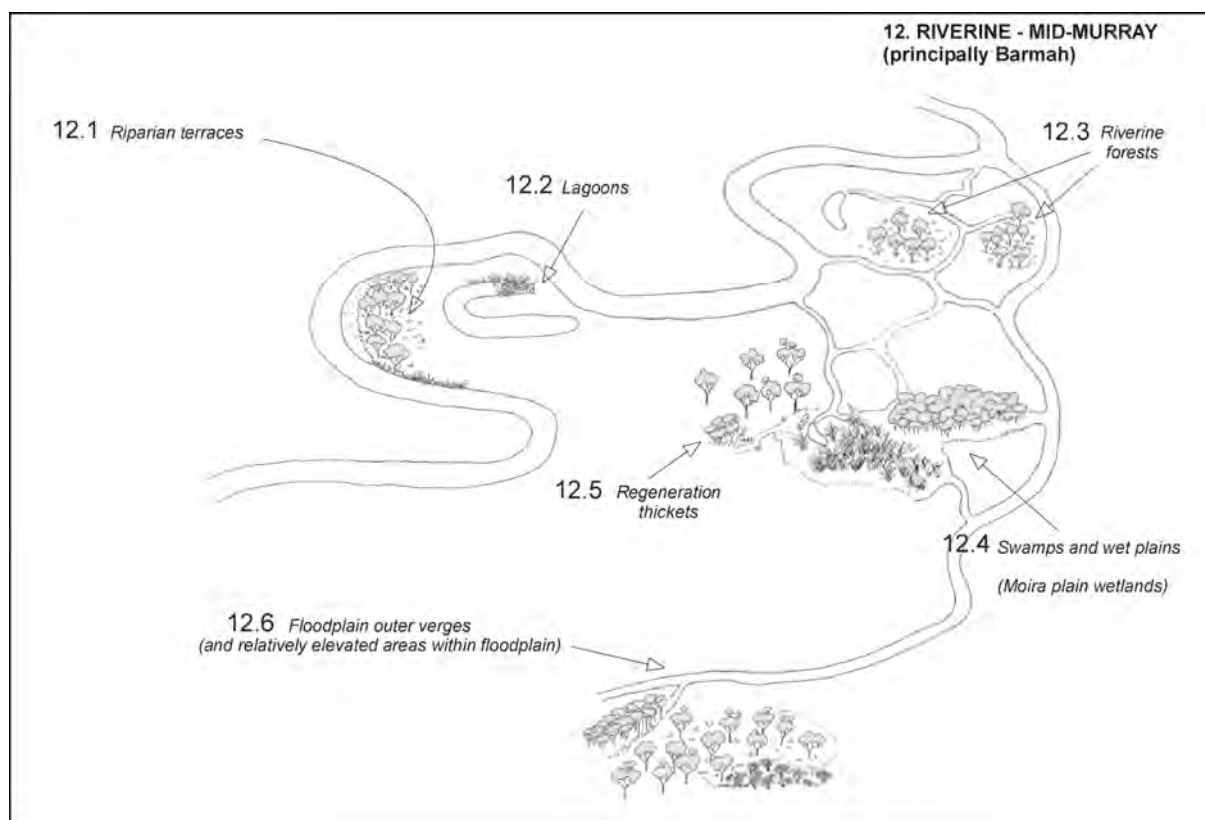
Components continued overleaf

## 11. Mallee – non-riverine (continued)

Component	EVC
11.2 Intermittent/high-level floodways	<ul style="list-style-type: none"><li>• 820. Sub-saline Depression Shrubland</li></ul>
11.3 Dune-soak wetlands Very rare in flats/swales/soaks or ephemeral ponds. In general, the Mallee lacks wetlands with local catchments. Wet flats habitat mostly supports e.g. 95. Red Swale Mallee, 102. Low Chenopod Shrubland or grassy communities on the fringes to 101. Samphire Shrubland.	<ul style="list-style-type: none"><li>• 808. Lignum Shrubland (<i>Tall Cane Grass</i> community)</li></ul>

## 12. Riverine – mid-Murray

Wetlands associated with the riverine floodplain of Murray River and tributaries (approximately above Wakool Junction).



Component	EVC
12.1 Riparian terraces	<ul style="list-style-type: none"> <li>• 106. Grassy Riverine Forest</li> <li>• 811. Grassy Riverine Forest Floodway Pond Herbland Complex</li> <li>• 812. Grassy Riverine Forest/Riverine Swamp Forest Complex</li> <li>• 813. Intermittent Swampy Woodland (very minor)</li> <li>• 975. Riverine Ephemeral Wetland (very rare)</li> <li>• 816. Sedgy Riverine Forest</li> <li>• 817. Sedgy Riverine Forest/Riverine Swamp Forest Complex</li> </ul>
12.2 Lagoons	<ul style="list-style-type: none"> <li>• 334. Billabong Wetland Aggregate components including: <ul style="list-style-type: none"> <li>– 653. Aquatic Herbland</li> <li>– 949. Dwarf Floating Aquatic Herbland</li> <li>– 810. Floodway Pond Herbland</li> <li>– 918. Submerged Aquatic Herbland</li> <li>– 821. Tall Marsh</li> <li>– 990. Unvegetated</li> </ul> </li> </ul>
12.3 Riverine forests	<ul style="list-style-type: none"> <li>• 106. Grassy Riverine Forest</li> <li>• 812. Grassy Riverine Forest/Riverine Swamp Forest Complex</li> <li>• 816. Sedgy Riverine Forest</li> <li>• 817. Sedgy Riverine Forest/Riverine Swamp Forest Complex</li> </ul>

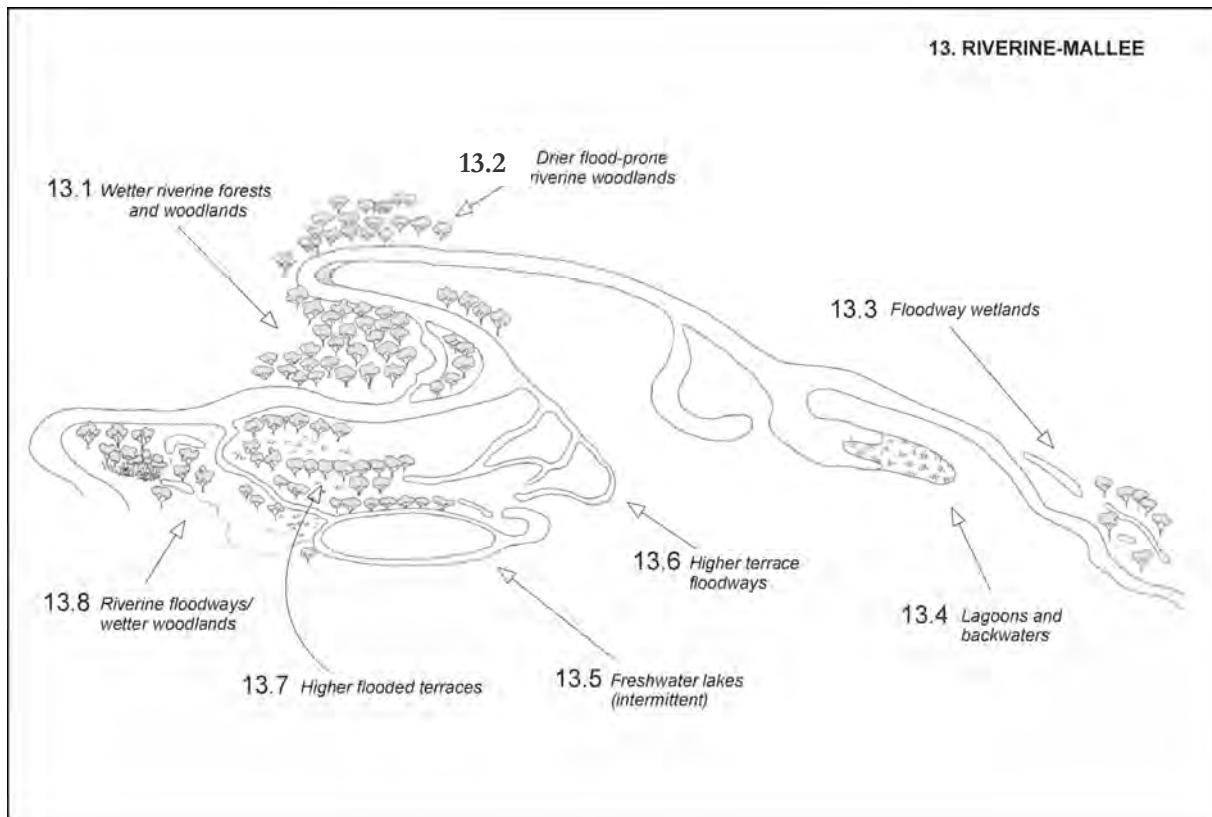
### Components continued overleaf

## 12. Riverine - mid-Murray (continued)

Component	EVC
12.4 Swamps and wet plains (Moirra plain wetlands)	<ul style="list-style-type: none"><li>• 653. Aquatic Herbland</li><li>• 809. Floodplain Grassy Wetland</li><li>• 810. Floodway Pond Herbland</li><li>• 945. Floodway Pond Herbland/Riverine Swamp Forest Complex</li><li>• 814. Riverine Swamp Forest</li><li>• 804. Rushy Riverine Swamp</li><li>• 819. Spike-sedge Wetland</li><li>• 821. Tall Marsh</li></ul>
12.5 Regeneration thickets	Juvenile:- <ul style="list-style-type: none"><li>• 814. Riverine Swamp Forest; and</li><li>• 945. Floodway Pond Herbland/Riverine Swamp Forest Complex</li></ul>
12.6 Floodplain outer verges (and relatively elevated areas within floodplain)	<ul style="list-style-type: none"><li>• 103. Riverine Grassy Chenopod Woodland (marginal, eastern end of distribution)</li><li>• 815. Riverine Swampy Woodland</li></ul>

### 13. Riverine - Mallee

Wetlands associated with the riverine floodplain of Murray River and Tributaries (approximately below Wakool Junction).



Component	EVC
13.1 Wetter riverine forests and woodlands	<ul style="list-style-type: none"> <li>• 106. Grassy Riverine Forest</li> <li>• 811. Grassy Riverine Forest/Floodway Pond Herbland Complex</li> <li>• 812. Grassy Riverine Forest/Riverine Swamp Forest Complex</li> <li>• 814. Riverine Swamp Forest (minor and mainly within complexes)</li> </ul>
13.2 Drier flood-prone riverine woodlands	<ul style="list-style-type: none"> <li>• 813. Intermittent Swampy Woodland/Riverine Grassy Woodland Complex</li> <li>• 103. Riverine Chenopod Woodland</li> </ul>
13.3 Floodway wetlands	<ul style="list-style-type: none"> <li>• 809. Floodplain Grassy Wetland</li> <li>• 810. Floodway Pond Herbland</li> <li>• 945. Floodway Pond Herbland/Riverine Swamp Forest Complex</li> <li>• 819. Spike-sedge Wetland</li> </ul>
13.4 Lagoons and backwaters	<ul style="list-style-type: none"> <li>• 653. Aquatic Herbland</li> <li>• 334. Billabong Wetland Aggregate</li> <li>• 918. Submerged Aquatic Herbland</li> <li>• 821. Tall Marsh</li> <li>• 990. Unvegetated</li> </ul>

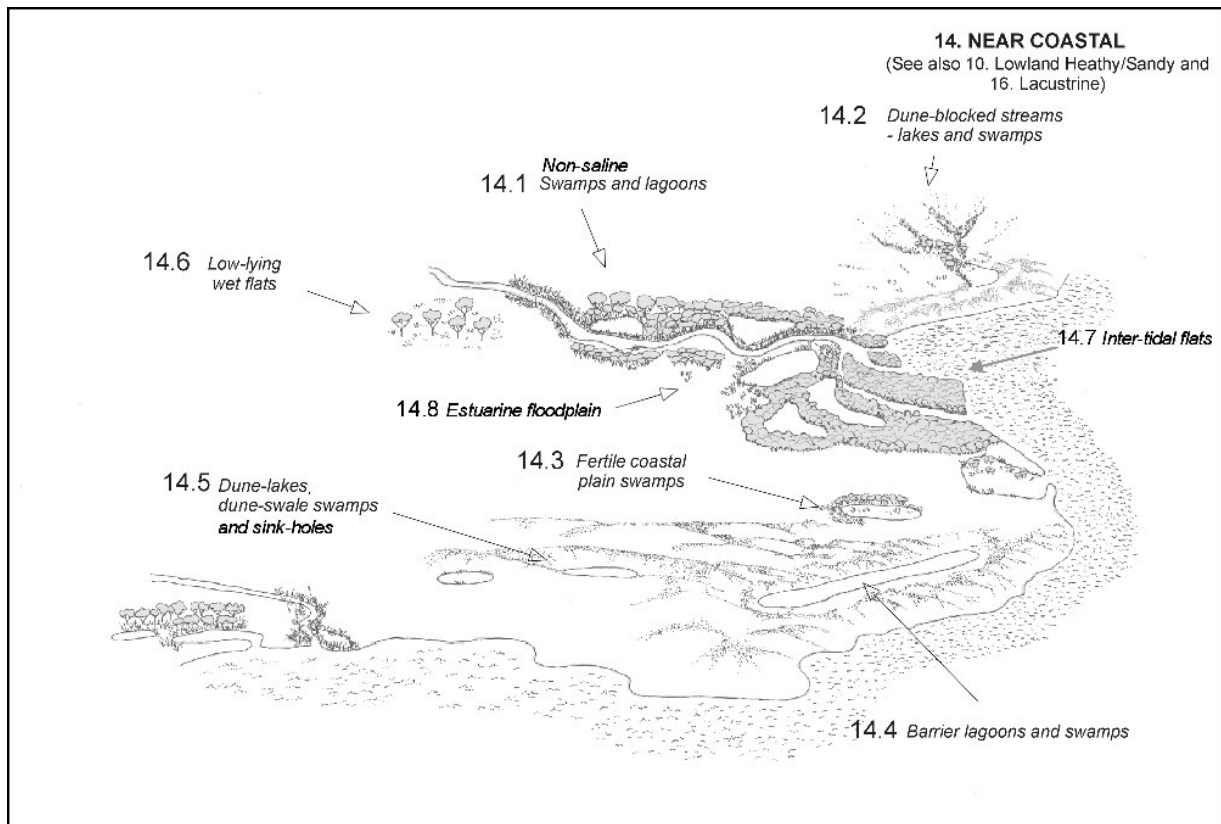
**Components continued overleaf**

### 13. Riverine - Mallee (continued)

Component	EVC
13.5 Freshwater lakes (intermittent)	<ul style="list-style-type: none"><li>• 718. Freshwater Lake Aggregate</li><li>• 813. Intermittent Swampy Woodland</li><li>• 107. Lake Bed Herbland or 990. Unvegetated</li><li>• 104. Lignum Swamp</li><li>• 823. Lignum Swampy Woodland</li><li>• 103. Riverine Chenopod Woodland (verges)</li><li>• 101. Samphire Shrubland (adventive in salinised areas)</li><li>• 990. Unvegetated</li></ul>
13.6 Higher terrace floodways	<ul style="list-style-type: none"><li>• 104. Lignum Swamp</li><li>• 820. Sub-saline Depression Shrubland</li></ul>
13.7 Higher flooded terraces	<ul style="list-style-type: none"><li>• 806. Alluvial Plains Semi-arid Grassland</li><li>• 808. Lignum Shrubland</li><li>• 104. Lignum Swamp (minor)</li><li>• 103. Riverine Chenopod Woodland</li></ul>
13.8 Riverine floodways/wetter woodlands	<ul style="list-style-type: none"><li>• 810. Floodway Pond Herbland</li><li>• 808. Lignum Shrubland</li><li>• 810. Floodway Pond Herbland</li><li>• 813. Intermittent Swampy Woodland</li><li>• 822. Intermittent Swampy Woodland/Riverine Grassy Woodland Complex</li><li>• 104. Lignum Swamp</li><li>• 823. Lignum Swampy Woodland</li></ul>

## 14. Near coastal

Wetlands associated with near-coastal situations (especially calcareous dune systems and blocked drainage lines), also wetlands with tidal or estuarine influences.



Component	EVC
14.1 Non-saline swamps and lagoons	<ul style="list-style-type: none"> <li>• 653. Aquatic Herbland, 308. Aquatic Sedgeland and 990. Unvegetated (open water)</li> <li>• 968. Gahnia Sedgeland</li> <li>• 53. Swamp Scrub</li> <li>• 821. Tall Marsh (including non-saline variants of Floodplain Reedbed and Reed Swamp)</li> <li>• 990. Unvegetated</li> </ul>
14.2 Dune-blocked streams - lakes and swamps	<ul style="list-style-type: none"> <li>• 653. Aquatic Herbland</li> <li>• 308. Aquatic Sedgeland</li> <li>• 875. Blocked Coastal Stream Swamp</li> <li>• 538. Brackish Herbland</li> <li>• 13. Brackish Sedgeland</li> <li>• 11. Coastal Lagoon Wetland</li> <li>• 968. Gahnia Sedgeland</li> <li>• 53. Swamp Scrub</li> <li>• 821. Tall Marsh</li> <li>• 990. Unvegetated</li> </ul>

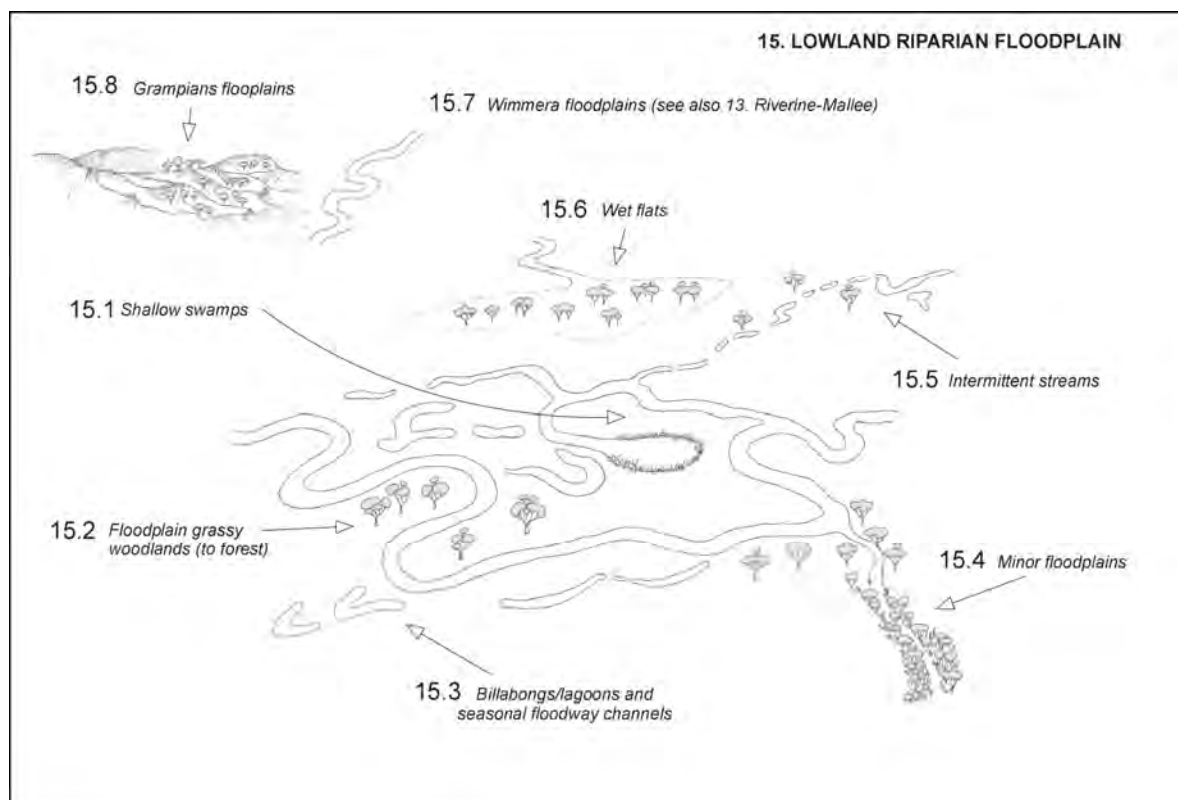
**Components continued overleaf**

## 14. Near coastal (continued)

Component	EVC
14.3 Fertile coastal plain swamps	<ul style="list-style-type: none"> <li>• 653. Aquatic Herbland</li> <li>• 308. Aquatic Sedgeland</li> <li>• 538. Brackish Herbland</li> <li>• 591. Calcareous Wet Herbland</li> <li>• 125. Plains Grassy Wetland (minor)</li> <li>• 647. Plains Sedgy Wetland</li> <li>• 1010. Plains Sedgy Wetland/Sedge Wetland Complex</li> <li>• 136. Sedge Wetland</li> <li>• 53. Swamp Scrub</li> <li>• 1113. Sedge Wetland/Brackish Herbland Complex</li> <li>• 990. Unvegetated</li> </ul>
14.4 Barrier lagoons and swamps	<ul style="list-style-type: none"> <li>• 306. Aquatic Grassy Wetland (rare)</li> <li>• 653. Aquatic Herbland</li> <li>• 537. Brackish Aquatic Herbland</li> <li>• 538. Brackish Herbland</li> <li>• 656. Brackish Wetland Aggregate</li> <li>• 842. Saline Aquatic Meadow</li> <li>• 53. Swamp Scrub</li> <li>• 12. Wet Swale Herbland</li> <li>• 914. Estuarine Flats Grassland</li> <li>• 932. Wet Verge Sedgeland</li> <li>• 990. Unvegetated</li> </ul>
14.5 Dune-lakes, dune-swale swamps and sink-holes	<ul style="list-style-type: none"> <li>• 538. Brackish Herbland</li> <li>• 656. Brackish Wetland Aggregate</li> <li>• 12. Wet Swale Herbland</li> <li>• 908. Sink-hole Wetland Aggregate</li> <li>• 990. Unvegetated</li> </ul>
14.6 Low-lying wet flats	<ul style="list-style-type: none"> <li>• 976. Coastal Ephemeral Wetland</li> <li>• 53. Swamp Scrub</li> <li>• 937. Swampy Woodland</li> <li>• 8. Wet Heathland</li> <li>• 1114. Brackish Sedgy Shrubland (rare)</li> </ul>
14.7 Inter-tidal flats	<ul style="list-style-type: none"> <li>• 845. Sea-grass Meadow</li> <li>• 140. Mangrove Shrubland</li> <li>• 9. Coastal Saltmarsh Aggregate</li> <li>• 196. Seasonally Inundated Sub-saline Herbland</li> <li>• 842. Saline Aquatic Meadow</li> <li>• 990. Unvegetated</li> </ul>
14.8 Estuarine floodplain	<ul style="list-style-type: none"> <li>• 10. Estuarine Wetland</li> <li>• 842. Saline Aquatic Meadow</li> <li>• 952. Estuarine Reedbed</li> <li>• 953. Estuarine Scrub</li> <li>• 914. Estuarine Flats Grassland</li> <li>• 13. Brackish Sedgeland</li> <li>• 538. Brackish Herbland</li> <li>• 656. Brackish Wetland Aggregate</li> <li>• 934. Brackish Grassland</li> <li>• 537. Brackish Aquatic Herbland</li> <li>• 990. Unvegetated</li> </ul>

## 15. Lowland riparian floodplain

Wetlands associated with floodplains of major streams outside of Victorian Riverina.



Component	EVC
15.1 Shallow swamps	<ul style="list-style-type: none"> <li>• 172. Floodplain Wetland Aggregate with components including:               <ul style="list-style-type: none"> <li>– 653. Aquatic Herbland</li> <li>– 308. Aquatic Sedgeland</li> <li>– 53. Swamp Scrub</li> <li>– 937. Swampy Woodland</li> <li>– 821. Tall Marsh</li> <li>– 932. Wet Verge Sedgeland (minor/rare components)</li> <li>– 809. Floodplain Grassy Wetland</li> <li>– 125. Plains Grassy Wetland</li> <li>– 804. Rushy Riverine Swamp</li> <li>– 819. Spike-sedge Wetland</li> </ul> </li> </ul>
15.2 Floodplain grassy woodlands (to forest)	<ul style="list-style-type: none"> <li>• 56. Floodplain Riparian Woodland aggregate including:               <ul style="list-style-type: none"> <li>– 56. Floodplain Riparian Woodland/334. Billabong Wetland Aggregate mosaic</li> <li>– 56. Floodplain Riparian Woodland/172. Floodplain Wetland Aggregate mosaic</li> </ul> </li> </ul>
15.3 Billabongs/lagoons and seasonal floodway channels	<ul style="list-style-type: none"> <li>• 334. Billabong Wetland Aggregate or 172. Floodplain Wetland Aggregate with various components as follows:               <ul style="list-style-type: none"> <li>– 653. Aquatic Herbland</li> <li>– 308. Aquatic Sedgeland</li> <li>– 949. Dwarf Floating Aquatic Herbland</li> <li>– 810. Floodway Pond Herbland</li> <li>– 918. Submerged Aquatic Herbland</li> <li>– 821. Tall Marsh</li> <li>– 932. Wet Verge Sedgeland</li> <li>– 990. Unvegetated</li> </ul> </li> </ul>

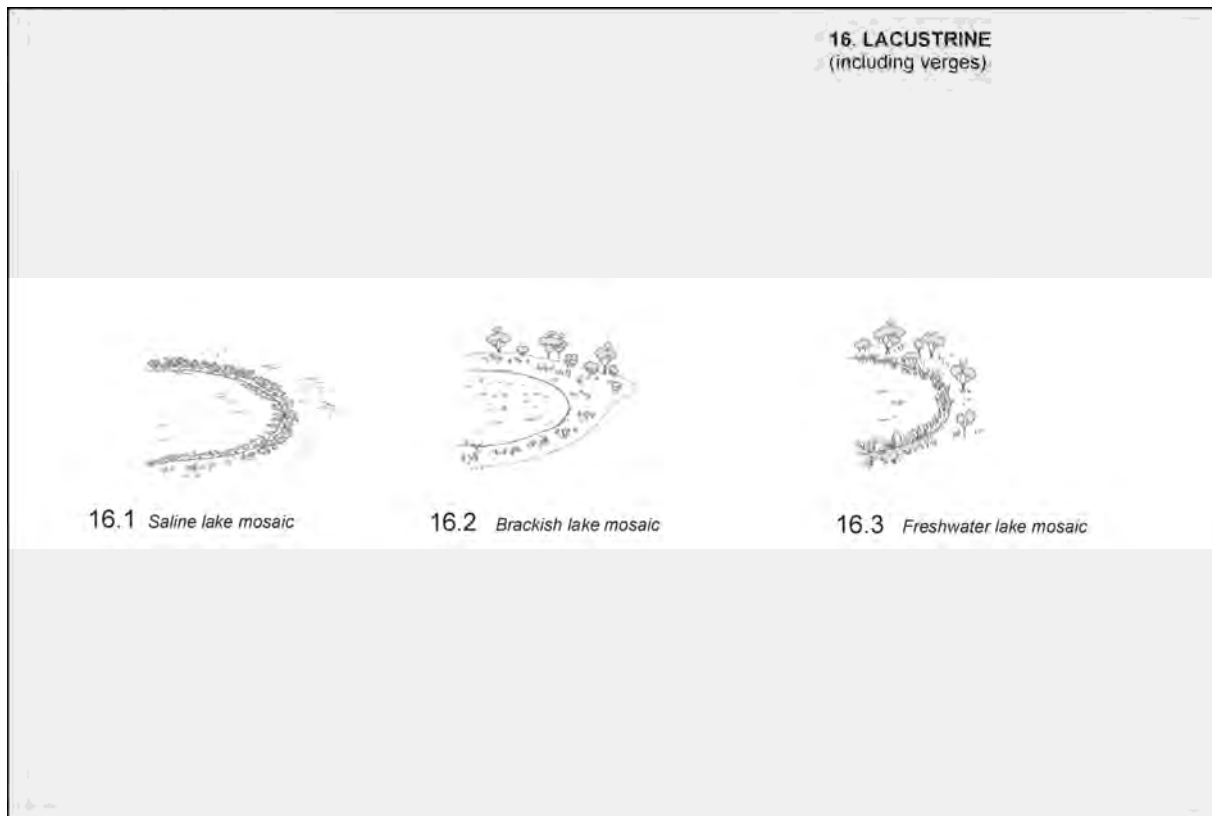
**Components continued overleaf**

## 15. Lowland riparian floodplain

Component	EVC
15.4 Minor floodplains	<ul style="list-style-type: none"><li>• 83. Swampy Riparian Woodland</li></ul>
15.5 Intermittent streams	<ul style="list-style-type: none"><li>• 53. Swamp Scrub</li></ul>
15.6 Wet flats	<ul style="list-style-type: none"><li>• 53. Swamp Scrub</li><li>• 937. Swampy Woodland</li></ul>
15.7 Wimmera floodplains (see also 13. Riverine - Mallee diagrams)	<ul style="list-style-type: none"><li>• 292. Red Gum Swamp</li></ul>
15.8 Grampians floodplains	<ul style="list-style-type: none"><li>• 280. Floodplain Thicket</li></ul>

## 16. Lacustrine

Vegetation associated with lakes.



Component	EVC
16.1 Saline Lake Aggregate	<ul style="list-style-type: none"> <li>• 538. Brackish Herbland</li> <li>• 888. Plains Saltmarsh</li> <li>• 842. Saline Aquatic Meadow or 990. Unvegetated (open water/bare soil/mud)</li> <li>• 648. Saline Lake-verge Aggregate</li> <li>• 676. Salt Paperbark Woodland (localised – Wimmera, north-west Victoria)</li> <li>• 101. Samphire Shrubland</li> <li>• 964. Shell-beach Herbland (volcanic plains, very rare)</li> <li>• 990. Unvegetated</li> </ul>
16.2 Brackish Lake Aggregate	<ul style="list-style-type: none"> <li>• 537. Brackish Aquatic Herbland or 990. Unvegetated (open water/bare soil/mud)</li> <li>• 538. Brackish Herbland</li> <li>• 539. Brackish Lake Bed Herbland (mostly drier north)</li> <li>• 947. Brackish Lignum Swamp</li> <li>• 13. Brackish Sedgeland</li> <li>• 656. Brackish Wetland Aggregate</li> <li>• 606. Cane Grass Wetland/Brackish Herbland Complex</li> <li>• 813. Intermittent Swampy Woodland</li> <li>• 104. Lignum Swamp</li> <li>• 823. Lignum Swampy Woodland</li> <li>• 842. Saline Aquatic Meadow</li> <li>• 918. Submerged Aquatic Herbland</li> <li>• 990. Unvegetated</li> </ul>

**Components continued overleaf**

## 16. Lacustrine (continued)

Component	EVC
16.3 Freshwater Lake Aggregate	<ul style="list-style-type: none"> <li>• 806. Alluvial Plains Semi-arid Grassland (Mallee)</li> <li>• 653. Aquatic Herbland</li> <li>• 308. Aquatic Sedgeland</li> <li>• 334. Billabong Wetland Aggregate</li> <li>• 291. Cane Grass Wetland</li> <li>• 602. Cane Grass Wetland/Aquatic Herbland Complex</li> <li>• 11. Coastal Lagoon Wetland</li> <li>• 949. Dwarf Floating Aquatic Herbland</li> <li>• 809. Floodplain Grassy Wetland (minor)</li> <li>• 810. Floodway Pond Herbland</li> <li>• 107. Lake Bed Herbland (Mallee)</li> <li>• 755. Plains Grassy Wetland/Aquatic Herbland Complex</li> <li>• 767. Plains Grassy Wetland/Brackish Herbland Complex</li> <li>• 647. Plains Sedgy Wetland</li> <li>• 963. Sedge Wetland/Aquatic Sedgeland Complex</li> <li>• 819. Spike-sedge Wetland</li> <li>• 857. Stony Rises Pond Aggregate</li> <li>• 918. Submerged Aquatic Herbland</li> <li>• 920. Sweet Grass Wetland</li> <li>• 821. Tall Marsh (including non-saline variants of Reed Swamp)</li> <li>• 990. Unvegetated</li> <li>• 932. Wet Verge Sedgeland</li> <li>• wooded verges - e.g. variously:               <ul style="list-style-type: none"> <li>– 813. Intermittent Swampy Woodland</li> <li>– 651. Plains Swampy Woodland</li> <li>– 292. Red Gum Swamp</li> <li>– 103. Riverine Chenopod Woodland</li> <li>– 814. Riverine Swamp Forest</li> <li>– 195. Seasonally Inundated Shrubby Woodland</li> <li>– 53. Swamp Scrub</li> <li>– 937. Swampy Woodland</li> </ul> </li> </ul>

## **Appendix 4. Example of EVC Benchmark for the Index of Wetland Condition.**

# EVC Benchmark for the Index of Wetland Condition

## EVC 945: Floodway Pond Herbland/Riverine Swamp Forest Complex

### Description:

Ground-layer dominated by herbaceous species largely shared with floodway ponds (Floodway Pond Herbland / Aquatic Herbland), or virtually absent (due to thick accumulations of forest litter or persistence of black water, or sometimes excluded by dense thickets of young River Red-gum *Eucalyptus camaldulensis* regeneration). The abundance of annual species can be highly variable between seasons (and equivalent seasons in different years). Dispersed on floodplains of Murray River and major tributaries, also some lake verges in the Wimmera.

**Indicator species** (some or all of these species should be present)

Scientific name	Common name	Comments
<b>Mid Murray</b>		
<i>Alternanthera denticulata</i> s.s.	Lesser Joyweed	
<i>Centipeda</i> spp.	Sneezeweed	especially <i>C. cunninghamii</i>
<i>Lachnagrostis filiformis</i> var. 2	Wetland Blown-grass	
<i>Myriophyllum crispatum</i>	Upright Water-milfoil	
<i>Stellaria caespitosa</i>	Matted Starwort	
<b>Murray Mallee</b>		
<i>Alternanthera</i> spp.	Joyweed	
<i>Centipeda cunninghamii</i>	Common Sneezeweed	
<i>Centipeda minima</i> s.l.	Spreading Sneezeweed	
<i>Cynodon dactylon</i> var. <i>pulchellus</i>	Native Couch	
<i>Eclipta platyglossa</i>	Yellow Twin-heads	
<i>Gnaphalium polycaulon</i>	Indian Cudweed	
<i>Pseudoraphis spinescens</i>	Spiny Mud-grass	sparse
<b>Murray Mallee &amp; Mid Murray</b>		
<i>Eleocharis acuta</i>	Common Spike-sedge	sometimes with a component of <i>Juncus ingens</i> , <i>Cyperus gunnii</i> or <i>Typha</i> spp.
<i>Eucalyptus camaldulensis</i>	River Red-gum	
<i>Lachnagrostis filiformis</i> var. 1	Common Blown-grass	
<i>Persicaria</i> spp.	Knotweed	Murray Mallee (especially <i>P. prostrata</i> ) & Mid Murray ( <i>P. prostrata</i> , <i>P. decipiens</i> , <i>P. hydropiper</i> )

### Conditions when the EVC should not be assessed

None recognised, provided attached vegetation within wetland shallows can be observed. Discretion required during prolonged dry periods and following recent flooding.

# EVC 945: Floodway Pond Herbland/Riverine Swamp Forest Complex

## 1. CRITICAL LIFEFORM GROUPINGS

### Conditions when specific critical lifeform groupings should not be assessed

None recognised.

### General comments on assessing critical lifeform groupings

None.

### Critical lifeform groupings and threshold values for determining if lifeform is substantially modified

Critical lifeform	No. spp.	% Cover	Comments
Medium (to large) aquatic herbs	3	+	
Medium monocots, at least semi-aquatic	2	+	
Small (to medium) herbs	3	+	often prostrate
Trees	1	5	exclude young regeneration

+ denotes presence

## 2. WEEDS

### High threat weed species

Scientific name	Common name
<i>Alisma lanceolata</i>	Water Plantain
<i>Cuscuta campestris</i>	Field Dodder
<i>Paspalum distichum</i>	Water Couch
<i>Sagittaria</i> spp.	Sagittaria
<i>Xanthium spinosum</i>	Bathurst Burr

### Conditions where weeds are considered to have a negligible impact

Opportunistic, flood-intolerant species present during dry periods.

## 3. INDICATORS OF ALTERED PROCESSES

Indicator of altered process	Cover	Scale of severity
River Red-gum <i>Eucalyptus camaldulensis</i> regeneration and/or Giant Rush <i>Juncus ingens</i> invasion.	patchy/dense regeneration, 5-10% cover	Minor
	10-20% cover	Moderate
	dense regeneration >20% cover	Severe

### Circumstances where some critical lifeform groupings may not be evident

None recognised.

## 4. VEGETATION STRUCTURE AND HEALTH

Structural dominant	Benchmark cover
River Red-gum <i>Eucalyptus camaldulensis</i>	10%

## Appendix 5. Wetland vegetation quality assessment and scoring framework.

### Critical lifeform groupings

Critical lifeform groupings	Score
All critical lifeform groupings effectively absent	0
>0 - <50% of critical lifeform groupings present	5
≥ 50% - <90% of critical lifeform groupings present, of those present:	
- at least 50% substantially modified	10
- less than 50% substantially modified	15
≥ 90% of critical lifeform groupings present, of those present:	
- at least 50% substantially modified	20
- less than 50% substantially modified	25

### Weeds

Weeds			
Total cover of weeds in EVC	% of weed cover made up of high threat weeds		
	nil	<50%	≥50%
>50%	7	3	0
25-50%	12	10	7
5-25%	18	12	12
<5%	25	22	18

### Indicators of altered processes

Indicators of altered processes	Score
EVC completely displaced and site substantially modified (e.g. cropped/fully-drained)	0
< 50% of critical lifeform groupings still represented	5
≥ 50% critical lifeform groupings present (or exempted as per benchmark)	
- altered process identified as 'severe'	10
- altered process identified as 'moderate'	15
- altered process identified as 'minor'	20
- no evidence of the altered process or none recognised in the benchmark	25

### Vegetation structure and health

Vegetation structure and health			
% of benchmark cover	% of structural dominants which are healthy		
	>70	30-70	<30
<10	0	0	0
10-50	15	10	5
>50	25	20	15

## Glossary of botanical terms

The glossary includes botanical terms used in this report and in the wetland EVC benchmark descriptions available on the Department of Sustainability and Environment website.

**Annual:** Plant that completes its life-cycle within a single year.

**Aquatic:** Plant where standing water above the ground surface is the typical habitat.

**Bryophyte:** General term denoting several non-vascular plant classes, including Mosses and Liverworts.

**Chenopod:** Plant which is a member of the saltbush family (Chenopodiaceae).

**Dicot:** Major grouping of flowering plants defined by traits related to paired embryonic leaves and general traits relating to morphology of the flower, stems and leaves. Including trees, shrubs and forbs (see 'herb').

**Ephemeral:** Very short-lived annual species, capable of exploiting an infrequent not necessarily annual expression of its habitat. Wetland ephemerals may be extremely small plants.

**Fern:** Perennial vascular plants that produce spores rather than seeds.

**Forest:** Vegetation dominated by more densely spaced trees (providing >30% projected foliar cover).

**Graminoid:** Grass-like plant (including e.g. grasses, sedges, rushes and restiads).

**Grass:** Plant which is a member of the family Poaceae.

**Grassland:** Vegetation dominated by grasses.

**Halophyte:** A plant which is tolerant of saline growth conditions.

**Heathland:** Vegetation, generally under two metres in height and providing at least 30% projected foliar cover, dominated by low shrubs with small 'ericoid' (similar to those of the genus *Erica*) leaves, providing at least 30% projected foliar cover.

**Herb:** Small non-woody seed-bearing plant. For the purpose of this report, specifically forbs - i.e. excluding grasses.

**Herbland:** Vegetation dominated by forbs (i.e. non-grassy herbaceous species).

**Monocot:** Major grouping of flowering plants defined by traits related to a single embryonic leaf and general traits relating to morphology of the flower, stems and leaves. Including graminoids (see above), orchids, lilies and some aquatic plant families with parallel leaf venation.

**Non-tufted:** Referring to plants where single stems or leaves emerge from the soil in a dispersed fashion rather than from a compact base.

**Obligate:** Confined to the specific habitat conditions as indicated (e.g. obligate aquatic).

**Perennial:** Plants that have the capacity to persist for three or more years if suitable conditions prevail. Note that biennial plants complete their life-cycle within a period of two years. See also 'annual'.

**Reed:** For this report, refers specifically to Common Reed (*Phragmites australis*).

**Restiad:** Plant which is a member of the family Restionaceae (e.g. Rope-rushes, Twine-rushes, Cord-rushes). Typically distinguished from other monocot groups by the presence of scale-leaves dispersed along the stems.

**Rhizomatous:** Descriptive of a plant having main lateral shoots arising below the ground surface which develop buds and roots and are capable of perpetuating the plant on division and thus may give rise to new individuals by vegetative means.

**Rush:** Plant which is a member of the family Juncaceae, in particular species of the genus *Juncus*. Typically distinguished from other monocot group by the radial arrangement of the chaff-like segments within individual flowers and the presence of soft pith within the stems.

**Samphire:** Succulent halophytes, typically referring to chenopods with such characteristics.

**Scrambler:** Climbing or semi-climbing plants which lack special means of attaching to a support.

**Scrub:** Vegetation dominated by taller shrubs (generally in excess of two metres in height), providing at least 30% projected foliar cover.

**Sedge:** Plant which is a member of the family Cyperaceae (e.g. species of the genera *Carex*, *Cyperus*, *Schoenus*, *Isolepis*, *Bolboschoenus*, *Schoenoplectus*, *Gahnia*, *Ficinia* and *Gymnoschoenus*).

Distinguished from grasses by traits including the structure of the flowering parts (notably the single sterile glume at the base of the individual flower) and usually the fused (rather than free) margins of the leaf-sheath.

**Semi-aquatic:** Plants capable of growth under at least shallow immersion, but continuing growth when emergent. Typically occupying the draw-down zone of wetlands rather than genuinely aquatic habitats.

**Semi-shrub:** Robust herbs with shrub-like traits or softer-stemmed small shrubs.

**Shrub:** Woody plants where the primary stem is replaced at an early growth stage such that no single stem is dominant (and usually less than about eight metres in height).

**Shrubland:** Vegetation dominated by shrubs, providing less than 30% projected foliar cover.

**Stoloniferous:** Descriptive of a plants having stems close to but above the ground surface that have the capacity to develop roots and are capable of perpetuating the plant on division and thus giving rise to new individuals by vegetative means.

**Tree:** Woody plant, typically with branches arising from a single trunk (and usually in excess of about eight metres in height at maturity).

**Tufted:** Having the leaves/stems joined at the base.

**Tussock:** Referring to monocots where the foliage and/or fine stems arise specifically from a compact base.

**Woodland:** Vegetation dominated by openly spaced trees (providing <30% projected foliar cover).

**Woody:** Referring to plants with the capacity to develop secondary growth consisting mainly of hard fibrous lignified tissues (essentially trees and shrubs).

#### **Note on size classes**

Sizes classes attributed to plants or critical life-forms (i.e. 'small', 'medium' and 'tall') are identical to those used in the habitat-hectare assessment method as outlined in Appendix 6 of the Vegetation Quality Assessment Manual (Department of Sustainability and Environment 2004).