



Pictured: Tarwin River fishing platform

6 Fishery Management Priorities

The West Gippsland region provides popular recreational fishing opportunities. In 2012, a survey of recreational fishers highlighted the West Gippsland region as the second most popular region for estuary fishing. Popular spots included Andersons Inlet and Shallow Inlet, Tarwin River, Blue Rock Lake, Powlett River, Lake Glenmaggie and the Tanjil and Latrobe rivers.

Recreational fishing is highly dependent on the health of the environment including the availability of suitable habitat, water quality and water regimes to sustain productive fisheries. To improve habitat outcomes on the ground, there is mutual benefit in Fisheries Victoria and recreational fishers working with WGCMA to identify and collaborate on habitat related projects that lead to better fishing and environmental outcomes.

Fishery management priorities were identified through a workshop with recreational fishing representatives held in December 2013. The outcomes of this workshop build on past fishery management processes in particular the *West Gippsland Fishery Management Plan* (DPI, 2008). The nine regional management priorities are listed below.

Fishery management priorities

- 1 Support efforts to improve fish passage in the Thomson River (Horseshoe Bend) for instream connectivity for threatened native (Australian grayling) and recreational fish species.
- 2 Investigate the re-establishment of floodplain riparian vegetation and instream habitat in the lower Powlett (downstream of Dalyston) and the Tarwin River-Anderson Inlet system.
- 3 Support efforts to collect and promote natural history (including fisheries and fish habitat) in the WGCMA region.
- 4 Investigate the ways to improve the structural complexity of instream habitat to create interstitial space catering for cryptic fish habitat.
- 5 Support WGCMA efforts to improve methods to control *Spartina* and their potential effects on fish ecology.
- 6 Support the reestablishment of sustainable populations of Australian bass in systems that historically supported recreational fisheries for this species.
- 7 Improve fish population monitoring through expanding fishery independent methods and using innovative fishery dependent citizen science methods such as use of angling clubs and angler diary programs etc.
- 8 Work with relevant stakeholders and authorities to identify and mitigate barriers to fish movement.
- 9 Identify and maintain wetlands that provide habitat critical for key recreational fishing.



Pictured: A shell midden in the Yarram area, uncovered after flooding

7 Aboriginal Cultural Values and Participation

Aboriginal Australians have a strong cultural connection to Country and the preservation of cultural heritage is extremely important. There are many areas of Aboriginal cultural sensitivity within the West Gippsland region, waterways in particular are significant. The Gunaikurnai, Bunurong, Boon Wurrung and Wurundjeri peoples are the traditional Custodians of the Country covered by this region.

Within the West Gippsland region the Gunaikurnai people are the largest Traditional Land Owning group, followed by the Bunurong/Boon Wurrung groups, then the Wurundjeri people who have an area of land at the North West of the catchment.

Developing this Strategy involved direct engagement with Traditional Owner groups. WGCMA recognises the importance of Traditional Owner groups being part of this process and the value of their contribution to the Strategy. The approach and level of engagement was based on their suggested approach in order to meet the needs of each group and optimise their contribution.

7.1 Gunaikurnai

The Gunaikurnai people have been Custodians of the waterways in the Gippsland region for thousands of years.

The Gunaikurnai are the recognised sovereign owners of their land and waters. They are working to achieve social justice, and to have a lead role in the management of land and waters. The Gunaikurnai believe they deserve a unique and influential place in the consultation processes for the management of these resources, and know they have a lot of work to do to ensure that this happens.

The Gunaikurnai people have lived, worked and hunted on and around the waterways for generations. Waterways supplying them with:

- **Food** – fishing, collecting mussels, catching eels, hunting animals, collecting swan eggs, and gathering of various plants for food and medicine.

Since Borun and Tuk came down from the mountains and the Gunaikurnai people were created, the Gunaikurnai cared for the waterways to ensure they were always a source of food and materials used for cultural activities. The regular floods experienced in this region were an important way for the rivers and estuaries to be flushed out and kept clean.

For the Gunaikurnai the lesson about floods come from Tiddalik the frog, who was too greedy with the water firstly causing drought and then flood with his bad behaviour.

Today the Gunaikurnai still use the waterways as an important tool to teach their culture to the young people. Sadly, the values of culturally important sites are being degraded by reduced water flows, pollution, pest plants and animals and by development.



Figure 10 Gunaikurnai clan map

- **Implements** – materials for basket weaving, grinding stones in river beds, clays for ceremony, bark for canoes.
- **Culture** – water bodies are important places for Gunaikurnai people to come together for cultural, social and recreational activities. In the past, these sites were important meeting places for different tribes and clans to conduct business such as trade.
- **Travel and boundaries** – rivers provided the tribal boundaries for our region, they were where the Gunaikurnai waited to be welcomed on to neighbouring country, and they were also an important means of travel both by foot and on water.

7.2 Boon Wurrung / Bunurong

Engagement with the Boon Wurrung on the Waterway Strategy began with an initial meeting between representatives from the WGCMA and the Boon Wurrung Foundation.

Further workshops were held where the Boon Wurrung people explained and demonstrated their connection to waterways. While not a conventional approach, this allowed staff to better understand the connection and priorities of the Boon Wurrung which was included in the Strategy.

WGCMA was still in the early stages of developing a relationship with the Bunurong group, when Administrators announced they had gone into receivership. A meeting had been planned, but at the time of the Strategy finalisation all matters involving cultural heritage are to be referred to the Boon Wurrung until further notice.

From creation, water and its uses have been vital to the Boon Wurrung people. “Creation stories” are a “Philosophy of being”, that “to be born on Boon Wurrung country means that you are part of that country”, traditionally her people “sang the country”, the song lines told of their journey through the land and their life on it (Briggs, 2013).

7.3 Wurundjeri

The majority of the Wurundjeri peoples land falls within the Port Phillip catchment. The WGCMA was in the early stages of developing a relationship with the Wurundjeri at the time of the Strategy finalisation and the Authority acknowledges that further opportunities to build this relationship are necessary.

7.4 Traditional Owner and Aboriginal Communities' Priorities

WGCMA is committed to working with Aboriginal stakeholders in natural resource management based on mutual trust, respect and understanding, in all aspects of its work throughout the West Gippsland region.

The objective of the engagement with Traditional Owners for this Strategy was to:

- further develop WGCMA relationship/partnerships with Traditional Owner groups
- increase WGCMA understanding of Traditional Owner needs relating to waterway management and cultural heritage more broadly



- capture Traditional Owner groups' needs, aspirations and where possible stories in relation to waterway management
- engage in meaningful and respectful way with Traditional Owners.

For further details on the specific engagement approaches with each Traditional Owner group please refer to the Aboriginal priority discussion paper at www.wgcma.vic.gov.au.

7.5 Overall Outcomes – Common Priorities

The overall outcomes of the Traditional Owner engagement process for this Strategy have been collated to present the common needs and priorities in relation to waterway management. Though the needs and views varied and will require specific follow up, common priorities were identified.

Importantly, both GLaWAC and the Boon Wurrung Foundation have identified specific needs and priorities that are captured in detail in the discussion paper at www.wgcma.vic.gov.au. These will be used to guide ongoing effort between WGCMA and each Traditional Owner group.

Pictured above right: Smoking ceremony – MoU Signing Event, above left: GLAWAC & WGCMA Board members MoU signing event

The common priorities and relevant actions for the Strategy are set out in the following table.

Table 2 Priorities for Traditional Owners

Priority	Action
Partnerships and involvement of Traditional Owners in the planning process for the management of waterways in the region.	<ul style="list-style-type: none"> • Take guidance from Traditional Owners on how they wish to participate, this can be found in documents such as the Gunaikurnai Country Plan currently under development. • Consistently communicate with Traditional Owner groups to ensure participation. • Identify opportunities for collaboration and projects that have shared purpose. • Increased involvement of Aboriginal peoples on project steering committees and WGCMA Board. • Help develop skills to enable Traditional Owners to sit on committees and Boards confidently and have meaningful input.
Participation, including employment of Traditional Owners in the management of waterways in the region.	<ul style="list-style-type: none"> • Engage Traditional Owners to undertake work on country through the waterway management program. • Ensure that all positions vacant at the WGCMA are advertised through Aboriginal channels. • Create opportunities for mentoring and work experience within the waterway management industry.
Protect cultural heritage and native title in the management of waterways within the region.	<ul style="list-style-type: none"> • Work with Traditional Owners to identify and protect sites of cultural importance along our waterways. • Create opportunities for Traditional Owners to access important cultural sites on the waterways.
Increase understanding, documentation and education of the Aboriginal cultural heritage of waterways within the region, including increasing the cultural competency of waterway managers.	<ul style="list-style-type: none"> • Community workshops. • Train WGCMA staff and partners, to ensure that every effort is being made to protect and improve cultural heritage.
Traditional ecological knowledge projects and integrate into NRM Planning.	<ul style="list-style-type: none"> • Work together to learn more about cultural values associated with environmental water and how they can improve work done in the WGCMA region, and deliver outcomes for the Aboriginal community on waterways. • Together learn more about Traditional burning and other traditional ecological techniques, then together implement these methods, creating work for Aboriginal people and further improving the waterways. • Identify and deliver traditional ecological knowledge projects.



Part D –Work Program

8 Implementation

This section sets out the work program and implementation arrangements for the Strategy.

8.1 Roles and Responsibilities

As the waterway management authority for the region, WGCMA will lead the implementation of this Strategy. The Strategy will be implemented as a sub strategy of the RCS in partnership with other agencies and community groups working in the West Gippsland region.

Details of roles and responsibilities of partners are available in Appendix two.

8.2 Resourcing

The implementation of this Strategy will be influenced by available funding sources and resources, the level of community support and the impacts of floods, drought and bushfire. WGCMA and partner agencies will develop funding proposals to support the actions within this Strategy as opportunities arise. Where relevant and appropriate, project investment proposals will be developed in conjunction with delivery partners and the community.

9 Work Program

This section sets out the targets and management activities for priority waterways. Work programs have been developed for each of the 11 waterway management units as well as a strategic management program that addresses region wide waterway management issues.

Waterway management units are based on functional groupings of waterways so that waterways that have similar values, threats and ecological processes are subject to similar management responses.

The 11 management units are:

- Gippsland Lakes and Wetlands
- Avon and Perry Rivers
- Lower Latrobe, Thomson and Macalister
- Mid Latrobe
- Upper Latrobe, Thomson, Macalister and Avon
- Giffard Plain and Merriman Creek
- Strzelecki
- Corner Inlet
- Wilsons Promontory
- Tarwin and Powlett Rivers
- Bunurong Coast and Inlets.

9.1 Cost Estimates

Average cost estimates are provided for each management unit for the eight year implementation period. The cost estimates are based on the average cost to implement the management actions and on-ground works. Not all management actions have been costed; those that have not been costed are indicated with an asterisk.

The cost estimates aim to provide the indicative level of funding required and has not considered in-kind contributions or the project management and administration costs associated with implementation. Costs associated with management activities will be reviewed and updated as part of the mid-term review of the Strategy (see Section 23.7).

9.2 Responsibilities

Responsibilities for implementation have been identified for individual management activity/output. The lead agency is identified first and is identified in bold text followed by the major partners.

10 Strategic Management Program

The Strategic Management Program sets out the priority activities required at a regional scale to address major waterway management issues (Table 3). Long Term Resource Condition Targets have not been identified for this work program and a cost estimate has not been made.

Table 3 Strategic Management Program

Management outcome target	Management activity / output	Lead agency and partners
Increased knowledge and participation in waterway management.	Support additional community monitoring activities in priority waterways or where there is strong community interest.	WGCMA , Landcare
	Collaborate with community groups to raise awareness with landholders of waterway management issues.	WGCMA , community groups
Collaborate with natural resource management agencies to deliver the Waterway Strategy.	Work with regional partners and the community to develop projects and secure funding for projects that aim to improve waterway health (priority waterways or other areas of high community significance).	WGCMA , DEPI, local government, Parks Victoria
	Support and establish partnership arrangements with community groups, landholders, government and non-government organisations for the delivery of projects in priority waterways.	WGCMA , Landcare, DEPI, Greening Australia, TFN, Parks Victoria, local government, private landholders, water authorities and industry bodies
	Support projects that permanently protect wetlands on private land through covenants and stewardship arrangements.	WGCMA , DEPI, TFN

Table 3 Strategic Management Program continued

Management outcome target	Management activity / output	Lead agency and partners
Increased knowledge of waterways and the options to manage them.	Undertake Index of Wetland Condition assessments as part of work site selection process and to establish baseline condition.	WGCMA, DEPI
	Conduct monitoring of works including photo-points and assessments of before and after condition.	WGCMA, DEPI
	Raise awareness of the impacts to shallow wetlands from drainage, cultivation and other physical works.	WGCMA
	Develop and implement a program to identify, understand, monitor and maintain high value GDEs, that considers potential risks associated with changes in aquifer pressure, groundwater quantity and/or groundwater quality.	WGCMA, DEPI, SRW
	Support private landholders and public land managers to identify waterways at high risk of acid sulfate soils activation and provide guidance on best management practices to rehabilitate waterways where acid sulfate soils have been activated.	WGCMA, DEPI
Statutory planning processes maintain and improve waterways in areas of urban, commercial and industrial development.	Support local government to identify waterways at high risk of acid sulfate soils activation and incorporate their management is considered in planning decisions.	WGCMA, local government
	Implement best practice urban stormwater management to manage sediment and nutrient input to waterways.	Local government, developers
	Maintain and restore waterways in proposed urban development including vegetated buffer zones at least 30 m wide along each side of the waterway.	Local government, developers
	Engage with developers, consultants, landholders and civil contractors and local government about works on waterways approvals requirements for waterways (including ephemeral streams and wetlands).	WGCMA, DEPI
	Ensure that management of native vegetation and sediment along and within waterways in urban areas occurs in line with approved flood studies and the renewed <i>Victorian Floodplain Management Strategy</i> .	Local government, WGCMA

Table 3 Strategic Management Program continued

Management outcome target	Management activity / output	Lead agency and partners
Statutory planning processes maintain and improve waterways in areas of urban, commercial and industrial development (continued).	Engage with local government to introduce an Environmental Significance Overlay to agreed priority urban waterways.	WGCMA , local government
	In partnership with local government, develop guidelines for waterway management plans in areas of urban development.	WGCMA , local government
Statutory planning processes maintain and improve waterways in rural areas.	Investigate and finalise artificial estuary opening management processes with relevant authorities.	WGCMA
	Ensure Works on Waterways approvals require commercial / industrial development to implement best practise treatment of stormwater where there is direct connection to a waterway.	WGCMA
	Investigate and trial planning scheme tools that maintain the extent of wetlands on private land including Environmental Significance Overlay and local planning policy.	WGCMA , local government
	Ensure Works on Waterways Approvals consider fish passage, availability of water, water quality impacts, native vegetation, physical form of the waterway, water sensitive road design.	WGCMA
	Work with local government to ensure that development of intensive agricultural enterprises (feedlots, piggeries, broiler farms) don't have an adverse impact on waterways.	WGCMA , local government
	Ensure planning approvals for land and water development maintain and improve waterways (including ephemeral streams and wetlands) and address impacts on water quality, native vegetation, geomorphology and hydrology.	WGCMA , SRW, local government,
	Ensure the impact on stream flows is considered in the assessment of take and use, mining, dam construction and groundwater licenses.	WGCMA , SRW, local government,
Improved planning for waterway management.	Review the Strategy work program for priority waterways in light of the 2014 climate change vulnerability assessment and plan.	WGCMA
	Develop cost-sharing arrangements for projects based on the cost-sharing principles in the <i>Victorian Waterway Management Strategy</i> .	WGCMA

11 Gippsland Lakes and Wetlands Management Unit



Figure 11 Conceptual diagram of Gippsland Lakes and Wetlands Management Unit

The Gippsland Lakes and Wetlands management unit extends between Sale in the west and Lakes Entrance in the east, spanning the boundary of the West and East Gippsland catchment management authority regions. The Lakes and many of their fringing wetlands are listed under the Ramsar Convention as a wetland system of international importance, in addition to having formal national and state conservation significance. They are also highly valued for recreational pursuits such as boating and fishing, urban development, hunting and nature appreciation.

Since 1889, the Lakes have been, permanently connected to the Southern Ocean at Lakes Entrance by a permanent artificial opening. The entrance has changed the Lakes from being naturally fresh-brackish to truly estuarine. The Lakes vary in salinity spatially according to proximity to the entrance, and temporally, due to variation in freshwater inflows.

Land clearing, mining, farming, forestry, urban development and river regulation and diversion have all affected the amount of freshwater, sediment, nutrients and other materials entering the Gippsland Lakes. This has had profound impacts on their environmental condition and associated ecological, social and economic values.

The Gippsland Lakes system is comprised of three habitat types: main lakes, fringing wetlands and estuarine river reaches.

The estuarine river reaches are an extension of the main lakes. The salt/freshwater interface is an area of high ecological productivity for microscopic floating plants and animals, while the fringing *Phragmites* reed beds and submerged logs provide habitat for invertebrates and fish. The estuarine river reaches are highly susceptible to shoreline erosion. Susceptibility to erosion is determined by the nature of the shoreline (soil type, vegetation, slope, moisture content). Loss of shoreline vegetation is caused by multiple factors including grazing, human access and changing water quality.

Fringing wetlands are associated with the main lakes and the estuarine river reaches. Unlike these habitats, many of the fringing wetlands naturally dry out at times. Freshwater (water salinity less than 3 g/L (approx. 5,000 $\mu\text{S}/\text{cm}$) e.g. Sale Common) and variably saline wetlands (e.g. Heart Morass) occur towards the western end of the Gippsland Lakes system or in close proximity to tributaries where they receive regular freshwater inflows. Hypersaline wetlands (water salinity greater than sea water (35 g/L) e.g. Lake Reeve) on the other hand do not receive regular freshwater inputs as they are generally distant from tributaries. All wetland types support important, albeit different, waterbird populations.

Climate change poses a significant challenge to the future management of the Gippsland Lakes. The combination of increased temperature, reduced rainfall, increased incidence of drought, floods, and bushfires, and sea level rise, could result in a magnitude of change nearing that of the opening of the permanent entrance, to which the Gippsland Lakes system is still responding.

During the period of the *RHS*, investigations were undertaken to improve understanding of the hydrological functioning of the Gippsland Lakes and their environmental water requirements. The Lower Latrobe wetlands and estuary were identified as a priority area, and considerable progress was made towards improving the management of their water regimes. This included establishing and delivering water under the Lower Latrobe Wetlands Environmental Entitlement (2010), upgrading the Sale Common's Latrobe River regulator, local research into wetland wetting/drying regimes and acid sulfate soil risk, and hydrodynamic modelling and monitoring in the Latrobe/Thomson estuary.

The other highlight of the *RHS* in this management unit is the establishment of a successful partnership between Field and Game Australia's Wet Trust, Bug Blitz, Watermark and WGCMA to establish and implement an ambitious project to restore approximately 1,350 ha of the Heart Morass wetland adjacent to the Ramsar site. To date considerable weed control, revegetation, nest box installation, access improvement and community engagement has been completed by the partnership.

This Strategy will continue to focus on improving the condition of the Latrobe/Thomson estuary and fringing wetlands (in particular the Lower Latrobe wetlands) of the Gippsland Lakes through an integrated program of environmental watering, control of weeds and establishment of vegetation. The Strategy continues to support the partnership between agencies and community groups working in the Gippsland Lakes and Wetlands.

For the purposes of the Gippsland Lakes Ramsar Site, this Strategy will be supplemented and complemented by a renewed Management Plan for the Site (which is currently in preparation and due for completion in 2015). The renewal of the *Gippsland Lakes Ramsar Site Management Plan* is being undertaken separately to the development of this Strategy as the Gippsland Lakes spans two CMA regions and many other agencies are directly involved in its management.

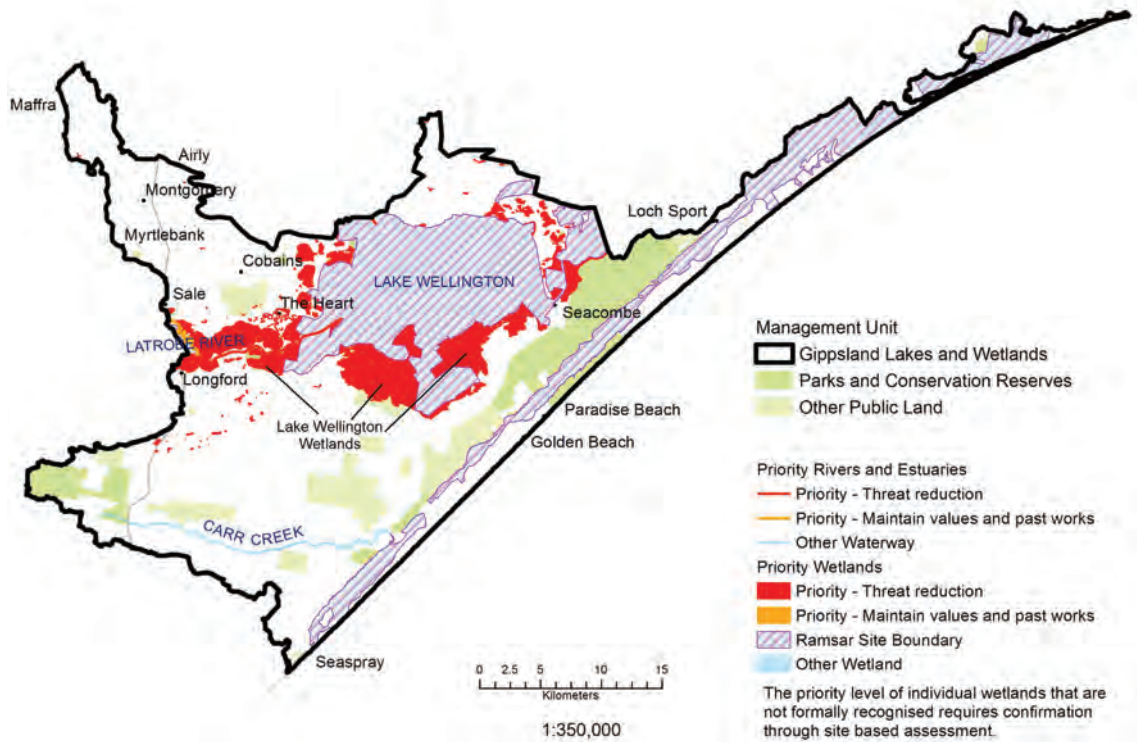


Figure 12 Map of priorities for Gippsland Lakes and Wetlands Management Unit

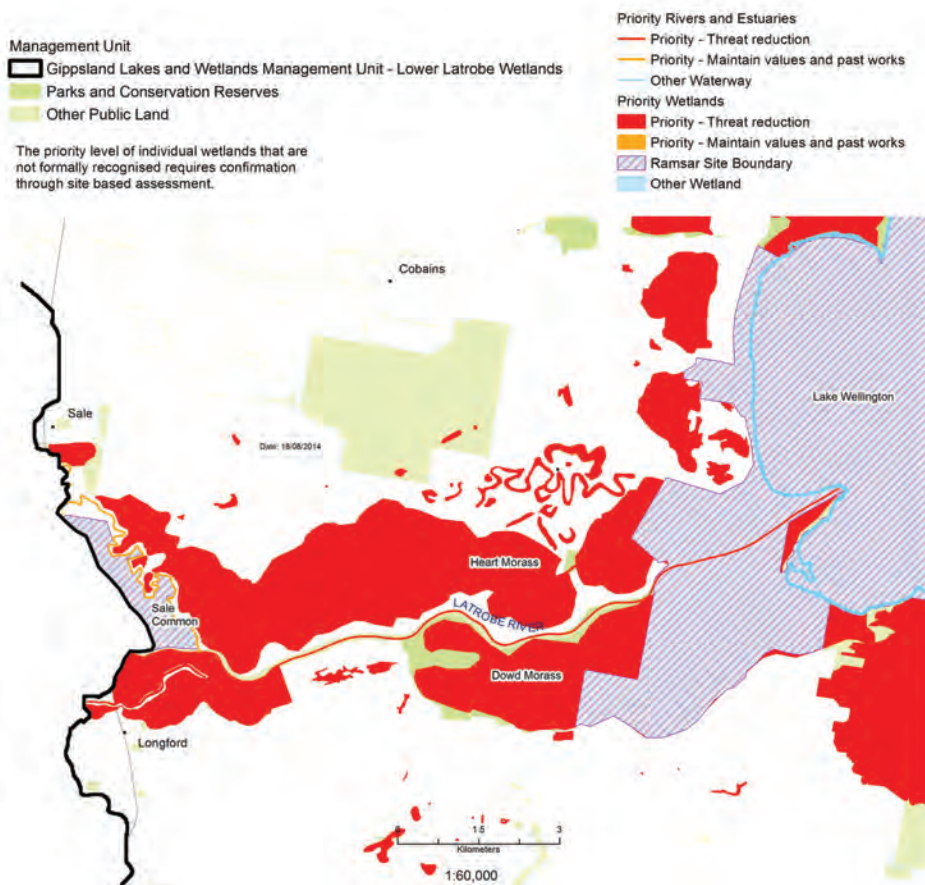


Figure 13 Map of the Lower Latrobe wetlands (Dowd Morass, Heart Morass, Sale Common)



Pictured: The Gippsland Lakes and many of their fringing wetlands are listed under the Ramsar Convention as a wetland system of international importance

Table 4 Gippsland Lakes and Wetlands Work Program

Priorities:
Gippsland Lakes Ramsar Site¹
Threat reduction: Latrobe River estuary (26-201), Lower Latrobe Wetlands (Heart Morass, Dowd Morass, Sale Common), Wetlands of the Gippsland Lakes and Wetlands Management Unit
Maintain values and past works: Thomson River estuary (25-201) ² , Flooding Creek ²
Long Term Resource Condition Target
All expected native fish species (migratory and non-migratory) are found in the reach and their abundance has increased.
The condition and extent of riparian vegetation communities is improved.
Riparian and wetland vegetation provides improved visual amenity and contributes to community use.
The ecological character of the Gippsland Lakes Ramsar Site and associated fringing wetlands is maintained.
Quality and quantity of freshwater flows from the Thomson and Latrobe systems to the Gippsland Lakes and fringing wetlands is maintained and, where possible, improved.
Values linked to Regional Goals: fish, birds, vegetation, social
Threats addressed by work program: acid sulfate soils, flow stress, invasive fauna, invasive flora, poor water quality

¹ Prioritisation of individual waterways / wetlands within the Gippsland Lakes Ramsar Site will occur through the *Gippsland Lakes Ramsar Management Plan*. Priorities have been identified in this Strategy where there are existing commitments in place through partnership arrangements or environmental entitlements.

² Management activities and targets for the Thomson River estuary and Flooding Creek included in the work program for the Lower Latrobe, Thomson and Macalister Management Unit.

Table 4 Gippsland Lakes and Wetlands Work Program continued

Management Outcome Target	Management activity / output		Lead agency and partners
Vegetated corridor is at least 15m wide on each bank for 90% of Thomson and Latrobe estuary.	Establish riparian management agreements with landholders.* (ha)	55	WGCMA , landholders
	Establish native vegetation. (ha)	15	WGCMA , landholders
Condition of the Lower Latrobe Wetlands (Dowd Morass, Heart Morass, Sale Common) has improved from baseline level. ³	Construct riparian (wetland) fencing to exclude stock. (km)	15	WGCMA , landholders, Parks Victoria
Less than 60% cover of invasive riparian flora are present in the shrub and ground layer (Lower Latrobe Wetlands and the Thomson and Latrobe estuary).	Establish weed control – stem poisoning / spraying of willow. (ha)	1	WGCMA , Parks Victoria
	Establish weed control – mechanical removal of willow. (ha)	1	
	Establish weed control – non woody. (ha)	5	WGCMA , Parks Victoria, landholders
	Establish woody weed control. (ha)	41	
	Maintain control of weeds in past works. (ha)	88	
Threats to water regime (altered seasonality, magnitude and water quality) are reduced through delivery of water to the Lower Latrobe Wetlands and the Thomson and Latrobe Estuary.	Undertake assessment of wetland watering infrastructure requirements (Heart Morass and Dowd Morass). (no. assessment)	1	WGCMA
	Prepare annual Seasonal Watering Proposal (Lower Latrobe Wetlands). ^{5*} (no. plans)	8	WGCMA
	Deliver environmental water in line with Seasonal Watering Statements (Lower Latrobe Wetlands).*	4	WGCMA , SRW, Parks Victoria, VEWH
	Install waterway structure (flow regulators) at Sale Common, Dowd Morass and Heart Morass. (no.)	10	WGCMA , Parks Victoria, WET Trust
	Construct earthworks (modification of barriers/spillways) to control wetland water regime at Dowd Morass and Heart Morass. ⁴ (no.)	7	WGCMA , Parks Victoria, WET Trust

³ Comprehensive baseline condition assessments have not yet been completed for all of the Lower Latrobe Wetlands.

⁴ These outputs subject to confirmation through an investigation into water infrastructure requirements which is due for completion in 2015.

Table 4 Gippsland Lakes and Wetlands Work Program continued

Management Outcome Target	Management activity / output		Lead agency and partners
Environmental water outcomes for the Lower Latrobe wetlands and Thomson and Latrobe estuary are improved through planning, reporting and monitoring.	Undertake investigation to inform Environmental Water Management Plan (review of flows studies and system operations) (Lower Latrobe Wetlands). ⁵ (no. assessment)	1	WGCMA , Parks Victoria, DEPI
	Develop and implement Environmental Water Management Plan for the Lower Latrobe Wetlands. ⁵ (no. plans)	1	WGCMA , Parks Victoria, DEPI
	Develop and implement Environmental Water monitoring program (vegetation, fish, fauna water quality). (no programs.)	1	WGCMA , Parks Victoria, DEPI
Increased community skills and knowledge of waterway management issues.	Support community monitoring of waterways to inform management. (no. sites)	4	WGCMA
	Coordinate/ and participate in engagement events. (no. events)	4	WGCMA , Bug Blitz
	Support development and implementation of the Gippsland Lakes Ramsar Site Management Plan.* (no. plan)	1	WGCMA , EGCMA, Parks Victoria, DEPI, GLMAC, Greening Australia, Trust for Nature
	Support landholders and public land managers to address threats to the Lake Wellington Wetlands (Wetlands of National Importance).*		WGCMA , DEPI, Parks Victoria, GLMAC, Greening Australia, Field and Game Australia.
	Support the Heart Morass Governors Committee to implement the Heart Morass Restoration Plan.* (no. partnership).	1	WGCMA , WET Trust, Field and Game Australia
	Ensure referral under the <i>EPBC</i> Act any actions (within or outside the Ramsar site) that may have a significant impact on the ecological character of the Gippsland Lakes Ramsar Site.*		DEPI , all Strategy partners and agencies
		Estimated cost	\$7,000,000

⁵ The outputs and associated costs for the Latrobe River estuary including: Annual Seasonal Watering Proposal, e-water delivery, EWMP and investigation to inform EWMPs and associated monitoring has been accounted for in the Lower Latrobe, Thomson and Macalister Management Unit.

* Management activities not costed

12 Avon and Perry Rivers Management Unit



Figure 14 Conceptual Diagram of the Avon and Perry Rivers Management Unit

The Avon and Perry rivers management unit incorporates the entire catchment of the Perry River and the lower reaches and tributaries of the Avon River. The area is made up of a variety of land uses including forestry, grazing, horticulture and includes the town of Stratford. The Avon River provides an important water source for irrigation as well as unregulated flows to Lake Wellington and its fringing wetlands. The Knob Reserve at Stratford adjacent to the Avon River has important cultural values for the Gunaikurnai people. The Perry River joins the Avon shortly before it enters Lake Wellington, forming a delta of regional geomorphological significance. The Perry River is of geomorphological significance due to its chain of ponds formation which remains intact across large sections of the waterway.

Wetlands in this management unit include those directly associated with the lower reaches and providing connectivity with the Gippsland Lakes. It also includes those found on the sandy plains to the east of the Perry River including the Billabong which is listed under the Directory of Important Wetlands Australia. The Billabong supports an important population of Dwarf Kerrawang, a nationally threatened plant species.

Land uses in this management unit have resulted in a loss of native riparian vegetation and instream habitat and widespread infestations of exotic weeds. In the Perry River system the unique chain of ponds geomorphology has been damaged by grazing and excavation of the ponds to form more permanent sources of water.

The Avon River has been impacted significantly by changes to physical form including channelisation and gravel extraction which has resulted in acceleration of processes such as widening, incision and downstream sedimentation. The processes have been further exacerbated by a history of major flooding that has changed the channel form resulting in a large inset floodplain dominated by cobble, pebble and sand. For most of the year the river forms a low flow channel that meanders across the confines of the inset floodplain. Flow in the Avon River is impacted by direct pumping (predominantly during summer/autumn), as well as pumping of groundwater from its connected aquifer.

During the life of the *RHS* there was a major focus on improving the condition and connectivity of vegetation along waterways and improving waterway stability as part of the geomorphological recovery of the Avon system. This Strategy will extend this work and continue to work towards repair of erosion and instabilities in the Avon and prevent damage to the chain of ponds in the Perry River system. The Strategy supports activities undertaken by agencies, community groups and landholders that maintain and improve the condition of wetlands, in particular the nationally critically endangered community, Seasonal Herbaceous Wetlands. Opportunities to improve the water regime in the mid-lower Avon River will be explored through the completion of a revised local management plan for the Avon River and its connected aquifer, and investigation of the potential to deliver stored environmental water to the river.

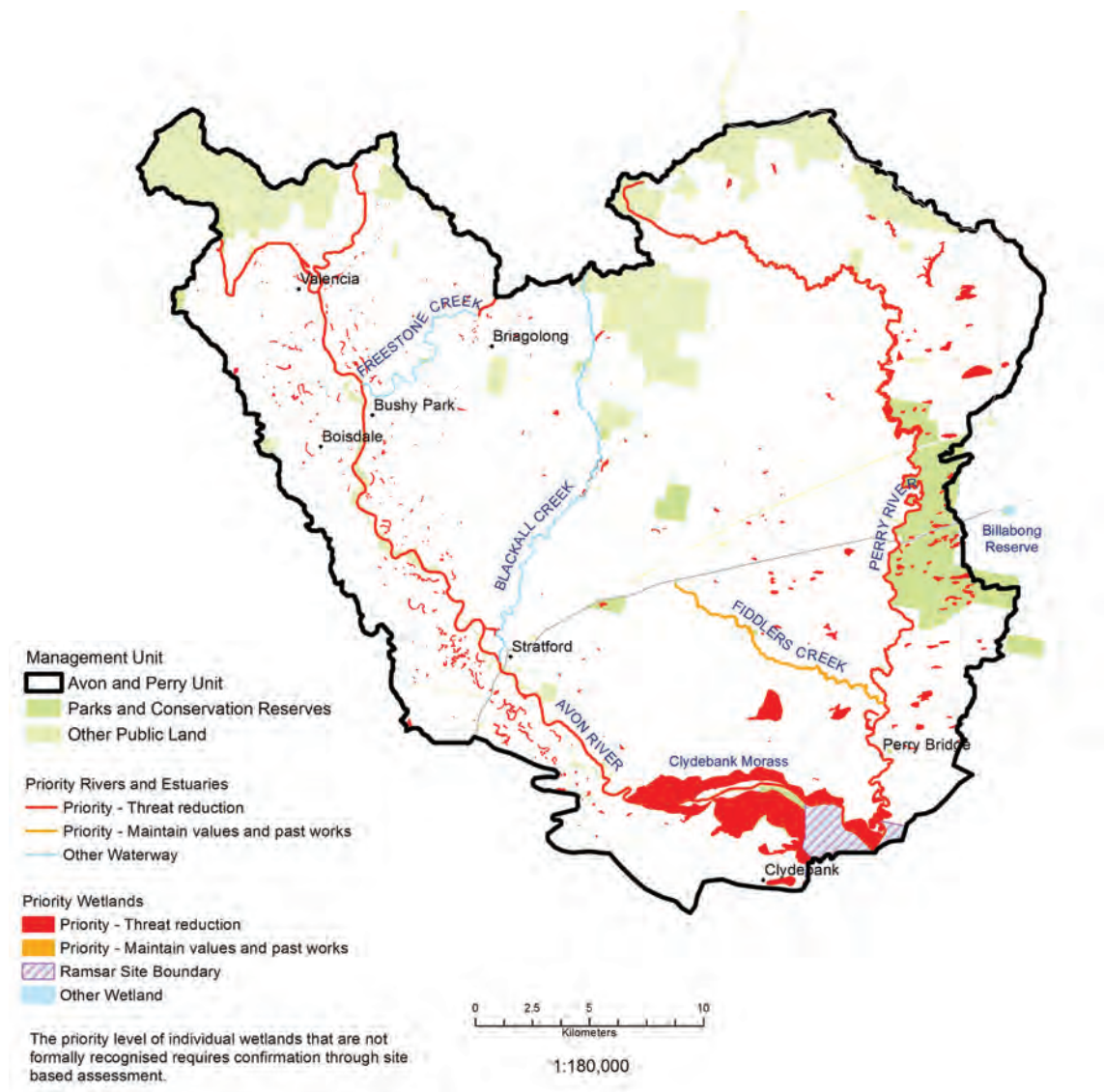


Figure 15 Map of priorities for Avon and Perry Rivers Management Unit

Table 5 Avon and Perry Rivers Work Program

Priorities			
Threat reduction: Avon River (25-19, 25-20, 25-21), Valencia Creek (25-29), Perry River (25-23, 25-24), Avon and Perry River estuary (25-219, 25-223), wetlands of the Avon and Perry			
Maintain values/past works: Fiddler's Creek (25-25)			
Long Term Resource Condition Target			
All expected native fish species (migratory and non-migratory) are found in the reach and their abundance has increased.			
Migratory fish have free passage at critical times.			
The condition and extent of riparian vegetation communities is improved.			
Vegetation is established on bars, benches, and the riparian zone providing stability and reducing sediment transportation rates.			
Riparian vegetation provides improved visual amenity and contributes to community use of waterways.			
Waterways are physically stable (not actively eroding at high rates) and social and economic values are not threatened by waterway instability.			
Water regime is improved to provide seasonal variability in summer and autumn.			
The extent of freshwater wetlands (including Seasonal Herbaceous Wetlands of the Temperate Lowland Plain) is maintained and their condition has improved.			
Values linked to Regional Goals: fish, birds, vegetation, social, economic, hydrology			
Threats addressed by work program: fish barrier, incision, invasive flora, loss of large wood, poor water quality, reduced riparian large trees, reduced riparian width, sedimentation			
Management Outcome Target	Management activity / output		Lead agency and partners
Recruitment and growth of large tree species is occurring successfully throughout riparian zones of priority waterways.	Establish riparian management agreements with landholders.* (ha)	213	WGCMA, landholders
	Construct riparian fencing to exclude stock. (km)	76	WGCMA, landholders
Vegetated riparian corridor is at least 15m on each side for 90% of priority waterways.	Establish native vegetation. (ha)	158	WGCMA, landholders
Wetland condition has improved from baseline. ¹	Construct riparian (wetland) fencing to exclude stock. (km)	16	WGCMA, landholders
	Support landholders to increase the area of wetlands under permanent protection.		WGCMA, Trust for Nature

¹ Comprehensive baseline condition assessments have not yet been completed for wetlands.

Table 5 Avon and Perry Rivers Work Program continued

Management Outcome Target	Management activity / output		Lead agency and partners
Less than 60% cover of invasive riparian flora are present in the shrub and ground layer of priority waterways.	Establish weed control – stem poisoning / spraying of willow. (ha)	40	WGCMA
	Establish woody weed control. (ha)	86	WGCMA , landholders
	Maintain control of weeds in past works. (ha)	223	WGCMA , landholders
No net export of coarse sediment from the Avon and Perry systems (25-219).	Undertake earth works (bank armouring) to address erosion. (km)	2	WGCMA
No active bed degradation in the Perry River (25-23, 25-24).	Undertake earth works (bank armouring) to address erosion. (no. sites)	12	WGCMA
Chain of ponds morphology of the Perry River is maintained (25-23, 25-24).	Construct waterway structure (chute). (no.)	4	WGCMA
	Install waterway structure (pile field). (no.)	20	WGCMA
	Undertake earth works (battering). (no.)	4	WGCMA
	Investigate and address impacts on the stability of gravel bars and benches along the Avon River from illegal recreational four wheel drive activities. (no. assessment)	1	DEPI, WGCMA
Large wood provides good habitat in the Lower Avon (25-19). There are numerous pieces of in stream wood from indigenous species.	Install large wood structures in the Lower Avon. (no.)	3	WGCMA
Costs and feasibility of addressing fish barrier in Perry River assessed (25-23).	Investigate the costs and feasibility of addressing fish barrier in the lower Perry River. (no. assessment)	1	WGCMA
Environmental water outcomes are improved through planning, reporting and monitoring (Avon River).	Undertake review of environmental flows studies and assess feasibility of using existing environmental entitlements in the Avon. (no. assessment)	1	WGCMA, DEPI, SRW
	Develop the revised Local Management Plan for the Avon River and Wa De Lock GMA. (no. plan)	1	SRW, WGCMA
	Implement the local management plan for the Avon River and Wa De Lock GMA.*		SRW, WGCMA
	Estimated cost	\$5,000,000	

* Management activities not costed

13 Lower Latrobe, Thomson and Macalister Management Unit



Figure 16 Conceptual diagram of the Lower Latrobe, Thomson and Macalister Management Unit

The lower Latrobe, Thomson and Macalister management unit incorporates the highly productive Macalister Irrigation District as well as agricultural areas on the floodplain of the Latrobe River downstream of Rosedale.

The Thomson and Macalister river systems supplies water for irrigation of dairy, beef and horticulture in the Macalister Irrigation District, the largest irrigation area south of the Great Dividing Range. The floodplain of the Thomson and Macalister rivers is characterised by relatively flat to undulating plains dotted with a network of paleo-channels and wetlands.

Despite massive changes to the landscape through development for agriculture, pockets of high value remnant vegetation (including Swamp Scrub and Floodplain Riparian Woodland) remain along the lower reaches of these waterways. This helps to stabilise the banks of the waterways and provides important habitat for riparian and in stream fauna including the nationally threatened Australian grayling.

Stability, erosion, channel change and impacts of flood flow on private land are major issues in the Lower Latrobe, Thomson and Macalister rivers and their associated floodplains. Past management activities have had a detrimental impact on the functioning of these systems as a result of channelisation, clearing of native vegetation from the riparian zone, planting of willows and stock access to waterways. These impacts have been exacerbated by bushfire, flooding and drought in recent years which has caused extensive damage across the management unit.

The communities of Heyfield, Maffra and Sale have a strong connection with the waterways in this management unit, with the Thomson and Macalister rivers flowing through the outskirts of the urban areas. Numerous wetlands and smaller waterways including Flooding Creek, Macalister Swamp Reserve, Herb Guyatt Reserve, Lake Guyatt, Lake Gutheridge and the Heyfield wetlands are also valued for their visual amenity and recreational uses.

During the life of the *RHS* there was a major focus on improving condition and connectivity of vegetation along waterways and across the floodplain of the lower Thomson, Macalister and Latrobe rivers. This Strategy will extend this work and continue to work towards repair of erosion and instabilities across the main waterways.

Stored environmental water became available for use in the Thomson (Thomson Reservoir), Macalister (Lake Glenmaggie) and Latrobe (Blue Rock Reservoir) river systems during the period of the *RHS*. While annual plans for the use of this water have been regularly prepared since the establishment of the environmental entitlements, this Strategy recognises the need to consider environmental watering needs and priorities over multiple years.

This will be achieved through the completion of Environmental Water Management Plans which have a five to 10 year planning horizon. Delivery of environmental water will be complemented by, and may also complement, works to improve instream habitat and riparian condition.

The Strategy supports the work of community groups and agencies working collaboratively to improve the condition of urban waterways.

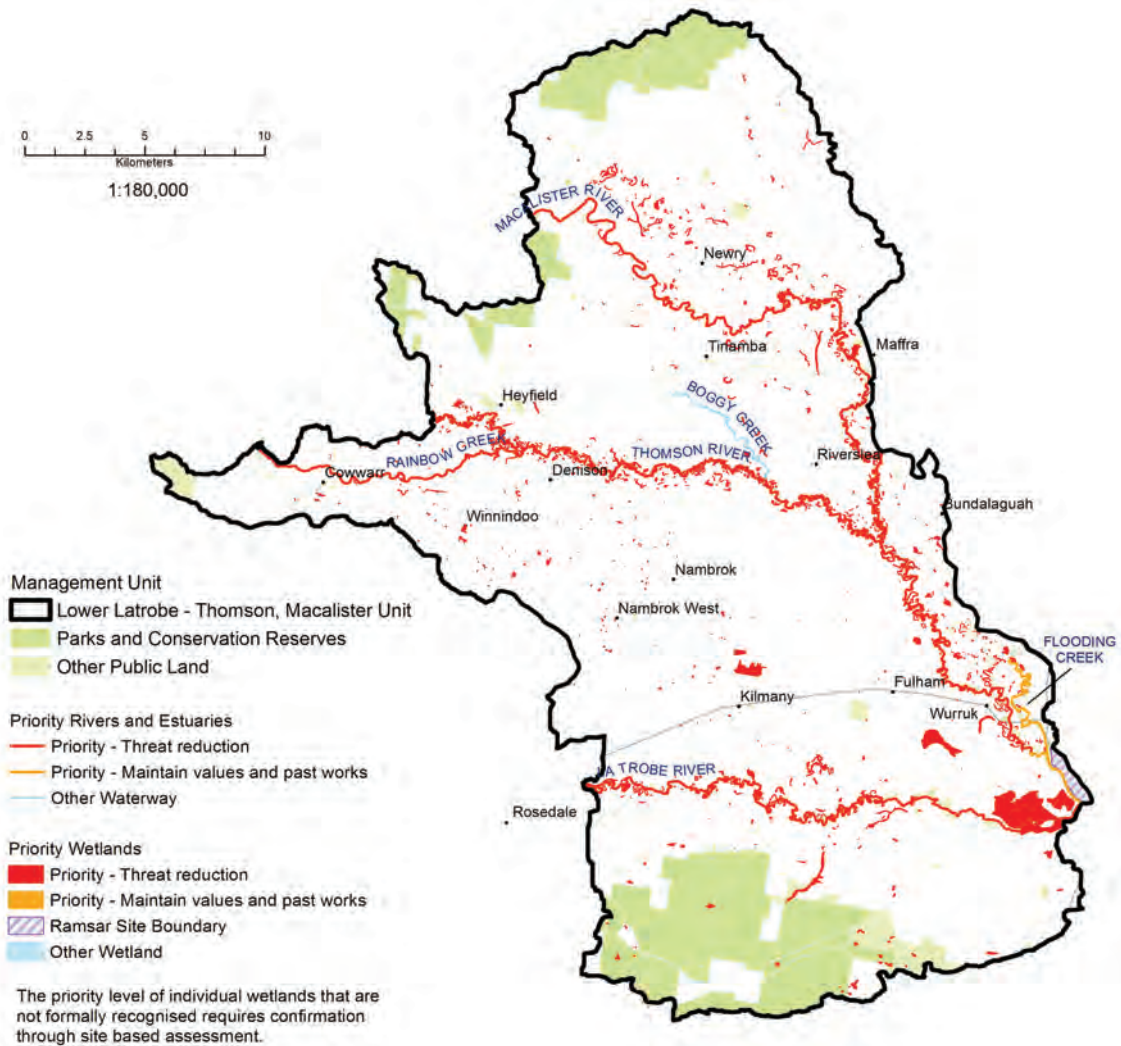


Figure 17 Map of priorities for Lower Latrobe, Thomson and Macalister Management Unit

Table 6 Lower Latrobe, Thomson and Macalister Work Program

Priorities			
Threat reduction: Thomson River (25-1, 25-2, 25-3), Rainbow Creek (25-17), Macalister River (25-7, 25-8), Latrobe River (26-2), Wetlands of the Lower Latrobe, Thomson and Macalister			
Maintain values/past works: Thomson River estuary (25-201), Flooding Creek			
Long Term Resource Condition Targets			
All expected native fish species (migratory and non-migratory) are found in the reach and their abundance has increased.			
Populations of Australian Grayling are self-sustaining.			
Vegetation establishment provides a robust buffer, improves vegetation connectivity and shading of waterways.			
Water regime is managed to provide required base flows and flow variability within and between seasons.			
Habitat for birds particularly in terms of the condition and extent of wetlands is maintained.			
Riparian vegetation provides improved visual amenity and contributes to community use.			
Community uses are maintained through improvements to water quality and erosion.			
Waterways in the catchment provide water of suitable quality to support economic uses including township, rural uses and fishing.			
Waterways are physically stable (not actively eroding at high rates) and their values are not threatened by waterway instability.			
The extent of freshwater wetlands (including Seasonal Herbaceous Wetlands of the Temperate Lowland Plain) is maintained and their condition has improved.			
Values linked to Regional Goals: fish, birds, invertebrates, vegetation, landscape, social, economic, hydrology			
Threats addressed by work program: bank erosion, floodplain connectivity, flow stress, incision, invasive flora, poor water quality, reduced riparian large trees, reduced riparian width, sedimentation			
Management Outcome Target	Management activity / output		Lead agency and partners
Vegetated corridor is at least 15m wide on each side for 90% of priority waterways.	Establish riparian management agreements with landholders.* (ha)	345	WGCMA, landholders
	Construct riparian fencing to exclude stock. (km)	115	WGCMA, landholders
Wetland condition has improved from baseline. ¹	Construct riparian (wetland) fencing to exclude stock. (km)	25	WGCMA, landholders
	Establish native vegetation. (ha)	180	WGCMA, landholders
	Maintain vegetation in past works through supplementary planting. (ha)	25	WGCMA, landholders
	Support landholders to increase the area of wetlands under permanent protection.		TFN, WGCMA

¹ Comprehensive baseline condition assessments have not yet been completed.

Table 6 Lower Latrobe, Thomson and Macalister Work Program continued

Management Outcome Target	Management activity / output		Lead agency and partners
Less than 60% cover of invasive riparian flora is present in the shrub and ground layer of priority waterways.	Establish weed control – stem poisoning / spraying of willow. (ha)	50	WGCMA, landholders
	Establish weed control – mechanical removal of willow. (ha)	37	WGCMA, landholders
	Establish woody weed control. (ha)	52	WGCMA, landholders
	Maintain control of weeds in past works. (ha)	120	WGCMA, landholders
	Waterway surveillance and inspection (weeds). (km)	230	WGCMA
Less than 50% of Rainbow Ck and Thomson and Macalister rivers (25-17, 25-2, 25-7, 25-8) have active bank erosion.	Undertake earth works (bank armouring) to address erosion. (km)	6.5	WGCMA
	Undertake earth works (bank armouring) to address erosion. (no. sites)	64	WGCMA
No further bed degradation in the Lower Macalister.	Construct waterway structure (chute). (no.)	2	WGCMA
Large wood provides good habitat in the Lower Macalister River (25-8).	Install large wood structures. (no.)	10	WGCMA
Length and quality of in-stream habitat is increased along the Lower Latrobe (26-2).	Construct waterway structure to reinstate meanders. (no.)	3	WGCMA
Wetland water regime (altered seasonality and magnitude) threats are reduced in priority waterways.	Investigate wetland watering infrastructure requirements (floodplain wetlands Thomson, Macalister and Latrobe).	1	WGCMA
	Waterway structure flow regulator. ² (no.)	3	WGCMA, landholders
	Earth works – barrier modification. ² (no.)	3	WGCMA, landholders
Water regime threats (seasonality and magnitude) are reduced through delivery of water to priority reaches.	Prepare annual Seasonal Watering Proposal (Latrobe River, Thomson River, Macalister River).* (no. plan)	24	WGCMA
	Deliver environmental water in line with Seasonal Watering Statements (Latrobe River, Thomson River, Macalister River).*	24	WGCMA, SRW, VEWH

² These outputs subject to confirmation through an investigation into water infrastructure requirements which is due for completion in 2014.

Table 6 Lower Latrobe, Thomson and Macalister Work Program continued

Management Outcome Target	Management activity / output		Lead agency and partners
Environmental water outcomes are improved through planning, reporting and monitoring.	Undertake investigation to inform Environmental Water Management Plan (review of flows studies and system operations). (no. assessment)	3	WGCMA , VEWH, SRW
	Develop and implement Environmental Water Management Plan for the Latrobe River, Thomson River and Macalister River. (no. plan)	3	WGCMA , VEWH, SRW
	Environmental Water Monitoring Program implemented in the Thomson, Macalister and Latrobe (vegetation, fish, physical form, water quality). (no. program)	3	WGCMA , DEPI
Costs and feasibility of addressing fish barrier in the Macalister River assessed.	Investigate fish passage requirements and options at the Maffra Weir. (no. assessment)	1	WGCMA , SRW
Management of urban waterways occurs through partnership arrangements between land and waterway managers.	Establish waterway management arrangements for agreed priority urban waterways.* (no. partnerships)	1	WGCMA , Wellington Shire Council
	Integrate vegetation establishment and weed maintenance with recreational uses along urban waterways (Flooding Creek, Herb Guyatt Reserve, Macalister Swamp Reserve, Heyfield wetlands, Port of Sale).* (no. projects)	5	WGCMA , Wellington Shire Council
Increased community skills and knowledge of waterway management issues.	Support community monitoring of waterways (including Drainwatch) to inform management. (no. sites)	5	WGCMA
	Coordination / participation in engagement events. (no. events)	2	WGCMA , SRW
On-ground works and monitoring activities will effectively and efficiently deliver their desired outcomes over the longer term.	Investigate the fluvial geomorphology of the Latrobe River and its tributaries. (no. assessment)	1	WGCMA , SRW
Estimated cost			\$7,400,000

* Management activities not costed

14 Mid Latrobe Management Unit



Figure 18 Conceptual diagram of the Mid Latrobe Management Unit

The Mid Latrobe management unit provides potable water to residential customers throughout Gippsland as well as water to the power and manufacturing industries. The Latrobe Valley power industry is the major supplier of electricity across Victoria and is one of the largest employers within the Latrobe Valley.

The waterways of the Mid Latrobe management unit have been significantly impacted by past management practices and changes to natural water regimes. Across the mid Latrobe channelisation, clearing of vegetation and stock access has caused bank erosion and deepening and widening of waterways. Infestations of weeds, particularly willow species, have exacerbated these problems.

Urban waterways including Traralgon Creek, Waterhole Creek and Hazel Creek have also been impacted by past management practices. There is also increased stormwater from urban and industrial areas and reduced connectivity and lack of native vegetation in each of these waterways. Despite this they are highly valued by local communities for their amenity and recreational opportunities. Detailed waterway planning has been completed for these urban waterways and strong partnerships between government agencies and the community exist for implementation.

In the past decade there has been significant progress made in restoring Traralgon Creek through an integrated program of stock exclusion, revegetation, control of invasive flora and stabilisation works.

During the life of this Strategy the establishment of vegetated riparian corridors outside of the township boundary, additional stabilisation works and a comprehensive maintenance program will contribute to the achievement of long term targets for this waterway.

The other tributaries of the Latrobe including Shady Creek, Rintoul Creek, Eaglehawk Creek and the Tyers River will also be the focus for effort in this Strategy, building on existing partnerships with community groups and landholders.



Figure 19 Map of priorities for the Mid Latrobe Management Unit

Table 7 Mid Latrobe Work Program

Priorities			
Threat reduction: Latrobe River (26-3, 26-4), Eaglehawk Creek (26-9), Traralgon Creek (26-11), Rintoul Creek (26-13, Shady Creek (26-28), Waterhole Creek (26-15), Hazel Creek, Wetlands of the Mid Latrobe Management Unit			
Matlin values/past works: Rintoul Creek (26-14), Tyers River (26-16)			
Long Term Resource Condition Target			
Native fish populations (migratory and non-migratory) have increased in diversity and numbers present.			
Habitat for birds, particularly in terms of mature trees is widespread downstream of Traralgon township and birds are able to move between waterway and wetland habitats.			
Vegetation establishment improves connectivity with remnant patches and provides shading of the waterway.			
Riparian vegetation provides improved visual amenity and contributes to waterway stability.			
Waterways are physically stable (not actively eroding at high rates) and social and economic uses are not threatened by waterway instability.			
Water regime is managed to provide required base flows and flow variability within and between seasons.			
Values linked to Regional Goals: fish, birds, amphibians, invertebrates, vegetation, landscape, social, economic			
Threats addressed by work program: bank erosion, fish barrier, flow stress, incision, invasive flora, poor water quality, reduced riparian large trees, reduced riparian width			
Management Outcome Target	Management activity / output		Lead agency and partners
Recruitment and growth of large tree species is occurring successfully throughout riparian zones (Traralgon Creek, Latrobe River 26-3 and 26-5, Rintoul Creek 26-13).	Establish riparian management agreements with landholders.* (ha)	39	WGCMA, landholders
	Construct riparian fencing to exclude stock. (km)	18	WGCMA, landholders
	Establish native vegetation. (ha)	8	WGCMA, landholders
	Maintain vegetation in past works through supplementary planting. (ha)	25	WGCMA, landholders
Less than 60% cover of invasive riparian flora are present in the shrub and ground layer of priority waterways.	Establish weed control – mechanical removal of willow. (ha)	28	WGCMA
	Establish woody weed control. (ha)	8	WGCMA, landholders
	Maintain control of weeds in past works. (ha)	55	WGCMA, landholders
	Waterway surveillance and inspection (weeds). (km)	30	WGCMA

Table 7 Mid Latrobe Work Program continued

Management Outcome Target	Management activity / output		Lead agency and partners
Less than 50% of Traralgon Creek, and Latrobe River (26-11, 26-3, 26-5) have active bank erosion.	Undertake earth works (bank armouring) to address erosion. (km)	2	WGCMA
	Undertake earth works (bank armouring) to address erosion. (no. sites)	32	WGCMA
Reduce bed instability threats in Shady Creek (26-28).	Construct waterway structure (chute). (no.)	3	WGCMA
	Maintain waterway structure (chute). (no.)	5	WGCMA
	Management of Traralgon Creek occurs in line with arrangements set out in the Traralgon Creek Memorandum of Understanding.* (no. partnership)	1	Latrobe City Council, WGCMA,
	Investigate and construct stormwater treatment wetland south of Traralgon township.	1	Latrobe City Council, WGCMA
	Implement priority actions within the Waterhole Creek Waterway Management Plan.	1	Latrobe City Council, WGCMA, Landcare, HVP and other community groups
Environmental water outcomes are improved through planning, reporting and monitoring.	Undertake investigation to inform Environmental Water Management Plan (review of flows studies and system operations). ¹		WGCMA, VEWH, SRW
	Develop and implement Environmental Water Management Plan for the Latrobe River.* ¹		WGCMA, VEWH, SRW
	Environmental Water Monitoring Program implemented (vegetation, fish, physical form, water quality).* ¹ (no. program)		WGCMA, DEPI
Water regime threats (altered seasonality and magnitude) are reduced through delivery of water.	Prepare annual Seasonal Watering Proposal (Latrobe River).* ¹		WGCMA
	Deliver environmental water in line with Seasonal Watering Statements (Latrobe River).* ¹		WGCMA, SRW, VEWH

¹ Output and associated cost is accounted for in Lower Latrobe, Thomson and Macalister Management Unit

Table 7 Mid Latrobe Work Program continued

Management Outcome Target	Management activity / output		Lead agency and partners
Increased community skills and knowledge of waterway management issues.	Support community monitoring of waterways (Traralgon Creek, Hazel Creek and Waterhole Creek) to inform management. (no. sites)	3	WGCMA , Landcare, Latrobe City Council
	Coordination / participation in engagement events. (no. events)	3	WGCMA , Landcare, Latrobe Council
On-ground works and monitoring activities will effectively and efficiently deliver their desired outcomes over the longer term.	Investigate the fluvial geomorphology of the Latrobe River and its tributaries. ^{*1}		WGCMA , SRW
Costs and feasibility of addressing fish barrier in Tyers River assessed (26-16).	Investigate feasibility of addressing fish passage requirements in the Tyers River. (no. assessment)		WGCMA , GW
Estimated cost			\$4,100,000

¹ Output and associated cost is accounted for in Lower Latrobe, Thomson and Macalister Management Unit

* Management activity not costed

15 Upper Thomson, Latrobe, Macalister and Avon Management Unit



Figure 20 Conceptual diagram of the Upper Thomson, Latrobe, Macalister and Avon Management Unit

The upper catchments of the Thomson, Macalister and Avon rivers drain from the southern slopes of the Great Dividing Range and support significant natural values including sub alpine and alpine wetlands. Two of these wetlands listed under the *Directory of Important Wetlands Australia*, Caledonia Fen and Lake Tarli Karng and the Alpine *Sphagnum* Bogs and Associated Fens found in this management unit are an ecological community which is listed as endangered under the *EPBC Act 1999* and threatened under the *FFG Act 1988*.

The Aberfeldy River and Upper Thomson River from the reservoir to Cowwarr Weir are designated Heritage Rivers based on ecological, historical and recreational features.

The waterways of the upper catchment are an important tourism destination supporting canoeing and rafting along with camping and four wheel driving. The waterways have important cultural values both pre and post European settlement. Stringers Creek flows through the township of Walhalla and is valued by the local community and visitors to the area.

The Thomson, Latrobe and Macalister rivers are important sources of water for irrigation and domestic supply as well as industrial uses and are regulated through major storages and weirs including the Thomson Reservoir, Cowwarr Weir, Blue Rock Dam, Moondarra Reservoir and Lake Glenmaggie. The Avon River is the only one of the four systems that drains to Lake Wellington to remain unregulated.

The waterways of the upper catchments are generally in much better condition than those in other parts of the region. The Thomson River has its flow regulated by the Thomson Reservoir and the Tanjil below Blue Rock Dam, which impacts on the natural water regime. Bushfires are a regular occurrence in the upper catchments and in the period after fire waterways are impacted on by increased spread of exotic flora, poor water quality and destruction of riparian vegetation.

Habitat in the form of riparian vegetation and large wood within the stream has been compromised through bushfire, flood and historical clearing. Climate change poses a significant threat to waterways located in the steep hills and sub alpine areas of this management unit. The impacts from reduced rainfall and increased temperature on vegetation communities and fauna species including threatened species such as the Baw Baw Frog also need to be considered.

In the past decade significant investment has been directed into stabilisation works in the Upper Macalister and Avon rivers as a part of flood damage recovery programs. In the life of this Strategy, there will be a focus on reducing bank erosion of the Upper Latrobe and Tanjil rivers. The establishment of vegetated riparian corridors will be critical to ensure the long term success of both new and past stabilisation works.

The long term goal for EPBC listed Australian Grayling populations in the Thomson River will be achieved through delivery of environmental water and the provision of passage for migratory fish around the Horseshoe Bend tunnel.

Across the waterways of the upper catchment there has been a sustained focus on addressing weeds through surveillance, targeted works to control infestations either at a reach scale to contain infestations or as part of site based restoration works. Within this Strategy there will be a continued emphasis on undertaking surveillance and assessment of infestations to inform works programming.

The Strategy supports the implementation of the Spatial Action Plan for Alpine Peatlands and activities that will maintain the values of Caledonia Fen and Lake Tali Karng.



Figure 21 Map of priorities for Upper Thomson, Latrobe, Macalister, Avon Management Unit

Table 8 Upper Thomson, Latrobe, Macalister and Avon Work Program

Priorities:			
Threat reduction: Thomson River (25-4, 25-5), Macalister River (25-9, 25-12), Aberfeldy River (25-18), Avon River (25-22), Freestone Creek (25-28), Tanjil River (26-23, 26-25), Latrobe River (26-6, 26-7), Tyers River (26-17)			
Maintain values/past works: Macalister River (25-10), Barkly River (25-13), Valencia Creek (25-30), Ben Cruachan Creek (25-31), Jordan River (26-6), Shady Creek (26-29), Loch River (26-30), Thomson River (25-99), Stringers Creek, Wetlands of the Upper Thomson, Latrobe, Macalister and Avon Management Unit, Caledonia Fen, Lake Tarli Karng			
Long Term Resource Condition Target			
All expected native fish species (migratory and non-migratory) are found in the reach and their abundance has increased.			
Populations of Australian Grayling are self-sustaining.			
The condition and extent of riparian vegetation communities is improved.			
Riparian vegetation provides improved visual amenity and contributes to waterway stability.			
Waterways are physically stable (not actively eroding at high rates) and water supply is not threatened by waterway instability).			
Water regime is improved to provide seasonal variability within and between seasons.			
Alpine and subalpine wetlands (including Alpine <i>Sphagnum</i> Bogs and Associated Fens) in good condition are maintained and there is improvement in the condition of degraded wetlands.			
Values linked to Regional Goals: fish, birds, amphibians, invertebrates, vegetation, landscape, social, economic, hydrology			
Threats addressed by work program: fish barrier, flow stress, invasive flora, invasive fauna, poor water quality, loss of large wood, reduced riparian large trees			
Management Outcome Target	Management activity / output		Lead agency and partners
Recruitment and growth of large tree species is occurring successfully throughout riparian zones of priority waterways.	Establish riparian management agreements with landholders.* (ha)	56	WGCMA, landholders
	Construct riparian fencing to exclude stock. (km)	43	WGCMA, landholders
	Establish native vegetation. (ha)	56	WGCMA, landholders
Less than 60% cover of invasive riparian flora are present in the shrub and ground layer of priority waterways.	Establish weed control – mechanical removal of willow. (ha)	16	WGCMA
	Establish weed control – stem poisoning / spraying of willow. (ha)	19	WGCMA, Parks Victoria
	Establish woody weed control. (ha)	39	WGCMA, Parks Victoria, landholders
	Biennial waterway surveillance and inspection (weeds). (km)	276	WGCMA, Parks Victoria
	Investigate and map the extent and location of weed infestations (biennial) to inform work program for priority reaches. (no. assessments)	4	Parks Victoria, WGCMA

Table 8 Upper Thomson, Latrobe, Macalister and Avon Work Program continued

Management Outcome Target	Management activity / output		Lead agency and partners
Willow infestations are contained to prevent spread into adjacent catchments (Upper Thomson 25-99, Tanjil River 26-24, 26-25).	Annual catchment surveillance and inspection (weeds). (ha)	2400	Parks Victoria
	Establish weed control – stem poisoning / spraying of willow. (ha)	40	Parks Victoria
Woody weed infestations are contained to prevent spread into adjacent catchments (Upper Thomson 25-99, Tanjil River (26-24, 26-25).	Annual waterway surveillance and inspection (weeds). (km)	240	Parks Victoria
	Establish weed control – woody weeds as required based on surveillance.		Parks Victoria
Fish passage provided to the Upper Thomson (25-5) and Aberfeldy Rivers (25-18).	Provide fish passage around Horseshoe Bend Tunnel through construction of a fishway. (no.)	1	WGCMA, DEPI
	Continue to engage with the community about the Horseshoe Bend Tunnel fish passage project.		
Less than 50% of Tanjil River and Upper Latrobe (26-6, 26-23, 26-24) has active bank erosion.	Undertake earth works (bank armouring) to address erosion. (km)	2	WGCMA
	Undertake earth works (bank armouring) to address erosion. (no. sites)	40	WGCMA
Water regime (altered seasonality and magnitude) threats are improved through delivery of water.	Prepare Annual Seasonal Watering Proposal (Thomson River, Latrobe River). ^{*1}		WGCMA
	Deliver Environmental Water in line with Seasonal Watering Statements. ^{*1}		WGCMA, VEWH, SRW, bulk entitlement holders
Environmental water outcomes are improved through planning, reporting and monitoring.	Undertake investigation to inform Environmental Water Management Plan (review of flows studies and system operations). ^{*1}		WGCMA, VEWH, SRW
	Develop and implement Environmental Water Management Plans for the Thomson River and Latrobe River. ^{*1}		WGCMA, VEWH, SRW
	Implement Environmental Water Monitoring Program (vegetation, fish, physical form, water quality). ^{*1} (no. program)		WGCMA, DEPI

¹ These outputs and associated costs accounted for in the Lower Latrobe, Thomson and Macalister Management Unit.

Table 8 Upper Thomson, Latrobe, Macalister and Avon Work Program continued

Management Outcome Target	Management activity / output	Lead agency and partners
Condition of 25% of alpine and subalpine wetlands in the Mt Howitt to Mt Wellington area is maintained in medium condition.	Implement the Victorian Alpine Peatlands Spatial Action plan for alpine and sub alpine wetlands.	Parks Victoria, WGCMA
100% of alpine and subalpine wetlands in the Baw Baw area and 75% of peatlands in the Mt Howitt to Wellington area is maintained in 'good' condition.	Continue to implement the Stringers Creek Streamscape Plan.*	Baw Baw Shire Council, WGCMA
	Support Parks Victoria to manage threats to Lake Tarli Karng and Caledonia Fen.*	DEPI, WGCMA
	Estimated cost	\$6,435,000

* Management activity not costed

16 Giffard Plain and Merriman Creek Management Unit



Figure 22 Conceptual diagram of the Giffard Plain and Merriman Creek Management Unit

The Giffard Plain and Merriman management unit has its headwaters in the eastern end of the Strzelecki Ranges. Merriman Creek and its tributary Monkey Creek drain directly to the southern coastline of South Gippsland. To the east of the Merriman Creek estuary lays Jack Smith Lake which is fed by numerous ephemeral waterways that drain from the Mullungdung State Forest. Numerous wetlands are found through the Mullungdung State Forest and Holey Plains State Park located on sandy plains and fed by catchment runoff. The establishment of plantation forests has impacted on the hydrology of these wetlands and the vegetation and fauna they support.

Merriman Creek is an important water source for agriculture and the town of Seaspray. The coastal reaches of the waterways are important for recreation and tourism as are Seaspray, Woodside Beach and the use of Jack Smith Lake for hunting and camping and to access the ocean beaches for fishing.

Merriman Creek has been significantly impacted by changes to physical form including channelisation which together with removal of native vegetation has resulted in erosion and instability in the middle sections of the waterway.

During the life of the *RHS* significant gains were made in addressing willow infestations and excluding stock from riparian land along the lower reach of Merriman Creek.

This Strategy will build on the previous work along Merriman Creek and start work on improving the condition of wetlands in partnership with private landholders. The estuary of Merriman Creek will be the focus of investigations to improve understanding and management of its hydrology and artificial opening processes.

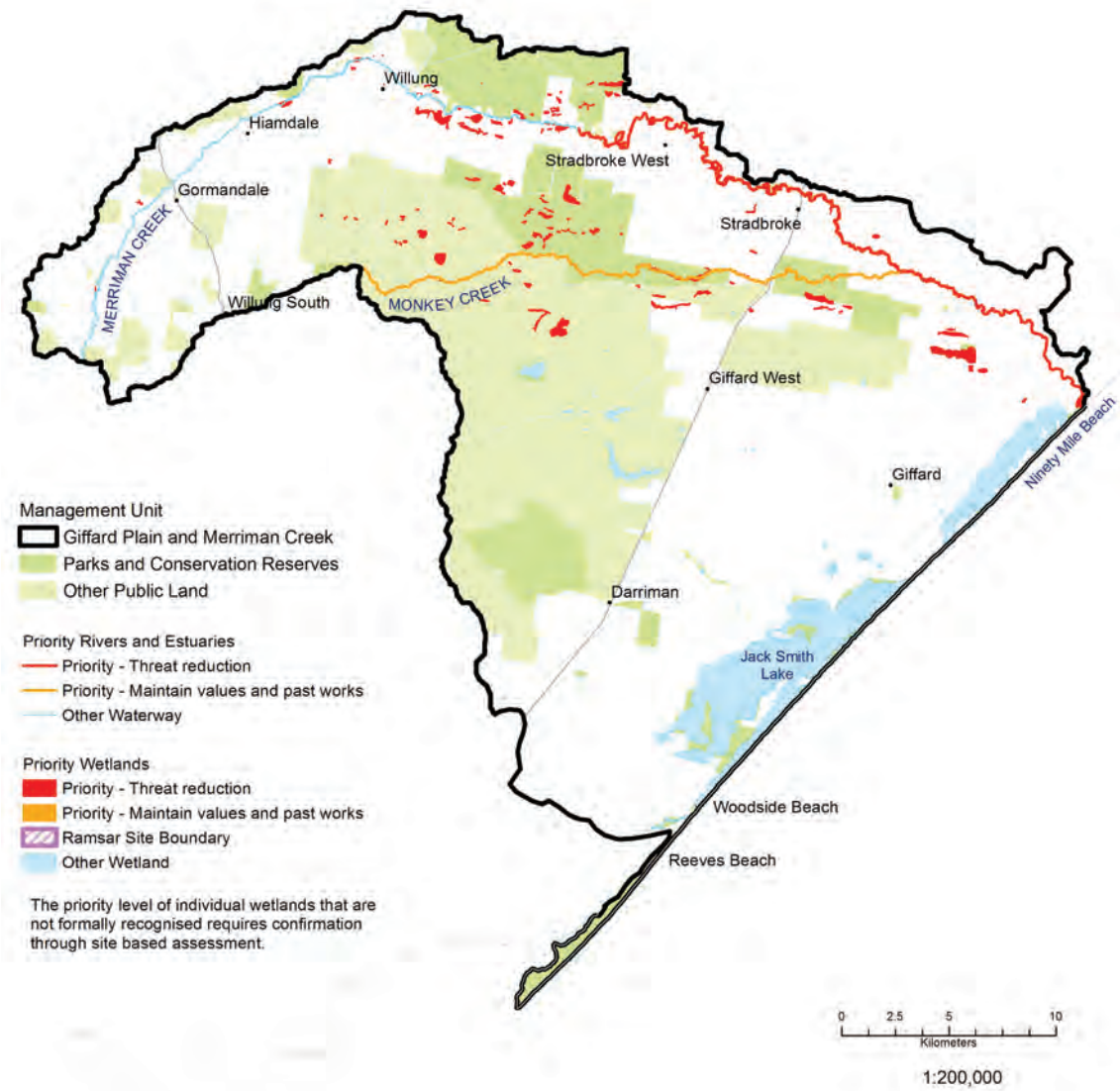


Figure 23 Map of priorities for Giffard Plain and Merriman Creek Management Unit

Table 9 Giffard Plain and Merriman Creek Work Program

Priorities			
Threat reduction: Merriman Creek (27-39), Monkey Creek (27-42), Wetlands of Merriman Creek and Giffard Plain			
Long Term Resource Condition Target			
All expected native fish species (migratory and non-migratory) are found in the reach and their abundance has increased.			
The condition and extent of riparian vegetation communities is improved.			
Riparian and wetland vegetation provides improved visual amenity and contributes to community use.			
The extent of freshwater wetlands (including Seasonal Herbaceous Wetlands of the Temperate Lowland Plain) is maintained and their condition has improved.			
Water regime is improved to provide seasonal variability in summer and autumn.			
Values linked to Regional Goals: fish, vegetation, social, hydrology			
Threats addressed by work program: fish barrier, floodplain connectivity, invasive flora, reduced riparian large trees			
Management Outcome Target	Management activity / output		Lead agency and partners
Vegetated corridor is at least 15m wide on each side for 90% of Merriman Creek.	Establish riparian management agreements with landholders.* (ha)	53	WGCMA, landholders
	Construct riparian fencing to exclude stock. (km)	8	WGCMA, landholders
	Establish native vegetation. (ha)	33	WGCMA, landholders
	Maintain established vegetation through supplementary planting. (ha)	8	WGCMA, landholders
Wetland condition has improved from baseline. ¹	Construct riparian (wetland) fencing to exclude stock. (km)	15	WGCMA, landholders
Less than 60% cover of invasive riparian flora are present in the shrub and ground layer.	Establish weed control – stem poisoning / spraying of willow. (ha)	5	WGCMA
	Establish weed control – mechanical removal of willow. (ha)	5	WGCMA
	Establish woody weed control. (ha)	25	WGCMA, landholders
	Maintain control of weeds in past works. (ha)	30	WGCMA, landholders
	Waterway surveillance and inspection (weeds). (km)	118	WGCMA, Landcare, landholders
Costs and feasibility of addressing fish barrier in Merriman Creek assessed.	Support Gippsland Water to implement fish passage requirements.*		Gippsland Water, WGCMA

¹ Comprehensive baseline condition assessments have not yet been completed for wetlands.

Table 9 Giffard Plain and Merriman Creek Work Program continued

Management Outcome Target	Management activity / output		Lead agency and partners
Artificial mouth openings are undertaken using risk based approach informed by the EEMSS.	Investigate the hydrology and opening regime of the Merriman Creek estuary and review options to establish hydrological connectivity with Lake Reeve. (no. assessment)	1	WGCMA, Wellington Shire Council, Parks Victoria
	Implement the EEMSS for the Merriman Creek estuary.*		WGCMA, Wellington Shire Council
	Establish management arrangements for artificial openings of Merriman Creek estuary. (no. partnership)		WGCMA, Wellington Shire Council
Environmental water outcomes are improved through planning, reporting and monitoring.	Implement local management rules related to groundwater and surface water management.*		SRW, WGCMA
		Estimated cost	\$800,000

* Management activity not costed

17 Strzelecki Management Unit



Figure 24 Conceptual diagram of the Strzelecki Management Unit

The Strzelecki management unit incorporates the headwaters of tributaries to both the Gippsland Lakes and Corner Inlet Ramsar sites. The area is dominated by the steep uplands of the Strzelecki Ranges with elevations greater than 600 m. The waterways are short with a limited mid and lower catchment and respond quickly to rainfall events resulting in rapid rise and fall in flows.

Rainfall is high, ranging from 800 mm to 1,200 mm. Native forest and plantation forestry dominates the land use with a smaller percentage of beef, sheep and dairy properties. Large tracts of native vegetation are protected in reserves and the Tarra Bulga and Morwell national parks. Freshwater macro invertebrate communities are in good condition in the very upper most reaches and the waterways provide habitat for species including the Gippsland Spiny Crayfish, Australian Grayling and the locally valued River Blackfish.

Waterways include the Agnes, Franklin, Jack and Albert rivers, Traralgon Creek and Morwell River. These waterways are impacted by harvesting of forest and bushfire as well as infestation of weeds. Poor water quality, erosion and stability are key issues and deposition of sediment results from hillslope and gully erosion in close proximity to waterways.

This Strategy will have a focus on surveillance and inspection of vegetated upper reaches of waterways with weed control as required. Fencing to exclude stock access, establishing vegetation and support for best management practice programs will contribute to improving water quality. These activities will have additional benefits for the stabilisation of river banks and provision of habitat for water dependent fauna species.

The Strategy supports the work of community groups and agencies working collaboratively to improve the condition of Turtons Creek and Agnes Falls, both popular tourist destinations in the local area.

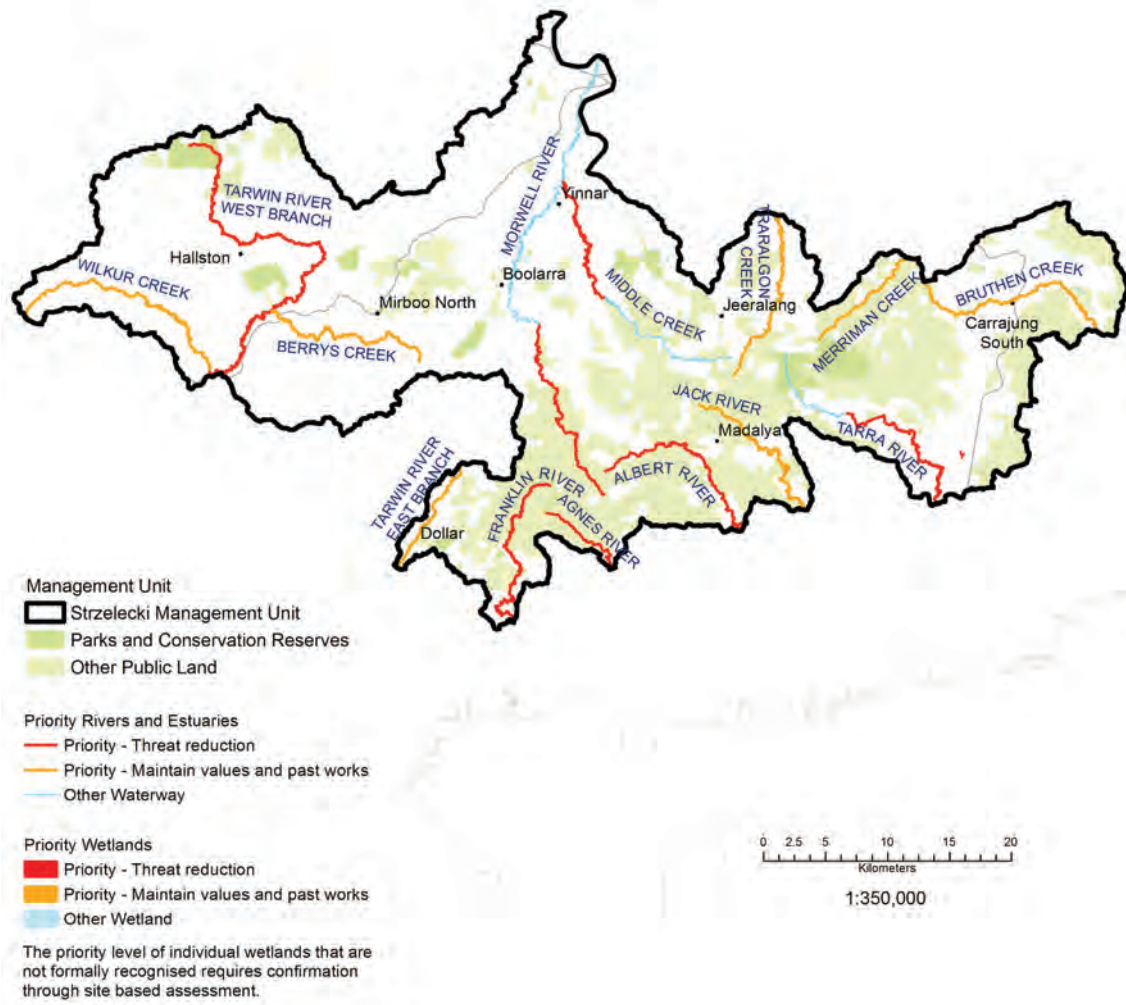


Figure 25 Map of priorities for Strzelecki Management Unit

Table 10 Strzelecki Unit Work Program

Priorities:		
Threat reduction: Morwell River (26-20), Middle Creek (26-21), Tarwin River – west branch (27-12), Franklin River (27-22), Agnes River (27-26), Albert River (27-30), Tarra River (27-34)		
Maintain values/past works: Traralgon Creek (26-12), Fish Creek – (27-14), Tarwin River – east branch (27-16), Wilkur Creek (27-18), Berrys Creek (27-19), Jack River (27-32), Bruthen Creek (27-38), Merriman Creek (27-41)		
Long Term Resource Condition Target		
All expected native fish species (migratory and non-migratory) are found in the reach and their abundance has increased.		
Habitat for birds and mammals particularly in terms of large trees is available in the Upper Morwell (26-20).		
South Gippsland Spiny Crayfish populations are maintained through habitat improvement.		
Vegetation establishment provides a robust riparian buffer.		
Community groups are actively involved in the management of waterways.		
Waterways in the catchment provide water of suitable quality to support social and economic uses including township water sources, rural uses and fishing.		
Waterways are physically stable (not actively eroding at high rates) and their values are not threatened by waterway instability.		
Water regime is improved to provide seasonal variability in summer and autumn.		
Values linked to Regional Goals: fish, birds, invertebrates, mammals, vegetation, social, landscape, economic		
Threats addressed by work program: invasive flora, poor water quality, reduced riparian connectivity, reduced riparian large trees, reduced riparian width		
Management Outcome Target	Management activity / output	Lead agency and partners
Recruitment and growth of large tree species is occurring successfully throughout riparian zones in Middle Creek (26-21, 26-22) and Tarra River (27-34).	Establish riparian management agreements with landholders.* (ha)	261 WGCMA, landholders
	Construct riparian fencing to exclude stock. (km)	116 WGCMA, landholders
	Establish native vegetation. (ha)	153 WGCMA, landholders
Vegetated riparian corridor is at least 15m wide on each bank for 90% of Middle Creek (26-21), Tarwin River – West branch(27-12), Franklin River (27-22), Agnes River (27-26), Albert River (27-30), Tarra River (27-34).	Maintain established vegetation through supplementary planting. (ha)	8 WGCMA, landholders
	Support forestry and agricultural industries to implement BMP programs that reduce sediment and nutrient runoff to waterways.*	WGCMA, Forestry Industry, GippsDairy, Meat & Livestock Australia, DEPI
Water quality threats to the Tarwin River are reduced.		
Nutrient and sediment load reduction targets from the Corner Inlet WQIP are achieved.		

Table 10 Strzelecki Unit Work Program continued

Management Outcome Target	Management activity / output		Lead agency and partners
Less than 60% cover of invasive riparian flora are present in the shrub and ground layer in priority waterways.	Establish weed control – mechanical removal of willow. (ha)	38	WGCMA
	Establish weed control – stem poisoning / spraying of willow. (ha)	37	WGCMA
	Establish woody weed control. (ha)	10	WGCMA, landholders
	Establish non-woody weed control. (ha)	10	WGCMA, landholders
	Maintain control of weeds in past works. (ha)	308	WGCMA, landholders
	Undertake surveillance and inspection of waterways (weeds). (km)	144	WGCMA
	Investigate and map the extent and location of weed infestations to inform work program for priority reaches (Morwell River, Middle Creek and Tarwin River). (no. assessments).	3	WGCMA, DEPI
Community participation in waterway management activities is increased.	Coordination / participation in engagement events. (no. events)	3	WGCMA, Landcare
	Support community monitoring of waterways to inform management. (no. sites)	4	WGCMA, Landcare
	Support DEPI and Landcare to implement priority actions for Turtons Creek Falls.		Landcare, DEPI
	Support Parks Victoria and the 'friends of' to implement priority actions for Agnes Falls.		Parks Victoria, Friends of Agnes Falls
Connected, surface and ground water resources are managed equitably.	Implement local management rules related to groundwater and surface water management.*		SRW, WGCMA
River Blackfish populations are improved in the Tarwin River system through habitat improvement works.	Undertake monitoring to assess River Blackfish populations and habitat condition. (no. assessment)	1	WGCMA, research Institutions
	Implement fish habitat improvement works.		WGCMA, recreational fishing groups
		Estimated cost	\$4,000,000

* Management activity not costed