The Victorian wetland classification framework 2014

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Executive summary

This report outlines a new framework for classifying wetlands in Victoria. It updates the Corrick wetland classification system which was first developed in 1976 (Corrick and Norman 1976) and applied comprehensively to a statewide spatial inventory of wetlands in 1994 known asWETLAND_1994.

The need for a new wetland classification system in Victoria was highlighted by the extensive, recent work on wetland classification that has occurred in other Australian states and at the national level resulting in the development of the Australian National Aquatic Ecosystem (ANAE) Classification Framework (AETG 2012). The reasons for developing a new wetland classification framework for Victoria include:

- the need for the attribution of key drivers and functional components of wetlands to support frameworks which are now used in Victoria for condition and risk assessment;
- the usefulness of categorising wetlands based on particular functional attributes of wetlands to inform policy development, management and research;
- the need to account for the range of wetlands in Victoria, some of which were not covered under the Corrick system;
- the availability of new data to assist in assigning functional attributes to wetlands across Victoria; and
- the ability to align with the national wetland classification system to facilitate national and cross-border assessment and reporting.

Wetlands, for the purpose of the framework, are defined as surface waters, whether natural, modified or artificial, subject to permanent, periodic or intermittent inundation, which hold static or very slow moving water and support biota adapted to inundation and the aquatic environment. This includes waterbodies such as lakes, swamps, fens, marshes, peatlands, springs and supratidal and intertidal (but not subtidal) areas.

This document:

- describes the development of the new Victorian classification framework;
- details how the Victorian classification framework has been applied to Victorian wetlands; and
- describes a new wetlands typology for use in Victoria.

The 1994 State wetlands inventory was updated in the period 2011 to 2014 based on new information about wetlands. The update resulted in the development of a new geospatial wetland inventory that included updated wetland mapping across Victoria known as WETLAND_CURRENT. Each wetland in WETLAND_CURRENT has been attributed and classified in accordance with the framework outlined in this report.

The objectives in developing the framework were to:

- allow naturally-occurring wetlands to be distinguished from human-made wetlands;
- assess the attributes used in the ANAE classification framework for their relevance and applicability to Victorian wetlands;
- categorise relevant attributes to discriminate between the range of possible states in wetlands across Victoria; and
- assign a wetland typology with a manageable number of wetland types for general use in Victoria.

The ANAE classification framework sets out a three level hierarchical classification for aquatic ecosystems (Figure E1). Level 1 of the hierarchy relates to regional attributes, Level 2 to landscape attributes and Level 3 to aquatic ecosystem class, system and habitat attributes. Wetlands are a subset of the aquatic ecosystems to which the framework applies. Wetlands in the Victorian wetlands inventory all fall within the aquatic ecosystem surface water class.

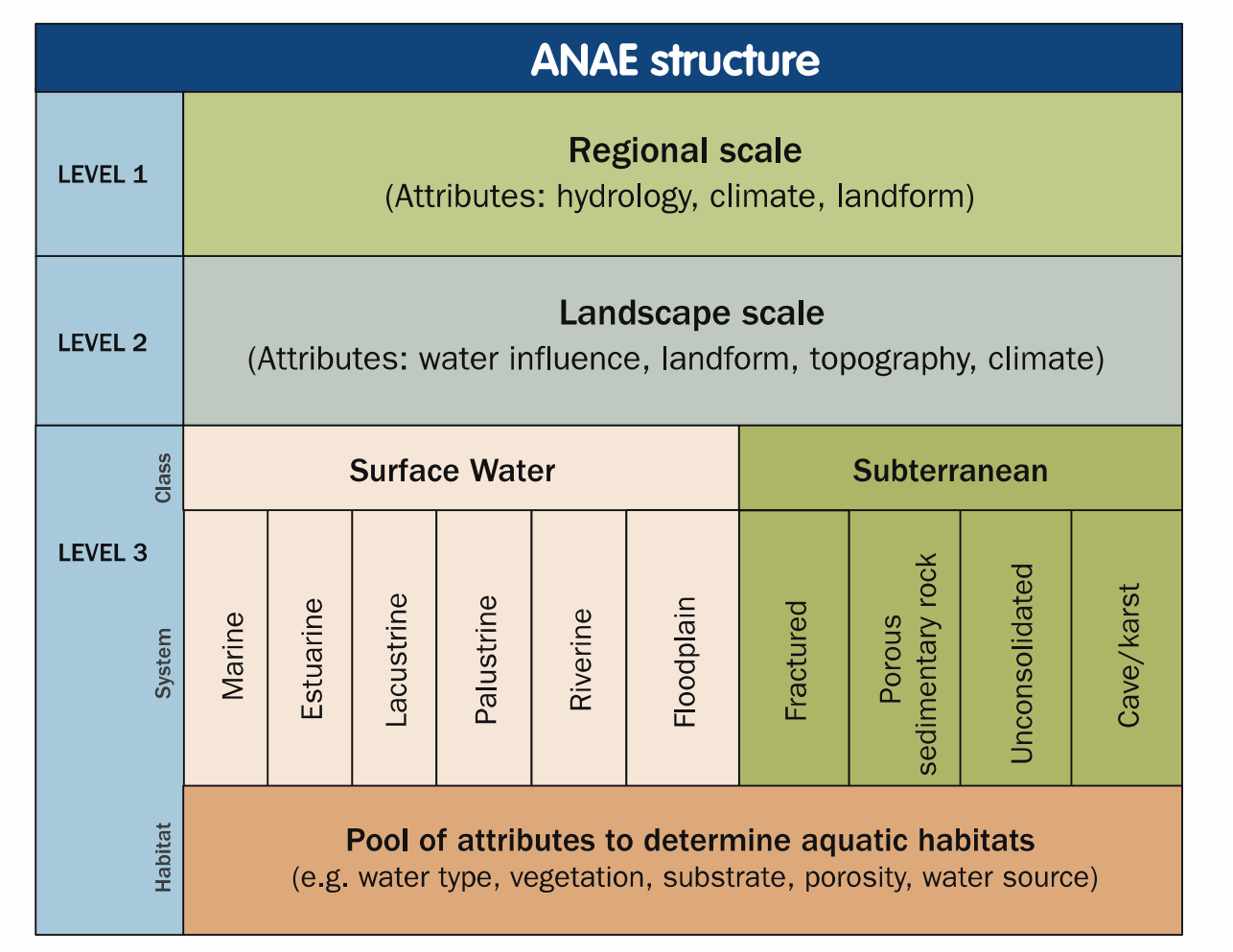

Figure E1. Structure and levels of the Australian National Aquatic Ecosystems Classification Framework (AETG 2012).

The ANAE classification framework regional and landscape attributes were assessed for their suitability for defining a suitable regionalisation for wetlands in Victoria. Based on the examination of how ANAE regional and landscape attributes apply to wetlands in Victoria, options were considered for spatially defining regional and landscape variation in wetlands in Victoria. These included adopting a particular ANAE Level 1 or 2 attribute; a combination of several such attributes; or (the preferred option) developing a unique wetland regionalisation system for use in Victoria based on knowledge of regional variation of Victoria's wetlands.

Wetland vegetation has been comprehensively described across the full range of Victoria's wetlands and wetland landscape profiles have been developed to describe the ecological context of wetland EVCs in Victoria as a means of facilitating EVC identification (DSE 2012). Therefore, this project spatially defined wetland landscapes based on the description of wetland landscape profiles (DSE 2012). These were assembled into a geospatial layer known as WETLAND_LANDSCAPES which can be overlaid with WETLAND_CURRENT to explore the regional variation in wetlands of the same type and aid the identification of representative wetlands.

The ANAE classification framework Level 3 attributes (with the exception of the class attribute) were reviewed to determine their relevance and applicability to the classification of Victoroa's wetlands and to assist with the selection of the attributes, categories and structure used in the Victorian wetland classification framework. The need for any additional attributes was considered, resulting in the inclusion of an additional attribute on wetland origin. The availability of existing data sets to support attribute categorisation was assessed and suitable data sources were identified. Categories for each suitable attribute were adopted, refining ANAE classification framework attribute categories as required to meet

Victoria's needs. Attribute categories were assigned to wetlands in WETLAND_CURRENT. The level of confidence for the assigned category for each attribute was also determined. The resulting Victorian wetland classification attributes and categories are set out in Table E1.

Table E1. Summary of the Victorian classification framework wetland system and habitat attributes, categories and subcategories.

LEVEL 3	**Wetland system**	**Lacustrine** (<30% cover of emergent vegetation)	**Palustrine** (>=30% cover of emergent vegetation)	**Marine** (intertidal wetlands in embayments)	**Estuarine** (semi-enclosed tidal wetlands and supratidal wetlands)
	Wetland habitat	Wetland origin • Naturally occurring • Human-made o aquaculture pond o farm dam o salt works o water storage o excavation pond o sewage treatment pond o stormwater treatment pond		Wetland origin • Naturally occurring • Human-made o aquaculture pond o salt works o excavation pond o stormwater treatment pond	
		Dominant vegetation • Forest/woodland • Shrub/fern • Sedge/grass/forb • Moss/heath • No emergent vegetation		Dominant vegetation • Mangrove • Saltmarsh • No emergent vegetation	
		Water source • Groundwater • River • Tidal • Artificial		Water source • Groundwater • River • Tidal • Artificial	
		Water regime • Permanent • Periodically inundated o seasonal o intermittent o episodic		Water regime • Supratidal • Intertidal	
		Salinity regime • Fresh • Hyposaline • Mesosaline • Hypersaline • Saline		Salinity regime • Hyposaline • Mesosaline • Hypersaline • Saline	

A standard wetland typology was also developed for inclusion in the Victorian wetland classification framework. The primary attribute for distinguishing wetland types is the wetland system attribute. Each of the four wetland system categories was then further subdivided, with the exception of the marine wetland system category which was assigned as a single type.

Estuarine wetlands were divided into two types based on the dominant vegetation attribute. Lacustrine wetlands were subdivided into four types based on the salinity regime and water regime attributes. The distinctions for lacustrine wetlands were between fresh and saline wetlands (combined hyposaline, mesosaline, hypersaline and saline categories) and, within those classes, between permanent and periodically inundated wetlands. Palustrine wetlands were subdivided into 12 types based on the salinity regime, water regime and dominant vegetation attributes with the exception of high country peatlands which were distinguished only by the dominant vegetation type moss/heath, making a total of 13 palustrine wetland types.

The naming convention for inland wetland types in the Victorian classification framework was informed by that used in a recent classification and typology for aquatic ecosystems in the Murray-Darling (Brooks et al. 2013). Lacustrine wetlands were named as lakes. Palustrine wetlands were named as swamps (wetlands dominated by woody vegetation), or marshes/meadows (wetland dominated by non-woody emergent vegetation) or high country peatlands (based on Lawrence et al. 2009). Estuarine wetlands were named as estuary or coastal saltmarsh, while marine wetlands were named as intertidal flats. The results of the application of the typology to the Victorian wetland inventory are presented in Table E2.

Table E2. Results of the wetland typology classification

Wetland type	Number of wetlands	Approximate % number of wetlands	Area of wetlands (ha)	Approximate % area of wetlands
Coastal saltmarsh	314	<1%	53733	7%
Estuary	27	<1%	4213	<1%
High country peatlands	3183	9%	4476	<1%
Intertidal flats	5	<1%	72790	9%
Permanent freshwater lakes	1016	3%	95596	12%
Permanent freshwater marshes and meadows	33	<1%	2241	<1%
Permanent freshwater swamps	192	<1%	897	<1%
Permanent freshwater swamps/marshes/meadows	2	<1%	52	<1%
Permanent saline lakes	101	<1%	65998	8%
Permanent saline marshes and meadows	11	<1%	2887	<1%
Permanent saline swamps	3	<1%	319	<1%
Permanent saline swamps/marshes/meadows	1	<1%	45	<1%
Temporary freshwater lakes	2542	7%	58314	7%
Temporary freshwater marshes and meadows	7383	21%	95107	12%
Temporary freshwater swamps	5976	17%	103669	13%

Wetland type	Number of wetlands	Approximate % number of wetlands	Area of wetlands (ha)	Approximate % area of wetlands
Temporary freshwater swamps/marshes/meadows	37	<1%	1016	<1%
Temporary saline lakes	564	2%	36704	5%
Temporary saline marshes and meadows	122	<1%	8536	1%
Temporary saline swamps	87	<1%	5430	<1%
Temporary saline swamps/marshes/meadows	15	<1%	1125	<1%
Unknown	13815	39%	170877	22%
Total	**35429**		**784025**	

This project developed a wetland regionalisation that built on earlier work that described wetland vegetation in Victoria (DSE 2012). The resulting wetland landscapes were considered to provide a better framework for explaining regional and landscape variation (as expressed through wetland vegetation) in wetlands than any of the ANAE classification framework Level 1 or 2 attributes whether used singly or combined. Wetland landscapes allow for regional variation to be taken into account to explain differences in wetlands with the same wetland system and habitat attributes. This will aid in identifying representative wetlands.

This project resulted in systematic categorisation of system and habitat attributes that relate to most of the key components and processes of wetland function that are recommended for use in Australia (AETG 2012). In this respect, it overcame the limitation of the Corrick classification system previously used in Victoria, in that the Corrick system was not strictly systematic in its classification of wetland attributes. This project introduced discrimination between wetlands of natural and artificial origin which was not explicitly included in the Corrick classification framework and added new water source attributes. It also brought Victoria's wetland classification generally into line with the national framework (AETG 2012)

The Victorian wetland typology closely followed that used by Brooks et al. (2013) for the classification of aquatic ecosystems in the Murray-Darling Basin. However, there was insufficient reliable data on wetland vegetation to enable marshes to be distinguished from meadows. Information was also lacking on wetland depth which is another characteristic used to distinguish between marshes and meadows.

The assignment of wetland attribute categories from existing datasets has some limitations and resulted in a significant percentage of wetlands being assigned unknown for several attributes. The assignment of the unknown category to attributes that inform the identification of the wetland type contributed to 39% of wetlands being of an unknown type.

The confidence level of the assigned category for each attribute varied but there were a significant percentage of wetlands with low confidence ratings for dominant vegetation attribute. As the latter is used in the classification for the wetland system attribute (to distinguish between lacustrine and palustrine wetlands), this also contributed to 33% of wetlands being assigned low confidence for wetland system classification.

While some data sources are of high quality, improvements to the level of confidence for wetland system and habitat attributes and filling of data gaps relies on:

- development of more accurate datasets for individual wetland attributes;
- ground truthing; and

- further testing of the accuracy of some existing data sources, especially for the water regime, salinity and dominant vegetation attributes.

Comprehensive spatial definition of wetland EVCs would be of significant benefit. It would improve the accuracy of the wetland system and dominant vegetation categories assigned to wetlands and aid in the discrimination between marshes and meadows (allowing for more specificity in wetland type definition). It would also improve the accuracy and confidence in assigning the salinity and water regime categories as expert knowledge exists on the salinity and water regime preferences for each wetland EVC.

Regular updates of attribute data from IWC and other field assessments are also recommended. Further work is also recommended to monitor wetland water regime, for example using LANDSAT data that informs Geoscience Australia's Water Observations from Space (WOFS) product, and to test the accuracy of this product for wetlands. Due to lack of any other comprehensive, independent dataset on water regime, in this project, the accuracy of the WOFS dataset was not able to be tested.

An online tool to allow natural resource managers and planners to check attributes for individual wetlands has been developed. The tool allows wetland managers to propose updates to wetland attributes based on ground-truthed observations which will be validated and incorporated into future updates of the WETLAND_CURRENT dataset.

1. Introduction

This report outlines a new framework for classifying wetlands in Victoria. Since the late 1970's Victoria has used a wetland classification system and typology, commonly referred to as the Corrick system (Corrick and Norman 1976, Corrick and Norman 1980, Corrick 1981, 1982). The need for a new wetland classification system in Victoria was highlighted by the extensive work on wetland classification that has occurred in other Australian states and at the national level. The former national Aquatic Ecosystems Task Group (AETG) on which all Australian jurisdictions were represented, agreed that jurisdictions should move towards a common classification system for aquatic ecosystems (rivers and streams, lentic wetlands, estuaries and shallow marine waters). The former AETG developed the Interim Australian National Aquatic Ecosystems Classification Framework (ANAE classification framework), which included wetlands (AETG 2012). This work highlighted some limitations of the Corrick system. In addition, there is now a greater body of information about wetlands in Victoria. The development of a new framework in Victoria provided an opportunity to use this new information and to align with the national framework.

Wetlands, for the purpose of the framework, are defined as surface waters, whether natural, modified or artificial, subject to permanent, periodic or intermittent inundation, which hold static or very slow moving water and support biota adapted to inundation and the aquatic environment. This includes waterbodies such as lakes, swamps, fens, marshes, peatlands, springs and supratidal and intertidal (but not subtidal) areas. Estuaries have been separately delineated and classified in Victoria (Barton et al. 2008, Pope et al. 2011). However, there is some overlap between estuaries and tidal wetlands. Intertidal waters in Western Port, Port Phillip Bay and Corner Inlet and those in or adjacent to some estuaries are covered by the framework. Subterranean aquatic ecosystems are not covered.

The purpose of this document is to:

- describe the development of the Victorian classification framework;
- detail how the Victorian classification framework has been applied to Victorian wetlands; and
- describe a new wetlands typology for use in Victoria.

The document also provides background information on the Corrick classification system and the ANAE classification framework.

1.1 The Corrick wetland classification system

The Corrick system was developed in the period 1976 to 1980. It covers both natural and artificial wetlands. It defines eight wetland categories, two of which (salt works and sewage ponds) include only artificial or human-made wetlands (Table 1), (Corrick and Norman 1980, Corrick 1981, 1982).

Wetland categories, with the exception of salt works and sewage ponds, are described in terms of the following attributes:

- salinity (fresh or saline);
- permanency (permanent and semi-permanent); and
- depth (with the exception of the semi-permanent saline category).

The two artificial wetland categories and are not further subdivided. The remaining six categories are subdivided into subcategories (Table 1).

Artificial impoundments are included as a subcategory of the permanent open freshwater category. For the other five categories, the subcategories relate to natural wetlands. Wetlands in each of the six categories are mainly differentiated on the basis of dominant vegetation, or the lack thereof. However, permanent open freshwater wetlands are categorised by depth as well as vegetation, permanent saline wetlands are subcategorised by depth or as intertidal wetlands but not by vegetation, while semi-permanent saline wetlands are subcategorised by salinity as well as vegetation or its absence (salt pan).

Table 1. The Corrick classification system (Corrick and Norman 1980, Corrick 1981, 1982).

Category	Subcategory	Depth (metres)
Sewage ponds	Undefined	Undefined
Salt works	Undefined	Undefined
Freshwater meadow These include shallow (up to 0.3 m) and temporary (less than four months duration) surface water, although soils are generally waterlogged throughout winter.	Herb-dominated Sedge-dominated Red gum-dominated Lignum dominated Black Box-dominated Cane grass-dominated	< 0.3
Shallow freshwater marsh Wetlands that are usually dry by mid-summer and fill again with the onset of winter rains. Soils are waterlogged throughout the year and surface water up to 0.5 m deep may be present for as long as eight months.	Herb-dominated Sedge-dominated Cane grass-dominated Lignum dominated Red gum-dominated Black Box-dominated Dead timber Rush-dominated Reed-dominated	< 0.5
Deep freshwater marsh Wetlands that generally remain inundated to a depth of 1 – 2 m throughout the year.	Shrub-dominated Reed-dominated Sedge-dominated Rush-dominated Open water Cane grass-dominated Lignum-dominated Red gum-dominated Black Box-dominated Dead timber	< 2
Permanent open freshwater Wetlands that are usually more than 1 m deep. They can be natural or artificial. Wetlands are described to be permanent if they retain water for longer than 12 months, however they can have periods of drying.	Shallow Deep Impoundment Red gum-dominated Cane grass-dominated Dead timber Black Box-dominated Rush-dominated Reed-dominated Shrub-dominated Sedge-dominated Lignum-dominated	< 2 > 2
Semi permanent saline These wetlands may be inundated to a depth of 2 m for as long as eight months each year. Saline wetlands are those in which salinity exceeds 3,000 mg/L throughout the whole year.	Salt pan Salt meadow Salt flats Sea rush Hypersaline lake Melaleuca-dominated Dead timber	< 2

Category	Subcategory	Depth (metres)
Permanent saline These wetlands include inland, coastal and intertidal wetlands. Saline wetlands are those in which salinity exceeds 3,000 mg/L throughout the whole year.	Shallow Deep Intertidal flats Mangroves	< 2 > 2

Since its development, the Corrick system has been widely utilised in natural resource management, wetland policy and science in Victoria. It is a straightforward system that corresponds well to the obvious features of wetlands, as observed in the field. However, it has some limitations.

- The system does not incorporate regional variation related to major landscape drivers of wetland type such as climate, landform, hydrology and topography.
- The system does not explicitly distinguish between major aquatic ecosystem classes (lacustrine, palustrine, estuarine or marine systems).
- The Corrick system provides a wetland typology but is not strictly systematic in classifying wetlands based on their attributes.
- Some wetland types are not included, for example high country peatlands, springs and soaks.
- There is limited discrimination for human-made wetlands.

One hundred and forty five wetland ecological vegetation classes (EVCs[1]) have been described in Victoria since the Corrick system was developed (DSE 2012, DEPI 2013), (Appendix 1). This compares with 13 general wetland vegetation categories used by Corrick (Table 1). The greater level of discrimination using wetland EVCs facilitates more accurate identification of some wetland attributes and provides a basis for wetland regionalisation at the landscape scale (Section 3.1).

1.2 Rationale behind the new Victorian Classification Framework

Taking into account the limitations of the Corrick system, there are several reasons to develop a new framework for wetland classification in Victoria. These include:

- the need for the attribution of key drivers and functional components of wetlands to support frameworks which are now used in Victoria for condition and risk assessment;
- the usefulness of identifying particular functional attributes of wetlands to inform policy development, management and research;
- the need to account for all wetlands; and
- the availability of new data to assist in assigning functional attributes to wetlands across Victoria.

There has been significant development in Australia of wetland classification frameworks in recent years. Queensland developed a wetland classification system in 2005 (EPA 2005) and this system was applied with some modifications in New South Wales (Imgraben 2009) and South Australia (Jones and Miles 2009). This work, informed the ANAE classification framework (AETG 2012) which applies to other aquatic ecosystems such as rivers, estuaries, subterranean aquatic ecosystems and floodplains as well as wetlands. In its development, the ANAE classification framework was trialled in South Australia (Butcher et al. 2011) and has been applied in the Murray-Darling Basin (Brooks et al. 2013), providing further insights into the feasibility of its application for wetlands.

1 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 (DNRE 2002).

Victoria is in the position to draw on this wide body of expertise to develop the new wetland classification framework. There are also advantages in seeking to align with the national wetland classification system to facilitate national and cross-border assessment and reporting. This is not possible with the current Corrick system.

1.3 ANAE classification framework

The ANAE classification framework defines the term classification and typology as follows (AETG 2012).

> "Classification is the process of attributing (aquatic ecosystems) with logical datasets that have been identified as being relevant to ecological functioning.
>
> Typology is an extension to classification whereby those classified aquatic ecosystems are assembled into groups for a specific purpose, i.e. a naming convention."

The ANAE classification framework takes a semi-hierarchical approach to aquatic ecosystem classification based on the systematic application of attributes that relate to the key drivers and components of wetland function. While the current version of the framework includes a classification system, it does not incorporate an aquatic ecosystem typology, although future versions may do so (AETG 2012).

The ANAE classification framework sets out a three level hierarchical classification for aquatic ecosystems (AETG 2012), (Figure 1) which includes a range of attributes relevant to wetlands in Victoria (Table 2). At level 3 of the hierarchy, wetlands in Victoria fall into the palustrine, lacustrine, marine and estuarine system categories. The ANAE classification framework habitat attributes for these systems (Appendix 2) are potentially relevant for Victorian wetlands.

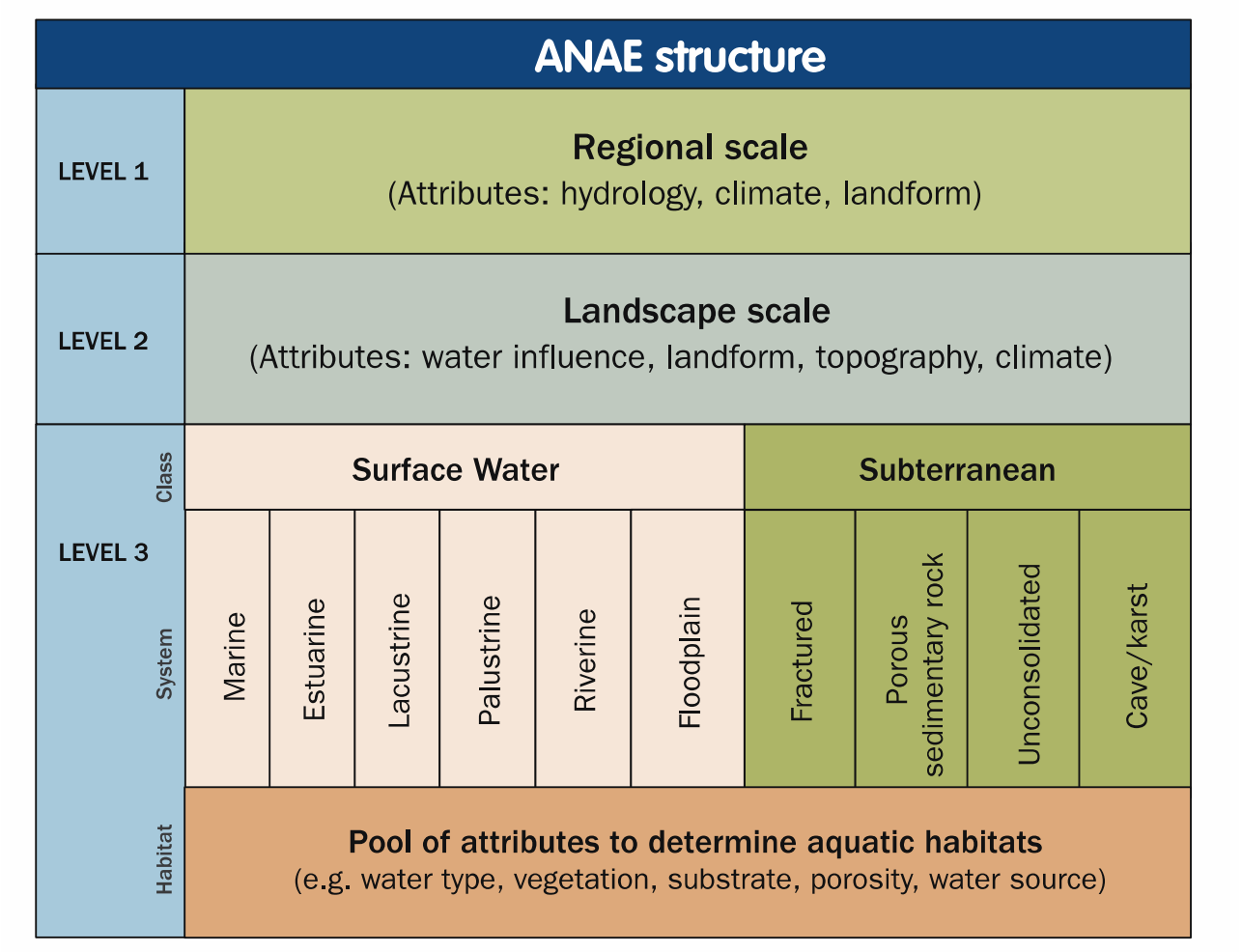

Figure 1. Structure and levels of the Australian National Aquatic Ecosystems Classification Framework (AETG 2012).

Table 2. ANAE classification framework attributes potentially relevant to wetlands in Victoria (AETG 2012). Further detail on the metrics for aquatic habitats is provided in Appendix 2.

ANAE classification framework regional scale attributes (Level 1)	
Climate	
Climate groups from the Bureau of Meteorology Climate Classification of Australia	
Landform	
Australian Soil Resources Information System physiographic provinces	
Interim Bioregionalisation of Australia (IBRA) bioregions	
Integrated Marine and Coastal Regionalisation of Australia (IMCRA) provinces (marine and estuarine wetlands)	
Hydrology - inland surface waters	
Surface water drainage divisions	
ANAE classification framework landscape scale attributes (Level 2)	
Climate	
Climate classes from the Bureau of Meteorology Australian Climate Classification of Australia	
Landform	
Australian Soil Resources Information System physiographic regions	
IBRA sub-regions	
IMCRA bioregions (marine and estuarine wetlands)	
Topography	
Upland, slope, lowland	
Water influence (estuarine wetland only)	
Tide, wave or river dominated	
ANAE classification framework systems (Level 3)	
Surface Water	
Marine	
Estuarine	
Lacustrine	
Palustrine	
ANAE classification framework habitat attributes (Level 3)	
Lacustrine/palustrine	**Marine/estuarine**
Landform	Substrate
Soil/substrate	Structural macrobiota
Dominant vegetation	Water depth
Dominant water source	Light availability
Water type	Nutrient availability
Water regime	Exposure

1.4 Victorian wetland inventories

The Corrick system was applied to inland and intertidal wetlands greater than a hectare across Victoria in the period from 1976 to 1994. This data is stored in a statewide wetlands inventory which consists of a geospatial data layer: WETLAND_1994. The layer defines the spatial extent of wetlands as well as their categories and subcategories (Table 1). During the development of WETLAND_1994, wetland categories were also applied to a statewide geospatial layer WETLAND_1788 that estimates the extent and type of wetlands present at the time of European settlement.

The 1994 State wetlands inventory was updated in the period 2011 to 2014 based on new information about wetlands. This update of the statewide wetland inventory involved:

- a synthesis of regional wetland inventory updates that had been undertaken in Victoria since 1994 (Table 3);
- repositioning of wetlands that were subject to planimetric positioning errors in the WETLAND_1994 data layer; and
- in-fill mapping of new wetlands in the parts Victoria that had not been mapped during the regional wetland inventory updates since 1994.

The update resulted in the development of a new geospatial wetland inventory that included updated wetland mapping across Victoria: WETLAND_CURRENT. Each wetland has been attributed and classified in accordance with the framework outlined in this report. WETLAND_1788 was also updated to form a new layer of pre-European extent: WETLAND_PRE_EUROPEAN.

Some of regional wetland inventory updates that had been undertaken in Victoria since 1994 applied the Corrick system (Table 1) to newly delineated wetlands and updated the classification of existing wetlands using the Corrick system categories and subcategories. WETLAND_CURRENT includes fields specifying the Corrick wetland identifier and category. The most recent Corrick category information was used to populate the category field, where available. That is, the Corrick category from regional updates was used in preference to Corrick category from WETLAND_1994. As a result, the Corrick category field in the WETLAND_CURRENT data layer can differ from that in the WETLAND_1994 data layer.

Table 3. Regional datasets integrated into the WETLAND_CURRENT and WETLAND_PRE_EUROPEAN datasets

Description	Abbreviation	Corrick classification
A layer developed by Department of Environment, Land, Water and Planning (DELWP) which defines high country peatlands as described in Lawrence et al. 2009	ALPS	None
A layer developed by Corangamite Catchment Management Authority (CMA) which updated the WETLAND_1994 mapping for the Corangamite region	CORANG	Category (and occasional sub-category)
Delineation of Broken River floodplain wetlands by Ecology Australia in February 2007 for the Goulburn Broken CMA	GB_LB	None
A layer developed by Goulburn Broken CMA which defines springs as described in Coates et al. 2010	GB_SPR	None
A layer developed by Goulburn Broken CMA which defines soaks as described in Carr et al. 2006	GB_SS	Category and sub-category for 20% of features
A layer developed by Mallee CMA which updated the WETLAND_1994 mapping for the Mallee region	MALLEE2013	Category and sub-category

Description	Abbreviation	Corrick classification
A layer developed by North Central CMA which updated the WETLAND_1994 mapping for the North Central dryland region	N_CENT	Category (no sub-category)
A layer developed by West Gippsland CMA which updated the WETLAND_1994 mapping for the West Gippsland region	W_GIPP	Category (no sub-category)
A layer developed by Wimmera CMA which updated the WETLAND_1994 mapping for the Wimmera region	WIMM2	Category, slightly modified (no sub-category)
A layer developed by the Winton Wetlands Committee of Management which delineates the Winton wetlands following the decommissioning of Lake Mokoan	WINTON	None

2. Approach for developing the Victorian wetland classification framework

The Victorian wetland classification framework is designed to be of use to a wide range of stakeholders, including State and regional natural resource management agencies, the Australian Government, wetland managers, scientists and community organisations.

The goal of this project was to design a new framework for classifying naturally occurring and artificial wetlands in Victoria that aligns with the ANAE classification framework and contains the basic information necessary to provide improved support for wetland policy development, management, assessment and general understanding of wetland diversity. The objectives in developing the framework were to:

- allow naturally-occurring wetlands to be distinguished from human-made wetlands;
- assess the attributes used in the ANAE classification framework for their relevance and applicability to Victorian wetlands;
- categorise relevant attributes to discriminate between the range of possible states in wetlands across Victoria; and
- assign a wetland typology with a manageable number of wetland types for general use in Victoria.

The ANAE classification framework was reviewed to assist with the selection of the attributes, categories and structure used in the Victorian framework. Because other wetland classification systems in use in Australia and internationally were considered in the development of these systems, these were not reviewed with the exception of the Ramsar Convention classification system which informed the classification of human made wetlands. Attributes from each level of the ANAE classification framework (Figure 1) (AETG 2012) were assessed to determine their relevance and applicability in developing the Victorian wetland classification framework.

It was decided to include system and habitat attributes in the Victorian statewide wetlands inventory (WETLAND_CURRENT) but not regional and landscape scale attributes as these can be derived for Victoria's wetlands, as necessary, by overlaying existing relevant geospatial datasets. The ANAE classification framework Level 1 and 2 regional and landscape scale attributes were assessed for their usefulness in describing variation in wetlands across the state. Based on this assessment, it was decided to define specific wetland landscapes for use in Victoria (see Section 3.1).

The Victorian wetlands inventory (WETLAND_CURRENT) includes only lentic surface waters. The ANAE classification framework riverine and floodplain systems and the subterranean class, system and habitat attributes (Figure 1) were not applicable to Victorian wetlands and were excluded from the assessment of ANAE classification framework Level 3 attributes.

The steps for assessing relevant and applicable system and habitat attributes and assigning appropriate categories for each adopted attribute to the Victorian wetland inventory (WETLAND_CURRENT) are described below.

1. Attributes in ANAE classification framework were assessed for their usefulness in describing Victoria's wetlands.
2. The need for any additional attributes was considered resulting in the inclusion of an additional attribute on wetland origin.
3. The Ramsar Convention classification was reviewed in relation to the classification of human-made wetlands.
4. The availability of existing data sets to support attribute categorisation was assessed and suitable data sources were identified (Appendix 3).
5. Useful attributes where data was available were adopted and ANAE classification framework habitat attribute categories (Appendix 2) were reviewed and refined, if necessary.
6. Attribute categories were assigned to wetlands in WETLAND_CURRENT.
7. The level of confidence for the assigned category for each attribute was also determined using rules which are described in each of the relevant sections below.

Key attributes for defining wetland types were identified. Using these attributes, wetland types were identified and assigned to wetlands in WETLAND_CURRENT.

The Victorian wetland inventory includes both the system and habitat attributes selected for the framework and the new wetland types as well as the former WETLAND_1994 wetland identifier and Corrick category. The WETLAND_1994 wetland identifier provides links to the former Corrick wetland inventory datasets.

3. Regional and landscape attributes

Regionalisations based on broad-scale attributes such as climate, physiographic patterns, and dispersal barriers and finer scale data related to those attributes are an accepted international tool to assist in the description of ecosystem boundaries for planning, management and policy purposes (AETG 2012). Levels 1 and 2 of the ANAE classification framework (Figure 1**Error! Reference source not found.**)are described as "large scale, national regionalisations for landform, climate, hydrology, topography and water influence intended to provide context relative to both the regional and landscape scales and are based on collated, existing datasets and inferred patterns across a variety of spatial scales" (AETG 2012).

The ANAE classification framework regional and landscape attributes were examined and assessed for their usefulness in defining a suitable regionalisation for wetlands in Victoria.

3.1 ANAE Classification regional and landscape attributes

The relation of the ANAE classification framework regional and landscape attributes to Victoria is described below.

In relation to landform there are, in Victoria:

- two Australian Soil Resources Information System (ASRIS) physiographic provinces and 14 physiographic regions (Pain et al., 2011) (Table 4, Figure 2);

- 11 Interim Bioregionalisation of Australia (IBRA) 6.1 bioregions and 28 IBRA 6.1 subregions (Table 4, Figure 3);
- three Integrated Marine and Coastal Regionalisation of Australia (IMCRA) Provincial Bioregions and four Meso-scale Bioregions in Victorian nearshore waters (Commonwealth of Australia 2006) (Table 4, Figure 4**Error! Reference source not found.**).

With regard to topographic classes, the ANAE classification framework does not provide a definition of the upland, lowland and slope categories but suggests that such a regionalisation should be developed. For this project, the physiographic regions were categorised into the three different classes (Table 4, Figure 5) based on their descriptions in Pain et al. (2011) (Appendix 4).

There are two climate groups and five climate classes in Victoria, based on the classification (Table 5, Figure 6), (BoM 2010). In relation to hydrology there are two drainage divisions and 29 river basins in Victoria (Table 6, Figure 7), (Bureau of Meteorology 2012).

Table 4. ANAE classification framework region and landscape attributes for landform in Victoria. Levels 2 and 1 refer to the levels used in the ANAE classification framework.

Attribute	Occurrence in Victoria		
ASRIS physiographic provinces (Level 1) and regions (Level 2)	**Province**	**Regions (Figure 2)**	
	Kosciuszkan Uplands	- Hume Slopes - Monaro Fall - East Victorian Uplands - West Victorian Plains - Gippsland Plain	- Australian Alps - Monaro Tableland - West Victorian Uplands - South Victorian Uplands
	Murray Lowlands	- Lower Darling Plain - Mallee Dunefield - Millicent Plain	- Riverine Plain - Wimmera Plain
Bioregions (Level 1) and sub-regions (Level 2)	**IBRA 6.1 bioregion**	**IBRA 6.1 subregions (Figure 3)**	
	Australian Alps	- Victorian Alps	
	Flinders	- Wilsons Promontory	
	Murray-Darling Depression	- Lowan Mallee - Murray Mallee - Wimmera Plain	
	NSW South Western Slopes	- Northern Inland Slopes	
	Narracorte Coastal Plain	- Bridgewater - Glenelg Plain	
	Riverina	- Victorian Riverina - Robinvale Plains	- Murray Fans - Murray Scroll Belt
	South East Coastal Plain	- Gippsland Plain - Warrnambool Plain	- Otway Plain
	South East Corner	- East Gippsland Uplands - East Gippsland Lowlands - Highlands – Far East	
	South Eastern Highlands	- Highlands – Northern Fall - Highlands – Southern Fall - Monaro Tablelands	- Otway Ranges - Strzelecki Ranges
	Victorian Volcanic Plain	- Victorian Volcanic Plain	

Attribute	Occurrence in Victoria	
	IMCRA Provincial Bioregion	**Meso-scale Bioregion (Figure 4)**
	- Central Eastern Transition - Western Bass Strait IMCRA transition - Southeast IMCRA transition	- Otway - Central Victoria - Victorian Embayments - Flinders - Twofold Shelf

Topographic classes (Level 2) - based on physiographic regions (Figure 5).	**Topographic classes**	**Physiographic regions**	
	Upland	- Australian Alps - East Victorian Uplands - West Victorian Uplands	- Monaro Tableland - South Victorian Uplands
	Slope	- Hume Slopes	- Monaro Fall
	Lowland	- Gippsland Plain - Riverine Plain - Wimmera Plain - West Victorian Plains	- Lower Darling Plain - Mallee Dunefield - Millicent Plain

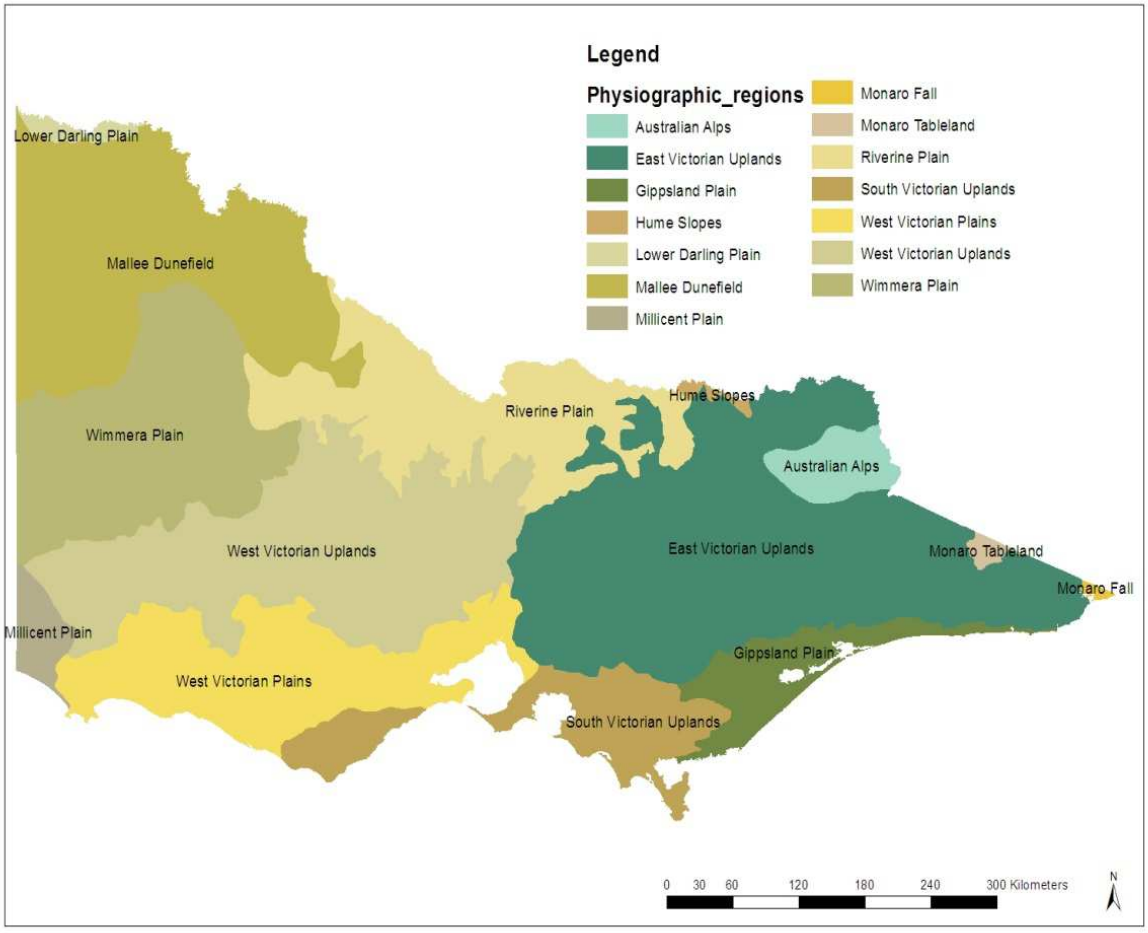

Figure 2. Australian Soil Resources Information System physiographic regions in Victoria (Pain et al., 2011).

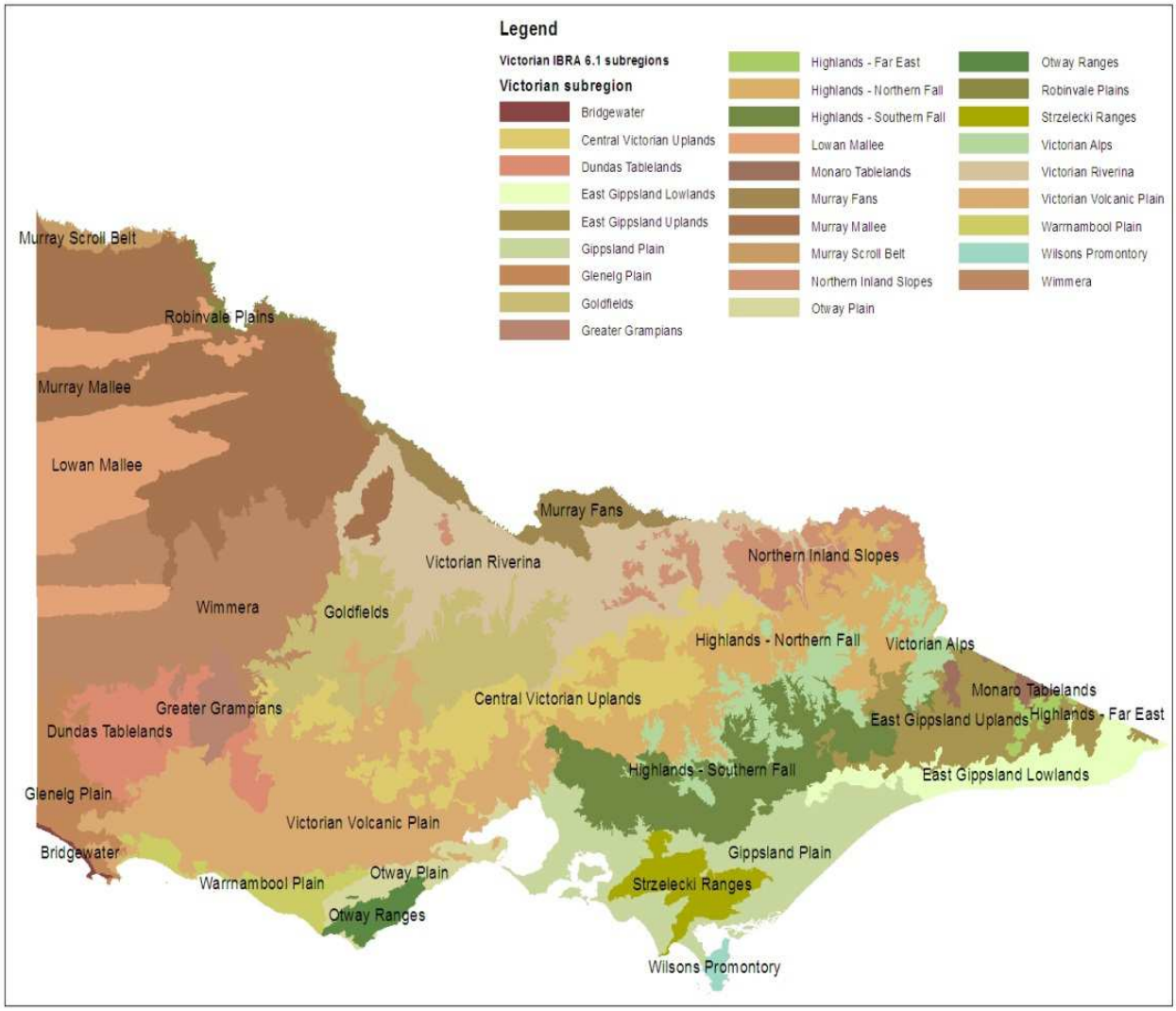

Figure 3. IBRA subregions (IBRA 6.1) in Victoria.

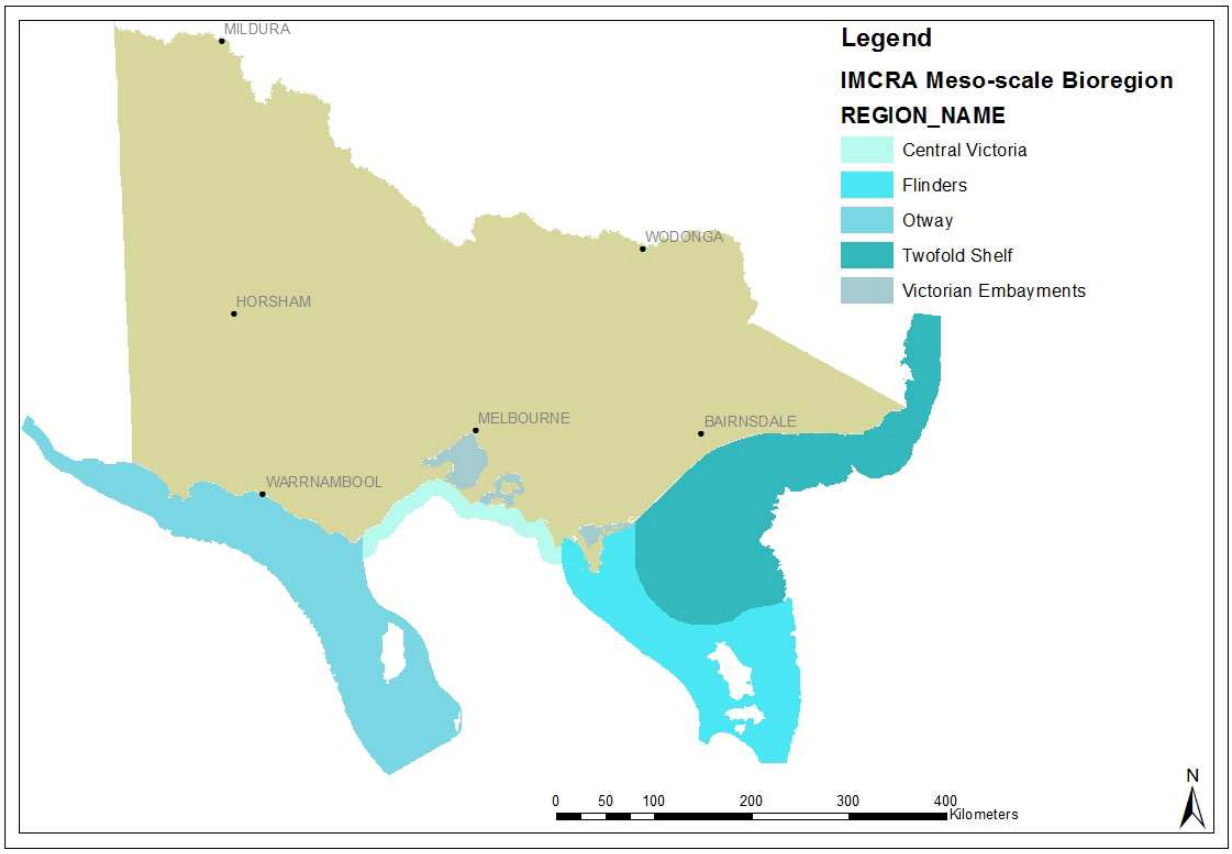

Figure 4. IMCRA meso-scale bioregions in Victorian waters (IMCRA 4.0) (Commonwealth of Australia 2006).

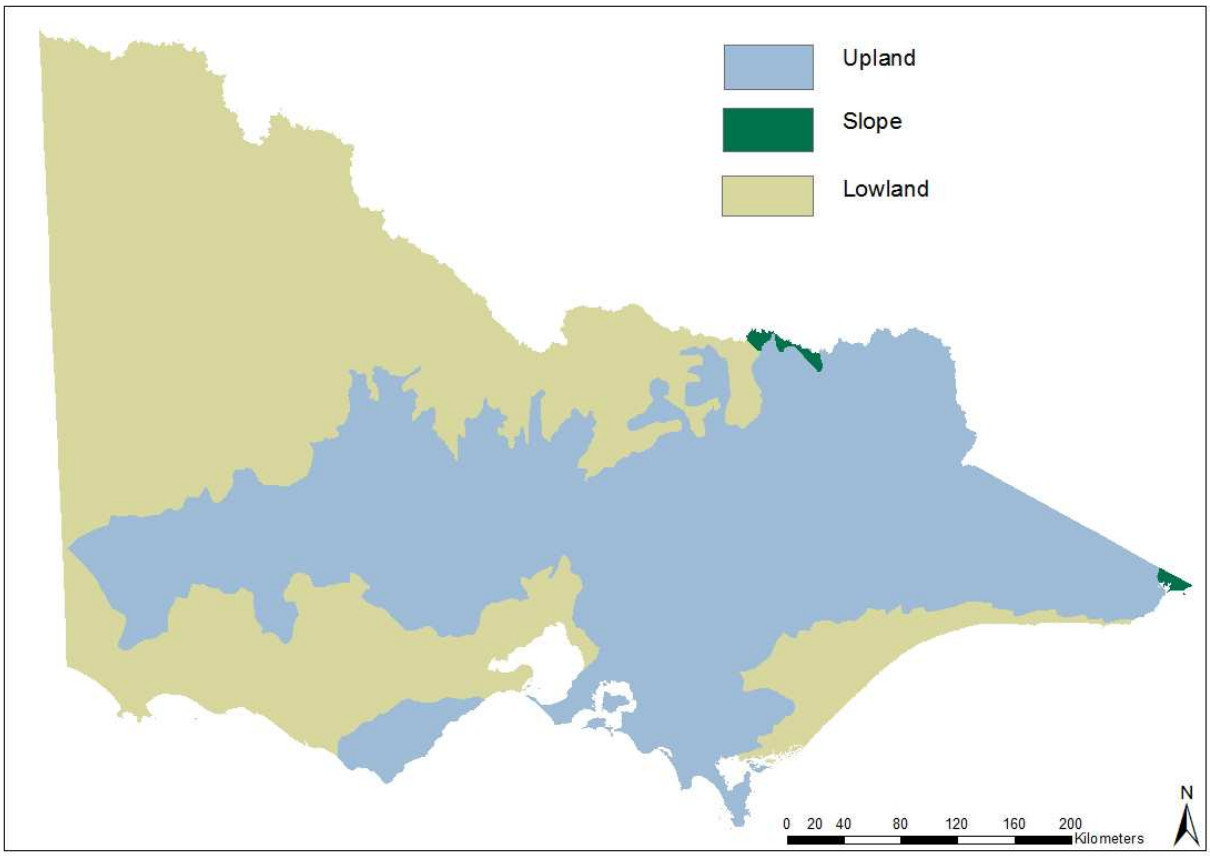

Figure 5. Topographic classes in Victoria based on grouping of ASIRS physiographic regions.

Table 5. ANAE classification framework region and landscape attributes for climate in Victoria.

Attribute	Occurrence in Victoria	
Climate	**Climate group**	**Climate class**
Bureau of Meteorology Climate Classification of Australia climate groups (ANAE Level 1) and climate classes (ANAE Level 2) Victoria (Figure 6)	Grassland	- warm (summer drought)
	Temperate	- no dry season (hot summer) - no dry season (warm summer) - distinctly dry (and warm) summer - no dry season (mild summer)

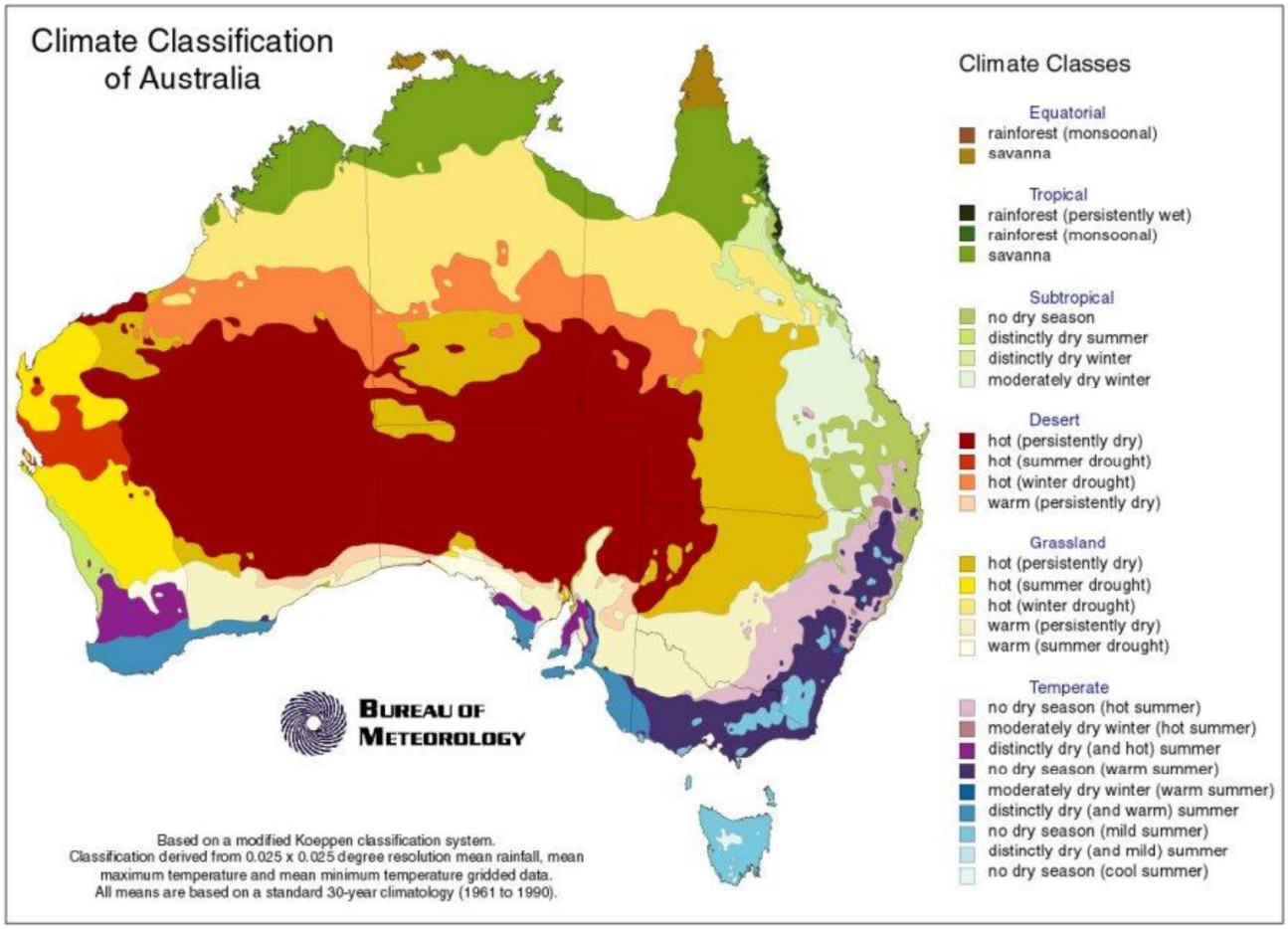

Figure 6. Climate groups and classes (Bureau of Meteorology 2010).

Table 6. ANAE classification framework region and landscape attributes for hydrology in Victoria.

Attribute	Occurrence in Victoria		
Hydrology - inland surface waters Drainage divisions (Level 1) and river basins (Level 2), (Figure 7)	**Drainage division**	**River basin**	
	Murray-Darling	- Avoca River	- Avon Rivers
		- Broken River	- Campaspe River
		- Goulburn River	- Kiewa River
		- Loddon River	- Mallee
		- Ovens River	- Upper Murray River
		- Wimmera	
	South-East Coast	- Barwon River	- Bunyip River
		- East Gippsland	- Glenelg River
		- Hopkins River	- Lake Corangamite
		- Latrobe River	- Maribyrnong River
		- Millicent Coast	- Mitchell River
		- Moorabool River	- Otway Coast
		- Portland Coast	- South Gippsland
		- Snowy River	- Tambo River
		- Thomson River	- Werribee River
		- Yarra River	

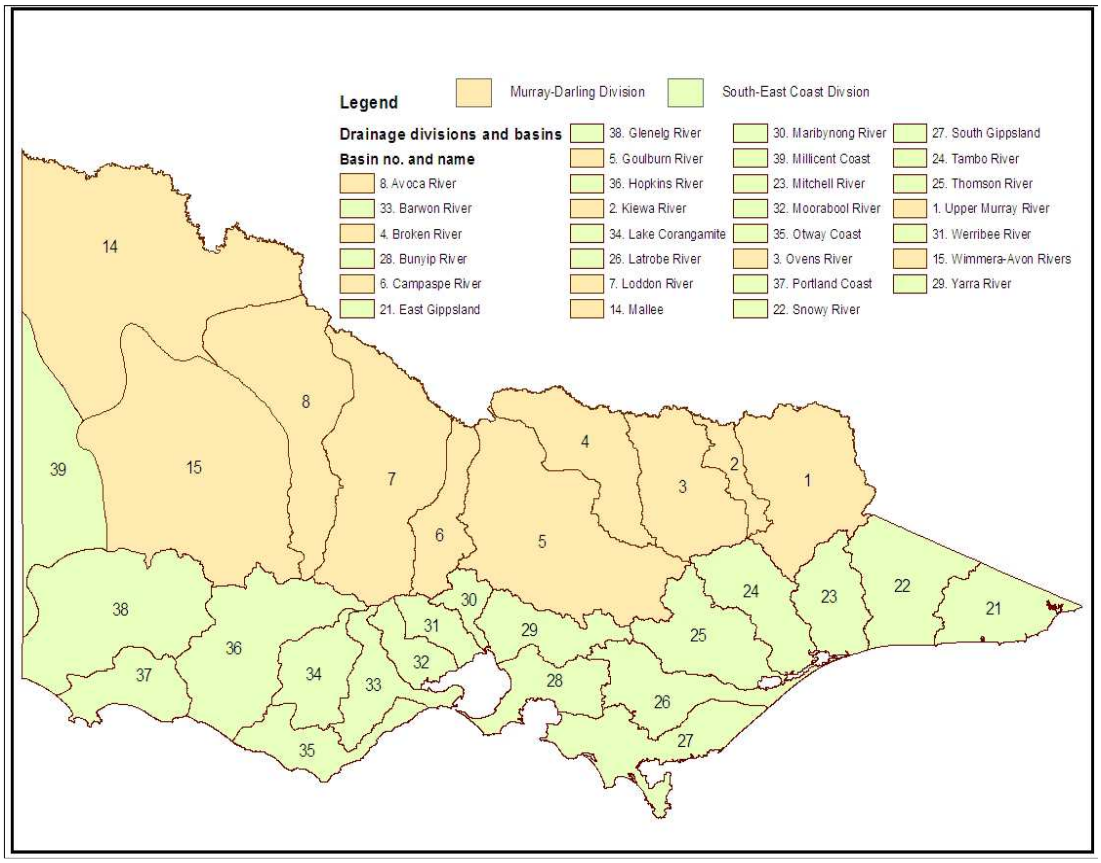

Figure 7. Drainage divisions and basins in Victoria (Bureau of Meteorology 2012)

3.2 Assessing ANAE regional and landscape attributes for use in Victoria

Based on the examination of how ANAE regional and landscape attributes apply to wetlands in Victoria, four options were considered for spatially defining regional and landscape variation in wetlands in Victoria. These were:

1. adopting the ANAE Level 1 or 2 attribute that best explains regional and landscape wetland variation;
2. systematically combining two or more of the ANAE Level 1 or 2 attributes until units are identified that best explain regional and landscape wetland variation;
3. applying the ANAE region and landscape attributes as required for any particular purpose; or
4. developing a wetland regionalisation system for use in Victoria.

The selection of suitable attributes to spatially define regional and landscape variation in wetlands requires:

- knowledge of the spatial definition of attributes that drive regional wetland variation, for example the ANAE Levels 1 and 2 attributes (Section 3.1);
- a balance in scale and complexity between the level of detail needed to describe variation in wetland drivers meaningfully and that which is required for practical application;
- identification of one or more wetland components through which that regional variation is expressed, given available knowledge and information; and
- knowledge about the spatial distribution of that component or components across the landscape.

Of the various wetland components which could potentially define regional wetland variation, wetland vegetation was considered as the most suitable. Wetland vegetation is a function not only of local factors such as the hydrological and salinity regime of the wetland, but also of the key wetland drivers such as climate, geomorphology and landform. Wetland vegetation that is associated with a particular hydrological and salinity regime can exhibit regional variation based on climate, geomorphology and landform. The regional variation in wetland vegetation is likely to influence and, at least partly, explain some of the regional variation in other wetland biota based on its role in providing habitat.

Wetland vegetation has been comprehensively described across the full range of Victoria's wetlands using wetland EVCs (DSE 2012, DEPI 2013), (Appendix 1). There is no available, comparable description for other wetland biological, physical or chemical components that are likely to exhibit regional environmental variation. There is information, based on expert advice, about the likely distribution of each EVC in Victoria (DSE 2012). Wetland landscape profiles have been developed to describe the ecological context of wetland EVCs in Victoria as a means of facilitating EVC identification (DSE 2012), (Table 7). Particular EVCs have been associated with particular wetland landscape profiles, noting that certain EVCs may be associated with more than one profile. This potentially provides a useful basis for wetland regionalisation (DSE 2012). There are some spatial data on the distribution of wetland EVCs in Victoria.

Option 1 was not adopted. Examination of the spatial definition of ANAE Level 1 and 2 attributes identified that IBRA subregions were the attribute most closely aligned with wetland landscape profiles. However, IBRA subregions do not distinguish some of the important regional variation associated with less fertile sedimentary soils, floodplains, coastal situations and elevation. Option 2 was not adopted as none of the other ANAE Level 1 and 2 attributes provided the necessary additional information to address the deficiencies of the IBRA subregions for explaining regional wetland variation. With regard to Option 3, each of the region and landscape attributes can be applied to individual wetlands using available geospatial datasets as required for any particular purpose, for example a national wetland inventory.

Option 3 was adopted as the preferred approach.

Table 7. Victorian wetland landscape profiles (DSE 2012).

Wetland landscape	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, 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 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 of 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.

3.3 Victorian wetland landscapes

To encapsulate the regional and landscape variation in wetlands, this project identified wetland landscapes in Victoria.

The approach used in this project was to spatially define wetland landscapes in Victoria based on the description of wetland landscape profiles (DSE 2012), (Table 7). The lacustrine wetland landscape profile was excluded from the spatial analysis as lakes are distributed across most wetland regions and by definition are not dominated by emergent vegetation ((Section 4).

The method for spatially defining wetland landscapes in Victoria is summarised below. See Appendix 5 for a full description. IBRA subregions were selected as the base dataset as there was broad similarity between IBRA subregions and several wetland landscapes. Based on the descriptions of wetlands associated with each wetland landscape profile (Table 7), each wetland landscape was defined by refining one or more IBRA subregions using other environmental variables, including vegetation types, geomorphic units, floodplains, elevation and distribution of key species. The resulting wetland landscapes are shown in Figure 8. Wetland landscapes were numbered in accordance with Table 7.

The ANAE classification framework suggests that "when lacustrine, palustrine or riverine systems occur on a floodplain (identified through Level 2 classification), they should each be associated with the active floodplain which is defined as that area with an average recurrence interval (ARI) of 10 years (AETG 2012). This definition was used guide the delineation of wetland landscapes 12, 13 and 15.

Defined wetland landscapes for Victoria were assembled into a geospatial layer: WETLAND_LANDSCAPES. The wetland landscape is not assigned as an attribute in the Victorian wetland inventory WETLAND_CURRENT. However, the WETLAND_LANDSCAPES layer can be overlaid with WETLAND_CURRENT to explore the regional variation in wetlands of the same type and aid the identification of representative wetlands.

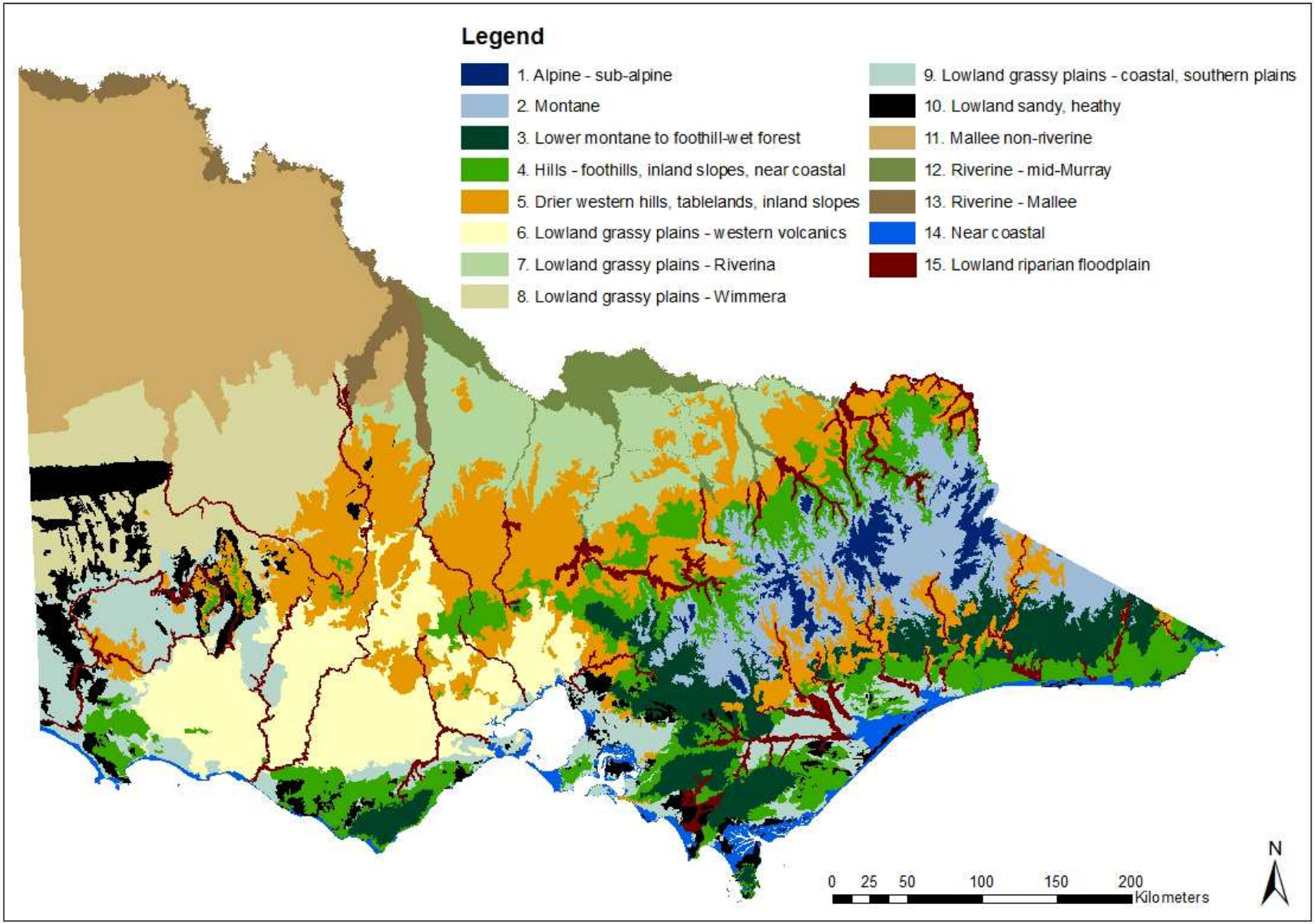

Figure 8. Victorian wetland landscapes derived from the WETLAND_LANDSCAPES layer created for this project.

4. Assigning the wetland system attribute to Victorian wetlands

Systems are used as the highest hierarchical level of a classification of wetlands and deepwater habitats in the United States (Cowardin et al. 1979) and have been adopted within Level 3 of the ANAE classification framework (AETG 2012).

4.1 Wetland system classification categories

In the ANAE classification framework (AETG 2012), the following aquatic system categories are relevant to wetlands in Victoria: lacustrine, palustrine, estuarine and marine.

Lacustrine aquatic systems are defined by Cowardin (1979) as aquatic environments with all the following characteristics.

1. They are situated in a topographic depression or a naturally dammed river channel.
2. They are lacking trees, shrubs, persistent emergents, emergent mosses or lichens with greater than 30 percent areal coverage.
3. The total area exceeds eight hectares. Similar aquatic environments totalling less than eight hectares are also included if an active wave-formed or bedrock shoreline feature makes up all or part of the boundary, or if the water depth in the deepest part of the basin exceeds two metres at low water.
4. Lacustrine habitats can be either tidal or non-tidal provided water salinity due to sea derived salts is always less than 500 mg/L.

Palustrine aquatic systems are defined by Cowardin (1979) as including all non-tidal aquatic habitats dominated by trees, shrubs, persistent emergents, emergent mosses or lichens, and all such habitats that occur in tidal areas where salinity due to ocean-derived salts is below 500 mg/L. It also includes habitats lacking such vegetation which have the following four characteristics:

1. area less than eight hectares;
2. where active wave formed or bedrock shoreline features are lacking;
3. where the water depth in the deepest part of basin is less than two metres at low water; and
4. the salinity due to ocean-derived salts is less than 0.5 parts per thousand.

The ANAE definition for marine aquatic ecosystems includes shallow coastal indentations or bays (or parts thereof) without appreciable freshwater inflows (AETG 2012). The ANAE defines estuarine aquatic ecosystems as those areas that are semi-enclosed by land with a permanently or intermittently open connection with the ocean, and where ocean water can be diluted by freshwater runoff from the land.

In Victoria, the decision was made to assign aquatic system attributes to whole wetlands rather than to habitats within wetlands.

The system definitions used in the ANAE were refined for the Victorian classification framework and the attribute renamed as “wetland system” (Table 8).

In Victoria, the definition of wetlands includes supratidal and intertidal areas which under the ANAE classification system would fall into the marine or estuarine system categories (AETG 2012). Some intertidal wetlands overlap with areas identified as estuaries on the DELWP estuary geospatial layer: ESTURAIES (Appendix 3). Supratidal wetlands and wetlands that are semi-enclosed by land with a permanently or intermittently open connection with the ocean (referred to in this report as estuaries) were classed as estuarine. Intertidal wetlands in embayments, which are not semi-enclosed, were classed as marine.

Palustrine and lacustrine wetlands were distinguished from marine and estuarine systems by the lack of tidal influence. For Victorian wetlands less than eight hectares in area, there is no comprehensive data on the nature of the shoreline and data on depth is not available for most wetlands. Therefore, the assignment of wetlands to the lacustrine or palustrine category is based solely on the percentage of vegetation cover, regardless of area. An additional category, Palustrine or Lacustrine (unknown specifics), was adopted where emergent vegetation cover could not be determined.

Table 8. Wetland system categories for the Victorian classification framework.

Category	Description	Examples
Lacustrine	Non-tidal wetlands with less than 30% emergent vegetation cover	Lake Corangamite, Lake Charm, Waranga Basin, Lake Hattah, Lake Hindmarsh, Albert Park Lake
Palustrine	Non-tidal wetlands with 30% or more emergent vegetation cover	Mount William Swamp, Tragowel Swamp, Dowd Morass, Cabbage Tree Lagoon, Third Marsh (Koorangie), Barmah Forest
Marine	Intertidal wetlands in embayments	Corner Inlet, Western Port, Mud Islands
Estuarine	Estuaries, coastal saltmarshes and semi-permanent supratidal wetlands adjoining estuaries	Anderson Inlet, Shallow Inlet, Swan Bay, Lake King, Glenelg Estuary, Lake Connewarre
Palustrine or Lacustrine (unknown specifics)	Non-tidal wetlands where the proportion of emergent vegetation could not be determined	-

4.2 Assigning wetland system categories to coastal wetlands

The classification of wetland system categories was applied to the WETLAND_CURRENT dataset.

In a manual desktop assessment, several data sources were visually examined on screen to identify the wetland system category for wetlands located close to the Victorian coast. These included recent aerial photography (1990s and 2000-14), the Corrick classification recorded in WETLAND_CURRENT, the EVCs present in the modelled 2005 EVCs (updated) dataset, the ESTUARIES dataset, the watercourse network 1:25,000 dataset and the Victorian Coastal Saltmarsh and Estuarine EVCs (Table 9) dataset (Appendix 3). In some cases, online documents were reviewed to confirm further details of specific wetlands.

Table 9. Victorian coastal saltmarsh and estuarine EVCs (Boon et al. 2011)

EVC number	EVC name	EVC number	EVC name
538	Brackish Herbland	10	Estuarine Wetland
947	Brackish Lignum Swamp	140	Mangrove Shrubland
A110	Coastal Dry Saltmarsh	842	Saline Aquatic Meadow
A111	Coastal Hypersaline Saltmarsh	A113	Saltmarsh-grass Swamp
A109	Coastal Saline Grassland	196	Seasonally Inundated Sub-saline Herbland
9	Coastal Saltmarsh Aggregate	A107	
A112	Coastal Tussock Saltmarsh	A108	Wet Saltmarsh Herbland
914	Estuarine Flats Grassland		Wet Saltmarsh Shrubland

Wetlands with tidal influence were located in estuaries and marine embayments or had a hydrological connection to an estuary or embayment and supported EVCs tolerant of at least hyposaline conditions. Information on the preferred salinity regimes of EVCs is available for wetland EVCs in a DELWP database (Appendix 6). Wetlands without a tidal influence were assigned as lacustrine if emergent EVCs covered <30% of the wetland or palustrine, if this was not the case.

Wetlands subject to tidal influence were identified and categorised as either marine or estuarine. Intertidal wetlands in the marine embayments of Corner Inlet, Nooramunga, Western Port and Port Phillip Bay were classed as marine while tidal wetlands semi-enclosed by land or adjacent to mapped estuaries were classed as estuarine. Lake Wellington and Lake Victoria in the Gippsland Lakes system were classed as non-tidal as tides are not perceptible in these two wetlands (Bird 1994).

Three hundred and seventy two coastal wetlands were assigned a wetland system through the manual desktop assessment (Appendix 7). Approximately 85% were estuarine, 5% were lacustrine, 9% were palustrine and only 1% were classified as marine (Table A7.2, Appendix 7). These wetlands were all assigned a high level of confidence for the assigned wetland system category. This confidence level was based on the fact that the information visually examined on screen came from a number of sources which were of a high level of consistency.

4.3 Assigning wetland system categories to non-coastal wetlands

Following the manual review of coastal wetlands, all remaining wetlands in the WETLAND_CURRENT data layer were analysed to determine if they were palustrine or lacustrine systems. The wetland system category for non-coastal wetlands was derived through separate analysis of the geospatial datasets in Table 10. For each dataset, wetlands were classed as having either emergent or non-emergent vegetation, using the rules in Table 10. The results from each of the derived datasets were then compared. The rules in Table 11 outline how the six datasets were compared.

Table 10. Datasets (Appendix 3) and rules for determining the emergent vegetation category for non-coastal wetlands from independent data sources.

Dataset name	Rule for assigning emergent vegetation category
ALPS	Emergent vegetation is present in all wetlands derived from this source
GB_SPR	Emergent vegetation is present in all wetlands derived from this source
GB_SS	Emergent vegetation is present in all wetlands derived from this source
IWC Data Management System (IWCDMS)	For wetlands where Index of Wetland Condition (IWC) assessments have been undertaken, the percent cover of emergent and non-emergent (Appendix 1) wetland EVCs was determined. Wetlands were classed as supporting emergent vegetation if EVCs classed as emergent occupied 30% or more of the wetland area. If they occupied <30% the category was non-emergent.
Corrick classification (Table 1)	• The wetland vegetation was classed as non-emergent if the wetland category was permanent saline, sewage pond or salt works, or if the following sub-categories occupied more than70% of the wetland area: o dead timber; open water; deep; hypersaline lake; impoundment; salt pan;or shallow. • Wetlands with any other (known) Corrick category/sub-category were considered to have emergent vegetation if that vegetation covered >=30% of the wetland. • Wetlands without a Corrick category/sub-category were not assigned an emergent vegetation category for this data source.

Dataset name	Rule for assigning emergent vegetation category
Modelled 2005 EVCs (updated)	All EVCs identified in the statewide EVC data layer were classed as emergent or non-emergent (Appendix 1). Wetlands were classed as supporting emergent vegetation if EVCs classed as emergent occupied 30% or more of the wetland area. If they occupied <30% the category was unknown. An unknown category is assigned rather than a non-emergent category because an absence of emergent vegetation types in the modelled 2005 EVC layer is often due to data gaps and inaccurate vegetation modelling, rather than a true on-ground lack of emergent vegetation.

Table 11. The rules for assigning wetland system and confidence levels to non-coastal wetlands

Wetland system category assigned	Confidence of classificat-ion	Derived from ALPS, GB_SPR or GB_SS dataset	Emergent vegetation category derived from dataset			Approximate percentage of wetlands
			IWCDMS	Corrick classification	Modelled 2005 EVCs (updated)	
Lacustrine	High	No	Non-emergent	Non-emergent	Unknown	<1
			Non-emergent	Non-emergent	Emergent	<1
	Moderate	No	Non-emergent	Emergent or unknown	Emergent or unknown	<1
	Low	No	Unknown	Non-emergent	Unknown	6
Palustrine	High	Yes	Not applicable			13
		No	Emergent	Emergent	Emergent	1
			Emergent	Emergent	Unknown	<1
	Moderate	No	Emergent	Non-emergent or unknown	Unknown	<1
			Unknown	Emergent	Emergent	18
			Emergent	Non-emergent or unknown	Emergent	<1
	Low	No	Unknown	Emergent	Unknown	11
			Unknown	Unknown	Emergent	17
Palustrine or Lacustrine (unknown specifics)	Not applicable	No	Unknown	Unknown	Unknown	20
			Unknown	Non-emergent	Emergent	12

The rules in Table 11 are based on the reliability of the datasets. The first four datasets in Table 10 were considered the most reliable. The first three datasets were recently developed as a result of detailed study of particular wetland types (Lawrence et al. 2009, Coates et al. 2010 and Carr et al. 2006). The fourth was based on field visits where IWC assessments were undertaken (including identification and assessment of wetland EVCs) from 2009 onwards. Data was recorded in and available from the IWCDMS.

The last two datasets in Table 10 were considered less reliable. The Corrick classification (derived from WETLAND_1994 and more recent regional updates) is mostly based on vegetation information pre-1994 which may no longer be accurate. Vegetation information from the Modelled 2005 EVCs (updated) spatial dataset is considered the least reliable as it is based on modelled information and is at a scale which is generally too small to accurately define EVCs in wetlands.

Where application of the rules in Table 11 resulted in an interim wetland system category of Palustrine or Lacustrine (unknown specifics), further processing was undertaken using the All Victorian Dam Boundaries dataset. Of these wetlands, those with greater than 70% overlap with the All Victorian Dam Boundaries dataset were assigned a lacustrine wetland system and a moderate confidence level. All other wetlands maintained their classification as Palustrine or Lacustrine (unknown specifics) and were not assigned a confidence level.

4.4 Wetland system classification results

The wetland system classification process identified that the majority of Victoria's wetlands are palustrine systems (Table 12).

Table 12. Results of the wetland system classification

Wetland system	Confidence level	Approximate percentage of wetlands
Marine	High	<1
Estuarine	High	1
Lacustrine	High	<1
	Moderate	8
	Low	4
Palustrine	High	15
	Moderate	18
	Low	29
Palustrine or Lacustrine (unknown specifics)	N/A	25

5. Assigning wetland habitat attributes to Victorian wetlands

Each of the ANAE aquatic ecosystem habitat attributes (AETG 2012, Table 2, Appendix 2) was assessed to determine suitability for inclusion in the Victorian wetland classification framework. An additional attribute of wetland origin was also included.

5.1 Wetland origin

Wetland origin is considered to be an important attribute as it assists in identifying management objectives for individual wetlands.

5.1.1 Wetland origin classification categories

Wetland origin distinguishes naturally occurring wetlands from those that are human-made. Human-made or artificial wetlands are constructed for specific purposes such as water storage or result from human activities such as quarrying or drainage.

For the purposes of the framework two broad types of wetlands are recognised as described below.

1. Naturally-occurring wetlands. These are defined as wetlands of natural origin which essentially retain their natural form, even if their hydrology has been altered from the natural regime for a utilitarian purpose such as salt harvesting, water storage or saline water disposal. Examples of naturally occurring wetlands where the water regime has been altered for a utilitarian purpose are Lake Tutchewop which is used as a salinity disposal basin and Kow Swamp which is used as a water storage.
2. Human-made wetlands. These are defined as wetlands which have been largely drained and occupy a significantly reduced area or purpose built wetlands which occupy areas of land which were not originally wetlands. Purpose built wetlands may have displaced naturally-occurring wetlands but are quite different in form and area to the wetlands displaced. Examples are Waranga Basin and Lake Hume. They may occupy other natural features such as former river channels, for example, Loddon Weir.

The Corrick system includes three human-made wetland types: salt works, sewage treatment ponds and impoundments (Table 1). The system does not, however, differentiate the different types of impoundments. For example, it does not distinguish between farm dams and large urban and agricultural water storages. Nor does it include other human made wetlands such as those constructed for stormwater treatment and/or amenity.

The Ramsar Convention classification system for human-made wetlands was reviewed. It includes a category for human-made wetlands (Ramsar Convention Secretariat 2006) which are classified into the following types[2]:

1. aquaculture (e.g. fish/shrimp) ponds;
2. ponds - includes farm ponds, stock ponds, small tanks (generally below eight hectares);
3. irrigated land (includes irrigation channels and rice fields);
4. seasonally flooded agricultural land (including intensively managed or grazed wet meadow or pasture);
5. salt exploitation sites (salt pans, salines, etc.);
6. water storage areas; reservoirs/barrages/dams/impoundments (generally over eight hectares);
7. excavations (gravel/brick/clay pits; borrow pits, mining pools);
8. wastewater treatment areas (sewage farms, settling ponds, oxidation basins, etc.);
9. canals and drainage channels, ditches; and

Zk(c). karst and other subterranean hydrological systems, human-made.

Of these, types 3, 4, 9 and Zk(c) are not classed as wetlands under the definition of wetlands used in Victoria.

[2] The types are those used in the Ramsar Convention classification (http://www.ramsar.org/sites/default/files/documents/pdf/guide/guide-list2009-e.pdf - see Appendix B. The type number is that used by the Convention.

As constructed wetlands for stormwater treatment and/or amenity are relatively common in urban areas, these were included as a category of human-made wetlands in the framework, in addition to the relevant Ramsar Convention classification system categories. The framework adopts ten categories of wetland origin, including "unknown" (Table 13).

Table 13. Categories for the wetland origin attribute.

Wetland type	Wetland origin category	Examples
Naturally occurring	Naturally occurring	Lakes, swamps, springs, soaks and tidal wetlands of natural origin
Human-made	Aquaculture pond	Fish/shrimp ponds
	Dam/Storage < 8 ha	Farm ponds, stock ponds, small tanks less than eight hectares in area
	Dam/Storage ≥ 8 ha	Water storages (reservoirs, barrages, dams, impoundments) over eight hectares in area
	Salt works	Salt exploitation sites (e.g. salt pans)
	Excavation pond	Gravel, brick or clay pits, borrow pits, mining pools
	Sewage treatment pond	Sewage farms, settling ponds, oxidation basins
	Stormwater treatment pond	Constructed wetlands for stormwater treatment, sediment retention and/or amenity
	Artificial (type unknown)	Human-made wetland where the wetland origin category is unable to be determined
Unknown	Unknown	Wetland origin category is unable to be determined

5.1.2 Assigning wetland origin categories

The classification of wetland origin categories was applied to the WETLAND_CURRENT dataset.

Step 1. Assign wetland origin through manual desktop examination

The first step in the classification of wetland origin involved determination of the wetland origin for several large wetlands, assessed through a manual desktop examination of aerial photography, Corrick classification and WETLAND_1788. This manual desktop process identified the wetland origin for:

- 343 wetlands that had a known artificial water source and for which wetland origin had also been determined based on visual, on-screen examination, expert knowledge and online information (Appendix 8) which were assigned a high confidence level;
- 79 wetlands that were considered to be human-made based on an individual manual assessment of each wetland which were assigned moderate or high confidence levels based on interpretation of aerial imagery;
- 1,330 wetlands that were considered to be naturally-occurring based on examination of the Corrick class which were assigned a moderate confidence level; and
- 329 wetlands that were considered to be naturally-occurring based on their overlap with WETLAND_1788 which were assigned a moderate confidence level.

Step 2. Assign wetland origin to high country peatlands, springs and soaks

In step 2, following the manual desktop process, all wetlands in WETLAND_CURRENT that were sourced from the ALPS, GB_SPR or GB_SS geospatial layers (see Section 1.3) were classified as naturally occurring as

these wetlands are known to be of natural origin based on the descriptions of these wetlands in Lawrence et al. (2009), Coates et al. (2010) and Carr et al. (2006). The confidence rating assigned for these wetlands was high.

At this stage, any wetland classified with a wetland origin attribute through steps 1 and 2 above were excluded from subsequent analysis. For those that remained, the following process was used to infer wetland origin.

Step 3. Assign wetland origin by examining changes in wetland extent since European settlement

Step 3 involved identifying whether the WETLAND_1994 feature was also present in the original WETLAND_1788 dataset . Wetlands in the WETLAND_1994 dataset that are not present on the WETLAND_1788 dataset are assumed to be human-made unless they are of a type not mapped in the WETLAND-1994 dataset (for example, high country peatlands, springs and soaks). *C*hanges to the extent of the wetland are likely to reflect human modification. A significant increase in wetland area often reflects conversion of a naturally-occurring wetland to an human-made water storage. A decrease in area is likely to indicate that the wetland has been drained or converted into a smaller water storage or sewage treatment pond. A figure of 40% was arbitrarily chosen to indicate significant change in area. Wetlands that were present in both datasets and did not vary by more than 40% of their original (WETLAND_1788) area were assumed to be naturally occurring.

Step 4. Assign wetland origin according to Corrick category

In step 4, any features in WETLAND_CURRENT that were derived from WETLAND_1994 with a Corrick class of 20 - Sewage treatment pond were classified as human-made, sewage treatment pond.

Step 5. Assign wetland origin from other datasets

Step 5 comprised spatial overlay analysis of four independent datasets (Appendix 3):

- All Victorian Dam Boundaries;
- DRWaterbodies;
- Water area 1:25,000; and
- Features of interest.

These datasets each have one or more attributes that provides some information on whether a given wetland was likely to be naturally occurring or human made (Table 14). The intent of the spatial overlay analysis was to infer the wetland origin based on the existing attribute information in the four datasets. This relied upon the features in each of the four datasets having been classified as either naturally occurring, or human made, and if possible distinguishing what form of human made wetland they comprised.

Table 14. Relevant wetland origin attribute information in four independent data sources.

Dataset name	Relevant attribute	Feature type	Feature type description	Wetland origin
All Victorian Dam Boundaries	Feature_type	Aquaculture area	e.g. fish hatcheries	Aquaculture pond
		Industrial storage	Dams intersecting industrial or mining land uses	Excavation ponds OR Dam/Storage
		Rural irrigation storage	Dams intersecting irrigated land uses	Farm dams OR Dam/Storage
		Settling ponds	Ponds used for water treatment	Sewage treatment ponds
		Town rural storage	Named storages and storages > 250ML	Dam/Storage

Dataset name	Relevant attribute	Feature type	Feature type description	Wetland origin
		Waste water	Not described	Sewage treatment pond
		Flood irrigation storage	Dams used to harvest stormwater runoff	Stormwater treatment ponds
		Rural licensed storage	Dams that are likely to be linked to licences	Dam/Storage
		Rural storage	Likely to be stock and domestic dams	Dam/Storage
DRWater-bodies	Desc	Bio-retention system	No description	Stormwater treatment ponds
		Sediment trap	No description	Naturally occurring
		Natural body of water	No description	Stormwater treatment ponds
		Wetlands	No description	Stormwater treatment ponds
Water area 1:25,000	Origin	1	Natural	Naturally occurring
		2	Man-made	Artificial (type unknown)
Water area 1:25,000	Ftype_code	wb_lake	Lake/dam	Unknown
		wb_lake_salt	Salt lake	Salt works
		Waterbody	Waterbody	Unknown
		wb_void	Waterbody void (island)	Unknown
		flat_sti	Area subject to inundation	Unknown
		pondage	Pondage	Unknown
		pondage_saltpan	Salt pan / evaporator	Salt works
		pondage_sewage	Sewage filtration beds	Sewage treatment pond
		wetland_swamp	Swamp	Naturally occurring
		wetland_mangrove	Mangroves	Naturally occurring
		watercourse_area	Not described	Naturally occurring
		watercourse_area_river	Watercourse area	Naturally occurring
		watercourse_area_ channel	Large man-made channel	Unknown
		watercourse_area_ drain	Large man-made drain	Unknown

Dataset name	Relevant attribute	Feature type	Feature type description	Wetland origin
Water area 1:25,000	Wtr_use_fn	1	Water Supply	Farm dams or Dam/Storage
		2	Flood Control	Unknown
		3	Salt Evaporation	Salt works
		4	Sewage	Sewage treatment ponds
		5	Tailing Dam	Excavation pond
		6	Cooling Ponds	Unknown
		7	Drainage	Unknown
		8	Irrigation	Farm dams or Dam/Storage
		9	Recreation	Dam/Storage
Features of interest	Feature_ subtype	Abandoned quarry	No description	Excavation pond
		Landfill	No description	Excavation pond
		Mine	No description	Excavation pond
		Quarry	No description	Excavation pond

Based on the examination of changes in wetland extent since European settlement and spatial overlay analysis of the four datasets in Step 5, each wetland was classified into one of the wetland origin categories, with a confidence rating assigned depending on whether the results provided consistent or conflicting classifications for each wetland (Table 15). Confidence ratings were also applied to wetlands analysed in steps 3-5 (Table 15).

The Dam/Storage features were subsequently classified into those that were less than or greater than eight hectares, to distinguish between farm dams and water storages over eight hectares.

Table 15. Wetland origin categories and confidence levels for wetlands analysed in steps 2-5 above.

Wetland origin category	Confidence	Basis for classification
Naturally occurring	High	Spatial overlay analysis suggested the wetland was generally of this origin, with consistent classification results between the four datasets in Table 14
	Moderate	Area of the WETLAND_1994 feature did not vary by more than 40% compared to the original WETLAND_1788 feature or Spatial overlay analysis suggested the wetland was generally of this origin, with only minor conflicting classification results between the four datasets in Table 14
	Low	Spatial overlay analysis suggested the wetland was generally of this origin, although there were significant conflicting classification results between the four datasets in Table 14

Wetland origin category	Confidence	Basis for classification
Aquaculture ponds	High	Spatial overlay analysis suggested the wetland was generally of this origin, with consistent classification results between the four datasets in Table 14
Dam/Storage	High	Spatial overlay analysis suggested the wetland was generally of this origin, with consistent classification results between the four datasets in Table 14
Dam/Storage	Moderate	Spatial overlay analysis suggested the wetland was generally of this origin, with only minor conflicting classification results between the four datasets in Table 14
	Low	Spatial overlay analysis suggested the wetland was generally of this origin, although there were significant conflicting classification results between the four datasets in Table 14
Excavation ponds	High	Spatial overlay analysis suggested the wetland was generally of this origin, with consistent classification results between the four datasets in Table 14
	Moderate	Spatial overlay analysis suggested the wetland was generally of this origin, with only minor conflicting classification results between the four datasets in Table 14
	Low	Spatial overlay analysis suggested the wetland was generally of this origin, although there were significant conflicting classification results between the four datasets in Table 14
Salt works	High	Spatial overlay analysis suggested the wetland was generally of this origin, with consistent classification results between the four datasets in Table 14
	Moderate	Spatial overlay analysis suggested the wetland was generally of this origin, with only minor conflicting classification results between the four datasets in Table 14
Sewage treatment ponds	High	Wetland classified as a sewage treatment pond in Wetland 1994 or Spatial overlay analysis suggested the wetland was generally of this origin, with consistent classification results between the four datasets in Table 14
	Moderate	Spatial overlay analysis suggested the wetland was generally of this origin, with only minor conflicting classification results between the four datasets in Table 14
	Low	Spatial overlay analysis suggested the wetland was generally of this origin, although there were significant conflicting classification results between the four datasets in Table 14
Stormwater treatment ponds	High	Spatial overlay analysis suggested the wetland was generally of this origin, with consistent classification results between the four datasets in Table 14
	Moderate	Spatial overlay analysis suggested the wetland was generally of this origin, with only minor conflicting classification results between the four datasets in Table 14
	Low	Spatial overlay analysis suggested the wetland was generally of this origin, although there were significant conflicting classification results between the four datasets in Table 14

Wetland origin category	Confidence	Basis for classification
Artificial (type unknown)	High	Feature occurs in WETLAND_1994 only (not in WETLAND_1788), while the datasets in Table 14 did not provide a definitive origin or Spatial overlay analysis suggested the wetland was generally of this origin, with consistent classification results between the four datasets in Table 14
	Moderate	Spatial overlay analysis suggested the wetland was generally of this origin with only minor conflicting classification results between the four datasets in Table 14
	Low	Area of the WETLAND_1994 feature varied by more than 40% compared to the original WETLAND_1788 feature, while other spatial overlay analysis did not provide a definitive classification of origin
Unknown	n/a	Wetland does not occur in WETLAND_1994 or WETLAND_1788 No wetland origin could be determined from the datasets in Table 14 or the wetland does not overlap with any of the datasets in Table 14

5.1.3 Wetland origin classification results

The wetland origin classification process identified that the majority of Victoria's wetlands are naturally occurring and the most common type of human-made wetlands are dam/storages less than eight hectares in size (Table 16).

Table 16. Results of the wetland origin classification

Wetland system	Approximate percentage of wetlands
Naturally occurring	72
Aquaculture ponds	<1
Artificial (type unknown)	4
Dam/Storage <8ha	22
Dam/Storage =>8ha	1
Excavation ponds	<1
Salt works	<1
Sewage treatment ponds	1
Stormwater treatment ponds	<1
Unknown	<1

5.2 Landform habitat attributes

The ANAE classification framework adopts the following landform categories for aquatic ecosystems (AETG 2012):

- high energy (upland, slope)
- low energy (upland–plateau, lowland)

AETG (2012) suggests that these categories are more applicable to riverine systems but may have application to describe lacustrine and palustrine systems as well.

The landform habitat attribute was not included in the Victorian classification framework. Palustrine and lacustrine wetlands are not high energy systems and their landform setting is better captured at the regional level through the wetland landscapes described in Section 3.1 which incorporate the regional influence of landform on wetland type, as well as other regional and landscape wetland drivers.

5.3 Soil attributes

For lacustrine and palustrine wetlands, the ANAE classification framework adopts the following soil categories (AETG 2012):

- Porous
  - Peat (organic)
  - Mineral (soil)
- Sand (non-soil)
  - Non-porous
  - Rock (non-soil)

For marine and estuarine systems, the following substrate categories are adopted:

- Unbroken rock
- Broken rock/Boulder/Cobble
- Pebble/Gravel
- Sand
- Silt

There are no suitable data at the individual wetland scale available to assign soil categories to wetlands in Victoria. Soil categories were not used in the Victorian classification framework.

5.4 Dominant wetland vegetation

Wetland vegetation is an important wetland characteristic and is fundamental to wetland function (Mitsch and Gosselink 2000). There is a detailed description of the wetland vegetation types that occur in Victoria. The Victorian wetland vegetation typology (DSE 2012) classifies wetland vegetation into 145 EVCs (Appendix 1). These are used in IWC assessments at individual wetlands (DSE 2005, DEPI 2013) and data is stored in the DELWP IWCDMS. However, the spatial distribution of these EVCs has not been comprehensively mapped. Moreover, there are too many categories in this typology to be useful in the classification of dominant vegetation. Therefore, it was decided to group wetland EVCs into larger categories analogous to the ANAE dominant vegetation categories.

5.4.1 Dominant vegetation classification categories

The ANAE classification framework (AETG 2012) adopts dominant vegetation categories for lacustrine and palustrine systems and structural macrobiota categories for marine and estuarine systems (Appendix 2), (Table 17).

Table 17. ANAE classification framework dominant vegetation and structural macrobiota categories (AETG 2012).

Dominant vegetation categories (lacustrine and palustrine systems)	Structural macrobiota vegetation categories (marine and estuarine systems)
Forested	Mangroves
Shrub	Saltmarsh
Sedge/grass/forb	Seagrass
No emergent vegetation	Macroalgae

Although some data are available for seagrass and macroalgae, these categories were not included in the classification as data were not available for all marine and estuarine wetlands. In addition, the data for seagrass that exist for some wetlands date from 1999 and seagrass is known to vary in distribution over relatively short time periods.

Benchmark descriptions have been developed for each of Victoria's 145 wetland vegetation EVCs (DEPI 2013). A review of these descriptions resulted in the following changes being made to the ANAE classification framework categories.

- An additional category of moss/heath was included to account for vegetation of high country peatlands.
- The forested category was expanded to cover woodland as well.
- A coastal saltmarsh category was included to cover coastal saltmarsh and estuarine EVCs (Table 9). Some EVCs in Table 9 also occur in inland settings. These are classified as shrub or sedge/grass/forb for inland occurrences (Appendix 1).

The new Victorian Wetland Classification Framework adopts seven categories of dominant vegetation which are variously applicable to different wetland system categories, and an unknown category (Table 18).

Each wetland EVC was assigned to a dominant vegetation category in Table 18 (Appendix 1). EVCs in the Modelled 2005 EVCs (updated) dataset were also used in the analysis as, for the majority of wetlands, these was the only geospatial data on wetland vegetation available, even though there are inaccuracies related to the modelling process and scale of mapping. Those EVCs in the Modelled 2005 EVCs (updated) dataset which are not listed as wetland EVCs, were a assigned dominant vegetation category as outlined in Appendix 1.

It should be noted that palustrine wetlands may be assigned the dominant vegetation category of no emergent vegetation if this category covers the greatest proportion of the wetland but emergent vegetation covers at least 30% of the wetland.

Table 18. Dominant vegetation categories adopted for the Victorian wetland classification framework. Coastal saltmarsh includes both coastal saltmarsh and estuarine EVCs mapped by Boon et al. (2011) (Table 9).

Dominant vegetation categories	Applicability to wetland system categories
Forest/woodland	Applicable for palustrine systems
Shrub	Applicable for palustrine systems
Sedge/grass/forb	Applicable for palustrine systems
Moss/heath	Applicable for palustrine systems
Mangrove	Applicable for marine or estuarine systems
Coastal saltmarsh	Applicable for marine or estuarine systems
No emergent vegetation	Applicable for lacustrine, palustrine, marine or estuarine systems
Unknown	Applicable to all wetland systems (applied where no dominant vegetation category could be determined)

5.4.2 Assigning dominant vegetation categories

The classification of dominant wetland vegetation categories was applied to the WETLAND_CURRENT dataset and a confidence category assigned. The process involved five steps which are described in further detail below.

Step 1. Assign dominant vegetation categories to lacustrine wetlands, high country peatlands, springs and soaks

By definition, >70% of the area of lacustrine wetlands has no vegetation or non-emergent vegetation (Section 4.3). Thus, lacustrine wetlands were assigned to the no emergent vegetation category . These wetlands were assigned a confidence level of high.

Wetland features in WETLAND_CURRENT that were sourced from the ALPS dataset (Appendix 3) were categorised as moss/heath as they are likely to support this category of vegetation (Lawrence et al. 2009). However, Lawrence et al. (2009) state that, while *Sphagnum* species are present in of southeastern Australian high country peatlands, the dominant taxa are typically graminoid species in the Restionaceae and Cyperaceae and shrubs in the Epacridaceae and Myrtaceae families. More work is required to spatially define dominant vegetation categories for these wetlands more accurately.

For wetlands in the GB_SS dataset, there was no information on the spatial distribution of EVCs present in the geospatial layer. All spring-soak wetlands were classed as moss/heath, although, based on the description of the EVCs present in these wetlands (Carr et al. 2006), other dominant vegetation categories are also present (Appendix 9). More work is required to spatially define dominant vegetation categories for these wetlands.

Wetlands in WETLAND_CURRENT that were sourced from the GB_SPR dataset (Appendix 3) were assigned as either forest/woodland, shrub or sedge/grass/forb dominant vegetation categories based on the broad vegetation type assigned during the original mapping and the information in Coates et al. (2010), (Appendix 9). These wetlands from the ALPS, GB_SS and GB_SPR datasets were assigned a confidence level of high as data were derived from recent mapping, although the confidence level for wetlands that were sourced from the GB_SS dataset should be further reviewed.

Step 2. Assign dominant vegetation categories to wetlands covered by IWC assessments

This step of the analysis applied only to wetlands not covered in the first step. The EVCs recorded for individual wetlands in the IWCDMS are those recorded in on-ground IWC assessments. The IWCDMS

records the wetland EVCs present (using the list of EVCs in Table A1.1, Appendix 1) and the proportion of the wetland occupied by each EVC.

For wetlands where EVC data is available in the IWCDMS, each EVC was assigned to one of the vegetation categories in Table 18 based on the information in Appendix 1. Note that for EVCs in Table 9 which may occur in either coastal or non-coastal settings (e.g. Brackish Lignum Swamp), the coastal saltmarsh dominant vegetation category was assigned to the EVC when the wetland was within 1 km of either the coastline or within a mapped estuary. Otherwise the non-coastal dominant vegetation category was assigned to the EVC. For each wetland, the proportions were summed for each dominant vegetation category and wetland was assigned to the dominant vegetation category that covered the greatest proportion of the wetland. These wetlands were assigned a confidence level of high.

Step 3. Independently determine the dominant vegetation for remaining wetlands from different data sources

This and step 4 of the analysis applied only to wetlands not covered in Steps 1 and 2.

Three different datasets were used to independently assign the dominant vegetation category to the remaining wetlands.

Firstly, the wetlands on WETLAND_CURRENT that were intersected by the Victorian Saltmarsh Study (2010) dataset were identified. Areas within these wetlands were assigned to one of mangrove shrubland, coastal saltmarsh or unknown. For each wetland, the areas of each category were summed and the category that occupied the greatest proportion of the area was assigned to the wetland.

Secondly, wetlands on WETLAND_CURRENT dataset with Corrick category or subcategory information were assigned vegetation categories as outlined in Table 19. The dominant vegetation category assigned to the wetland was that which occupied the greatest proportion of the area of the wetland. Islands within wetlands were excluded from the analysis.

Thirdly, the WETLAND_CURRENT dataset was overlaid with the Modelled 2005 EVCs (updated) dataset and vegetation categories assigned to areas within wetlands as indicated in Appendix 1. A dominant vegetation class was only assigned for wetlands that had at least 30% of their area intersecting a known dominant vegetation category from the Modelled 2005 EVCs (updated) dataset. Wetlands with less than 30% intersect with EVCs were classed as unknown.

Table 19. Assignment of dominant vegetation categories to remaining wetland areas in WETLAND_CURRENT using the WETLAND_1994 dataset.

Dominant vegetation category	Corrick category	Corrick subcategory
Forest/Woodland	n/a	Melaleuca-dominated Black Box-dominated Red gum-dominated
Shrub	n/a	Lignum dominated Shrub-dominated
Sedge/grass/forb	n/a	Herb-dominated Sedge-dominated Cane grass-dominated Rush-dominated Reed-dominated Salt meadow (in non-coastal settings) Salt flats Sea rush
Moss/heath	n/a	n/a

Dominant vegetation category	Corrick category	Corrick subcategory
No emergent vegetation	20 - Sewage oxidation basin 21 - Salt evaporation basin	Open water Dead timber Deep Hypersaline lake Impoundment Salt pan Shallow Intertidal flats
Mangrove	n/a	Mangroves
Coastal saltmarsh	n/a	Salt meadow (in coastal settings)
Unknown	n/a	No subcategory

Step 4. Compare the results obtained in Step 3 and assign the dominant vegetation category and level of confidence to the wetlands covered in Step 3

The results from the three datasets used in Step 3 were compared and final dominant vegetation category was assigned along with data confidence levels based on the consistency of the results and the reliability of the datasets (Table 20).

The coastal saltmarsh dataset is considered to have a high degree of reliability because it is based on recent detailed mapping. The Corrick categories and subcategories are considered moderately reliable. They were mapped as part of a detailed investigation but vegetation distribution may have changed since this mapping occurred. Vegetation information from the Modelled 2005 EVC spatial dataset is considered the least reliable as it is based on modelled information and is at a scale which is generally too small to accurately define EVCs in wetlands. Thus, the results from the saltmarsh mapping were given precedence over those of WETLAND_1994 and those from WETLAND_1994 were given precedence over the results from the Modelled 2005 EVCs (updated) dataset.

Table 20. Rules to assign vegetation categories to remaining wetland areas in WETLAND_CURRENT.

		Dominant vegetation category in input dataset			
Dominant vegetation category	**Confidence**	**Coastal saltmarsh mapping**	**Corrick classification**	**Modelled 2005 EVCs (updated)**	**Approximate percentage of wetlands**
Forest/ woodland	High	Not applicable	Forest/woodland	Forest/woodland	2
	Moderate		Forest/woodland	Unknown	<1
	Low		Unknown	Forest/woodland	13
Shrub	High	Not applicable	Shrub	Shrub	<1
	Moderate		Shrub	Unknown	<1
	Low		Unknown	Shrub	2
Sedge/ grass/ forb	High	Not applicable	Sedge/grass/forb	Sedge/grass/forb	3
	Moderate		Sedge/grass/forb	Unknown	8
	Low		Unknown	Sedge/grass/forb	2

Dominant vegetation category	Confidence	Dominant vegetation category in input dataset: Coastal saltmarsh mapping	Corrick classification	Modelled 2005 EVCs (updated)	Approximate percentage of wetlands
Moss/heath	Low	Not applicable	Not applicable	Moss/heath	3
No emergent vegetation	High	Unknown	No emergent vegetation	No emergent vegetation	<1
	Moderate	Unknown	No emergent vegetation	Unknown	11
	Low	Unknown	Unknown	No emergent vegetation	<1
Mangrove	High	Mangrove	Any category	Any category	1
Coastal saltmarsh	High	Coastal saltmarsh	Any category	Any category	2
	Moderate	Unknown	Coastal saltmarsh	Coastal saltmarsh or Unknown	<1
	Low	Unknown	Unknown	Coastal saltmarsh	<1
Unknown	Not applicable	Unknown	Unknown	Unknown	17
		Unknown	Any two conflicting categories (not including unknown)		35

Step 5. Ensure consistency with wetland system classification

At the completion of Steps 1 to 4 there were less than 10 wetlands where the dominant vegetation classification was inconsistent with the wetland system classification (Table 18). These wetlands were manually reviewed and the dominant vegetation corrected.

5.4.3 Dominant vegetation classification results

The dominant vegetation classification process identified that the majority of Victoria's wetlands with known vegetation category are sedge/grass/forb, with forest/woodland the second most common category (Table 21). Dominant vegetation was unable to be determined for a third of wetlands.

Table 21. Results of the dominant vegetation classification.

Wetland system	Approximate percentage of wetlands
Forest/woodland	17
Shrub	3
Sedge/grass/forb	22
Moss/heath	9
Coastal saltmarsh	1
Mangrove	<1
No emergent vegetation	13
Unknown	34

5.5 Water regime

Wetland water regime is likely to be the single most important determinant for the establishment and maintenance of specific types of wetlands and wetland processes (Mitsch and Gosselink 2000, DSE 2005). A wetland's hydrology both modifies and determines wetland characteristics (such as soil and biota) and, in turn, is affected by these characteristics (i.e. through a build-up of materials which leads to a change in wetland morphology) (Breen 1989, Mitsch and Gosselink 2000).

Wetland hydrology influences the chemical and physical aspects of the wetland, which affect the biotic components. Hydrology affects the oxygen concentration in the soil, redox potential and availability of nutrients and toxicants (McKnight et al. 1981). Drying affects the rate of organic matter breakdown and alters the chemical composition of organic matter (Boon 2006). Longer flooding periods will lead to the development of hydric soil properties and an accumulation of organic material (Tiner 1993). Depth influences the duration of flooding, light attenuation and wetland vegetation types.

5.5.1 Water regime classification categories

The ANAE classification system adopts two sets of alternative water regime categories for lacustrine and palustrine aquatic ecosystems but does not propose a water regime category for marine or estuarine aquatic ecosystems (Appendix 2).

The Victorian wetland inventory includes marine and estuarine as well as lacustrine and palustrine wetland systems. Therefore, water regime categories were designed to cover the full range of wetland system types. For lacustrine and palustrine wetlands the categorisation related to the level of permanency. For non-permanent (periodically inundated) lacustrine and palustrine wetlands, subcategories were defined (Table 22). These categories were the same as those adopted previously in a study by Cant et al. (2012). Estuarine and marine wetlands in Victoria were categorised by tidal regime (Table 22).

Table 22. Water regime categories adopted in the Victorian wetland classification framework.

Wetland system	Water regime category	Category description	Water regime subcategory	Subcategory description	
				Frequency of inundation	Duration of inundation
Lacustrine and palustrine	Permanent	Inundated constantly, rarely drying completely	-	Constant, annual or less frequently but before usually wetland dries.	Never dries or dries rarely (i.e. holds water at least 8 years in every 10), but levels may fluctuate within or between years.
	Periodically inundated	Inundated annually to infrequently, holding water for at least 1 month to more than 1 year before drying	Seasonal	Annual or near annual inundation (i.e. holds water at least 8 years in every 10)	Holds water 1-8 months, then dries
			Intermittent	Infrequent – holds water, on average, 3-<8 years in every 10	Holds water > 1 month to > 1 year, then dries
			Episodic	Infrequent – holds water, on average, less than 3 years in every 10	Holds water > 1 month to >1 year, then dries
	Unknown	Water regime category unable to be determined			

Wetland system	Water regime category	Category description	Water regime subcategory	Subcategory description	
				Frequency of inundation	Duration of inundation
Marine and estuarine	Intertidal	Inundated twice daily, with inundation lasting hours	-	-	-
	Supratidal	Inundated several times per year, with inundation lasting hours	-	-	-
	Unknown	Water regime category unable to be determined			

5.5.2 Assigning water regime categories

Assigning water regime categories to coastal wetlands through desktop interpretation

The classification of water regime for coastal wetlands was undertaken during the manual desktop assessment of coastal wetlands (Section 4.2). Marine wetlands were classed as intertidal. Information on the water regime preferences of wetland EVCs is held in an unpublished DELWP database. This information was used, in addition to the other data sources described in Section 4.2 to assign coastal estuarine, lacustrine or palustrine wetlands to water regime categories. Estuarine wetlands were classed as intertidal or supratidal. Coastal lacustrine and palustrine wetlands were assigned to one of the relevant categories or subcategories in Table 22.

Three hundred and seventy two coastal wetlands were assigned a water regime through the manual desktop assessment (Appendix 7). Approximately 33% of those classified through the manual desktop assessment were assigned as intertidal, 9% as periodically inundated, 5% as permanent and 53% as supratidal (Table A7.2, Appendix 7). These wetlands were all assigned a high level of confidence for the water regime classification.

Assigning categories and subcategories to non-coastal wetlands

Wetlands that were not classified through the manual assessment of coastal wetlands were assigned a water regime category through a separate process.

All wetlands in the WETLAND_CURRENT dataset that were derived from the ALPS geospatial layer (Appendix 3) were classed as having a permanent water regime category. This dataset was considered to have a high degree of reliability based on the description in Lawrence et al. (2009). The level of confidence was assigned as high.

For remaining wetlands, the water regime classification was derived from analysis of Geoscience Australia's *Water Observations From Space (WOFS)* dataset, the wetland system category (Section 4.2) and area of the wetland.

The WFOS dataset is a satellite imagery product , derived from Landsat images over the period 1987 to the present time that depicts observed surface water across Australia (http://www.ga.gov.au/scientific-topics/hazards/flood/wofs)). The Landsat images were taken approximately once every 16 days. Water presence is calculated for every available Landsat observation in the archive of Landsat images.

For this project, only data over the period 2000 to 2013 were available. The dataset supplied by Geoscience Australia data contained a field providing the percentage of clear observations in which water was detected in each 25 metre by 25 metre grid cell in Victoria over this period. The period 2000-2013 included the last

ten years of the 1997-2009 Millennium drought when rainfall in south-eastern Australia was 12.4% below the twentieth century mean for the years 1997-2009 inclusive (CSIRO 2011). This drought was followed by floods in 2010/11 in which south-eastern Australia recorded its fourth highest annual rainfall (CSIRO 2011).

The distribution of WFOS percentage detection within each wetland was examined through spatial analysis. For each wetland this provided statistics on the minimum, maximum, mean and standard deviation of percentage detection for the group of cells that intersected the wetland. Water does not need to cover the full extent of a wetland for the wetland to be classed as holding water using the category definitions in Table 22. It need only be present. Therefore, a single arbitrary figure that represents the water frequency at each wetland was adopted equal to the mean value plus two times the standard deviation ($\mu + 2\sigma$) of the WFOS percentage detection data.

This WFOS data was used to assign the water regime using the rules outlined in Table 23. It was assumed that lacustrine wetlands were not seasonally inundated and these were assigned only to the permanent, periodically inundated – intermittent or periodically inundated – episodic categories. However, it was assumed that palustrine wetlands could possibly be seasonal. Based on the water regime category definitions in Table 22, seasonal wetlands may hold water from between approximately 67% of the time (if they hold water for eight months in every year) to 7% of the time (if they hold water for only one month in eight years out of ten). It was assumed that palustrine wetlands that held water 30 – <67% of the time were either seasonal or intermittent, while those that held water 7 – <30% of the time were assumed to be either seasonal or episodic.

If a wetland on WETLAND_CURRENT covered an area greater than nine 25 X 25 metre grid cells (0.5625 hectares) and water was not detected in a clear Landsat image during the 14 years of WOFS data, it was assumed that water was present at a very low frequency and the episodic category was assigned, although it is possible that the non-detection of water may have been due to vegetation cover. However, if the wetland was <= 0.5625 hectares, it was assumed that water was present at an unknown frequency but it the wetland was too small or too thickly covered with emergent vegetation for water to have been detected and it was classed as periodically inundated – unknown.

A number of wetlands were located beyond the extent of the WFOS dataset and were therefore assigned an unknown water regime.

Table 23. Rules used to assign water regime based on WFOS values, Corrick classification, wetland system and wetland size. Corrick category 20 is sewage pond (Table 1). It was assumed that lacustrine wetlands

Wetland system	WOFS value ($\mu + 2\sigma$)	Area (Ha)	Regime	Confidence
Lacustrine	≥ 80	any	Permanent	Moderate
	30 – 80	any	Periodically inundated - Intermittent	Moderate
	0 - <30	any	Periodically inundated - Episodic	Moderate
Palustrine or Palustrine or Lacustrine (unknown specifics)	≥ 80	any	Permanent	Moderate
	67 – 80	any	Periodically inundated - Intermittent	Moderate
	30 – <67	any	Periodically inundated - Seasonal or Intermittent	Moderate
	7 – <30	any	Periodically inundated - Seasonal or Episodic	Moderate
	>0 – 7	any	Periodically inundated - Episodic	Moderate
	0	> 0.5625	Periodically inundated - Episodic	Moderate
	0	≤ 0.5625	Periodically inundated - Unknown	Moderate

5.5.3 Water regime classification results

The water regime classification identified that the majority of Victoria's wetlands with a known water regime category are periodically inundated , most of these being in the episodic subcategory (Table 24). This is likely to reflect the significant number of dry years in the 2000-2013 period covered by the WOFS dataset which was used to calculate the water regime for all non-tidal wetlands except those mapped in the ALPS dataset.

Table 24. Results of the water regime classification

Water regime	Approximate percentage of wetlands
Permanent	14
Periodically Inundated - Intermittent	4
Periodically Inundated - Episodic	52
Periodically Inundated - Seasonal Or Intermittent	5
Periodically Inundated - Seasonal Or Episodic	11
Periodically Inundated - Unknown	12
Supratidal	1
Intertidal	<1
Unknown	2

5.6 Water source

Knowledge of the source (or sources) of water for a wetland is important for managing wetlands. It indicates which wetlands could be affected by decisions and activities to allocate and manage water such as river regulation, groundwater licensing, storage management and environmental watering.

5.6.1 Classification categories

For lacustrine and palustrine aquatic ecosystems in the surface waters class, the ANAE classification system includes a dominant water source attribute with the following categories (Appendix 2):

- surface water;
- groundwater;
- both surface and groundwater (where there is temporal dominance by one or the other); and
- localised rainfall.

For estuarine and marine aquatic ecosystems, there are no relevant water source attributes.

An individual wetland may have more than one water source. In Victoria, data are not available for the majority of wetlands to identify the relative volumetric contribution of each water source. Rather than assign a dominant water source in accordance with the ANAE classification framework, the Victorian wetland classification framework adopted a separate attribute for surface, groundwater and artificial water sources. An attribute was not adopted for localised rainfall and runoff (Table 25) as it was assumed that all wetlands have some input from localised rainfall and runoff. The categories for each water resource attribute relate to the probability of that water source occurring (Table 25). This allows a user to

understand the likely presence of each water source, but does not attempt to assign a single dominant water source to an individual wetland.

The river water source attribute is used to identify those wetlands which receive inflows from in-channel or overbank river flows. The groundwater water source is used for wetlands which have a surface expression of groundwater. The tidal water source attribute applies to marine and estuarine systems. The artificial water source is included to allow identification of wetlands which receive inflows from managed delivery of water.

Table 25. Water source attributes and categories used in the Victorian wetland classification framework.

Water source attribute	Attribute description	Attribute categories
Groundwater	Wetlands which have a surface expression of groundwater	Very high (probability of groundwater inflows) High (probability of groundwater inflows) Moderate (probability of groundwater inflows) Low (probability of groundwater inflows) Unknown
River	Wetlands that receive water from in-channel or overbank river flows	Very high (probability of river inflows) High (probability of river inflows) Moderate (probability of river inflows) Low (probability of river inflows) Very low (probability of river inflows) Unknown
Tidal	Wetlands which are inundated by regular or spring tides	Intertidal Supratidal Non-tidal
Artificial	Wetlands which receive an artificial water source e.g. direct discharges from agriculture or industry, sewage and wastewater discharges, urban run-off that is directed to the wetland, environmental, recreational or consumptive water that is pumped into the wetland or supplied through channels and regulating structures	Artificial Not artificial Unknown

The approach utilised multiple lines of evidence and classified the likelihood for each water source independently of other water sources. The method is outlined below for each water source.

5.6.2 Assigning groundwater source categories

All wetlands On WETLAND_CURRENT that were sourced from the ALPS, GB_SPR and GB_SS geospatial layers (Table 3) were classified as having a very high probability of receiving groundwater inflows, with a high level of confidence based on information in Lawrence et al. (2009), Coates et al. (2010) and Carr (2006).

The groundwater classification for remaining wetlands was based on the National Atlas of Groundwater Dependent Ecosystems (GDE Atlas), recently released by the Australian Government (Appendix 3). The GDE

Atlas is a spatial database that describes the likelihood that a mapped wetland interacts with groundwater. The database also provides an estimate of the relative contribution of groundwater versus surface water at each mapped wetland.

The wetland polygons in the GDE Atlas were derived from WETLAND_1994. WETLAND_CURRENT includes additional wetland polygons for which no information is provided in the GDE Atlas. For these, the groundwater category of unknown was assigned and the level of confidence was not applicable. For some wetlands in WETLAND_CURRENT, the mapped extent has changed from that depicted in WETLAND_1994, based on the input datasets (Table 3). For these wetlands, the wetland was assigned the same groundwater classification and confidence rating as that assigned to the feature in the GDE Atlas.

The information in the GDE Atlas was applied to WETLAND_CURRENT by using spatial overlay analysis to extract the GDE Atlas information for each corresponding WETLAND_CURRENT wetland. Only the GDE Atlas features described as ecosystems that rely upon the surface expression of groundwater were used in the spatial overlay analysis. The descriptions used in the GDE Atlas were translated to describe the probability that a wetland mapped on WETLAND_CURRENT receives groundwater and separately describe the confidence in this assessment (Table 26).

Table 26. Assignment of probability and confidence categories for the groundwater water source attribute for wetlands not sourced from the ALPS, GB_SPR and GB_SS geospatial layers based on the GDE Atlas descriptions.

GDE Atlas terminology	WETLAND_CURRENT groundwater categories (probability of groundwater inflows)	WETLAND_CURRENT groundwater confidence
Identified in previous study: desktop Identified in previous study: fieldwork	Very high	High
High potential for GW interaction	High	Moderate
Moderate potential for GW interaction	Moderate	Moderate
Low potential for GW interaction	Low	Moderate
No data available to infer probability of groundwater inflows (wetland not mapped in the GDE Atlas)	Unknown	n/a

5.6.3 Assigning river water source categories

The wetland landscapes dataset (Section 3.1) identifies the following wetland landscapes as floodplains: Riverine mid-Murray (12), Riverine – Mallee (13) and Lowland Riparian Floodplain (15), (Table 7, Figure 8). These wetland landscapes are based on the regularly wetted areas of major river floodplains and were combined to form a floodplain extent layer. However, estuaries, wetlands on coastal floodplains and in less frequently flooded inland floodplains also receive river inflows, albeit less often. For this reason, additional datasets were used to derive probability categories for the river water source attribute. The river water source categorisation was based on spatial overlay analysis of WETLAND_CURRENT with the following five independent data sources. All datasets, except floodplain extent, are described in Appendix 3.

1. Watercourse network 1:250,000 to 1:5,000,000;
2. floodplain extent (wetland landscapes 12, 13 and 15);

3. 1 in 100 year flood extent;
4. Floodway; and
5. Watercourse network 1:25,000.

Major rivers on the watercourse network 1:250,000 to 1 :5,000,000 layer, were distinguished from minor watercourses (minor rivers, streams and other watercourses) which are identified on the watercourse network 1:25,000 layer.

Spatial overlay analysis was used to determine if each wetland intersected each of the five datasets. Wetlands intersecting a major river were assigned a very high probability of receiving river flows, while those on a minor watercourse were assumed not to receive significant river inflows. Based on this logic each wetland was assigned a probability category for the river water source attribute (Table 27).

Some wetlands in the Mallee CMA were omitted from the analysis as updated wetland mapping from the CMA was received after this analysis had been undertaken. Wetlands in the updated dataset which did not match previously recorded wetlands were assigned to the unknown category.

In addition to classifying the like probability of riverine flows, a description of the relative confidence in the classification was provided based on the alignment or conflicts between the five independent data sources. Wetlands that had a high degree of alignment for this attribute were assign high confidence, while those that had conflicting information from the various data sources were assigned low or moderate confidence, depending on the degree of alignment.

Table 27. Assignment of probability categories for the river water source attribute.

Wetland 2013 river classification	Basis for classification
Very high (probability of river inflows)	The wetland intersects the Watercourse network 1:250,000 to 1:5,000,000 layer, i.e. a major river runs through the wetland itself The wetland intersects the Floodplain extent, Floodway and 1 in 100 year flood extent layers, i.e. the wetland is always mapped as within an inundation area
High (probability of river inflows)	The wetland intersects the Floodplain extent, and either Floodway or 1 in 100 year flood extent layers, i.e. the wetland is often mapped as within an inundation area The wetland intersects the Floodway and 1 in 100 year flood extent layers, but not the Floodplain extent layer, i.e. the wetland is often mapped as within an inundation area
Moderate (probability of river inflows)	The wetland intersects the Floodplain extent layer, but not the Floodway or 1 in 100 year flood extent layers, i.e. predicted floodplain but outside existing inundation mapping
Low (probability of river inflows)	The wetland intersects only the Floodway layer or the 1 in 100 year flood extent layer and does not intersect the Floodplain extent layer, i.e. the wetland is rarely mapped as within an inundation area The wetland intersects only the Watercourse network 1:25,000 layer but not any other layer, i.e. the wetland is outside of mapped inundation area and only intersects a very minor waterway, which is probably too small to provide significant riverine flows
Very low (probability of river inflows)	The wetland does not intersect any of the riverine inundation layers, i.e. the wetland is outside of mapped inundation or riverine area

5.6.4 Assigning tidal water source categories

The wetland system and water regime attribute was used to assign wetlands to the appropriate tidal water source attribute (see Sections 4.2 and 5.5.2).

5.6.5 Assigning artificial water source categories

Artificial inflows are those that are purposely directed to a wetland for a specific reason. For the purposes of this classification, inundation of floodplain wetlands incidentally related to river regulation or to the maintenance of weir pool levels is not classed as artificial. The following types of wetlands are likely to receive at least some of their inflows from artificially provided flows:

- instream storages where inflows are manipulated to increase storage volumes by release of water from upstream storages;
- water storages to which water is actively directed through channels;
- stormwater wetlands;
- sewage treatment ponds;
- wetlands to which industrial or agricultural effluent is directed;
- salt works;
- wetlands to which environmental water is or has been be directed;
- salinity disposal basins;
- aquaculture ponds; and
- wetlands to which water is directed for recreational purposes.

The artificial water source category is not necessarily related to the wetland origin category (see Section 5.1.1). Wetlands of natural origin may be managed by artificially supplementing natural flows. For example, Kow Swamp, a naturally occurring wetland in northern Victoria, is used as a water storage by artificially diverting flows into the wetland from the Murray River. Environmental water is artificially pumped to the naturally occurring Hattah Lakes from the Murray River on occasions to enable the lakes to be inundated at river levels below the threshold required for natural flooding, while releases of environmental water from upstream storages are used to artificially inundate wetlands such as Barmah Forest. Conversely, artificial wetlands such as farm dams generally receive water from natural surface runoff, while headwater water storages such as Dartmouth Dam receive only natural river inflows.

The wetlands receiving artificial inflows may also derive water from natural sources. Information is not available to determine if the artificial water source, where present, is dominant over inflows derived from natural water sources. The categories were selected to identify whether or not the wetland received at least some artificial inflows or whether the presence of artificial inflows was unknown (Table 28). An additional attribute was included to identify the level of confidence with which the category is likely to occur.

Table 28. Description of artificial water source categories.

WETLAND_CURRENT artificial water source category	Description
Artificial	Wetlands where at least some of the inflows are artificially directed to the wetland for a specific purpose.
Not artificial	Wetlands where all water inflows are of natural origin or are an indirect result of river regulation.
Unknown	Wetlands for which there is no information on whether the water source is artificial or not

The assignment of the artificial water source category to wetlands in WETLAND_CURRENT was undertaken in two steps. In the first step, the category and level of confidence was assigned from a single data source with no comparison of results from other data sources. In the second step, the category and level of confidence was assigned to the remaining wetlands based on a comparison of results from three independent data sources.

Step 1. Assign category based on a single data source

Wetland features in WETLAND_CURRENT that were sourced from the ALPS, GB_SPR or GB_SS geospatial layers (see Section 1.3) were assigned the category not artificial with a high level of confidence as these wetlands are known to have a natural water source (Lawrence et al. 2009 , Coates et al. 2010 and Carr et al. 2006).

In addition, a list of specific wetlands that are known to have an artificial water source was compiled based on the information sources outlined in Appendix 8. These wetlands were assigned to the artificial category with a high level of confidence, although, as discussed in Appendix 8, wetlands that were identified as having received environmental water may not necessarily receive it in the future.

Step 2. Assign category based on the results from three independent data sources

For the remaining wetlands, the artificial water source classification was based on spatial overlay analysis and comparison of results from the following three independent data sources (described in Appendix 3):

- All Victorian Dam Boundaries;
- DRWaterbodies; and
- Water area 1:25,000.

These datasets provide some attributes that assist in identifying the wetland water source (Table 29). The table also indicates the type of features that were likely or unlikely to receive water artificially.

Table 29. Independent data sources used to assign artificial water source categories in Step 2.

Dataset name	Relevant attribute	Feature type	Description/examples	Likely supply of water
All Victorian Dam Boundaries	Feature_type	Aquaculture area	e.g. fish hatcheries	Artificial
		Industrial storage	Dams intersecting industrial or mining land uses	Artificial
		Rural irrigation storage	Dams intersecting irrigated land uses	Artificial
		Settling ponds	Ponds used for water treatment	Artificial
		Town rural storage	Named storages and storages > 250ML	Artificial
		Waste water	Not described	Artificial
All Victorian Dam Boundaries	Feature_type	Flood irrigation storage	Dams used to harvest stormwater runoff	Not artificial
		Rural licensed storage	Dams that are likely to be linked to licences	Not artificial
		Rural storage	Likely to be stock and domestic dams	Not artificial

Dataset name	Relevant attribute	Feature type	Description/examples	Likely supply of water
DRWater-bodies	Desc	Bio-retention system	No description	Artificial
		Sediment trap	No description	Artificial
		Natural body of water	No description	Not artificial
		Wetlands	No description	Not artificial
Water area 1:25,000	Wtr_use_fn	1	Water Supply	Unknown
		2	Flood Control	Artificial
		3	Salt Evaporation	Artificial
		4	Sewage	Artificial
		5	Tailing Dam	Artificial
		6	Cooling Ponds	Artificial
		7	Drainage	Unknown
		8	Irrigation	Artificial
		9	Recreation	Artificial

Spatial overlay analysis was used to determine the percentage of each wetland that intersected each of the three datasets. Using this information, the features in each dataset were classified as either receiving artificial water or not depending on whether the percentage of the wetland intersected was insignificant (less than five percent). The level of five percent was arbitrarily chosen.

Based on this logic, each wetland was classified as either receiving water from artificial or not artificial sources as follows.

- Wetlands where 5% or more of the wetland overlapping with artificial water supply features in one or more of the three datasets were classified as artificial.
- Wetlands with less than 5% of the wetland overlapping with artificial water supply features in each of the three datasets were classified as not artificial.

Where no data was available to support this classification, the wetland was classified as unknown.

Wetlands that intersect a larger area of an artificially-supplied feature on one of the three datasets were considered to have a higher probability of actually receiving artificial deliveries. Conversely, wetlands where the percentage overlap was insignificant for each of the three datasets, are more likely to be not artificial. The level of confidence in the artificial classification (Table 30) was based on percentage of the wetland intersected by artificial features in the three datasets

Table 30. Confidence levels for artificial water source categories assigned in Step 2.

WETLAND_CURRENT artificial confidence	Category	Basis for classification
High	Artificial	More than 50% of the wetland overlaps with artificial water supply features in one or more of the three datasets, i.e. the majority of the wetland is mapped as a type of feature that receives artificial water supplies
Moderate	Artificial	Between 20-49% of the wetland overlaps with artificial water supply features in one or more of the three datasets, i.e. much of wetland is mapped as a type of feature that receives artificial water supplies
	No artificial	Less than 5% of the wetland overlaps with artificial water supply features in each of the three datasets, i.e. none or an insignificant amount of the wetland is mapped as a type of feature that receives artificial water supplies
Low	Artificial	Between 5-19% of the wetland overlaps with artificial water supply features in one or more of the three datasets, i.e. some of wetland is mapped as a type of feature that receives artificial water supplies

5.6.5 Water source classification results

The water source classification process identified that a similar frequency of wetlands receiving groundwater and riverine water supplies across Victoria (Table 31).

Table 31. Results of the water source classification showing approximate percentage of wetlands with different water sources with varying degrees of probability for groundwater and river water sources.

	Approximate percentage of wetlands			
Classification	Groundwater	River	Tidal	Artificial
Very high probability	18	17		
High probability	8	5		
Moderate probability	15	3		
Low probability	10	27		
Very low probability		49		
Intertidal			<1	
Supratidal			<1	
Non-tidal			99	
Artificial				6
Not artificial				82
Unknown	49	<1		12

5.7 Salinity regime

Salinity concentrations have a strong effect on wetland biota (invertebrates, fish, amphibians, waterbirds and plants). Thresholds of salinity tolerance have been observed for many organisms in Victoria (e.g. Clunie et al. 2002, James et al. 2003, Smith et al. 2009). Generally the number of aquatic wetland fauna species decreases abruptly above 3,000 mg/L and continues to decline with increasing salinity. Hypersaline wetlands can have unique zooplankton and phytoplankton communities (Marchant and Williams 1977, Radke et al. 2003, Cant et al. 2010).

Similarly, aquatic plants more commonly associated with freshwater habitats tend to be absent when salinities exceed 4,000 mg/L (James et al. 2003), although some species are absent at considerably lower salinities (Brock 1981, Brock and Shiel 1983, Brock and Lane 1983, James et al. 2003). Once salinities reach 10,000 mg/L only halophytic species such as *Ruppia* spp. and *Lepilaena* spp. will be present (Brock and Lane 1983). Sim et al. (2006) found that the survival of adult plants of three *Ruppia* spp.in Western Australia declined markedly at salinities above 45,000 mg/L.

Based on the examination of a range of wetland datasets, Davis et al. (2003) proposed the following interim salinity categories:

- Fresh - <1,000 mg/L
- Hyposaline - 1,000 – 10,000 mg/L
- Saline - 10,000 – 100,000 mg/L
- Hypersaline - >100,000 mg/L.

The salinity concentration of a wetland may change significantly as the wetland fills and dries. For the purpose of the framework, the salinity category assigned is that which characterises the wetland when it is greater than 75% full.

5.7.1 Classification categories

The ANAE classification system adopts two sets of alternative water type categories for lacustrine and palustrine aquatic ecosystems (salinity or pH) but does not propose any water type category for marine or estuarine aquatic ecosystems (Appendix 2). There is almost no data available to assign pH categories to wetlands in Victoria and this attribute is not used in the Victorian wetland classification framework. However, data exists to assign the majority of Victoria's wetlands to salinity categories.

The Victorian wetland inventory includes marine and estuarine as well as lacustrine and palustrine systems. Therefore, salinity categories were designed to cover the full range of wetland system types.

Categories adopted for the Victorian wetland classification framework consider the effects of salinity on wetland biodiversity, the commonly accepted salinity thresholds and the concentration at which salt becomes saturated in solution as outlined below.

- Plankton species composition changes between 1,000 mg/L to 2,000 mg/L.
- 3,000 mg/L is widely recognised as the upper limit for fresh and the lower limit for saline waters (e.g. Nielsen et al. 2003).
- 10,000 mg/L is a recognised threshold for effects of salinity on some aquatic biota in Australia (Brock and Lane 1983, Brock et al. 2003).
- Above 10,000 mg/L only halophytic plant species are present (Smith et al. 2009).
- There is a marked decline in *Ruppia* spp. at salinities above 45,000 mg/L (Sim et al. 2006).
- There is little change in aquatic species richness above 50,000 mg/L (Kalff 2002).
- Salt becomes saturated in solution above 350,000 mg/L.

Research on the effects of salinity on biota supports the use of different thresholds for the salinity attribute than those used in the ANAE classification framework which recognises three salinity categories (fresh:

<3000 mg/L, brackish: 3000 – 5000 mg/L and saline: > 5000 mg/L) or in the Corrick classification system. The Corrick classification system recognises three salinity categories: fresh, saline and hypersaline (Table 1). Saline wetlands exceed 3000 mg/L throughout the year but no threshold is provided for the hypersaline lake subcategory (Corrick and Norman 1980, Corrick 1981, 1982). The salinity categories in Table 32 have been adopted for the framework. A category of saline has been included for saline wetlands where a more specific saline category cannot be reliably identified.

Table 32. Salinity categories for the Victorian wetland classification framework.

Salinity regime category	Lower salinity (mg/L)	Upper salinity (mg/L)
Fresh	0	3,000
Hyposaline	3,000	10,000
Mesosaline	10,000	50,000
Hypersaline	50,000	350,000
Saline	3,000	350,000
Unknown	-	-

5.7.2 Assigning categories

The assignment of wetlands to the salinity regime categories in Table 32 proceeded in four steps.

Step 1. Assign category based on manual desktop assessment or a single data source

Three hundred and seventy two coastal wetlands were assigned a salinity regime category through the manual desktop assessment described in Section 4.2 (Appendix 7). Salinity categories were assigned based on Information on the preferred salinity regimes of EVCs held in a DELWP database (Appendix 6).

For each wetland, the salinity category or categories for the EVCs in the wetland were compared and a salinity category assigned to the wetland. If the wetland EVCs had the same preferences, one of the first four categories in Table 32 was assigned. In some wetlands, saltmarsh EVCs which have a preferred salinity category of hyposaline occurred in conjunction with EVCs that had a preferred salinity regime of fresh. If the latter covered most of the wetland, the fresh category was assigned, otherwise hyposaline category was assigned. If the EVCs were different but all fell into the broad saline category, the saline category was assigned.

Approximately 2% of those classified through the manual desktop assessment were fresh, <1% were hypersaline, 3% were hyposaline and 35% were mesosaline (Table A7.2, Appendix 7). Fifty nine percent of wetlands were saline but the subcategory could not be determined.

All marine wetlands were assigned a salinity regime category of mesosaline based on the salinity levels of seawater of around 35,000 mg/L. These wetlands were all assigned a high level of confidence in their salinity regime classification.

In addition, all wetlands in the WETLAND_CURRENT dataset that were derived from the ALPS, GB_SPR and GB_SS geospatial layers (Appendix 3) were classed as fresh.

All wetlands classified through Step 1 were assigned a high confidence level and excluded from further analysis.

Step 2. Assign category for remaining wetlands based on the results from independent data sources

The classification of remaining wetlands used multiple lines of evidence to classify the most likely salinity regime category, based on the following three relatively independent datasets (Appendix 3):

1. IWC Data Management System;
2. Corrick category and subcategory in WETLAND_1994; and
3. ESTUARIES.

The salinity regimes assigned to EVCs in Appendix 6 were used to assign salinity categories to wetlands where IWC assessments had been undertaken using the IWC using data derived from the IWCDMS. This was done by comparing the salinity category or categories for the EVCs in the wetland using expert judgement. If the wetland EVCs had the same preferences, one of the first four categories in Table 32 was assigned. If the EVCs were different but all fell into the broad saline category, the saline category was assigned. Otherwise the salinity regime was classed as unknown.

For wetlands with Corrick category and/or subcategory information, wetlands were classified into one of three salinity regime categories (fresh, saline or hypersaline, based on the rules outlined in Table 33. If a wetland did not have a Corrick category assigned it was classified as unknown for this information source.

Wetlands in WETLAND_CURRENT that intersected with estuaries were classified as saline. There was insufficient information to classify them into the hyposaline, mesosaline or hypersaline categories. Those that did not intersect with estuaries were classed as unknown for this information source.

Table 33. Assignment of salinity regime based on Corrick category and subcategory (Table 1).

Salinity regime	Corrick category / subcategory
Fresh	Corrick category is either flooded river flats, freshwater meadow, shallow freshwater marsh, deep freshwater marsh, permanent open freshwater or sewage oxidation basin
Saline	Corrick category is either semi-permanent saline (provided that subcategory is not hypersaline lake), permanent saline or salt evaporation basin
Hypersaline	Corrick category is semi-permanent saline and subcategory is hypersaline lake

Step 3. Compare the results from independent data sources and assign the salinity regime category to the wetlands covered in Step 2

The results from these three overlay analyses were then compared and final salinity regime category was assigned based on the consistency of the results and the reliability of the datasets (Table 34).

The derived datasets were considered moderately reliable where the three overlay analyses were not substantially inconsistent from each other, but where the three overlays were inconsistent, the classification was considered to be of low confidence (Table 34). The moderate confidence assigned for consistent overlay analyses was based on the following factors.

- IWC EVCs are considered reliable as they are based on field assessments, however, the confidence in assigning the salinity regime was considered lower because some EVCs have a range of salinity regime preferences (Appendix 6).
- The salinity regime dataset derived from Corrick information was considered to be only moderately reliable. Most Corrick information is for wetlands derived from the WETLAND_1994 dataset. Most of these have not had their Corrick classification updated since 1994. It is possible the salinity categories may have changed. In addition, the threshold for the hypersaline category is different to that used in this framework.
- The estuaries dataset was considered to be moderately reliable as the mapping of estuaries is considered accurate. However, the discrimination between different saline categories is not possible.

Table 34. Assignment of final salinity regime categories to remaining wetlands in WETLAND_CURRENT based on comparison of results from three datasets.

Assigned salinity regime category	Salinity regime category from analysis of dataset			
	IWCDMS	Corrick classification	Estuaries	Confidence
Fresh	Fresh	Fresh	Unknown	Moderate
	Fresh	Unknown	Unknown	Moderate
	Unknown	Fresh	Unknown	Moderate
	Fresh	Fresh	Saline	Low
	Unknown	Fresh	Saline	Low
Hyposaline	Hyposaline	Saline	Unknown	Moderate
	Hyposaline	Hypersaline	Saline or Unknown	Moderate
	Hyposaline	Unknown	Unknown	Moderate
	Hyposaline	Fresh	Saline or Unknown	Low
Mesosaline	Mesosaline	Saline	Unknown	Moderate
	Mesosaline	Hypersaline	Unknown	Moderate
Hypersaline	Hypersaline	Hypersaline	Unknown	Moderate
	Hypersaline	Saline	Unknown	Moderate
	Unknown	Hypersaline	Unknown	Moderate
Saline	Saline	Saline	Unknown	Moderate
	Saline	Hypersaline	Unknown	Moderate
	Saline	Unknown	Unknown	Moderate
	Unknown	Saline	Saline	Moderate
	Unknown	Saline	Unknown	Moderate
	Unknown	Unknown	Saline	Low
Unknown	Any combination of results other than those above			

Step 4. Amend salinity regime for riverine influenced wetlands with unknown salinity regime

Wetlands which were assigned an unknown salinity regime through steps 1 to 3, were then examined against the river water source classification (Section 5.6.3). Wetlands with an otherwise unknown salinity regime but with a high or very high probability of receiving riverine water sources were updated to be classified as fresh, with a moderate confidence level.

5.7.3 Classification results

The salinity regime classification process identified that the vast majority of wetlands in Victoria are fresh (Table 35).

Table 35. Results of the salinity regime classification

Classification	Approximate percentage of wetlands
Fresh	86
Saline	4
Hyposaline	<1
Mesosaline	1
Hypersaline	<1
Unknown	9

5.8 Summary of Victorian wetland classification attributes

The attributes at each level of the Victorian wetland classification framework are summarised in Table 36.

Table 36. Summary of the Victorian classification framework attributes, categories and subcategories.

<table>
<tr><td rowspan="2">LEVELS 1 & 2</td><td>National region and landscape</td><td colspan="4">1. National landform, climate and hydrology regions
2. Landscape groupings within national landform, climate and hydrology regions
(can be attributed as required from existing geospatial coverages)</td></tr>
<tr><td>Victoria</td><td colspan="4">Victorian wetland landscapes
(can be attributed as required from the wetland landscapes dataset)</td></tr>
<tr><td rowspan="6">LEVEL 3</td><td>Wetland system</td><td>Lacustrine
(<30% cover of emergent vegetation)</td><td>Palustrine
(>=30% cover of emergent vegetation)</td><td>Marine
(intertidal wetlands in embayments)</td><td>Estuarine
(semi-enclosed tidal wetlands and supratidal wetlands)</td></tr>
<tr><td rowspan="5">Wetland habitat</td><td colspan="2">Wetland origin
• Naturally occurring
• Human-made
o aquaculture pond
o farm dam
o salt works
o water storage
o excavation pond
o sewage treatment pond
o stormwater treatment pond</td><td colspan="2">Wetland origin
• Naturally occurring
• Human-made
o aquaculture pond
o salt works
o excavation pond
o stormwater treatment pond</td></tr>
<tr><td colspan="2">Dominant vegetation
• Forest/woodland
• Shrub/fern
• Sedge/grass/forb
• Moss/heath
• No emergent vegetation</td><td colspan="2">Dominant vegetation
• Mangrove
• Saltmarsh
• No emergent vegetation</td></tr>
<tr><td colspan="2">Water source
• Groundwater
• River
• Tidal
• Artificial</td><td colspan="2">Water source
• Groundwater
• River
• Tidal
• Artificial</td></tr>
<tr><td colspan="2">Water regime
• Permanent
• Periodically inundated
o seasonal
o intermittent
o episodic</td><td colspan="2">Water regime
• Supratidal
• Intertidal</td></tr>
<tr><td colspan="2">Salinity regime
• Fresh
• Hyposaline
• Mesosaline
• Hypersaline
• Saline</td><td colspan="2">Salinity regime
• Hyposaline
• Mesosaline
• Hypersaline
• Saline</td></tr>
</table>

6. Victorian wetland typology

A standard wetland typology was developed for inclusion in the Victorian wetland classification framework. However, the attributes assigned to wetlands in the framework also allow the flexibility to develop specific wetland typologies for individual projects with attributes selected according to project objectives.

6.1 Wetland typologies

In a recent classification of wetlands in the Murray-Darling Basin, Brooks et al. (2013) suggest that a wetland typology should be ecologically meaningful, comparable with other typologies, particularly the Ramsar and other jurisdictional typologies and should reflect the key drivers of wetland ecology using clear wetland type definitions.

The ANAE classification framework does not outline a wetland typology. Therefore, other wetland typologies that are based on the ANAE classification framework attributes were examined for relevance to Victoria. The following summaries of wetland typologies are adapted from Brooks et al. (2013) who reviewed a number of example wetland typologies to illustrate attributes that are commonly included.

- The Ramsar Convention wetland classification system groups wetlands into three major types: inland, marine/coastal and human-made wetlands. Further classification is not systematically derived from wetland attributes. The main attributes used to define wetland types are water regime, water type, dominant vegetation but other attributes are also variously used, including substrate, altitude, area and ecosystem type (e.g. tundra, coral reefs).
- The South Australian (SA) classification uses a two-level typology (Jones and Miles 2009). The wetland system attribute is used to group wetlands into major groups. Wetland types at the next level are not grouped systematically by attribute, but it is obvious from the type names that a variety of attributes have been variously used to identify wetland types, for example, water regime, water type, water source and vegetation.
- The Queensland (Qld) wetland typology (EPA 2005) uses a range of ANAE attributes (Table 37) to systematically derive wetland types. The wetland system attribute was used to group wetlands at the highest level into two groups:
    - estuarine; and
    - lacustrine and palustrine.

  Estuarine wetlands were further classified by vegetation, while lacustrine and palustrine wetlands were grouped by climate and further classified by other attributes (Table 37).

Brooks et al. (2013) also used a systematic wetland typology based on ANAE attributes as does New South Wales (NSW), (Imgraben 2009). Brooks et al. (2013) selected attributes by wetland system class (Table 37). The NSW wetland typology used the climate attribute to group wetlands at the highest level (Table 37).

The attributes used in the Victorian wetland classification framework allow for a typology to be systematically derived. The typologies used in Qld and NSW use mainly ANAE Level 3 attributes but also include Level 1 and 2 attributes (Figure 1). In Victoria, ANAE level 1 and 2 attributes are captured in the wetland landscapes regionalisation (Section 3) and are mapped in a separate geospatial dataset. Therefore, only ANAE level 3 attributes are used in the Victorian wetland typology. As with other comparable wetland typologies, Level 3 attributes of wetland system, salinity regime, water regime and dominant vegetation were considered to be the most useful for discriminating between wetlands.

Table 37. Attributes used in various systematically-derived wetland classification typologies in Australia.

Wetland attribute	Level used in typology: Qld Estuarine	Qld Lacustrine and palustrine	NSW	MDBA Lacustrine and palustrine	MDBA Estuarine
Wetland system	1	2	4	1	1
Climatic	-	1	1	-	
Wetland substrate	-	3	-	-	
Water type (salinity)	-	4	5	2	
Water regime	-	5	Yes	-	
Landscape geomorphology or topography	-	6	2 (Landscape) 3 (Landform)	-	
Vegetation	2	7	6	3 (Dominant vegetation) 4 (Finer-scale vegetation)	
Water influence	-	-	-	-	1
Water depth	-	-	-	-	2
Substrate	-	-	-	-	3
Structural macrobiota	-	-	-	-	4

6.2. Wetland type names

The naming convention for wetlands used by Brooks et al. (2013) informed the some of the wetland type names used in the Victorian wetland typology. These names refer to commonly used terms in wetland typologies. The definitions set out in Brooks et al. (2013) were adopted as outlined below.

- Swamp – a wetland dominated by woody vegetation, either shrubs and or trees.
- Marsh – a wetland dominated by non-woody emergent vegetation such as sedges, reeds and rushes. Marshes can be shallow or deep with a combination of emergent and submergent vegetation types. They may also have areas of open water in deeper systems, up to 70 per cent of wetland area. Marshes are typically between 0.5 to 2 metres depth, but depth can be highly variable.
- Meadow – a wetland dominated by grasses (excluding Phragmites which is typically found in deeper marsh environments) and forbs. Meadows typically have shallow depths in the order of 10 to 50 centimetres. They are rarely permanent, often being filled on a seasonal basis.

It should be noted that there is no depth attribute in the Victorian wetland classification framework and the naming convention relied on the dominant vegetation category alone. Because the sedge/grass/forb dominant vegetation category covers sedges reeds, rushes, grasses and forbs, a distinction was not able to be made in the Victorian wetland typology between meadows and marshes. Although the wetland EVC benchmark descriptions in DEPI (2013) can be used to distinguish between marshes and meadows based on

EVCs identified at individual wetlands, accurate and comprehensive geospatial data is not available to allow attribution for wetlands generally.

The term lakes was used for lacustrine wetlands in Victoria, noting that in the Victorian wetland classification framework the assignment of wetlands to the lacustrine wetland system category is based solely on the percentage of emergent vegetation cover (<30%) regardless of area (Section 4.1).

The wetland type high country peatlands was adopted for the Victorian wetland typology as these have been incorporated into the WETLAND_CURRENT dataset from the ALPS dataset developed by Lawrence et al. (2009). Lawrence et al. (2009) adopt the definition of peatlands proposed by Whinam & Hope (2005) and use the term peatlands: "to incorporate all Australian vegetation complexes that other authors have labelled bogs, fens, or mosslands, as well as environments where soil properties have been defined as having a large peaty component". They apply the term high country peatlands to those peatlands that occur over 1000 metres in Victoria. This wetland type was also applied to wetlands derived from the GB_SS dataset. Wetlands derived from both the ALPS and GB_SS datasets were assigned the dominant vegetation category of moss/heath.

Coastal saltmarshes, for the purpose of the Victorian wetland typology, are coastal wetlands dominated by the EVCs in (Table 9). Mapping of coastal saltmarsh and estuarine EVCs (Boon et al. 2011) enabled coastal saltmarshes to be identified as a separate type. The name intertidal wetlands, adopted for marine wetlands, is based on the definition in Table 8. Estuaries are those areas which overlap the Victorian ESTUARIES layer (Appendix 3).and are not dominated by coastal saltmarsh or estuarine EVCs (Table 9).

Springs and soaks that were mapped in the Goulburn-Broken catchment region have been incorporated into the WETLAND_CURRENT dataset. However, these were not assigned as a separate type because it was not known which of the wetlands in the rest of the state might also fall into this type. Springs and soaks in the Goulburn-Broken catchment region can be identified in the WETLAND_CURRENT dataset using the ex_dataset attribute which specifies the origin of each wetland polygon.

6.3 Typology structure

The attributes used to derive the Victorian wetland typology are set out in Table 38. The primary attribute for distinguishing wetland types is the wetland system attribute. Each of the four wetland system categories was then further subdivided, with the exception of the marine wetland system category which was assigned as a single type.

Estuarine wetlands were divided into two types based on whether or not the dominant vegetation type was coastal saltmarsh. Lacustrine wetlands were subdivided into four types based on the salinity regime and water regime attributes. The distinctions were between fresh wetlands and saline wetlands (combined hyposaline, mesosaline, hypersaline and saline categories) and, within those classes, between permanent and periodically inundated wetlands.

Palustrine wetlands were subdivided based on the salinity regime, water regime and dominant vegetation attributes with the exception of high country peatlands which were distinguished only by the dominant vegetation type moss/heath. High country peatlands all have a salinity regime of fresh and a water regime of permanent. Apart from high country peatlands, a further 12 palustrine wetland types were identified. The distinctions were between:

- firstly, fresh and saline wetlands where the following categories were classed as saline: hyposaline, mesosaline, hypersaline and saline;
- secondly, permanent and periodically inundated wetlands with no distinction between the four subcategories of the periodically inundated category (Table 22); and
- thirdly, the types of dominant vegetation:
    - combined forest/woodland and shrub categories;
    - sedge/grass/forb category; and
    - no emergent vegetation category.

The dominant vegetation category of no emergent vegetation is due to the fact that, although at least 30% of the wetland was covered by vegetation, the no emergent vegetation category occupied more of the wetland area than any other dominant vegetation category. It was not possible to determine if these wetlands were swamps, marshes or meadows. Only 0.2% (55) of wetlands fell into this category (Table 39).

Approximately 40% of wetlands could not be assigned to a type due to one or more of the relevant attributes being unknown. The results of the wetland typology classification is set out in Table 39.

Table 38. Wetland types and attributes used to derive wetland types in the Victorian wetland typology.

Wetland system	Salinity regime	Water regime	Dominant vegetation	Wetland type
Estuarine	-	-	Not coastal saltmarsh	Estuary
Estuarine	-	-	Coastal saltmarsh	Coastal saltmarsh
Marine	-	-	-	Intertidal flats
Lacustrine	Fresh	Permanent	-	Permanent freshwater lakes
Lacustrine	Fresh	Periodically Inundated	-	Temporary freshwater lakes
Lacustrine	Saline	Permanent	-	Permanent saline lakes
Lacustrine	Saline	Periodically Inundated	-	Temporary saline lakes
Palustrine	-	-	Moss/heath	High country peatlands
Palustrine	Fresh	Permanent	Sedge/grass/forb	Permanent freshwater marshes and meadows
Palustrine	Fresh	Permanent	Forest/woodland or Shrub	Permanent freshwater swamps
Palustrine	Fresh	Permanent	No emergent vegetation	Permanent freshwater swamps/marshes/meadows
Palustrine	Saline	Permanent	Sedge/grass/forb	Permanent saline marshes and meadows
Palustrine	Saline	Permanent	Forest/woodland or Shrub	Permanent saline swamps
Palustrine	Saline	Permanent	No emergent vegetation	Permanent saline swamps/marshes/meadows
Palustrine	Fresh	Periodically Inundated	Sedge/grass/forb	Temporary freshwater marshes and meadows
Palustrine	Fresh	Periodically Inundated	Forest/woodland or Shrub	Temporary freshwater swamps
Palustrine	Fresh	Periodically Inundated	No emergent vegetation	Temporary freshwater swamps/marshes/meadows
Palustrine	Saline	Periodically Inundated	Sedge/grass/forb	Temporary saline marshes and meadows
Palustrine	Saline	Periodically Inundated	Forest/woodland or Shrub	Temporary saline swamps

Wetland system	Salinity regime	Water regime	Dominant vegetation	Wetland type
Palustrine	Saline	Periodically Inundated	No emergent vegetation	Temporary saline swamps/marshes/meadows

Table 39. Results of the wetland typology classification

Wetland type	Number of wetlands	Percentage number of wetlands	Area of wetlands (ha)	Percentage area of wetlands
Coastal saltmarsh	314	<1%	53733	7%
Estuary	27	<1%	4213	<1%
High country peatlands	3183	9%	4476	<1%
Intertidal flats	5	<1%	72790	9%
Permanent freshwater lakes	1016	3%	95596	12%
Permanent freshwater marshes and meadows	33	<1%	2241	<1%
Permanent freshwater swamps	192	<1%	897	<1%
Permanent freshwater swamps/marshes/meadows	2	<1%	52	<1%
Permanent saline lakes	101	<1%	65998	8%
Permanent saline marshes and meadows	11	<1%	2887	<1%
Permanent saline swamps	3	<1%	319	<1%
Permanent saline swamps/marshes/meadows	1	<1%	45	<1%
Temporary freshwater lakes	2542	7%	58314	7%
Temporary freshwater marshes and meadows	7383	21%	95107	12%
Temporary freshwater swamps	5976	17%	103669	13%
Temporary freshwater swamps/marshes/meadows	37	<1%	1016	<1%
Temporary saline lakes	564	2%	36704	5%
Temporary saline marshes and meadows	122	<1%	8536	1%
Temporary saline swamps	87	<1%	5430	<1%
Temporary saline swamps/marshes/meadows	15	<1%	1125	<1%
Unknown	13815	39%	170877	22%
Total	**35429**		**784025**	

7. Discussion

This project developed a wetland regionalisation that built on earlier work that described wetland vegetation in Victoria (DSE 2012). The resulting wetland landscapes were considered to provide a better framework for explaining regional and landscape variation (as expressed through wetland vegetation) in wetlands than any of the ANAE classification framework Level 1 or 2 attributes whether used singly or combined. The key regional and landscape wetland drivers vary in their influence on wetland vegetation variation across the state as illustrated in the wetland landscape profile descriptions in Table 7. Identifying the dominant wetland drivers in in different parts of Victoria allowed unique combinations of drivers to be used to identify wetland landscapes. Wetland landscapes allow for regional variation to be taken into account to explain differences in wetlands with the same wetland system and habitat attributes. This will aid in identifying representative wetlands.

This project resulted in systematic categorisation of system and habitat attributes that relate to most of the key components and processes of wetland function that are recommended for use in Australia (AETG 2012). In this respect, it overcame the limitation of the Corrick classification system previously used in Victoria, in that the Corrick system was not strictly systematic in its classification of wetland attributes. This project introduced discrimination between wetlands of natural and artificial origin which was not explicitly included in the Corrick classification framework and added new water source attributes. It also brought Victoria's wetland classification generally into line with the national framework (AETG 2012) and with recent classification frameworks for Queensland (EPA 2005) and the Murray-Darling Basin (Brooks et al. 2013). However, there are some differences to the national framework (AETG 2012), as summarised below.

- For non-marine and non- estuarine wetlands less than eight hectares in area, data on the nature of the shoreline and depth was not available. Thus lacustrine wetlands were distinguished from palustrine wetlands solely on the percentage cover of emergent vegetation.
- An additional wetland origin attribute was used in the Victorian framework.
- The landform habitat attribute was not used in the Victorian framework as it was not considered as an important distinguishing feature for lotic environments.
- The soil attribute was not used in the Victorian framework as there was no suitable data source at an appropriate scale to assign soil categories.
- For the dominant vegetation attribute, the ANAE classification framework forested category was expanded to include woodland. Two additional categories were adopted (moss/heath and coastal saltmarsh) as vegetation studies and mapping for specific projects provided data sources for these categories in Victoria.
- In the Victorian framework, water regime categories were designed to cover the full range of wetland system types covered in the Victorian wetland inventory, WETLAND_CURRENT. Water regime categories for lacustrine and palustrine wetlands In the Victorian framework provided more discrimination than those recommended in the national framework. As no marine and estuarine Victorian wetlands were subtidal, this attribute was not included.
- Wetland water source was characterised in three separate attributes for groundwater, river water and an artificial water source in the Victorian framework, as opposed to a single attribute in the national framework. This was due to the fact that data existed to assign probabilities of wetlands receiving different water sources but did not exist to enable the dominant water source to be determined. As all wetlands receive some input from localised rainfall, this attribute was not included.
- The salinity ANAE classification framework regime categories were also refined based on the work of several authors (Section 5.7).

The Victorian wetland typology closely followed that used by Brooks et al. (2013) for the classification of aquatic ecosystems in the Murray-Darling Basin. For palustrine wetlands, the dominant vegetation category

sedge/grass/forb did not provide the basis for distinguishing between meadows and marshes. No comprehensive, available vegetation dataset was considered sufficiently reliable to identify finer scale vegetation (dominant species) as used by Brooks et al (2013).

The wetland types adopted in the Victorian classification framework resolve some of the issues with the Corrick categories. For example, marine and estuarine wetlands can now be distinguished from lacustrine and palustrine wetlands. High country peatlands, which were not included in the wetland inventory and in the classification developed by Corrick can now be distinguished from other palustrine wetland types used by Corrick such as freshwater meadows and shallow and deep freshwater marshes. However, some discrimination that existed in the Corrick classification has been lost, for example the distinction between marshes and meadows and the distinction between deep and shallow freshwater marshes. Data on wetland depth is not available at the 20 – 50 cm level of resolution needed to distinguish these depth categories for most wetlands.

The assignment of wetland attribute categories from existing datasets has some limitations and resulted in a significant percentage of wetlands being assigned unknown for several attributes (Table 40). The assignment of the unknown category to attributes that inform the identification of the wetland type contributed to 39% of wetlands being of an unknown type.

Table 40. Percentage (approximate) of wetlands where the attribute category was assigned as unknown.

Attribute	Percentage of wetlands
Wetland system (lacustrine or palustrine)	25
Wetland system (estuarine/marine)	0
Wetland origin	<1
Dominant vegetation	34
Water regime	2
Groundwater source	49
River water source	<1
Artificial water source	12
Salinity regime	9
Wetland type	39

The confidence level of the assigned category for each attribute varied (Table 41) but there were a significant percentage of wetlands with low confidence ratings for dominant vegetation attribute. As the latter is used in the classification of wetland system, this also contributed to 33% of wetlands being assigned low confidence for wetland system classification.

Approximately 80% of wetlands in the Victorian wetland inventory are less than or equal to ten hectares in area. Data sources, such as the Modelled 2005 EVCs (updated) dataset, often do not discriminate between small wetlands and the surrounding landscape. This means that wetland attributes derived from those sources may be inaccurate. In addition, independent data sources for an attribute may record conflicting categories for the attribute, may use categories that cannot easily be aligned or may not exist.

While some data sources are of high quality, improvements to the level of confidence for wetland system and habitat attributes and filling of data gaps relies on:

- development of more accurate datasets for individual wetland attributes;
- ground truthing; and

- further testing of the accuracy of some existing data sources, especially for the water regime, salinity and dominant vegetation attributes.

Table 41. Percentage (approximate) of wetlands with different confidence levels assigned for attributes.

Attribute	High	Moderate	Low	Not applicable
Wetland system	17	26	33	25
Wetland origin	43	56	1	<1
Dominant vegetation	37	12	18	34
Water regime	9	88	0	2
Water source - groundwater	18	33	<1	49
Water source - river	82	9	8	<1
Water source - tidal	100	0	0	0
Water source - artificial	19	69	1	12
Salinity regime	16	72	3	9

Comprehensive spatial definition of wetland EVCs would be of significant benefit.

- It would improve the accuracy of the dominant vegetation category assigned to wetlands.
- It would aid in the discrimination between marshes and meadows, allowing for more specificity in wetland type definition.
- It would inform the assignment of the salinity regime and water regime categories. The salinity regime preferences for individual wetland EVCs were assigned by an expert in wetland vegetation (Appendix 6) as were the water regime EVC preferences. This work is currently being reviewed. When the wetland EVCs that are present at a wetland are identified, the salinity regime of a wetland can be inferred with a high degree of confidence. Inferring water regime is more difficult as EVCs typically have a wider degree of water regime category preferences, but for wetlands where the wetland EVCs present all have a similar preference, the knowledge would be informative.

Regular updates of attribute data from IWC and other field assessments is recommended. Further work is also recommended to monitor wetland water regime, for example using LANDSAT data that informs Geoscience Australia's Water Observations from Space (WOFS) product, and to test the accuracy of this product for wetlands. Due to lack of any other comprehensive, independent dataset on water regime, in this project, the accuracy of the WOFS dataset was not able to be tested.

An online tool to allow natural resource managers and planners to check attributes for individual wetlands has been developed. The tool allows wetland managers to propose updates to wetland attributes based on ground-truthed observations which will be validated and incorporated in updates to the WETLAND_CURRENT dataset.

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Appendix 1. EVCs occurring within wetlands

Wetland EVCs have been described in DEPI 2013 (Table A1.1). They have not been mapped across Victoria but the location of EVCs has been identified for wetlands where IWC assessments have been undertaken. Location information is stored in the IWC Data Management System.

The list of 145 wetland EVCs (DEPI 2013), (Table A1.1) includes provisional EVCs that have yet to be formally approved by DELWP. Their descriptions may be subject to future change. A107-A113 are provisional wetland EVCs that represent resolution of the components of EVC 9 - Coastal Saltmarsh Aggregate. These are presented in more detail in the recently completed Victorian Saltmarsh Study (Boon et al. 2011). A101-A102 and A104-A106, A114-A115 are other provisional wetland EVCs.

In Victoria, EVCs that were described prior to the definition of wetland EVCs (DEPI 2013) are mapped in the geospatial layer Modelled 2005 EVCs. Details of these are provided in a set of benchmark descriptions available on the DELWP website. An unpublished geospatial layer (DELWP Modelled 2005 EVC unpublished update) was also available for the project. It updates Modelled 2005 EVC mapping based on surveys undertaken in some parts of the state after 2005. These data sources focused primarily on mapping of terrestrial EVCs.

For this project, the DELWP Modelled 2005 EVC unpublished update dataset was overlaid on the Modelled 2005 EVCs dataset for areas where mapping had been updated since 2005 to form a single layer (Modelled 2005 EVCs (updated)) which was used in this project (Table A3.1).

In the Modelled 2005 EVCs (updated) dataset, the EVCs which are mapped as occurring in wetlands fall into three different groups:

1. wetland EVCs (included in Table A1.1);
2. EVCs which occur in wetlands but are not included in DEPI (2013) due to the fact that they have been superseded in the review of wetland EVCs (DEPI 2013) (TableA1.2); and
3. EVCs which do not occur in wetlands, but, because of the scale of mapping and possible inaccuracies in the Modelled 2005 EVCs (updated) dataset, are mapped as intersecting wetlands (TableA1.2).

The EVCs in the third group were included in the analysis to assign the wetland system and dominant vegetation attribute categories (Sections 4.4 and 5.4) as, for the majority of wetlands, these was the only geospatial data on wetland vegetation available.

A1.1 Assigning dominant vegetation categories to wetland EVCs

The categories assigned to wetland EVCs to identify emergent vegetation (to aid in the identification of lacustrine wetlands) and to determine the dominant vegetation category of each wetland are indicated in the Table A1.1. They were based on interpretation of the benchmark descriptions for each wetland EVC (DEPI 2013). The term emergent refers to vegetation that emerges above the surface of the water when water is present in the wetland.

An EVC was classed as non-emergent if:

- it occurred only as a floating surface layer;
- it was rooted but was only weakly emergent above the water surface; or
- it was characteristic of a drier phase and would not persist and emerge above the water surface when inundated.

In the case of the dominant vegetation category, where an EVC could potentially be assigned to more than one category based on structural characteristics, the tallest structural category was adopted. For example, Coastal Saltmarsh Aggregate may be dominated by either shrubs or herbaceous to grassy and sedgy

species. It was assigned the dominant vegetation category of shrub. Where an EVC was a recognised component of coastal saltmarsh that could also occur in inland situations, it was assigned to the coastal saltmarsh category in coastal settings but to a structural category in inland settings. This applied to all EVCs in Table 9 except A107 – A112, based on information in DSE (2012) and the wetland EVC descriptions in DEPI (2013).

Table A1.1 Wetland EVCs and their emergent vegetation and dominant vegetation categories.

EVC no.	EVC name	Emergent vegetation category	Dominant vegetation category
1111	Alkaline Basaltic Wetland Aggregate	Emergent	Sedge/grass/forb
806	Alluvial Plains Semi-arid Grassland	Emergent	Sedge/grass/forb
239	Alpine Creekline Herbland	Emergent	Sedge/grass/forb
171	Alpine Fen	Emergent	Sedge/grass/forb
288	Alpine Heath Peatland	Emergent	Moss/heath
1011	Alpine Hummock Peatland	Emergent	Moss/heath
905	Alpine Short Herbland	Emergent	Sedge/grass/forb
306	Aquatic Grassy Wetland	Emergent	Sedge/grass/forb
653	Aquatic Herbland	Emergent	Sedge/grass/forb
308	Aquatic Sedgeland	Emergent	Sedge/grass/forb
334	Billabong Wetland Aggregate	Emergent	Sedge/grass/forb
369	Black Box Wetland	Emergent	Forest/Woodland
875	Blocked Coastal Stream Swamp	Emergent	Sedge/grass/forb
537	Brackish Aquatic Herbland	Non-emergent	No emergent vegetation
934	Brackish Grassland	Emergent	Sedge/grass/forb
538	Brackish Herbland	Emergent	Sedge/grass/forb
636	Brackish Lake Aggregate	Emergent	No emergent vegetation
539	Brackish Lake Bed Herbland	Non-emergent	Sedge/grass/forb
947	Brackish Lignum Swamp	Emergent	Shrub
13	Brackish Sedgeland	Emergent	Sedge/grass/forb
1114	Brackish Sedgy Shrubland	Emergent	Shrub
973	Brackish Shrubland	Emergent	Shrub
656	Brackish Wetland Aggregate	Emergent	Sedge/grass/forb
A106	Calcareous Sedgy Shrubland	Emergent	Shrub
591	Calcareous Wet Herbland	Emergent	Sedge/grass/forb
291	Cane Grass Wetland	Emergent	Sedge/grass/forb

EVC no.	EVC name	Emergent vegetation category	Dominant vegetation category
602	Cane Grass Wetland/Aquatic Herbland Complex	Emergent	Sedge/grass/forb
606	Cane Grass Wetland/Brackish Herbland Complex	Emergent	Sedge/grass/forb
284	Claypan Ephemeral Wetland	Emergent	Sedge/grass/forb
A110	Coastal Dry Saltmarsh	Emergent	Coastal saltmarsh
976	Coastal Ephemeral Wetland	Emergent	Forest/Woodland
A111	Coastal Hypersaline Saltmarsh	Emergent	Coastal saltmarsh
11	Coastal Lagoon Wetland	Emergent	Sedge/grass/forb
A109	Coastal Saline Grassland	Emergent	Coastal saltmarsh
9	Coastal Saltmarsh Aggregate	Emergent	Coastal saltmarsh (coastal)
9	Coastal Saltmarsh Aggregate	Emergent	Shrub (non-coastal)
A112	Coastal Tussock Saltmarsh	Emergent	Coastal saltmarsh
673	Dune Soak Woodland	Emergent	Forest/Woodland
949	Dwarf Floating Aquatic Herbland	Non-emergent	No emergent vegetation
678	Ephemeral Drainage-line Grassy Wetland	Emergent	Sedge/grass/forb
914	Estuarine Flats Grassland	Emergent	Coastal saltmarsh
952	Estuarine Reedbed	Emergent	Sedge/grass/forb
953	Estuarine Scrub	Emergent	Shrub
10	Estuarine Wetland	Emergent	Sedge/grass forb
721	Fern Swamp	Emergent	Shrub*
809	Floodplain Grassy Wetland	Emergent	Sedge/grass/forb
56	Floodplain Riparian Woodland	Emergent	Forest/Woodland
280	Floodplain Thicket	Emergent	Shrub
172	Floodplain Wetland Aggregate	Emergent	Sedge/grass/forb
810	Floodway Pond Herbland	Non-emergent	No emergent vegetation
945	Floodway Pond Herbland/Riverine Swamp Forest Complex	Emergent	Forest/Woodland
723	Forest Bog	Emergent	Shrub
728	Forest Creekline Sedge Swamp	Emergent	Sedge/grass/forb
718	Freshwater Lake Aggregate	Emergent	No emergent vegetation
954	Freshwater Lignum - Cane Grass Swamp	Emergent	Shrub

EVC no.	EVC name	Emergent vegetation category	Dominant vegetation category
657	Freshwater Lignum Shrubland	Emergent	Shrub
968	Gahnia Sedgeland	Emergent	Sedge/grass/forb
1112	Granite Rock-pool Wetland	Emergent	Sedge/grass/forb
106	Grassy Riverine Forest	Emergent	Forest/Woodland
811	Grassy Riverine Forest/Floodway Pond Herbland Complex	Emergent	Forest/Woodland
812	Grassy Riverine Forest/Riverine Swamp Forest Complex	Emergent	Forest/Woodland
124	Grey Clay Drainage-line Aggregate	Emergent	Sedge/grass/forb
956	Herb-rich Gilgai Wetland	Emergent	Sedge/grass/forb
708	Hypersaline Inland Saltmarsh Aggregate	Emergent	Shrub
813	Intermittent Swampy Woodland	Emergent	Forest/Woodland
822	Intermittent Swampy Woodland/Riverine Grassy Woodland Complex	Emergent	Forest/Woodland
107	Lake Bed Herbland	Non-emergent	No emergent vegetation
974	Lava Plain Ephemeral Wetland	Emergent	Sedge/grass/forb
808	Lignum Shrubland	Emergent	Shrub
104	Lignum Swamp	Emergent	Shrub
823	Lignum Swampy Woodland	Emergent	Forest/Woodland
140	Mangrove Shrubland	Emergent	Mangrove
966	Montane Bog	Emergent	Moss/heath
41	Montane Riparian Thicket	Emergent	Shrub
40	Montane Riparian Woodland	Emergent	Forest/Woodland
148	Montane Sedgeland	Emergent	Sedge/grass/forb
318	Montane Swamp	Emergent	Sedge/grass/forb
185	Perched Boggy Shrubland Aggregate	Emergent	Shrub
125	Plains Grassy Wetland	Emergent	Sedge/grass/forb
755	Plains Grassy Wetland/Aquatic Herbland Complex	Emergent	Sedge/grass/forb
767	Plains Grassy Wetland/Brackish Herbland Complex	Emergent	Sedge/grass/forb
958	Plains Grassy Wetland/Calcareous Wet Herbland Complex	Emergent	Sedge/grass/forb
A101	Plains Grassy Wetland/Lignum Swamp Complex	Emergent	Shrub
959	Plains Grassy Wetland/Sedge-rich Wetland Complex	Emergent	Sedge/grass/forb

EVC no.	EVC name	Emergent vegetation category	Dominant vegetation category
960	Plains Grassy Wetland/Spike-sedge Wetland Complex	Emergent	Sedge/grass/forb
961	Plains Rushy Wetland	Emergent	Sedge/grass/forb
888	Plains Saltmarsh	Emergent	Sedge/grass/forb
647	Plains Sedgy Wetland	Emergent	Sedge/grass/forb
1010	Plains Sedgy Wetland/Sedge Wetland Complex	Emergent	Sedge/grass/forb
283	Plains Sedgy Woodland	Emergent	Forest/Woodland
651	Plains Swampy Woodland	Emergent	Forest/Woodland
784	Plains Swampy Woodland/Lignum Swamp Complex	Emergent	Forest/Woodland
292	Red Gum Swamp	Emergent	Forest/Woodland
A114	Red Gum Swamp/Cane Grass Wetland Complex	Emergent	Forest/Woodland
A115	Red Gum Swamp/Plains Rushy Wetland Complex	Emergent	Forest/Woodland
191	Riparian Scrub	Emergent	Shrub
59	Riparian Thicket	Emergent	Shrub
103	Riverine Chenopod Woodland	Emergent	Forest/Woodland
975	Riverine Ephemeral Wetland	Emergent	Forest/Woodland
814	Riverine Swamp Forest	Emergent	Forest/Woodland
815	Riverine Swampy Woodland	Emergent	Forest/Woodland
804	Rushy Riverine Swamp	Emergent	Sedge/grass/forb
842	Saline Aquatic Meadow	Non-emergent	No emergent vegetation
717	Saline Lake Aggregate	Non-emergent	No emergent vegetation
648	Saline Lake-verge Aggregate	Non-emergent	No emergent vegetation
676	Salt Paperbark Woodland	Emergent	Forest/Woodland
A113	Saltmarsh-grass Swamp	Emergent	Coastal saltmarsh (Coastal)
A113	Saltmarsh-grass Swamp	Emergent	Sedge/grass/forb (Non-coastal)
101	Samphire Shrubland	Emergent	Shrub
845	Sea-grass Meadow	Non-emergent	No emergent vegetation
195	Seasonally Inundated Shrubby Woodland	Emergent	Forest/Woodland

EVC no.	EVC name	Emergent vegetation category	Dominant vegetation category
196	Seasonally Inundated Sub-saline Herbland	Emergent	Sedge/grass/forb (Non-coastal)
196	Seasonally Inundated Sub-saline Herbland	Emergent	Coastal saltmarsh (Coastal)
136	Sedge Wetland	Emergent	Sedge/grass/forb
A102	Sedge Wetland/Aquatic Herbland Complex	Emergent	Sedge/grass/forb
963	Sedge Wetland/Aquatic Sedgeland Complex	Emergent	Sedge/grass/forb
1113	Sedge Wetland/Brackish Herbland Complex	Emergent	Sedge/grass/forb
883	Sedge Wetland/Calcareous Wet Herbland Complex	Emergent	Sedge/grass/forb
281	Sedge-rich Wetland	Emergent	Sedge/grass/forb
816	Sedgy Riverine Forest	Emergent	Forest/Woodland
817	Sedgy Riverine Forest/Riverine Swamp Forest Complex	Emergent	Forest/Woodland
707	Sedgy Swamp Woodland	Emergent	Forest/Woodland
964	Shell-beach Herbland	Emergent	Sedge/grass/forb
908	Sink-hole Wetland	Emergent	Sedge/grass/forb
819	Spike-sedge Wetland	Emergent	Sedge/grass/forb
80	Spring Soak Woodland	Emergent	Forest/Woodland
857	Stony Rises Pond Aggregate	Emergent	Sedge/grass/forb
210	Sub-alpine Wet Heathland	Emergent	Moss/heath
917	Sub-alpine Wet Sedgeland	Emergent	Sedge/grass/forb
918	Submerged Aquatic Herbland	Non-emergent	No emergent vegetation
820	Sub-saline Depression Shrubland	Emergent	Shrub
49	Swamp Heathland Aggregate	Emergent	Forest/Woodland
53	Swamp Scrub	Emergent	Shrub
2004	Swamp Scrub/Gahnia Sedgeland Complex	Emergent	Shrub
83	Swampy Riparian Woodland	Emergent	Forest/Woodland
937	Swampy Woodland	Emergent	Forest/Woodland
920	Sweet Grass Wetland	Emergent	Sedge/grass/forb
821	Tall Marsh	Emergent	Sedge/grass/forb
999	Unknown/Unclassified	Emergent	Unknown
990	Unvegetated (open water/bare soil/mud)	Non-emergent	No emergent vegetation

EVC no.	EVC name	Emergent vegetation category	Dominant vegetation category
8	Wet Heathland	Emergent	Shrub
A104	Wet Heathland/Plains Grassy Wetland Complex	Emergent	Shrub
A105	Wet Heathland/Plains Sedgy Wetland Complex	Emergent	Shrub
931	Wet Heathland/Sedge Wetland Complex	Emergent	Shrub
A107	Wet Saltmarsh Herbland	Emergent	Coastal saltmarsh
A108	Wet Saltmarsh Shrubland	Emergent	Coastal saltmarsh
12	Wet Swale Herbland	Emergent	Sedge/grass/forb
932	Wet Verge Sedgeland	Emergent	Sedge/grass/forb

*Included in shrub category, though dominated by ferns.

** Occurs on the fringes of EVC 717 and assigned the same category as EVC 717.

A1.2 Assigning dominant vegetation categories to Modelled 2005 EVCs (updated) dataset EVCs

One of the two EVC data sources for the Modelled 2005 EVCs (updated) dataset (Modelled 2005 EVC) has assigned EVCs to groups. Where the group name aligned with a dominant vegetation category, the EVCs in that group were assigned to the dominant vegetation category indicated by the group name unless the EVC description indicated that this was not appropriate. For the EVCs in the Modelled 2005 EVC (updated) dataset that are in groups that are not aligned with the dominant vegetation categories and for the EVCs derived from the other source dataset (DELWP Modelled 2005 EVC unpublished update), benchmark descriptions were examined and the EVCs individually assigned to the emergent and dominant vegetation categories. Where an EVC could potentially be assigned to more than one category based on structural characteristics, the tallest structural category was adopted.

In the Modelled 2005 EVC (updated) dataset, some EVCs are assigned the Corrick category name (Table 1). Using the information in Table 1, it was possible to assign two of these EVCs (freshwater meadow and shallow freshwater marsh) to the emergent vegetation category of emergent. However, it was not possible to determine the emergent vegetation category for other such EVCs or to determine the dominant vegetation category for any of the EVCs that matched Corrick categories based on the subcategories in Table 1. The assigned categories are shown in Table A1.2.

Table A1.2 Modelled 2005 EVCs (updated) dataset EVCs and their emergent vegetation and dominant vegetation categories.

EVC no.	EVC name	Emergent vegetation category	Dominant vegetation category
67	Alluvial Terraces Herb-rich Woodland	Emergent	Forest/Woodland
455	Alluvial Terraces Herb-rich Woodland/Claypan Ephemeral Wetland Mosaic	Emergent	Forest/Woodland
81	Alluvial Terraces Herb-rich Woodland/Creekline Grassy Woodland Mosaic	Emergent	Forest/Woodland
452	Alluvial Terraces Herb-rich Woodland/Hills Herb-rich Woodland Complex	Emergent	Forest/Woodland
152	Alluvial Terraces Herb-rich Woodland/Plains Grassy Woodland Complex	Emergent	Forest/Woodland
258	Alluvial Terraces Herb-rich Woodland/Plains Woodland/Gilgai Wetland Complex	Emergent	Forest/Woodland
457	Alluvial Terraces Herb-rich Woodland/Sedge Wetland Complex	Emergent	Forest/Woodland
153	Alluvial Terraces Herb-rich Woodland/Valley Grassy Forest Complex	Emergent	Forest/Woodland
156	Alpine Coniferous Shrubland	Emergent	Shrub
1000	Alpine Crag Complex	Non-emergent	No emergent vegetation
1002	Alpine Damp Grassland	Emergent	Sedge/grass/forb
1001	Alpine Grassland	Emergent	Sedge/grass/forb
1004	Alpine Grassy Heathland	Emergent	Shrub
1005	Alpine Grassy Heathland/Alpine Grassland Mosaic	Emergent	Shrub
1105	Alpine Rocky Outcrop Heathland/Alpine Dwarf Heathland Mosaic	Emergent	Shrub
1043	Aquatic Herbland/Floodplain Grassy Wetland Mosaic	Emergent	Sedge/grass/forb
1044	Aquatic Herbland/Floodway Pond Herbland Mosaic	Emergent	Sedge/grass/forb
691	Aquatic Herbland/Plains Sedgy Wetland Mosaic	Emergent	Sedge/grass/forb
1045	Aquatic Herbland/Riverine Swamp Forest Mosaic	Emergent	Forest/Woodland
915	Aquatic Herbland/Swamp Scrub Mosaic	Emergent	Shrub
1047	Aquatic Herbland/Tall Marsh Mosaic	Emergent	Sedge/grass/forb
14	Banksia Woodland	Emergent	Forest/Woodland
993	Bare Rock/Ground	Non-emergent	No emergent vegetation

EVC no.	EVC name	Emergent vegetation category	Dominant vegetation category
705	Basalt Creekline Shrubby Woodland	Emergent	Forest/Woodland
642	Basalt Shrubby Woodland	Emergent	Forest/Woodland
311	Berm Grassy Shrubland	Emergent	Shrub
297	Billabong Wetland/Red Gum Swamp Mosaic	Emergent	Forest/Woodland
154	Bird Colony Shrubland	Emergent	Shrub
155	Bird Colony Succulent Herbland	Emergent	Sedge/grass/forb
910	Bird Colony Succulent Herbland/Coastal Tussock Grassland Mosaic	Emergent	Sedge/grass/forb
663	Black Box Lignum Woodland	Emergent	Forest/Woodland
27	Blackthorn Scrub	Emergent	Shrub
61	Box Ironbark Forest	Emergent	Forest/Woodland
685	Box Ironbark Forest/Heathy Woodland Complex	Emergent	Forest/Woodland
643	Brackish Drainage-line Aggregate	Emergent	Sedge/grass/forb
833	Cane Grass Wetland/Lignum Swampy Woodland Mosaic	Emergent	Shrub
941	Cane Grass Wetland/Salt Paperbark Woodland Mosaic	Emergent	Forest/Woodland
898	Cane Grass-Lignum Halophytic Herbland	Emergent	Shrub
829	Chenopod Grassland	Emergent	Shrub
158	Chenopod Mallee	Unknown	Unknown
644	Cinder Cone Woodland	Emergent	Forest/Woodland
7	Clay Heathland	Emergent	Shrub
159	Clay Heathland/Wet Heathland/Riparian Scrub Mosaic	Emergent	Shrub
58	Cleared/Severely Disturbed	Unknown	Unknown
2	Coast Banksia Woodland	Emergent	Forest/Woodland
921	Coast Banksia Woodland/Coastal Dune Scrub Mosaic	Emergent	Forest/Woodland
144	Coast Banksia Woodland/Warm Temperate Rainforest Mosaic	Emergent	Forest/Woodland
181	Coast Gully Thicket	Emergent	Shrub
858	Coastal Alkaline Scrub	Emergent	Shrub
922	Coastal Alkaline Scrub/Bird Colony Succulent Herbland Mosaic	Emergent	Sedge/grass/forb
879	Coastal Dune Grassland	Emergent	Sedge/grass/forb

EVC no.	EVC name	Emergent vegetation category	Dominant vegetation category
160	Coastal Dune Scrub	Emergent	Shrub
909	Coastal Dune Scrub/Bird Colony Succulent Herbland Mosaic	Emergent	Shrub
1	Coastal Dune Scrub/Coastal Dune Grassland Mosaic	Emergent	Shrub
161	Coastal Headland Scrub	Emergent	Shrub
162	Coastal Headland Scrub/Coastal Tussock Grassland Mosaic	Emergent	Shrub
797	Coastal Landfill/Sand Accretion	Non-emergent	No emergent vegetation
900	Coastal Saltmarsh/Coastal Dune Grassland/Coastal Dune Scrub/Coastal Headland Scrub Mosaic	Emergent	Shrub
901	Coastal Saltmarsh/Estuarine Flats Grassland Mosaic	Emergent	Coastal saltmarsh
302	Coastal Saltmarsh/Mangrove Shrubland Mosaic	Emergent	Mangrove
5	Coastal Sand Heathland	Emergent	Shrub
163	Coastal Tussock Grassland	Emergent	Sedge/grass/forb
4	Coastal Vine-rich Forest	Emergent	Forest/Woodland
57	Conifer Plantation	Emergent	Forest/Woodland
31	Cool Temperate Rainforest	Emergent	Forest/Woodland
68	Creekline Grassy Woodland	Emergent	Forest/Woodland
869	Creekline Grassy Woodland/Red Gum Swamp Mosaic	Emergent	Forest/Woodland
164	Creekline Herb-rich Woodland	Emergent	Forest/Woodland
640	Creekline Sedgy Woodland	Emergent	Forest/Woodland
654	Creekline Tussock Grassland	Emergent	Sedge/grass/forb
29	Damp Forest	Emergent	Forest/Woodland
929	Damp Forest - Hardwood Plantation	Emergent	Forest/Woodland
165	Damp Heath Scrub	Emergent	Shrub
710	Damp Heathland	Emergent	Shrub
746	Damp Heathland/Damp Heathy Woodland Mosaic	Emergent	Forest/Woodland
763	Damp Heathland/Damp Heathy Woodland/Seasonally Inundated Shrubby Woodland Mosaic	Emergent	Forest/Woodland
734	Damp Heathland/Damp Heathy Woodland/Wet Heathland Mosaic	Emergent	Shrub
505	Damp Heathland/Riparian Scrub Complex	Emergent	Shrub

EVC no.	EVC name	Emergent vegetation category	Dominant vegetation category
595	Damp Heathland/Riparian Scrub Mosaic	Emergent	Shrub
762	Damp Heathland/Sand Heathland Mosaic	Emergent	Shrub
625	Damp Heathland/Wet Heathland Mosaic	Emergent	Shrub
793	Damp Heathy Woodland	Emergent	Forest/Woodland
1106	Damp Heathy Woodland/Lowland Forest Mosaic	Emergent	Forest/Woodland
3	Damp Sands Herb-rich Woodland	Emergent	Forest/Woodland
713	Damp Sands Herb-rich Woodland/Damp Heathland/Damp Heathy Woodland Mosaic	Emergent	Forest/Woodland
418	Damp Sands Herb-rich Woodland/Heathy Woodland Complex	Emergent	Forest/Woodland
881	Damp Sands Herb-rich Woodland/Heathy Woodland Mosaic	Emergent	Forest/Woodland
781	Damp Sands Herb-rich Woodland/Herb-rich Foothill Forest Mosaic	Emergent	Forest/Woodland
791	Damp Sands Herb-rich Woodland/Plains Grassy Woodland Complex	Emergent	Forest/Woodland
885	Damp Sands Herb-rich Woodland/Plains Grassy Woodland Mosaic	Emergent	Forest/Woodland
732	Damp Sands Herb-rich Woodland/Plains Swampy Woodland/Aquatic Herbland Mosaic	Emergent	Forest/Woodland
757	Damp Sands Herb-rich Woodland/Seasonally Inundated Shrubby Woodland Mosaic	Emergent	Forest/Woodland
421	Damp Sands Herb-rich Woodland/Sedgy Riparian Woodland Complex	Emergent	Forest/Woodland
779	Damp Sands Herb-rich Woodland/Shallow Sands Woodland Mosaic	Emergent	Forest/Woodland
414	Damp Sands Herb-rich Woodland/Shrubby Woodland Complex	Emergent	Forest/Woodland
672	Damp Sands Herb-rich Woodland/Shrubby Woodland Mosaic	Emergent	Forest/Woodland
878	Damp Sands Herb-rich Woodland/Swamp Scrub Complex	Emergent	Forest/Woodland
925	Damp Sands Herb-rich Woodland/Swamp Scrub Mosaic	Emergent	Forest/Woodland
681	Deep Freshwater Marsh	Emergent	Unknown
807	Disused Floodway Shrubby Herbland	Emergent	Shrub
168	Drainage-line Aggregate	Emergent	Forest/Woodland

EVC no.	EVC name	Emergent vegetation category	Dominant vegetation category
1022	Drainage-line Aggregate/Riverine Swamp Forest Mosaic	Emergent	Forest/Woodland
1023	Drainage-line Aggregate/Sedgy Riverine Forest Mosaic	Emergent	Forest/Woodland
1025	Drainage-line Aggregate/Tall Marsh Mosaic	Emergent	Forest/Woodland
679	Drainage-line Woodland	Emergent	Forest/Woodland
285	Dry Creekline Woodland	Emergent	Forest/Woodland
34	Dry Rainforest	Emergent	Forest/Woodland
169	Dry Valley Forest	Emergent	Forest/Woodland
695	Dry Valley Forest/Swamp Scrub/Warm Temperate Rainforest Mosaic	Emergent	Forest/Woodland
89	Dunefield Heathland	Emergent	Shrub
994	Dunes	Non-emergent	No emergent vegetation
895	Escarpment Shrubland	Emergent	Forest/Woodland
143	Estuarine Wetland/Coastal Saltmarsh Mosaic	Emergent	Coastal saltmarsh
935	Estuarine Wetland/Estuarine Swamp Scrub Mosaic	Emergent	Shrub
969	Exotic Non-native vegetation	Unknown	Unknown
1049	Floodplain Grassy Wetland/Floodway Pond Herbland Mosaic	Emergent	Sedge/grass/forb
1051	Floodplain Grassy Wetland/Riverine Swamp Forest Mosaic	Emergent	Forest/Woodland
1052	Floodplain Grassy Wetland/Riverine Swampy Woodland Mosaic	Emergent	Forest/Woodland
1054	Floodplain Grassy Wetland/Spike-sedge Wetland Mosaic	Emergent	Sedge/grass/forb
1055	Floodplain Grassy Wetland/Tall Marsh Mosaic	Emergent	Sedge/grass/forb
863	Floodplain Reedbed	Emergent	Sedge/grass/forb
690	Floodplain Riparian Woodland/Billabong Wetland Mosaic	Emergent	Forest/Woodland
256	Floodplain Riparian Woodland/Floodplain Wetland Mosaic	Emergent	Forest/Woodland
1033	Floodplain Riparian Woodland/Floodway Pond Herbland Mosaic	Emergent	Forest/Woodland
250	Floodplain Riparian Woodland/Plains Grassy Woodland Mosaic	Emergent	Forest/Woodland

EVC no.	EVC name	Emergent vegetation category	Dominant vegetation category
1032	Floodplain Riparian Woodland/Riverine Grassy Woodland Mosaic	Emergent	Forest/Woodland
1034	Floodplain Riparian Woodland/Riverine Swamp Forest Mosaic	Emergent	Forest/Woodland
1035	Floodplain Riparian Woodland/Sedgy Riverine Forest Mosaic	Emergent	Forest/Woodland
1037	Floodplain Riparian Woodland/Tall Marsh Mosaic	Emergent	Forest/Woodland
434	Floodplain Thicket/Damp Heathland Complex	Emergent	Shrub
432	Floodplain Thicket/Shallow Freshwater Marsh Complex	Emergent	Shrub
585	Floodplain Thicket/Wet Heathland Complex	Emergent	Shrub
1058	Floodway Pond Herbland/Riverine Swamp Forest Mosaic	Emergent	Forest/Woodland
1060	Floodway Pond Herbland/Tall Marsh Mosaic	Emergent	Sedge/grass/forb
680	Freshwater Meadow	Emergent	Sedge/grass/forb
135	Gallery Rainforest	Emergent	Forest/Woodland
260	Gilgai Wetland/Plains Grassy Woodland Complex	Emergent	Forest/Woodland
72	Granitic Hills Woodland	Emergent	Forest/Woodland
22	Grassy Dry Forest	Emergent	Forest/Woodland
320	Grassy Dry Forest/Heathy Dry Forest Complex	Emergent	Forest/Woodland
174	Grassy Dry Forest/Rocky Outcrop Shrubland/Rocky Outcrop Herbland Mosaic	Emergent	Forest/Woodland
128	Grassy Forest	Emergent	Forest/Woodland
1015	Grassy Riverine Forest/Drainage-line Aggregate Mosaic	Emergent	Forest/Woodland
1029	Grassy Riverine Forest/Floodway Pond Herbland Mosaic	Emergent	Forest/Woodland
1016	Grassy Riverine Forest/Plains Grassy Woodland/Grassy Woodland Mosaic	Emergent	Forest/Woodland
1017	Grassy Riverine Forest/Riverine Grassy Woodland Mosaic	Emergent	Forest/Woodland
1030	Grassy Riverine Forest/Riverine Swamp Forest Mosaic	Emergent	Forest/Woodland
1062	Grassy Riverine Forest/Riverine Swampy Woodland Mosaic	Emergent	Forest/Woodland
1063	Grassy Riverine Forest/Sedgy Riverine Forest Mosaic	Emergent	Forest/Woodland

EVC no.	EVC name	Emergent vegetation category	Dominant vegetation category
1065	Grassy Riverine Forest/Tall Marsh Mosaic	Emergent	Forest/Woodland
175	Grassy Woodland	Emergent	Forest/Woodland
252	Grassy Woodland/Alluvial Terraces Herb-rich Woodland Complex	Emergent	Forest/Woodland
76	Grassy Woodland/Alluvial Terraces Herb-rich Woodland Mosaic	Emergent	Forest/Woodland
697	Grassy Woodland/Alluvial Terraces Herb-rich Woodland Mosaic	Emergent	Forest/Woodland
719	Grassy Woodland/Damp Sands Herb-rich Woodland Mosaic	Emergent	Forest/Woodland
896	Grassy Woodland/Heathy Dry Forest Complex	Emergent	Forest/Woodland
802	Grassy Woodland/Heathy Woodland Mosaic	Emergent	Forest/Woodland
752	Grassy Woodland/Hills Herb-rich Woodland/Damp Sands Herb-rich Woodland Mosaic	Emergent	Forest/Woodland
274	Grassy Woodland/Plains Grassy Woodland Complex	Emergent	Forest/Woodland
924	Grassy Woodland/Swamp Scrub Mosaic	Emergent	Forest/Woodland
251	Grassy Woodland/Valley Grassy Forest Mosaic	Emergent	Forest/Woodland
902	Gully Woodland	Emergent	Forest/Woodland
279	Heathland Thicket	Emergent	Shrub
426	Heathland Thicket/Sand Heathland Complex	Emergent	Shrub
565	Heathland Thicket/Seasonally Inundated Shrubby Woodland Complex	Emergent	Forest/Woodland
20	Heathy Dry Forest	Emergent	Forest/Woodland
391	Heathy Dry Forest/Damp Sands Herb-rich Woodland Complex	Emergent	Forest/Woodland
176	Heathy Dry Forest/Grassy Woodland Complex	Emergent	Forest/Woodland
393	Heathy Dry Forest/Heathy Woodland Complex	Emergent	Forest/Woodland
396	Heathy Dry Forest/Sedgy Riparian Woodland Complex	Emergent	Forest/Woodland
392	Heathy Dry Forest/Shrubby Woodland Complex	Emergent	Forest/Woodland
179	Heathy Herb-rich Woodland	Emergent	Forest/Woodland
785	Heathy Herb-rich Woodland/Damp Sands Herb-rich Woodland Mosaic	Emergent	Forest/Woodland
88	Heathy Mallee	Emergent	Shrub
48	Heathy Woodland	Emergent	Forest/Woodland

EVC no.	EVC name	Emergent vegetation category	Dominant vegetation category
650	Heathy Woodland/Damp Heathy Woodland/Damp Heathland Mosaic	Emergent	Forest/Woodland
481	Heathy Woodland/Heathy Dry Forest Complex	Emergent	Forest/Woodland
790	Heathy Woodland/Heathy Herb-rich Woodland Mosaic	Emergent	Forest/Woodland
786	Heathy Woodland/Heathy Herb-rich Woodland/Damp Heathy Woodland Mosaic	Emergent	Forest/Woodland
737	Heathy Woodland/Limestone Woodland Mosaic	Emergent	Forest/Woodland
493	Heathy Woodland/Plains Grassy Woodland Mosaic	Emergent	Forest/Woodland
892	Heathy Woodland/Sand Heathland Mosaic	Emergent	Forest/Woodland
471	Heathy Woodland/Shrubby Woodland Mosaic	Emergent	Forest/Woodland
23	Herb-rich Foothill Forest	Emergent	Forest/Woodland
178	Herb-rich Foothill Forest/Shrubby Foothill Forest Complex	Emergent	Forest/Woodland
71	Hills Herb-rich Woodland	Emergent	Forest/Woodland
745	Hills Herb-rich Woodland/Plains Grassy Woodland Mosaic	Emergent	Forest/Woodland
400	Hills Herb-rich Woodland/Shrubby Woodland Complex	Emergent	Forest/Woodland
677	Inland Saltmarsh	Emergent	Shrub
939	Lake Bed Herbland/Red Gum Swamp Mosaic	Emergent	Forest/Woodland
1014	Late-lying Snowpatch Herbland	Emergent	Sedge/grass/forb
704	Lateritic Woodland	Emergent	Forest/Woodland
760	Lateritic Woodland/Heathy Dry Forest Mosaic	Emergent	Forest/Woodland
942	Lignum Swampy Woodland/Lake Bed Herbland Mosaic	Emergent	Forest/Woodland
943	Lignum Swampy Woodland/Plains Grassland Mosaic	Emergent	Forest/Woodland
655	Lignum-Cane Grass Swamp	Emergent	Shrub
15	Limestone Box Forest	Emergent	Forest/Woodland
133	Limestone Pomaderris Shrubland	Emergent	Shrub
91	Loamy Sands Mallee	Unknown	Unknown
102	Low Chenopod Shrubland	Emergent	Shrub
66	Low Rises Woodland	Emergent	Forest/Woodland
1038	Low Rises Woodland/Riverine Swampy Woodland Mosaic	Emergent	Forest/Woodland

EVC no.	EVC name	Emergent vegetation category	Dominant vegetation category
87	Lowan Sands Mallee	Emergent	Shrub
16	Lowland Forest	Emergent	Forest/Woodland
916	Lowland Forest - Hardwood Plantation	Emergent	Forest/Woodland
795	Lowland Forest/Damp Sands Herb-rich Woodland Mosaic	Emergent	Forest/Woodland
698	Lowland Forest/Heathy Woodland Mosaic	Emergent	Forest/Woodland
877	Lowland Herb-rich Forest	Emergent	Forest/Woodland
652	Lunette Woodland	Emergent	Forest/Woodland
903	Mangrove Shrubland/Estuarine Flats Grassland Mosaic	Emergent	Mangrove
38	Montane Damp Forest	Emergent	Forest/Woodland
36	Montane Dry Woodland	Emergent	Forest/Woodland
702	Montane Grassland	Emergent	Sedge/grass/forb
37	Montane Grassy Woodland	Emergent	Forest/Woodland
703	Montane Grassy Woodland/Montane Grassland Mosaic	Emergent	Forest/Woodland
319	Montane Herb-rich Woodland	Emergent	Forest/Woodland
183	Montane Shrubby Woodland	Emergent	Forest/Woodland
39	Montane Wet Forest	Emergent	Forest/Woodland
1048	Mosaic of Aquatic Herbland/Floodway Pond Herbland-Riverine Swamp Forest Complex	Emergent	Forest/Woodland
1046	Mosaic of Aquatic Herbland/Sedgy Riverine Forest-Riverine Swamp Forest Complex	Emergent	Forest/Woodland
1039	Mosaic of Drainage-line Aggregate/Floodway Pond Herbland-Riverine Swamp Forest Complex	Emergent	Forest/Woodland
1021	Mosaic of Drainage-line Aggregate/Grassy Riverine Forest-Riverine Swamp Forest Complex	Emergent	Forest/Woodland
1024	Mosaic of Drainage-line Aggregate/Sedgy Riverine Forest-Riverine Swamp Forest Complex	Emergent	Forest/Woodland
1056	Mosaic of Floodplain Grassy Wetland/Floodway Pond Herbland-Riverine Swamp Forest Complex	Emergent	Forest/Woodland
1050	Mosaic of Floodplain Grassy Wetland/Grassy Riverine Forest-Riverine Swamp Forest Complex	Emergent	Forest/Woodland
1053	Mosaic of Floodplain Grassy Wetland/Sedgy Riverine Forest-Riverine Swamp Forest Complex	Emergent	Forest/Woodland
1036	Mosaic of Floodplain Riparian Woodland/Sedgy	Emergent	Forest/Woodland

EVC no.	EVC name	Emergent vegetation category	Dominant vegetation category
	Riverine Forest-Riverine Swamp Forest Complex		
1057	Mosaic of Floodway Pond Herbland/Grassy Riverine Forest-Riverine Swamp Forest Complex	Emergent	Forest/Woodland
1059	Mosaic of Floodway Pond Herbland/Sedgy Riverine Forest-Riverine Swamp Forest Complex	Emergent	Forest/Woodland
1020	Mosaic of Grassy Riverine Forest/Floodway Pond Herbland-Riverine Swamp Forest Complex	Emergent	Forest/Woodland
1019	Mosaic of Grassy Riverine Forest/Sedgy Riverine Forest-Riverine Swamp Forest Complex	Emergent	Forest/Woodland
1061	Mosaic of Grassy Riverine Forest-Riverine Swamp Forest Complex/Riverine Swamp Forest	Emergent	Forest/Woodland
1042	Mosaic of Riverine Grassy Woodland/Floodway Pond Herbland-Riverine Swamp Forest Complex	Emergent	Forest/Woodland
1072	Mosaic of Riverine Swamp Forest/Floodway Pond Herbland-Riverine Swamp Forest Complex	Emergent	Forest/Woodland
1074	Mosaic of Riverine Swampy Woodland/Sedgy Riverine Forest-Riverine Swamp Forest Complex	Emergent	Forest/Woodland
1078	Mosaic of Sedgy Riverine Forest/Floodway Pond Herbland-Riverine Swamp Forest Complex	Emergent	Forest/Woodland
1075	Mosaic of Sedgy Riverine Forest/Sedgy Riverine Forest-Riverine Swamp Forest Complex	Emergent	Forest/Woodland
1080	Mosaic of Sedgy Riverine Forest-Riverine Swamp Forest Complex/Floodway Pond Herbland-Riverine Swamp Forest Complex	Emergent	Forest/Woodland
1079	Mosaic of Sedgy Riverine Forest-Riverine Swamp Forest Complex/Tall Marsh	Emergent	Forest/Woodland
1083	Mosaic of Tall Marsh/Floodway Pond Herbland-Riverine Swamp Forest Complex	Emergent	Forest/Woodland
1085	Mountain Valley Riparian Woodland	Emergent	Forest/Woodland
950	Native EVCs - Hardwood Plantation	Emergent	Forest/Woodland
982	No EVC assigned - need editing	Unknown	Unknown
971	Non-Woody Vegetation - No EVC assigned	Unknown	Unknown
996	Not assessed to date	Unknown	Unknown
981	Parilla Mallee	Emergent	Shrub
682	Permanent Open Freshwater	Non-emergent	No emergent vegetation
684	Permanent Saline	Non-emergent	No emergent vegetation

EVC no.	EVC name	Emergent vegetation category	Dominant vegetation category
891	Plains Brackish Sedge Wetland	Emergent	Sedge/grass/forb
899	Plains Freshwater Sedge Wetland	Emergent	Sedge/grass/forb
132	Plains Grassland	Emergent	Sedge/grass/forb
897	Plains Grassland/Plains Grassy Woodland Mosaic	Emergent	Forest/Woodland
267	Plains Grassland/Plains Grassy Woodland/Gilgai Wetland Mosaic	Emergent	Forest/Woodland
715	Plains Grassland/Stony Knoll Shrubland Mosaic	Emergent	Shrub
151	Plains Grassy Forest	Emergent	Forest/Woodland
832	Plains Grassy Wetland/Red Gum Swamp Mosaic	Emergent	Forest/Woodland
55	Plains Grassy Woodland	Emergent	Forest/Woodland
261	Plains Grassy Woodland/Creekline Grassy Woodland Mosaic	Emergent	Forest/Woodland
238	Plains Grassy Woodland/Creekline Grassy Woodland/Floodplain Riparian Woodland Mosaic	Emergent	Forest/Woodland
240	Plains Grassy Woodland/Creekline Grassy Woodland/Wetland Formation Mosaic	Emergent	Forest/Woodland
186	Plains Grassy Woodland/Floodplain Riparian Woodland Complex	Emergent	Forest/Woodland
259	Plains Grassy Woodland/Gilgai Wetland Mosaic	Emergent	Forest/Woodland
263	Plains Grassy Woodland/Plains Grassland/Plains Grassy Wetland Mosaic	Emergent	Forest/Woodland
739	Plains Grassy Woodland/Plains Swampy Woodland Mosaic	Emergent	Forest/Woodland
716	Plains Grassy Woodland/Stony Knoll Shrubland Mosaic	Emergent	Forest/Woodland
927	Plains Grassy Woodland/Swamp Scrub/Plains Grassy Wetland Mosaic	Emergent	Forest/Woodland
188	Plains Grassy Woodland/Valley Grassy Forest Complex	Emergent	Forest/Woodland
190	Plains Grassy Woodland/Valley Grassy Forest/Grassy Woodland Complex	Emergent	Forest/Woodland
826	Plains Savannah	Emergent	Sedge/grass/forb
780	Plains Sedgy Woodland/Shallow Sands Woodland/Heathy Woodland Mosaic	Emergent	Forest/Woodland
776	Plains Swampy Woodland/Swamp Scrub Mosaic	Emergent	Forest/Woodland
803	Plains Woodland	Emergent	Forest/Woodland

EVC no.	EVC name	Emergent vegetation category	Dominant vegetation category
787	Plains Woodland/Damp Sands Herb-rich Woodland Mosaic	Emergent	Forest/Woodland
235	Plains Woodland/Herb-rich Gilgai Wetland Mosaic	Emergent	Forest/Woodland
855	Plains Woodland/Lignum Swamp Mosaic	Emergent	Forest/Woodland
693	Plains Woodland/Plains Grassland Mosaic	Emergent	Forest/Woodland
273	Plains Woodland/Plains Grassland/Gilgai Wetland Mosaic	Emergent	Forest/Woodland
660	Plains Woodland/Plains Grassy Wetland Mosaic	Emergent	Forest/Woodland
724	Plains Woodland/Plains Sedgy Woodland/Damp Sands Herb-rich Woodland Mosaic	Emergent	Forest/Woodland
856	Plains Woodland/Red Gum Swamp Mosaic	Emergent	Forest/Woodland
149	Plantation (Softwood and Hardwood)	Emergent	Forest/Woodland
987	Plantation (undefined)	Emergent	Forest/Woodland
997	Private Land No Tree Cover	Unknown	Unknown
138	Railway-Roadside-Fenceline Vegetation	Unknown	Unknown
830	Red Gum Swamp/Cane Grass Wetland Mosaic	Emergent	Forest/Woodland
834	Red Gum Swamp/Lignum Swampy Woodland Mosaic	Emergent	Forest/Woodland
333	Red Gum Swamp/Plains Grassy Wetland Mosaic	Emergent	Forest/Woodland
831	Red Gum Swamp/Spike-sedge Wetland Mosaic	Emergent	Forest/Woodland
886	Red Gum Wetland/Aquatic Herbland Mosaic	Emergent	Forest/Woodland
458	Red Gum Wetland/Shallow Freshwater Marsh Mosaic	Emergent	Forest/Woodland
95	Red Swale Mallee	Emergent	Shrub
300	Reed Swamp	Emergent	Sedge/grass/forb
96	Ridged Plains Mallee	Emergent	Shrub
18	Riparian Forest	Emergent	Forest/Woodland
237	Riparian Forest/Swampy Riparian Woodland Mosaic	Emergent	Forest/Woodland
84	Riparian Forest/Swampy Riparian Woodland/Riparian Shrubland/Riverine Escarpment Scrub Mosaic	Emergent	Forest/Woodland
123	Riparian Forest/Warm Temperate Rainforest Mosaic	Emergent	Forest/Woodland
509	Riparian Scrub/Heathland Thicket Mosaic	Emergent	Shrub
510	Riparian Scrub/Sedgy Riparian Woodland Complex	Emergent	Forest/Woodland
596	Riparian Scrub/Sedgy Riparian Woodland Mosaic	Emergent	Forest/Woodland

EVC no.	EVC name	Emergent vegetation category	Dominant vegetation category
17	Riparian Scrub/Swampy Riparian Woodland Complex	Emergent	Forest/Woodland
19	Riparian Shrubland	Emergent	Shrub
269	Riparian Shrubland/Swampy Riparian Woodland Mosaic	Emergent	Forest/Woodland
641	Riparian Woodland	Emergent	Forest/Woodland
668	Riparian Woodland/Escarpment Shrubland Mosaic	Emergent	Forest/Woodland
321	Riverine Chenopod Woodland/Lignum Swamp Mosaic	Emergent	Forest/Woodland
110	Riverine Chenopod Woodland/Plains Grassland Mosaic	Emergent	Forest/Woodland
82	Riverine Escarpment Scrub	Emergent	Shrub
1088	Riverine Grassland	Emergent	Sedge/grass/forb
295	Riverine Grassy Woodland	Emergent	Forest/Woodland
1027	Riverine Grassy Woodland/Grassy Riverine Forest-Riverine Swamp Forest Complex	Emergent	Forest/Woodland
870	Riverine Grassy Woodland/Plains Woodland Complex	Emergent	Forest/Woodland
871	Riverine Grassy Woodland/Plains Woodland/Gilgai Wetland Complex	Emergent	Forest/Woodland
872	Riverine Grassy Woodland/Plains Woodland/Riverine Chenopod Woodland Complex	Emergent	Forest/Woodland
873	Riverine Grassy Woodland/Riverine Chenopod Woodland/Wetland Mosaic	Emergent	Forest/Woodland
1028	Riverine Grassy Woodland/Riverine Swamp Forest Mosaic	Emergent	Forest/Woodland
1040	Riverine Grassy Woodland/Riverine Swampy Woodland Mosaic	Emergent	Forest/Woodland
1041	Riverine Grassy Woodland/Sedgy Riverine Forest Mosaic	Emergent	Forest/Woodland
658	Riverine Grassy Woodland/Sedgy Riverine Forest/Aquatic Herbland Mosaic	Emergent	Forest/Woodland
255	Riverine Grassy Woodland/Sedgy Riverine Forest/Wetland Formation Mosaic	Emergent	Forest/Woodland
1067	Riverine Swamp Forest/Riverine Swampy Woodland Mosaic	Emergent	Forest/Woodland
1068	Riverine Swamp Forest/Sedgy Riverine Forest Mosaic	Emergent	Forest/Woodland

EVC no.	EVC name	Emergent vegetation category	Dominant vegetation category
1069	Riverine Swamp Forest/Sedgy Riverine Forest-Riverine Swamp Forest Complex	Emergent	Forest/Woodland
1070	Riverine Swamp Forest/Spike-sedge Wetland Mosaic	Emergent	Forest/Woodland
1071	Riverine Swamp Forest/Tall Marsh Mosaic	Emergent	Forest/Woodland
946	Riverine Swampy Woodland/Lignum Swamp Mosaic	Emergent	Forest/Woodland
1099	Riverine Swampy Woodland/Plains Grassy Wetland Mosaic	Emergent	Forest/Woodland
1073	Riverine Swampy Woodland/Sedgy Riverine Forest Mosaic	Emergent	Forest/Woodland
64	Rocky Chenopod Woodland	Emergent	Forest/Woodland
193	Rocky Outcrop Herbland	Emergent	Sedge/grass/forb
28	Rocky Outcrop Shrubland	Emergent	Shrub
73	Rocky Outcrop Shrubland/Rocky Outcrop Herbland Mosaic	Emergent	Shrub
351	Rocky Outcrop Shrubland/Rocky Outcrop Herbland/Grassy Dry Forest Complex	Emergent	Shrub
986	Rocky Shore	Non-emergent	No emergent vegetation
741	Salt Paperbark Woodland/Samphire Shrubland Mosaic	Emergent	Forest/Woodland
940	Samphire Shrubland/Saline Lake Mosaic	Emergent	Shrub
134	Sand Forest	Emergent	Forest/Woodland
6	Sand Heathland	Emergent	Shrub
500	Sand Heathland/Damp Heathland Complex	Emergent	Shrub
307	Sand Heathland/Wet Heathland Mosaic	Emergent	Shrub
264	Sand Ridge Woodland	Emergent	Forest/Woodland
93	Sandstone Ridge Shrubland	Emergent	Shrub
257	Sandstone Ridge Shrubland/Box Ironbark Forest Mosaic	Emergent	Forest/Woodland
694	Sandstone Ridge Shrubland/Low Rises Woodland Mosaic	Emergent	Forest/Woodland
985	Sandy Beach	Non-emergent	No emergent vegetation
141	Sandy Flood Scrub	Emergent	Shrub
874	Sandy Stream Shrubland	Emergent	Shrub

EVC no.	EVC name	Emergent vegetation category	Dominant vegetation category
674	Sandy Stream Woodland	Emergent	Forest/Woodland
894	Scoria Cone Woodland	Emergent	Forest/Woodland
529	Seasonally Inundated Shrubby Woodland/Heathland Thicket Mosaic	Emergent	Forest/Woodland
751	Seasonally Inundated Shrubby Woodland/Plains Sedgy Woodland Mosaic	Emergent	Forest/Woodland
531	Seasonally Inundated Shrubby Woodland/Sedge Wetland Complex	Emergent	Forest/Woodland
198	Sedgy Riparian Woodland	Emergent	Forest/Woodland
798	Sedgy Riparian Woodland/Riparian Scrub Mosaic	Emergent	Forest/Woodland
1076	Sedgy Riverine Forest/Spike-sedge Wetland Mosaic	Emergent	Forest/Woodland
1077	Sedgy Riverine Forest/Tall Marsh Mosaic	Emergent	Forest/Woodland
98	Semi-arid Chenopod Woodland	Emergent	Forest/Woodland
828	Semi-arid Parilla Woodland	Emergent	Forest/Woodland
97	Semi-arid Woodland	Unknown	Unknown
683	Semi-Permanent Saline	Unknown	Unknown
200	Shallow Freshwater Marsh	Emergent	Unknown
519	Shallow Freshwater Marsh/Floodplain Thicket Mosaic	Emergent	Shrub
521	Shallow Freshwater Marsh/Seasonally Inundated Shrubby Woodland Complex	Emergent	Forest/Woodland
882	Shallow Sands Woodland	Emergent	Forest/Woodland
788	Shallow Sands Woodland/Heathy Herb-rich Woodland Mosaic	Emergent	Forest/Woodland
748	Shallow Sands Woodland/Heathy Woodland Mosaic	Emergent	Forest/Woodland
711	Shallow Sands Woodland/Plains Sedgy Woodland Mosaic	Emergent	Forest/Woodland
749	Shallow Sands Woodland/Plains Sedgy Woodland/Seasonally Inundated Shrubby Woodland Mosaic	Emergent	Forest/Woodland
750	Shallow Sands Woodland/Plains Sedgy Woodland/Seasonally Inundated Shrubby Woodland/Damp Sands Herb-rich Woodland Mosaic	Emergent	Forest/Woodland
867	Shallow Sands Woodland/Plains Woodland Mosaic	Emergent	Forest/Woodland
316	Shrubby Damp Forest	Emergent	Forest/Woodland
21	Shrubby Dry Forest	Emergent	Forest/Woodland

EVC no.	EVC name	Emergent vegetation category	Dominant vegetation category
45	Shrubby Foothill Forest	Emergent	Forest/Woodland
315	Shrubby Foothill Forest/Damp Forest Complex	Emergent	Forest/Woodland
938	Shrubby Gully Forest	Emergent	Forest/Woodland
818	Shrubby Riverine Woodland	Emergent	Forest/Woodland
201	Shrubby Wet Forest	Emergent	Forest/Woodland
282	Shrubby Woodland	Emergent	Forest/Woodland
439	Shrubby Woodland/Alluvial Terraces Herb-rich Woodland Complex	Emergent	Forest/Woodland
438	Shrubby Woodland/Alluvial Terraces Herb-rich Woodland Mosaic	Emergent	Forest/Woodland
547	Shrubby Woodland/Damp Sands Herb-rich Woodland Complex	Emergent	Forest/Woodland
436	Shrubby Woodland/Damp Sands Herb-rich Woodland Mosaic	Emergent	Forest/Woodland
441	Shrubby Woodland/Heathy Woodland Complex	Emergent	Forest/Woodland
449	Shrubby Woodland/Riparian Scrub Complex	Emergent	Forest/Woodland
799	Shrubby Woodland/Riparian Scrub Mosaic	Emergent	Forest/Woodland
448	Shrubby Woodland/Sand Heathland Complex	Emergent	Forest/Woodland
443	Shrubby Woodland/Seasonally Inundated Shrubby Woodland Complex	Emergent	Forest/Woodland
450	Shrubby Woodland/Sedgy Riparian Woodland Complex	Emergent	Forest/Woodland
1012	Snowpatch Grassland	Emergent	Sedge/grass/forb
1081	Spike-sedge Wetland/Tall Marsh Mosaic	Emergent	Sedge/grass/forb
714	Stony Knoll Shrubland/Plains Grassy Woodland/Plains Grassy Wetland Mosaic	Emergent	Forest/Woodland
203	Stony Rises Woodland	Emergent	Forest/Woodland
792	Stony Rises Woodland/Stony Knoll Shrubland Complex	Emergent	Forest/Woodland
851	Stream Bank Shrubland	Emergent	Shrub
204	Sub-alpine Damp Heathland	Emergent	Shrub
1003	Sub-alpine Dry Shrubland	Emergent	Shrub
206	Sub-alpine Grassland	Emergent	Sedge/grass/forb
208	Sub-alpine Riparian Shrubland	Emergent	Shrub
42	Sub-alpine Shrubland	Emergent	Shrub

EVC no.	EVC name	Emergent vegetation category	Dominant vegetation category
44	Sub-alpine Treeless Vegetation	Emergent	Shrub
211	Sub-alpine Wet Heathland/Alpine Valley Peatland Mosaic	Emergent	Moss/heath
317	Sub-alpine Wet Heathland/Sub-alpine Grassland Mosaic	Emergent	Shrub
43	Sub-alpine Woodland	Emergent	Forest/Woodland
720	Swamp Scrub/Aquatic Herbland Mosaic	Emergent	Shrub
687	Swamp Scrub/Plains Grassland Mosaic	Emergent	Shrub
639	Swamp Scrub/Plains Grassy Forest Mosaic	Emergent	Forest/Woodland
700	Swamp Scrub/Plains Sedgy Wetland Mosaic	Emergent	Shrub
733	Swamp Scrub/Plains Sedgy Wetland/Aquatic Herbland Mosaic	Emergent	Shrub
701	Swamp Scrub/Warm Temperate Rainforest/Billabong Wetland Mosaic	Emergent	Forest/Woodland
638	Swamp Scrub/Wet Heathland Mosaic	Emergent	Shrub
126	Swampy Riparian Complex	Emergent	Shrub
212	Swampy Riparian Woodland/Perched Boggy Shrubland Mosaic	Emergent	Forest/Woodland
688	Swampy Riparian Woodland/Swamp Scrub Mosaic	Emergent	Forest/Woodland
35	Tableland Damp Forest	Emergent	Forest/Woodland
1087	Tall Marsh/Aquatic Herbland Mosaic	Emergent	Sedge/grass/forb
1084	Tall Marsh/Non-Vegetation Mosaic	Emergent	Sedge/grass/forb
1090	Tall Marsh/Open Water Mosaic	Emergent	Sedge/grass/forb
1082	Tall Marsh/Riverine Swamp Forest Mosaic	Emergent	Forest/Woodland
90	Tea-tree Scrub	Emergent	Shrub
313	Unclassified Moist Forests	Emergent	Forest/Woodland
47	Valley Grassy Forest	Emergent	Forest/Woodland
409	Valley Grassy Forest/Heathy Woodland Complex	Emergent	Forest/Woodland
408	Valley Grassy Forest/Herb-rich Foothill Forest Complex	Emergent	Forest/Woodland
241	Valley Grassy Forest/Plains Grassy Woodland Complex	Emergent	Forest/Woodland
699	Valley Grassy Forest/Swamp Scrub Mosaic	Emergent	Forest/Woodland
127	Valley Heathy Forest	Emergent	Forest/Woodland

EVC no.	EVC name	Emergent vegetation category	Dominant vegetation category
32	Warm Temperate Rainforest	Emergent	Forest/Woodland
995	Water - Ocean	Non-emergent	No emergent vegetation
1107	Water Body - estuary	Non-emergent	No emergent vegetation
992	Water Body - Fresh	Non-emergent	No emergent vegetation
998	Water Body - man-made	Non-emergent	No emergent vegetation
991	Water body - salt	Non-emergent	No emergent vegetation
983	Water Body - to be determined	Non-emergent	No emergent vegetation
30	Wet Forest	Emergent	Forest/Woodland
930	Wet Forest - Hardwood Plantation	Emergent	Forest/Woodland
686	Wet Heathland/Damp Heathland Mosaic	Emergent	Shrub
645	Wet Heathland/Heathy Woodland Mosaic	Emergent	Forest/Woodland
768	Wet Heathland/Riparian Scrub Mosaic	Emergent	Shrub
233	Wet Sands Thicket	Emergent	Shrub
74	Wetland Formation	Emergent	Sedge/grass/forb
824	Woorinen Mallee	Unknown	Unknown
86	Woorinen Sands Mallee	Unknown	Unknown

Appendix 2. ANAE classification framework habitat attributes for surface waters

Table A2.1 ANAE classification attributes for aquatic habitats (AETG (2012).

System	Attribute	Metrics		
Marine and estuarine	Substrate	Unbroken rock Broken rock/Boulder/Cobble Pebble/Gravel Sand Silt		
	Structural Macrobiota	Mangroves Saltmarsh Seagrass Macroalgae Coral Filter feeders		
	Water Depth	Supratidal Intertidal Subtidal Shallow Deep Abysmal		
	Light Availability	>15% 5 – 15% <5%	or	Photic zone Low light zone Aphotic zone
	Nutrient Availability	High Medium Low	or	Oligotrophic Mesotrophic Eutrophic
	Exposure	Sheltered Exposed		
Lacustrine and palustrine	Landform	High Energy Upland Slope Low Energy Upland (Plateau) Lowland		

System	Attribute	Metrics		
Lacustrine and palustrine	Soils	Porous		
		Peat (organic)		
		Mineral (soil)		
		Sand (non-soil		
		Non-porous		
		Rock (non-soil)		
	Dominant vegetation	Forested		
		Shrub		
		Sedge/grass/forb		
		No emergent vegetation		
	Dominant water source (>70%)	Surface water		
		Groundwater		
		Both surface and ground (where there is temporal dominance by one or the other)		
		Localised rainfall		
	Water type	Salinity	or	pH
		Fresh (<3000 mg/L)		Acidic (<6)
		Brackish (3000 – 5000 mg/L)		Neutral (6 – 8)
		Saline (> 5000 mg/L)		Alkaline (>7)
	Water regime	Permanently inundated	or	Commonly wet (>70% of time)
		Seasonally inundated		Periodic inundation
		Aseasonally inundated		Waterlogged

Appendix 3. Datasets used to assign system and habitat attributes

Table A3.1. Datasets used to assign wetland system and habitat attributes to wetlands in WETLAND_CURRENT.

Dataset name	Description	Attribute					
		Wetland system	Wetland origin	Dominant vegetation	Water source	Water regime	Salinity regime
1 in 100 year flood extent	Polygon data delineating modelled statistical flood extent with an Average Recurrence Interval of 100 years http://www.giconnections.vic.gov.au/content/vicgdd/record/ANZVI0803003630.htm				✓		
All Victorian dam boundaries	A dataset developed for DELWP by SKM that maps dams across Victoria (unpublished).		✓		✓		
ALPS	A layer developed by DELWP which defines high country peatlands as described in Lawrence et al. 2009		✓	✓			
DRWaterbodies	Melbourne Water's stormwater assets database (unpublished).		✓		✓		
ESTUARIES	DELWP geospatial layer defining the spatial extent of estuaries, developed by Deakin University (Barton et al. 2008)	✓					✓
Features of interest	A dataset intended to describe and record the location of features of interest as supplied by an authoritative source, including features such as education centres, landmarks, geographical points, mines. http://www.dse.vic.gov.au/__data/assets/pdf_file/0018/142470/Vicmap-Features-of-Interest-Prod-Desc-V1_1.pdf		✓				
Floodplain extent	Wetland landscapes 12 (Riverine mid-Murray), 13 (Riverine – Mallee) and 15 (Lowland Riparian Floodplain) on the WETLAND_REGIONS dataset (Section 3.1.1, Figure 8)				✓		
Floodway	Polygon features representing 'declared' or otherwise delineated floodways. Floodways are typically areas of low lying land close to rivers that are prone to flooding http://www.giconnections.vic.gov.au/content/vicgdd/record/ANZVI0803004311.htm				✓		

Dataset name	Description	Attribute					
		Wetland system	Wetland origin	Dominant vegetation	Water source	Water regime	Salinity regime
GB_SPR	A layer developed by Goulburn Broken CMA which defines springs as described in Coates et al. 2010		✓	✓			
GB_SS	A layer developed by Goulburn Broken CMA which defines soaks as described in Carr et al. 2006		✓	✓			
Geoscience Australia's *Water Observations From Space*	Dataset obtained from Geoscience Australia http://www.ga.gov.au/scientific-topics/hazards/flood/wofs					✓	
IWC Data Management System (IWCDMS)	A dataset stored in the Index of Wetland Condition Data Management System (IWCDMS) which includes the proportion of each EVC present at each assessed wetland as recorded in IWC field assessments and using the EVCs in Appendix 1.			✓			✓
Modelled 2005 EVCs (updated)	A dataset combined from two sources: Modelled 2005 EVCs - polygon features delineating native vegetation type across Victoria, modelled in 2005 using EVCs http://www.giconnections.vic.gov.au/content/vicgdd/record/ANZVI0803003495.htm DELWP Modelled 2005 EVC unpublished update - polygon features delineating native vegetation type (EVCs) across parts of Victoria had been updated from modelled EVC 2005 based on surveys after 2005.	✓	✓	✓	✓	✓	✓
National Atlas of Groundwater Dependent Ecosystems (GDE Atlas)	An atlas of groundwater dependent ecosystems released by the Australian Government http://www.bom.gov.au/water/groundwater/gde <<add reference>>				✓		
Victorian Coastal Saltmarsh and Estuarine EVCs	Mapping of coastal saltmarsh and estuarine EVCs (Table 9) across Victoria (unpublished dataset developed for the Victorian Saltmarsh Study (Boon et al. 2011)	✓					✓
VMINDEX_FRAMEWORK_AREA_POLYGON	Polygon version of outline of Victoria's landmass at 1:25:000 scale. http://www.giconnections.vic.gov.au/content/vicgdd/record/ANZVI0803002865.htm	✓					✓

Dataset name	Description	Attribute					
		Wetland system	Wetland origin	Dominant vegetation	Water source	Water regime	Salinity regime
Water area 1:25,000	Polygon features delineating hydrological features, including lakes, flats (subject to inundation), wetlands, pondages (saltpan and sewage), watercourse areas, rapids and waterfalls. http://services.land.vic.gov.au/rhok/Metadata/HY_WATER_AREA_POLYGON.htm		✓		✓	✓	
Watercourse network 1:25,000	Line features delineating hydrological features. For the analysis of data for river water source attribute, the dataset was restricted to features categorised as a watercourse_river or watercourse_stream (as per FEATURE_TYPE_CODE attribute) http://www.giconnections.vic.gov.au/content/vicgdd/record/ANZVI0803002490.htm				✓		
Watercourse network 1:250,000 to 1 :5,000,000	Line features delineating hydrological features, for this analysis restricted to features categorised as a watercourse_river or watercourse_stream (as per FEATURE_TYPE_CODE attribute) http://www.giconnections.vic.gov.au/content/vicgdd/record/ANZVI0803003512.htm				✓		
WETLAND_1788	A DELWP layer developed by Corrick which estimates the extent and type of wetlands present at the time of European settlement using the Corrick classification.		✓				
WETLAND_1994	A layer developed by DELWP which defines the spatial extent of wetlands as well as their Corrick categories and subcategories based on data from 1976 to 1994 and subsequent refinements.		✓	✓	✓	✓	✓

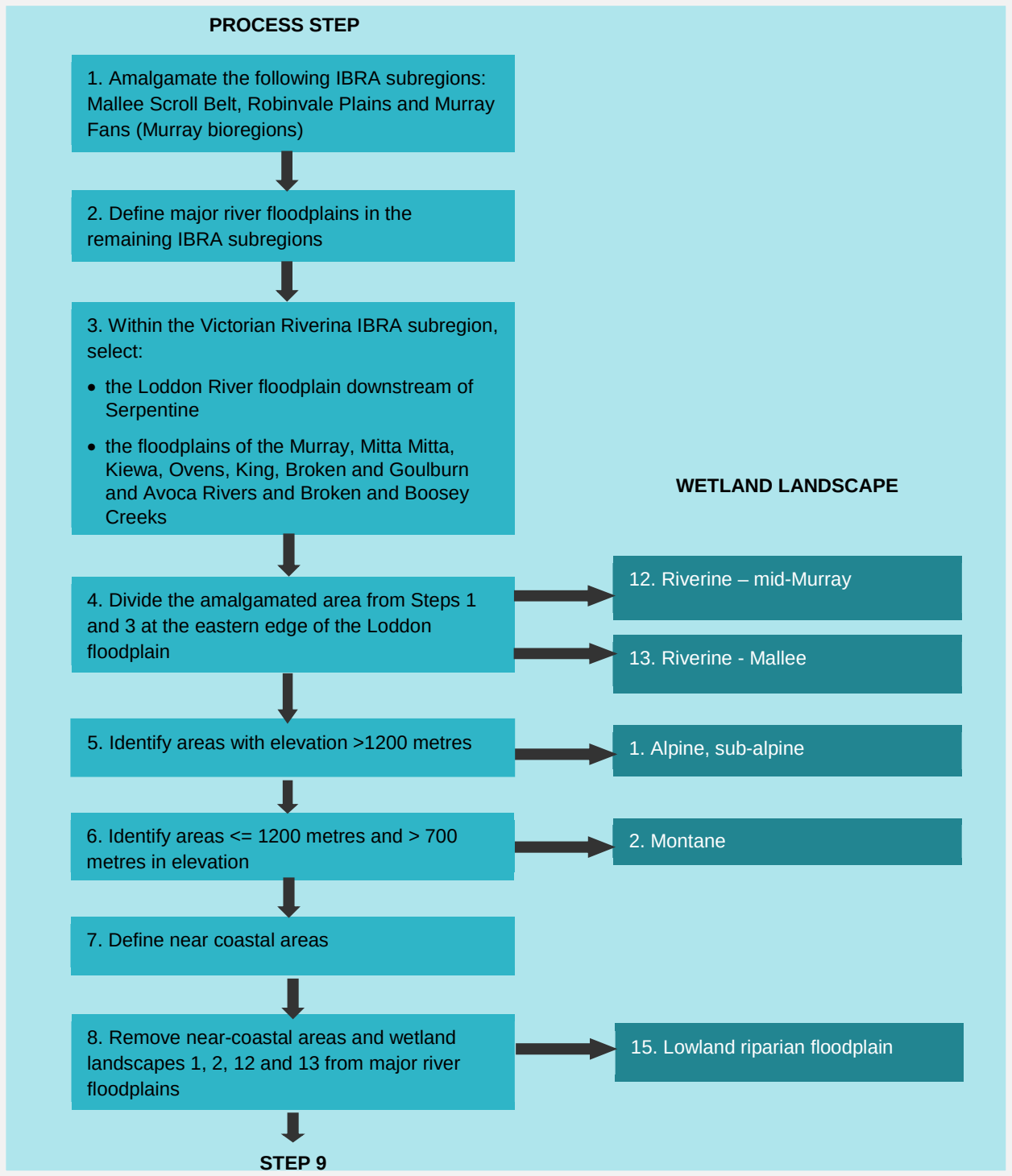
Appendix 4. Description of Australian Soil Resources Information System regions in Victoria

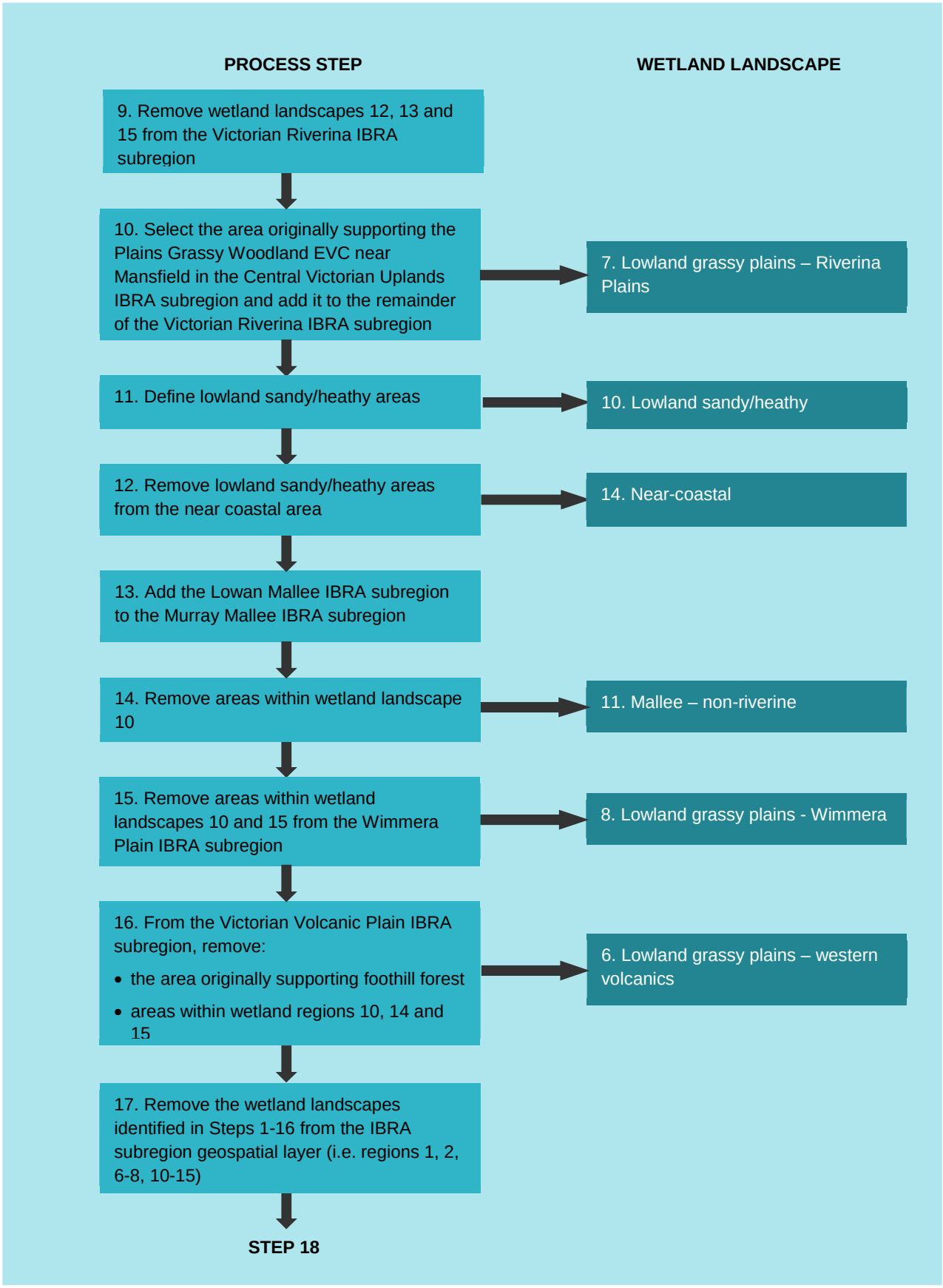
Table A4.1 Description of Australian Soil Resources Information System regions in Victoria. Source: Pain et al. (2011).

Region number	Province	Region	Region description
10701	Kosciuszkan Uplands Province	Hume Slopes	Ridges and minor tablelands stepping down westwards and breaking into detached hills with intervening alluvial valley floors. Some strong structural control on landforms.
10703	Kosciuszkan Uplands Province	Australian Alps	Dissected high upland, glaciated locally with some periglacial features. Uplifted blocks surrounded by highly dissected high relief hill country.
10704	Kosciuszkan Uplands Province	Tinderry-Gourock Ranges	High hill chains of granite, sandstone and greywacke, moderately dissected, some fault lines.
10705	Kosciuszkan Uplands Province	Monaro Fall	Deeply dissected steeply sloping plateau margin in metamorphics and granite. Bounded in the west by the Great Escarpment.
10706	Kosciuszkan Uplands Province	Monaro Tableland	Undulating upland plains with some tablular basalt relief and granite tors.
10707	Kosciuszkan Uplands Province	East Victorian Uplands	Dissected high plateaus on various resistant rocks, with isolated high plains.
10708	Kosciuszkan Uplands Province	West Victorian Uplands	Moderately high plateaus and strike ridges.
10709	Kosciuszkan Uplands Province	West Victorian Plains	Plains mainly on basalt lavas with many volcanic forms and lakes, partly on weak sedimentary rocks.
10710	Kosciuszkan Uplands Province	South Victorian Uplands	Low fault blocks, mainly of tilted and dissected sandstone; granite hills and islands, in two parts either side of Port Phillip Bay.
10711	Kosciuszkan Uplands Province	Gippsland Plain	Terraced plains with sand and gravels..
20301	Murray Lowlands Province	Lower Darling Plain	Floodplain and lunette lakes.
20302	Murray Lowlands Province	Cobar Plains	Plains with remnants of silcrete and low sandstone ridges, sand cover in west, with west-east longitundinal dunes.
20303	Murray Lowlands Province	Condobolin Plains	Plains of gravel and sandy alluvium.
20304	Murray Lowlands Province	Ivanhoe Plains	Plains with low west-east stabilised longitundinal dunes and sandplain, small pans with lunettes, minor sandstone ridges, floodplains.
20305	Murray Lowlands Province	Riverine Plain	Alluvial plain.
20306	Murray Lowlands Province	Mallee Dunefield	Fixed west-east calcareous longitudinal dunes.
20307	Murray Lowlands Province	Wimmera Plain	Aeolian and alluvial sandplain, minor low sandstone ridges.
20308	Murray Lowlands Province	Coorong Plain	Coastal barrier, lagoons and limestone dunes.
20309	Murray Lowlands Province	Millicent Plain	Parallel dune limestone ridges with intervening swamps; closed karst depressions and young volcanoes in south east.
20310	Murray Lowlands Province	West-Turkey Plains	Plains with variable dune cover, claypans, saline swamps, and intermittent lakes in low-lying areas.

Appendix 5. Definition of Victorian wetland landscapes

The steps used in the process of defining wetland landscapes are shown in Figure A5.1. Notes following the flow chart provide information on data sources (Table A5.1) and specific steps.




PROCESS STEP
WETLAND LANDSCAPE
9. Remove wetland landscapes 12, 13 and 15 from the Victorian Riverina IBRA subregion
10. Select the area originally supporting the Plains Grassy Woodland EVC near Mansfield in the Central Victorian Uplands IBRA subregion and add it to the remainder of the Victorian Riverina IBRA subregion
7. Lowland grassy plains – Riverina Plains
11. Define lowland sandy/heathy areas
10. Lowland sandy/heathy
12. Remove lowland sandy/heathy areas from the near coastal area
14. Near-coastal
13. Add the Lowan Mallee IBRA subregion to the Murray Mallee IBRA subregion
14. Remove areas within wetland landscape 10
11. Mallee – non-riverine
15. Remove areas within wetland landscapes 10 and 15 from the Wimmera Plain IBRA subregion
8. Lowland grassy plains - Wimmera
16. From the Victorian Volcanic Plain IBRA subregion, remove:
• the area originally supporting foothill forest
• areas within wetland regions 10, 14 and 15
6. Lowland grassy plains – western volcanics
17. Remove the wetland landscapes identified in Steps 1-16 from the IBRA subregion geospatial layer (i.e. regions 1, 2, 6-8, 10-15)
STEP 18

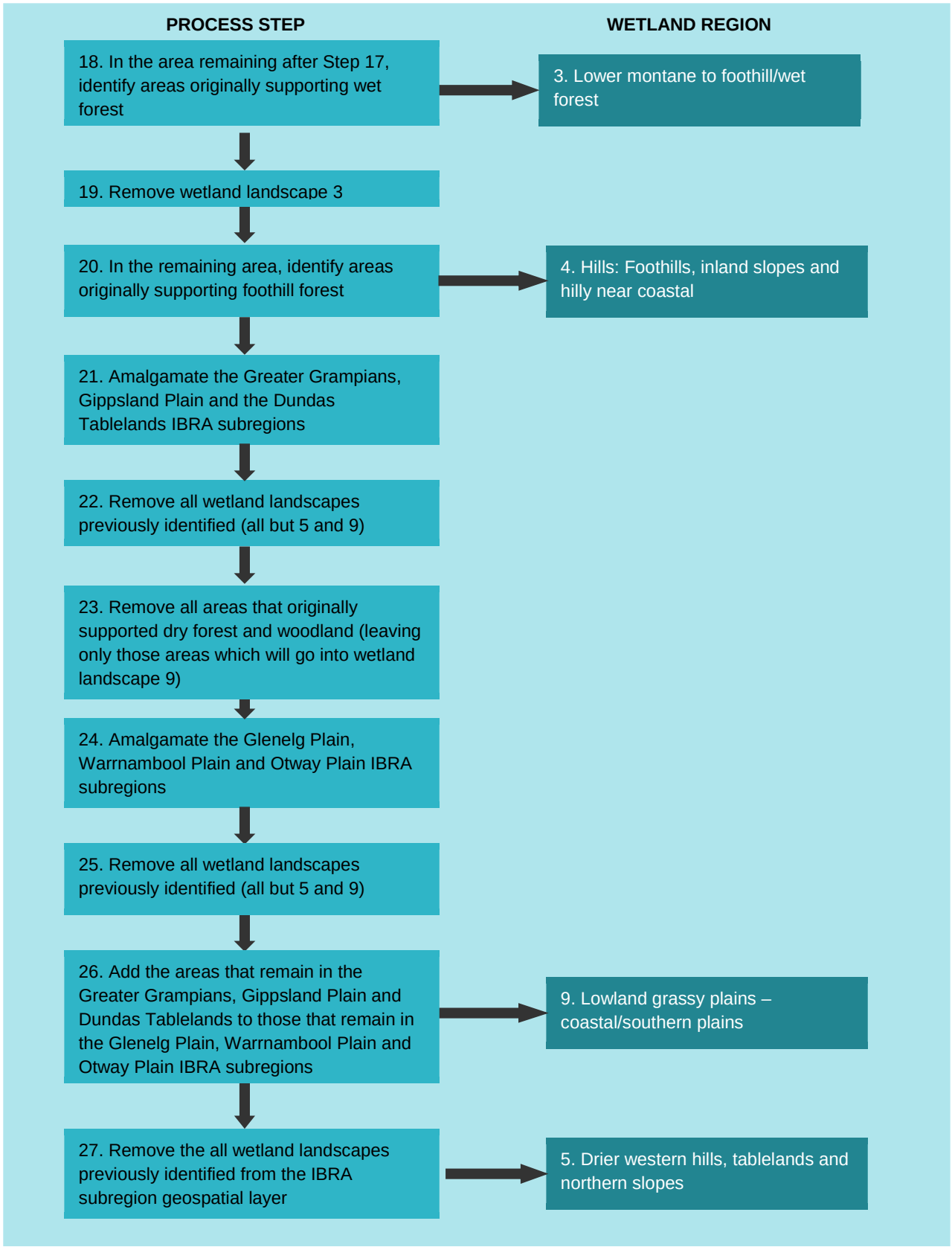


Figure A5.1. Process steps in the definition of Victorian wetland landscapes.

Table A5.1 Sources of data used to define Victorian Wetland landscapes.

Data type	Data source	Scale
IBRA subregions	VBIOREG100	1:100,000
Vegetation - original extent of EVCs	NV1750_EVC	1:100,000
Geomorphic units Present floodplain	LSYS250	1:250,000
Extant wetlands	WETLAND_1994	1:100,000
Major rivers	HY_WATERCOURSE	
Flora species	VBA_FLORA25 VBA_FLORA100	1:25,000 1:100,000
Elevation	Vicmap Elevation 10 - 20 m	-

Step 2. Definition of major river floodplains

The main rivers in Victoria outside the Mallee Scroll Belt, Robinvale Plains and Murray Fans Victorian subregions (Table A5.2) were selected and a 500 metre buffer added to both sides of each river. A set of EVCs that occur on lowland riparian floodplains was selected (Table A5.3). The selected EVC polygons that intersected with the 500 metre river buffer were added to the buffer. The area of present floodplain in the LANDSYS layer that intersected the combined area of river buffer and floodplain EVCs was then added. Finally, wetlands on the WETLAND_1994 layer that intersected the combined area of river buffer, floodplain EVCs and present floodplain were added to define the major river floodplains in the IBRA subregions outside the Mallee Scroll Belt, Robinvale Plains and Murray Fans.

Table A5.2 Main rivers selected to define lowland riparian floodplains outside the Mallee Scroll Belt, Robinvale Plains and Murray Fans Victorian subregions.

Murray-Darling Drainage Division	South East Coast Drainage Division
Murray River	Genoa River
Mitta Mitta River	Cann River
Kiewa River	Bemm River
Ovens River	Brodribb River
King River	Snowy River
Broken River	Buchan River
Broken Creek	Tambo River
Kiewa River	Nicholson River
Boosey Creek	Dargo River
Goulburn River	Wonnangatta River
Campaspe River	Mitchell River
Loddon River	Avon River
Avoca River	Macalister River
Wimmera River	Thomson River
	La Trobe River
	Tarwin River
	Yarra River

Murray-Darling Drainage Division	South East Coast Drainage Division
	Werribee River
	Barwon River
	Leigh River
	Yarrowee River
	Mount Emu Creek
	Hopkins River
	Wannon River
	Glenelg River

Table A5.3 EVCs that occur on lowland riparian floodplains.

EVC number	EVC name
663	Black Box Lignum Woodland
68	Creekline Grassy Woodland
679	Drainage-line Woodland
56	Floodplain Riparian Woodland
813	Intermittent Swampy Woodland
822	Intermittent Swampy Woodland/Riverine Grassy Woodland Complex
823	Lignum Swampy Woodland
641	Riparian Woodland
103	Riverine Chenopod Woodland
321	Riverine Chenopod Woodland/Lignum Swamp Mosaic

Step 7. Definition of near coastal areas

Near coastal areas were defined by combining the following areas:

1. the Barrier Complexes - Discovery Bay, Gippsland Lakes geomorphic units from the LANDSYS layer;
2. the Bridgewater IBRA subregion;
3. a selection of coastal EVCs (Table A5.4);
4. wetlands from the WETLAND_1994 layer that intersect the combination of 1-3 above or occur in marine waters; and
5. selected coastal areas in the Otway Plain IBRA subregion (Figure A5.2)

Table A5.4 Coastal EVCs used in the definition of near coastal areas.

EVC number	EVC name
1	Coastal Dune Scrub/Coastal Dune Grassland Mosaic
2	Coast Banksia Woodland
9	Coastal Saltmarsh
10	Estuarine Wetland
11	Coastal Lagoon Wetland
144	Coast Banksia Woodland/Warm Temperate Rainforest Mosaic
160	Coastal Dune Scrub
161	Coastal Headland Scrub
162	Coastal Headland Scrub/Coastal Tussock Grassland Mosaic
163	Coastal Tussock Grassland
181	Coast Gully Thicket
302	Coastal Saltmarsh/Mangrove Shrubland Mosaic
665	Coastal Mallee Scrub
797	Coastal Landfill/Sand Accretion
858	Coastal Alkaline Scrub
879	Coastal Dune Grassland
900	Coastal Saltmarsh/Coastal Dune Grassland/Coastal Dune Scrub/Coastal Headland Scrub Mosaic
904	Coast Banksia Woodland/Swamp Scrub Mosaic
909	Coastal Dune Scrub/Bird Colony Succulent Herbland Mosaic
914	Estuarine Flats Grassland
919	Coastal Headland Scrub/Coast Banksia Woodland Mosaic
921	Coast Banksia Woodland/Coastal Dune Scrub Mosaic
922	Coastal Alkaline Scrub/Bird Colony Succulent Herbland Mosaic
935	Estuarine Wetland/Estuarine Swamp Scrub Mosaic

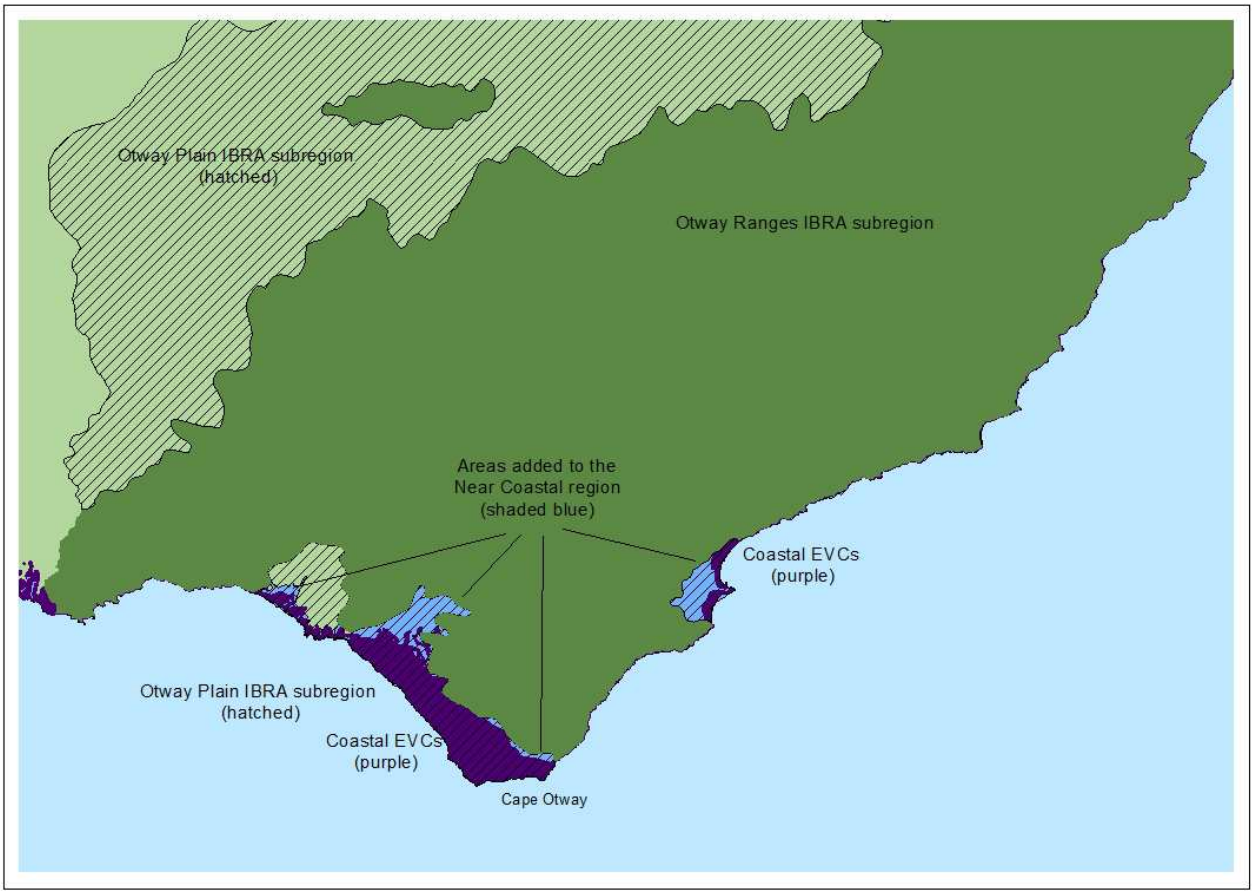


Figure A5.2. Selected areas in the Otway Plain IBRA subregion assigned to the near coastal region.

Step 10. Selection of area in the Central Victorian Uplands IBRA subregion for inclusion in wetland landscape 7

The area in the Central Victorian Uplands IBRA subregion assigned to the Lowland grassy plains – Riverina plains wetland landscape was manually defined based on the occurrence of the Plains Grassy Woodland in the modelled 2005 EVC dataset (Figure A5.3).

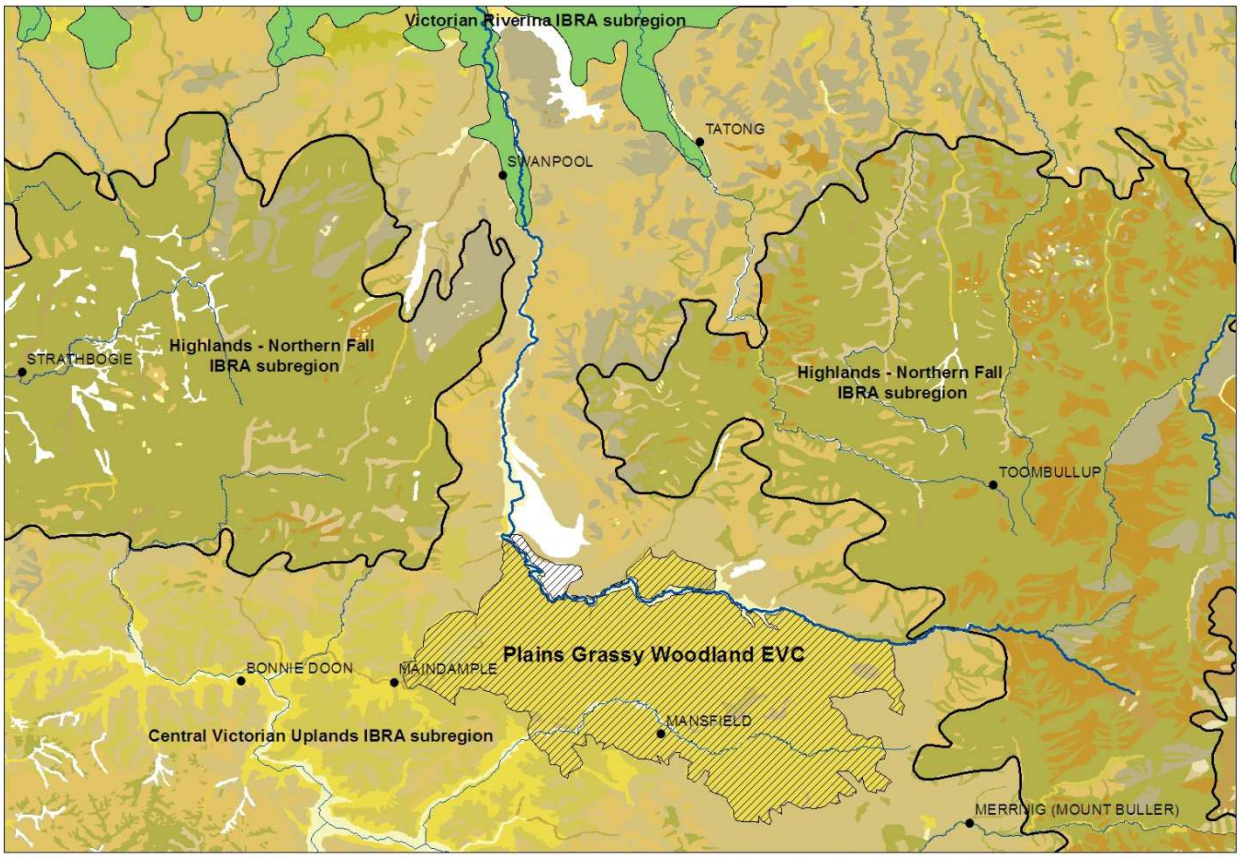


Figure A5.3. Selected polygon (hatched) in the Central Victorian Uplands IBRA subregion assigned to the Lowland grassy plains – Riverina plains wetland landscape.

Step 11. Definition of lowland sandy/heathy areas

Heathy EVCs were selected (Table A5.5) and displayed against IBRA subregions. Heathy EVCs in the alpine and montane wetland landscapes were not included.

For the Lowan Mallee IBRA subregion, the whole of the southernmost polygon was selected as being of predominantly heathy vegetation. For the Wimmera IBRA subregion, geomorphic units and heathy EVCs were displayed and polygons were manually drawn or geomorphic unit polygons were selected where heathy vegetation predominated. For the remainder of the State, heathy polygons were manually drawn where heathy vegetation predominated, based on expert knowledge of heathy/sandy areas where wetlands were likely to occur.

Table A5.5 Heathy EVCs used in the definition of the lowland/sandy/heathy wetland landscape.

EVC number	EVC name
7	Clay Heathland
159	Clay Heathland/Wet Heathland/Riparian Scrub Mosaic
5	Coastal Sand Heathland
165	Damp Heath Scrub
836	Damp Heath Scrub/Heathy Woodland Complex
710	Damp Heathland

EVC number	EVC name
746	Damp Heathland/Damp Heathy Woodland Mosaic
763	Damp Heathland/Damp Heathy Woodland/Seasonally Inundated Shrubby Woodland Mosaic
734	Damp Heathland/Damp Heathy Woodland/Wet Heathland Mosaic
505	Damp Heathland/Riparian Scrub Complex
595	Damp Heathland/Riparian Scrub Mosaic
762	Damp Heathland/Sand Heathland Mosaic
754	Damp Heathland/Seasonally Inundated Shrubby Woodland Mosaic
625	Damp Heathland/Wet Heathland Mosaic
793	Damp Heathy Woodland
1106	Damp Heathy Woodland/Lowland Forest Mosaic
673	Dune Soak Woodland
89	Dunefield Heathland
279	Heathland Thicket
426	Heathland Thicket/Sand Heathland Complex
565	Heathland Thicket/Seasonally Inundated Shrubby Woodland Complex
601	Heathland Thicket/Sedgy Riparian Woodland Complex
427	Heathland Thicket/Wet Heathland Complex
771	Heathy Dry Forest/Sand Heathland Mosaic
179	Heathy Herb-rich Woodland
48	Heathy Woodland
478	Heathy Woodland/Damp Heathland Complex
650	Heathy Woodland/Damp Heathy Woodland/Damp Heathland Mosaic
487	Heathy Woodland/Grassy Dry Forest Complex
481	Heathy Woodland/Heathy Dry Forest Complex
790	Heathy Woodland/Heathy Herb-rich Woodland Mosaic
786	Heathy Woodland/Heathy Herb-rich Woodland/Damp Heathy Woodland Mosaic
584	Heathy Woodland/Hills Herb-rich Woodland Complex
737	Heathy Woodland/Limestone Woodland Mosaic
485	Heathy Woodland/Plains Grassy Woodland Complex
493	Heathy Woodland/Plains Grassy Woodland Mosaic
467	Heathy Woodland/Riparian Scrub Complex
477	Heathy Woodland/Sand Heathland Complex

EVC number	EVC name
892	Heathy Woodland/Sand Heathland Mosaic
756	Heathy Woodland/Seasonally Inundated Shrubby Woodland Mosaic
468	Heathy Woodland/Sedgy Riparian Woodland Complex
475	Heathy Woodland/Sedgy Riparian Woodland Mosaic
489	Heathy Woodland/Shrubby Woodland Complex
471	Heathy Woodland/Shrubby Woodland Mosaic
464	Heathy Woodland/Valley Grassy Forest Complex
278	Herb-rich Heathy Forest
704	Lateritic Woodland
760	Lateritic Woodland/Heathy Dry Forest Mosaic
764	Lateritic Woodland/Heathy Woodland Mosaic
664	Limestone Ridge Woodland
670	Limestone Woodland
134	Sand Forest
6	Sand Heathland
500	Sand Heathland/Damp Heathland Complex
502	Sand Heathland/Seasonally Inundated Shrubby Woodland Mosaic
307	Sand Heathland/Wet Heathland Mosaic
282	Shrubby Woodland
441	Shrubby Woodland/Heathy Woodland Complex
766	Shrubby Woodland/Lateritic Woodland Mosaic
448	Shrubby Woodland/Sand Heathland Complex
90	Tea-tree Scrub
8	Wet Heathland
686	Wet Heathland/Damp Heathland Mosaic
645	Wet Heathland/Heathy Woodland Mosaic
504	Wet Heathland/Riparian Scrub Complex
768	Wet Heathland/Riparian Scrub Mosaic

Steps 16 and 20. Definition of foothill forest

The EVCs in Table A5.6 were used to identify the distribution of foothill forest. Polygons were manually drawn around areas where foothill forest predominated.

Table A5.6. EVCs used to identify foothill forest.

EVC number	EVC name
23	Herb-rich Foothill Forest
379	Herb-rich Foothill Forest/Damp Sands Herb-rich Woodland Complex
600	Herb-rich Foothill Forest/Damp Sands Herb-rich Woodland Mosaic
381	Herb-rich Foothill Forest/Grassy Dry Forest Complex
378	Herb-rich Foothill Forest/Lowland Forest Complex
380	Herb-rich Foothill Forest/Sedgy Riparian Woodland Complex
178	Herb-rich Foothill Forest/Shrubby Foothill Forest Complex
16	Lowland Forest
623	Lowland Forest/Damp Sands Herb-rich Woodland Complex
795	Lowland Forest/Damp Sands Herb-rich Woodland Mosaic
388	Lowland Forest/Grassy Dry Forest Complex
382	Lowland Forest/Heathy Dry Forest Complex
384	Lowland Forest/Heathy Woodland Complex
698	Lowland Forest/Heathy Woodland Mosaic
558	Lowland Forest/Hills Herb-rich Woodland Complex
385	Lowland Forest/Riparian Forest Complex
386	Lowland Forest/Riparian Scrub Complex
387	Lowland Forest/Riparian Shrubland Complex
590	Lowland Forest/Shrubby Woodland Complex
383	Lowland Forest/Valley Grassy Forest Complex
877	Lowland Herb-rich Forest
45	Shrubby Foothill Forest
377	Shrubby Foothill Forest/Heathy Dry Forest Complex
376	Shrubby Foothill Forest/Lowland Forest Complex

Step 18. Definition of wet forest

The EVCs in Table A5.7 were used to identify the distribution of wet forest. Polygons were manually drawn around areas where wet forest predominated. Truly montane areas (> 700 metres elevation) were excluded but Montane EVCs that occur at lower elevations were included.

Table A5.7. EVCs used to identify wet forest.

EVC number	EVC name
31	Cool Temperate Rainforest
33	Cool Temperate Rainforest/Warm Temperate Rainforest Overlap
29	Damp Forest
371	Damp Forest/Herb-rich Foothill Forest Complex
597	Damp Forest/Herb-rich Foothill Forest Mosaic
372	Damp Forest/Lowland Forest Complex
373	Damp Forest/Riparian Scrub Complex
38	Montane Damp Forest
36	Montane Dry Woodland
39	Montane Wet Forest
316	Shrubby Damp Forest
201	Shrubby Wet Forest
35	Tableland Damp Forest
32	Warm Temperate Rainforest
30	Wet Forest
589	Wet Forest/Damp Forest Complex

Step 23. Definition of dry forest and woodland

The EVCs in Table A5.8 were used to identify the distribution of dry forest and woodland. Polygons were manually drawn around areas where dry forest and woodland predominated.

Table A5.8. EVCs used to identify dry forest and woodland.

EVC number	EVC name
61	Box Ironbark Forest
247	Box Ironbark Forest/Grassy Woodland Complex
685	Box Ironbark Forest/Heathy Woodland Complex
22	Grassy Dry Forest
248	Grassy Dry Forest/Granitic Hills Woodland Complex
320	Grassy Dry Forest/Heathy Dry Forest Complex

EVC number	EVC name
599	Grassy Dry Forest/Rocky Outcrop Shrubland Mosaic
174	Grassy Dry Forest/Rocky Outcrop Shrubland/Rocky Outcrop Herbland Mosaic
128	Grassy Forest
175	Grassy Woodland
20	Heathy Dry Forest
71	Hills Herb-rich Woodland
789	Hills Herb-rich Woodland/Grassy Dry Forest Complex
402	Hills Herb-rich Woodland/Heathy Dry Forest Complex
21	Shrubby Dry Forest
47	Valley Grassy Forest
213	Valley Grassy Forest/Box Ironbark Forest Complex
587	Valley Grassy Forest/Grassy Dry Forest Complex
265	Valley Grassy Forest/Grassy Dry Forest Mosaic
268	Valley Grassy Forest/Grassy Woodland Complex

Appendix 6. Salinity category preferences for wetland EVCs

Table A6.1. Salinity preferences for wetland EVCs. Coastal saltmarsh and estuarine EVCs (Table 9) are marked with an asterisk. Source: DSE (unpublished).

EVC number	EVC name	Salinity category	Salinity category preference
1111	Alkaline Basaltic Wetland Aggregate	Fresh (calcareous)	Common
806	Alluvial Plains Semi-arid Grassland	Fresh	Common
806	Alluvial Plains Semi-arid Grassland	Hyposaline	Less common
239	Alpine Creekline Herbland	Fresh	Common
171	Alpine Fen	Fresh	Common
288	Alpine Heath Peatland	Fresh	Common
1011	Alpine Hummock Peatland	Fresh	Common
905	Alpine Short Herbland	Fresh	Common
306	Aquatic Grassy Wetland	Fresh	Common
653	Aquatic Herbland	Fresh	Common
653	Aquatic Herbland	Hyposaline	Less common
308	Aquatic Sedgeland	Fresh	Common
308	Aquatic Sedgeland	Hyposaline	Less common
334	Billabong Wetland Aggregate	Fresh	Common
369	Black Box Wetland	Fresh	Common
875	Blocked Coastal Stream Swamp	Fresh	Common
875	Blocked Coastal Stream Swamp	Hyposaline	Less common
537	Brackish Aquatic Herbland	Hyposaline	Common
934	Brackish Grassland	Hyposaline	Common
538*	Brackish Herbland	Hyposaline	Common
538*	Brackish Herbland	Mesosaline	Less common
636	Brackish Lake Aggregate	Hyposaline	Common
539	Brackish Lake Bed Herbland	Hyposaline	Common
947*	Brackish Lignum Swamp	Hyposaline	Common
947*	Brackish Lignum Swamp	Mesosaline	Less common
13	Brackish Sedgeland	Hyposaline	Common
1114	Brackish Sedgy Shrubland	Hyposaline	Common
1114	Brackish Sedgy Shrubland	Fresh	Less common

EVC number	EVC name	Salinity category	Salinity category preference
973	Brackish Shrubland	Hyposaline	Common
973	Brackish Shrubland	Fresh	Less common
656	Brackish Wetland Aggregate	Hyposaline	Common
656	Brackish Wetland Aggregate	Mesosaline	Less common
A106	Calcareous Sedgy Shrubland	Fresh (calcareous)	Common
591	Calcareous Wet Herbland	Fresh (calcareous)	Common
291	Cane Grass Wetland	Fresh	Common
602	Cane Grass Wetland/Aquatic Herbland Complex	Fresh	Common
606	Cane Grass Wetland/Brackish Herbland Complex	Hyposaline	Common
284	Claypan Ephemeral Wetland	Fresh	Common
A110*	Coastal Dry Saltmarsh	Mesosaline	Common
A110*	Coastal Dry Saltmarsh	Hypersaline	Less common
976	Coastal Ephemeral Wetland	Fresh	Common
A111	Coastal Hypersaline Saltmarsh	Hypersaline	Common
11	Coastal Lagoon Wetland	Fresh	Common
11	Coastal Lagoon Wetland	Hyposaline	Less common
A109*	Coastal Saline Grassland	Mesosaline	Common
9*	Coastal Saltmarsh Aggregate	Mesosaline	Common
9	Coastal Saltmarsh Aggregate	Hypersaline	Common
A112*	Coastal Tussock Saltmarsh	Mesosaline	Common
673	Dune-soak Woodland	Fresh	Common
949	Dwarf Floating Aquatic Herbland	Fresh	Common
678	Ephemeral Drainage-line Grassy Wetland	Fresh	Common
914*	Estuarine Flats Grassland	Hyposaline	Common
952	Estuarine Reedbed	Hyposaline	Common
952	Estuarine Reedbed	Mesosaline	Less common
953	Estuarine Scrub	Hyposaline	Common
953	Estuarine Scrub	Mesosaline	Less common
10*	Estuarine Wetland	Hyposaline	Common
10*	Estuarine Wetland	Mesosaline	Less common
721	Fern Swamp	Fresh	Common

EVC number	EVC name	Salinity category	Salinity category preference
809	Floodplain Grassy Wetland	Fresh	Common
56	Floodplain Riparian Woodland	Fresh	Common
280	Floodplain Thicket	Fresh	Common
172	Floodplain Wetland Aggregate	Fresh	Common
810	Floodway Pond Herbland	Fresh	Common
945	Floodway Pond Herbland/Riverine Swamp Forest Complex	Fresh	Common
723	Forest Bog	Fresh	Common
728	Forest Creekline Sedge Swamp	Fresh	Common
718	Freshwater Lake Aggregate	Fresh	Common
954	Freshwater Lignum - Cane Grass Swamp	Fresh	Common
657	Freshwater Lignum Shrubland	Fresh	Common
968	Gahnia Sedgeland	Fresh (calcareous)	Common
1112	Granite Rock-pool Wetland	Fresh	Common
106	Grassy Riverine Forest	Fresh	Common
811	Grassy Riverine Forest/Floodway Pond Herbland Complex	Fresh	Common
812	Grassy Riverine Forest/Riverine Swamp Forest Complex	Fresh	Common
124	Grey Clay Drainage-line Aggregate	Hyposaline (possibly calcareous)	Common
708	Hypersaline Inland Saltmarsh Aggregate	Hypersaline	Common
813	Intermittent Swampy Woodland	Fresh	Common
813	Intermittent Swampy Woodland	Hyposaline	Less common
822	Intermittent Swampy Woodland/Riverine Grassy Woodland Complex	Fresh	Common
107	Lake Bed Herbland	Fresh	Common
107	Lake Bed Herbland	Hyposaline	Less common
808	Lignum Shrubland	Fresh	Common
808	Lignum Shrubland	Hyposaline	Less common
104	Lignum Swamp	Fresh	Common
104	Lignum Swamp	Hyposaline	Less common

EVC number	EVC name	Salinity category	Salinity category preference
823	Lignum Swampy Woodland	Fresh	Common
823	Lignum Swampy Woodland	Hyposaline	Less common
140*	Mangrove Shrubland	Mesosaline	Common
966	Montane Bog	Fresh	Common
41	Montane Riparian Thicket	Fresh	Common
40	Montane Riparian Woodland	Fresh	Common
148	Montane Sedgeland	Fresh	Common
318	Montane Swamp	Fresh	Common
185	Perched Boggy Shrubland Aggregate	Fresh	Common
125	Plains Grassy Wetland	Fresh	Common
755	Plains Grassy Wetland/Aquatic Herbland Complex	Fresh	Common
767	Plains Grassy Wetland/Brackish Herbland Complex	Hyposaline (sometimes calcareous)	Common
958	Plains Grassy Wetland/Calcareous Wet Herbland Complex	Fresh (calcareous)	Common
A101	Plains Grassy Wetland/Lignum Swamp Complex	Fresh	Common
A101	Plains Grassy Wetland/Lignum Swamp Complex	Hyposaline	Less common
959	Plains Grassy Wetland/Sedge-rich Wetland Complex	Fresh	Common
960	Plains Grassy Wetland/Spike-sedge Wetland Complex	Fresh	Common
961	Plains Rushy Wetland	Fresh	Common
888	Plains Saltmarsh	Mesosaline	Common
888	Plains Saltmarsh	Hypersaline	Less common
647	Plains Sedgy Wetland	Fresh	Common
1010	Plains Sedgy Wetland/Sedge Wetland Complex	Fresh	Common
283	Plains Sedgy Woodland	Fresh	Common
651	Plains Swampy Woodland	Fresh	Common
784	Plains Swampy Woodland/Lignum Swamp Complex	Fresh	Common

EVC number	EVC name	Salinity category	Salinity category preference
292	Red Gum Swamp	Fresh	Common
A114	Red Gum Swamp/Cane Grass Wetland Complex	Fresh	Common
A115	Red Gum Swamp/Plains Rushy Wetland Complex	Fresh	Common
191	Riparian Scrub	Fresh	Common
59	Riparian Thicket	Fresh	Common
103	Riverine Chenopod Woodland	Fresh	Common
103	Riverine Chenopod Woodland	Hyposaline	Less common
975	Riverine Ephemeral Wetland	Fresh	Common
814	Riverine Swamp Forest	Fresh	Common
815	Riverine Swampy Woodland	Fresh	Common
804	Rushy Riverine Swamp	Fresh	Common
842*	Saline Aquatic Meadow	Mesosaline	Common
842*	Saline Aquatic Meadow	Hyposaline	Less common
842*	Saline Aquatic Meadow	Hypersaline	Less common
717	Saline Lake Aggregate	Mesosaline	Common
717	Saline Lake Aggregate	Hypersaline	Less common
648	Saline Lake-verge Aggregate	Mesosaline	Common
648	Saline Lake-verge Aggregate	Hypersaline	Less common
676	Salt Paperbark Woodland	Mesosaline	Common
676	Salt Paperbark Woodland	Hypersaline	Less common
A113*	Saltmarsh-grass Swamp	Mesosaline	Common
A113*	Saltmarsh-grass Swamp	Hypersaline	Less common
101	Samphire Shrubland	Hypersaline and often calcareous	Common
101	Samphire Shrubland	Mesosaline	Common
845	Sea-grass Meadow	Mesosaline	Common
195	Seasonally Inundated Shrubby Woodland	Fresh	Common
196	Seasonally Inundated Sub-saline Herbland	Hyposaline	Common
196	Seasonally Inundated Sub-saline Herbland	Mesosaline	Less common
136	Sedge Wetland	Fresh	Common

EVC number	EVC name	Salinity category	Salinity category preference
A102	Sedge Wetland/Aquatic Herbland Complex	Fresh	Common
963	Sedge Wetland/Aquatic Sedgeland Complex	Fresh	Common
1113	Sedge Wetland/Brackish Herbland Complex	Hyposaline	Common
883	Sedge Wetland/Calcareous Wet Herbland Complex	Fresh (calcareous)	Common
281	Sedge-rich Wetland	Fresh	Common
816	Sedgy Riverine Forest	Fresh	Common
817	Sedgy Riverine Forest/Riverine Swamp Forest Complex	Fresh	Common
707	Sedgy Swamp Woodland	Fresh	Common
964	Shell-beach Herbland	Fresh	Common
964	Shell-beach Herbland	Hyposaline	Less common
908	Sink-hole Wetland Aggregate	Fresh (calcareous)	Common
819	Spike-sedge Wetland	Fresh	Common
80	Spring Soak Woodland	Fresh	Common
857	Stony Rises Pond Aggregate	Fresh	Common
210	Sub-alpine Wet Heathland	Fresh	Common
917	Sub-alpine Wet Sedgeland	Fresh	Common
918	Submerged Aquatic Herbland	Fresh	Common
918	Submerged Aquatic Herbland	Hyposaline	Less common
820	Sub-saline Depression Shrubland	Hyposaline	Common
49	Swamp Heathland Aggregate	Fresh	Common
53	Swamp Scrub	Fresh	Common
2004	Swamp Scrub/Gahnia Sedgeland Complex	Fresh	Common
83	Swampy Riparian Woodland	Fresh	Common
937	Swampy Woodland	Fresh	Common
920	Sweet Grass Wetland	Fresh	Common
821	Tall Marsh	Fresh	Common
821	Tall Marsh	Hyposaline	Less common
990	Unvegetated (open water/bare soil/mud – Non Vegetation)	Fresh	Common

EVC number	EVC name	Salinity category	Salinity category preference
990	Unvegetated (open water/bare soil/mud – Non Vegetation)	Hyposaline	Common
990	Unvegetated (open water/bare soil/mud – Non Vegetation)	Mesosaline	Common
990	Unvegetated (open water/bare soil/mud – Non Vegetation)	Hypersaline	Common
8	Wet Heathland	Fresh	Common
A104	Wet Heathland/Plains Grassy Wetland Complex	Fresh	Common
A105	Wet Heathland/Plains Sedgy Wetland Complex	Fresh	Common
931	Wet Heathland/Sedge Wetland Complex	Fresh	Common
A107*	Wet Saltmarsh Herbland	Mesosaline	Common
A108*	Wet Saltmarsh Shrubland	Mesosaline	Common
12	Wet Swale Herbland	Fresh	Common
932	Wet Verge Sedgeland	Fresh	Common

Appendix 7. Assignment of selected attributes for coastal wetlands

The wetland system, water regime and salinity categories of wetlands located near the coast were manually assessed and assigned as described in Sections 4.2, 5.7 and 5.7 (Table A7.1). The number of wetlands in each wetland system, water regime and salinity category is provided in Table A7.2.

Table A7.1. Wetland system, water regime and salinity regime categories assigned to coastal wetlands.

Wetland number	Wetland system	Water regime	Salinity regime
54571	Estuarine	Intertidal	Mesosaline
56102	Estuarine	Intertidal	Mesosaline
56122	Estuarine	Intertidal	Mesosaline
56123	Estuarine	Intertidal	Mesosaline
56124	Estuarine	Intertidal	Mesosaline
56125	Estuarine	Intertidal	Mesosaline
56126	Estuarine	Intertidal	Mesosaline
56127	Estuarine	Intertidal	Mesosaline
56129	Estuarine	Intertidal	Mesosaline
56185	Estuarine	Intertidal	Mesosaline
56186	Estuarine	Intertidal	Mesosaline
56205	Estuarine	Intertidal	Mesosaline
70263	Estuarine	Intertidal	Mesosaline
70266	Estuarine	Intertidal	Mesosaline
70271	Estuarine	Intertidal	Mesosaline
70401	Estuarine	Intertidal	Mesosaline
70802	Estuarine	Intertidal	Mesosaline
70803	Estuarine	Intertidal	Mesosaline
70804	Estuarine	Intertidal	Mesosaline
70805	Estuarine	Intertidal	Mesosaline
70867	Estuarine	Intertidal	Mesosaline
70874	Estuarine	Intertidal	Mesosaline
70879	Estuarine	Intertidal	Mesosaline
70881	Estuarine	Intertidal	Mesosaline
70884	Estuarine	Intertidal	Mesosaline
70887	Estuarine	Intertidal	Mesosaline

Wetland number	Wetland system	Water regime	Salinity regime
70891	Estuarine	Intertidal	Mesosaline
70896	Estuarine	Intertidal	Mesosaline
70903	Estuarine	Intertidal	Mesosaline
70916	Estuarine	Intertidal	Mesosaline
70921	Estuarine	Intertidal	Mesosaline
70925	Estuarine	Intertidal	Mesosaline
71263	Estuarine	Intertidal	Mesosaline
80158	Estuarine	Intertidal	Mesosaline
80297	Estuarine	Intertidal	Mesosaline
80751	Estuarine	Intertidal	Mesosaline
80752	Estuarine	Intertidal	Mesosaline
80754	Estuarine	Intertidal	Mesosaline
80900	Estuarine	Intertidal	Mesosaline
80904	Estuarine	Intertidal	Mesosaline
80976	Estuarine	Intertidal	Mesosaline
81005	Estuarine	Intertidal	Mesosaline
83464	Estuarine	Intertidal	Mesosaline
83465	Estuarine	Intertidal	Mesosaline
83466	Estuarine	Intertidal	Mesosaline
83467	Estuarine	Intertidal	Mesosaline
83469	Estuarine	Intertidal	Mesosaline
83470	Estuarine	Intertidal	Mesosaline
83471	Estuarine	Intertidal	Mesosaline
83472	Estuarine	Intertidal	Mesosaline
83473	Estuarine	Intertidal	Mesosaline
83474	Estuarine	Intertidal	Mesosaline
83475	Estuarine	Intertidal	Mesosaline
83476	Estuarine	Intertidal	Mesosaline
91770	Estuarine	Intertidal	Mesosaline
94331	Estuarine	Intertidal	Mesosaline
94480	Estuarine	Intertidal	Mesosaline
94490	Estuarine	Intertidal	Mesosaline

Wetland number	Wetland system	Water regime	Salinity regime
94497	Estuarine	Intertidal	Mesosaline
95995	Estuarine	Intertidal	Mesosaline
20612	Estuarine	Intertidal	Saline
23499	Estuarine	Intertidal	Saline
23540	Estuarine	Intertidal	Saline
23592	Estuarine	Intertidal	Saline
25600	Estuarine	Intertidal	Saline
25744	Estuarine	Intertidal	Saline
25842	Estuarine	Intertidal	Saline
25863	Estuarine	Intertidal	Saline
50013	Estuarine	Intertidal	Saline
50202	Estuarine	Intertidal	Saline
50203	Estuarine	Intertidal	Saline
50205	Estuarine	Intertidal	Saline
50210	Estuarine	Intertidal	Saline
50307	Estuarine	Intertidal	Saline
51911	Estuarine	Intertidal	Saline
51912	Estuarine	Intertidal	Saline
54546	Estuarine	Intertidal	Saline
54573	Estuarine	Intertidal	Saline
54575	Estuarine	Intertidal	Saline
54576	Estuarine	Intertidal	Saline
54584	Estuarine	Intertidal	Saline
54786	Estuarine	Intertidal	Saline
54925	Estuarine	Intertidal	Saline
56101	Estuarine	Intertidal	Saline
70854	Estuarine	Intertidal	Saline
70855	Estuarine	Intertidal	Saline
70856	Estuarine	Intertidal	Saline
70858	Estuarine	Intertidal	Saline
70860	Estuarine	Intertidal	Saline
70861	Estuarine	Intertidal	Saline

Wetland number	Wetland system	Water regime	Salinity regime
70863	Estuarine	Intertidal	Saline
70894	Estuarine	Intertidal	Saline
70909	Estuarine	Intertidal	Saline
71034	Estuarine	Intertidal	Saline
95516	Estuarine	Intertidal	Saline
96004	Estuarine	Intertidal	Saline
96512	Estuarine	Intertidal	Saline
96517	Estuarine	Intertidal	Saline
96518	Estuarine	Intertidal	Saline
96519	Estuarine	Intertidal	Saline
96520	Estuarine	Intertidal	Saline
96521	Estuarine	Intertidal	Saline
96522	Estuarine	Intertidal	Saline
96559	Estuarine	Intertidal	Saline
97504	Estuarine	Intertidal	Saline
97509	Estuarine	Intertidal	Saline
97518	Estuarine	Intertidal	Saline
97804	Estuarine	Intertidal	Saline
97805	Estuarine	Intertidal	Saline
97806	Estuarine	Intertidal	Saline
97807	Estuarine	Intertidal	Saline
97808	Estuarine	Intertidal	Saline
97810	Estuarine	Intertidal	Saline
97813	Estuarine	Intertidal	Saline
98100	Estuarine	Intertidal	Saline
98101	Estuarine	Intertidal	Saline
98102	Estuarine	Intertidal	Saline
98103	Estuarine	Intertidal	Saline
98104	Estuarine	Intertidal	Saline
50011	Estuarine	Supratidal	Hyposaline
50014	Estuarine	Supratidal	Hyposaline
50015	Estuarine	Supratidal	Hyposaline

Wetland number	Wetland system	Water regime	Salinity regime
50329	Estuarine	Supratidal	Hyposaline
50330	Estuarine	Supratidal	Hyposaline
80156	Estuarine	Supratidal	Hyposaline
45463	Estuarine	Supratidal	Mesosaline
54560	Estuarine	Supratidal	Mesosaline
54595	Estuarine	Supratidal	Mesosaline
54597	Estuarine	Supratidal	Mesosaline
54710	Estuarine	Supratidal	Mesosaline
54711	Estuarine	Supratidal	Mesosaline
54713	Estuarine	Supratidal	Mesosaline
54802	Estuarine	Supratidal	Mesosaline
54803	Estuarine	Supratidal	Mesosaline
54829	Estuarine	Supratidal	Mesosaline
54861	Estuarine	Supratidal	Mesosaline
54927	Estuarine	Supratidal	Mesosaline
54931	Estuarine	Supratidal	Mesosaline
56187	Estuarine	Supratidal	Mesosaline
70264	Estuarine	Supratidal	Mesosaline
70413	Estuarine	Supratidal	Mesosaline
70414	Estuarine	Supratidal	Mesosaline
70509	Estuarine	Supratidal	Mesosaline
80294	Estuarine	Supratidal	Mesosaline
80295	Estuarine	Supratidal	Mesosaline
80296	Estuarine	Supratidal	Mesosaline
80304	Estuarine	Supratidal	Mesosaline
90965	Estuarine	Supratidal	Mesosaline
90991	Estuarine	Supratidal	Mesosaline
91077	Estuarine	Supratidal	Mesosaline
94333	Estuarine	Supratidal	Mesosaline
94342	Estuarine	Supratidal	Mesosaline
94344	Estuarine	Supratidal	Mesosaline
94349	Estuarine	Supratidal	Mesosaline

Wetland number	Wetland system	Water regime	Salinity regime
94351	Estuarine	Supratidal	Mesosaline
94352	Estuarine	Supratidal	Mesosaline
94476	Estuarine	Supratidal	Mesosaline
94487	Estuarine	Supratidal	Mesosaline
94495	Estuarine	Supratidal	Mesosaline
94499	Estuarine	Supratidal	Mesosaline
94500	Estuarine	Supratidal	Mesosaline
94501	Estuarine	Supratidal	Mesosaline
94521	Estuarine	Supratidal	Mesosaline
94522	Estuarine	Supratidal	Mesosaline
94523	Estuarine	Supratidal	Mesosaline
94525	Estuarine	Supratidal	Mesosaline
95986	Estuarine	Supratidal	Mesosaline
95991	Estuarine	Supratidal	Mesosaline
95997	Estuarine	Supratidal	Mesosaline
97524	Estuarine	Supratidal	Mesosaline
98113	Estuarine	Supratidal	Mesosaline
98140	Estuarine	Supratidal	Mesosaline
98144	Estuarine	Supratidal	Mesosaline
98145	Estuarine	Supratidal	Mesosaline
20000	Estuarine	Supratidal	Saline
20001	Estuarine	Supratidal	Saline
23539	Estuarine	Supratidal	Saline
23586	Estuarine	Supratidal	Saline
23754	Estuarine	Supratidal	Saline
25669	Estuarine	Supratidal	Saline
25743	Estuarine	Supratidal	Saline
25804	Estuarine	Supratidal	Saline
25817	Estuarine	Supratidal	Saline
25853	Estuarine	Supratidal	Saline
25889	Estuarine	Supratidal	Saline
26007	Estuarine	Supratidal	Saline

Wetland number	Wetland system	Water regime	Salinity regime
26021	Estuarine	Supratidal	Saline
50003	Estuarine	Supratidal	Saline
50005	Estuarine	Supratidal	Saline
50006	Estuarine	Supratidal	Saline
50007	Estuarine	Supratidal	Saline
50008	Estuarine	Supratidal	Saline
50040	Estuarine	Supratidal	Saline
50056	Estuarine	Supratidal	Saline
50204	Estuarine	Supratidal	Saline
50208	Estuarine	Supratidal	Saline
50209	Estuarine	Supratidal	Saline
50211	Estuarine	Supratidal	Saline
50309	Estuarine	Supratidal	Saline
50331	Estuarine	Supratidal	Saline
50332	Estuarine	Supratidal	Saline
50334	Estuarine	Supratidal	Saline
50335	Estuarine	Supratidal	Saline
51900	Estuarine	Supratidal	Saline
54569	Estuarine	Supratidal	Saline
54574	Estuarine	Supratidal	Saline
54578	Estuarine	Supratidal	Saline
54592	Estuarine	Supratidal	Saline
54715	Estuarine	Supratidal	Saline
54720	Estuarine	Supratidal	Saline
54765	Estuarine	Supratidal	Saline
54774	Estuarine	Supratidal	Saline
54822	Estuarine	Supratidal	Saline
54860	Estuarine	Supratidal	Saline
54875	Estuarine	Supratidal	Saline
54926	Estuarine	Supratidal	Saline
54930	Estuarine	Supratidal	Saline
54933	Estuarine	Supratidal	Saline

Wetland number	Wetland system	Water regime	Salinity regime
56100	Estuarine	Supratidal	Saline
56114	Estuarine	Supratidal	Saline
56121	Estuarine	Supratidal	Saline
56128	Estuarine	Supratidal	Saline
56130	Estuarine	Supratidal	Saline
56194	Estuarine	Supratidal	Saline
56194	Estuarine	Supratidal	Saline
56207	Estuarine	Supratidal	Saline
56208	Estuarine	Supratidal	Saline
70269	Estuarine	Supratidal	Saline
70270	Estuarine	Supratidal	Saline
70409	Estuarine	Supratidal	Saline
70506	Estuarine	Supratidal	Saline
70807	Estuarine	Supratidal	Saline
70857	Estuarine	Supratidal	Saline
70859	Estuarine	Supratidal	Saline
70862	Estuarine	Supratidal	Saline
70904	Estuarine	Supratidal	Saline
70928	Estuarine	Supratidal	Saline
70932	Estuarine	Supratidal	Saline
70936	Estuarine	Supratidal	Saline
70938	Estuarine	Supratidal	Saline
71021	Estuarine	Supratidal	Saline
71214	Estuarine	Supratidal	Saline
71216	Estuarine	Supratidal	Saline
71217	Estuarine	Supratidal	Saline
80154	Estuarine	Supratidal	Saline
80291	Estuarine	Supratidal	Saline
80293	Estuarine	Supratidal	Saline
80303	Estuarine	Supratidal	Saline
83478	Estuarine	Supratidal	Saline
91056	Estuarine	Supratidal	Saline

Wetland number	Wetland system	Water regime	Salinity regime
91084	Estuarine	Supratidal	Saline
91578	Estuarine	Supratidal	Saline
91578	Estuarine	Supratidal	Saline
91769	Estuarine	Supratidal	Saline
94235	Estuarine	Supratidal	Saline
94328	Estuarine	Supratidal	Saline
94335	Estuarine	Supratidal	Saline
94336	Estuarine	Supratidal	Saline
94337	Estuarine	Supratidal	Saline
94341	Estuarine	Supratidal	Saline
94346	Estuarine	Supratidal	Saline
94347	Estuarine	Supratidal	Saline
94348	Estuarine	Supratidal	Saline
94350	Estuarine	Supratidal	Saline
94485	Estuarine	Supratidal	Saline
94486	Estuarine	Supratidal	Saline
94489	Estuarine	Supratidal	Saline
94491	Estuarine	Supratidal	Saline
94493	Estuarine	Supratidal	Saline
94496	Estuarine	Supratidal	Saline
94513	Estuarine	Supratidal	Saline
94516	Estuarine	Supratidal	Saline
94517	Estuarine	Supratidal	Saline
94518	Estuarine	Supratidal	Saline
94519	Estuarine	Supratidal	Saline
94524	Estuarine	Supratidal	Saline
95975	Estuarine	Supratidal	Saline
95976	Estuarine	Supratidal	Saline
95977	Estuarine	Supratidal	Saline
95978	Estuarine	Supratidal	Saline
95979	Estuarine	Supratidal	Saline
95981	Estuarine	Supratidal	Saline

Wetland number	Wetland system	Water regime	Salinity regime
95985	Estuarine	Supratidal	Saline
95988	Estuarine	Supratidal	Saline
95990	Estuarine	Supratidal	Saline
95992	Estuarine	Supratidal	Saline
95993	Estuarine	Supratidal	Saline
95994	Estuarine	Supratidal	Saline
96000	Estuarine	Supratidal	Saline
96535	Estuarine	Supratidal	Saline
96536	Estuarine	Supratidal	Saline
96538	Estuarine	Supratidal	Saline
96539	Estuarine	Supratidal	Saline
96540	Estuarine	Supratidal	Saline
97500	Estuarine	Supratidal	Saline
97517	Estuarine	Supratidal	Saline
97519	Estuarine	Supratidal	Saline
97520	Estuarine	Supratidal	Saline
97521	Estuarine	Supratidal	Saline
97522	Estuarine	Supratidal	Saline
97525	Estuarine	Supratidal	Saline
97809	Estuarine	Supratidal	Saline
97814	Estuarine	Supratidal	Saline
98105	Estuarine	Supratidal	Saline
98111	Estuarine	Supratidal	Saline
98112	Estuarine	Supratidal	Saline
98128	Estuarine	Supratidal	Saline
98129	Estuarine	Supratidal	Saline
98130	Estuarine	Supratidal	Saline
98131	Estuarine	Supratidal	Saline
98133	Estuarine	Supratidal	Saline
98134	Estuarine	Supratidal	Saline
98135	Estuarine	Supratidal	Saline
98136	Estuarine	Supratidal	Saline

Wetland number	Wetland system	Water regime	Salinity regime
98137	Estuarine	Supratidal	Saline
98138	Estuarine	Supratidal	Saline
98139	Estuarine	Supratidal	Saline
98141	Estuarine	Supratidal	Saline
56115	Lacustrine	Periodically inundated	Mesosaline
56209	Lacustrine	Periodically inundated	Mesosaline
54714	Lacustrine	Periodically inundated	Saline
56119	Lacustrine	Periodically inundated	Saline
56131	Lacustrine	Periodically inundated	Saline
56211	Lacustrine	Periodically inundated	Saline
83480	Lacustrine	Periodically inundated	Saline
83481	Lacustrine	Periodically inundated	Saline
94488	Lacustrine	Periodically inundated	Saline
25674	Lacustrine	Permanent	Fresh
70296	Lacustrine	Permanent	Fresh
70482	Lacustrine	Permanent	Fresh
56117	Lacustrine	Permanent	Hypersaline
56148	Lacustrine	Permanent	Mesosaline
56212	Lacustrine	Permanent	Saline
94492	Lacustrine	Permanent	Saline
94498	Lacustrine	Permanent	Saline
94502	Lacustrine	Permanent	Saline
70262	Marine	Intertidal	Mesosaline
70265	Marine	Intertidal	Mesosaline
70883	Marine	Intertidal	Mesosaline
80912	Marine	Intertidal	Mesosaline
70412	Palustrine	Periodically inundated	Hyposaline
50333	Palustrine	Periodically inundated	Hyposaline
56108	Palustrine	Periodically inundated	Mesosaline
56109	Palustrine	Periodically inundated	Mesosaline
56111	Palustrine	Periodically inundated	Mesosaline
56112	Palustrine	Periodically inundated	Mesosaline

Wetland number	Wetland system	Water regime	Salinity regime
56113	Palustrine	Periodically inundated	Mesosaline
56147	Palustrine	Periodically inundated	Mesosaline
56164	Palustrine	Periodically inundated	Mesosaline
56192	Palustrine	Periodically inundated	Mesosaline
56195	Palustrine	Periodically inundated	Mesosaline
56196	Palustrine	Periodically inundated	Mesosaline
56210	Palustrine	Periodically inundated	Mesosaline
70505	Palustrine	Periodically inundated	Mesosaline
91088	Palustrine	Periodically inundated	Mesosaline
91109	Palustrine	Periodically inundated	Mesosaline
56118	Palustrine	Periodically inundated	Mesosaline
56106	Palustrine	Periodically inundated	Saline
56110	Palustrine	Periodically inundated	Saline
94329	Palustrine	Periodically inundated	Saline
94484	Palustrine	Periodically inundated	Saline
94520	Palustrine	Periodically inundated	Saline
50289	Palustrine	Periodically inundated - seasonal	Fresh
96003	Palustrine	Periodically inundated - seasonal	Saline
80703	Palustrine	Permanent	Fresh
80911	Palustrine	Permanent	Fresh
83515	Palustrine	Permanent	Fresh
96534	Palustrine	Permanent	Fresh
96537	Palustrine	Permanent	Fresh
80910	Palustrine	Permanent	Hyposaline
91197	Palustrine	Permanent	Hyposaline
96508	Palustrine	Permanent	Hyposaline

Table A7.2. Number and approximate percentage of 372 coastal wetlands in each wetland system, water regime and salinity category.

Wetland system		Water regime		Salinity regime	
Category	**No. (%) of wetlands**	**Category**	**No. (%) of wetlands**	**Category**	**No. (%) of wetlands**
Estuarine	318 (85%)	Intertidal	123 (33%)	Fresh	9 (2%)
Lacustrine	18 (5%)	Supratidal	199 (53%)	Hyposaline	11 (3%)
Marine	4 (1%)	Permanent	17 (5%)	Mesosaline	131 (35%)
Palustrine	32 (9%)	Periodically inundated	31 (8%)	Hypersaline	1 (<1%)
		Periodically inundated - seasonal	2 (1%)	Saline	220 (59%)

Appendix 8. Wetlands with a known artificial water source

A list of wetlands known to receive artificial water supplies was compiled by considering those that received water for the following purposes:

- recreation, based on information within Sustainable Water Strategies and from www.gwmwater.org.au/information/recreational-lakes;
- salinity disposal, compiled from Murray-Darling Basin Authority website and local knowledge;
- water storage, based on the websites of Goulburn-Murray Water, Southern Rural Water and Grampians Wimmera Mallee Water; and
- environmental water based on information from the Victorian Environmental Water Holder (VEWH) and CMA websites.

For each of these wetlands, the wetland origin attribute was also assessed. Results are set out in Table A8.1.

Environmental water held by Victoria is now allocated to wetlands by the VEWH (instituted in 2010), in line with annual seasonal watering plans. These are formulated after consideration of seasonal watering proposals by the catchment management authorities (CMAs). The VEWH also publishes annual reports that identify wetlands that received environmental water. Prior to 2010, environmental water was allocated by DELWP. Environmental water held by the Commonwealth Environmental Water Holder is also allocated to wetlands in Victoria. Wetlands that have received environmental water usually do not receive environmental water every year as they may not be allocated as a priority site for watering in a particular year. It is possible that some wetlands that received environmental water on one occasion may not do so again as they may no longer be a priority for watering.

Information from the VEWH on which wetlands have received environmental water does not always accord with the information on CMA websites. In addition, information from these sources is not in a geospatial dataset and is sometimes inadequate to definitively identify individual wetlands. Table A8.1 identifies wetlands that that could positively be identified as receiving environmental water on at least one occasion. Table A8.1 may omit some wetlands that receive environmental water or include wetlands that are no longer a priority for watering.

Table A8.1. Wetlands with a known artificial water source and wetland origin for these wetlands.

Wetland No	Name	Recreation	Salinity disposal	Water storage	Environ-mental water	Origin
11659	Barbers Swamp	-	-	-	Yes	Naturally occurring
60700	Barmah Forest	-	-	-	Yes	Naturally occurring
60701	Barmah Forest	-	-	-	Yes	Naturally occurring
60703	Barmah Forest	-	-	-	Yes	Naturally occurring
60704	Barmah Forest	-	-	-	Yes	Naturally occurring
60705	Barmah Forest	-	-	-	Yes	Naturally occurring
60706	Barmah Forest	-	-	-	Yes	Naturally occurring
60707	Barmah Forest	-	-	-	Yes	Naturally occurring
60708	Barmah Forest	-	-	-	Yes	Naturally occurring

Wetland No	Name	Recreation	Salinity disposal	Water storage	Environ-mental water	Origin
60709	Barmah Forest	-	-	-	Yes	Naturally occurring
60710	Barmah Forest	-	-	-	Yes	Naturally occurring
60711	Barmah Forest	-	-	-	Yes	Naturally occurring
60712	Barmah Forest	-	-	-	Yes	Naturally occurring
60713	Barmah Forest	-	-	-	Yes	Naturally occurring
60715	Barmah Forest	-	-	-	Yes	Naturally occurring
60716	Barmah Forest	-	-	-	Yes	Naturally occurring
60717	Barmah Forest	-	-	-	Yes	Naturally occurring
60718	Barmah Forest	-	-	-	Yes	Naturally occurring
60719	Barmah Forest	-	-	-	Yes	Naturally occurring
60720	Barmah Forest	-	-	-	Yes	Naturally occurring
60721	Barmah Forest	-	-	-	Yes	Naturally occurring
60722	Barmah Forest	-	-	-	Yes	Naturally occurring
63900	Barmah Forest	-	-	-	Yes	Naturally occurring
63903	Barmah Forest	-	-	-	Yes	Naturally occurring
63905	Barmah Forest	-	-	-	Yes	Naturally occurring
63906	Barmah Forest	-	-	-	Yes	Naturally occurring
63907	Barmah Forest	-	-	-	Yes	Naturally occurring
63908	Barmah Forest	-	-	-	Yes	Naturally occurring
63909	Barmah Forest	-	-	-	Yes	Naturally occurring
63911	Barmah Forest	-	-	-	Yes	Naturally occurring
63912	Barmah Forest	-	-	-	Yes	Naturally occurring
63913	Barmah Forest	-	-	-	Yes	Naturally occurring
63916	Barmah Forest	-	-	-	Yes	Naturally occurring
63919	Barmah Forest	-	-	-	Yes	Naturally occurring
63921	Barmah Forest	-	-	-	Yes	Naturally occurring
63925	Barmah Forest	-	-	-	Yes	Naturally occurring
63929	Barmah Forest	-	-	-	Yes	Naturally occurring
63930	Barmah Forest	-	-	-	Yes	Naturally occurring
63931	Barmah Forest	-	-	-	Yes	Naturally occurring
63932	Barmah Forest	-	-	-	Yes	Naturally occurring
63933	Barmah Forest	-	-	-	Yes	Naturally occurring

Wetland No	Name	Recreation	Salinity disposal	Water storage	Environ-mental water	Origin
63934	Barmah Forest	-	-	-	Yes	Naturally occurring
63936	Barmah Forest	-	-	-	Yes	Naturally occurring
63941	Barmah Forest	-	-	-	Yes	Naturally occurring
63942	Barmah Forest	-	-	-	Yes	Naturally occurring
63943	Barmah Forest	-	-	-	Yes	Naturally occurring
63944	Barmah Forest	-	-	-	Yes	Naturally occurring
63945	Barmah Forest	-	-	-	Yes	Naturally occurring
63946	Barmah Forest	-	-	-	Yes	Naturally occurring
63947	Barmah Forest	-	-	-	Yes	Naturally occurring
63949	Barmah Forest	-	-	-	Yes	Naturally occurring
63951	Barmah Forest	-	-	-	Yes	Naturally occurring
63953	Barmah Forest	-	-	-	Yes	Naturally occurring
63954	Barmah Forest	-	-	-	Yes	Naturally occurring
63955	Barmah Forest	-	-	-	Yes	Naturally occurring
63956	Barmah Forest	-	-	-	Yes	Naturally occurring
63958	Barmah Forest	-	-	-	Yes	Naturally occurring
63959	Barmah Forest	-	-	-	Yes	Naturally occurring
63960	Barmah Forest	-	-	-	Yes	Naturally occurring
63961	Barmah Forest	-	-	-	Yes	Naturally occurring
63962	Barmah Forest	-	-	-	Yes	Naturally occurring
63963	Barmah Forest	-	-	-	Yes	Naturally occurring
63964	Barmah Forest	-	-	-	Yes	Naturally occurring
63965	Barmah Forest	-	-	-	Yes	Naturally occurring
63966	Barmah Forest	-	-	-	Yes	Naturally occurring
63967	Barmah Forest	-	-	-	Yes	Naturally occurring
63968	Barmah Forest	-	-	-	Yes	Naturally occurring
63969	Barmah Forest	-	-	-	Yes	Naturally occurring
63970	Barmah Forest	-	-	-	Yes	Naturally occurring
63971	Barmah Forest	-	-	-	Yes	Naturally occurring
63973	Barmah Forest	-	-	-	Yes	Naturally occurring
63974	Barmah Forest	-	-	-	Yes	Naturally occurring
63976	Barmah Forest	-	-	-	Yes	Naturally occurring

Wetland No	Name	Recreation	Salinity disposal	Water storage	Environ-mental water	Origin
63978	Barmah Forest	-	-	-	Yes	Naturally occurring
63980	Barmah Forest	-	-	-	Yes	Naturally occurring
63981	Barmah Forest	-	-	-	Yes	Naturally occurring
63984	Barmah Forest	-	-	-	Yes	Naturally occurring
63987	Barmah Forest	-	-	-	Yes	Naturally occurring
63989	Barmah Forest	-	-	-	Yes	Naturally occurring
63993	Barmah Forest	-	-	-	Yes	Naturally occurring
63995	Barmah Forest	-	-	-	Yes	Naturally occurring
63997	Barmah Forest	-	-	-	Yes	Naturally occurring
63998	Barmah Forest	-	-	-	Yes	Naturally occurring
64004	Barmah Forest	-	-	-	Yes	Naturally occurring
64005	Barmah Forest	-	-	-	Yes	Naturally occurring
64008	Barmah Forest	-	-	-	Yes	Naturally occurring
64010	Barmah Forest	-	-	-	Yes	Naturally occurring
64014	Barmah Forest	-	-	-	Yes	Naturally occurring
64037	Barmah Forest	-	-	-	Yes	Naturally occurring
64040	Barmah Forest	-	-	-	Yes	Naturally occurring
60702	Barmah Lake	-	-	-	Yes	Naturally occurring
45305	Barton Swamp	-	-	-	Yes	Naturally occurring
10837	Beulah Weir Pool	Yes	-	-	Yes	Dam/Storage =>8ha
63937	Big Woodcutter Lagoon	-	-	-	Yes	Naturally occurring
45354	Black Charlie Lagoon	-	-	-	Yes	Naturally occurring
64013	Black Engine Lagoon	-	-	-	Yes	Naturally occurring
45260	Black Swamp	-	-	-	Yes	Naturally occurring
63203	Black Swamp	-	-	-	Yes	Naturally occurring
63914	Boals Deadwood	-	-	-	Yes	Naturally occurring
11440	Brickworks Billabong	-	-	-	Yes	Naturally occurring
19295	Brim Weir Pool - recreation	Yes	-	-	-	Dam/Storage <8ha
11654	Bull Swamp	-	-	-	Yes	Naturally occurring
63999	Bunyip Hole	-	-	-	Yes	Naturally occurring
46067	Campaspe Weir	-	-	-	Yes	Dam/Storage =>8ha

Wetland No	Name	Recreation	Salinity disposal	Water storage	Environ-mental water	Origin
11451	Cardross Lakes	-	-	-	Yes	Artificial (type unknown)
11495	Cardross Lakes	-	-	-	Yes	Artificial (type unknown)
11496	Cardross Lakes	-	-	-	Yes	Artificial (type unknown)
11497	Cardross Lakes	-	-	-	Yes	Artificial (type unknown)
11503	Cardross Lakes	-	-	-	Yes	Artificial (type unknown)
11505	Cardross Lakes	-	-	-	Yes	Artificial (type unknown)
45286	Charcoal Swamp	-	-	-	Yes	Naturally occurring
12154	-	-	-	-	Yes	Naturally occurring
12156	-	-	-	-	Yes	Naturally occurring
12157	-	-	-	-	Yes	Naturally occurring
41089	Cherrip Swamp	-	-	-	Yes	Naturally occurring
76678	Clover Pondage	-	-	Yes	-	Dam/Storage <8ha
45269	Cockatoo Lagoon	-	-	-	Yes	Naturally occurring
40972	Corack Lake - Wimmera Mallee Pipeline	-	-	-	Yes	Naturally occurring
45280	Corduroy Swamp	-	-	-	Yes	Naturally occurring
40014	Creswick Swamp	-	-	-	Yes	Naturally occurring
43161	Cullens Lake	-	-	-	Yes	Naturally occurring
62010	Doctors Swamp	-	-	-	Yes	Naturally occurring
40522	Donald Park Lake	Yes	-	-	-	Naturally occurring
90998	Dowd Morass	-	-	-	Yes	Naturally occurring
45355	Dry Tree Lagoon	-	-	-	Yes	Naturally occurring
64039	Duck Hole Plain	-	-	-	Yes	Naturally occurring
41710	Goldfields Reservoir	-	-	Yes	-	Dam/Storage =>8ha
41735	Government Dam	-	-	Yes	-	Dam/Storage <8ha
19043	Green Lake	Yes	-	Yes	-	Naturally occurring
60254	Green Lake	-	-	Yes	-	Naturally occurring
11664	Green Lake (Sea	Yes	-	-	-	Naturally occurring

Wetland No	Name	Recreation	Salinity disposal	Water storage	Environ-mental water	Origin
	Lake)					
45274	Green Swamp	-	-	-	Yes	Naturally occurring
45239	Gunbower Forest	-	-	-	Yes	Naturally occurring
45240	Gunbower Forest	-	-	-	Yes	Naturally occurring
45241	Gunbower Forest	-	-	-	Yes	Naturally occurring
45242	Gunbower Forest	-	-	-	Yes	Naturally occurring
45243	Gunbower Forest	-	-	-	Yes	Naturally occurring
45244	Gunbower Forest	-	-	-	Yes	Naturally occurring
45246	Gunbower Forest	-	-	-	Yes	Naturally occurring
45248	Gunbower Forest	-	-	-	Yes	Naturally occurring
45249	Gunbower Forest	-	-	-	Yes	Naturally occurring
45250	Gunbower Forest	-	-	-	Yes	Naturally occurring
45251	Gunbower Forest	-	-	-	Yes	Naturally occurring
45252	Gunbower Forest	-	-	-	Yes	Naturally occurring
45253	Gunbower Forest	-	-	-	Yes	Naturally occurring
45255	Gunbower Forest	-	-	-	Yes	Naturally occurring
45256	Gunbower Forest	-	-	-	Yes	Naturally occurring
45257	Gunbower Forest	-	-	-	Yes	Naturally occurring
45258	Gunbower Forest	-	-	-	Yes	Naturally occurring
45259	Gunbower Forest	-	-	-	Yes	Naturally occurring
45261	Gunbower Forest	-	-	-	Yes	Naturally occurring
45262	Gunbower Forest	-	-	-	Yes	Naturally occurring
45263	Gunbower Forest	-	-	-	Yes	Naturally occurring
45271	Gunbower Forest	-	-	-	Yes	Naturally occurring
45273	Gunbower Forest	-	-	-	Yes	Naturally occurring
45276	Gunbower Forest	-	-	-	Yes	Naturally occurring
45277	Gunbower Forest	-	-	-	Yes	Naturally occurring
45278	Gunbower Forest	-	-	-	Yes	Naturally occurring
45279	Gunbower Forest	-	-	-	Yes	Naturally occurring
45281	Gunbower Forest	-	-	-	Yes	Naturally occurring
45287	Gunbower Forest	-	-	-	Yes	Naturally occurring
45288	Gunbower Forest	-	-	-	Yes	Naturally occurring

Wetland No	Name	Recreation	Salinity disposal	Water storage	Environ-mental water	Origin
45292	Gunbower Forest	-	-	-	Yes	Naturally occurring
45295	Gunbower Forest	-	-	-	Yes	Naturally occurring
45296	Gunbower Forest	-	-	-	Yes	Naturally occurring
45297	Gunbower Forest	-	-	-	Yes	Naturally occurring
45299	Gunbower Forest	-	-	-	Yes	Naturally occurring
45301	Gunbower Forest	-	-	-	Yes	Naturally occurring
45306	Gunbower Forest	-	-	-	Yes	Naturally occurring
45307	Gunbower Forest	-	-	-	Yes	Naturally occurring
45308	Gunbower Forest	-	-	-	Yes	Naturally occurring
45309	Gunbower Forest	-	-	-	Yes	Naturally occurring
45311	Gunbower Forest	-	-	-	Yes	Naturally occurring
45312	Gunbower Forest	-	-	-	Yes	Naturally occurring
45314	Gunbower Forest	-	-	-	Yes	Naturally occurring
45317	Gunbower Forest	-	-	-	Yes	Naturally occurring
45318	Gunbower Forest	-	-	-	Yes	Naturally occurring
45319	Gunbower Forest	-	-	-	Yes	Naturally occurring
45320	Gunbower Forest	-	-	-	Yes	Naturally occurring
45321	Gunbower Forest	-	-	-	Yes	Naturally occurring
45322	Gunbower Forest	-	-	-	Yes	Naturally occurring
45323	Gunbower Forest	-	-	-	Yes	Naturally occurring
45324	Gunbower Forest	-	-	-	Yes	Naturally occurring
45328	Gunbower Forest	-	-	-	Yes	Naturally occurring
45329	Gunbower Forest	-	-	-	Yes	Naturally occurring
45330	Gunbower Forest	-	-	-	Yes	Naturally occurring
45331	Gunbower Forest	-	-	-	Yes	Naturally occurring
45333	Gunbower Forest	-	-	-	Yes	Naturally occurring
45337	Gunbower Forest	-	-	-	Yes	Naturally occurring
45339	Gunbower Forest	-	-	-	Yes	Naturally occurring
45341	Gunbower Forest	-	-	-	Yes	Naturally occurring
45342	Gunbower Forest	-	-	-	Yes	Naturally occurring
45343	Gunbower Forest	-	-	-	Yes	Naturally occurring
45351	Gunbower Forest	-	-	-	Yes	Naturally occurring

Wetland No	Name	Recreation	Salinity disposal	Water storage	Environ-mental water	Origin
45352	Gunbower Forest	-	-	-	Yes	Naturally occurring
45353	Gunbower Forest	-	-	-	Yes	Naturally occurring
45356	Gunbower Forest	-	-	-	Yes	Naturally occurring
45357	Gunbower Forest	-	-	-	Yes	Naturally occurring
45359	Gunbower Forest	-	-	-	Yes	Naturally occurring
45360	Gunbower Forest	-	-	-	Yes	Naturally occurring
45362	Gunbower Forest	-	-	-	Yes	Naturally occurring
45363	Gunbower Forest	-	-	-	Yes	Naturally occurring
45364	Gunbower Forest	-	-	-	Yes	Naturally occurring
45367	Gunbower Forest	-	-	-	Yes	Naturally occurring
45373	Gunbower Forest	-	-	-	Yes	Naturally occurring
45376	Gunbower Forest	-	-	-	Yes	Naturally occurring
46501	Gunbower Forest	-	-	-	Yes	Naturally occurring
45303	Gunbower Island State Forest	-	-	-	Yes	Naturally occurring
63935	Harbours Lake	-	-	-	Yes	Naturally occurring
45326	Harrison Lagoon	-	-	-	Yes	Naturally occurring
12765	Heywood Lake	-	-	-	Yes	Naturally occurring
45231	Hird Swamp	-	-	-	Yes	Naturally occurring
63982	Hookes Lagoon	-	-	-	Yes	Naturally occurring
11443	Horseshoe Bend Billabong	-	-	-	Yes	Naturally occurring
45270	Horseshoe Lagoon	-	-	-	Yes	Naturally occurring
54573	Hospital Swamp	-	-	-	Yes	Naturally occurring
60714	Hut Lake	-	-	-	Yes	Naturally occurring
45268	Iron Punt Lagoon	-	-	-	Yes	Naturally occurring
11491	Irymple Tank	-	-	-	Yes	Naturally occurring
40991	Jeffcott Wildlife Reserve	-	-	-	Yes	Naturally occurring
40817	Jesse Swamp	-	-	-	Yes	Naturally occurring
45222	Johnson Swamp	-	-	-	Yes	Naturally occurring
76679	Junction Dam	-	-	Yes	-	Dam/Storage =>8ha
43164	Kangaroo Lake	-	-	Yes	-	Naturally occurring

Wetland No	Name	Recreation	Salinity disposal	Water storage	Environ-mental water	Origin
43229	Kerang Weir	-	-	Yes	-	Dam/Storage =>8ha
11360	Kings Billabong	-	-	-	Yes	Naturally occurring
63206	Kinnairds Swamp	-	-	-	Yes	Naturally occurring
45294	Kow Swamp	-	-	Yes	-	Naturally occurring
42125	Laanecoorie Reservoir	-	-	Yes	-	Dam/Storage =>8ha
11137	Lake Arawak	-	-	-	Yes	Naturally occurring
76682	Lake Banimboola	-	-	Yes	-	Naturally occurring
43617	Lake Boga	-	-	Yes	-	Naturally occurring
42640	Lake Boort	-	-	-	Yes	Naturally occurring
11154	Lake Brockie	-	-	-	Yes	Naturally occurring
11136	Lake Bulla	-	-	-	Yes	Naturally occurring
12217	Lake Carpul	-	-	-	Yes	Naturally occurring
43192	Lake Charm	-	-	Yes	-	Naturally occurring
11696	Lake Danaher Bushland Reserve	-	-	-	Yes	Naturally occurring
43190	Lake Elizabeth	-	-	-	Yes	Naturally occurring
45826	Lake Eppalock	-	-	Yes	-	Dam/Storage =>8ha
40027	Lake Hancock	Yes	-	-	-	Naturally occurring
40096	Lake Hancock	Yes	-	-	-	Naturally occurring
11127	Lake Hattah	-	-	-	Yes	Naturally occurring
11350	Lake Hawthorn	-	Yes	-	-	Naturally occurring
18651	Lake Hindmarsh	-	-	-	Yes	Naturally occurring
77784	Lake Hume	-	-	Yes	-	Dam/Storage =>8ha
43193	Lake Kelly	-	Yes	-	-	Naturally occurring
11131	Lake Konardin	-	-	-	Yes	Naturally occurring
11198	Lake Kramen	-	-	-	Yes	Naturally occurring
10805	Lake Lascelles	Yes	-	-	-	Naturally occurring
43171	Lake Leaghur	-	-	-	Yes	Naturally occurring
11141	Lake Lockie	-	-	-	Yes	Naturally occurring
19456	Lake Lonsdale	-	-	Yes	-	Dam/Storage =>8ha
19538	Lake Lonsdale	-	-	Yes	-	Dam/Storage =>8ha
43180	Lake Meering	-	-	-	Yes	Naturally occurring

Wetland No	Name	Recreation	Salinity disposal	Water storage	Environ-mental water	Origin
11130	Lake Mournpall	-	-	-	Yes	Naturally occurring
67918	Lake Mulwala	-	-	Yes	-	Dam/Storage =>8ha
43205	Lake Murphy	-	-	-	Yes	Naturally occurring
61955	Lake Nagambie	-	-	Yes	-	Dam/Storage =>8ha
12213	Lake Powell	-	-	-	Yes	Naturally occurring
11432	Lake Ranfurly East	-	Yes	-	-	Naturally occurring
11420	Lake Ranfurly West	-	Yes	-	-	Naturally occurring
11157	Lake Roonki	-	-	-	Yes	Naturally occurring
43158	Lake Tutchewop	-	Yes	-	-	Naturally occurring
10172	Lake Wallawalla	-	-	-	Yes	Naturally occurring
43172	Lake William	-	Yes	-	-	Naturally occurring
42643	Lake Yando	-	-	-	Yes	Naturally occurring
11143	Lake Yelwell	-	-	-	Yes	Naturally occurring
11142	Lake Yerang	-	-	-	Yes	Naturally occurring
55553	Lal Lal Reservoir	-	-	Yes	-	Dam/Storage =>8ha
43878	Lauriston Reservoir	-	-	Yes	-	Dam/Storage =>8ha
42639	Little Lake Boort	-	-	-	Yes	Naturally occurring
11129	Little Lake Hattah	-	-	-	Yes	Naturally occurring
43188	Little Lake Kelly	-	Yes	-	-	Naturally occurring
43187	Little Lake Meering	-	-	-	Yes	Naturally occurring
45266	Little Punt Lagoon	-	-	-	Yes	Naturally occurring
45283	Little Reedy Lagoon	-	-	-	Yes	Naturally occurring
63922	Little Rushy Swamp	-	-	-	Yes	Naturally occurring
42712	Loddon Weir	-	-	Yes	-	Dam/Storage =>8ha
45264	Long Lagoon	-	-	-	Yes	Naturally occurring
43866	Malmsbury Reservoir	-	-	Yes	-	Dam/Storage =>8ha
11207	Margooya Lagoon	-	-	-	Yes	Naturally occurring
45245	Marshall Lagoon	-	-	-	Yes	Naturally occurring
45216	Mcdonalds Swamp	-	-	-	Yes	Naturally occurring
63910	Mcdonalds Waterhole	-	-	-	Yes	Naturally occurring
70520	Melton Reservoir	-	-	Yes	-	Dam/Storage =>8ha

Wetland No	Name	Recreation	Salinity disposal	Water storage	Environ-mental water	Origin
43218	Middle Lake	-	-	Yes	-	Naturally occurring
76677	Mount Beauty Pondage	-	-	Yes	-	Dam/Storage =>8ha
12801	Narrung	-	-	-	Yes	Naturally occurring
45254	No. 2 Swamp	-	-	-	Yes	Naturally occurring
63923	Paddy Farrels Lagoon	-	-	-	Yes	Naturally occurring
11439	Merbein Common	-	-	-	Yes	Naturally occurring
11441	Merbein Common	-	-	-	Yes	Naturally occurring
11442	Merbein Common	-	-	-	Yes	Naturally occurring
11444	Merbein Common	-	-	-	Yes	Naturally occurring
45345	Pig Swamp	-	-	-	Yes	Naturally occurring
63957	Punt Paddock Lagoon	-	-	-	Yes	Naturally occurring
45267	Reedy Lagoon	-	-	-	Yes	Naturally occurring
43217	Reedy Lake	-	-	Yes	-	Naturally occurring
54577	Reedy Lake	-	-	-	Yes	Naturally occurring
63950	Reedy Lake	-	-	-	Yes	Naturally occurring
63173	Reedy Swamp Wildlife Reserve	-	-	-	Yes	Naturally occurring
80939	Reservoir on tributary to Billy Creek at Staceys Bridge	-	-	Yes	-	Dam/Storage <8ha
80955	Reservoir on tributary to Billy Creek at Staceys Bridge	-	-	Yes	-	Dam/Storage <8ha
80956	Reservoir on tributary to Billy Creek at Staceys Bridge	-	-	Yes	-	Dam/Storage <8ha
46013	Richardsons Lagoon (Bailleu Wetland)	-	-	-	Yes	Naturally occurring
46014	Richardsons Lagoon (Bailleu Wetland)	-	-	-	Yes	Naturally occurring
46015	Richardsons Lagoon (Bailleu Wetland)	-	-	-	Yes	Naturally occurring

Wetland No	Name	Recreation	Salinity disposal	Water storage	Environ-mental water	Origin
10597	Robertson Wetland	-	-	-	Yes	Naturally occurring
11608	Roselyn Wetland	-	-	-	Yes	Naturally occurring
43609	Round Lake	-	-	-	Yes	Naturally occurring
91145	Sale Common	-	-	-	Yes	Naturally occurring
11512	Sandilong Creek	-	-	-	Yes	Naturally occurring
19071	Sawpit Swamp	-	-	-	Yes	Naturally occurring
45298	Smith Swamp	-	-	-	Yes	Naturally occurring
71009	South-Eastern Purification Plant (South)	-	-	Yes	-	Sewage treatment ponds
41500	Sth Drainage Lake	-	-	-	Yes	Naturally occurring
63927	Tarma Lagoon	-	-	-	Yes	Naturally occurring
19060	Taylors Lake	-	-	Yes	-	Naturally occurring
12450	Tchum Lake South - recreation	Yes	-	-	-	Naturally occurring
90963	The Heart Morass (East)	-	-	-	Yes	Naturally occurring
91156	The Heart Morass (West)	-	-	-	Yes	Naturally occurring
43207	Third Lake	-	-	Yes	-	Naturally occurring
17699	Toolondo Reservoir	Yes	-	Yes	-	Naturally occurring
63904	Top Island	-	-	-	Yes	Naturally occurring
64038	Top Lake	-	-	-	Yes	Naturally occurring
61919	Waranga Reservoir	-	-	Yes	-	Dam/Storage =>8ha
10638	Wargan Basins (Meridian Lakes)	-	Yes	-	-	Artificial (type unknown)
10639	Wargan Basins (Meridian Lakes)	-	Yes	-	-	Artificial (type unknown)
10640	Wargan Basins (Meridian Lakes)	-	Yes	-	-	Artificial (type unknown)
10641	Wargan Basins (Meridian Lakes)	-	Yes	-	-	Artificial (type unknown)
10642	Wargan Basins (Meridian Lakes)	-	Yes	-	-	Artificial (type unknown)
10643	Wargan Basins (Meridian Lakes)	-	Yes	-	-	Artificial (type unknown)

Wetland No	Name	Recreation	Salinity disposal	Water storage	Environ-mental water	Origin
10644	Wargan Basins (Meridian Lakes)	-	Yes	-	-	Artificial (type unknown)
11449	Wargan Basins (Meridian Lakes)	-	Yes	-	-	Artificial (type unknown)
19781	Watchem Lake	Yes	-	-	-	Naturally occurring
45272	Whistler Lagoon	-	-	-	Yes	Naturally occurring
41003	Wooroonook Lake - Church	Yes	-	-	-	Naturally occurring
41002	Wooroonook Lake - Main	Yes	-	-	-	Naturally occurring
81285	Yallourn Storage	-	-	Yes	-	Dam/Storage =>8ha
12230	Yungera Wetland	-	-	-	Yes	Naturally occurring
12239	Yungera Wetland	-	-	-	Yes	Naturally occurring
12780	Yungera Wetland	-	-	-	Yes	Naturally occurring

Appendix 9. Vegetation of spring soak and upland soak wetlands

Carr et al. (2006) identified 13 EVCs in spring-soak wetlands in Goulburn-Broken Catchment Management Authority region (Table A9.1). These include a variety of dominant vegetation categories but were assigned the moss/heath category due to lack of spatial EVC data in the GB_SS dataset.

Table A9.1. EVCs in peatland and spring-soak wetlands in the Goulburn-Broken Catchment Management Authority region (Carr et al. 2006).

Topographic area	EVC number and name
Sub-alpine zone (highest altitudes - e.g. Lake Mountain)	171 Alpine Fen 210 Sub-alpine Wet Heathland 288 Alpine Valley Peatland
Montane elevations (e.g. Lake Mountain, Blue Range, variants of EVCs 148 and 41 extending to lower elevations at Murrundindi)	40 Montane Riparian Woodland 41 Montane Riparian Thicket 148 Montane Sedgeland 966 Montane Bog (still as EVC 318 Montane Swamp in Highlands Northern Fall bioregion)
Foothills to lower montane (e.g. Strathbogies, Highlands, Warby Ranges)	73 Rocky Outcrop Shrubland / Rocky Outcrop Herbland Mosaic 80 Spring-soak Woodland 83 Swampy Riparian Woodland 185 Perched Boggy Shrubland 191 Riparian Scrub 937 Swampy Woodland

Dominant vegetation categories were assigned to spring soak and upland soak wetlands derived from the GB_SPR layer (Appendix 3) based on the information in Coates et al. 2010 (Table A9.2). Paddock remnants were described by Coates et al. as being largely devoid of trees or shrubs but noted that the area was originally forested and the resulting changes have been brought about by land clearing an altered land use. This broad vegetation type has been classed as sedge/grass/forb on the assumption that these remnants area are now dominated by non-native pasture grasses.

Table A9.2. Classification of dominant vegetation in broad vegetation types of Coates et al. (2010) identified in soaks, wetlands and remnants on the Strathbogie Plateau.

Broad vegetation type	Dominant vegetation category
Forest/woodland	Forest/Woodland
Shrub-dominated	Shrub
Sedgy/reedy	Sedge/grass/forb
Paddock remnant	Sedge/grass/forb

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