

PART C

THE APPROACH USED IN WATERWAY PRIORITISATION

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Part C outlines the process undertaken to identify high value and priority waterways within the region. It then outlines the process to assess risk and develop management actions to reduce this risk through a program of works presented in **Part D**.

SUMMARY OF PRIORITISATION APPROACH AND SECTIONS IN PART C

<h3>3.1 VISION</h3>	<p>Creates a 50-year+ vision for condition of the waterways in the Glenelg Hopkins region.</p> <p><i>See page 53.</i></p>
<h3>3.2 GOALS AND OVERARCHING PRINCIPLES</h3>	<p>Establishes regional goals to be achieved over 20+ years. Regional and VWMS principles are encompassed in goals and incorporated into the eight-year work plan.</p> <p><i>See page 53.</i></p>
<h3>3.3 ASSETS-BASED APPROACH</h3>	<p>Describes the asset-based approach. Environmental, social and economic values are scored for all waterway assets using the Aquatic Values Identification and Risk Assessment (AVIRA) tool.</p> <p><i>See page 55.</i></p>
<h3>3.4 HIGH VALUE WATERWAYS</h3>	<p>Identifies High Value Waterways using environmental, social and economic values in the AVIRA tool and policy guidance provided by the VWMS.</p> <p><i>See page 58.</i></p>
<h3>3.5 PRIORITY WATERWAYS</h3>	<p>Identifies Priority Waterways by linking the values to the regional goals. Considers risks to each priority waterway asset and assesses the feasibility of undertaking the actions required to achieve desired outcomes. Six Waterway Management Areas are identified.</p> <p><i>See page 59.</i></p>
<h3>3.6 PROGRAM LOGIC</h3>	<p>Describes the program logic approach used to identify management objectives and high level management actions for priority waterways. The priority management actions form the eight-year regional work program in Part C.</p> <p><i>See page 67.</i></p>

3.1 VISION

The vision articulates the major goals and ambitions of the GHWS. It is a long-term view of what the region's waterways and waterway management will be like in 50 years.

The GHWS also aligns with and is guided by the Glenelg Hopkins CMA's vision for the region and the vision of the Victorian Waterway Management Strategy.

GLENELG HOPKINS WATERWAY STRATEGY VISION

*RESILIENT RIVERS, ESTUARIES AND WETLANDS
CONNECTING THE ENVIRONMENT AND PEOPLE AND
SUPPORTING REGIONAL COMMUNITIES*

3.2 GOALS AND OVERARCHING PRINCIPLES

To achieve the vision, five regional goals were developed that enable identification of broad strategic directions, guide identification of priority waterways and inform development of the eight-year work plan.

The following goals have a conceptual or qualitative link to the management outcomes and are not expected to be achieved in less than 20 years:

- maintain Heritage River values in the Glenelg River
- restore hydrological and ecological values of high value drained wetlands and wetland systems
- protect or improve threatened fish populations in the Glenelg Hopkins region
- maintain or improve significant waterway dependent species and communities
- maintain or improve high value recreational fishing through habitat protection.

3.3.1 (CONTINUED)

The management approach of the GHWS is guided by the goals and the following principles of the Victorian Waterway Management Strategy:

PARTNERSHIP APPROACH – waterway management will continue to be a partnership between government, industry and the community.

COMMUNITY INVOLVEMENT – communities will have the opportunity to be involved in all major phases of waterway management and this participation can help foster increased stewardship of waterways.

INTEGRATED CATCHMENT MANAGEMENT – integrated management of waterways will occur within a broader framework of integrated catchment management. Management will recognise the importance of waterways as a connection between catchments, groundwater, coasts and the receiving marine environment, and the strong influence of land use and catchment condition on waterway condition.

APPROPRIATE TOOLS – the full complement of instruments and approaches will be considered to improve waterway condition, including direct government investment in on-ground works, grant and incentive programs, management agreements, market-based instruments, information and extension programs and regulation.

VALUE FOR MONEY – government will direct investment to management activities that provide the most efficient and effective long-term improvements in waterway condition and the greatest community gain.

EVIDENCE-BASED DECISION MAKING – best available knowledge will underpin decision making, policy and waterway management programs.

ADAPTIVE MANAGEMENT – policy and programs are part of a broader framework of adaptive management (supported by effective monitoring, reporting, evaluation and research) to ensure continuous improvement.

In addition, the following regional principles have been identified and incorporated into all facets of the eight-year work plan:

COMMUNITY ENGAGEMENT – Planning and implementation of waterway health programs and projects will maximise opportunities for community engagement.

INDIGENOUS KNOWLEDGE AND CULTURAL HERITAGE – Skills, knowledge and perspectives of Indigenous people are to be incorporated into waterway management.

MAINTENANCE – Previous investments are secured through monitoring and maintenance of prior projects.

Below left: Pelicans at Glenelg River mouth, Nelson.

Below right: Canoeing on the Glenelg River, Casterton.



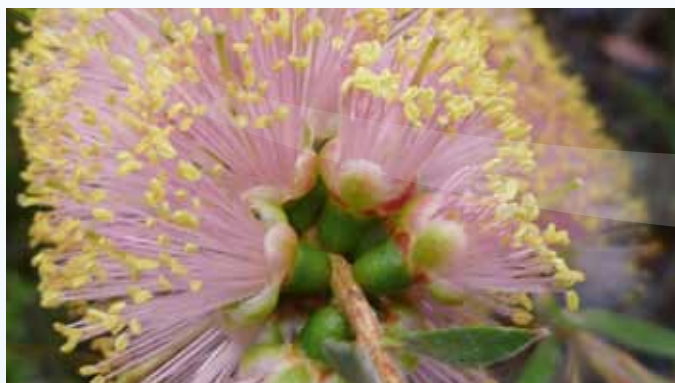
3.3 ASSET-BASED APPROACH

An asset is a spatially defined, biophysical component of the environment (for example, a river, estuary or wetland) that has particular values associated with it.

Asset-based approaches have become the primary framework for managing the natural environment. Planning focuses on managing important natural assets, rather than threat-based issues such as investing in management of poor water quality or salinity over large geographic areas. This does not mean threats are not addressed but the focus of investment is reducing the threat to a particular asset.

The values associated with these assets can be classified as environmental, social, cultural or economic. The asset-based approach facilitates development of integrated work programs that can address multiple threats to the values of an asset. Asset-based approaches also direct public investment in natural resource management towards high value areas (rather than large areas in poor condition) and provide the basis for identifying priorities for investment. With limited resources available for natural resource management, the focus on priority areas means that public resources will be directed to the areas of highest environmental, social, cultural and economic value.

Below left: The federally-listed Wimmera bottlebrush (*Callistemon wimmerensis*) is a significant water dependent species.
Below right: Yambuk estuary.



3.3.1 AQUATIC VALUE IDENTIFICATION RISK ASSESSMENT DATABASE

The regional priority setting process relies on information about values, threats and risks. It is vital that this information is collected and described in a consistent way and, where possible, the information is based on real data (for example, data collected from on-ground monitoring activities). The Aquatic Value Identification and Risk Assessment (AVIRA) database contains information about the values and threats associated with selected river, estuary and wetland assets which are used to support the regional priority setting process. Figure 8 over page provides an example of the AVIRA database framework, using wetlands as an example.

The assets refer to sections of rivers, estuaries or wetlands assessed as part of the Index of Stream Condition, Index of Wetland Condition or pilot Index of Estuary Condition programs and therefore have detailed information available about environmental values and threats. Other types of values, particularly social and economic values, required information to be collected at the regional level by waterway managers.

Environmental values are grouped under the following categories (Appendix 6):

- Formally Recognised Significance
- Representativeness
- Rare or Threatened Species/Communities
- Naturalness
- Landscape Features.

Social values are grouped in the following categories:

- Activity
- Place
- People.

Economic values are grouped in categories such as:

- Water
- Power Generation
- Other Resources.



3.3.1 (CONTINUED)

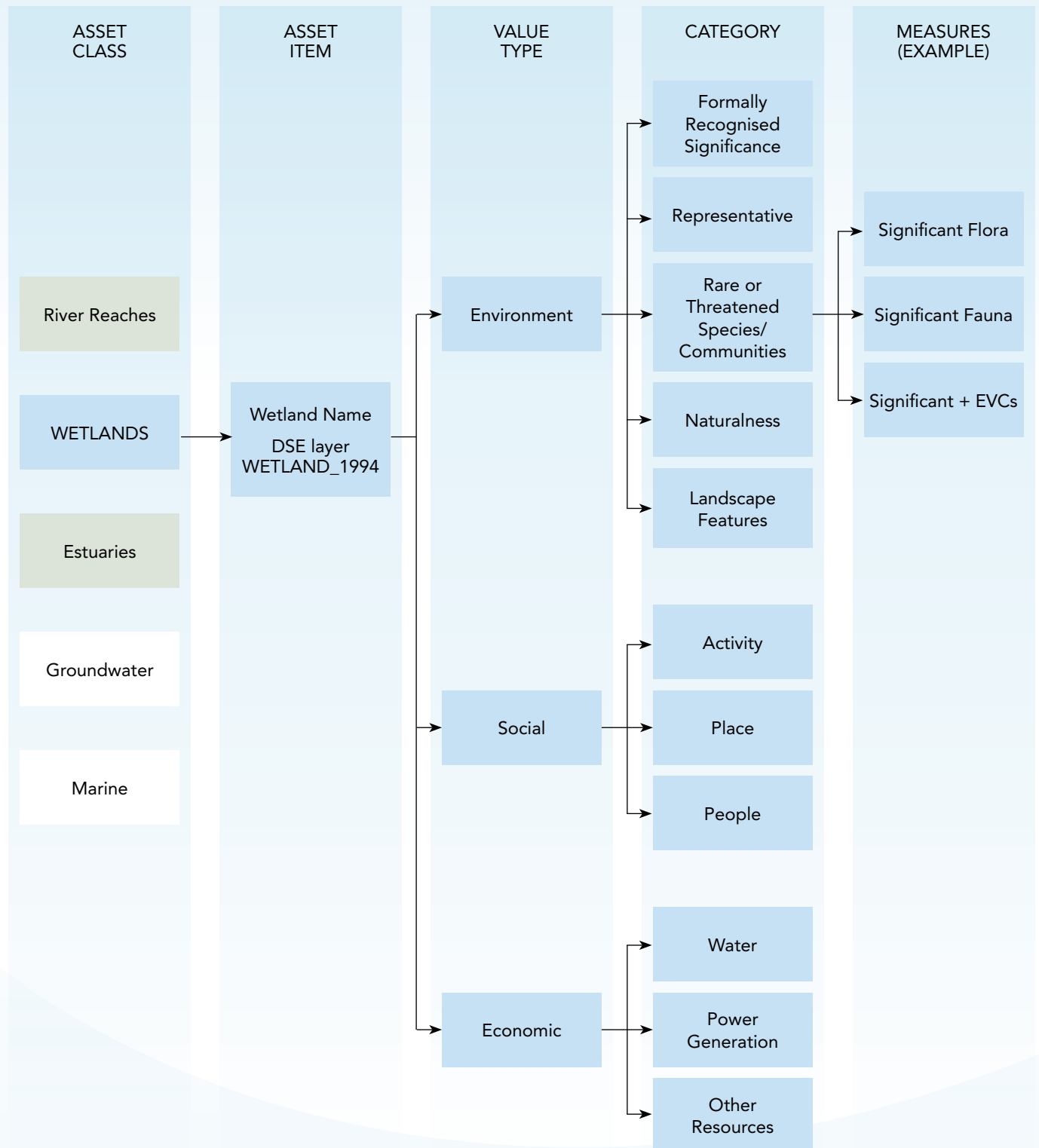


Figure 8. AVIRA conceptual framework. Wetlands are provided as an example. Groundwater and marine asset classes are not part of this strategy

3.3.1 (CONTINUED)

To ensure that all information is collected and entered into the database in a consistent manner, a process for collecting and scoring all values was developed by DEPI in partnership with the waterway managers. This process is explained in a manual which sets out the data requirements and scoring of each measure. When no data is available for a particular measure, this is recorded in the database, with the aim of filling this data gap over the eight-year implementation period of the GHWS. An example of the data sources and scoring rules for the values 'Heritage Rivers' and 'non-motor boating' is shown below.

Different approaches were adopted for a number of wetland assets that were not listed in AVIRA (see 3.5.1).

Table 4. Example using AVIRA to score waterway asset values and scores

VALUE – NON-MOTOR BOATING (SOCIAL)	
Score	Descriptor
5	Waterway used for annual (or more frequent) non-motor boating event
4	Waterway is popular for non-motor boating
3	Waterway is occasionally used for non-motor boating
1	Not known to be used for non-motor boating
0	Not suitable for non-motor boating

Data source: Peak bodies (for example, Canoeing Victoria or Rowing Victoria), My Victorian Waterway survey or local knowledge.

VALUE – HERITAGE RIVERS (ENVIRONMENTAL)	
Score	Descriptor
Yes	Asset forms part of a Heritage River
No	Asset does not form part of a Heritage River

Data source: Heritage Rivers – Rivers and Streams Special Investigation, Final Recommendations (Land Conservation Council 1991).

The threats identified for AVIRA are categorised under the following groupings (Appendix 7):

- Altered water regimes
- Altered physical form
- Poor water quality
- Degraded habitats
- Invasive flora and fauna
- Reduced connectivity.

Under each grouping, a number of individual threats were identified. For example threats associated with altered water regimes include, changes to zero flow frequency, changes to flow seasonality, and changes to bank full flow frequency. The level of each of these individual threats can be quantified by specific measures. This enables an assessment of threat severity, ranging from 5 (very high threat) to 1 (very low threat). Where there is 'no evidence' of a threat impacting on a value, a severity score of 1 is applied as a precautionary measure. Where there is evidence that there is 'no threat', a score of 0 is used.

The database includes a standardised risk assessment procedure that provides an automated assessment of the level of risk to all values present in a waterway. This assessment is based on evidence of associations between values and threats and incorporates a level of confidence in each of those associations. The database also provides a suggested category of management response for each value-threat combination which includes reducing the threat, protecting the value or filling data gaps.

3.4 HIGH VALUE WATERWAYS

The Victorian Waterway Management Strategy indicates that waterways will be considered high value if they have one, or more, of the following characteristics:

- formally recognised significance
- presence of highly threatened or rare species and communities
- high naturalness values (for example, aquatic invertebrate communities and riparian vegetation) or special waterway features (for example, drought refuges and important bird habitat)
- high social and economic values (for example, recreational fishing, Aboriginal cultural heritage, urban/rural water sources).

High value waterways and their associated values were identified using AVIRA scores and the criteria listed in Appendix 8. Due to capacity constraints, condition assessments could only be undertaken, and AVIRA populated, for wetlands in the Directory of Important Wetlands in Australia and those previously listed in the RCS.

Based on the AVIRA scores and criteria 110 (97 per cent) river reaches, 226 (74 per cent) wetlands and 8 (100 per cent) estuaries in the Glenelg Hopkins region were deemed to be high value (see Appendix 9). This list was refined to identify priority waterways for targeted management actions over the next eight years.

*Below left: Scar trees are a significant cultural feature and often occur along waterways in the region.
Below right: Hopkins River is a high value waterway.*



3.5 PRIORITY WATERWAYS

A high proportion of waterways are considered high value. The numbers reflect the value the community places on many waterways within the Glenelg Hopkins region. A process to further refine the number of waterways, for management attention over the next eight years, was required.

To identify priority waterways, the high value waterways were filtered to select those that had the following characteristics:

- values aligned with regional goals (Appendix 10, Appendix 11 and Appendix 12)
- moderate to very high risk to those values
- technically feasible to address threats.

Using data about the risk and technical feasibility, the priority waterways were ranked and a priority waterway score was identified. The priority scores were used to reduce the list of waterways to a manageable number to focus on in the eight-year planning period (see Figure 9 below) and identified the following number of priority waterways:

- 39 river reaches (see Table 5)
- 59 wetlands (see Table 6)
- 8 estuaries (see Table 7).

Priority for the development of the regional work program was given to waterways with higher risk scores and high feasibility of addressing those threats. These waterways form the basis of the work program in Part D. It is recognised that management activities will be undertaken on other waterways when opportunities arise. However, works on these other waterways should address the following criteria:

- reduce threats to priority waterways
- provide connectivity
- protect public infrastructure or reduce risks from extreme events
- maintain or strengthen community commitment to improving the condition of local waterways
- required to meet regulatory obligations.

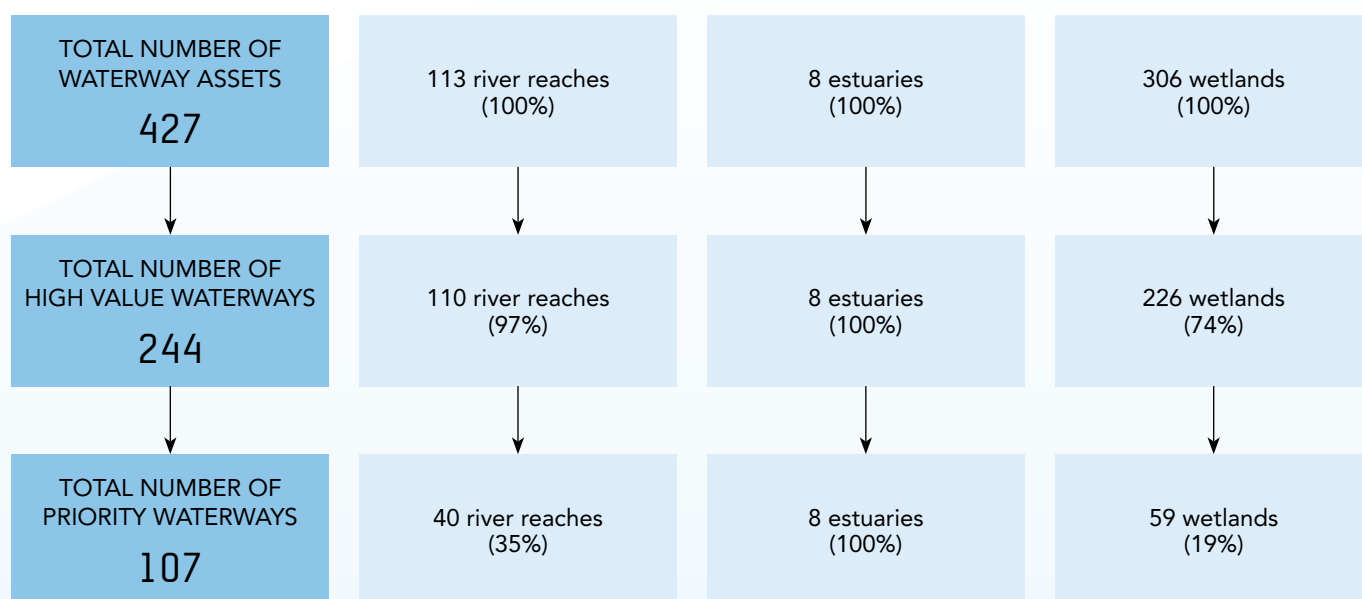


Figure 9. Filtering waterway assets to identify priority waterways

Table 5. Priority river reaches in each Waterway Management Area

River Name	Reach Numbers
Coastal Waterway Management Area	
Brucknell Creek	36-13
Merri River	36-38
Surry River	37-03, 37-04, 37-05
Fitzroy River	37-07
Darlot Creek	37-09
Eumeralla River	37-11
Moyne River	37-16
Moleside Creek	38-14
Lower Glenelg Waterway Management Area	
Glenelg River	38-02, 38-03, 38-04, 38-05
Crawford River	38-15, 38-16
Stokes River	38-21, 38-20
Upper Glenelg Waterway Management Area	
Glenelg River	38-06, 38-07, 38-08, 38-09, 38-10, 38-11, 38-12, 38-13
Wando River	38-44
Upper Hopkins Waterway Management Area	
Mt Emu Creek	36-22
Trawalla Creek	36-23
Volcanic Plain Waterway Management Area	
Mt Emu Creek	36-17
Wannon Waterway Management Area	
Wannon River	38-22, 38-23, 38-24, 38-25, 38-26, 38-28
Miakite Creek	38-30
Grange Burn Creek	38-35, 38-37
Dwyer Creek	38-40

Table 6. Priority wetlands in each Waterway Management Area.
ID number refers to the wetland identifier in the Victorian wetland inventory geospatial layer WETLAND_CURRENT

ID Number	Wetland Name	Wetland Complex
Coastal Waterway Management Area		
20501	Long Swamp (East)	Long Swamp
20502	Lake Bongbong/Lake Monbeong	Long Swamp
20614	Long Swamp (West)	Long Swamp
20613	McFarlanes Swamp	Long Swamp
20561	Unnamed	Bridgewater Lakes
20562	Bridgewater Lakes (North)	Bridgewater Lakes
20563	Unnamed	Bridgewater Lakes
20565	Bridgewater Lakes (South)	
25630	Tower Hill Lake (West)	Tower Hill
25632	Wagon Bay	Tower Hill
25638	Tower Hill Lake (East)	Tower Hill
23598	Lake Condah	
Lower Glenelg Waterway Management Area		
20568	Grassy Flats Swamp	
20965	Grannys Swamp	Mundi-Selkirk
21063	Blackjack Swamp	Mundi-Selkirk
21088	Unnamed	Mundi-Selkirk
20137	Unnamed	Mundi-Selkirk
20911	McCallums Swamp	Mundi-Selkirk
21103	Unnamed	Mundi-Selkirk
21141	Tulich Swamp	
21167	Unnamed	Mundi-Selkirk
21186	Unnamed	Mundi-Selkirk
21229	Unnamed	Mundi-Selkirk
21243	Unnamed	Mundi-Selkirk
21154	Unnamed	Mundi-Selkirk
21852	Blackjack Swamp	Mundi-Selkirk
22953	Unnamed	Mundi-Selkirk
22957	Unnamed	Mundi-Selkirk
20158	Kaladbro Swamp	Lindsay-Werrikoo
21131	Unnamed	Lindsay-Werrikoo
21136	Unnamed	Lindsay-Werrikoo
21166	Unnamed	Lindsay-Werrikoo
21180	Mill Swamp	Lindsay-Werrikoo
21657	Kerr Swamp	Lindsay-Werrikoo
21752	Church Swamp	Lindsay-Werrikoo
22935	Dismal Swamp	Boiler Swamp
22937	Nowackis Swamp	Boiler Swamp

ID Number	Wetland Name	Wetland Complex
Upper Glenelg Waterway Management Area		
22985	Smokey Swamp	Dergholm
22994	Unnamed	Dergholm
23000	Sampey Swamp	Dergholm
23003	Unnamed	Dergholm
23078	Beniagh Swamp	
27624	Victoria Lagoon	
27669	Moora Moora Reservoir	
27675	Rocklands Reservoir	
Upper Hopkins Waterway Management Area		
29160	Cockajemmy Lakes	Cockajemmy Lakes
31808	Lake Muirhead	Lake Muirhead
31816	Mount William Swamp	Mount William Swamp
Volcanic Plain Waterway Management Area		
32240	Lake Bookar	Western District Lakes Ramsar site
32553	Nerrin Nerrin Swamp	Nerrin Nerrin Swamp
29078	Lake Towanway	Woorndoo-Hopkins
29086	Unnamed	Woorndoo-Hopkins
29106	Unnamed	Woorndoo-Hopkins
32200	Lake Elingamite	
Wannon Waterway Management Area		
26609	Bryan Swamp	
26718	Gooseneck Swamp	
26740	Lake Kennedy	Lake Linlithgow
26766	Lake Linlithgow	Lake Linlithgow
26815	Unnamed	Lake Linlithgow

Table 7. Priority estuaries in the Coastal Waterway Management Area

Estuary Name	ISC Reach Number
Glenelg River	38-201; 38-202
Wattle Hill Creek	37-201
Moyne River	37-216
Lake Yambuk	37-211
Fitzroy River	37-206
Hopkins River	36-201
Merri River	36-238
Surry River	37-203

3.5.1 PRIORITY WETLAND COMPLEXES

The prioritisation process using AVIRA (see 3.3.1) required data; such as information provided by the Index of Wetland Condition assessments. Due to varying levels of information about the values of, and threats to, the region's 5,400 wetlands a multi-faceted approach to wetland prioritisation was employed. If wetlands listed in *Table 6* are part of a complex, all wetlands within the complexes may be considered priority, subject to on-ground assessments of the wetland's conditions, values and threats. The work program (see *Part D*) provides examples of works for wetlands within those complexes. Seasonal herbaceous wetlands (see 3.5.2) and wetlands identified during development of the RCS, using the Investment Framework for Environmental Resources (INFFER) prioritisation tool are also considered priority.

Over the next eight years, Glenelg Hopkins CMA will focus on improving knowledge of the region's wetlands, implementing the work programs identified through this strategy and using knowledge of some wetlands to inform broader management direction (see 2.7).

3.5.2 SEASONAL HERBACEOUS WETLANDS

The RCS identified Seasonal Herbaceous Wetlands (SHWs) as a significant wetland area within the catchment. Seasonal Herbaceous Wetlands (Freshwater) of the Temperate Lowland Plains, are a nationally protected wetland type, recently listed under the *Australian EPBC Act*. The Glenelg Hopkins region contains over 1,600 Seasonal Herbaceous Wetlands.

Wetland classifications vary between states. In Victoria wetlands are classified using the system of Corrick and Norman (1980) and Corrick (1982). In order to identify the Seasonal Herbaceous Wetlands within the Glenelg Hopkins region, the Corrick communities most consistent with the national ecological community can be used.

These have been identified as:

- Freshwater meadow – herb dominated
- Freshwater meadow – sedge dominated
- Shallow freshwater marsh – herb dominated
- Shallow freshwater marsh – sedge dominated.

These categories are characterised by shallow, temporary waters that fill the wetlands during winter rains and dry out over summer. Freshwater meadows tend to be shallower and more briefly inundated than shallow freshwater marshes.

Indicative mapping of SHWs prepared during the development of this strategy (see *Figure 10*) shows areas with high densities of this wetland type. These areas are referred to as wetland clusters. Further knowledge gathering and specific site visits are needed to determine the management requirements of many of these wetlands (see 2.7).

Below left: Bridgewater Lakes.

Below right: Seasonal Herbaceous Wetland in a dry phase.



3.5.2 (CONTINUED)

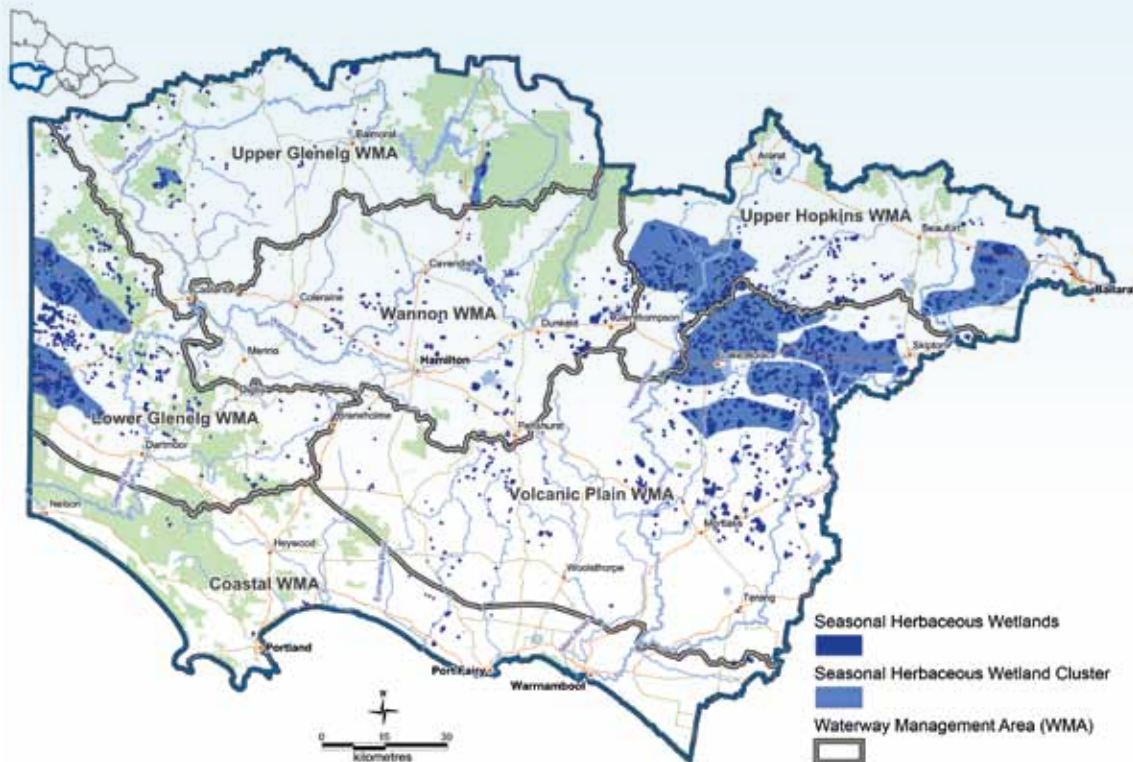


Figure 10. Locations of seasonal herbaceous wetlands and wetland clusters within the Glenelg Hopkins region

3.5.3 WATERWAY MANAGEMENT AREAS

Priority waterways were mapped to show their location in the landscape and assist with identifying target areas for management actions (see Figure 11). Waterway Management Areas (WMAs) were devised that broadly align with priority areas for intervention identified in the Regional Catchment Strategy (see Figure 12). WMAs assist in aligning regional priorities of the RCS and GHWS and enable more flexibility in the implementation of the strategy. Each WMA incorporates sub-catchments identified in the previous RRHS from one or more of the major basins: Glenelg, Hopkins and Portland (see Figure 13).

In the previous RRHS and in this strategy, the Millicent Coast basin is incorporated into the Glenelg basin, given its small size and lack of river reaches in the Glenelg Hopkins region.

Limited resources mean that public investment must be directed to waterway assets that are identified as a priority. However, to protect the values within these waterway assets, works and activities will often have to be undertaken in non-priority reaches (i.e. in upstream reaches of a river or estuary) or elsewhere within the catchment. There will also be opportunity for the community to continue to work on locally significant waterway assets with the assistance of the Glenelg Hopkins CMA and other partners from time to time (see 4.9.4). However, major investment in waterway outcomes will be directed towards implementing the work plan in this strategy.

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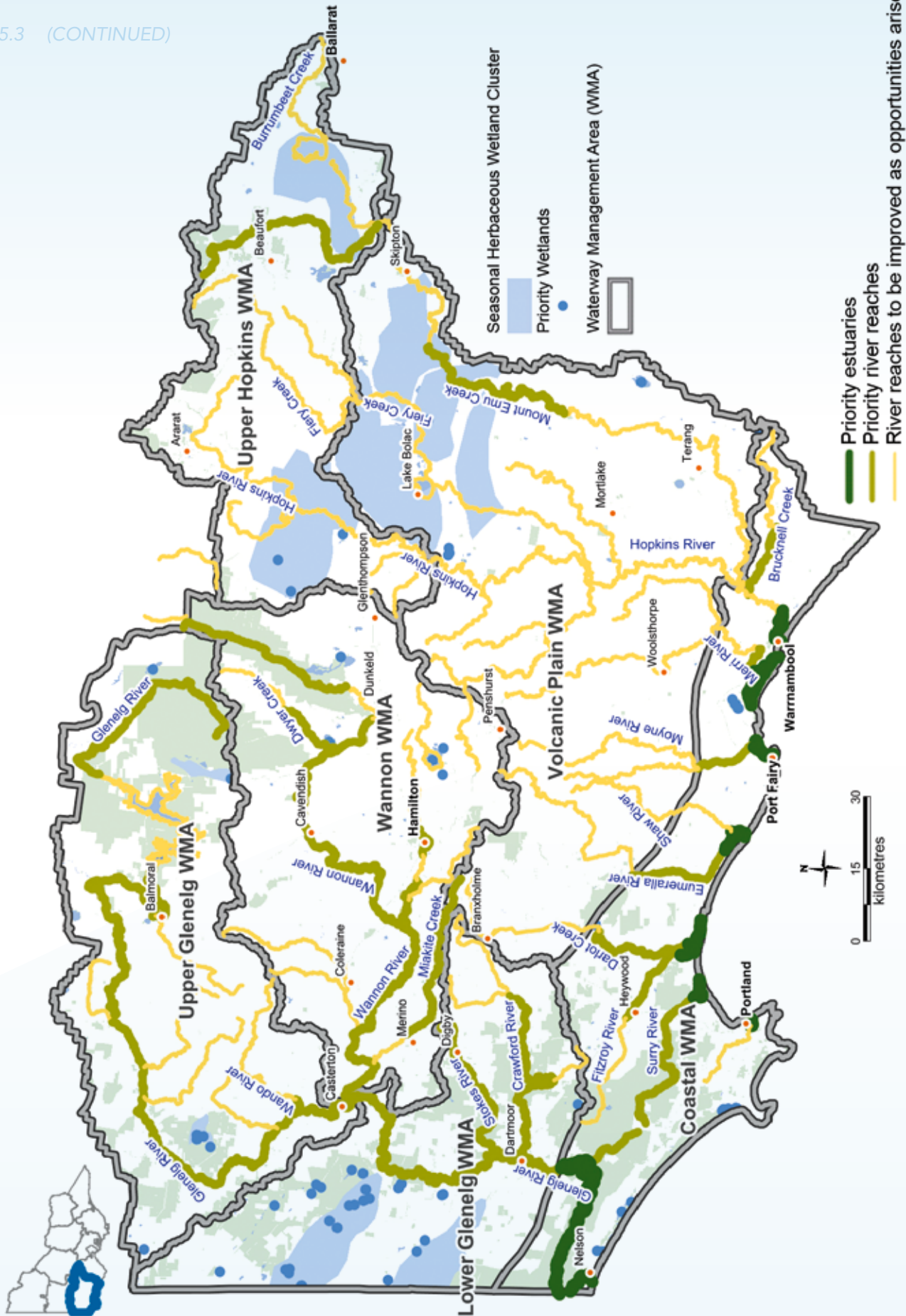


Figure 11. Priority waterways and seasonal herbaceous wetland priority areas within Waterway Management Areas

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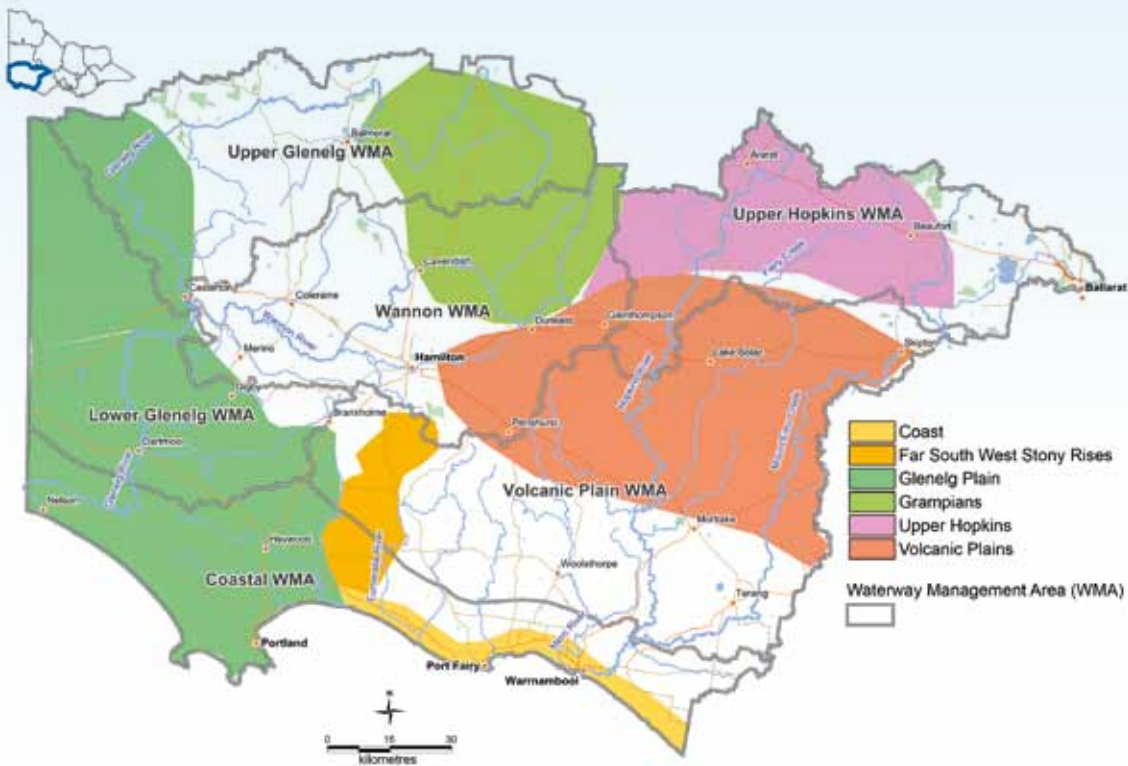


Figure 12. Priority areas for intervention identified in the Glenelg Hopkins Regional Catchment Strategy 2013-2019



Figure 13. Glenelg Hopkins CMA sub-catchments overlaid with Waterway Management Areas

3.6 PROGRAM LOGIC

Program logic is a planning approach commonly used in natural resource management that demonstrates the rationale for a program and expresses how change is expected to occur.

The program logic provides the rationale for how the GHWS contributes to the vision for Victoria’s waterways, identified in the Victorian Waterway Management Strategy and the Glenelg Hopkins region’s vision, identified in this strategy.

The simplified program logic for GHWS is illustrated in Figure 14 below. It describes how each year, specific management activities and outputs are delivered in order to achieve particular management outcomes.

Over the eight-year planning period, these outputs and outcomes collectively contribute to achieving regional goals and either maintaining or improving the environmental condition of waterways. In the long-term, this will ensure that the Glenelg Hopkins region’s waterways can continue to support environmental, social, cultural and economic values.

The program logic approach is utilised in Part D to identify condition targets (8+ years), management outcomes (1-8 years) and high level management actions (annual) for priority waterways. These three levels all contribute towards the regional goals. These activities form the basis of the eight-year regional work program.

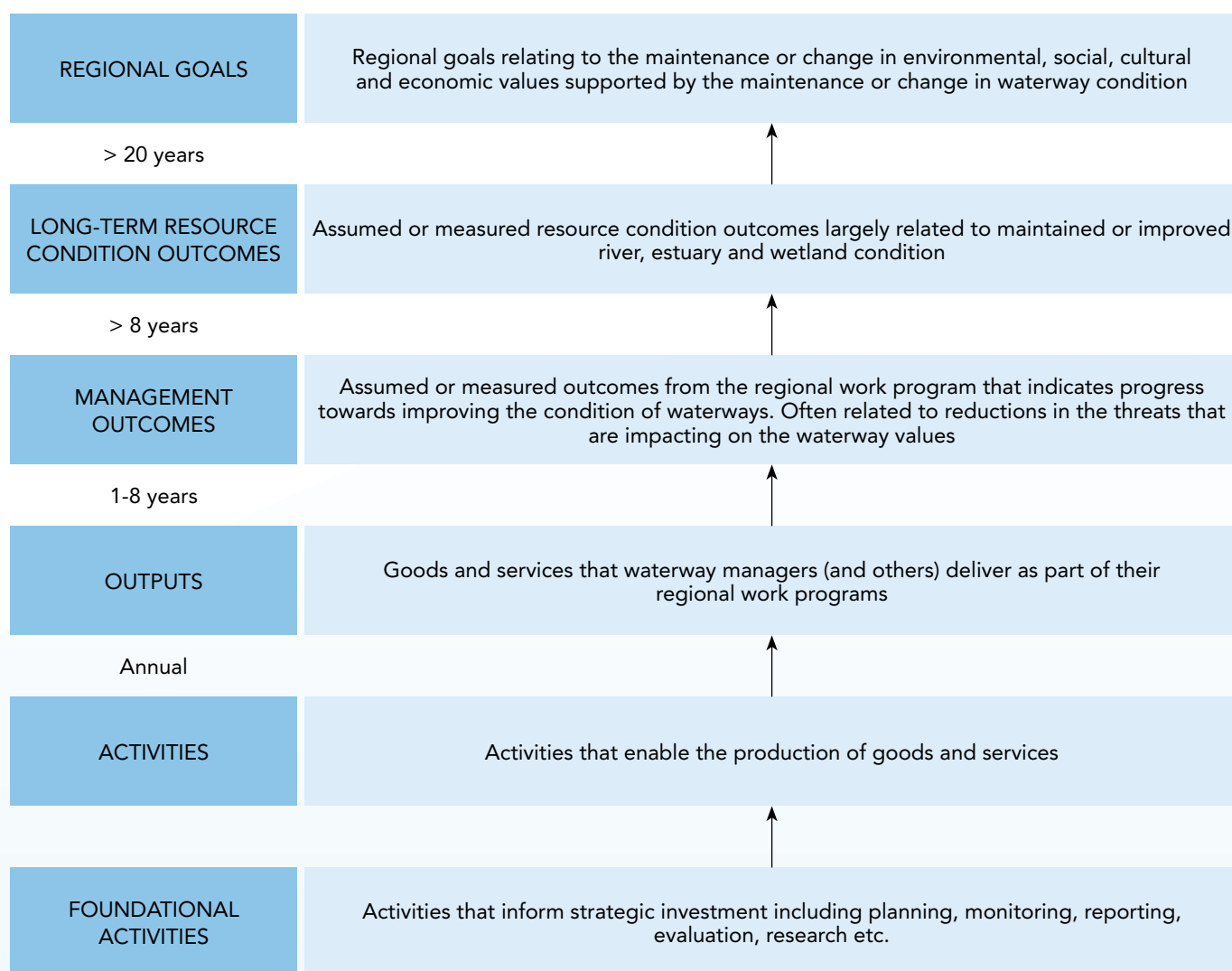


Figure 14. Simplified program logic for the Glenelg Hopkins Waterway Strategy

3.6.1 DEVELOPING TARGETS

The GHWS follows clear program logic that aligns with the DEPI MER Framework³⁶. Targets are set at three levels within the program logic:

- long-term resource condition (8+ years)
- management outcome (1-8 years)
- management outputs (annual).

The targets provide quantitative measures of progress towards qualitative goals.

Targets within the GHWS are set at the 'asset' level (river or estuary reach, wetland) and then amalgamated to the planning unit (management region/sub catchment) and regional scale. The targets contribute to the targets set in the Victorian Waterway Management Strategy.

Logic models were used to confirm the management actions required to achieve waterway health outcomes and to inform target setting in the GHWS³⁷.

Management outcomes are linked to a one to eight year timeframe, and are set to refer to an expected and measurable change to the threat scores for the asset within the strategy implementation period. However, the rollout of priority activities will occur over the eight-year implementation period of the strategy and therefore some outcomes may not be measurable during the strategy review. The targets are based on a conceptual and logical framework; hence outcomes do not need to be measured for every asset. The assumptions within the logical framework will be tested and applied across the region and in some cases across Victoria (see example in Figure 15 below).

While targets within the GHWS are considered achievable, the quantities within the outputs provide an indicative level of investment that could be reasonably implemented within an eight-year timeframe.

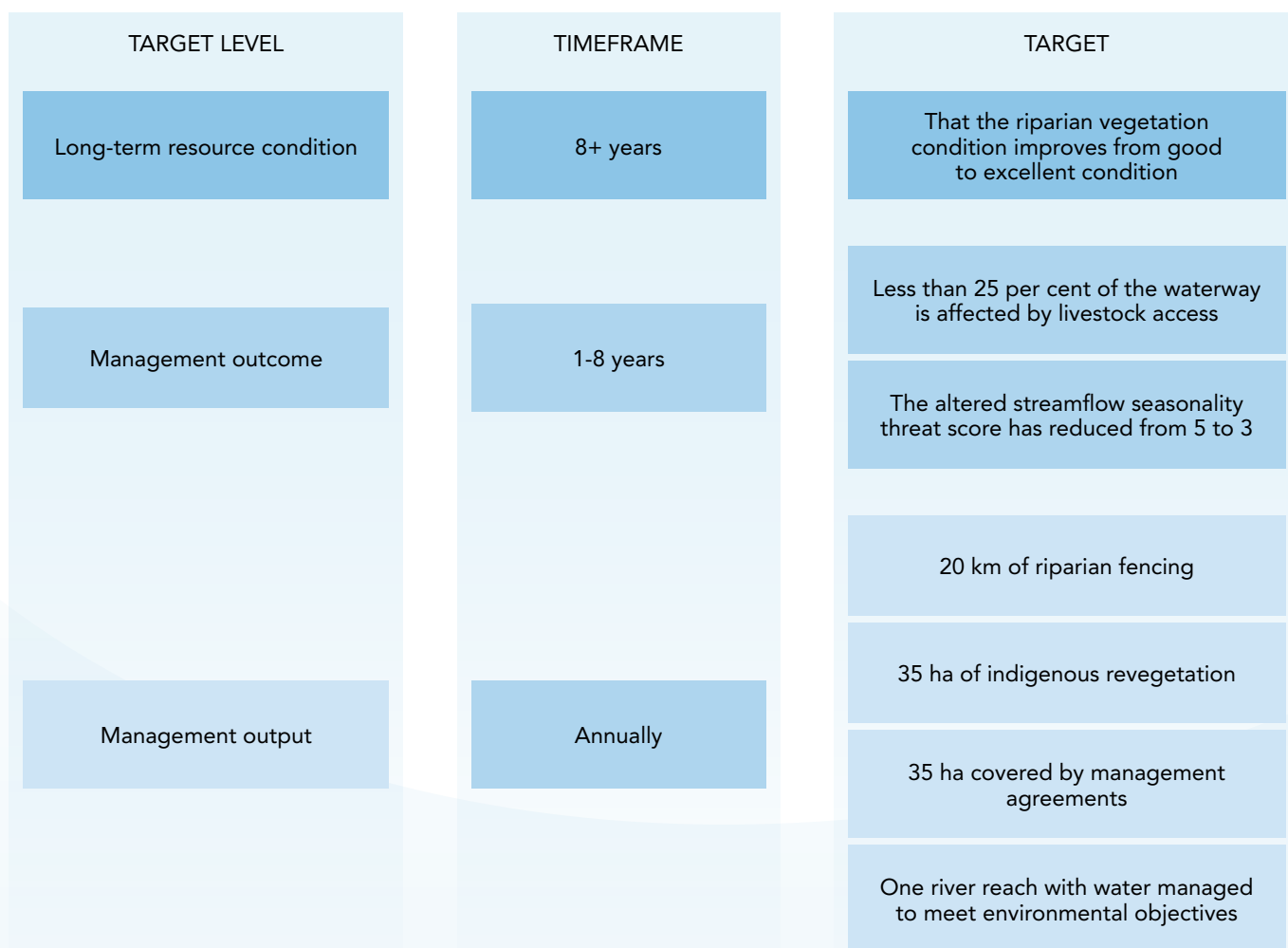


Figure 15. Example of the three levels of targets set for vegetation resource condition