Index of Wetland Condition – Assessment of Wetland Vegetation

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Contents

1 Introduction

1.1 Status and purpose of the document

This is an update to earlier versions of *Index of Wetland Condition – Assessment of Wetland Vegetation* (DSE 2005a, DSE 2009, DSE 2012, DELWP 2016a, DELWP 2018). It includes additional wetland Ecological Vegetation Classes (EVCs), their descriptions and updates to:

- existing EVCs and their descriptions
- landscape profile diagrams
- wetland vegetation assessment attributes
- formatting into the current DELWP report template.

The original version of this report (DSE 2005a) was prepared by the former Victorian Department of Sustainability and Environment (DSE) with funding assistance from the former National Action Plan for Salinity and Water Quality and the former 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 primarily designed for wetlands with very little or no flow and with minimal marine hydrological influence – however the wetland vegetation assessment component can be extended to include coastal intertidal vegetation. The development of the IWC and its measures are described in DSE (2005b).

Wetland vegetation condition assessment is one of several measures of wetland condition included in the 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 can be subject to only intermittent and temporary inundation events. Variability in the vegetation is expressed 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 because 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.

3 Assessment of wetland vegetation condition

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

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

3.1 Wetland vegetation typology and methodology

EVCs that occur in wetlands

Victoria's Framework for Native Vegetation Management (DNRE 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 or episodic 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 (either in terms of presences or absences of relevant species or both presences and 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 indicator species.

The typology includes 158 EVCs (Appendix 1). These include an EVC (EVC 999) for situations where the EVC is unknown or unclassified and 29 provisional wetland EVCs which, to date, have not been formally adopted within DELWP's vegetation quality assessment framework. These vary from vegetation indicative of permanent inundation, through to EVCs occupying semi-permanent, seasonal or temporary wetland habitats.

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 from particular lifeform groups being present. These species are not necessarily specific to a single EVC. However these associations, including selections of these species 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, EVCs generally include a range of potential indicator species that are representative of 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 *Duma 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 of these 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 interpretation of associations of species, or species-groups, within wetlands requires an acceptance that more than one plant community may be simultaneously present. This may be due to ecologically intermediate conditions, where (mostly variously reduced) components of the respective EVCs overlap. In these cases, the spatial vegetation 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 some wetlands, then the species-group is considered to represent 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 (157), guidance is required to assist in the identification of EVCs at individual wetlands.

Guidance is based on potential wetland landscapes profiles in Victoria (Table 1, Appendix 3). Several components are identified for each of the 16 potential wetland landscape profiles defined. These are illustrated on landscape profile diagrams to show graphically the location of the components in the landscape and the EVCs associated with each component are listed (Appendix 3). Once potential EVCs have been determined for a wetland with the aid of landscape profile diagrams, the defining characteristics and indicator species for those EVCs can be checked to confirm identification of the EVC or EVCs present at the wetland.

Table 1. Victorian wetland landscape profiles.

Wetland landscape profile	Wetlands associated with wetland landscape profile
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, springs and soaks, swales and wet flats of lower rainfall hilly areas (specifically north-east hills, drier Midlands of north-central Victoria and the elevated plateau of the 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 sandy/heathy	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 the Murray River and Tributaries (approximately upstream of Kerang).
13. Riverine - Mallee	Wetlands associated with the riverine floodplain of the Murray River and Tributaries (approximately downstream of Kerang).
14. Near coastal	Wetlands associated with near-coastal situations (especially calcareous dune systems and blocked drainage lines) and including those with tidal or estuarine influences.
15. Lowland riparian floodplain	Wetlands associated with floodplains of major streams outside of the Victorian Riverina.
16. Lacustrine	Vegetation associated with lakes.

Wetland landscape profiles are also spatially defined – these are termed wetland landscapes. The approach for delineating these was based on the landscape profile descriptions and expert knowledge of wetland EVC distribution in relation to regional and landscape attributes. The lacustrine wetland landscape profile is not represented spatially as lakes are distributed across a number of wetland regions. Further details of the method for spatially defining wetland landscapes are provided in the Victorian wetland classification framework (DELWP 2016b). A map of Victorian wetland regions is shown below in Figure 1.

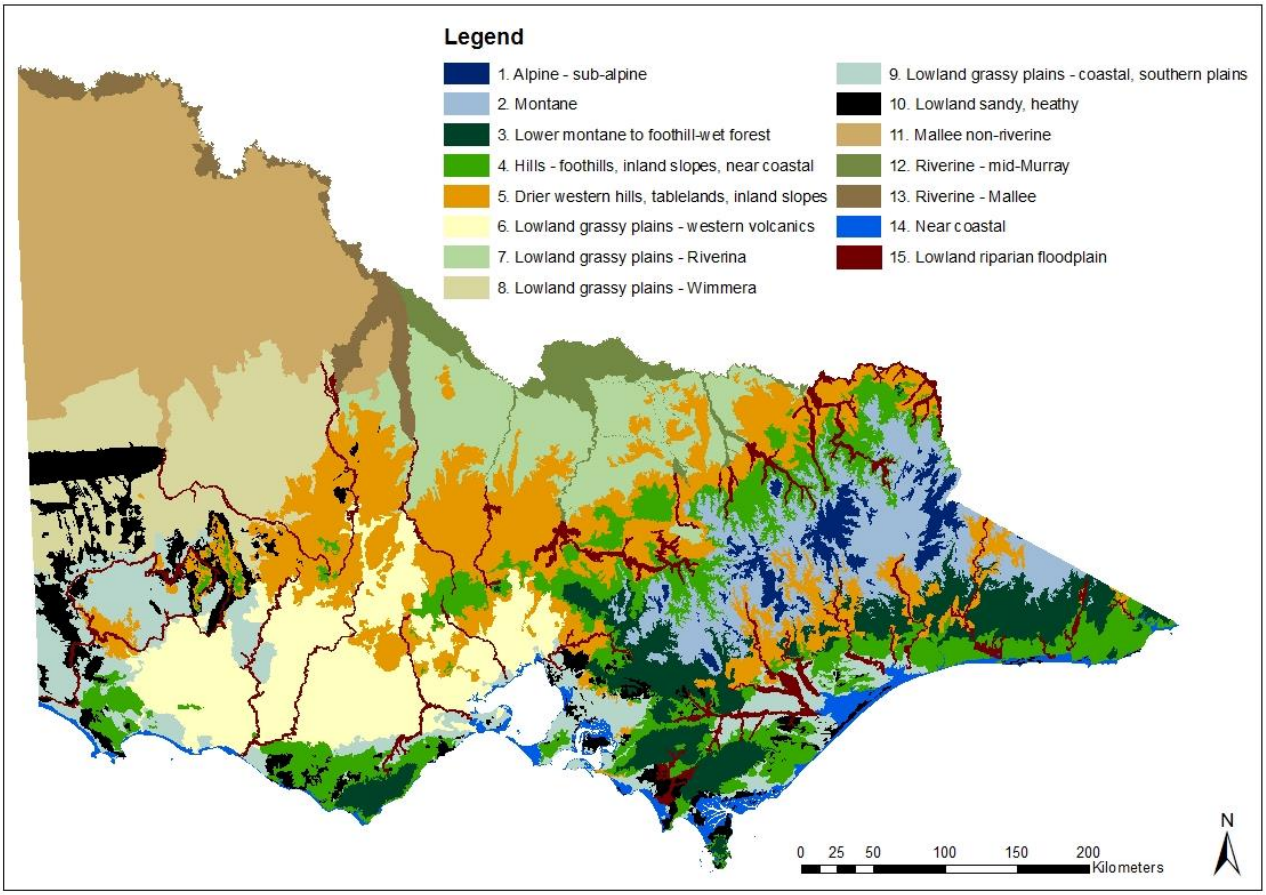

Figure 1. Victorian wetland landscapes.

Defining characteristics of wetland aggregate EVCs

The term aggregate is applied to an EVC label where the EVC represents a group of vegetation types associated with wetlands occurring within a given ecological context (e.g. saline, brackish or freshwater lakes; billabongs; mineralised drainage-lines on grey-clay basalt derived soils) or a reliable sequence of two or more vegetation components associated with a specific habitat (e.g. Sink-hole Wetland, Spring-soak Woodland).

The range of EVCs which can be variously expressed in these situations can be determined; however the scale and intricacy can be prohibitive to resolution of the component EVCs, especially for the purpose of broader-scale mapping.

3.3 Assessment of wetland vegetation condition

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 condition of the vegetation can be assessed.

In the assessment method presented, vegetation condition 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 based on 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 condition. 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) (DSE 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 condition, with the exception of lack of weeds, and in a modified sense, structure and health of the overstorey. 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 with the exception of the lack of weeds, different attributes were required. The method outlined here uses the following attributes to assess the condition of wetland vegetation: critical lifeform groups, 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 of severe drought.

Benchmark descriptions were prepared for each of the 156 vegetated EVCs occurring in wetlands covered by the project and have been updated recently (DELWP 2020a). These specify the benchmark for each of the attributes for each EVC except EVC 999 (modified) and EVC 990 (lacking vascular vegetation). See Appendix 4 for an example of an EVC benchmark description.

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. This is also the field assessment sheet for the IWC wetland vegetation condition assessment in the IWC method (DELWP 2020b).

Critical lifeform groups

The interpretation of representation of critical life-forms as used in the IWC has some significant differences from the assessment of life-forms as used in the Habitat Hectares method of the Native Vegetation Framework. Within the IWC assessments, each species should be scored within only one of the critical lifeform groups. If there is any doubt as to which grouping is appropriate, the relevant group is selected on the basis of the characteristics of the relevant species at maturity.

The critical lifeform groups of the IWC apply only to species which are inherently a component of the relevant wetland EVC. These comprise species which have at least a consistent seasonal presence during characteristic cyclic variation within the wetland. This includes species which utilise seasonal or otherwise cyclical dryer phases of the wetland (e.g. annuals which germinate during draw-down), and those that may

also extend into dryer habitats but have long-term presence within the wetland through tolerance of the natural inundation regime. However, dryland species which have opportunistically colonised from outside of the wetland during prolonged dry conditions should not be included in the assessment of representation of critical lifeform groups. The life-form assessment excludes species whose presence would be indicative of altered processes. However, it does not exclude species which would be naturally present within the relevant EVC but have increased in abundance due to altered processes.

Benchmark descriptions specify the critical lifeform groups which are expected to be present in each EVC. The benchmark also specifies minimum species diversity and cover levels for each lifeform grouping to be regarded as unmodified.

Scoring is based on the presence of lifeform groups 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 a similar but modified process in relation to 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 representative of 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.

Environmental weeds can include species native to parts of Victoria but occurring outside of their natural range – e.g. Coast Wattle *Acacia longifolia* subsp. *sophorae*, Coast Tea-tree *Leptospermum laevigatum* and Sweet Pittosporum *Pittosporum undulatum*. In some cases it may be necessary to decide whether invasive species represent local dryland species which have opportunistically colonised wetlands as a consequence of modified hydrology (in which case they will represent indicators of altered processes), or whether these are invasive species operating outside of their natural range (in which case they will represent weeds). If a species interpreted as representing a weed is also reflecting changes to hydrological conditions, its performance within the wetland could also contribute to consideration of altered processes.

Indicators of altered processes

Many dryland EVCs are indicative of relatively fixed conditions of the habitat (such as combinations of ranges of geology, aspect, altitude and rainfall). A somewhat different perspective on wetland EVCs is required as the hydrological regime is a determinant of which EVCs are expressed within a particular range of more general habitat conditions.

The altered processes component is intended to provide an assessment of the extent of modification to ecological processes, as indicated by shifts in the composition or recruitment patterns of the vegetation. No points are allocated where the wetland has effectively been displaced. Five points are allocated where only a fragment of the presumed original flora has persisted, as expressed by persistence of <50% of the critical life-forms – this is very different to 50% of the pre-modification species composition, given the conservative nature of selection of life-forms to minimize underscoring of wetland systems which are naturally species-poor.

Where there are indications of altered processes and at least 50 % of the critical life-forms are present, the ratings severe (ten points), moderate (fifteen points) and minor (twenty points) are applied using the highest rated indicator present. For the purposes of the IWC, these ratings are defined as follows:

Minor: Some indications of altered processes, but barely affecting structure or floristics of the vegetation; changes starting but apparently reversible or low impact (e.g. incidental colonisation of opportunistic dryland species, or small scale shifts occurring in the distribution of wetland species across zones that are outside of the natural seasonal cycles, including mortality of long lived dominants).

Moderate: Invasions (or losses of key structural elements) substantial, with indications of potential for longer-term persistence of these changes (e.g. the presence of well-established individuals of species with longer life cycles from dryland habitats or otherwise outside of the relevant wetland zone; colonisers more than scattered and contributing to the overall vegetation structure; dryland invasions at least patchy or establishing fronts over substantial portion of the respective wetland zones or moderate mortality of long lived dominants).

Severe: Changes high impact, with invasions dominating or key structural elements greatly reduced or displaced; system apparently substantially modified with changes unlikely to be reversed in medium to longer-term context (e.g. major and lasting changes in the structure of the vegetation have occurred, such as invasions or major mortality of long-lived species throughout much of the wetland area).

The level of altered processes should be interpreted with this staged framework in mind, and the reasons for the interpretation recorded on the assessment sheet.

Some examples of the more readily recognisable indicators of altered processes are provided in the IWC benchmarks, however ideally a broader perspective is desirable. Generally the indicators constitute indigenous species which have colonised from outside the relevant habitat or respective zone of the wetland (e.g. invasion by River Red-gum *Eucalyptus camaldulensis* seedlings, Tangled Lignum *Duma florulenta*, Cumbungi *Typha* spp. or Samphires *Tecticornia* spp., or decline of structural dominants due to hydrological changes (e.g. drowning of mature River Red-gum). However introduced species may also be used as indicators where their presence is indicative of altered hydrology (i.e. where they would not be viable or as abundant under the pre-modification inundation regime). There should not be concern about duplication of using the same species as both indicators of altered processes and including them in the assessment of environmental weeds – e.g. particular weeds may or may not be indicative of direct alteration of site factors. While in general the relative performance of indicators of altered processes within wetlands will pertain to hydrological changes, it may be reasonable to extend this perspective to include species indicative of other ecological changes such as altered fire regimes or loss of native herbivores, if these factors are clearly relevant to functional changes in the wetland.

Indicators of altered processes include a wide range of dryland species which have colonised wetlands under prolonged dry conditions (a range of these are discussed under EVC 999). Examples of indicators of altered processes can also include aquatic species indicative of summer inundation which would not be able to perform under pre-modification hydrology, such as *Typha* spp. They can also include species indicative of elevated water-tables which have arisen through land-use practises (e.g. saline conditions colonised by *Tecticornia pergranulata*, but not naturally saline wetlands dominated by this species).

Introduced species which are both serious environmental weeds and potential indicators of altered processes, where occurring in habitats which were not previously wet over summer, include Water Couch *Paspalum distichum*, Lesser Reed-mace *Typha latifolia* and Arrowhead *Sagittaria* spp.

The scoring is outlined in Appendix 5.

Vegetation structure and health

This attribute assesses the condition or indicators of poor health 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 healthy canopy (rather than individual specimens), in a similar fashion to the assessment of tree health used in the Habitat-Hectare method.

The approach provides some assessment 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.

The health assessment interprets the projected cover of living individuals of the relevant species, making allowances for herbaceous species where seasonal dieback of aerial parts is normal and not indicative of poor health of the vegetation. Hence attached but senescent aerial parts of reeds or cumbungi would be included as healthy cover unless there was evidence that dieback had occurred that was not part of normal seasonal fluctuations.

At times it may be confusing as to whether stags should be included as a proportion of the cover which is in poor health or whether they should be excluded from contributing to the benchmark cover. Generally it will be sensible to include them as a weighted contribution to cover – i.e. what proportion of the cover had been lost through their death, at least as long as they are still clearly identifiable as trunks which would be potentially standing in the absence of a disturbance event. Given the width of the ranges provided for the health assessment (i.e. within bench mark cover range and at least 70% in good health for maximum score), it is unlikely that natural attrition of veteran trees would lead to decreases in allocated scores.

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 scores 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.

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Appendix 1 EVCs included in the wetland EVC typology

Wetland EVC name	Wetland EVC number
Alkaline Basaltic Wetland Aggregate	1111
Alluvial Plains Semi-arid Grassland	806
Alluvial Plains Semi-arid Shrubland (previously known as Lignum Shrubland)	A123
Alpine Creekline Herbland	239
Alpine Fen	171
Alpine Heath Peatland	288
Alpine Hummock Peatland	1011
Alpine Short Herbland	905
Aquatic Grassy Wetland	306
Aquatic Herbland	653
Aquatic Sedgeland	308
Billabong Wetland Aggregate	334
Black Box Wetland	369
Blocked Coastal Stream Swamp	875
Brackish Aquatic Herbland	537
Brackish Grassland	934
Brackish Herbland	538
Brackish Lake Aggregate	636
Brackish Lake Bed Herbland	539
Brackish Lignum Swamp	947
Brackish Sedgeland	13
Brackish Sedgy Shrubland	1114
Brackish Shrubland	973
Brackish Wetland Aggregate	656
Calcareous Sedgy Shrubland	A106#
Calcareous Wet Herbland	591
Cane Grass Wetland	291
Cane Grass Wetland/Alluvial Plains Shrubland Complex	A117#
Cane Grass Wetland/Aquatic Herbland Complex	602
Cane Grass Wetland/Brackish Herbland Complex	606
Claypan Ephemeral Wetland	284
Coastal Dry Saltmarsh	A110*
Coastal Ephemeral Wetland	976
Coastal Hypersaline Saltmarsh	A111*
Coastal Lagoon Wetland Aggregate	11
Coastal Saline Grassland	A109*
Coastal Saltmarsh Aggregate	9
Coastal Tussock Saltmarsh	A112*
Dune-soak Woodland	673
Dwarf Floating Aquatic Herbland	949
Ephemeral Drainage-line Grassy Wetland	678

Continued overleaf

Wetland EVC name	Wetland EVC number
Ephemeral Drainage-line Grassy Wetland	678
Estuarine Flats Grassland	914
Estuarine Reedbed	952
Estuarine Scrub	953
Estuarine Wetland	10
Fern Swamp	721
Floodplain Grassy Wetland	809
Floodplain Riparian Woodland	56
Floodplain Thicket	280
Floodplain Wetland Aggregate	172
Floodway Pond Herbland	810
Floodway Pond Herbland/Riverine Swamp Forest Complex	945
Forest Bog	723
Forest Creekline Sedge Swamp	728
Forest Wet Flat Herbland	A129#
Freshwater Lake Aggregate	718
Freshwater Lignum - Cane Grass Swamp	954
Freshwater Lignum Shrubland	657
Gahnia Sedgeland	968
Grassy Red Gum Swamp	A127#
Granite Rock-pool Wetland	1112
Grassy Riverine Forest	106
Grassy Riverine Forest/Floodway Pond Herbland Complex	811
Grassy Riverine Forest/Riverine Swamp Forest Complex	812
Grey Clay Drainage-line Aggregate	124
Herb-rich Gilgai Wetland	956
Hypersaline Inland Saltmarsh Aggregate	708
Intermittent Swampy Woodland	813
Intermittent Swampy Woodland/Floodway Pond Herbland Complex	A121#
Intermittent Swampy Woodland/Lake Bed Herbland Complex	A119#
Intermittent Swampy Woodland/Riverine Grassy Woodland Complex	822
Lake Bed Herbland	107
Lake Bed Herbland/Lake Bed Herbland Complex	A122#
Lava Plain Ephemeral Wetland	974
Lignum Swamp	104
Lignum Swampy Woodland	823
Mangrove Shrubland	140
Montane Bog	966
Montane Riparian Thicket	41
Montane Riparian Woodland	40
Montane Sedgeland	148
Montane Swamp	318

Continued overleaf

Wetland EVC name	Wetland EVC number
Perched Boggy Shrubland Aggregate	185
Plains Grassy Wetland	125
Plains Grassy Wetland/Aquatic Herbland Complex	755
Plains Grassy Wetland/Brackish Herbland Complex	767
Plains Grassy Wetland/Calcareous Wet Herbland Complex	958
Plains Grassy Wetland/Lignum Swamp Complex	A101#
Plains Grassy Wetland/Sedge-rich Wetland Complex	959
Plains Grassy Wetland/Spike-sedge Wetland Complex	960
Plains Rushy Wetland	961
Plains Saltmarsh Aggregate	888
Plains Sedgy Wetland	647
Plains Sedgy Wetland/Sedge Wetland Complex	1010
Plains Sedgy Woodland	283
Plains Swampy Woodland	651
Plains Swampy Woodland/Lignum Swamp Complex	784
Red Gum Swamp	292
Red Gum Swamp/Cane Grass Wetland Complex	A114#
Red Gum Swamp/Plains Rushy Wetland Complex	A115#
Riparian Fern Scrub	A120#
Riparian Scrub	191
Riparian Thicket	59
Riverine Chenopod Woodland	103
Riverine Claypan Herbland	A128#
Riverine Ephemeral Wetland	975
Riverine Swamp Forest	814
Riverine Swampy Woodland	815
Rushy Riverine Swamp Aggregate	804
Saline Aquatic Meadow	842
Saline Lake Aggregate	717
Saline Lake-verge Aggregate	648
Salt Paperbark Woodland	676
Saltmarsh-grass Swamp	A113*
Samphire Shrubland	101
Sandy Stream Pond Aggregate	A124#
Sea-grass Meadow	845
Seasonally Inundated Shrubby Woodland	195
Seasonally Inundated Sub-saline Herbland	196
Sedge Wetland	136
Sedge Wetland/Aquatic Herbland Complex	A102#
Sedge Wetland/Aquatic Sedgeland Complex	963
Sedge Wetland/Brackish Herbland Complex	1113
Sedge Wetland/Calcareous Wet Herbland Complex	883
Sedge-rich Wetland	281

Continued overleaf

Wetland EVC name	Wetland EVC number
Sedgy Riverine Forest	816
Sedgy Riverine Forest/Riverine Swamp Forest Complex	817
Sedgy Swamp Woodland	707
Shell-beach Herbland	964
Sink-hole Wetland Aggregate	908
Spike-sedge Wetland	819
Spring-soak Woodland Aggregate	80
Stony Rises Pond Aggregate	857
Sub-alpine Pond Herbland	913
Sub-alpine Wet Heathland	210
Sub-alpine Wet Sedgeland	917
Submerged Aquatic Herbland	918
Sub-saline Depression Shrubland	820
Swamp Heathland Aggregate	49
Swamp Scrub	53
Swamp Scrub/Gahnia Sedgeland Complex	2004
Swampy Riparian Woodland	83
Swampy Woodland	937
Sweet Grass Wetland	920
Tall Marsh	821
Unvegetated (open water/bare soil/mud – 'Non Vegetation')	990
Wet Heathland	8
Wet Heathland/Plains Grassy Wetland Complex	A104#
Wet Heathland/Plains Sedgy Wetland Complex	A105#
Wet Heathland/Sedge Wetland Complex	931
Wet Saltmarsh Herbland	A107*
Wet Saltmarsh Shrubland	A108*
Wet Sedgy Herbland	A116
Wet Swale Herbland	12
Wet Verge Herbland	A118#
Wet Verge Herbland/Floodway Pond Herbland Complex	A125#
Wet Verge Sedgeland	932
Wet Verge Sedgeland/Sedge Wetland Complex	A126#

* These EVCs represent resolution of the potential components of EVC 9 Coastal Saltmarsh Aggregate. These are presented in more detail in the 'Victorian Saltmarsh Study 2010' (Boon et al. 2011). Of these, only A113 is recognised as having occurrences outside of coastal saltmarsh habitats. To date these have not been adopted within DELWP's vegetation quality assessment framework

These EVCs are additional wetland Ecological Vegetation Classes and to date have not been adopted within DSE's vegetation quality assessment framework.

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 755), 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 perennis* s.l., *Eleocharis acuta*, *Carex gaudichaudiana*, *Triglochin alcockiae*, *Ornduffia reniformis*, *Crassula helmsii*, *Lilaeopsis polyantha*, *Ranunculus amphitrichus*, *Montia australasica*, *Rumex bidens*, *Stellaria angustifolia* subsp. *angustifolia*, *Myriophyllum simulans*, *Isolepis fluitans*, *Asperula subsimplex*, *Potamogeton cheesemanii*, *Urtica incisa*, *Hydrocotyle tripartita*, *Hydrocotyle sibthorpioides*, *Lobelia beaugleholei*, *Senecio psilocarpus*, *Persicaria decipiens*, *Leptinella reptans* s.s. and *Senecio pinnatifolius* var. *pinnatifolius*

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 mitchellii*, *Calocephalus sonderi*, *Sclerochlamys brachyptera*, *Plantago cunninghamii* and *Brachyscome* spp.

Alluvial Plains Semi-arid Shrubland (EVC A123) (previously known as 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 in more elevated parts of riverine floodplains. The prior name 'Lignum Shrubland' was misleading and created confusion with EVC 104 (Lignum Swamp). Tangled Lignum is not a consistent component of the vegetation in the Alluvial Plains Semi-arid Shrubland EVC.

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

Riverine Alluvial Plains Semi-arid Shrubland:
Sclerochlamys brachyptera, *Plantago cunninghamii*, *Goodenia* spp., *Bulbine semibarbata*, *Brachyscome lineariloba*, *Brachyscome ciliaris*, *Isoetopsis graminifolia*, *Rhodanthe corymbiflora*, *Senecio glossanthus*, *Tetragonia moorei*, *Atriplex leptocarpa*, *Calotis hispidula*, *Calocephalus sonderi* and *Sporobolus mitchellii*.

Tall Cane Grass Alluvial Plains Semi-arid Shrubland:
Further north-west: *Eragrostis australasica*, *Lachnagrostis filiformis* s.s., *Asperula gemella*, *Chenopodium nitrariaceum*, *Eleocharis pallens* and *Senecio runcinifolius*.

Birchip (Chirrup Swamp, where transitional towards Cane Grass dominated Lignum Swamp [EVC 104]): *Eragrostis australasica*, *Amphibromus nervosus*, *Senecio runcinifolius*, *Lachnagrostis filiformis* var. 1 and *Epilobium billardierianum*.

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* spp., *Myriophyllum pedunculatum*, *Epacris* spp., *Schoenus* spp., *Poa* spp., *Oreomyrrhis* spp., *Psychrophila introloba* and *Plantago* spp. in gaps or more open stands.

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 mountain areas.

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

Alpine Heath Peatland (EVC 288)

Defining Characteristics: Dwarf heathland of high altitude valley floors. Typically dominated by *Epacris glacialis* and growing on remnant 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. and *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 continentis*, *Baeckea* spp., *Epacris* spp., *Callistemon pityoides*, *Empodisma minus*, *Carex* spp., *Astelia alpina*, *Carpha* spp., *Lobelia surrepens*, *Ranunculus* spp. (notably *R. pimpinellifolius* and *R. gunnianus*), *Hypericum japonicum* and *Epilobium* spp.

Alpine Short Herbland (EVC 905)

Defining characteristics: Dwarf herbland of wet alpine soils, in sites with a short growing season. Typically found in areas of late-lying snow. Rare and localised, on higher mountains.

Indicator species: *Psychrophila introloba*, *Oreobolus pumilio* subsp. *pumilio*, *Oreomyrrhis pulvinifica*, *Juncus antarcticus*, *Plantago muelleri*, *Utricularia monanthos*, *Isolepis* spp., less commonly *Parantennaria uniceps* and *Deyeuxia affinis*.

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* (*L. perennis* s.l.) 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, lacking woody species (or nearly so), dominated by herbaceous aquatic species (often with at least rootstocks tolerant of dry periods). Widespread, but rare in mountains and north-west.

Indicator species: *Myriophyllum* spp., *Cycnogeton* spp., variously with *Ornduffia reniformis*, *Ludwigia peploides* subsp. *montevidensis*, *Nymphoides* spp. and *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.s.), *Baumea articulata* and robust forms of *Baumea rubiginosa* s.l. Often occurs in association with Aquatic Herbland (EVC 653).

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 (EVC 172) and wetter variants of the primarily terrestrial Floodplain Riparian Woodland (EVC 56). Other relevant EVC mapping units include Floodplain Riparian Woodland/Floodplain Wetland Mosaic and Floodplain Riparian Woodland/Billabong Wetland Mosaic. Recognisable wetland components of Billabong Wetland Aggregate include Aquatic Herbland (EVC 653), Aquatic Sedgeland (EVC 308), Tall Marsh (EVC 821), Dwarf Floating Aquatic Herbland (EVC 949) and Floodway Pond Herbland (EVC 810). 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 a sedgy-herbaceous understorey including species indicative of wetland habitats. Seasonal to episodic swampy woodland, with aquatic and semi-aquatic species present within Black Box dominated vegetation. Rare, lower Loddon - Avoca area and Wimmera.

Indicator species: *E. largiflorens*, (open) *Duma florulenta*, *Amphibromus* spp. (mainly *A. nervosus*), *Lachnagrostis filiformis* s.s., *Eleocharis acuta*, *Marsilea drummondii*, *Lobelia concolor*, *Ranunculus inundatus* and *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*, *Althenia* spp. and *Lilaeopsis polyantha*, Stoneworts (Family Characeae), *Thyridia repens*, *Stuckenia pectinata* 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 *Rytidosperma* spp., with e.g. *Distichlis distichophylla*, *Calocephalus lacteus*, *Selliera radicans*, *Disphyma crassifolium* subsp. *clavellatum*, *Sebaea* spp., *Wilsonia rotundifolia* and *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 *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 (EVC 537), Brackish Lake Bed Herbland (EVC 539), Brackish Herbland (538), Brackish Sedgeland (EVC 13) and Brackish Wetland Aggregate (EVC 656). 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 unit (open water/bare soil/mud). Localized in north and west, very rare in near coastal sites (e.g. Bellarine Peninsula, lower Latrobe wetlands).

Indicator species: Variously *Cressa australis*, *Heliotropium curassavicum*, *Atriplex australasica*, *Glycyrrhiza acanthocarpa*, *Thyridia repens*, *Chenopodium glaucum*, *Sporobolus* spp. (*S. mitchellii and S. virginicus*), *Atriplex suberecta* and *Myriophyllum verrucosum*. Scattered living veteran trees *of Eucalyptus camaldulensis* can be present around the outer fringes, and dead stags may be extensive through the vegetation reflecting an altered hydrology.

Brackish Lignum Swamp (EVC 947)

Defining characteristics: Wetland dominated by *Duma 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 shared with 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 and localized in coastal areas west of Melbourne.

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

Brackish Sedgeland (EVC 13)

Defining characteristics: Medium to tall sedgeland, dominated by salt-tolerant sedges in association with a 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 caldwellii* and/or *Schoenoplectus pungens* in some wetter versions (but note also EVC 656 Brackish Wetland Aggregate).

Brackish Sedgy Shrubland (EVC 1114)

Defining characteristics: Sedgy shrubland vegetation with a minor component of halophytic species, occurring on faintly brackish 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* s.s., *Brachyscome graminea*, *Centella cordifolia*, *Rytidosperma semiannulare*, *Deyeuxia densa*, *Drosera pygmaea*, *Hemarthria uncinata* var. *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 the dominant species tolerant of lower levels of salinity, but ground-layer with a sparse grassy-herbaceous ground-layer with few if any halophytic species. Ephemerals are prevalent and indicative of seasonal waterlogging. Rare, Little Desert and nearby far south-west.

Indicator species: *Melaleuca brevifolia*, variously with *Acacia farinosa*, *Rytidosperma* spp. (*R. geniculatum*, *R. setaceum*, *R. semiannulare*), *Austrostipa scabra*, *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 gracilenta* 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 (EVC 13), Brackish Herbland (EVC 538) and Saline Aquatic Meadow (EVC 842). Mainly western and northern areas, but also scattered sites on coastal plains.

Indicator species: See descriptions of component EVCs above; in addition *Juncus kraussii* subsp. *australiensis* can be conspicuous in some variants.

Calcareous Sedgy Shrubland (EVC A106)

Defining characteristics: Stunted shrubland with a conspicuous sedge component, occurring in coastal barrier swamps on calcareous soils. The activities of yabbies are a conspicuous influence on the soils. Very localised, apparently confined to the far south-west of the State, where greatly reduced by recent hydrological interventions.

Indicator species: Component species include *Leptospermum lanigerum*, *Gahnia trifida*, *Logania ovata*, *Lepidosperma neesii*, *Schoenus nitens*, *Euphrasia collina* subsp. *collina*, *Prasophyllum frenchii*, *Selliera radicans*, *Cassytha glabella*, *Lobelia anceps*, *Hydrocotyle pterocarpa*, *Comesperma volubile* and *Thysanotus patersonii*. While herbs are generally sparse, some variants can be species-rich.

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. s.l., *Amphibromus recurvatus* and *Goodenia humilis*. Sparse emergent *Baumea arthrophylla* 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 *Eleocharis acuta*, *Potamogeton tricarinatus* s.l. and *Lachnagrostis filiformis* s.s.

Cane Grass Wetland/Alluvial Plains Semi-arid Shrubland Complex (EVC A117)

Defining characteristics: Wetland vegetation dominated by a mixture of Southern Cane-grass and shrub or shrub-like species indicative of Alluvial Plains Semi-arid Shrubland (EVC A123) - notably Cane Grass, with a minor component of Tangled Lignum and/or Nitre Goosefoot. It occurs on heavy soils in low-rainfall habitat that is prone to shallow intermittent inundation. Apparently very rare and localised, known only from the riverine plain south-west of Echuca.

Indicator species: Co-dominated by the cane grasses *Eragrostis australasica* and *Eragrostis infecunda*, with the shrubs *Duma florulenta* and *Chenopodium nitrariaceum* variously present in low numbers. The vegetation is relatively species-poor, with additional species including *Lachnagrostis filiformis* s.s., *Eleocharis acuta*, *Calocephalus sonderi*, *Cressa australis*, *Ranunculus pumilio*, *Rumex tenax* and *Senecio runcinifolius*.

Cane Grass Wetland/Aquatic Herbland Complex (EVC 602)

Defining characteristics: Wetland vegetation with open stands of 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., *Cycnogeton procerum*, *Lilaeopsis polyantha*, variously including *Lachnagrostis perennis* s.l., *Lachnagrostis filiformis* s.s., *Crassula helmsii*, *Ranunculus* spp., *Stellaria angustifolia* subsp. *angustifolia*, *Amphibromus nervosus*, *Glyceria australis* and *Juncus holoschoenus*.

Cane Grass Wetland/Brackish Herbland Complex (EVC 606)

Defining characteristics: Wetland dominated by open stands of 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 perlaxa*, *Thyridia repens*, *Sebaea albidiflora*, *Selliera radicans*, *Wilsonia rotundifolia*, *Myriophyllum verrucosum* and *Lachnagrostis* spp., with *Sporobolus virginicus*, *Stellaria angustifolia* subsp. *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 in vicinity of the Grampians.

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

Coastal Dry Saltmarsh (EVC A110)

Defining characteristics: Herbland to low shrubland of upper coastal saltmarsh in lower rainfall areas, subject to relatively infrequent tidal inundation or sometimes in remnant near coastal lacustrine sites which no longer have direct access to tidal inundation events. Localised and severely depleted, Bellarine Peninsula, Western Port Phillip Bay, head of Western Port and Lake Reeve.

Indicator species: Variously dominated by *Sarcocornia blackiana*, *Frankenia pauciflora*, *Disphyma crassifolium* subsp. *clavellatum*, *Angianthus preissianus* or very rarely *Sebaea albidiflora*. Associated species variously include *Sarcocornia quinqueflora*, *Samolus repens*, *Hemichroa pentandra*, *Triglochin striata*, *Suaeda australis* and *Distichlis distichophylla*.

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 and possibly Phillip Island. Could also be regarded as a variant of Swampy Woodland (EVC 937).

Indicator species: *Eucalyptus ovata*, *Acacia melanoxylon*, *Leptospermum continentale*, *Ozothamnus ferrugineus*, *Acaena novae-zelandiae*, *Rytidosperma semiannulare*, *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 Hypersaline Saltmarsh (EVC A111)

Defining characteristics: Low shrubland dominated by succulent chenopods (or rarely Salt Lawrencia), occurring in highly hypersaline coastal saltmarsh habitat above the zone of regular tides. Extremely localised in Western Port Phillip Bay and on the Bellarine Peninsula, with a community dominated by *Tecticornia pergranulata* also occurring at Lake Reeve in Gippsland.

Indicator species: Dominated by *Tecticornia pergranulata*, *Tecticornia* sp. (Connewarre), or very locally *Lawrencia squamata*. Can be very species poor, with most consistent associated species including *Sarcocornia quinqueflora* and to a lesser extent *Frankenia pauciflora*, and less frequently *Disphyma crassifolium* subsp. *clavellatum*, *Samolus repens* and *Suaeda australis*. A range of indigenous annuals can be present in relatively intact sites, e.g. on low mounds associated with *Tecticornia* sp. (Connewarre).

Coastal Lagoon Wetland Aggregate (EVC 11)

Defining characteristics: An aggregate EVC which includes the various zones of vegetation associated with sedge-fringed aquatic vegetation of near coastal lagoons. Components include Aquatic Sedgeland (EVC 308), Aquatic Herbland (EVC 653) and Swamp Scrub (EVC 53). Rare, further eastern Victoria, but possibly elsewhere along coast.

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

Coastal Saline Grassland (EVC A109)

Defining characteristics: Grassland dominated by rhizomatous grasses (at best development forming mounds), occurring towards the upper zones of coastal saltmarsh. Restricted extent along the Victorian coastline, with scattered distribution but mostly between the Bellarine Peninsula and Western Port Bay.

Indicator species: Frequently very species poor, especially at maximum development. Typically dominated by either *Distichlis distichophylla* (particularly on heavier soils) or *Sporobolus virginicus* (particularly on sandier soils). *Sarcocornia quinqueflora* and *Triglochin striata* are the most frequent associated species recorded with *D. distichophylla*. *S. virginicus* occurs at the boundary between Coastal Saltmarsh and Estuarine Flats Grassland, and stands may include a component of *Ficinia nodosa*.

Coastal Saltmarsh Aggregate (EVC 9)

Defining characteristics: Variously low shrubby or herbaceous (to grassy or sedgy) vegetation of salinised coastal soils, in or adjacent to tidally influenced wetland. Coastal Saltmarsh Aggregate can include a number of zones of varying structure and floristics, reflecting the regimen of tidal inundation and substrate character. Refer to EVCs A107-A113 for resolution of potential components of Coastal Saltmarsh Aggregate. Scattered distribution in sheltered embayments and estuaries along the Victorian coast.

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

Coastal Tussock Saltmarsh (EVC A112)

Defining characteristics: Upper coastal saltmarsh zones dominated by robust tussocks. Scattered distribution along the Victorian coast.

Indicator species: Dominated by either *Gahnia filum* or *Austrostipa stipoides* with a range of halophytic species at lower covers. *Sarcocornia quinqueflora* is typically present, with *Samolus repens*, *Suaeda australis* and *Distichlis distichophylla* also relatively frequent associates.

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, localised in sandy areas south of the Little Desert.

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 a 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., *Spirodela punctata*, *Wolffia* spp., *Azolla* spp. and the liverwort *Ricciocarpos 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, low rainfall volcanic plains to near west of Melbourne and possibly also Cressy and Skipton areas.

Indicator species: Relatively open *Themeda triandra* and/or *Rytidosperma duttonianum* grassland with associated species including *Eryngium vesiculosum*, *Coronidium gunnianum*, *Eleocharis acuta*, *Marsilea drummondii*, *Amphibromus nervosus*, *Lachnagrostis perennis* s.l., *Eleocharis pusilla*, *Haloragis heterophylla*, *Calotis* spp., *Calocephalus citreus*, *Eryngium ovinum*, *Minuria leptophylla*, *Walwhalleya proluta* and *Chloris truncata*.

Estuarine Flats Grassland (EVC 914)

Defining characteristic: Tussock grassland to sedgeland 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* s.s., *Distichlis distichophylla*, *Acaena novae-zelandiae* and *Apium prostratum*.

Estuarine Reedbed (EVC 952)

Defining characteristic: Vegetation dominated by reeds (usually c. 1.5–3 m in height), in association with a sparse ground-layer of salt tolerant herbs. Distinguished from Estuarine Wetland (EVC 10) 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 Nelson and East Gippsland.

Indicator species: *Phragmites australis*, with associated species variously including *Samolus repens*, *Juncus kraussii* subsp. *australiensis*, *Triglochin striata*, *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 habitats, occurring in association with a 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), sometimes with *Myoporum insulare*, 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 striata* and *Selliera radicans*, variously with *Sarcocornia quinqueflora*, *Gahnia filum*, *Poa poiformis*, *Juncus kraussii* subsp. *australiensis*, *Disphyma crassifolium* subsp. *clavellatum* and *Distichlis distichophylla*. Species such as

Ficinia nodosa, *Tetragonia implexicoma*, *and Rhagodia candolleana* can occur on the drier verges, but are less typical of the vegetation. While the vegetation is frequently relatively species-poor, some sites can be rich in small herbs.

Estuarine Wetland (EVC10)

Defining characteristic: Rushland/sedgeland vegetation, usually dominated by *Juncus kraussii* subsp*. australiensis* and variously with a component of halophytic herbs, occurring in regularly-inundated wetlands of estuarine flats. Distinguished from Estuarine Reedbed (EVC 952) by the smaller stature and reduced dominance of *Phragmites australis* (and greater diversity), from Coastal Saltmarsh Aggregate (EVC 9) by the dominance of medium-sized graminoids (other than *Austrostipa stipoides* in the latter), and from Estuarine Scrub (EVC 953) 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* subsp*. australiensis*, sometimes with *Bolboschoenus caldwellii*, *Schoenoplectus pungens* and/or (stunted and sub-dominant) *Phragmites australis*; variously with *Samolus repens*, *Ranunculus amphitrichus*, *Distichlis distichophylla*, *Isolepis cernua*, *Selliera radicans*, *Apium prostratum*, *Triglochin striata*, *Leptinella* spp., *Thyridia repens*, *Sarcocornia quinqueflora* and *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) vegetation of swampy drainage lines in high-rainfall areas (mostly occurring along drainage systems which support Riparian Thicket (EVC 59) or Cool Temperate Rainforest (EVC 31) 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 wattsii*, *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 or Cynodon dactylon* var*. pulchellus*, with associated species variously including *Azolla filiculoides*, *Myriophyllum crispatum*, *Eleocharis acuta*, *Persicaria prostrata*, *Lachnagrostis filiformis* s.s., *Ludwigia peploides* subsp. *montevidensis*, *Nymphoides crenata*, *Stellaria angustifolia subsp. tenella*, *Juncus ingens* and *Centipeda* spp*.* (and in drier north-western Victoria, *Sporobolus mitchellii* in association with *P. spinescens*).

Floodplain Riparian Woodland (EVC 56)

Defining characteristics: Eucalypt dominated woodland of well developed floodplains of less arid areas, often including treeless wetland areas (referable to Floodplain Wetland Aggregate [EVC 172]). 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

the non-wetland EVC Riparian Woodland. This internal variation within the EVC has led to the additional mapping 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 during vegetation mapping exercises. 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 of the State.

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

Floodplain Thicket (EVC 280)

Defining characteristics: Dense shrubby woodland to open woodland vegetation of braided channel systems of poorly-drained broad alluvial flats associated with floodplain habitats. Characterised by the diversity of *Melaleuca* and *Leptospermum* spp. present. Floodplain Thicket has floristic affinities with forms of Riparian Scrub (EVC 191) and Swamp Scrub (EVC 53). 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 provincialis*, *Acacia verticillata*, C*allistemon rugulosus*, *Gahnia sieberiana*, *Baumea tetragona*, *Empodisma minus* and aquatics in channels. Associated *Eucalyptus* spp. include *E. camaldulensis*, *E. leucoxylon*, *E. ovata* and *E. viminalis*.

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 (EVC 56). Potentially includes mosaics of scrub/shrubland, reedbed, sedgeland, rushland, grassland and/or herbland zones. The following components are variously recognisable within Floodplain Wetland Aggregate: Aquatic Herbland (EVC 653), Aquatic Sedgeland (EVC 308), Tall Marsh (EVC 821), Swamp Scrub (EVC 53), Wet Verge Sedgeland (EVC 932), Floodway Pond Herbland (EVC 810) and Dwarf Floating Aquatic Herbland (EVC 949). Billabong Wetland Aggregate (EVC 334) 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 (EVC 990) and probably between seasons at some locations. Widely dispersed along major riparian floodplains, especially of the Murray River and tributaries.

Indicator species: *Centipeda* spp., *Stellaria angustifolia* subsp. *tenella*, *Dysphania glomulifera* subsp. *glomulifera*, *Fimbristylis* spp., *Polygonum plebeium*, *Glinus* spp., *Persicaria* spp., *Alternanthera* spp., *Lachnagrostis filiformis* s.s.; 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: River Red-gum with a ground-layer dominated by herbaceous species largely shared with Floodway Pond Herbland (EVC 810) and/or Aquatic Herbland (EVC 653), or with the ground-layer 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 the Murray River and major tributaries, also some lake verges in the Wimmera.

Indicator species:

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

Mid-Murray (e.g. Barmah) - *Eucalyptus camaldulensis* with *Lachnagrostis filiformis* s.s., *Stellaria angustifolia* subsp. *tenella*, *Centipeda* spp., especially *C. cunninghamii*, *Alternanthera denticulata s.s.*, *Persicaria* spp. (*P. prostrata*, *P. decipiens*, *P. hydropiper*), *Myriophyllum crispatum* and *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 occurring within forest communities of South Gippsland and the south-west of the State.

Indicator species:

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

South-west Victoria - *Melaleuca squarrosa*, *Baloskion 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 in southern Victoria, mainly in highlands.

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

Forest Wet Flat Herbland (EVC A129)

Defining characteristics: Low herbland to grassland on flats subject to waterlogging and sporadic shallow inundation, at the heads of minor drainage lines within Herb-rich Foothill Forest at low to moderate elevations (c. 100-700 m elevation). Known from very localized occurrences on the Strathbogie Tableland, the Trentham and Kyneton districts, and the Cobboboonee Forest.

Indicator species: Major species include *Centipeda elatinoides*, *Centella cordifolia*, *Isolepis fluitans* and *Lachnagrostis perennis* spp. agg., with grasses including *Deyeuxia quadriseta*, *Rytidosperma semiannulare* and *Amphibromus nervosus* variously conspicuous under some seasonal conditions. A patchy or scattered component of *Carex appressa* is present, with other taller monocots variously including *Juncus* spp. (*J. gregiflorus* or *J. amabilis*), *Lepidosperma elatius* and *Gahnia sieberiana*, and *Lomandra longifolia* and *Poa labillardierei* in the vicinity of drier edges. Additional ground-later species variously include *Eleocharis acuta*, *Gratiola peruviana*, *Hydrocotyle sibthorpioides*, *Hypericum japonicum*, *Juncus holoschoenus*, *Montia australasica*, *Eryngium vesiculosum* and *Hemarthria uncinata*. Scattered eucalypts can be present in parts of the wetland: Tree species occurring in the vicinity of the wetlands variously include *Eucalyptus camphora*

subsp. *humeana* (Strathbogies), *Eucalyptus brookeriana* (Trentham), *Eucalyptus ovata*, *Eucalyptus viminalis* subsp*. viminalis*, *Eucalyptus radiata* s.l. and *Acacia melanoxylon*.

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 (EVC 653), Submerged Aquatic Herbland (EVC 918) or open water (and bare earth or Lake Bed Herbland [EVC 107] when dry). A range of communities can occur on the fringes (see landscape profile key). Variants of Tall Marsh (EVC 821) are often present in more sheltered verges. Scattered, mainly western areas of the State.

Indicator species: See descriptions of component EVCs.

Freshwater Lignum - Cane Grass Swamp (EVC 954)

Defining characteristics: Open grassy shrubland of wetland dominated by *Eragrostis infecunda* with *Duma florulenta*, 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: *Eragrostis infecunda*, *Duma florulenta*, *Eleocharis acuta*, *Lachnagrostis filiformis* s.s., *Marsilea drummondii*, *Potamogeton tricarinatus* s.l. and *Rumex* spp*.* Additional species from the richer outer verges include *Rytidosperma duttonianum*, *Amphibromus nervosus*, *Carex tereticaulis*, *Centipeda cunninghamii*, *Eryngium vesiculosum*, *Eclipta platyglossa*, *Asperula conferta*, *Goodenia heteromera*, *Haloragis aspera*, *Juncus flavidus*, *Lobelia concolor*, *Teucrium racemosum* s.l. and *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: *Duma florulenta*, with associated species including *Rytidosperma duttonianum*, *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 Red Gum Swamp (EVC A127)

Defining characteristics: An open to very open woodland dominated by River Red-gum, over a relatively species-poor ground-layer dominated by Common Swamp Wallaby-grass, potentially including treeless areas. The abundance of swamp wallaby-grass can be relatively consistent or vary with flooding cycles, with the ground-layer potentially being herbaceous to sedgy in character at times. Apparently very rare, disjunct sites in the Victorian Riverina.

Indicator species: *Amphibromus nervosus*, variously with *Alternanthera denticulata*, *Centipeda cunninghamii*, *Damasonium minus*, *Dysphania pumilio*, *Elatine gratioloides*, *Eleocharis acuta*, *Eucalyptus camaldulensis*, *Lachnagrostis filiformis* s.s., *Laphangium luteoalbum*, *Ludwigia peploides* subsp.

montevidensis, *Marsilea drummondii*, *Myriophyllum verrucosum*, *Persicaria lapathifolia*, *Persicaria prostrata*, with *Eragrostis infecunda* and *Poa fordeana* a minor component where present.

Grassy Riverine Forest (EVC 106)

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

Indicator species: *Eucalyptus camaldulensis* with *Paspalidium jubiflorum* dominant in the ground-layer, associated species include *Centipeda cunninghamii*, *Brachyscome paludicola*, *Wahlenbergia fluminalis*, *Euphorbia dallachyana*, *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: Eucalypt dominated forest or woodland of flood-prone areas, where herbaceous species characteristic of drying mud within wetlands (Floodway Pond Herbland [EVC 810] or in part Lake Bed Herbland [EVC 107]) are conspicuous in association or fine-scale mosaic with *Paspalidium jubiflorum* and other species characteristic of Grassy Riverine Forest (EVC 106). Restricted extent, Murray River system mainly in far north-west, but upstream at least as far as Barmah Forest.

Indicator species: *Eucalyptus camaldulensis*, with *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., *Stemodia florulenta*, *Eclipta platyglossa*, *Euphorbia dallachyana*, *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 dominated forest of flood-prone areas, where the understorey dominants (e.g. *Eleocharis acuta* and/or *Pseudoraphis spinescens*) of Riverine Swamp Forest (EVC 814) are conspicuous in association or fine-scale mosaic with the larger tussock species (principally *Paspalidium jubiflorum*) characteristic of Grassy Riverine Forest (EVC 106). Murray River system, very restricted outside of Barmah Forest.

Indicator species: *Eucalyptus 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* s.s., *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 the non-wetland EVC Creekline Tussock Grassland. The components of Brackish Herbland (EVC 538) and Brackish Aquatic Herbland (EVC 537) are also variously recognisable within the vegetation aggregate. Rare, western Volcanic Plains.

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

Herb-rich Gilgai Wetland (EVC 956)

Defining characteristics: Herbland of very small, seasonally wet gilgai depressions on heavy soil plains, occurring as part of a mosaic within drier woodland and grassland formations. Where present, surrounding trees can include *Eucalyptus camaldulensis*, *Eucalyptus largiflorens*, *Eucalyptus microcarpa* and/or

Allocasuarina luehmannii. Formerly widespread in lowland plains areas of northern and western Victoria, but now very rare as a consequence of agricultural practices.

Indicator species: Herbs are conspicuous, generally in association with Nardoo and Spike-rushes. Grasses are typically a minor component where present. Component species variously include *Lobelia pratioides*, *Lobelia concolor*, *Goodenia* spp., *Marsilea drummondii*, *Rumex tenax*, *Haloragis* spp., *Eleocharis acuta*, *Eleocharis pusilla*, *Eleocharis pallens* and *Amphibromus* spp.

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 monospecific (or nearly so) low shrubland of stunted succulent chenopods. Drier western and north-western Victoria.

Indicator species: *Tecticornia* spp. and *Althenia/Ruppia* spp.

Intermittent Swampy Woodland (EVC 813)

Defining characteristics: Eucalypt (+/- Acacia) dominated 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 modified as a consequence of 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 *Duma florulenta*). Major species include *Sporobolus mitchellii*, *Cyperus gymnocaulos*, *Cressa australis*, *Haloragis aspera*, *Centipeda cunninghamii*, *Sphaeromorphaea australis*, *Stemodia florulenta*, *Lachnagrostis filiformis* s.s., *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/Floodway Pond Herbland Complex (EVC A121)

Defining Characteristics: An open woodland dominated by River Red-gum, sometimes with sparse Eumong, over a potentially diverse herbaceous ground-layer with a range of species shared with Floodway Pond Herbland (EVC 810) and a component of species shared with Intermittent Swampy Woodland (EVC 813). It abuts Intermittent Swampy Woodland on higher ground. Recorded only from the Robinvale and Boort areas where very localised, but potentially more widespread on floodplains of the Murray River in the Victorian Mallee.

Indicator species: *Eucalyptus camaldulensis*, sometimes with sparse *Acacia stenophylla*. Ground-layer species variously include *Alternanthera denticulata*, *Cardamine moirensis*, *Centipeda cunninghamii*, *Centipeda minima* subsp. *minima* s.s., *Cynodon dactylon* var. *pulchellus* s.s., *Eclipta platyglossa*, *Euchiton sphaericus*, *Euphorbia dallachyana*, *Glinus lotoides*, *Gnaphalium polycaulon*, *Lachnagrostis filiformis* s.s., *Laphangium luteoalbum*, *Lepidium pseudohyssopifolium*, *Ludwigia peploides* subsp. *montevidensis*, *Myosurus australis*, *Persicaria lapathifolia*, *Picris squarrosa*, *Ranunculus pentandrus* var. *platycarpus*, *Rorippa eustylis* and *Senecio glossanthus* s.s. *Eleocharis acuta*, *Paspalidium jubiflorum*, *Sporobolus mitchellii* and *Wahlenbergia fluminalis* are minor components where present.

Intermittent Swampy Woodland/Lake Bed Herbland Complex (EVC A119)

Defining characteristics: Open eucalypt dominated woodland with a ground-layer including a substantial component of herbaceous (to semi-shrub) species adapted to drying mud within lake beds. Some of these evade periods of prolonged inundation as seed, while others persist as dormant tuberous rootstocks. Occurs on the beds of less saline, relatively shallow lakes of the Wimmera and southern Mallee/western Riverina, with the herbaceous component expressing following drawdown.

Indicator species: *Eucalyptus camaldulensis* with ground-layer species variously including *Glycyrrhiza acanthocarpa*, *Malva weinmanniana*, *Cullen cinereum*, *Trigonella suavissima*, *Glossostigma elatinoides*, *Sporobolus mitchellii*, *Cressa australis*, *Heliotropium curassavicum*, *Centipeda cunninghamii*, *Centipeda*

minima s.l., *Polygonum plebeium*, *Lachnagrostis filiformis* s.s., *Senecio runcinifolius*, *Dysphania pumilio* and *Laphangium luteoalbum*. Aquatic species including *Myriophyllum verrucosum* and *Potamogeton tricarinatus* s.l. can remain evident for a short period following drawdown.

Intermittent Swampy Woodland/Riverine Grassy Woodland Complex (EVC 822)

Defining characteristics: Eucalypt (+/- Acacia) dominated 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 *Rytidosperma* spp., *Lobelia concolor*, *Wahlenbergia fluminalis*, *Brachyscome paludicola*, *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: Variously including *Glycyrrhiza acanthocarpa*, *Malva weinmanniana*, *Glossostigma* spp., *Solanum simile*, *Dysphania pumilio*, *Trigonella suavissima*; also localised species including *Austrobryonia micrantha* and *Cullen cinereum*.

Lake Bed Herbland/Floodway Pond Herbland Complex (EVC A122)

Defining Characteristics: Herbland dominated by species adapted to drying mud within small floodway lagoons, with floristics intermediate in character between Lake Bed Herbland (EVC 107) and Floodway Pond Herbland (EVC 810). Apparently very rare, far north-west of the State.

Indicator species: Conspicuous species at known sites include *Atriplex* aff. *leptocarpa*, *Centipeda crateriformis* subsp. *crateriformis*, *Glinus lotoides*, *Glycyrrhiza acanthocarpa*, *Ranunculus pentandrus* var. *platycarpa*, *Scleroblitum atriplicinum* and *Tetragonia moorei*.

Lava Plain Ephemeral Wetland (EVC 974)

Defining characteristics: Low herbland of small ephemeral wetlands within stony swales of geologically recent lava flows, on shallow brown loamy soils. Fringing dryland vegetation typically including *Melicytus* spp. (Tree Violet/ Shrub Violet). Extremely restricted and localised, known only from near Mt Napier in the further south-west of the State and near Werribee.

Indicator species: Conspicuous species at known sites include *Persicaria prostrata*, *Oxalis* sp. aff. *exilis* (glabrescent), *Haloragis aspera*, and *Dichondra repens*, with associated species variously including *Isolepis fluitans*, *Eleocharis pusilla*, *Marsilea costulifera*, *Lachnagrostis filiformis* s.s., *Alternanthera* sp. 1 (Plains), *Carex inversa*, *Crassula peduncularis*, *Hydrocotyle sibthorpioides*, *Pauridia vaginata*, *Lythrum hyssopifolia*, *Rumex brownii*, *Cullen parvum*, *Rytidosperma caespitosum* and *Rytidosperma duttonianum.*

Lignum Swamp (EVC 104)

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

Indicator species: *Duma florulenta*, with species variously including *Eleocharis acuta*, *Marsilea drummondii*, *Eragrostis infecunda*, *Lachnagrostis filiformis* s.s., *Senecio runcinifolius*, *Senecio glossanthus*, *Rytidosperma duttonianum*, *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 and/or acacia dominated 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: *Duma 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 Connewarre to the eastern side of Nooramunga Marine Coastal Park, with most extensive development within Corner Inlet and Western Port.

Indicator species: Characteristically occurs as monospecific 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 shrubland with sedge and moss components in 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 gunnii*, *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* s.l., *Epacris* spp. (notably *E. paludosa*), *Sphagnum* spp. and *Empodisma minus*, with associated species including *Richea victoriana*, *Oxalis magellanica*, *Wittsteinia vacciniacea* and *Blechnum penna-marina* subsp. *alpina*. *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 waterlogging. 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* subsp. *alpina*, *Olearia phlogopappa*, *Tasmannia lanceolata*, *Gaultheria appressa*, *Chiloglottis* spp., *Leptinella filicula*, *Mentha laxiflora*, *Dianella tasmanica* and *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*, *Anthosachne scabra* s.l., *Carex gaudichaudiana*, *Carex appressa*, *Hypericum japonicum*, *Deyeuxia quadriseta*, *Epilobium gunnianum*, *Gratiola peruviana*, *Ranunculus lappaceus*, *Blechnum penna-marina* subsp. *alpina*, *Blechnum minus*, *Leptospermum grandifolium*, *Leptospermum myrtifolium*, *Rubus parvifolius*, *Geranium potentilloides* and *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 or occasionally Cool Temperate Rainforest.

Indicator species: *Carex gaudichaudiana*, *Carex appressa*, *Carex alsophila*, *Sphagnum* spp., *Epilobium* spp. and *Hydrocotyle* spp., variously in association with *Poa labillardierei*, *Poa ensiformis*, *Eleocharis gracilis*, *Veronica gracilis*, *Veronica subtilis*, *Gonocarpus micranthus*, *Hookerochloa hookeriana*, *Hydrocotyle tripartita*, *Hypericum japonicum*, *Lobelia surrepens*, *Geranium potentilloides*, *Acaena novae-zelandiae*, *Luzula modesta*, *Oreomyrrhis eriopoda*, *Blechnum penna-marina* subsp. *alpina*, *Juncus alexandri*, *Hierochloe 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 (EVC 966). Rare, East Gippsland.

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

Perched Boggy Shrubland Aggregate (EVC 185)

Defining characteristics: Mosaic of dense shrubland variously in association with a herbaceous-sedgy ground-layer in which mosses can be abundant, occurring on reliably saturated soils associated with impeding layers, soaks and springs. Swampy Riparian Woodland (EVC 83) occurs in similar habitats to Perched Boggy Shrubland, but the former is associated with flowing water. In its initial description, "Perched Boggy Shrubland Complex" was reported as always surrounded by the terrestrial EVC Herb-rich Foothill Forest. Very restricted extent, confined to the north-east of the State.

Indicator species: *Baeckea utilis* s.s., *Sphagnum* spp., *Epacris breviflora*, *Leptospermum continentale*, *Acacia verticillata*, *Gonocarpus micranthus*, *Eriocaulon scariosum*, *Eleocharis gracilis*, *Ranunculus* spp., *Gahnia* spp. and *Baumea* spp.

Plains Grassy Wetland (EVC 125)

Defining characteristics: Grassy-herbaceous vegetation of shallow seasonal wetlands of fertile 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*), *Rytidosperma duttonianum*, *Glyceria australis*, *Poa labillardierei*, *Lachnagrostis perennis* s.l., *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*, *Montia australasica*, *Allittia cardiocarpa*, *Craspedia paludicola*, *Microseris scapigera* s.s., *Potamogeton tricarinatus* s.l., *Coronidium gunnianum* and *Ornduffia reniformis*.

Plains Grassy Wetland/Aquatic Herbland Complex (EVC 755)

Defining characteristics: Structural dominants of Plains Grassy Wetland (EVC 125), with aquatic herbs also prevalent. Scattered on western basalt plains, especially in cooler areas.

Indicator species: *Glyceria australis*, variously with *Myriophyllum* spp. (notably *M. variifolium*), *Rumex bidens*, *Potamogeton tricarinatus* s.l., *Montia australasica* and *Cycnogeton* spp.

Plains Grassy Wetland/Brackish Herbland Complex (EVC 767)

Defining characteristics: Structural dominants of Plains Grassy Wetland (EVC 125) in association with herbaceous species characteristic of Brackish Herbland (EVC 538). 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 *Rytidosperma duttonianum*, variously with *Lobelia irrigua*, *Ranunculus diminutus*, *Isolepis cernua*, *Triglochin striata*, *Wilsonia rotundifolia*, *Samolus repens* and *Selliera radicans*.

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

Plains Grassy Wetland/Calcareous Wet Herbland Complex (EVC 958)

Defining characteristics: Structural dominants (and some of key indicator dicot herbs) of Plains Grassy Wetland (EVC 125) 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 perennis* s.l., *Eleocharis acuta*, *Potamogeton tricarinatus* s.l. and *Cycnogeton* spp.

Plains Grassy Wetland/Lignum Swamp Complex (EVC A101)

Defining characteristics: Open shrubland with a grassy ground-layer including structural and floristic components (grasses and dicot herbs) of Plains Grassy Wetland (EVC 125), occurring in association with Tangled Lignum (or sometimes Spiny Lignum or Cane Grass). Scattered sites in the Riverina, where previously more extensive along ephemeral drainage-lines, also Victorian Volcanic Plains where very restricted in extent.

Indicator species: *Duma florulenta* (and sometimes *Duma horrida* subsp*. horrida* and/or *Eragrostis australasica*), *Rytidosperma duttonianum*, *Amphibromus nervosus*, *Walwhalleya proluta*, *Eragrostis infecunda*, *Lachnagrostis filiformis* s.s., *Haloragis aspera*, *Goodenia* spp., *Juncus flavidus*, *Lobelia concolor* and *Senecio runcinifolius*. A component of grasses shared with drier sites (e.g. *Chloris truncata* and *Austrostipa* spp.) can be present.

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 (EVC 281), with species characteristic of Plains Grassy Wetland (EVC 125). Very rare, scattered sites on western basalt plains, also Wimmera (e.g. State Forest north of White Lake).

Indicator species: *Chorizandra enodis* (and in high quality sites *Craspedia paludicola*) dominant, associated species include *Lachnagrostis aemula* s.l., *Lachnagrostis perennis* s.l., *Amphibromus nervosus*, *Allittia cardiocarpa*, *Rytidosperma duttonianum*, *Eleocharis acuta*, *Eleocharis pusilla*, *Eryngium vesiculosum*, *Glyceria australis*, *Microseris scapigera* s.s., *Pentapogon quadrifidus* var*. quadrifidus*, *Potamogeton tricarinatus* s.l., *Schoenus apogon* and *Ornduffia 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 species characteristic of Plains Grassy Wetland (EVC 125). Scattered sites mostly in western Victoria.

Indicator species: The main species include *Glyceria australis*, *Eleocharis acuta*, *Lachnagrostis filiformis* s.s., *Lachnagrostis perennis* s.l. and *Amphibromus nervosus*, sometimes with *Montia australasica* and *Potamogeton tricarinatus* s.l., lower rainfall variants also with *Eragrostis infecunda.*

Plains Rushy Wetland (EVC 961)

Defining characteristics: Rush dominated wetlands with floristic affinities to Plains Grassy Wetland (EVC 125). Scattered on plains of central western and north-central areas of Victoria.

Indicator species: *Juncus flavidus*, *Juncus semisolidus*, *Eleocharis acuta* and *Lachnagrostis filiformis* s.s. An ephemeral component has been noted at some locations.

Plains Saltmarsh Aggregate(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 *Tecticornia* and/or *Frankenia* as in Samphire Shrubland [EVC 101]). Plains Saltmarsh is frequently included (and mapped) as a component of Saline Lake Aggregate (EVC 717). Scattered in less arid western areas.

Indicator species: *Sarcocornia quinqueflora*, *Suaeda australis*, *Samolus repens* and *Puccinellia 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 (EVC 125). Plains Sedgy Wetland can occur in mosaic or complex with Plains Grassy Wetland and Aquatic Herbland (EVC 653). Some variants attributed to Plains Sedgy Wetland approach Sedge Wetland (EVC 136) but can be distinguished by the presence of a substantial cover of the herb-rich component shared with Plains Grassy Wetland. Scattered on plains and tablelands mostly on and south of the Divide.

Indicator species: *Carex tereticaulis* (or sometimes *Baumea arthrophylla*), *Eleocharis acuta* and *Amphibromus* spp., *Montia australasica* and *Stellaria angustifolia* subsp. *angustifolia* (and in highest quality sites, species including *Coronidium gunnianum*, *Craspedia paludicola*, *Senecio psilocarpus*, *Microseris scapigera* s.s., *Allittia cardiocarpa* and *Xerochrysum palustre*).

Plains Sedgy Wetland/Sedge Wetland Complex (EVC 1010)

Defining characteristics: Sedge dominated wetland vegetation of cooler lowland plains, with structural characteristics of Sedge Wetland (EVC 136), but including herbaceous species characteristically associated with wet sites on fertile soils as for Plains Sedgy Wetland (EVC 647). Rare, disjunct sites in southern Victoria.

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

Plains Sedgy Woodland (EVC 283)

Defining characteristics: Woodland, mostly eucalypt dominated, occurring in seasonally inundated shallow depressions on broad plains, within floodplains and fringing dunes. The most similar EVCs are Seasonally Inundated Shrubby Woodland (EVC 195), or for wettest forms, Red Gum Swamp (EVC 292) or Sedge-rich Wetland (EVC 281). 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*, or occasionally *Allocasuarina luehmannii*), *Leptospermum* spp. (sparse), *Lepidosperma* spp. (variously *L. longitudinale*, *L. lineare* and *L. congestum*), *Chorizandra enodis*, *Schoenus tesquorum*, *Ornduffia reniformis*, *Isolepis fluitans*, *Potamogeton tricarinatus* s.l. etc.

Plains Swampy Woodland (EVC 651)

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

Indicator species: *Eucalyptus ovata* (occasionally *Eucalyptus camaldulensis* or *Eucalyptus tereticornis* subsp. *mediana*), *Acacia melanoxylon*, *Poa labillardierei*, *Carex* spp., *Lachnagrostis* spp., with e.g. *Lobelia* spp., *Coronidium gunnianum*, *Eryngium vesiculosum* and *Centella cordifolia*. Shrubs (*Ozothamnus ferrugineus*, *Leptospermum continentale* and *Allocasuarina paludosa*) can be present in the highest rainfall plains areas.

Plains Swampy Woodland/Lignum Swamp Complex (EVC 784)

Defining characteristics: Vegetation including a mixture of structural components of Plains Swampy Woodland (EVC 651) and Lignum Swamp (EVC 104), but without the floristic attributes of Red Gum Swamp (EVC 292). Extremely rare, drier volcanic plains, mainly in rainshadow area to the west of Melbourne.

Indicator species: *Eucalyptus camaldulensis*, *Duma florulenta*, *Poa labillardierei*, *Lachnagrostis filiformis* s.s., *Ottelia ovalifolia*, *Schoenus apogon*, *Persicaria prostrata*, *Lythrum hyssopifolia*, *Amphibromus* spp., and *Rytidosperma* spp.

Red Gum Swamp (EVC 292)

Defining characteristics: Eucalypt dominated 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* (or occasionally *Eucalyptus tereticornis* subsp. *mediana*), *Carex tereticaulis* (or rarely *Baumea arthrophylla* and *Lepidosperma longitudinale*), *Eleocharis acuta*, *Marsilea drummondii* and *Myriophyllum crispatum*.

Red Gum Swamp/Cane Grass Wetland Complex (EVC A114)

Defining characteristics: Species-poor wetland vegetation transitional between the component EVCs (EVCs 292 and 291 respectively), with River Red-gum occurring in association with Southern Cane-grass and a component of aquatic herbs. Rare, recorded from the Wimmera, northern Volcanic Plains and lowland north-east of the State.

Indicator species: *Eucalyptus camaldulensis* and *Eragrostis infecunda*, variously with *Potamogeton sulcatus*, *Myriophyllum crispatum*, *Eleocharis acuta*, *Limosella australis*, *Ottelia ovalifolia* subsp. *ovalifolia*, *Utricularia australis*, *Azolla* spp. and *Centipeda cunninghamii.*

Red Gum Swamp/Plains Rushy Wetland Complex (EVC A115)

Defining characteristics: Wetland vegetation transitional between the component EVCs (EVCs 292 and 961 respectively), with River Red-gum occurring in association with rushes and a variable component of rhizomatous to stoloniferous aquatic grasses and herbs. Rare, recorded from the western north-central and the lowland north-east parts of the State.

Indicator species: *Eucalyptus camaldulensis*, *Juncus semisolidus* and *Juncus flavidus*, variously with *Lachnagrostis perennis* s.l., *Glyceria australis*, *Rumex tenax*, *Persicaria prostrata*, *Eleocharis acuta*, *Epilobium* spp., *Centipeda* spp. and *Myriophyllum* spp.

Riparian Fern Scrub (EVC A120)

Defining characteristics: Dense tall shrubby vegetation with a primarily ferny ground-layer, associated with waterlogged and inundation-prone soils with a substantial organic content. Distinguished from Riparian Scrub (EVC 191) and Riparian Thicket (EVC 59) by greater height and more open and diverse ferny understorey. Distinguished from Swamp Scrub by being dominated by Scented Paperbark as well as by understorey character. Localised in the Otway Ranges and probably also higher rainfall parts of the Gippsland Plain.

Indicator species: Usually dominated by *Melaleuca squarrosa*, sometimes with *Leptospermum lanigerum*, with *Eucalyptus ovata* generally a relatively minor component where present. Ferns are conspicuous, variously including *Blechnum minus*, *Blechnum nudum*, *Blechnum wattsii*, *Dicksonia antarctica*, *Gleichenia microphylla*, *Histiopteris incisa*, *Hypolepis* spp., *Pteris tremula* and *Todea barbara*. Other species variously include *Gahnia sieberiana*, *Tetrarrhena juncea*, *Isolepis inundata*, *Cycnogeton procerum* s.l., *Gratiola peruviana*, *Juncus* spp. (notably *J. procerus* and *J. gregiflorus*), *Myriophyllum pedunculatum* and robust variants of *Triglochin striatum* s.l.

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 and more acidic but similarly wet sites to Swamp Scrub (EVC 53). Higher rainfall southern areas. *Leptospermum lanigerum* dominated variants on Mt Disappointment and in Strathbogie Ranges, previously referred to Riparian Scrub, are now considered better referred to Riparian Thicket (EVC 59).

Indicator species: *Melaleuca squarrosa*, *Gleichenia microphylla*, *Baumea tetragona*, *Baumea gunnii*, *Gahnia sieberiana* and *Lepidosperma elatius.*

Riparian Thicket (EVC 59)

Defining characteristics: Closed scrub with a component of ferns and large sedges, occurring along swampy drainage lines with acidic soils, at altitudes intermediate between the habitats of Riparian Scrub (EVC 191) and Montane Riparian Thicket (EVC 41) (c. 450–700 m). Very localised on ranges mostly north of the Divide

Indicator species: *Leptospermum lanigerum*, *Blechnum nudum*, *Blechnum wattsii*, *Coprosma quadrifida*, *Gleichenia microphylla*, *Tetrarrhena juncea*, *Mentha laxiflora*, *Agrostis* spp. agg. aff. *hiemalis*, *Gratiola pubescens*, *Veronica calycina* and *Carex* spp.

Riverine Chenopod Woodland (EVC 103)

Defining characteristics: Eucalypt dominated woodland of the most elevated of the flood-prone riverine terraces, relatively intact examples with a diverse shrubby-grassy understorey which can be rich in annual species. Prior to river regulation, at least a portion of the habitat was prone to irregular shallow flooding, and comprised intermittent or episodic wetland. Floodplains of the north-west of the State.

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

Riverine Claypan Herbland (EVC A128)

Defining Characteristics: Vegetation dominated by ephemeral and annual forbs, especially small daisies, occurring in shallow, seasonally-inundated claypan depressions. At Barmah Forest and Ulupna Island it typically occurs in localised treeless patches amongst Riverine Swampy Woodland (EVC 815) and can abut the lower margins of slightly more elevated areas supporting the terrestrial EVCs Plains Woodland or Shallow Sands Woodland. Some of these patches occur within the mapping unit Riverine Grassland (EVC 1088). The associated vegetation in the lower rainfall Mallee locations is less well documented, but includes drier vegetation communities, including Semi-arid Woodland and presumably also Alluvial Plains Semi-arid Shrubland (EVC A123) and possibly Lignum Swampy Woodland (EVC 823). While having some similarity to Claypan Ephemeral Wetland (EVC 284) from the vicinity of the Grampians, EVC 284 differs from EVC A128 in characteristics including the prevalence of ephemeral monocots (notably species of *Centrolepis* and *Aphelia*) and in occurring on cracking silty clays within the EVC Alluvial Terraces Herb-rich Woodland. Riverine Claypan Herbland is typically inundated by local run-off of winter rainfall rather than by overbank flooding. This EVC is currently confirmed only from the mid-Murray (Barmah Forest and Ulupna Island) and Mallee (Lake Powell – Lake Carpul area, with additional poorly known variants occurring in interdune swales at Hattah, Murray-Sunset and Wyperfeld tentatively included in this EVC). This EVC is confined to small localised patches and of is extremely limited total extent.

Indicator Species:

Mid Murray: *Myriocephalus rhizocephalus*, variously with *Brachyscome muelleroides*, *Brachyscome readeri*, *Crassula colorata*, *Crassula decumbens*, *Crassula peduncularis*, *Eleocharis pusilla*, *Glossostigma cleistanthum*, *Goodenia gracilis*, *Isoetopsis graminifolia*, *Lachnagrostis filiformis* s.s., *Lobelia concolor*, *Millotia perpusilla*, *Myriophyllum glomeratum*, *Plagiobothrys elachanthus*, *Rytidosperma duttonianum* and *Wurmbea dioica.*

Mallee: *Myriocephalus rhizocephalus*, *Ranunculus pentandrus* var. *platycarpus*, *Pilularia novae-hollandiae*, *Glossostigma cleistanthum*, *Glossostigma drummondii*, *Limosella curdieana*, *Hyalosperma glutinosum*, *Brachyscome lineariloba*, *Lepidium monoplocoides*, *Triglochin nana*, *Crassula decumbens*, *Myosurus australis*, *Pogonolepis muelleriana*, *Spergularia brevifolia*, *Triptilodiscus pygmaeus* and *Amphibromus nervosus*.

Riverine Ephemeral Wetland (EVC 975)

Defining characteristics: Herbland of the floor of riverine depressions, on relatively free-draining sandy soils, 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 dominated forest (to woodland), to 30–40 m or more in height with a generally species-poor understorey dominated by obligate wetland species. Opportunistic annuals can become prevalent 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* s.s., *Cardamine moirensis*, *Ranunculus pumilio*, *Cycnogeton procerum* 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 latter 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 dominated woodland to open woodland, ground-layer grassy to sedgy to herbaceous, with species indicative of periodic waterlogging (and with floristic affinities to Plains Grassy Wetland [EVC 125]). 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*, *Rytidosperma duttonianum*, *Lachnagrostis filiformis* s.s., *Eleocharis acuta*, *Juncus* spp. (*J. flavidus*, *J. amabilis*, *J. subsecundus* and *J. pallidus*), *Walwhalleya proluta*, *Isolepis* spp., *Alternanthera denticulata* s.l., *Lythrum hyssopifolia*, *Swainsona procumbens*, *Asperula conferta*, *Haloragis aspera*, *Calotis scapigera*, *Marsilea* spp., *Lobelia concolor*, *Poa fordeana* and *Rumex* spp.

Riverine Floodplain - *E. camaldulensis* (sometimes with scattered *E. largiflorens*), with species including *Rytidosperma duttonianum*, *Amphibromus nervosus*, *Eleocharis acuta*, *Eleocharis pusilla*, *Lobelia concolor*, *Wahlenbergia fluminalis*, *Goodenia* spp., *Calotis s*pp., *Marsilea* spp., *Poa fordeana* and *Brachyscome paludicola*. Sparse tussocks of *Carex tereticaulis* or *Paspalidium jubiflorum* can also be present.

Rushy Riverine Swamp Aggregate (EVC 804)

Defining characteristics: Aggregate EVC describing the various zones of vegetation associated with semi-permanent wetlands with turf/aquatic grass 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 a patchy structural mosaic. Variously including species-poor components of Tall Marsh (EVC 821), Floodplain Grassy Wetland (EVC 809), Aquatic Sedgeland (EVC 308), Aquatic Herbland (EVC 653) and Dwarf Floating Aquatic Herbland (EVC 949). 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 angustifolia* subsp*. tenella* 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*. montevidensis*, *Potamogeton tricarinatus* s.l., *Landoltia punctata*, *Ricciocarpos natans* and *Vallisneria australis.*

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 vascular vegetation is characteristically extremely species-poor, comprising one or more species of *Althenia* or *Ruppia.* The non-vascular stoneworts (*Lamprothamnium* spp.) can also be conspicuous and are ecologically important.

Widespread in lowlands (within restricted habitat), principally in the Wimmera, western volcanics and coastal areas.

Indicator species: Variously *Ruppia megacarpa*, *Ruppia polycarpa*, *Althenia* spp. (e.g. *A. preissii*, *A. bilocularis*, *A. cylindrocarpa*), *Ruppia maritima* s.s. (confined to north-west of the State) and *Lamprothamnium* spp.

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 (EVC 842), Plains Saltmarsh Aggregate (EVC 888), Brackish Herbland (EVC 538), Brackish Sedgeland (EVC 13) and, on drier verges, Brackish Grassland (EVC 934) and Brackish Shrubland (EVC 973). 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 Plains Saltmarsh Aggregate (EVC 888) , Brackish Herbland (EVC 538), Brackish Sedgeland (EVC 13), Brackish Wetland Aggregate (EVC 656) and, on drier verges, Brackish Grassland (EVC 934) and Brackish Shrubland (EVC 973). 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 dominated woodland with a 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*, with *Tecticornia* spp., *Sarcocornia quinqueflora* and halophytic herbs - e.g. variously *Triglochin striata*, *Thyridia repens* and *Selliera radicans*.

Saltmarsh-grass Swamp (EVC A113)

Defining characteristics: Inundation-prone grassland of highly saline sites, dominated by Saltmarsh Grass. Shallow intermittent saline lakes in parts of inland western Victoria, also extremely restricted occurrences in the Barwon River estuary and on wet saline flats in the Kerang area.

Indicator species: *Puccinellia perlaxa* or *Puccinellia stricta*, with associated species mostly at lower covers, variously including *Sarcocornia quinqueflora*, *Suaeda australis*, *Tecticornia pergranulata*, *Wilsonia rotundifolia*, *Senecio halophilus*, *Gahnia filum* and *Wilsonia humilis*.

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

Sandy Stream Pond Aggregate (EVC A124)

Defining Characteristics: Sandy Stream Pond Aggregate occupies chain of ponds habitats along intermittent floodways through sandy terrain. Individual ponds supporting this aggregate EVC can include representation of indicator species from a wide range of component Wetland EVCs, often on a very fine scale of pattern. The relevant component EVCs variously include Aquatic Grassy Wetland (EVC 306), Aquatic Herbland (EVC 653), Aquatic Sedgeland (EVC 308), Dwarf Floating Aquatic Herbland (EVC 949), Floodway Pond Herbland (EVC 810), Submerged Aquatic Herbland (EVC 918), Sweet Grass Wetland (EVC 920), Tall Marsh (EVC 821), Wet Verge Herbland (EVC A118), Wet Verge Herbland/Floodway Pond Herbland Complex

(EVC A125), Wet Verge Sedgeland (EVC 932) and Wet Verge Sedgeland/Sedge Wetland Complex (EVC A126). Wet Verge Herbland is usually a conspicuous component. Sandy Stream Pond Aggregate is known with certainty only from the Providence Ponds - Perry River and adjacent catchments in Gippsland.

Indicator Species: Variously *Callitriche sonderi*, *Carex appressa*, *Carex gaudichaudiana*, *Centella cordifolia*, *Cycnogeton microtuberosum*, *Cyperus gunnii* subsp*. gunnii*, *Eleocharis sphacelata*, *Glyceria australis*, *Gratiola pedunculata*, *Gratiola peruviana*, *Hydrocotyle sibthorpioides*, *Hypericum japonicum*, *Isolepis fluitans*, *Juncus bufonius*, *Juncus planifolius*, *Juncus procerus*, *Lachnagrostis filiformis* s.s., *Lachnagrostis perennis* s.l., *Laphangium luteoalbum*, *Lythrum hyssopifolia*, *Montia australasica*, *Myriophyllum simulans*, *Persicaria hydropiper*, *Persicaria prostrata*, *Phragmites australis*, *Potamogeton australiensis* and *Potamogeton cheesemanii.*

Sea-grass Meadow (EVC 845)

Defining characteristics: 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 Western Port Bay.

Indicator species: *Zostera* and/or *Heterozostera* spp., often monospecific and sometimes in close proximity to stands of *Avicennia marina*. *Zostera muelleri* s.l. extends into lower estuarine habitats, with *Heterozostera* spp. conspicuous on intertidal mud flats. A localised variant of inter-tidal mud-flats of western Port Phillip Bay includes *Althenia 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 depressions between dunes), in habitat that is occasionally inundated, or at least waterlogged, for extensive periods over winter. The EVC is characteristically rich in geophytes, sedges and annual herbs, usually with a conspicuous shrubby component. 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* and *E. tereticornis* subsp*. mediana* in Gippsland) with *Callistemon* spp. (*C. rugulosus* 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 referred to Brackish Shrubland (EVC 973).

Seasonally Inundated Sub-saline Herbland (EVC 196)

Defining characteristics: 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* and *W. rotundifolia*.

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. The habitat is prone to shallow seasonal inundation and extreme summer dryness. This EVC is typically species-rich, with many species seasonally apparent at very low frequencies. Restricted, south-western areas of the State.

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*, *Montia australasica*, *Goodenia humilis* and *Ornduffia reniformis*.

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 to tall sedges (rarely to medium height), lacking the diversity of broad-leaved herbs associated with relatively intact Plains Sedgy Wetland

(EVC 647), 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, with associated species variously including *Schoenus* spp. (variously *S. tesquorum*, *S. apogon*, *S. brevifolius*), *Goodenia humilis* and *Patersonia* spp.

Sedge Wetland/Aquatic Herbland Complex (EVC A102)

Defining characteristics: Open sedgeland occurring in association with a well developed component of aquatic herbs. Apparently restricted distribution on the west side of the Grampians.

Indicator species: *Lepidosperma longitudinale*, *Baumea arthrophylla*, *Myriophyllum integrifolium* and *Villarsia* spp. s.l. Fringed by *Eucalyptus camaldulensis*.

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 (EVC 136). Restricted, principally in the south-west of the State but with disjunct outliers further east (e.g. Dereel, Brisbane Ranges).

Indicator species: *Baumea articulata*, *Chorizandra australis* (or possibly on occasions *Chorizandra cymbaria* s.s.), *Lepidosperma longitudinale*, *Baumea arthrophylla*, *Ornduffia reniformis*, *Myriophyllum* spp. (*M. crispatum* and *M. simulans*), *Cycnogeton* spp. 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 (EVC 136) occurring in association with a component of halophytic herbs. Very rare, recorded from sub-saline 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*, *Gahnia trifida* and/or *Lepidosperma longitudinale*, variously with e.g. *Lobelia irrigua*, *Isolepis cernua*, *Schoenus nitens*, *Selliera radicans*, *Distichlis distichophylla*, *Centella cordifolia* and *Samolus repens*.

Sedge Wetland/Calcareous Wet Herbland Complex (EVC 883)

Defining characteristics: Open sward of sedge species characteristic of Sedge Wetland (EVC 136), in association with herbaceous species characteristic of wet calcareous habitats. Rare with variants from near-coastal Western Victoria and South Gippsland.

Indicator species:

Western Victoria: *Baumea arthrophylla*, *Lachnagrostis perennis* s.l., *Centella cordifolia*, *Hydrocotyle muscosa*, *Isolepis fluitans*, *Myriophyllum simulans*, *Goodenia humilis*, *Schoenus tesquorum* and *Ornduffia 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*) and *Mentha diemenica* s.l., 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.

Sedgy Riverine Forest (EVC 816)

Defining characteristics: Eucalypt dominated forest (to woodland) with the understorey dominated by larger sedges (to sedgy-herbaceous or sedgy-grassy), floristics with some affinities to Red Gum Swamp (EVC 292). Floodplains of less arid Riverina and Wimmera (absent from further north-west).

Indicator species:

Murray River Floodplain: *Eucalyptus camaldulensis* with *Carex tereticaulis*, variously with *Bolboschoenus medianus*, *Paspalidium jubiflorum*, *Eleocharis acuta*, *Juncus amabilis*, *Lobelia concolor*, *Brachyscome*

paludicola, *Amphibromus nervosus*, *Lachnagrostis filiformis* s.s., *Calotis* spp., *Stellaria angustifolia* subsp. *angustifolia*, *Phragmites australis* and *Craspedia paludicola*, with *Eleocharis pusilla* on drier margins.

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

Sedgy Riverine Forest/Riverine Swamp Forest Complex (EVC 817)

Defining characteristics: Eucalypt dominated forest (to woodland), with the understorey dominants of Riverine Swamp Forest (EVC 814) conspicuous in association or fine-scale mosaic with larger tussock or rhizomatous species characteristic of Sedgy Riverine Forest (EVC 816). Floodplains of less arid parts of the Riverina, but mainly within Barmah Forest.

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

Sedgy Swamp Woodland (EVC 707)

Defining characteristics: Eucalypt dominated woodland with the 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, possibly also central Gippsland.

Indicator species: *Eucalyptus ovata* (and possibly *Eucalyptus camaldulensis* and/or *Eucalyptus tereticornis* subsp. *mediana*), *Lepidosperma longitudinale* (or rarely *Lepidosperma congestum*), *Goodenia humilis*, *Gratiola pubescens*, *Ornduffia reniformis* and *Centella cordifolia*.

Shell Beach Herbland (EVC 964)

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

Indicator species: *Convolvulus* spp. and *Wilsonia backhousei*, with *Cuscuta* spp., *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-herbaceous verge, which is fringed by Swamp Scrub (EVC 53) at the few known sites. Rare, far south-west.

Indicator species: *Myriophyllum salsugineum* and *Chara*/*Nitella* spp. (Characeae), *Baumea arthrophylla*, *Baumea juncea*, *Schoenoplectus pungens*, *Typha* spp., *Cycnogeton* spp. and *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 the western volcanics, Riverina floodplains and Wimmera.

Indicator species: *Eleocharis acuta* (or rarely *E. pusilla*), monospecific or with *Lachnagrostis filiformis* s.s. and incidental opportunistic species (e.g. *Crassula helmsii*, *Cycnogeton procerum*, *Lythrum hyssopifolia*, *Glyceria australis* and *Stellaria* spp). The verges can be more species-rich and grade into other EVCs, notably Plains Grassy Wetland (EVC 125).

Spring Soak Woodland Aggregate (EVC 80)

Defining characteristics: Herbland to eucalypt dominated woodland with a 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*, *E. cadens* or *E. nortonii*), *Leptospermum continentale*, with *Goodenia macbarronii*, *Schoenus apogon* and a range of associated herbs, sedges and rushes – e.g. *Aphelia gracilis*, *Glossostigma elatinoides*, *Drosera hookeri*, *Centrolepis strigosa* subsp. *strigosa*, *Hypericum japonicum*, *Isotoma fluviatilis* subsp. *australis*, *Eragrostis brownii* and *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 (EVC 949), Wet Verge Sedgeland (EVC 932) and/or Tall Marsh (EVC 821). 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 Pond Herbland (EVC 913)

Defining characteristics: Herbland of small seasonal ponds within sub-alpine to alpine vegetation. These systems of small temporary ponds occur in mosaic with Sub-alpine Wet Heathland (EVC 210) and/or Alpine Damp Grassland (EVC 1002). The geomorphological processes leading to the creation of these ponds are poorly understood, but include solifluction. The known sites are on granitic or basaltic geologies, typically with humified peat soils within an elevation range of c. 1470 - 1760 m. Extremely localised and restricted extent in the Victorian Alps (e.g. Bogong High Plains, near Mt Wellington and Mount Buffalo)

Indicator species: *Myriophyllum pedunculatum*, *Isolepis crassiuscula*, *Agrostis* spp., and *Ranunculus millanii,* with *Lobelia gelida* at Mt Buffalo. Species around the verges of the relevant ponds include *Carex gaudichaudiana*, *Gonocarpus micranthus*, *Richea continentalis*, *Juncus* spp., *Poa* spp., *Plantago muelleri*, *Rytidosperma* spp., *Baeckea gunniana* and *Deyeuxia brachyathera.*

Sub-alpine Wet Heathland (EVC 210)

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

Indicator species: *Baeckea* spp., *Epacris* spp. (notably *E. paludosa*), *Empodisma minus*, *Callistemon pityoides*, *Sphagnum cristatum* and *Hakea microcarpa.*

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 *Psychrophila introloba*, *Sphagnum* spp. and (patchy) *Callistemon pityoides*.

Submerged Aquatic Herbland (EVC 918)

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

Indicator species: *Vallisneria australis* 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

including Tall Marsh (EVC 821), Aquatic Herbland (EVC 653), Brackish Aquatic Herbland (EVC 537) and (rarely) Saline Aquatic Meadow (EVC 842).

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) parts of the Riverine Chenopod Woodland (EVC 103) 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*, *Cressa australis* and *Frankenia* spp. or *Sarcocornia* spp.

Swamp Heathland Aggregate (EVC 49)

Defining characteristics: Collective label for the various zones of densely shrubby vegetation associated with waterlogged flats on acidic soils of the Central Highlands. Considered to include three component EVCs (Riparian Scrub [EVC 191], Wet Heathland [EVC 8] and the terrestrial EVC 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* and *Chorizandra cymbaria* s.s., typically fringed by Damp Heathy Woodland dominated by *Eucalyptus cephalocarpa* s.l.

Swamp Scrub (EVC 53)

Defining characteristics: Dense (and potentially up to 10–15 m tall) shrubby vegetation of relatively fertile swampy flats, dominated by Myrtaceous shrubs (to small trees), ground-layer often sparse, aquatic species conspicuous, *Sphagnum* and/or ferns tolerant of waterlogging sometimes present. Formerly widespread in cooler lowland southern areas of Victoria. Note that much of the prior EVC mapping has included the drier (non wetland) EVC 948 Damp Melaleuca Scrub, and the saline EVC 953 Estuarine Scrub within a broader circumscription of Swamp Scrub. Damp Melaleuca Scrub is distinguished by a ground-layer dominated by terrestrial species (e.g. grasses and forbs with bryophytes and lichens) and Estuarine Scrub by a ground-layer dominated by salt-tolerant to halophytic species.

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

Swamp Scrub/Gahnia Sedgeland Complex (EVC 2004)

Defining characteristics: Dense shrubby sedgeland on swampy ground on limestone geologies, structurally and floristically intermediate between Gahnia Sedgeland (EVC 968) and Swamp Scrub (53). Very localised in the far south-west of the State (e.g. Long Swamp).

Indicator species: *Leptospermum lanigerum*, *Melaleuca squarrosa*, *Gahnia trifida*, *Gahnia clarkei*, *Baumea juncea*, *Baumea arthrophylla*, *Hydrocotyle sibthorpioides*, *Acaena novae-zelandiae*, *Urtica incisa*, *Poa tenera*, *Lachnagrostis scabra*, *Leucopogon* sp. aff. *parviflorus*, *Pteridium esculentum*, *Blechnum* spp., *Cassytha melantha* and *Viola hederacea* sensu Entwisle (1976); outer margins with *Eucalyptus ovata* and *Ozothamnus ferrugineus*.

Swampy Riparian Woodland (EVC 83)

Defining characteristics: Eucalypt dominated 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 (EVC 56). Scattered in moister lowland areas to foothill elevations (e.g. Strathbogie Tableland).

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 denotes a poorly-understood range of vegetation types 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 (EVC 83) 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* s.l., *E. obliqua* and *E. radiata* s.l.), variously with *Melaleuca ericifolia* (of reduced vigour relative to occurrences within Swamp Scrub [EVC 53] and Swampy Riparian Woodland), *Acacia* spp. (including *A. melanoxylon* and *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. It is distinguished from Plains Grassy Wetland (EVC 125) by its extremely low diversity. Sweet Grass Wetland is frequently monospecific or virtually so. It can form an inner zone to Plains Grassy Wetland and in some (but not all) instances, a pragmatic approach may be to treat wetland cores dominated by Sweet Grass as a very species-poor phase of Plains Grassy Wetland. Scattered on western volcanics, also recorded from the less-arid Wimmera and south-west Victoria, and with minor atypical occurrences in Gippsland.

Indicator species: *Glyceria australis*, sometimes monospecific or with sparse associated species including *Eleocharis acuta*, *Rumex bidens* and *Lachnagrostis perennis* s.l. *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. The structure is variously rushland, sedgeland or reedbed, locally closed or in association or fine-scale mosaic with Aquatic Herbland (EVC 653), e.g. along floodway lagoons. The vegetation is typically treeless, but sparse *Eucalyptus camaldulensis* (or in higher rainfall areas, *Eucalyptus ovata*) are dispersed through some sites where sufficient dry periods occur to allow their survival. Scattered across lowland Victoria.

Indicator species: Variously with *Phragmites australis*, *Typha* spp., *Juncus ingens*, *Juncus procerus*, *Schoenoplectus tabernaemontani* 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 angustifolia* subsp. *tenella*, *Amphibromus fluitans*, *Pseudoraphis spinescens*, *Calystegia sepium*, *Azolla* spp., *Landoltia punctata* and *Lemna* spp. In cooler or more reliably inundated areas, frequent associated species include *Wolffia* spp. 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* and *Sclerolaena* spp.), grasses (e.g. *Rytidosperma* spp., *Austrostipa* spp., *Chloris truncata*, *Enteropogon acicularis* and *Lachnagrostis filiformis* s.s.) and herbs or shrubs, notably daisies (e.g. *Senecio* spp., *Vittadinia* spp. and *Cassinia* spp.). The composition will change according to the length of time since inundation, with the potential for progressive colonisation by a range of less opportunistic species from adjacent dryland communities.

Of the above species, *Lachnagrostis filiformis* s.s. 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 [EVC 810] or Lake Bed Herbland [EVC 107] 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* s.s. 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 perennis* s.l. constitutes clearly representative wetland vegetation, and is referrable to Aquatic Grassy Wetland (EVC 306).

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. 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 (below 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., *Leptocarpus* spp. s.l., *Empodisma minus* and including species restricted to waterlogged habitats, e.g. *Sprengelia incarnata*, *Drosera binata*, *Gonocarpus micranthus*.

Wet Heathland/Plains Grassy Wetland Complex (EVC A104)

Defining characteristics: Low shrubland dominated by sclerophyllous species, with a diverse grassy-herbaceous ground-layer including species shared with seasonal grassy wetlands of heavy soils on lowland plains. Extremely localised in far south-west Victoria.

Indicator species: *Melaleuca gibbosa*, *Leptospermum continentale*, *Amphibromus* spp., *Allittia cardiocarpa*, *Craspedia paludicola* and *Ornduffia reniformis*.

Wet Heathland/Plains Sedgy Wetland Complex (EVC A105)

Defining characteristics: Low shrubland dominated by sclerophyllous species, with a sedgy ground-layer including herbaceous species shared with seasonal wetlands of heavy soils on lowland plains. Extremely localised in far south-west Victoria.

Indicator species: *Melaleuca gibbosa*, *Baumea arthrophylla*, *Ornduffia reniformis*, *Allittia cardiocarpa*, *Craspedia paludicola* and *Senecio squarrosus.*

Wet Heathland/Sedge Wetland Complex (EVC 931)

Defining characteristics: Sedgy open heathland, transitional in structure and floristics between Wet Heathland (EVC 8) and Sedge Wetland (EVC 136). Rare, recorded with certainty only from south-west Victoria.

Indicator species: *Leptospermum continentale*, *Lepidosperma longitudinale*, *Lepyrodia* spp. and *Schoenus tesquorum*, with associated species including *Amphibromus recurvatus*, *Rytidosperma semiannulare*, *Mazus pumilio*, *Melaleuca squarrosa*, *Lobelia pedunculata* s.l., *Centella cordifolia* and *Ornduffia reniformis.*

Wet Saltmarsh Herbland (EVC A107)

Defining characteristics: Low herbland dominated by succulent to semi-succulent halophytic herbs or semi-shrubs, occupying low-lying areas of coastal saltmarsh subject to regular inundation. Widespread but confined to restricted areas of suitable habitat in sheltered parts of the Victorian coast.

Indicator species: Often very species-poor, most frequently dominated by *Sarcocornia quinqueflora*, less commonly by *Hemichroa pentandra*, *Selliera radicans*, *Samolus repens* or *Suaeda australis*, and on rare occasions, *Triglochin striata*.

Wet Saltmarsh Shrubland (EVC A108)

Defining characteristics: Shrubland dominated by halophytic species and subject to regular tidal inundation. Scattered along Victorian coast, but largely confined to between Breamlea and Corner Inlet.

Indicator species: Often very species-poor, most frequently dominated by *Tecticornia arbuscula*, much less commonly by *Atriplex paludosa*, and rarely by *Atriplex cinerea*. *Sarcocornia quinqueflora* is also frequent in wetter sites with *T. arbuscula*, but less abundant in the slightly more elevated communities dominated by *Atriplex* spp., where *Distichlis distichophylla* becomes more prevalent. *Suaeda australis* can also be conspicuous.

Wet Sedgy Herbland (EVC A116)

Defining characteristics: Species-poor vegetation dominated by herbaceous monocots other than grasses, sometimes with sparse, taller emergent rushes. It occurs on silty alluvium in coastal plain habitats prone to shallow seasonal inundation. Apparently very rare and localised, known only from restricted occurrences in west to south Gippsland, where sometimes occurring adjacent to or in mosaic with Swamp Scrub (EVC 53).

Indicator species: Dominated by *Isolepis inundata* and robust forms of *Triglochin striata*, variously with *Eleocharis acuta* and/or *Eleocharis pusilla*. Additional minor species include *Isolepis producta*, *Eleocharis sphacelata*, *Myriophyllum simulans*, *Cycnogeton procerum*, *Cycnogeton microtuberosum*, *Baumea rubiginosa*, *Selliera radicans* and *Lobelia anceps*. A sparse component of scattered *Juncus ingens* and/or *Juncus pallidus* is sometimes present, but is not characteristic.

Wet Swale Herbland (EVC 12)

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

Indicator species: *Pseudoraphis paradoxa*, *Eleocharis sphacelata*, *Ornduffia reniformis*, *Myriophyllum simulans*, *Cycnogeton* spp., *Baumea articulata*, *Hydrocotyle sibthorpioides*, *Asperula subsimplex* and *Potamogeton tricarinatus* s.l.

Wet Verge Herbland (EVC A118)

Defining characteristics: Low herbland dominated by amphibious/semi-aquatic species. It occupies seasonally wet habitat in the outer drawdown zone of wetlands that have a sufficiently reliable water supply and elevated watertable to support Aquatic Herbland (EVC 653). Wet Verge Herbland typically abuts Aquatic Herbland, but is much more diverse than that EVC. The soils are typically high in organic content. Apparently very restricted, scattered across southern lowland parts of the State, where often bounded by

Swamp Scrub (EVC 53), Riparian Scrub (EVC 171) or sometimes the terrestrial EVC Damp Heathland, on peaty to sandy soils.

Indicator species: Common species include *Goodenia humilis*, *Hydrocotyle sibthorpioides*, *Centella cordifolia*, *Myriophyllum simulans*, *Isotoma fluviatilis* subsp*. australis*, *Montia australasica*, *Gratiola pubescens*, *Isolepis fluitans*, *Gonocarpus micranthus*, *Schoenus maschalinus* and *Crassula helmsii*. Additional associated species variously include *Hypericum japonicum*, *Juncus planifolius*, *Juncus holoschoenus*, *Isolepis inundata*, *Lobelia anceps*, *Lilaeopsis polyantha*, *Hydrocotyle tripartita*, robust forms of *Triglochin striata*, *Lachnagrostis filiformis* s.s., *Lachnagrostis perennis* s.l., *Eleocharis acuta* and *Hemarthria uncinata*. Occasional larger sedges and rushes or incidental plants of shrubs such as *Leptospermum continentale* can also be present, but are not representative.

Wet Verge Herbland/Floodway Pond Herbland Complex (EVC A125)

Defining Characteristics: Low herbland dominated by a mixture of amphibious/semi-aquatic species, species capable of dormancy during inundation events, and short-lived species which germinate following recession of the water's edge. The floristics comprise a mixture of species which are characteristic of either Wet Verge Herbland (EVC A118) or Floodway Pond Herbland (EVC 810). It occupies the lower drawdown zone of the ponds in situations where inundation is more prolonged than those supporting Floodway Pond Herbland, and expresses following drawdown. Wet Verge Herbland/Floodway Pond Herbland Complex is known only from the Perry River - Providence Ponds catchment.

Indicator Species: Variously *Alternanthera denticulata*, *Callitriche sonderi*, *Cardamine microthrix*, *Centella cordifolia*, *Centipeda cunninghamii*, *Centipeda minima* subsp*. minima* s.s., *Cycnogeton microtuberosum*, *Gratiola pedunculata*, *Gratiola peruviana*, *Hydrocotyle sibthorpioides*, *Hypsela tridens*, *Isolepis fluitans*, *Juncus bufonius*, *Juncus planifolius*, *Lachnagrostis filiformis* s.s., *Laphangium luteoalbum*, *Lythrum hyssopifolia*, *Montia australasica*, *Myriophyllum simulans* and *Persicaria prostrata*.

Wet Verge Sedgeland (EVC 932)

Defining characteristics: Tussock (or sometimes sward-forming) sedge dominated wetland component of cooler areas, occasionally occurring as the 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*, *Carex gaudichaudiana*, *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*.

Wet Verge Sedgeland/Sedge Wetland Complex (EVC A126)

Defining characteristics: Sedge-dominated vegetation of the outer zones of wetlands and along floodways, dominated by a mixture of the structural dominants of Wet Verge Sedgeland (EVC 952) and Sedge Wetland (EVC 136). Wet Verge Sedgeland/Sedge Wetland Complex is of very restricted total extent and known only from the Perry River - Providence Ponds catchment.

Indicator Species: *Acaena novae-zelandiae*, *Carex appressa*, *Carex gaudichaudiana*, *Hydrocotyle sibthorpioides*, *Lachnagrostis filiformis s.s.*, *Laphangium luteoalbum*, *Lepidosperma longitudinale* and *Poa labillardierei* var*. labillardierei*.

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 the sub-alpine zone. Subject to cold air drainage, but below the 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 and 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 HILLS AND TABLELANDS (MAINLY WESTERN) AND NORTHERN SLOPES: Wetlands associated with drainage lines, springs and soaks, swales and wet flats of lower rainfall hilly areas (specifically north-east hills, drier Midlands of north-central Victoria and the elevated plateau of the 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 upstream of Kerang)

13. RIVERINE - MALLEE: Wetlands associated with the riverine floodplain of Murray River and Tributaries (approximately downstream of Kerang)

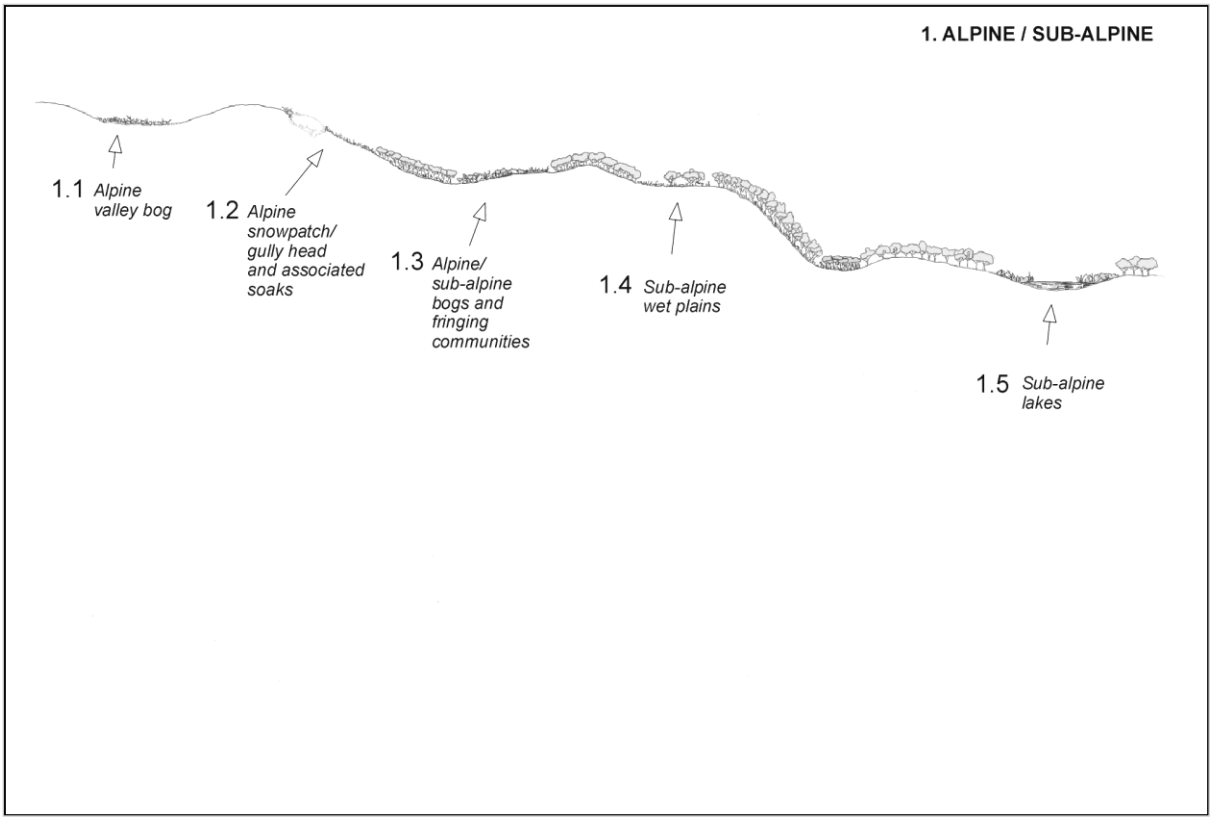
14. NEAR COASTAL: Wetlands associated with near-coastal situations (especially calcareous dune systems and blocked drainage lines) and including those with tidal or estuarine influences.

15. LOWLAND RIPARIAN FLOODPLAIN: Wetlands associated with floodplains of major streams outside of Victorian Riverina.

16. LACUSTRINE: Vegetation associated with lakes.

1 Alpine/Sub-alpine

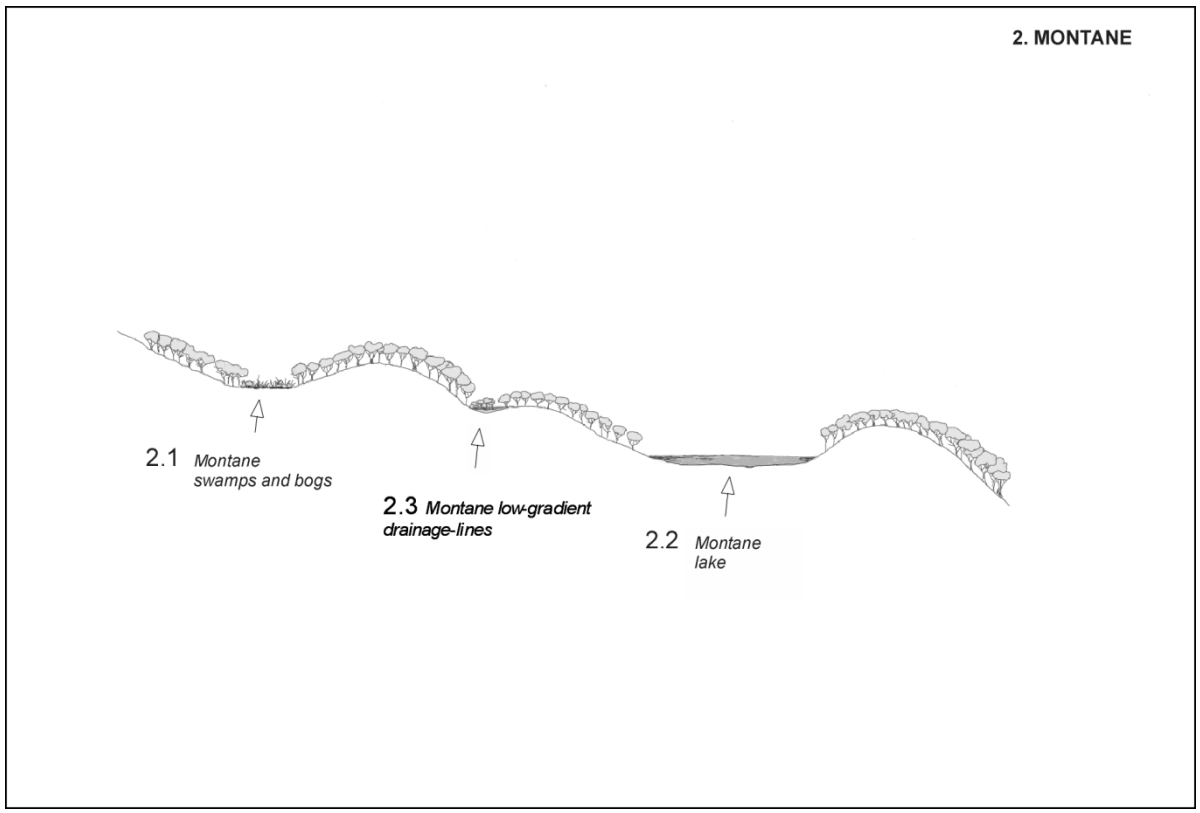
Wetlands associated with higher mountain areas of eastern Victoria, within areas subject to sustained winter snow (generally above 1200 m elevation, but sometimes extending lower with cool air drainage).



Component	Wetland EVC
1.1 Alpine valley bog	171. Alpine Fen 288. Alpine Heath Peatland 1011. Alpine Hummock Peatland
1.2 Alpine snow-patch/gully head and associated soaks	239. Alpine Creekline Herbland 288. Alpine Heath Peatland 905. Alpine Short Herbland 210. Sub-alpine Wet Heathland
1.3 Alpine/sub-alpine bogs and fringing communities	171. Alpine Fen 1011. Alpine Hummock Peatland 41. Montane Riparian Thicket 913. Sub-alpine Pond Herbland 210. Sub-alpine Wet Heathland
1.4 Sub-alpine wet plains	917. Sub-alpine Wet Sedgeland
1.5 Sub-alpine lakes	308. Aquatic Sedgeland Verge communities - see 1.3 above.

2 Montane

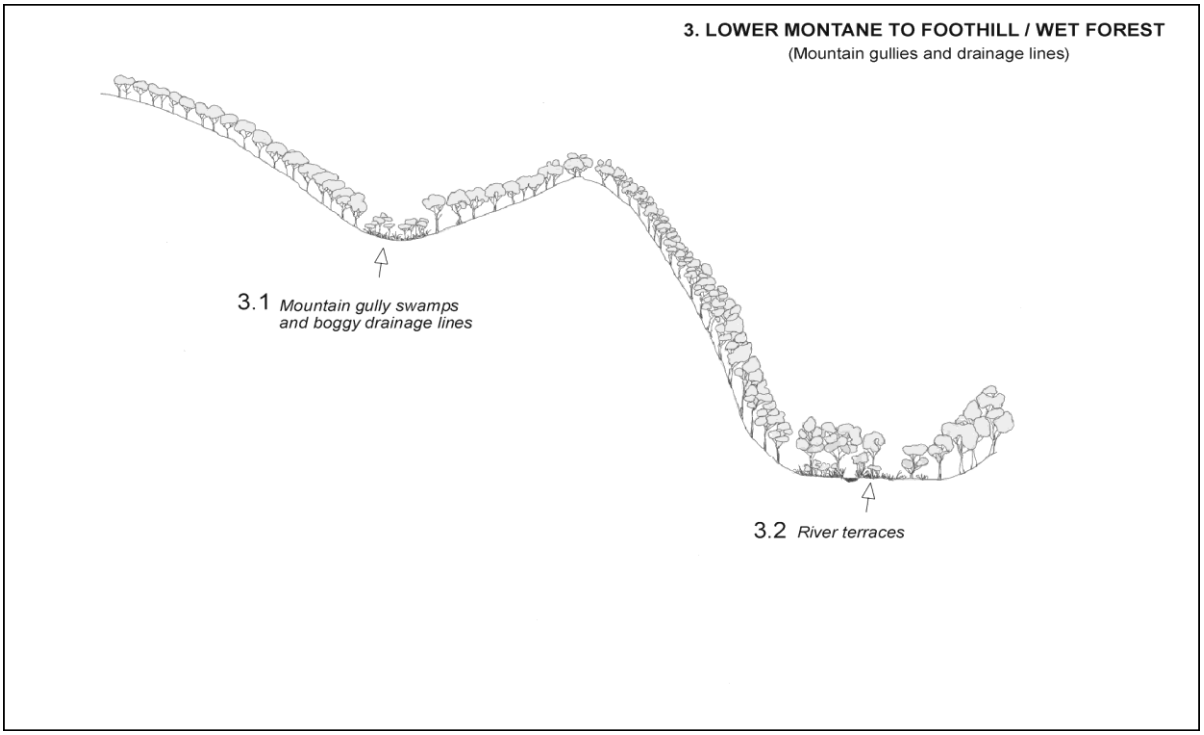
Wetlands associated with high elevation areas (generally within 700–1200 m elevation) of eastern Victoria below the sub-alpine zone. Subject to cold air drainage, but below the zone of sustained winter snow.



Component	Wetland EVC
2.1 Montane swamps and bogs	653. Aquatic Herbland 308. Aquatic Sedgeland 966. Montane Bog 148. Montane Sedgeland 318. Montane Swamp 210 Sub-alpine Wet Heathland
2.2 Montane lake	767. Plains Grassy Wetland/Brackish Herbland Complex
2.3 Montane low-gradient drainage lines	41. Montane Riparian Thicket 40. Montane Riparian Woodland 148. Montane Sedgeland

3 Lower montane to foothill/wet forest

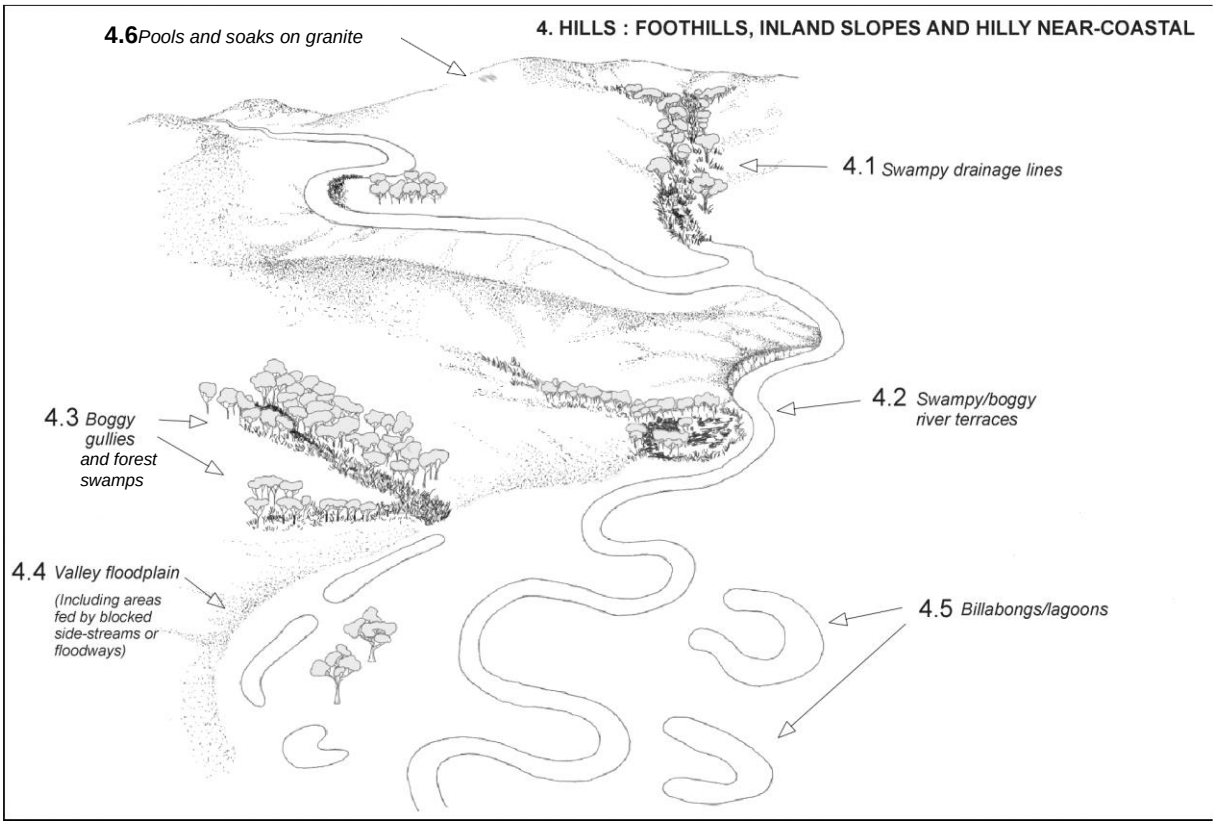
Wetlands of gullies and drainage lines within taller, denser forest country (e.g. East Gippsland, South Gippsland, Central Highlands and Otways).



Component	Wetland EVC
3.1 Mountain gully swamps and boggy drainage lines	721. Fern Swamp 728. Forest Creekline Sedge Swamp 185. Perched Boggy Shrubland Aggregate 191. Riparian Scrub 59. Riparian Thicket
3.2. River terraces	191. Riparian Scrub 83. Swampy Riparian Woodland

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	Wetland EVC
4.1 Swampy drainage lines	728. Forest Creekline Sedge Swamp 937. Swampy Woodland 83. Swampy Riparian Woodland
4.2 Swampy/boggy river terraces	83. Swampy Riparian Woodland 53. Swamp Scrub 937. Swampy Woodland 932. Wet Verge Sedgeland
4.3 Boggy gullies and forest swamps	723. Forest Bog A129. Forest Wet Flat Herbland 185. Perched Boggy Shrubland Aggregate A120. Riparian Fern Scrub 191. Riparian Scrub 195. Seasonally Inundated Shrubby Woodland (dry north-central to south-west) 80. Spring-soak Woodland Aggregate (dry north-east) 49. Swamp Heathland Aggregate A104. Wet Heathland/Plains Grassy Wetland Complex A105. Wet Heathland/Plains Sedgy Wetland Complex

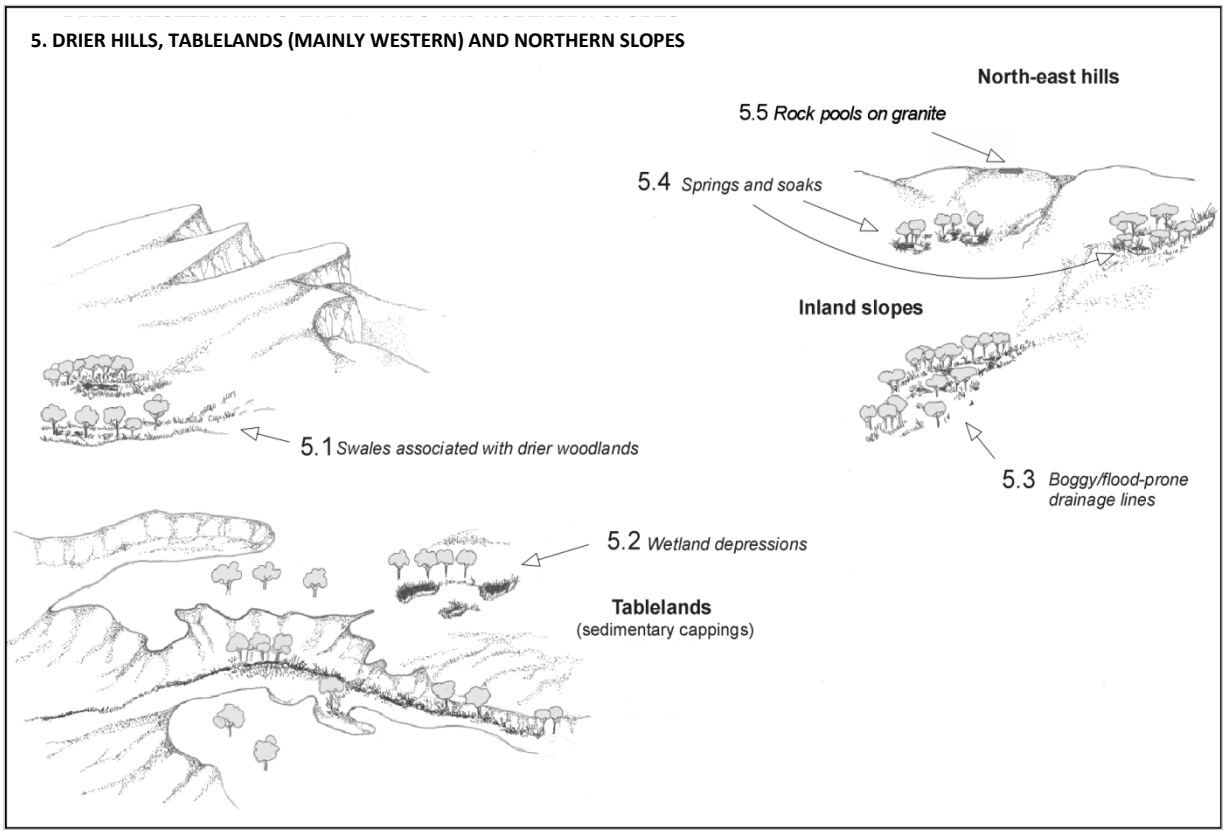
Components continued overleaf

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

Component	Wetland EVC
4.4 Valley floodplain	56. Floodplain Riparian Woodland 56. Floodplain Riparian Woodland/334. Billabong Wetland Aggregate 56. Floodplain Riparian Woodland/172. Floodplain Wetland Aggregate
4.5 Billabongs/lagoons	334. Billabong Wetland Aggregate/172. Floodplain Wetland Aggregate with potential components: 819. Spike-sedge Wetland 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 Aggregate 185. Perched Boggy Shrubland Aggregate (far north-east)

5 Drier hills and tablelands (mainly western) and northern slopes

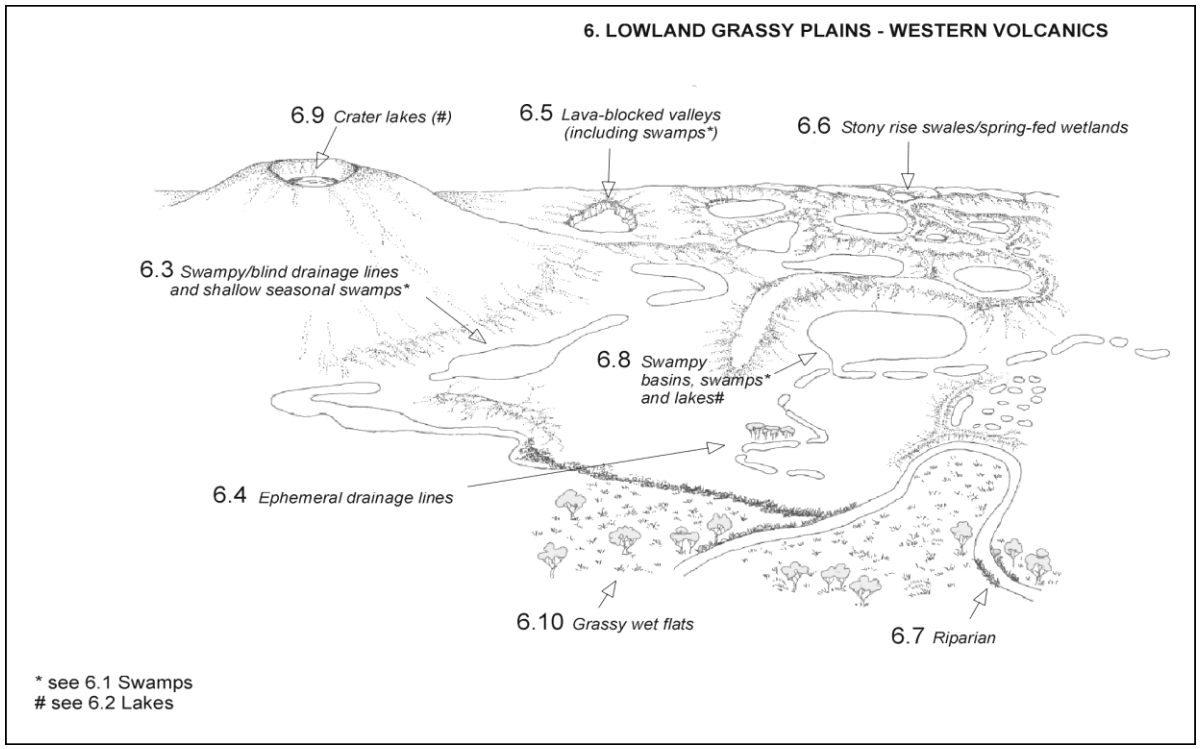
Wetlands associated with drainage lines, springs and soaks, swales and wet flats of lower rainfall hilly areas (specifically north-east hills, drier Midlands of north-central Victoria and the elevated plateau of the Dundas Tablelands, generally <650 mm rainfall per annum).



Component	Wetland EVC
5.1 Swales associated with drier woodlands	284. Claypan Ephemeral Wetland 195. Seasonally Inundated Shrubby Woodland 281. Sedge-rich Wetland
5.2 Wetland depressions	306. Aquatic Grassy Wetland 653. Aquatic Herbland 308. Aquatic Sedgeland 125. Plains Grassy Wetland A101. Plains Grassy Wetland/Lignum Swamp Complex 647. Plains Sedgy Wetland 1010. Plains Sedgy Wetland/Sedge Wetland Complex 292. Red Gum Swamp A115. Red Gum Swamp/Plains Rushy Wetland Complex 963. Sedge Wetland/Aquatic Sedgeland Complex A118. Wet Verge Herbland
5.3 Boggy/flood-prone drainage lines (inland slopes)	83. Swampy Riparian Woodland 195. Seasonally Inundated Shrubby Woodland
5.4 Springs and soaks (North–east hills)	80. Spring Soak Woodland Aggregate
5.5 Rock pools on granite	1112. Granite Rock-pool Wetland

6 Lowland grassy plains – western volcanics

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



Component	Wetland EVC
6.1 Swamps	1111. Alkaline Basaltic Wetland Aggregate, components variously including: 653. Aquatic Herbland 755. Plains Grassy Wetland/Aquatic Herbland Complex 883. Sedge Wetland/Calcareous Wet Herbland Complex 821. Tall Marsh 932. Wet Verge Sedgeland 306. Aquatic Grassy Wetland 653. Aquatic Herbland 308. Aquatic Sedgeland
	291. Cane Grass Wetland 104. Lignum Swamp 125. Plains Grassy Wetland 755. Plains Grassy Wetland/Aquatic Herbland Complex 960. Plains Grassy Wetland/Spike-sedge Wetland Complex A101. Plains Grassy Wetland/Lignum Swamp Complex 961. Plains Rushy Wetland (low rainfall areas) 647. Plains Sedgy Wetland 1010. Plains Sedgy Wetland/Sedge Wetland Complex 784. Plains Swampy Woodland/Lignum Swamp Complex 292. Red Gum Swamp (rare on basalt) A114. Red Gum Swamp/Cane Grass Wetland Complex (very rare) A115. Red Gum Swamp/Plains Rushy Wetland Complex 819. Spike-sedge Wetland 920. Sweet Grass Wetland

6 Lowland grassy plains – western volcanics (continued)

Component	Wetland EVC
6.2 Lakes	718. Freshwater Lake Aggregate, components variously including: 306. Aquatic Grassy Wetland 653. Aquatic Herbland 308. Aquatic Sedgeland 949. Dwarf Floating Aquatic Herbland 657. Freshwater Lignum Shrubland 755. Plains Grassy Wetland/Aquatic Herbland Complex 647. Plains Sedgy Wetland 651. Plains Swampy Woodland 918. Submerged Aquatic Herbland 821. Tall Marsh 990. Unvegetated 932. Wet Verge Sedgeland
	636. Brackish Lake Aggregate, components variously including: 537. Brackish Aquatic Herbland 947. Brackish Lignum Swamp 538. Brackish Herbland 656. Brackish Wetland Aggregate 657. Freshwater Lignum Shrubland 842. Saline Aquatic Meadow 918. Submerged Aquatic Herbland 821. Tall Marsh 990. Unvegetated
	717. Saline Lake Aggregate, components variously including: 538. Brackish Herbland 947. Brackish Lignum Swamp 888. Plains Saltmarsh Aggregate 842. Saline Aquatic Meadow 648. Saline Lake-verge Aggregate A113. Saltmarsh-grass Swamp 964. Shell-beach Herbland (extremely localised) 990. Unvegetated
6.3 Swampy/blind drainage lines and shallow seasonal swamps	947. Brackish Lignum Swamp 656. Brackish Wetland Aggregate 291. Cane Grass Wetland 767. Plains Grassy Wetland/Brackish Herbland Complex 959. Plains Grassy Wetland/Sedge-rich Wetland Complex 960. Plains Grassy Wetland/Spike-sedge Wetland Complex
6.4 Ephemeral drainage lines	538. Brackish Herbland 656. Brackish Wetland Aggregate 678. Ephemeral Drainage-line Grassy Wetland (rainshadow areas west of Melbourne) 124. Grey Clay Drainage-line Aggregate 974. Lava Plain Ephemeral Wetland (very rare) 767. Plains Grassy Wetland/Brackish Herbland Complex 53. Swamp Scrub
6.5 Lava-blocked valleys	see 6.1 Swamps and 6.2 Lakes

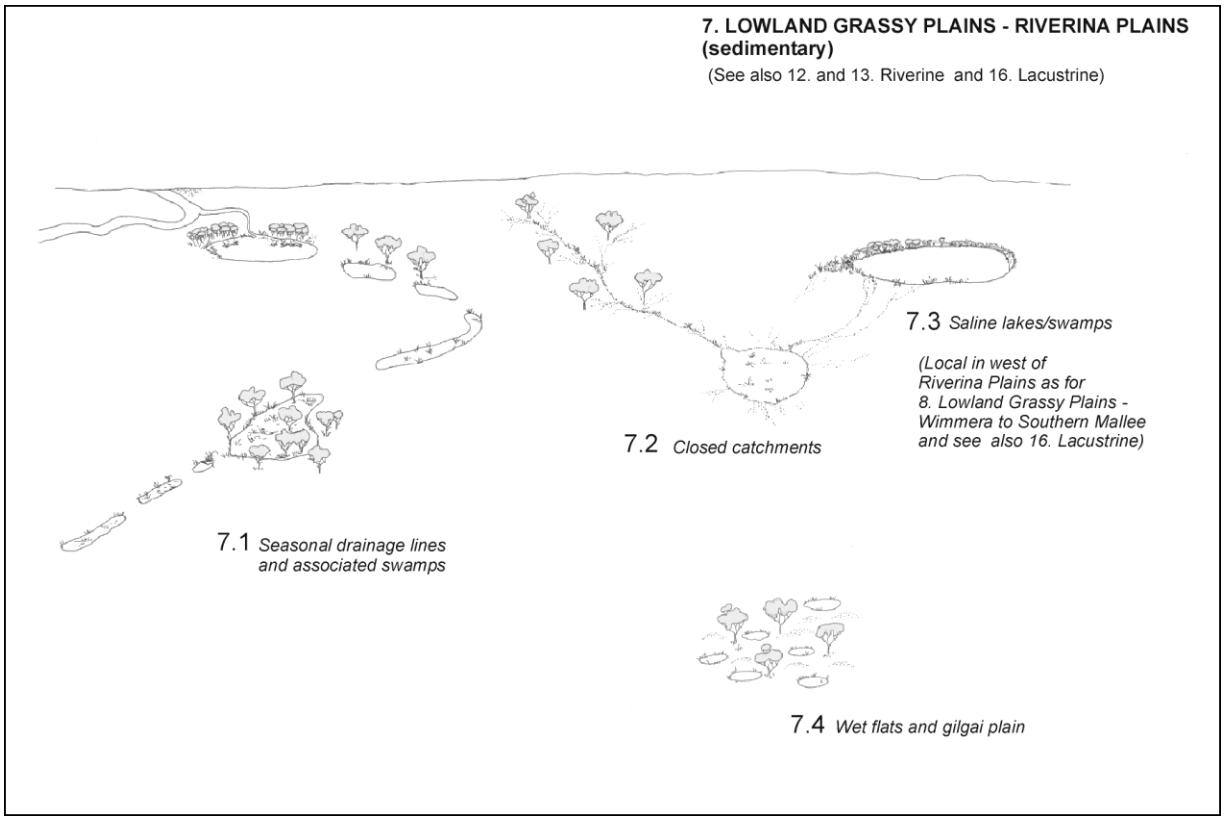
Components continued overleaf

6 Lowland grassy plains – western volcanics (continued)

Component	Wetland EVC
6.6 Stony rise swales/spring-fed wetlands	306. Aquatic Grassy Wetland 653. Aquatic Herbland 538. Brackish Herbland 949. Dwarf Floating Aquatic Herbland 755. Plains Grassy Wetland/Aquatic Herbland Complex 767. Plains Grassy Wetland/Brackish Herbland Complex 647. Plains Sedgy Wetland 857. Stony Rises Pond Aggregate 920. Sweet-grass Wetland 932. Wet Verge Sedgeland
6.7 Riparian	56. Floodplain Riparian Woodland 172. Floodplain Wetland Aggregate
6.8 Swampy basins, swamps and lakes	see 6.1 Swamps and 6.2 Lakes
6.9 Crater lakes	see 6.2 Lakes
6.10 Grassy wet flats Gilgai systems occurring within the Plains Grassland/ Herb-rich Gilgai Wetland Mosaic and Plains Grassy Woodland/Herb-rich Gilgai Wetland Mosaic can be assessed using the IWC benchmark. Assessment of these mosaic EVCs as a whole should be conducted using the Habitat Hectares method.	956. Herb-rich Gilgai Wetland 125. Plains Grassy Wetland 651. Plains Swampy Woodland
6.11 Swamps in higher rainfall areas on basalt (far southwest)	647. Plains Sedgy Wetland 651. Plains Swampy Woodland A104. Wet Heathland/Plains Grassy Wetland Complex A105. Wet Heathland/Plains Sedgy Wetland Complex

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	Wetland EVC
7.1 Seasonal drainage lines and associated swamps	806. Alluvial Plains Semi-arid Grassland (very localised) A123. Alluvial Plains Semi-arid Shrubland (very localised) 653. Aquatic Herbland A127. Grassy Red Gum Swamp 813. Intermittent Swampy Woodland (very localised) 104. Lignum Swamp 823. Lignum Swampy Woodland 125. Plains Grassy Wetland A101. Plains Grassy Wetland/Lignum Swamp Complex 292. Red Gum Swamp 819. Spike-sedge Wetland
7.2 Closed catchments	291. Cane Grass Wetland 104. Lignum Swamp 961. Plains Rushy Wetland A101. Plains Grassy Wetland/Lignum Swamp Complex 292. Red Gum Swamp A114. Red Gum Swamp/Cane Grass Wetland Complex A115. Red Gum Swamp/Plains Rushy Wetland Complex A117. Cane Grass Wetland/Alluvial Plains Semi-arid Shrubland Complex (very localised)

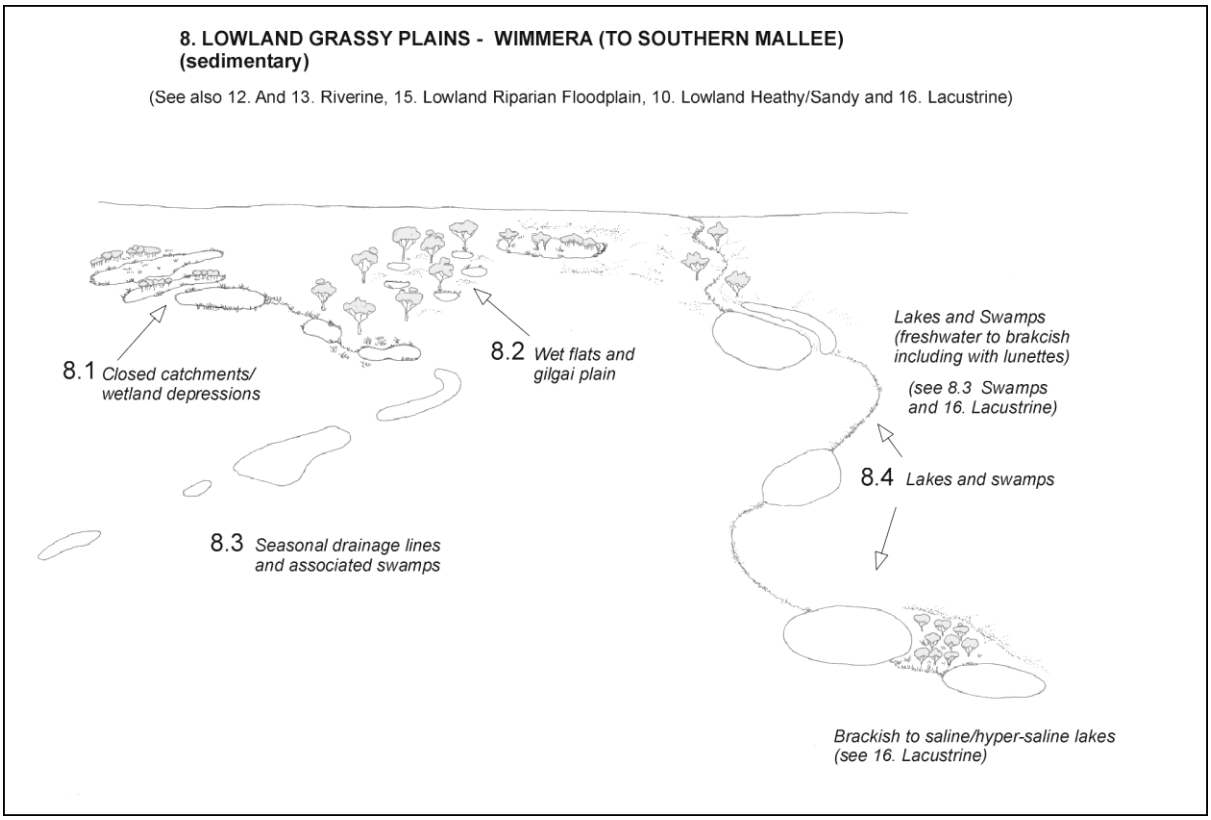
Components continued overleaf

7 Lowland grassy plains – Riverina plains (continued)

Component	Wetland EVC
7.3 Saline lakes/swamps Localised, in west of Riverina : also see 8. Lowland Grassy Plains – Wimmera (to Southern Mallee) and 16. Lacustrine diagrams	537. Brackish Aquatic Herbland 538. Brackish Herbland 636. Brackish Lake Aggregate 539. Brackish Lake Bed Herbland 947. Brackish Lignum Swamp 656. Brackish Wetland Aggregate 842. Saline Aquatic Meadow 717. Saline Lake Aggregate 648. Saline Lake-verge Aggregate 101. Samphire Shrubland (mainly adventive, species-poor) 990. Unvegetated
7.4 Wet flats and gilgai plains Gilgai systems occurring with EVC 235 Plains Woodland-Herb-rich Gilgai Wetland Mosaic can be assessed using the IWC benchmark. Assessment of the mosaic as a whole should be conducted using the Habitat Hectares method.	956. Herb-rich Gilgai Wetland 815. Riverine Swampy Woodland 125. Plains Grassy Wetland

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	Wetland EVC
8.1 Closed catchments/wetland depressions	A123. Alluvial Plains Semi-arid Shrubland (*Tall Cane Grass* community) 369. Black Box Wetland 947. Brackish Lignum Swamp 606. Cane Grass Wetland/Brackish Herbland Complex 104. Lignum Swamp 125. Plains Grassy Wetland
8.2 Wet flats and gilgai plain Gilgai systems occurring with EVC 235 Plains Woodland-Herb-rich Gilgai Wetland Mosaic can be assessed using the IWC benchmark. Assessment of the mosaic as a whole should be conducted using the Habitat Hectares method.	956. Herb-rich Gilgai Wetland 125. Plains Grassy Wetland 283. Plains Sedgy Woodland (also see 'Lowland Heathy/Sandy' diagram)

Components continued overleaf

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

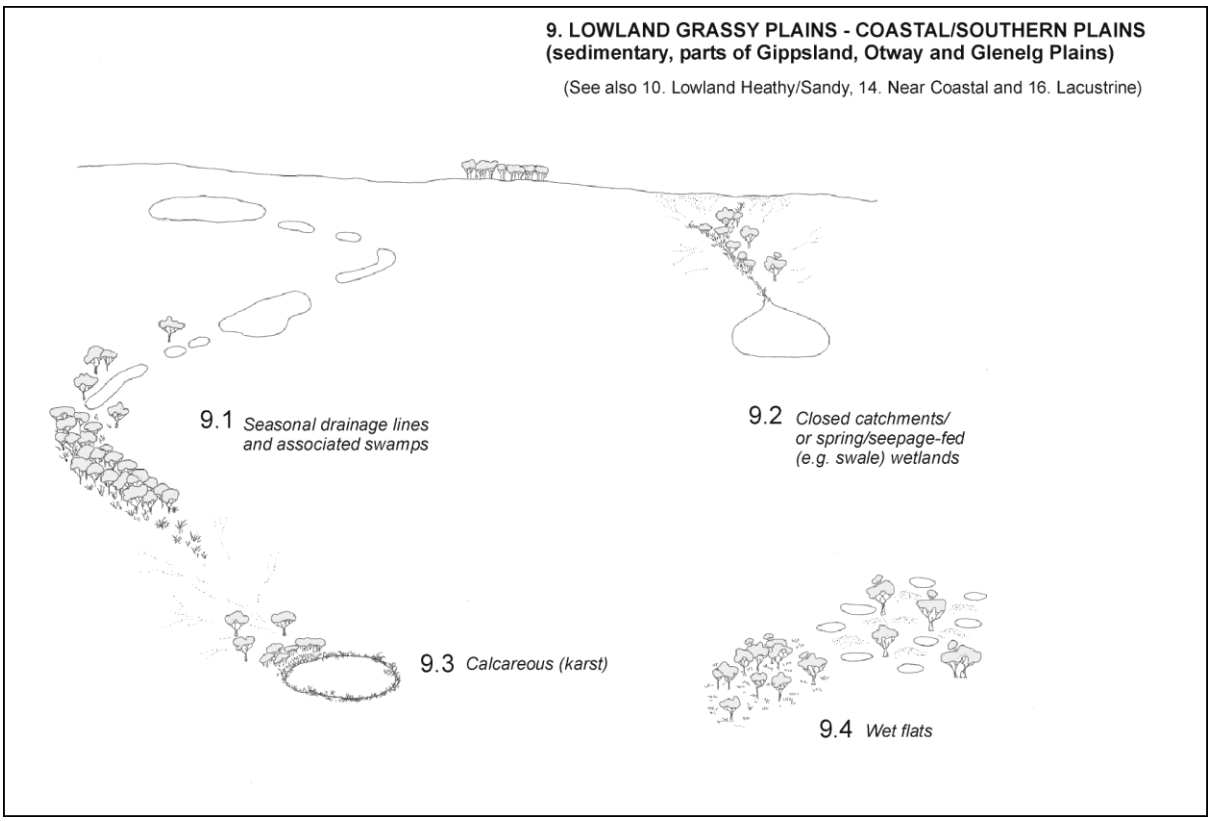
Component	Wetland EVC
8.3 Seasonal drainage lines and associated swamps (also see 6.1 Swamps)	653. Aquatic Herbland 291. Cane Grass Wetland 606. Cane Grass Wetland/Brackish Herbland Complex 954. Freshwater Lignum - Cane Grass Swamp 104. Lignum Swamp 125. Plains Grassy Wetland 959 Plains Grassy Wetland/Sedge-rich Wetland 960 Plains Grassy Wetland/Spike-sedge Wetland Complex 292. Red Gum Swamp A114. Red Gum Swamp/Cane Grass Wetland Complex 819. Spike-sedge Wetland 920. Sweet Grass Wetland
8.3 Seasonal drainage lines and associated swamps (also see 6.1 Swamps)	653. Aquatic Herbland 291. Cane Grass Wetland 606. Cane Grass Wetland/Brackish Herbland Complex 954. Freshwater Lignum - Cane Grass Swamp 104. Lignum Swamp 125. Plains Grassy Wetland 959 Plains Grassy Wetland/Sedge-rich Wetland 960 Plains Grassy Wetland/Spike-sedge Wetland Complex 292. Red Gum Swamp A114. Red Gum Swamp/Cane Grass Wetland Complex 819. Spike-sedge Wetland 920. Sweet Grass Wetland

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

Component	Wetland EVC
8.4 Lakes and swamps See also 8.3 Swamps and 16. Lacustrine diagrams	718. Freshwater Lake Aggregate, components variously including: 653. Aquatic Herbland 602. Cane Grass Wetland/Aquatic Herbland Complex 949. Dwarf Floating Aquatic Herbland 954. Freshwater Lignum -Cane Grass Swamp 813. Intermittent Swampy Woodland A121. Intermittent Swampy Woodland/Floodway Pond Herbland Complex A119. Intermittent Swampy Woodland/Lake Bed Herbland Complex 107. Lake Bed Herbland 823. Lignum Swampy Woodland 814. Riverine Swamp Forest/292. Red Gum Swamp (verge communities) 918. Submerged Aquatic Herbland 821. Tall Marsh 990. Unvegetated
	636. Brackish Lake Aggregate, components variously including: 537. Brackish Aquatic Herbland 934. Brackish Grassland 538. Brackish Herbland 539. Brackish Lake Bed Herbland 947. Brackish Lignum Swamp 656. Brackish Wetland Aggregate 606. Cane Grass Wetland/Brackish Herbland Complex 990. Unvegetated
	717. Saline (to hypersaline) Lake Aggregate, components variously including: 934. Brackish Grassland 538. Brackish Herbland 947. Brackish Lignum Swamp 973. Brackish Shrubland 708. Hypersaline Inland Saltmarsh Aggregate 842. Saline Aquatic Meadow 648. Saline Lake-verge Aggregate 676 Salt Paperbark Woodland A113. Saltmarsh-grass Swamp 101. Samphire Shrubland 990. Unvegetated

9 Lowland grassy plains – coastal/southern plains

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



Component	Wetland EVC
9.1 Seasonal drainage lines and associated swamps	653. Aquatic Herbland 308. Aquatic Sedgeland 125. Plains Grassy Wetland 651. Plains Swampy Woodland 819. Spike-sedge Wetland 53. Swamp Scrub 821. Tall Marsh 932. Wet Verge Sedgeland
9.2 Closed catchments or spring/seepage-fed (e.g. swale) wetlands	306. Aquatic Grassy Wetland 653. Aquatic Herbland 308. Aquatic Sedgeland 647. Plains Sedgy Wetland 1010. Plains Sedgy Wetland/Sedge Wetland Complex 651. Plains Swampy Woodland 292. Red Gum Swamp

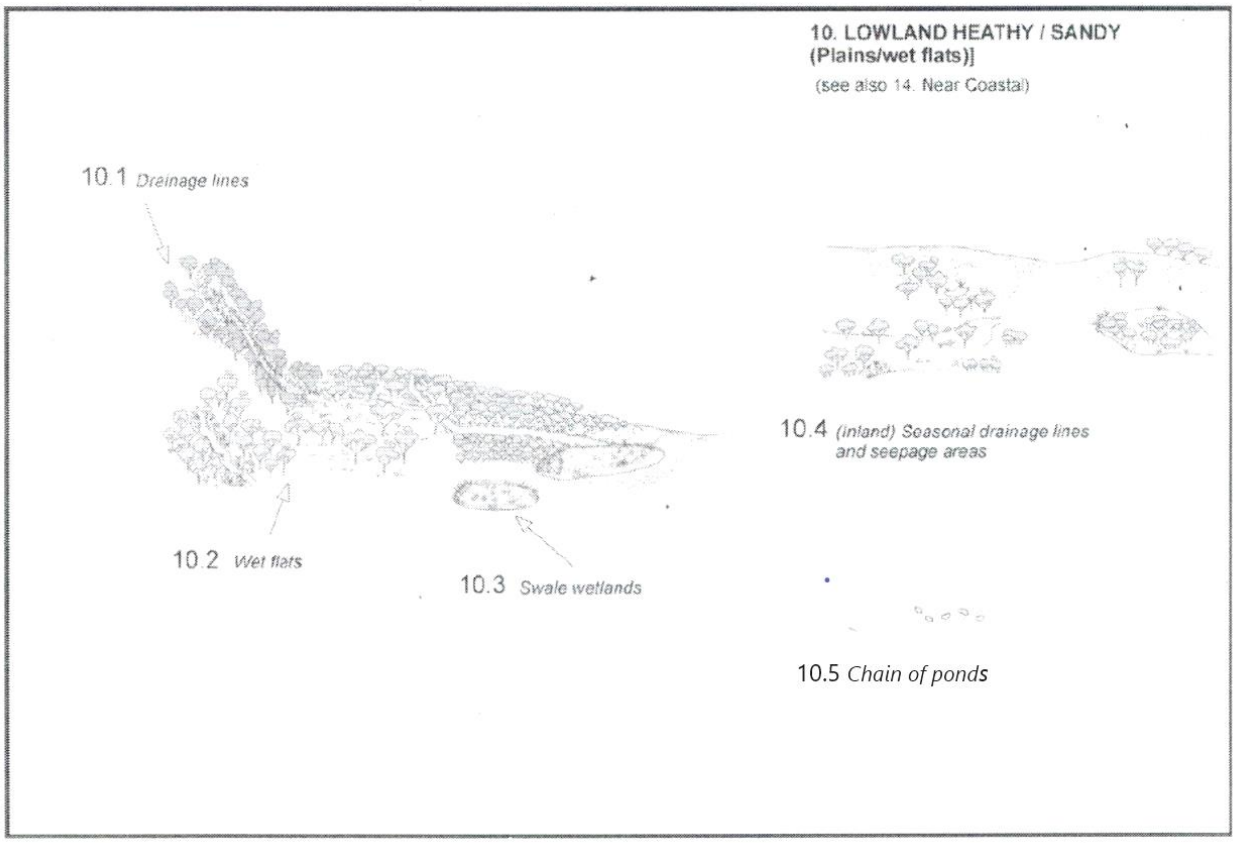
Components continued overleaf

9 Lowland grassy plains – coastal/southern plains (continued)

Component	Wetland EVC
9.3 Calcareous ('karst')	591. Calcareous Wet Herbland 958. Plains Grassy Wetland/Calcareous Wet Herbland Complex 136. Sedge Wetland 883. Sedge Wetland/Calcareous Wet Herbland Complex 908. Sink-hole Wetland Aggregate 53. Swamp Scrub (calcareous community) 2004. Swamp Scrub/Gahnia Sedgeland Complex 990. Unvegetated
9.4 Wet flats	976. Coastal Ephemeral Wetland 125. Plains Grassy Wetland 651. Plains Swampy Woodland

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).



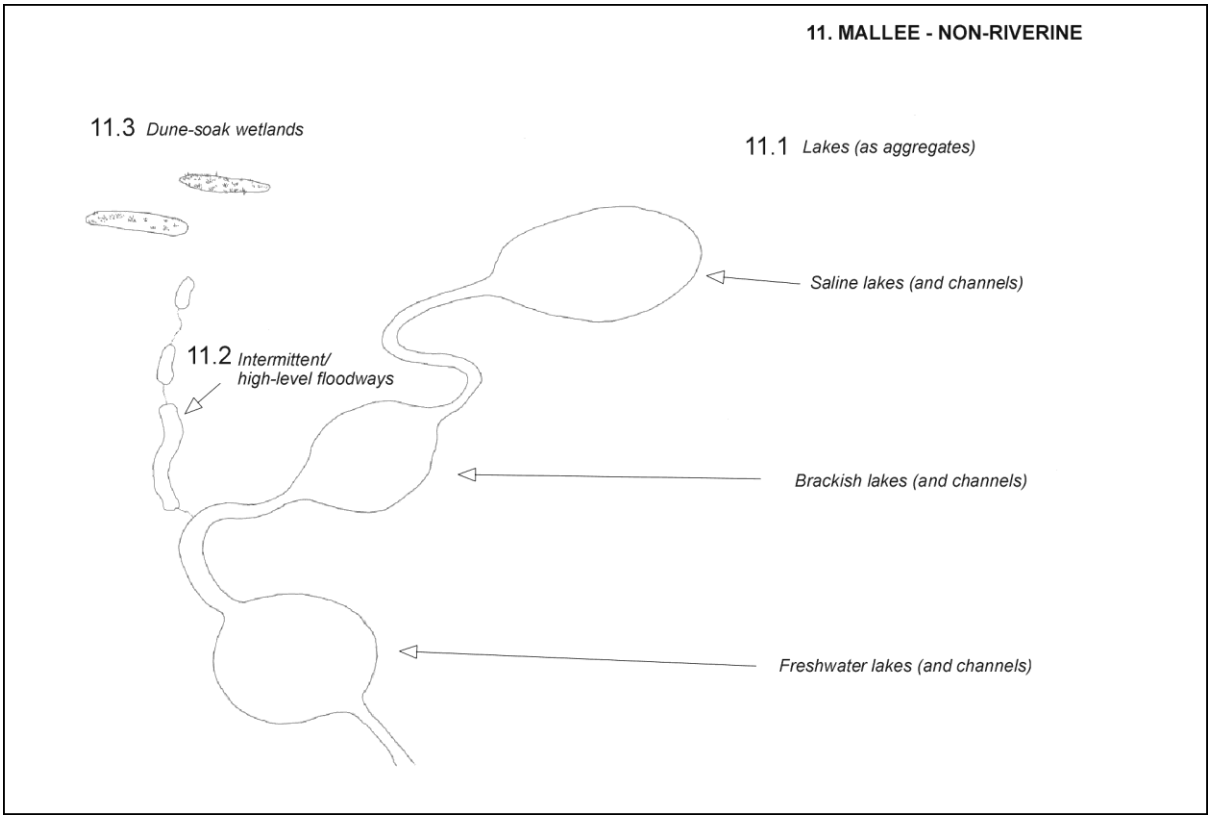
Component	Wetland EVC
10.1 Drainage lines	A120. Riparian Fern Scrub 191. Riparian Scrub 53. Swamp Scrub 49. Swamp Heathland Aggregate
10.2 Wet flats	13. Brackish Sedgeland (very localised) 707. Sedgy Swamp Woodland (rare) 937. Swampy Woodland 53. Swamp Scrub 8. Wet Heathland 931. Wet Heathland/Sedge Wetland Complex A104. Wet Heathland/Plains Grassy Wetland Complex A105. Wet Heathland/Plains Sedgy Wetland Complex

Components continued overleaf

Component	Wetland EVC
10.3 Swale wetlands	653. Aquatic Herbland 308. Aquatic Sedgeland 723. Forest Bog 1010. Plains Sedgy Wetland/Sedge Wetland Complex 136. Sedge Wetland A102. Sedge Wetland/Aquatic Herbland complex 195. Seasonally inundated Shrubby Woodland 963. Sedge Wetland/Aquatic Sedgeland Complex 707. Sedgy Swamp Woodland (rare) A118. Wet Verge Herbland
10.4 (Inland) Seasonal drainage lines and seepage areas	973. Brackish Shrubland 673. Dune-soak Woodland 195. Seasonally Inundated Shrubby Woodland
10.5 Chain of Ponds	A124. Sandy Stream Pond Aggregate, components variously including: 306, Aquatic Grassy Wetland 652. Aquatic Herbland 308. Aquatic Sedgeland 949. Dwarf Floating Aquatic Herbland 918. Submerged Aquatic Herbland (extremely localised) 920. Sweet Grass Wetland 821. Tall Marsh A118. Wet Verge Herbland A125. Wet Verge Herbland/Floodway Pond Herbland Complex 932. Wet Verge Sedgeland A126. Wet Verge Sedgeland/Sedge Wetland Complex

11. Mallee – non-riverine

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



Component	Wetland EVC
11.1 Lakes (and associated channels) as aggregates See also 'Lacustrine', diagram 16.	718. Freshwater Lake Aggregate, components variously including: 653. Aquatic Herbland (riverine/artificial only) 813. Intermittent Swampy Woodland A119. Intermittent Swampy Woodland/Lake Bed Herbland Complex 107. Lake Bed Herbland 103. Riverine Chenopod Woodland 821. Tall Marsh 990. Unvegetated
	636. Brackish Lake Aggregate, components variously including: A123. Alluvial Plains Semi-arid Shrubland 539. Brackish Lake Bed Herbland 104. Lignum Swamp 823. Lignum Swampy Woodland 842. Saline Aquatic Meadow 990. Unvegetated (outer verges can be as for 718. Freshwater Lake Aggregate)

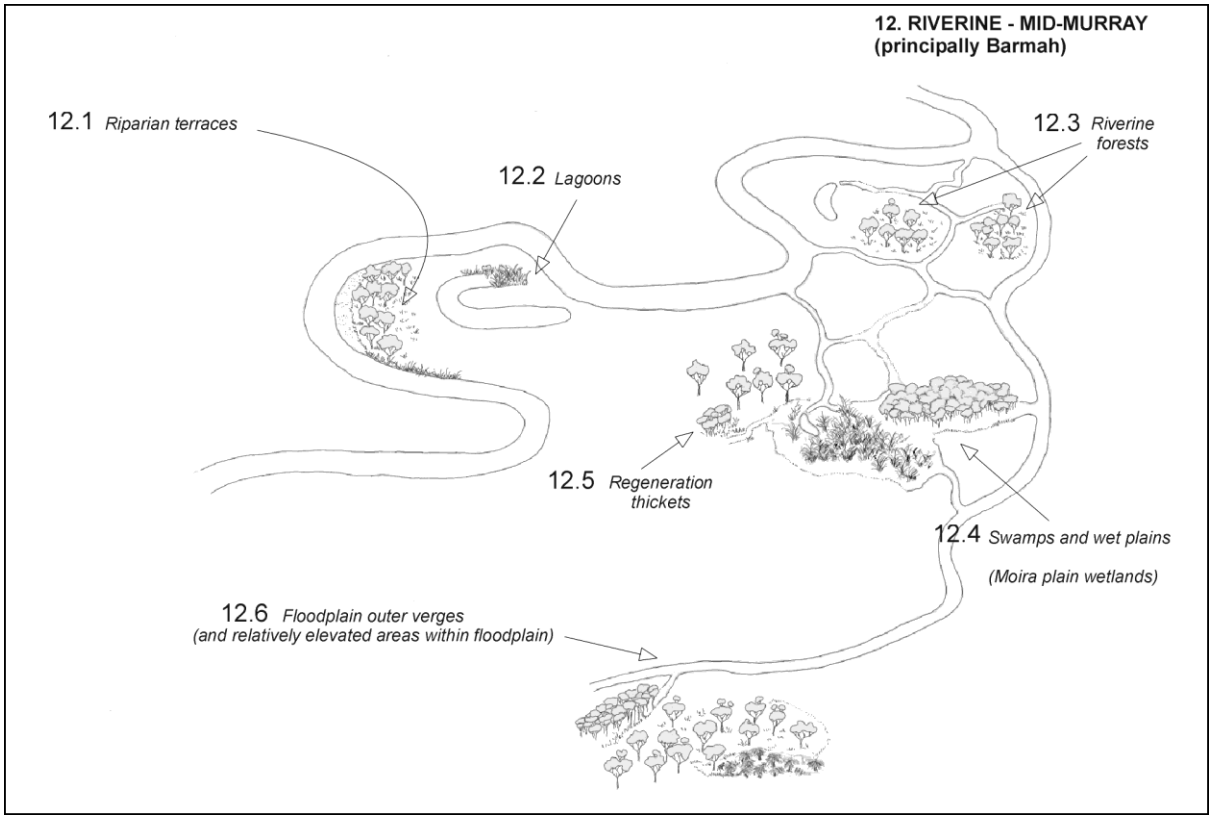
Components continued overleaf

11 Mallee – non-riverine (continued)

Component	Wetland EVC
11.1 Lakes (and associated channels) as aggregates (continued) See also 'Lacustrine', diagram 16.	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
11.2 Intermittent/high-level floodways	820. Sub-saline Depression Shrubland
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.	A123. Alluvial Plains Semi-arid Shrubland (*Tall Cane Grass* community) A128. Riverine Claypan Herbland

12 Riverine – mid-Murray

Wetlands associated with the riverine floodplain of the Murray River and tributaries (approximately upstream of Kerang).



Component	Wetland EVC
12.1 Riparian terraces	334. Billabong Wetland Aggregate 56. Floodplain Riparian Woodland 172. Floodplain Wetland Aggregate 106. Grassy Riverine Forest 811. Grassy Riverine Forest/Floodway Pond Herbland Complex 812. Grassy Riverine Forest/Riverine Swamp Forest Complex 813. Intermittent Swampy Woodland (very minor) 975. Riverine Ephemeral Wetland (very rare) 816. Sedgy Riverine Forest 817. Sedgy Riverine Forest/Riverine Swamp Forest Complex
12.2 Lagoons	334. Billabong Wetland Aggregate components including: 653. Aquatic Herbland 949. Dwarf Floating Aquatic Herbland 810. Floodway Pond Herbland 918. Submerged Aquatic Herbland 821. Tall Marsh 990. Unvegetated

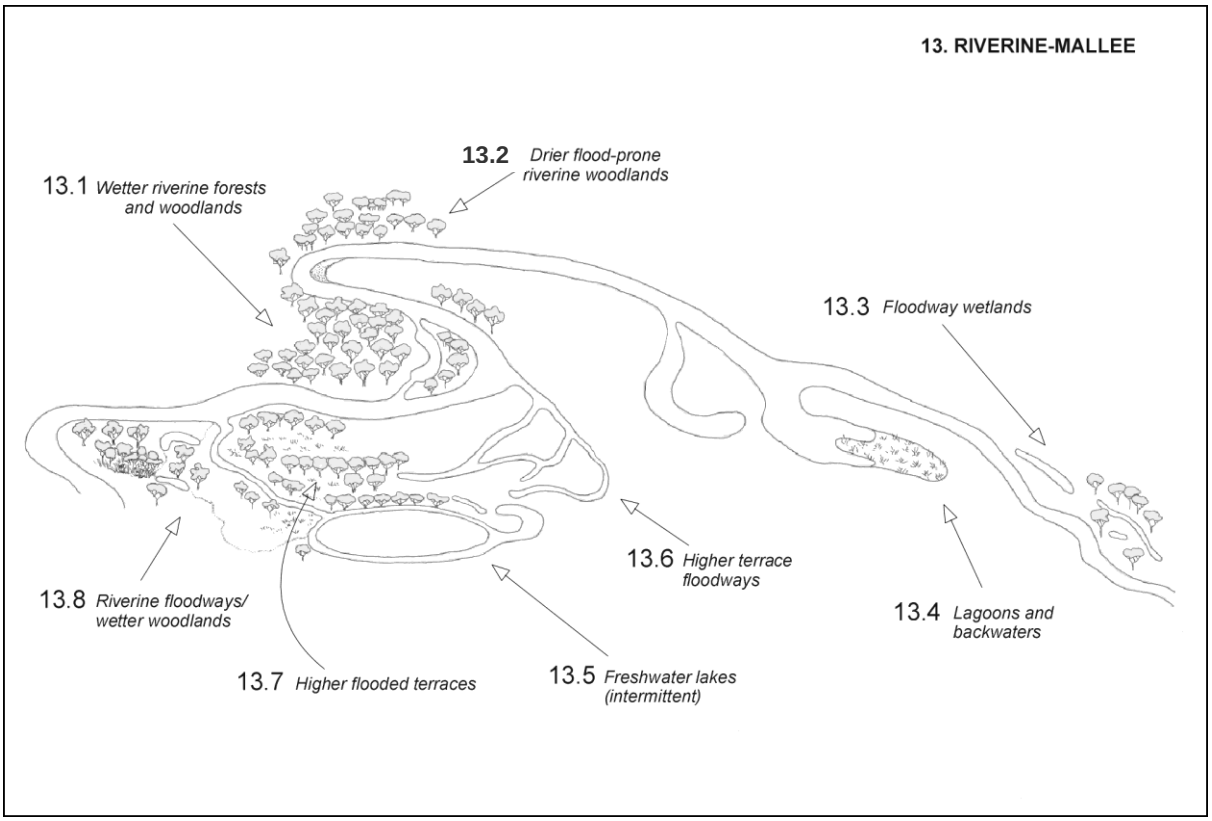
Components continued overleaf

12 Riverine - mid-Murray (continued)

Component	Wetland EVC
12.3 Riverine forests	106. Grassy Riverine Forest 812. Grassy Riverine Forest/Riverine Swamp Forest Complex 816. Sedgy Riverine Forest 817. Sedgy Riverine Forest/Riverine Swamp Forest Complex
12.4 Swamps and wet plains (Moira plain wetlands)	653. Aquatic Herbland 809. Floodplain Grassy Wetland 810. Floodway Pond Herbland 945. Floodway Pond Herbland/Riverine Swamp Forest Complex 814. Riverine Swamp Forest 804. Rushy Riverine Swamp Aggregate 819. Spike-sedge Wetland 821. Tall Marsh
12.5 Regeneration thickets	Juvenile: 814. Riverine Swamp Forest; and 945. Floodway Pond Herbland/Riverine Swamp Forest Complex
12.6 Floodplain outer verges (and relatively elevated areas within floodplain)	103. Riverine Chenopod Woodland (marginal, eastern end of distribution) 815. Riverine Swampy Woodland A128. Riverine Claypan Herbland

13 Riverine - Mallee

Wetlands associated with the riverine floodplain of the Murray River and Tributaries (approximately downstream of Kerang).



Component	Wetland EVC
13.1 Wetter riverine forests and woodlands	106. Grassy Riverine Forest 811. Grassy Riverine Forest/Floodway Pond Herbland Complex 812. Grassy Riverine Forest/Riverine Swamp Forest Complex 814. Riverine Swamp Forest (minor and mainly within complexes)
13.2 Drier flood-prone riverine woodlands	813. Intermittent Swampy Woodland/Riverine Grassy Woodland Complex 103. Riverine Chenopod Woodland
13.3 Floodway wetlands	809. Floodplain Grassy Wetland 810. Floodway Pond Herbland 945. Floodway Pond Herbland/Riverine Swamp Forest Complex A122. Lake Bed Herbland/Floodway Pond Complex 819. Spike-sedge Wetland
13.4 Lagoons and backwaters	653. Aquatic Herbland 334. Billabong Wetland Aggregate 918. Submerged Aquatic Herbland 821. Tall Marsh 990. Unvegetated

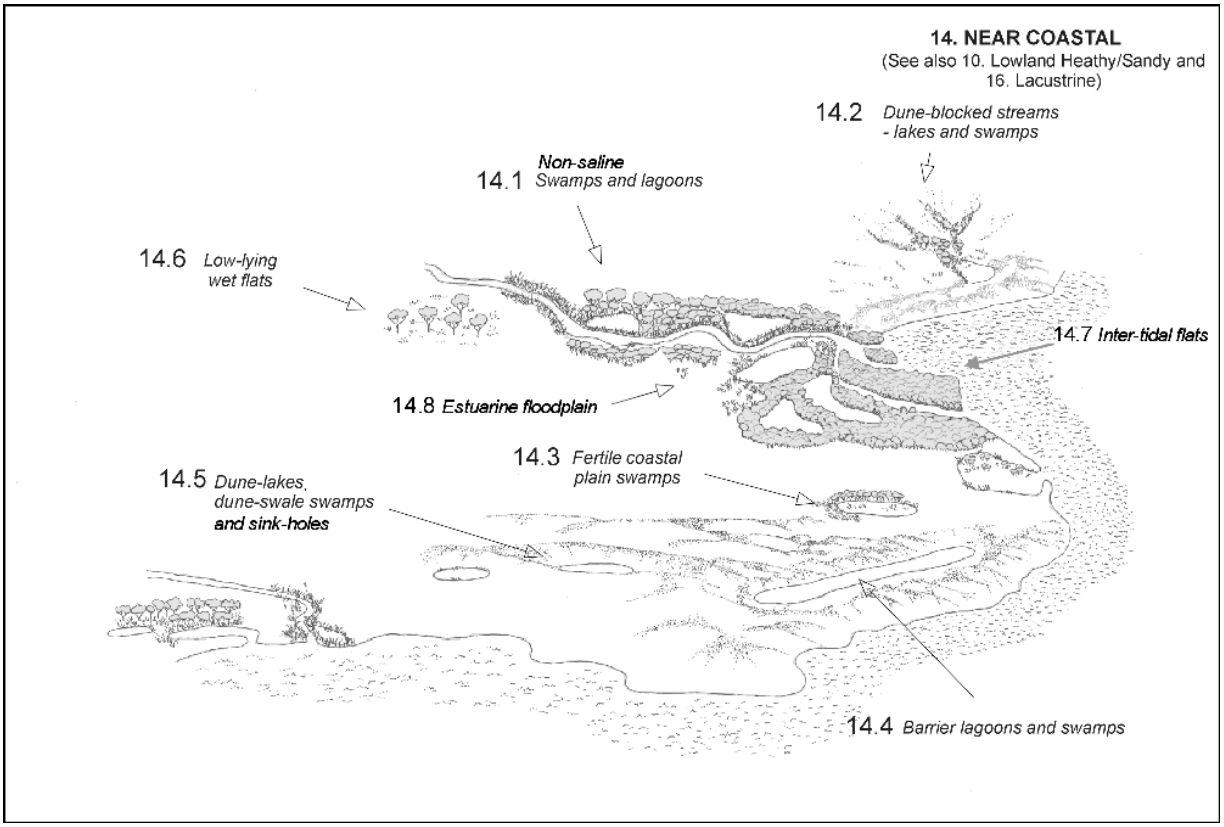
Components continued overleaf

13 Riverine - Mallee (continued)

Component	Wetland EVC
13.5 Freshwater lakes (intermittent)	718. Freshwater Lake Aggregate 813. Intermittent Swampy Woodland A119. Intermittent Swampy Woodland/Lake Bed Herbland Complex 107. Lake Bed Herbland or 990. Unvegetated 104. Lignum Swamp 823. Lignum Swampy Woodland 103. Riverine Chenopod Woodland (verges) 101. Samphire Shrubland (adventive in salinised areas) 990. Unvegetated
13.6 Higher terrace floodways	104. Lignum Swamp A128. Riverine Claypan Herbland 820. Sub-saline Depression Shrubland
13.7 Higher flooded terraces	806. Alluvial Plains Semi-arid Grassland A123. Alluvial Plains Semi-arid Shrubland 104. Lignum Swamp (minor) 103. Riverine Chenopod Woodland
13.8 Riverine floodways/wetter woodlands	A123. Alluvial Plains Semi-arid Shrubland 810. Floodway Pond Herbland 813. Intermittent Swampy Woodland 822. Intermittent Swampy Woodland/Riverine Grassy Woodland Complex 104. Lignum Swamp 823. Lignum Swampy Woodland

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	Wetland EVC
14.1 Non-saline swamps and lagoons	653. Aquatic Herbland 308. Aquatic Sedgeland 810. Floodway Pond Herbland 968. Gahnia Sedgeland 819. Spike-sedge Wetland 53. Swamp Scrub 821. Tall Marsh 990. Unvegetated (open water) A116. Wet Sedgy Herbland (very rare) A118. Wet Verge Herbland
14.2 Dune-blocked streams - lakes and swamps	653. Aquatic Herbland 308. Aquatic Sedgeland 875. Blocked Coastal Stream Swamp 538. Brackish Herbland 13. Brackish Sedgeland 11. Coastal Lagoon Wetland Aggregate 968. Gahnia Sedgeland 53. Swamp Scrub 821. Tall Marsh 990. Unvegetated

Components continued overleaf

14 Near coastal (continued)

Component	Wetland EVC
14.3 Fertile coastal plain swamps	653. Aquatic Herbland 308. Aquatic Sedgeland 538. Brackish Herbland 591. Calcareous Wet Herbland 125. Plains Grassy Wetland (minor) 647. Plains Sedgy Wetland 1010. Plains Sedgy Wetland/Sedge Wetland Complex 136. Sedge Wetland 1113. Sedge Wetland/Brackish Herbland Complex 53. Swamp Scrub 990. Unvegetated
14.4 Barrier lagoons and swamps	306. Aquatic Grassy Wetland (rare) 653. Aquatic Herbland 537. Brackish Aquatic Herbland 538. Brackish Herbland 656. Brackish Wetland Aggregate A106. Calcareous Sedgy Shrubland (rare) 11. Coastal Lagoon Wetland Aggregate 914. Estuarine Flats Grassland 968. Gahnia Sedgeland 842. Saline Aquatic Meadow 53. Swamp Scrub 2004. Swamp Scrub/Gahnia Sedgeland Complex 990. Unvegetated 12. Wet Swale Herbland 932. Wet Verge Sedgeland
14.5 Dune-lakes, dune-swale swamps and sink-holes	538. Brackish Herbland 656. Brackish Wetland Aggregate 908. Sink-hole Wetland Aggregate 990. Unvegetated 12. Wet Swale Herbland
14.6 Low-lying wet flats	1114. Brackish Sedgy Shrubland (rare) 976. Coastal Ephemeral Wetland 53. Swamp Scrub 937. Swampy Woodland 8. Wet Heathland
Inter-tidal flats (extending to spring-tide zone) Note: generally not covered by the IWC unless a remnant which is no longer tidally inundated	9. Coastal Saltmarsh Aggregate ***** 140. Mangrove Shrubland 842. Saline Aquatic Meadow 845. Sea-grass Meadow 196. Seasonally Inundated Sub-saline Herbland 990. Unvegetated

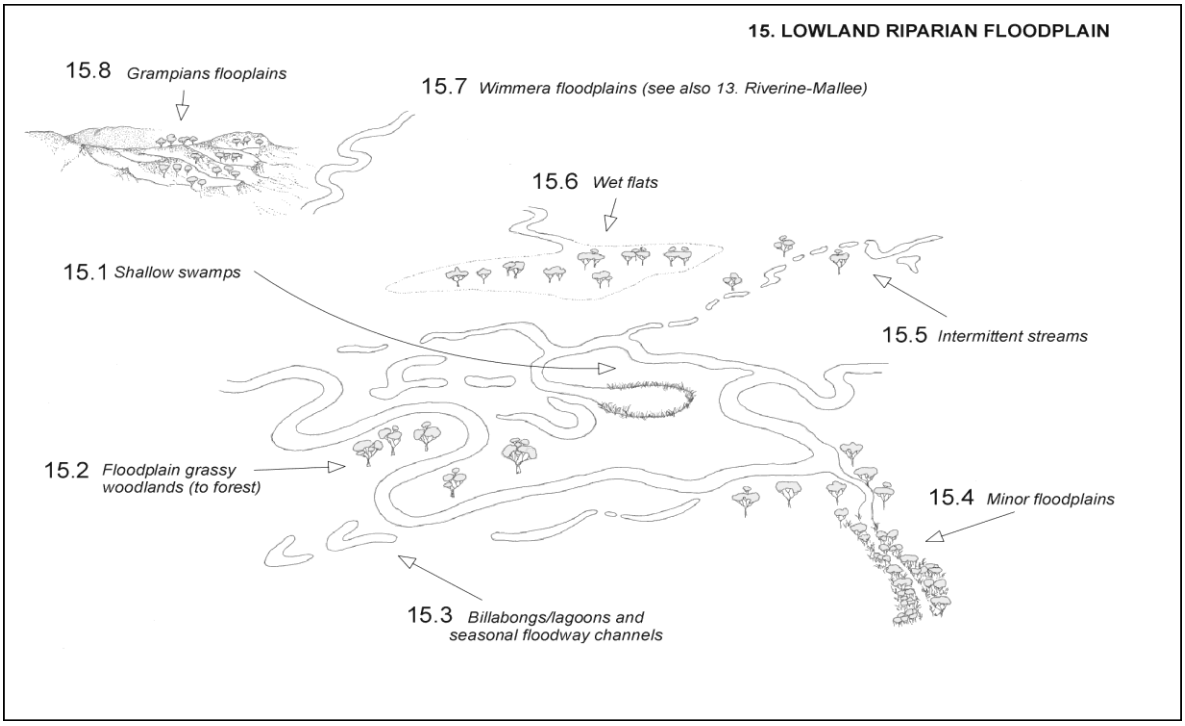
Components continued overleaf

14 Near coastal (continued)

Component	Wetland EVC
*A107-A113 represent resolution of the potential components of EVC 9 Coastal Saltmarsh Aggregate. These are presented in more detail in the recently completed 'Victorian Saltmarsh Study 2010' (Victorian Saltmarsh Study Group 2010). Of these, only A113 is recognised as having occurrences outside of coastal saltmarsh habitats.	A107. Wet Saltmarsh Herbland A108. Wet Saltmarsh Shrubland A109. Coastal Saline Grassland A110. Coastal Dry Saltmarsh A111. Coastal Hypersaline Saltmarsh A112. Coastal Tussock Saltmarsh A113. Saltmarsh-grass Swamp (rare)
14.8 Estuarine floodplain	537. Brackish Aquatic Herbland 934. Brackish Grassland 538. Brackish Herbland 539. Brackish Lake Bed Herbland 13. Brackish Sedgeland 656. Brackish Wetland Aggregate 914. Estuarine Flats Grassland 952. Estuarine Reedbed 953. Estuarine Scrub 10. Estuarine Wetland 842. Saline Aquatic Meadow 990. Unvegetated

15 Lowland riparian floodplain

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



Component	Wetland EVC
15.1 Shallow swamps	172. Floodplain Wetland Aggregate with components including: 653. Aquatic Herbland 308. Aquatic Sedgeland 53. Swamp Scrub 937. Swampy Woodland 821. Tall Marsh 932. Wet Verge Sedgeland 809. Floodplain Grassy Wetland 125. Plains Grassy Wetland 819. Spike-sedge Wetland
15.2 Floodplain grassy woodlands (to forest)	56. Floodplain Riparian Woodland, including in mosaic with: 334. Billabong Wetland Aggregate 172. Floodplain Wetland Aggregate

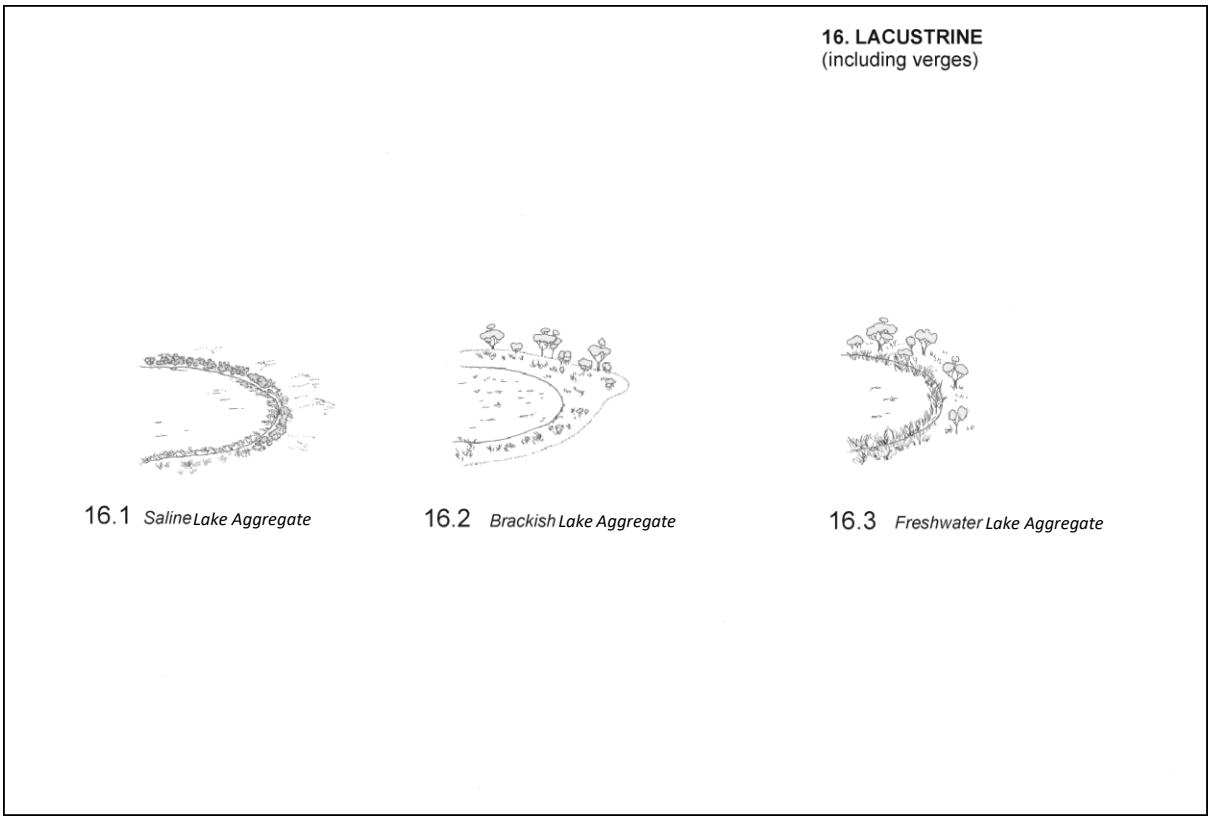
Components continued overleaf

15 Lowland riparian floodplain (continued)

Component	Wetland EVC
15.3 Billabongs/lagoons and seasonal floodway channels	334. Billabong Wetland Aggregate or 172. Floodplain Wetland Aggregate with various components as follows: 653. Aquatic Herbland 308. Aquatic Sedgeland 949. Dwarf Floating Aquatic Herbland 810. Floodway Pond Herbland 918. Submerged Aquatic Herbland 821. Tall Marsh 990. Unvegetated 932. Wet Verge Sedgeland
15.4 Minor floodplains	83. Swampy Riparian Woodland
15.5 Intermittent streams	53. Swamp Scrub
15.6 Wet flats	53. Swamp Scrub 937. Swampy Woodland
15.7 Wimmera floodplains (see also 13. Riverine - Mallee diagrams)	292. Red Gum Swamp
15.8 Grampians floodplains	280. Floodplain Thicket

16 Lacustrine

Vegetation associated with lakes.



Component	Wetland EVC
16.1 Saline Lake Aggregate	538. Brackish Herbland 888. Plains Saltmarsh Aggregate 842. Saline Aquatic Meadow or 990. Unvegetated (open water/bare soil/mud) 648. Saline Lake-verge Aggregate A113. Saltmarsh-grass Swamp 676. Salt Paperbark Woodland (localised – Wimmera, north-west Victoria) 101. Samphire Shrubland 964. Shell-beach Herbland (volcanic plains, very rare) 990. Unvegetated

16 Lacustrine (continued)

Component	Wetland EVC
16.2 Brackish Lake Aggregate	537. Brackish Aquatic Herbland or 990. Unvegetated (open water/bare soil/mud) 538. Brackish Herbland 539. Brackish Lake Bed Herbland (mostly drier north) 947. Brackish Lignum Swamp 13. Brackish Sedgeland 656. Brackish Wetland Aggregate 606. Cane Grass Wetland/Brackish Herbland Complex 813. Intermittent Swampy Woodland 104. Lignum Swamp 823. Lignum Swampy Woodland 842. Saline Aquatic Meadow 918. Submerged Aquatic Herbland 990. Unvegetated
16.3 Freshwater Lake Aggregate	806. Alluvial Plains Semi-arid Grassland (Mallee) 653. Aquatic Herbland 308. Aquatic Sedgeland 334. Billabong Wetland Aggregate 291. Cane Grass Wetland 602. Cane Grass Wetland/Aquatic Herbland Complex 11. Coastal Lagoon Wetland Aggregate 949. Dwarf Floating Aquatic Herbland 809. Floodplain Grassy Wetland (minor) 810. Floodway Pond Herbland 107. Lake Bed Herbland (Mallee) 755. Plains Grassy Wetland/Aquatic Herbland Complex 767. Plains Grassy Wetland/Brackish Herbland Complex 647. Plains Sedgy Wetland 963. Sedge Wetland/Aquatic Sedgeland Complex 819. Spike-sedge Wetland 857. Stony Rises Pond Aggregate 918. Submerged Aquatic Herbland 920. Sweet Grass Wetland 821. Tall Marsh (including non-saline variants of Reed Swamp) 990. Unvegetated 932. Wet Verge Sedgeland
	Wooded verges - e.g. variously: 813. Intermittent Swampy Woodland A119. Intermittent Swampy Woodland/Lake Bed Herbland Complex 651. Plains Swampy Woodland 292. Red Gum Swamp 103. Riverine Chenopod Woodland 814. Riverine Swamp Forest 195. Seasonally Inundated Shrubby Woodland 53. Swamp Scrub 937.Swampy Woodland

Appendix 4 Example of EVC Benchmark for the Index of Wetland Condition

EVC 647: Plains Sedgy Wetland

Description:

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 (EVC 125). Scattered on plains and tablelands mostly on and south of the Divide.

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

Scientific name	Common name
Amphibromus spp.	Swamp Wallaby-grass
Baumea arthrophylla	Fine Twig-sedge
Carex tereticaulis	Poong'ort
Eleocharis acuta	Common Spike-sedge
Montia australasica	White Purslane
Stellaria angustifolia subsp. *angustifolia*	Swamp Starwort
Highest quality sites	
Allittia cardiocarpa	Swamp Daisy
Coronidium gunnianum	Pale Swamp Everlasting
Craspedia paludicola	Swamp Billy-buttons
Microseris scapigera s.s	Plains Yam-daisy
Senecio psilocarpus	Swamp Fireweed
Xerochrysum palustre	Swamp Everlasting

Notes on indicator species

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 including a substantial cover of the herb-rich component shared with Plains Grassy Wetland.

Conditions when the EVC should not be assessed

None recognised (subject to water quality adequate to view attached vegetation in wetland shallows).

1. CRITICAL LIFEFORM GROUPS

Conditions when specific critical lifeform groups should not be assessed

None recognised.

EVC 647: Plains Sedgy Wetland (continued)

Critical lifeform groups and threshold values for determining if lifeform is substantially modified

Critical lifeform	No. Spp.	% Cover	Comments
Medium (to tall) herbs	3	15	including semi-aquatic species
Small herbs	5	1	
Medium (to tall) sedges	1	15	
Small (to medium) non-tufted sedges	2	10	
Medium grasses	3	5	

2. WEEDS

High threat weed species

Scientific name	Common name
Cyperus eragrostis	Drain Flat-sedge
Juncus articulatus	Jointed Rush
Juncus bulbosus	Bulbous Rush
Paspalum distichum	Water Couch

Conditions where weeds are considered to have a negligible impact

None recognised.

3. INDICATORS OF ALTERED PROCESSES

None recognised.

4. VEGETATION STRUCTURE AND HEALTH

Structural dominant	Benchmark cover
Medium (to tall) sedges, either Fine Twig-sedge *Baumea arthrophylla*, or Poong'ort *Carex tereticaulis*	30%

Appendix 5 Wetland vegetation condition assessment scoring sheet

Individual EVC assessment

1. Record EVC name (A) and number (B)
2. Refer to the EVC benchmark description
3. Check the benchmark description for any conditions when the EVC should not be assessed
4. Document the number of critical lifeforms identified in the benchmark at (C)
5. List all critical lifeforms present in table (D)

***Note**: Only wetland species should be used to assess critical lifeforms. Species should only be allocated to one critical lifeform group and allocation should be based on the mature life stage. Opportunistic dryland species should not be included.*

6. For each critical lifeform present, indicate if it is unmodified (UM), or modified by a reduction in species (S), % cover (C) or both (B).
7. Count the number of critical lifeforms listed that are unmodified (UM) and record at (E)
8. Count the number of critical lifeforms listed that are modified (i.e. scored an (S), (C) or (B) and record at (F)
9. Record the number of critical lifeforms absent at (G)
10. Determine the critical lifeform groups score and enter at (H)
11. Determine and circle weeds score and enter value at (I)
12. List high threat weeds on the reverse of this sheet.

***Note**: high threat weeds include those listed in the benchmark and other weeds that have the ability to displace native vegetation.*

13. Determine indicators of altered processes score and enter at (J). Refer to the critical lifeform groups listed in benchmark Section 1 to determine whether or not 50% of these are present.

***Note:** This can include invasions of indigenous introduced species. Could also include declines in indigenous species where this is indicating hydrological change*

14. Determine vegetation structure and health score and enter at (K)
15. Add the scores for each benchmark attribute and divide by 5 to get the EVC score out of a maximum score of 20.
16. Optional: list any other species of interest/ or a full species list on the reverse of this page.

EVC name (unit number, if relevant) (A)	**EVC No. (B)**
Critical lifeform (CLF) groups (benchmark Section 1)	
Number of critical lifeforms identified in the benchmark **(C)**	

List Critical Life Forms present(D)	**Is the CLF unmodified (UM) or modified by a reduction in species (S), % cover (C), or both (B)**

Number of lifeforms present that are unmodified **(E)**	
Number of lifeforms present that are modified **(F)**	
Number of lifeforms absent **(G)**	
Score = ((25 X (E/C)) + ((25/2) x (F/C))) (round to two decimal places)	
Critical lifeform groups score	**(H)**

Weeds (benchmark Section 2)

Total cover of weeds or crop in EVC	**Total cover of high threat weeds**					
	nil	>0-<1%	1- <5%	5-<25%	25-<50%	≥50%
≥50%	7	6	5	3	1	0
25-<50%	12	10	8	6	3	-
5-<25%	17	15	13	10	-	-
1- <5%	23	21	18	-	-	-
<1%	25	23	-	-	-	-

Weeds score **(I)**

Indicators of altered processes (benchmark Section 3)	**Score**
EVC completely displaced and site substantially modified (e.g. cropped/fully-drained)	0
< 50% of critical lifeform groups still represented	5
≥ 50% of critical lifeform groups present (or exempted as per benchmark) and altered process identified as:	
(a) severe	10
(b) moderate	15
(c) minor	20
No evidence of altered process	25
What is the evidence for the altered process? (describe below)	
Indicators of altered processes score	**(J)**

Vegetation structure and health (benchmark Section 4)

% of benchmark cover	**% of cover of structural dominants which are healthy**		
	>70	**30-70**	**<30**
<10	5	2	0
10-50	15	10	5
>50	25	20	15

Vegetation structure and health score	**(K)**
Wetland EVC score (H + I + J + K)/5	

Appendix 6 Glossary of botanic terms

The glossary includes botanical terms and size ranges of critical life-forms (Table 6A) used in this report and in the wetland EVC benchmark descriptions (DELWP 2015b).

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 and not necessarily annual expression of its habitat. Wetland ephemerals may be extremely small plants.

Fern: Mostly 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 the interpretation of critical life-forms in this report, the term herb is generally used to specifically refer to forbs - i.e. excluding grasses, sedges and rushes.

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.

Appendix 6 Glossary of botanic terms (continued)

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 groups 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).

Table 6A. Size ranges used for critical life-forms in the wetland vegetation assessment using method outlined in this report.

Life form	Size classes				
	Tiny	**Prostrate**	**Small**	**Medium**	**Tall**
Shrubs	NA	<20 cm	20 cm - < 1 m	1 – 3 m	>3 m
Herbs	<5 cm	<5 cm and carpet or mat-forming	5 cm - < 15 cm	15 cm - <50 cm	>50 cm
Graminoid	<10 cm	<10 cm and mat-forming	10 cm - < 30 cm	30 cm - <1m	> 1 m

Notes on size ranges

- The range of a given size class can differ from the most similar Vegetation Quality Assessment category (DSE 2004).
- The term semi-shrubs applies to robust herbs which are to some extent woody. Where this term is used in the benchmarks, the relevant size range for herbs applies.
- Graminoids can variously include grasses, sedges, rushes, restiads, mat-rushes and grass trees. Where the term 'monocot' is used in a generalised way in the benchmarks, the relevant size range as for graminoids applies.
- 'Cane-grass' is sometimes used in the benchmarks as a life-form (rather than a more generalised 'medium to tall grasses') – this term applies to hard-stemmed grasses, notably of the genus *Eragrostis* – these species can appear either tufted or non-tufted, according to growing conditions and grazing pressure.
- The term 'tiny floating aquatics' is considered self explanatory – these species are not rhizomatous, comprising detached individual plants up to a few cm in size but frequently much smaller.

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