

# PART A

## REGIONAL OVERVIEW AND STRATEGIC CONTEXT



# PART A: REGIONAL OVERVIEW AND STRATEGIC CONTEXT

Part A provides a description of the waterways in the Glenelg Hopkins region and an outline of the process for strategy development, including incorporation of community and Indigenous values, identification of key legislation and policy, and learnings from the previous Regional River Health Strategy and Addendum.

## SUMMARY OF SECTIONS IN PART A

<b>1.1 REGIONAL OVERVIEW</b>	Describes the Glenelg Hopkins CMA region, basins and Waterway Management Areas. <i>See page 11.</i>
<b>1.2 REGIONAL WATERWAYS</b>	Describes key values associated with the region's rivers, estuaries and wetlands; threats to those values and current conditions. <i>See page 12.</i>
<b>1.3 COMMUNITY PARTICIPATION</b>	Outlines the process for community input to the strategy development including results of the flagship species survey and Fisheries Victoria workshop. <i>See page 18.</i>
<b>1.4 INDIGENOUS PEOPLE'S KNOWLEDGE AND INVOLVEMENT</b>	Outlines the process of input to the strategy from Traditional Owners and incorporation of Indigenous cultural values. <i>See page 20.</i>
<b>1.5 STRATEGIC AND LEGISLATIVE CONTEXT</b>	Describes the legislation and policy that informs and guides development of the strategy. <i>See page 22.</i>
<b>1.6 REVIEW OF PREVIOUS RIVER HEALTH STRATEGY AND ADDENDUM</b>	Reviews implementation of the Regional River Health Strategy and Addendum; identifies key learnings and achievements. <i>See page 24.</i>

## 1.1 REGIONAL OVERVIEW

The Glenelg Hopkins region covers approximately 26,910 square kilometres, extending from Ballarat in the east to the South Australian border in the west, and from the southern coast of Victoria to the townships of Harrow and Ararat in the north.

Australia has 12 major drainage divisions. The Glenelg Hopkins region falls within the South East Drainage Division and contains four main basins: Glenelg, Hopkins, Portland Coast and Millicent Coast.

The Glenelg Hopkins regional boundary is based on the external boundary of the above four basins and the South Australian border (Figure 1 below). A small portion of the Glenelg River basin crosses the South Australian border and is not considered to be within the Glenelg Hopkins region boundary. The previous Regional River Health Strategy (RRHS) divided each basin into 32 smaller sub-catchments incorporating a smaller creek or river with consideration of surface water catchments, soil types and bioregions. To better align the GHWS with the Regional Catchment Strategy (RCS), the basins were consolidated into six Waterway Management Areas (WMAs).

The boundaries of the region include marine and coastal waters out to the state limit of three nautical miles.

The Glenelg Hopkins region contains a number of natural waterway features that are of state, national and international significance, including:

- Budj Bim National Heritage Landscape – including Mt Eccles, Lake Condah, and Tyrendarra area
- Glenelg River – the lower section of the Glenelg River is one of 18 Heritage Rivers in Victoria as listed under the *Heritage Rivers Act 1992*
- Western District Ramsar Lakes – Lake Bookar is one of nine wetlands in the Western District Lakes Ramsar site, which is recognised as internationally important under the Ramsar Convention on Wetlands. The other eight wetlands are in the Corangamite region
- Important Bird Areas (IBAs) (sites of global bird conservation importance) – Yambuk Lakes complex, Port Fairy to Warrnambool and Discovery Bay to Piccaninnie Ponds
- Threatened flora – 20 endangered Ecological Vegetation Classes (EVCs) and two nationally listed ecological communities; Seasonal Herbaceous Wetlands (Freshwater) of the Temperate Lowland Plains and Temperate Coastal Saltmarsh.

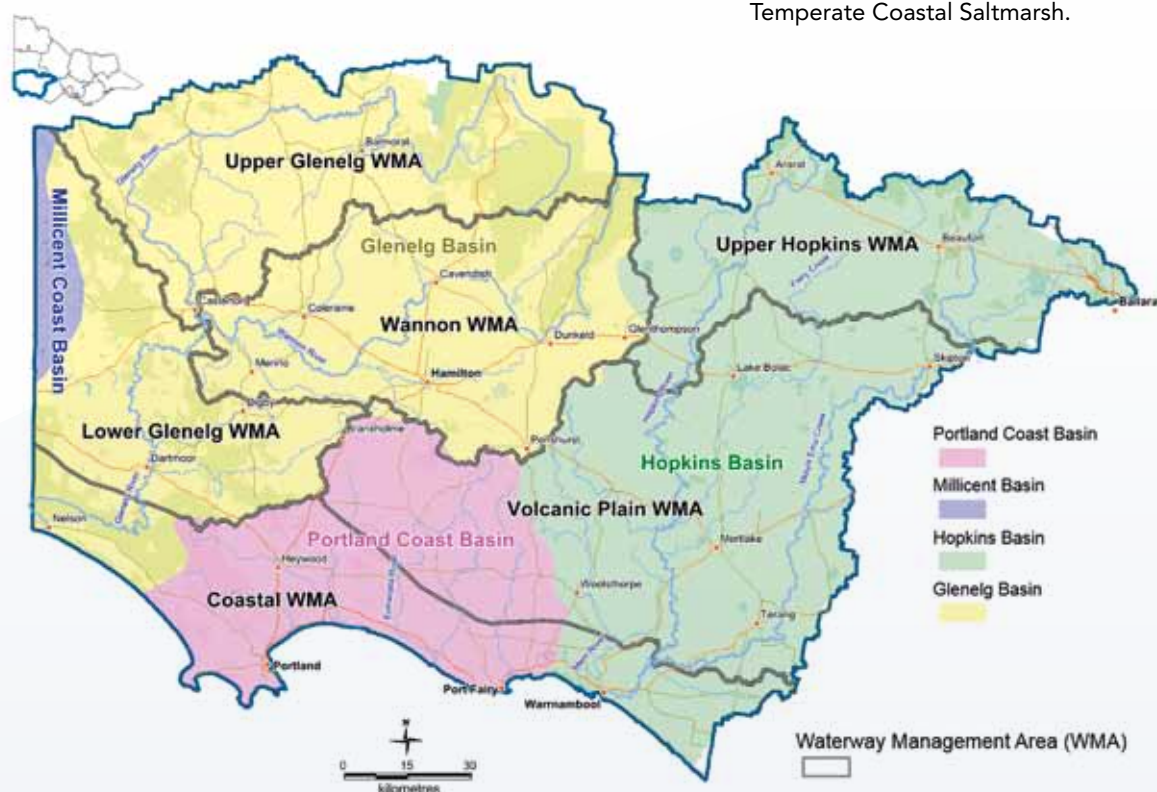


Figure 1. Major river basins and Waterway Management Areas in the Glenelg Hopkins region



## 1.2 GLENELG HOPKINS WATERWAYS

### 1.2.1 WATERWAY VALUES

Improving the environmental condition of waterways in priority areas is a critical task to sustain populations of native plants and animals, provide opportunities for recreation, protect cultural values, and support economic development through important industries such as tourism and agriculture (see Figure 2).

All waterways benefit the community by providing a range of products and processes collectively known as ecosystem services. Water for human and stock use and recreational fishing contribute greatly to the region's use and enjoyment of waterways. Processes such as decomposition, and filtering and transport of nutrients promote healthy waterways and support waterway's environmental, social, cultural and economic values.

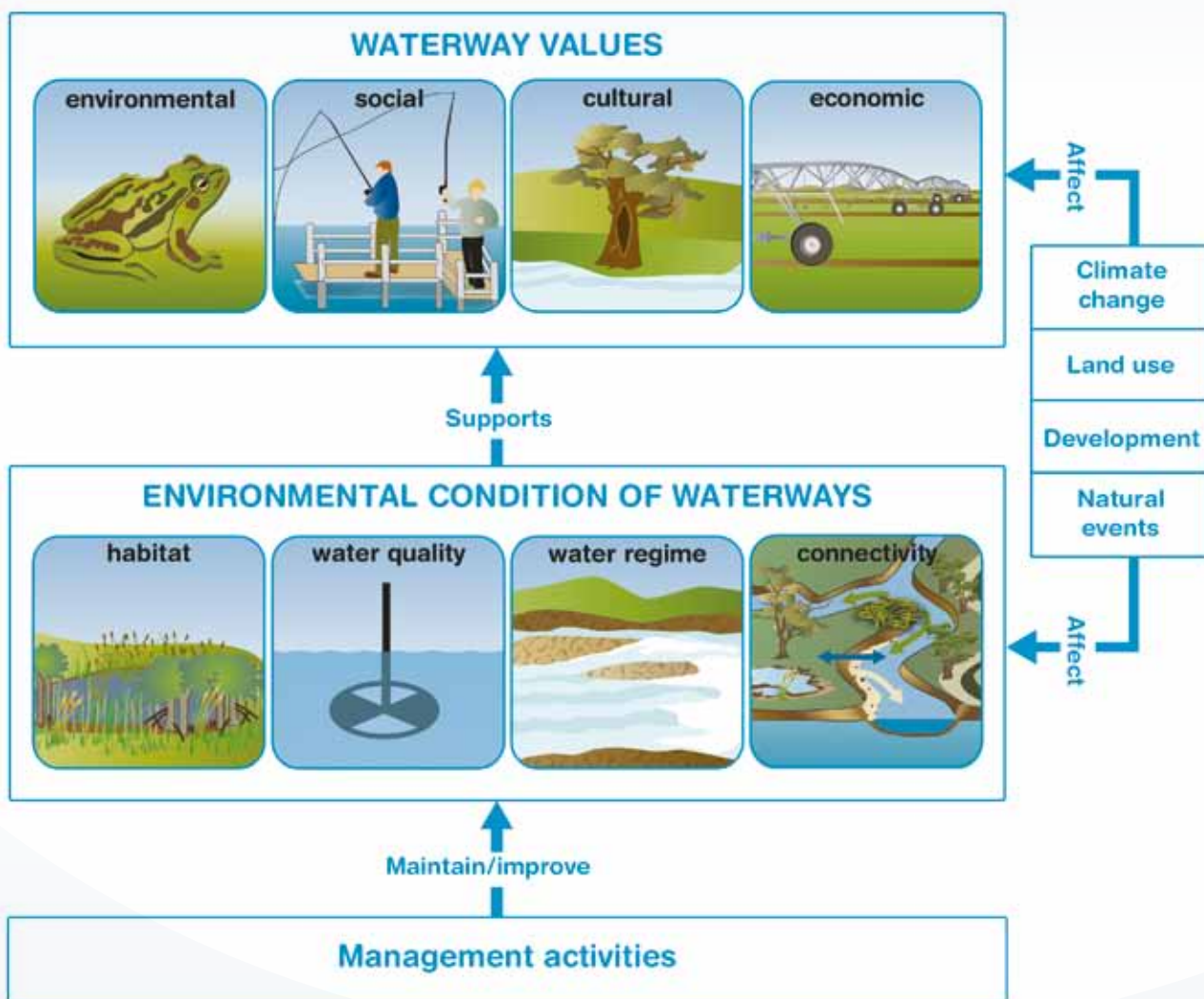


Figure 2. The drivers of environmental condition that support the values of waterways<sup>1</sup>

### 1.2.2 RIVERS

The Glenelg River is the largest river in south-west Victoria and contains some of the best condition river reaches in the region. The Glenelg basin contains more than 150 threatened to near-threatened species and ecological communities and falls within one of 15 listed 'biodiversity hotspots' in Australia, and one of only two in Victoria. Significant tributaries of the Glenelg River include the Wannon, Chetwynd, Stokes, Crawford and Wando rivers.

The four main catchments within the Portland Coast basin are the Moyne, Eumeralla-Shaw system, Darlot Creek – Fitzroy River system and the Surry River. These are relatively short rivers, which drain the immediate inland areas and flow to the Southern Ocean.

The Hopkins River is a major waterway draining the eastern part of the region and enters the Southern Ocean at Warrnambool. The Hopkins basin is largely cleared and used for agriculture. The Hopkins River estuary reach is one of three premier river reaches under the Go Fishing in Victoria Program, selected for their existing high recreational fisheries values. The Merri River, and the Fiery and Mt Emu creeks are other significant waterways within the Hopkins basin.

All basins have high value environmental reaches, which support rare and threatened fauna and flora. The region's rivers support a range of social values including fishing, boating, camping, swimming, picnicking and bushwalking.

Rivers contribute to the region's economy and are valued for the supply of water for agriculture, sand mining, drinking water, tourism and fishing.

### 1.2.3 ESTUARIES

Estuaries, where rivers meet the sea, are an important link between catchments, coasts and the marine environment. There are eight major estuaries in the Glenelg Hopkins region: Glenelg River estuary, Fawthrop Lagoon, Surry River estuary, Fitzroy River estuary, Yambuk Lake, Moyne River estuary, Merri River estuary and the Hopkins River estuary.

Estuaries are highly dynamic and productive systems that support a rich and diverse array of wildlife and unique wetland vegetation communities. They provide key spawning and nursery grounds for many species of fish and drought refuge and critical breeding and foraging areas for birds. Estuaries also play a pivotal role in maintaining water quality through nutrient and sediment filtering. Estuaries of the region also support significant numbers of threatened species listed under state and national legislation.

Most estuaries within the region close intermittently following the formation of a sand bar at the estuary mouth. Both Moyne estuary and the smaller outlet associated with Fawthrop Lagoon are artificially kept permanently open.

Several estuaries are recognised at national and international levels for their environmental significance. The Glenelg River estuary is listed as a Heritage River under the *Heritage Rivers Act 1992* (Vic) and as a wetland of national significance in the Directory of Important Wetlands in Australia (DIWA). The Yambuk Lake complex, along with the Lower Merri River wetlands (Kellys and Saltwater swamps) are DIWA-listed wetlands. Estuaries provide important habitat for migratory bird species, which are protected under international agreements.

Estuaries underpin key social, economic and cultural heritage values within south-west Victoria. They are a significant drawcard for tourism and are highly valued by the local and broader communities for scenic beauty, recreational fishing, swimming, camping, bird watching and boating.

*Below left: Glenelg River.*

*Below right: Hopkins River estuary.*



### 1.2.4 WETLANDS

The catchment has more than 5,400 wetlands, covering 73,000 ha or three per cent of the region's area. This represents 14 per cent of Victoria's total area of wetlands and 44 per cent of the state's total number of wetlands.<sup>2</sup> The region's wetlands vary greatly, ranging from large and permanent freshwater lakes to small and ephemeral (non-permanent) freshwater meadows. Seasonal Herbaceous Wetlands, which are ephemeral, isolated freshwater wetlands, are particularly well represented. This wetland type is listed as critically endangered under the *Environment Protection and Biodiversity Conservation Act 1999* (Cwlth) (EPBC).

Wetlands of the Glenelg Hopkins region are recognised as key areas for conservation under a number of international agreements. Lake Bookar, near Camperdown, is part of the Western District Lakes Ramsar Site, which is recognised under the Ramsar Convention as a wetland of international importance<sup>3</sup>, while several other wetlands support migratory waterbird species listed under international bilateral migratory bird agreements with Japan, China and the Republic of Korea (JAMBA, CAMBA and ROKAMBA) and the Convention on Migratory Species. There are three Important Bird Areas (IBAs) including Yambuk Lakes complex IBA, Port Fairy to Warrnambool IBA, and Discovery Bay to Piccaninnie Ponds IBA. Sixteen of the region's wetlands are DIWA-listed.

Wetlands are integral to healthy ecosystems in the region's landscape. They receive runoff, absorb and filter floodwaters, replenish groundwater reserves, act as direct surface water supplies and are important drought refuges for wildlife. Wetlands are also of great social and economic value to the region, supporting some of the most significant recreational attractions in the area including boating, fishing, camping, swimming and sightseeing.

Further details of the natural waterway assets associated with each of the six Waterway Management Areas are provided in *Part D*.

### 1.2.5 THREATS TO WATERWAY VALUES

The type and extent of threats to the region's rivers, estuaries and wetlands are often associated with current or historic land use adjacent to the waterway and in the broader catchment. A large proportion of the Portland and Hopkins basins is used for agriculture, with grazing and cropping in the north of the region and dairy in the south. The Glenelg basin is predominantly used for grazing and timber production with much of the southern part of the basin in National or State parks.

Specific threats to waterways in each Waterway Management Area are documented in *Part D*. However, some threats such as erosion, nutrient inputs, pest plants and animals, altered flows and climate change are widespread and impact the entire region.

Across the Glenelg Hopkins region, river values and condition are often compromised by erosion and sedimentation, particularly where catchments have been cleared and stock can directly access the waterway. Increased nutrient loads in waterways as a result of uncontrolled stock access, agricultural fertilisers and urban stormwater runoff can cause blooms of blue-green algae that impact on regional communities and the economy.

Pest plants can significantly reduce waterway values by decreasing river access for recreational activities and pest animals impact on native species by direct predation or competing for habitat and food. Water extraction, land use and river regulation can alter flow regimes. Climate change is predicted to result in longer periods of low flow to our waterways and more frequent extreme events such as floods, fire and drought.

The 2004-2010 drought is believed to have impacted greatly on the Glenelg Hopkins and Wimmera regions, and was a significant factor in the lower than expected waterway condition results of the third Index of Stream Condition assessment (see 1.2.6).

*Below left: Fraser Swamp.*

*Below right: Stock access to waterways can lead to excess nutrients and increase in blue-green algae blooms.*





### 1.2.5 (CONTINUED)

Estuaries are dynamic and resilient systems, but face a range of threats from human and natural causes.<sup>4</sup> The proximity of estuaries to coastal settlements exposes them to intense levels of recreation and social use. Predicted population growth in coastal areas will increase development pressure, particularly along waterways. The high value of coastal agricultural land contributes to the pressure on coastal land, including land adjacent to estuaries. The main threats to the region's estuaries include inappropriate development and land use, riparian degradation, reduced water quality, exotic flora and fauna, bank and bed instability, stock access to riparian zones, and flow deviation. Unlicensed artificial estuary mouth openings can also have a negative impact on the form and function of estuaries. Estuaries and their associated wetland complexes are particularly susceptible to predicted climate change impacts, such as altered inundation and salinity regimes from altered flows and increased sea levels and storm events.

The extent of wetlands in the region has declined by approximately 60 per cent since European settlement, primarily due to drainage and conversion to agriculture. Key threats to wetland values and condition in the Glenelg Hopkins region include drainage, stock grazing, cropping, pest plants, water extraction, nutrient enrichment and runoff and drift of pesticides and herbicides. Some threats are predicted to be exacerbated with climate change, with many wetlands undergoing extended dry periods and sea level rise likely to affect coastal wetlands.<sup>5,6</sup>

These threats are likely to lead to a decline in the condition of our waterways and loss of environmental, social, cultural and economic values.

### 1.2.6 CONDITION

The condition of waterways in the region varies from excellent to very poor, reflecting the level of modification of the waterway and types of use. Waterways in near natural condition with high environmental values are generally in National and State parks. Highly modified waterways are typically in urban areas or areas of intensive agriculture. These waterways often support economic values and recreational activities.

River condition in Victoria is assessed using the Index of Stream Condition (ISC)<sup>7</sup>. The ISC measures the environmental condition of river reaches. The third ISC report<sup>8</sup> provides a summary of river health for major rivers and streams in Victoria using data collected over a six-year period from 2004-2010. The report is a 'snapshot' and the measures are not designed for comparison of river health with previous ISC assessments.

ISC3 results showed that stream condition varied considerably between the three basins in the region, with streams in the Glenelg basin being in best condition (see Figure 3). All reaches in good condition (14 per cent of reaches assessed) were in the Glenelg basin. Both the Glenelg and Portland basins had the majority of their stream length in moderate condition (68 per cent and 84 per cent respectively). The majority of stream length in the Hopkins basin was in poor condition (38 per cent) or very poor condition (56 per cent). This result is generally due to modified flow regimes, degraded riparian vegetation, poor bank condition and low water quality from elevated nutrients and salinity. It should be noted that the assessment coincided with a drought period, which was particularly severe in the Glenelg Hopkins region. These conditions impacted on several measures of the ISC, in particular water quality and hydrology.

*Below left: Stock access to river banks can lead to bank erosion and loss of productive agricultural land.  
Below right: Gully erosion in the upper Glenelg catchments.*



## 1.2.5 (CONTINUED)

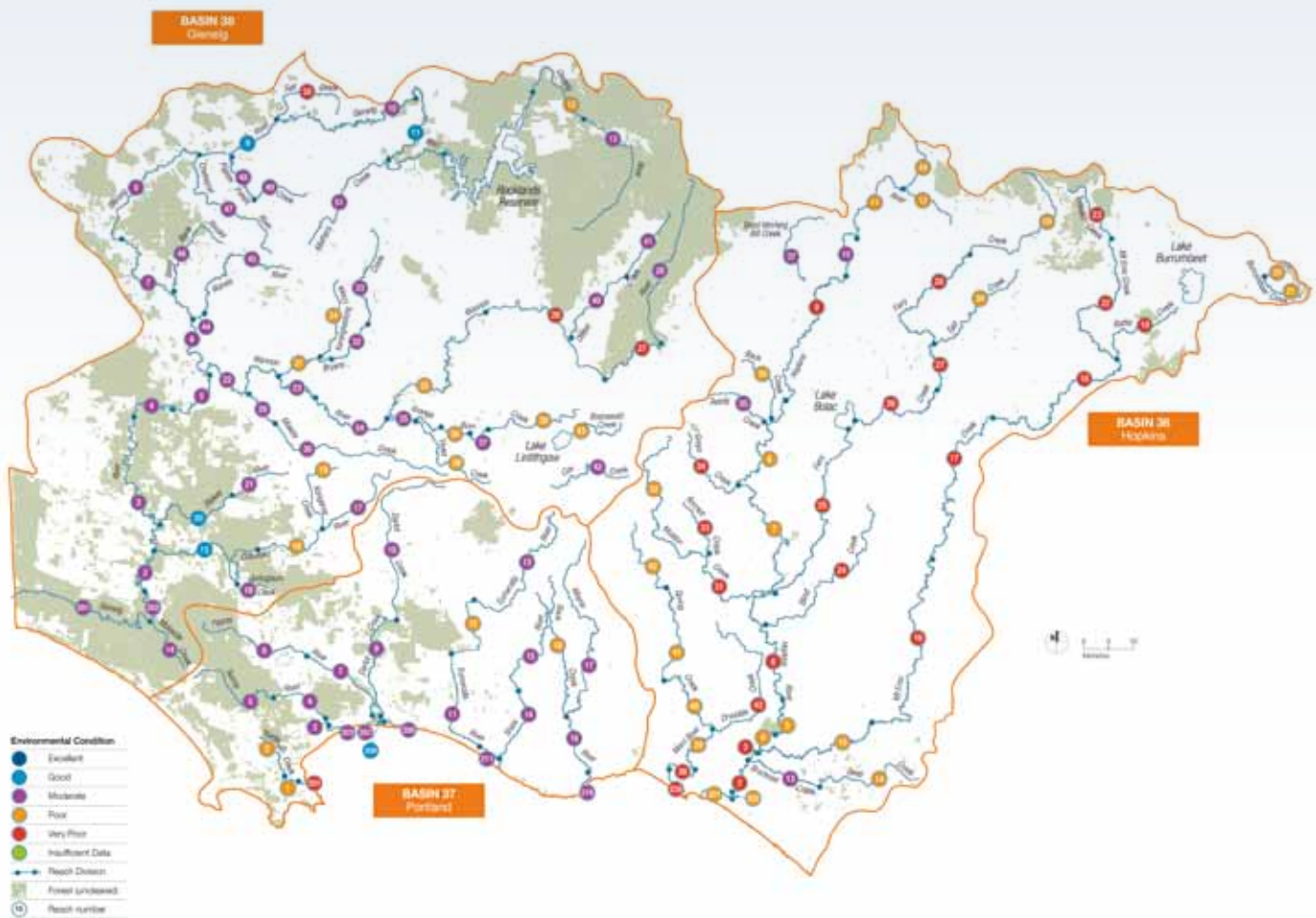


Figure 3. Condition of reaches in Glenelg, Portland and Hopkins basins based on the third ISC report

The Index of Wetland Condition (IWC) was developed by the Department of Environment and Primary Industries (DEPI) in November 2005 to measure the condition of wetlands across Victoria. The IWC measures aspects of a wetland's soils, water, plants and its catchment. DEPI co-ordinated an IWC assessment of wetlands in Glenelg Hopkins region in 2009 (see Table 1).

The assessment revealed that the majority of the wetlands surveyed were in good to excellent condition with the exception of shallow freshwater meadows. Meadows are dry for extended periods and therefore more vulnerable to conversion to agricultural use. Of the wetlands that remain in the region, most are on private land. Many are accessed by stock, which reduces fringing vegetation, impacts on hydrology and affects natural processes.



## 1.2.5 (CONTINUED)

Table 1. Wetland condition of selected wetlands based on 2009 IWC scores

TYPE	WETLANDS SURVEYED (%)			WETLAND CONDITION CATEGORY (NUMBER)				
	Proportion of all wetlands	Per cent surveyed	Percentage of all types surveyed	Excellent	Good	Insufficient data	Moderate	Poor
Deep freshwater marsh	12.3%	6.9%	27.0%	30	15		4	1
Shallow freshwater marsh	20.3%	4.1%	27.0%	33	6	2	5	4
Freshwater meadow	47.4%	2.5%	37.8%	17	8	1	13	31
Open water	13.9%	0.8%	3.8%		3		1	3
Permanent saline	1.5%	8.0%	3.8%	3	3		1	
Semi permanent saline	4.5%	0.4%	0.5%				1	

A Victorian Index of Estuary Condition (IEC) is currently in development and methods for assessing the health of Victoria's estuaries are being trialled. The IEC will identify aspects of the estuary that are suitable for measuring ecological condition in a consistent and systematic way.



## 1.3 COMMUNITY PARTICIPATION

Waterways in the Glenelg Hopkins region have benefited from strong community involvement. Community members from a variety of industry, recreational and environment groups make a valuable contribution to waterway management in the Glenelg Hopkins region by volunteering their time, local knowledge and expertise.

Individual land managers – often in conjunction with Landcare groups, community groups or with assistance from the CMA – undertake works that both protect waterway values and assist in farm management. In 2009, the *My Victorian Waterway Survey* was undertaken with over 7,000 Victorians participating. The results showed respondents in the Hopkins basin had the highest level of participation in waterway improvement activities across Victoria.

The Glenelg Hopkins CMA has a strong relationship with research institutes and universities. These organisations increase our knowledge of waterway form and function and provide evidence to inform decision making and more effective management.

This strategy was developed in close collaboration with community and government agencies. It utilises and builds on the extensive engagement undertaken during development of the Glenelg Hopkins RCS. Through the RCS consultation, the community identified many important rivers, estuaries and wetlands with high environmental, social, cultural and economic values.

Community input was encouraged in a variety of forums at different stages of the strategy development (see *Appendix 1*). Glenelg Hopkins CMA community advisory groups had significant input into the development of the vision and 20-year goals for the strategy, as well as commenting on earlier drafts of the strategy. Indigenous knowledge and values with regard to waterway management were incorporated through general community forums but also through discussions with members of each Registered Aboriginal Party (RAP) or RAP Applicant (see *Appendix 2*). A community survey was used to identify flagship species for rivers, wetlands and estuaries for use in the AVIRA asset identification process. Input to the strategy was also encouraged in meetings with many community groups during the public comment period.

The development of the GHWS provided an opportunity for fisheries managers, anglers and other interested groups to work together to develop project ideas for the management of our region's recreational fishing waters for the next eight years. A workshop was convened by DEPI, in partnership with Glenelg Hopkins CMA, to identify areas of potential alignment between these priorities and broader river health works (see *Appendix 3*).

**Flagship species** are plants and animals with important social values that are valued by the community. Promotion of flagship species brings to attention the need for conservation of both the individual species and its associated waterway habitat. Two species for each waterway type (rivers, estuaries and wetlands) were selected by the community (see *Table 2*). Waterways with these species are included in the waterway priority setting process.

*Below left: Community members help plant trees in Portland.*

*Below right: Landholders have made a significant contribution to protecting waterways.*



Table 2. Flagship species in Glenelg Hopkins waterways

## WATERWAY TYPE: RIVERS



**Glenelg spiny cray *Euastacus bispinosus*** – An endangered species found only in south-west Victoria and south-east South Australia; mainly found in the Grampians, Crawford River, Wannon River, Glenelg River and their tributaries. The species has seen a population decline across the entire species distribution area over the past century as a result of over-fishing, low environmental flows, habitat degradation and the introduction of invasive fish species.



**River red gum *Eucalyptus camaldulensis*** – A common and widespread tree found along waterways as well as scattered across the landscape. These trees are remnants of the woodlands that covered much of the Glenelg Hopkins region and south-east Australia. Mature river red gums can reach ages of several hundred years, and commonly grow on riverine sites and plains that receive periodic flooding. Isolated trees provide valuable habitat for wildlife across the landscape. Threats to river red gums include disease, lack of natural regeneration, changes to water regime, and land use change.

## WATERWAY TYPE: ESTUARIES



**Black bream *Acanthopagrus butcheri*** – Primarily an inhabitant of estuaries and coastal lakes. During the breeding season, the species penetrates into the upper reaches of rivers to spawn with juveniles returning to the estuaries. Southern black bream is a major target species for both commercial and amateur fishers. Black bream are potentially threatened by over-fishing, inappropriate artificial river mouth opening and poor water quality.

Photo: D. Crooks.



**Short-finned eel *Anguilla australis*** – Has been a culturally and economically significant species in south-west Victorian waterways for thousands of years, valued by the Gunditjmara and the Djab Wurrung people from western Victoria, who farmed eels on a large scale. Eels migrate at maturity downstream to the sea, then up to 4,000 km to a spawning ground in the Coral Sea off New Caledonia. The larvae, or 'glass eels', return to estuaries and move upstream to reach maturity. Short-finned eels are potentially threatened by barriers to migration of adults and larvae, wetland drainage, overharvesting of adult eels and harvesting of larval eels for aquaculture.

## WATERWAY TYPE: WETLANDS



**Brolga *Grus rubicunda*** – Brolgas found in the western district live permanently in the area, mating for life. During the breeding season (July to December) they nest in freshwater meadows or shallow freshwater marshes across the region. Key threats are fox predation of chicks and loss of wetland habitat.

Photo: R. Drummond.



**Ancient greenling *Hemiphysalia mirabilis*** – A small metallic green to bronze coloured damselfly. It is the only known species of the genus anywhere in the world and is commonly termed a 'living fossil'. It is endemic to freshwater swamps, wetlands, billabongs and lagoons in south-east Australia and is often associated with seasonal water bodies that dry out in summer. The species' populations are isolated across the landscape and vulnerable to ongoing threats from increased water demand, land clearing, draining of wetlands and habitat removal.

Photo: A. Cordero.



## 1.4 INDIGENOUS PEOPLE'S KNOWLEDGE AND INVOLVEMENT

Indigenous people have sustainably utilised the waterways in the Glenelg Hopkins region for at least the past 11,000 years and possibly more than 40,000 years.

Access to water and healthy waterways is important for many cultural practices. The region's rivers, estuaries and wetlands have been extensively used as sources of food, medicines, fibre and implements and this use is ongoing. There is physical evidence of historic use in the form of shell middens, oven mounds, stone quarries, fish traps and scarred trees.<sup>9</sup> Some sites may have no observable features but are important for their intangible links to places of spiritual or ceremonial significance, resources, trade, travel or stories.<sup>10</sup>

The *Aboriginal Heritage Act 2006* (Vic) recognises Aboriginal people 'as the primary guardians, keepers and knowledge holders of Aboriginal cultural heritage'. Registered Aboriginal Parties (RAPs) have important roles and functions in managing and protecting Aboriginal cultural heritage in Victoria. RAPs are determined by the Aboriginal Heritage Council. There are four recognised RAPs in the Glenelg Hopkins region: Gunditj Mirring Traditional Owners Aboriginal Corporation, Barengi Gadjin Land Council Aboriginal Corporation, Martang Pty Ltd, Wathaurung Aboriginal Corporation and RAP applicant Eastern Maar Aboriginal Corporation.<sup>11</sup>

Indigenous communities also have a central role as land managers on Indigenous Protected Areas (IPAs) at the Dean Maar property on Lake Yambuk, and Lake Condah and Tyrendarra on the Budj Bim National Heritage Landscape. In addition, Mount Eccles National Park is Victoria's first co-managed national park, being managed by the Gunditj Mirring Traditional Owners Aboriginal Corporation and Parks Victoria.

Indigenous communities' approach to natural resource management is fundamentally holistic, with cultural values intrinsically linked to country. All waterways are viewed as key to cultural, spiritual, social and economic survival. Consistent with this perspective, Indigenous communities recognise the value of all waterways and, as such, all were scored using AVIRA to reflect high Indigenous cultural values (see section 3.3.1). Specific values and aspirations, identified during consultation with each Registered Aboriginal Party, are recorded in *Appendix 2* and reflected in this strategy's recommended actions.

### ACTION 1-1:

Develop an Indigenous cultural heritage procedure to guide field staff and landholders undertaking on-ground works to facilitate identification and protection of cultural heritage sites

**Who:** Glenelg Hopkins CMA, Aboriginal Affairs Victoria, Gunditj Mirring Traditional Owners Aboriginal Corporation, Barengi Gadjin Land Council Aboriginal Corporation, Martang Pty Ltd, Wathaurung Aboriginal Corporation and Eastern Maar Aboriginal Corporation, other traditional owner groups and Indigenous organisations

### ACTION 1-2:

Investigate opportunities to progress priority actions identified during consultation with each Registered Aboriginal Party (RAP) or RAP applicant (*Appendix 2*)

**Who:** Glenelg Hopkins CMA, Aboriginal Affairs Victoria, Gunditj Mirring Traditional Owners Aboriginal Corporation, Barengi Gadjin Land Council Aboriginal Corporation, Martang Pty Ltd, Wathaurung Aboriginal Corporation and Eastern Maar Aboriginal Corporation, other traditional owner groups and Indigenous organisations



## CASE STUDY: LAKE CONDAH AND DARLOT CREEK<sup>†</sup>

*Restoration of water to Lake Condah, a key site of Budj Bim National Heritage Landscape, was a long-held vision for Gunditjmara Traditional Owners.*

*Lake Condah was drained in 1954 against the wishes of the Gunditjmara and surrounding landholders. Drainage of the lake damaged the 'heart of Budj Bim', and further injured fragile relationships between Indigenous and non-Indigenous communities of far south-western Victoria.*

*To Gunditjmara, the seasonal rising and falling of water in Lake Condah was likened to the beating heart of the Budj Bim landscape. As waters rose with autumnal rains, so too wetlands along the Budj Bim landscape filled, and the eel 'farming' that enabled Gunditjmara people to establish a sustainable, sedentary community (amongst the first people in the development of human history to do so), continued. After 40 years of effort, construction of a weir restoring the lake in 2010 brought healing to the Gunditjmara landscape. The achievement was made possible by extensive community engagement and detailed scientific research of Darlot Creek catchment and Lake Condah.*

*The return of water to the lake now provides the community and scientists with an excellent opportunity to observe changes from earlier benchmarked data. The return of water to the lake also allows the traditional story in its broader Budj Bim context to be told to tourists and visitors, helping to generate economic activity for Gunditjmara through a world class tourism operation.*

<sup>†</sup> This case study was sourced from the Gunditj Mirring Traditional Owners Aboriginal Corporation application for the 2013 Australian Riverprize. GMTOAC was the first Indigenous group to be a finalist in this national award.

*Below left: Black swans.*

*Below right: Darlot Creek Lake Condah.*



Photo: James Pevitt





## 1.5 STRATEGIC AND LEGISLATIVE CONTEXT

The Victorian Waterway Management Strategy 2013 provides the framework for government, in partnership with the community, to manage rivers, estuaries and wetlands and support their environmental, social, cultural and economic values now and into the future.

The Glenelg Hopkins Waterway Strategy is the cornerstone of regional planning for waterways. It delivers key elements of the state-wide management approach for rivers, estuaries and wetlands. Community input and participation is a critical element to ensure that regional planning reflects the community values of waterways in the region. The development of this strategy is a statutory requirement under the *Water Act 1989* (Vic).

The Glenelg Hopkins Regional Catchment Strategy (2013) identifies regional significant natural assets, sets 20-year condition objectives and regional priorities for land, water and biodiversity in the Glenelg Hopkins region. The GHWS is informed by the regional catchment strategy and other key strategic documents (see *Figure 4*).

Roles and responsibilities of agencies and corresponding actions in the strategy are directed by a suite of state, national and international legislation (see *Appendix 4*).

The principles and management direction of the GHWS aligns with the *Ngootyoong Gunditj Ngootyoong Mara South West Draft Management Plan* developed as a partnership between Parks Victoria Gunditjmara Traditional Owners and DEPI. The draft plan outlines priority environmental assets, goals and management strategies for the parks, reserves and Indigenous protected areas of south-west Victoria.

### 1.5.1 ROLES AND RESPONSIBILITIES

Effective waterway management requires an integrated, co-ordinated approach between government agencies and authorities, water corporations, local government, Traditional Owners, community groups and individuals (see 4.9).

The Glenelg Hopkins CMA, along with nine other CMAs, was established in 1997 by the Victorian Government, under the *Catchment and Land Protection Act 1994* (Vic) (CaLP Act), with the aim of creating a whole of catchment approach to natural resource management in the state.

The primary goal of the Victorian CMAs is to ensure the protection and restoration of land and water resources, the sustainable development of industries based on natural resources, and the conservation of our natural and cultural heritage. Under Part 10 of the *Water Act*, CMAs are designated with specific responsibility for the management of waterways, drainage and floodplains.

The range of functions that the CMA undertakes includes:

- developing a regional waterway strategy and associated action plans
- developing and implementing work programs
- authorising works on waterways, acting as a referral body for planning applications and licences to take and use water
- identifying regional priorities for environmental watering and facilitating water delivery
- providing input to water allocation processes
- developing and co-ordinating regional floodplain management plans
- responding to natural disasters and incidents affecting waterways, such as floods
- undertaking community participation and awareness programs.





## 1.5.1 (CONTINUED)

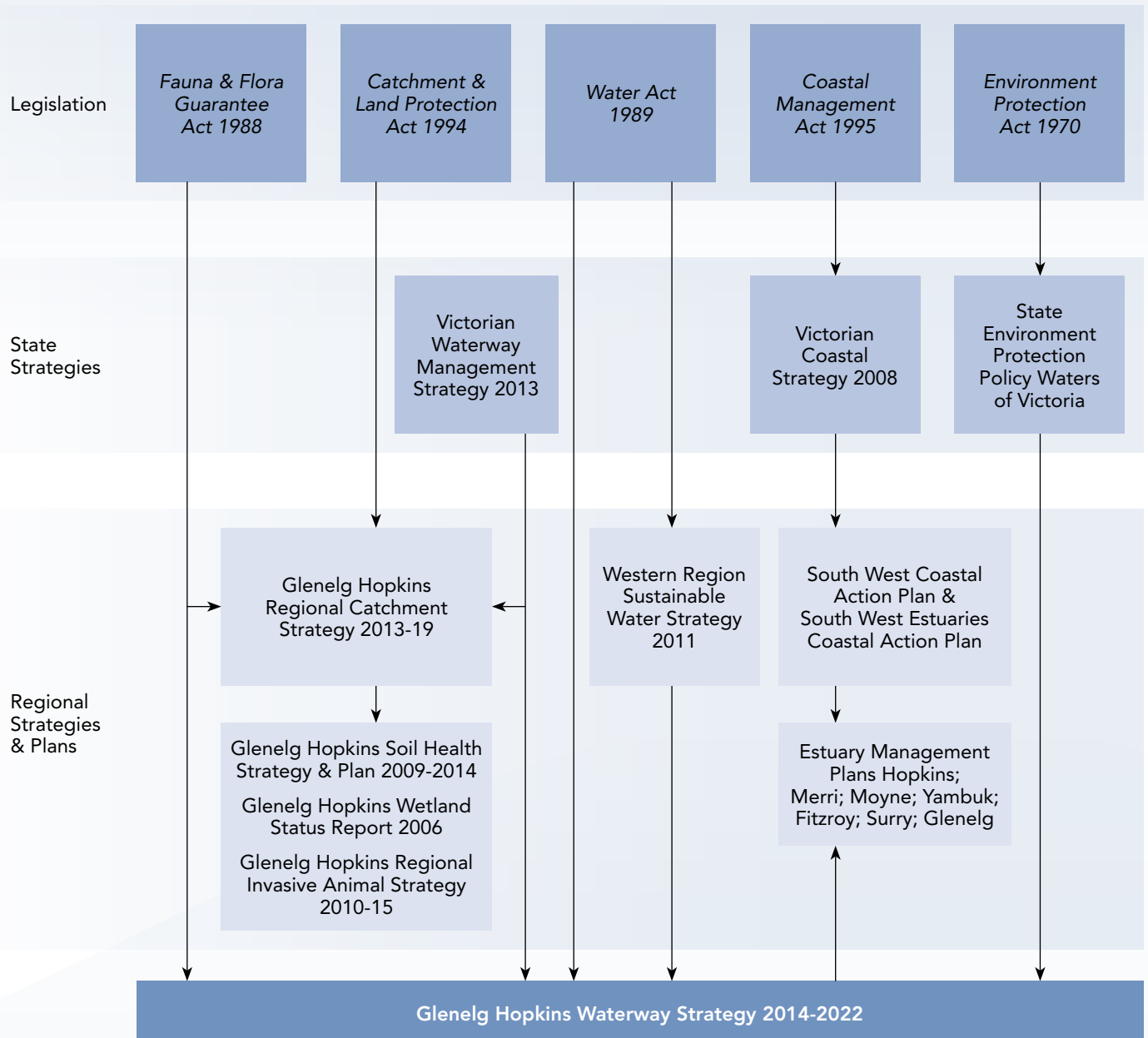


Figure 4. Key legislation, strategies and plans and their relationship with the Glenelg Hopkins Waterway Strategy

## 1.6 REVIEW OF PREVIOUS RIVER HEALTH STRATEGY AND ADDENDUM

### 1.6.1 ACHIEVEMENTS

The Glenelg Hopkins CMA released its first Regional River Health Strategy (RRHS) in 2004 to guide investment in river health across the region. The strategy documented key principles, identified assets and threats associated with priority sub-catchments and included implementation targets to improve the health of rivers throughout the region. An addendum to the RRHS was produced in 2010 to update the implementation targets in response to changes in environmental conditions and policy direction such as the Western Region Sustainable Water Strategy (2011).

The previous river health strategy and addendum were reviewed to evaluate progress towards achieving implementation targets.

This review indicated that 100 per cent of priority implementation targets in the RRHS and 80 per cent of priority implementation targets in the addendum were achieved (see Table 3). A summary of key waterway projects undertaken across the region is shown in Figure 5.

Table 3. Summary of achievements of implementation targets in RRHS & Addendum 2004-2011

Combined RRHS & addendum implementation targets	Target	Achievement
Rivers with negotiated environmental flow regimes (number)	2	2
Environmental flow regimes improved (number of rivers)	2	2
Fish barriers removed (number)	8	17
Stream bank stabilised through erosion control structures (km)	15	13
Remnant vegetation fenced (km)	497	1,423
Pest plants treated (ha)	891	2,129
Riparian zones revegetated with indigenous vegetation (ha)	625	2,512
In-stream habitat improved through large wood installation (km)	27	7.5

Below left: Large woody debris installation in Glenelg River.  
Below right: Sand extraction at Casterton.



Photo: Brian Murrell

# ACHIEVEMENTS IN RIVER MANAGEMENT

## 2013 AUSTRALIAN RIVERPRIZE

*In 2013 Glenelg Hopkins CMA was awarded the Australian Riverprize by the International River Foundation for the Glenelg River Restoration Project.*

*Riverprize gives recognition, reward and support to those who have developed and implemented outstanding, visionary and sustainable programs in river management. Funded by the Australian Government's Water for the Future initiative through the Water Smart Australia program, the \$200,000 Australian Riverprize is the largest prize for environmental achievement in the country.*

*From 2000 to 2013, 628 landholders completed the largest riparian project in Victoria's history.*

*The restoration project planted more than half a million trees, direct seeded 770 km of waterway frontage and fenced 1,600 km along the Glenelg River and its tributaries. Other achievements of the program included 2,000 ha of cross-tenure weed control, 870 pieces of large wood installed for habitat, removal of fish barriers, opening of 270 km of the Glenelg River to fish movement, and the establishment and delivery of an environmental flows entitlement.*

*The resulting river health improvements were demonstrated by water quality improvements and the recovery of native fish populations, which dramatically increased in the Glenelg River.*

*The Glenelg Hopkins CMA and the Glenelg River community were awarded the Australian Riverprize.*





## ACHIEVEMENTS IN ESTUARY MANAGEMENT

*Since the release of the River Health Strategy, the CMA has addressed many of the strategic planning gaps identified for estuaries. Estuary management plans were developed for the Hopkins, Merri, Yambuk, Fitzroy, Surry and Glenelg estuaries and the CMA provided input to the plan for the Moyne River estuary developed by Moyne Shire Council.*

*All estuaries in the Glenelg Hopkins CMA region are naturally intermittently closed estuaries – with the exception of the Moyne estuary and Fawthrop Lagoon, which are kept open. A key action in the estuary management plans was the development of a risk-based tool to guide estuary managers when deciding whether or not to artificially open an estuary.*

*The Estuary Entrance Management Support System (EEMSS) database was developed in 2006 by Glenelg Hopkins CMA in partnership with other agencies.*

*The EEMSS considers the social, economic and environmental values of each estuary and the likely impact of opening and not opening at different times of the year and at different water levels. The EEMSS was recently modified to be web-based and is now available to all coastal CMAs.*

Surry River estuary.



## ACHIEVEMENTS IN WETLAND MANAGEMENT

An Australian Government report<sup>12</sup> noted that while the Glenelg Hopkins CMA region had the highest number of wetlands of any Victorian CMA region, the CMA also had the lowest percentage of landholders protecting wetlands. The CMA in conjunction with the community developed a Regional Wetland Status Report in 2006 to document and recognise wetland values in the region and provide direction to wetland management.

Since the release of this document, the CMA has run three wetland tenders and one grassland tender to protect high priority wetlands. The regional community and the CMA played an important part in the nomination and recent EPBC-listing of the Seasonal Herbaceous Wetlands of the Lowland Temperate Plain. Future wetland projects will focus on this important wetland community across the Glenelg Plain and Victorian Volcanic Plain.

Over the last two years Nature Glenelg Trust (NGT) has coordinated wetland restoration projects on private and public land across south-east South Australia and south-west Victoria. Hydrology has been restored in a number of wetlands, mainly through temporary or permanent blocking (regulating the water level) of artificially constructed drains from wetland areas.

One such project, at Gooseneck Swamp in the Grampians National Park, has generated much community interest and involvement. The swamp contains the most significant population of the nationally endangered Wimmera bottlebrush, and nationally threatened growling grass frogs are also abundant. Gooseneck Swamp was first drained into Brady's swamp over 50 years ago.

This drain altered the wetland hydrology bringing forward and extending the drying phase and potentially impacting waterbirds, the Wimmera bottlebrush and other wetland values.

A digital elevation model (based on LiDAR topographical data) and ground survey were completed and a temporary sand-bag weir structure was put in place by community volunteers. Inundation of the wetland and wildlife response was monitored over spring 2013. Vegetation, bird and frog monitoring is taking place to determine if a more permanent structure is required. Initial monitoring has shown a 20-45 cm water level rise in Gooseneck Swamp, re-activation of the natural flow path between the two swamps and inundation of adjacent floodplain vegetation communities containing the Wimmera bottlebrush.



Gooseneck Swamp.



### GLENELG RIVER RESTORATION PROJECT

During 2000-2013, 628 landholders planted more than half a million trees and direct seeded 770 km of waterway frontage and fenced 1,600 km along the Glenelg River and its tributaries. Other achievements include completion of six Waterway Action Plans, removal of fish barriers, management of carp and opening 270 km of the Glenelg River to fish movement.

### ENVIRONMENTAL WATER

Environmental Water Reserves and infrastructure upgrades along the Glenelg River will realise the full benefits of the Wimmera Pipeline Project. Works included two outlet upgrades and installation of carp screens at Rocklands Reservoir for more efficient environmental water delivery. Environmental flows have reduced salinity levels by up to 80 per cent at some sites, estuary perch have expanded in range by 160 km and variegated pygmy perch have increased by 150 per cent.

### CASTERTON COMMUNITY RIVER RESTORATION PROJECT

Restoration works undertaken in conjunction with the Friends of the Glenelg River, Victorian Government and Glenelg Shire. Works include sand extraction, installation of 870 pieces of large wood for fish habitat, revegetation, community engagement events and the creation of the Kelpie Trail to reconnect the community back to the waterway.

### WESTERN GLENELG WETLANDS

Stewardship payments to private landowners to conserve unique wetlands on fossil sand dunes.

### GLENELG ALLIANCE

A major partnership project addressing priority pest plant and animal threats on 34,603 ha of public and private land in the Lower Glenelg High Ecological Value Ecosystem region.

### RESTORING LAKE CONDAH

Lake Condah, a significant cultural icon of the Gunditjmarra people, was re-established. A weir was constructed across a channel that drained the lake. As a result of heavy rainfall, Lake Condah water levels improved and the wetland is now a haven for wildlife. The Gunditjmarra people now operate an ecotourism business at Lake Condah.

### SALTMARSH TENDER

Project working with landholders to protect coastal saltmarsh and orange-bellied parrot habitat. 160 ha protected in the Glenelg Hopkins region.

### CREATING COASTAL CONNECTIONS

Developing projects with community groups to protect waterways, wetlands and terrestrial habitat along the coast.



Figure 5. Key waterway project achievements in the Glenelg Hopkins region



### THE GRANGE BURN WETLAND

Project transformed 14 ha of grazing land into a constructed wetland system to treat 70 per cent of Hamilton's storm water before it enters the Grange Burn. This system has resulted in significant reduction in litter and contaminants in the waterway, vital habitat for birds and provided an important recreational asset to the town.

### WETLAND RESTORATION

Nature Glenelg Trust (NGT) coordinated wetland restoration projects on private and public land across south-west Victoria. Hydrology has been restored in a number of wetlands, such as Gooseneck Swamp in the Grampians National Park.

### SEASONAL HERBACEOUS WETLANDS

The Victorian Volcanic Plains are a hotspot for the recently EPBC listed Seasonal Herbaceous Wetlands. 473 ha has been recently protected under the Grassland Tender program.

### BEYOND BOLAC CATCHMENT ACTION GROUP

Active community group that has undertaken extensive river and catchment health projects with a central focus on Fiery Creek and Lake Bolac.

### WETLANDS OF THE WANNON

CMA and landowner partnerships have led to changed grazing regimes for the protection of 465 ha of seasonal wetland.

### HEROS PROGRAM

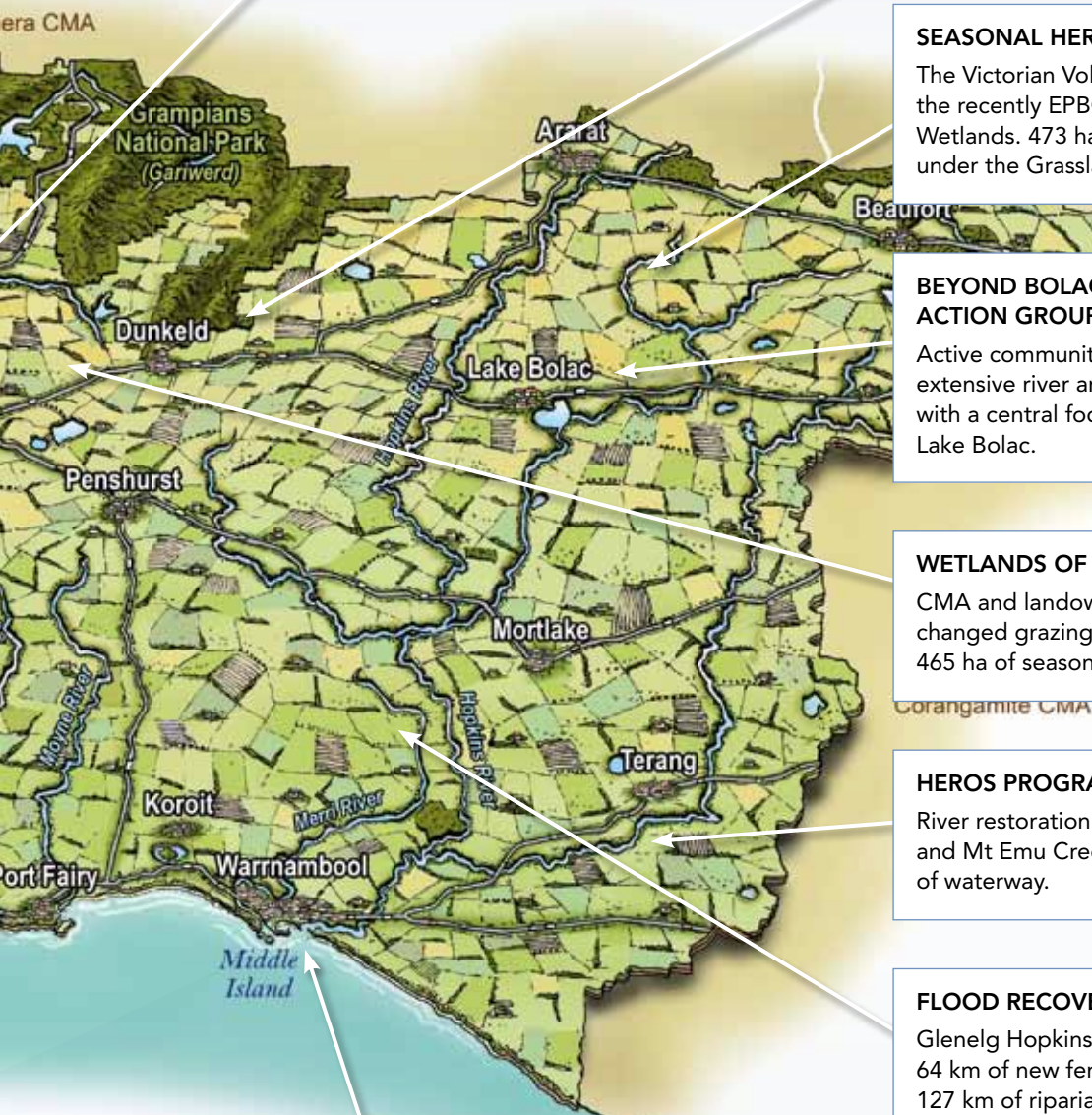
River restoration programs along Fiery Creek and Mt Emu Creek have fenced 23 km of waterway.

### FLOOD RECOVERY ASSISTANCE

Glenelg Hopkins CMA works crews installed 64 km of new fences, repaired or cleaned 127 km of riparian fences, revegetated 61 ha and eradicated 211 of weeds. National Disaster and Recovery Relief Arrangements (NDRRA) funded works to repair more than 50 sites, most of which were flood damaged erosion control structures.

### PLANNING FOR HEALTHY ESTUARIES

Estuary management plans, mapping and an estuary entrance management support system were developed to improve the health and management of estuaries.



### 1.6.2 KEY LEARNINGS FROM THE REVIEW

The management of rivers, estuaries and wetlands in Victoria is conducted within an adaptive management framework. At the core of adaptive management is the ability to learn from previous experience and update management approaches to reflect the knowledge gained during implementation.

Although two targets were not achieved, both demonstrate the importance of evaluating and adapting programs to ensure effective delivery. While only 87 per cent of the targeted amount of stream banks was stabilised through erosion control structures, the CMA's waterway action plans identified that fencing waterways to stabilise river banks was more cost effective than using costly hard engineering solutions. Under-achievement of the RRHS target for improving in-stream habitat through large wood installation (27 per cent) was due to concern over the potential risk that large wood might pose to the community and river infrastructure. This risk necessitated the development of a risk treatment plan and implementation of this plan before any further in-stream projects were undertaken across the region.

Other RRHS targets were over-achieved, particularly fencing remnant vegetation (286 per cent), treating pest plants (239 per cent) and revegetating riparian zones (401 per cent). Much of this has been attributed to the waterway action plan approach and new incentive scheme implemented six years ago, which have increased project sizes from 5 ha to 16 ha on average, with cost per hectare decreasing by 20 per cent, thus freeing up funding for further on-ground works.

The review also identified a number of specific issues with the previous strategy. These are as follows:

- State Environment Protection Policies (SEPP) guidelines were not appropriate for water quality targets
- timeframes for targets based on the Index of Stream Condition are unrealistic
- flow deviation is dependent on average rainfall, but average is not defined
- water quality targets assumed that all dairies will be made EPA compliant; this is unlikely as the Environment Protection Agency (EPA) audit program has ended
- DEPI (formerly DPI) fisheries plan was not implemented.

In most cases priority areas and reaches identified in the strategy were appropriate; however, at times it was found that unsuitable targets were set for some sub-catchments. Estimated costs were accurate in most cases, although potential cost increases also need to be taken into account.

While the general format of the GHWS is similar to that of the RRHS, greater emphasis is now placed on using monitoring evaluation, reporting and improvement (MERI) principles. The vision and goals from the previous strategy were sound; however, most could not be used to guide priorities or delivery mechanisms for implementation.

The information used to develop and implement the RRHS was appropriate; however, there was no use of MERI principles such as 'program logic' to show the explicit links between goals, resource condition targets (RCTs) and on-ground activities.

Having solid program logic and more-realistic goals will also give the new strategy greater credibility and relevance to planners. The RRHS was deemed difficult to use as a reporting standard (for annual condition reporting) as many goals were unrealistic.

It is expected that on-ground works carried out as directed by the RRHS would have generally improved river health in our region while achieving many RCTs outlined in the strategy. However a number of RCTs, particularly those concerned with water quality improvements, did not have realistic timeframes or could not reasonably be expected to be influenced by the scale of works undertaken by the CMA and its partners. Targets for the Glenelg Hopkins Waterway Strategy will now use conceptual models and clear program logic processes (see Section 3.6). This approach will ensure that RCTs will be achievable in the timeframes ascribed by the strategy, and measures will be those that can be influenced by the suggested activities. Efficiencies will be gained by having explicit links between annual reporting to investors and targets in the strategy.

During implementation of the RRHS, there were major climatic events that impacted on the ability to deliver on the RRHS and addendum and necessitated a shift in priorities.

The region was declared to be in drought between 2004 and 2010. Lower rainfall led to significantly reduced flows in the region's waterways. The Glenelg River had an estimated 65 per cent reduction in annual flow from 2004-08<sup>12</sup>, having a profound impact on the geomorphology, biodiversity functions and ecological recovery processes of the waterway. Environmental Drought Response Plans developed by CMAs in 2006-2007, identified key drought refuge sites. This plan guided the CMA Dry Inflow Contingency Plans (DICPs). DICPs recognised the limited ability of the CMA to increase flow to these sites and recommended increasing the waterway's resilience by minimising the impact of other stressors using activities such as riparian fencing.

The region experienced floods in late 2010 and early 2011 causing extensive inundation of agricultural land, with subsequent erosion and damage to fencing, pasture, crops and creek crossings. These floods highlighted the importance of an adaptive and flexible approach to waterway management; this adaptive approach is incorporated into the GHWS. The CMA employed 18 people for flood relief crews in 2011 to undertake flood recovery work. Crews were based in Hamilton, Warrnambool and Ararat. The project protected public infrastructure by cleaning up debris. It also protected environmental assets, such as high value river reaches, by undertaking NRM works to address major threats such as erosion and invasive plants and animals. The Natural Disaster Relief and Recovery Arrangements Program also funded additional support for flood affected communities.