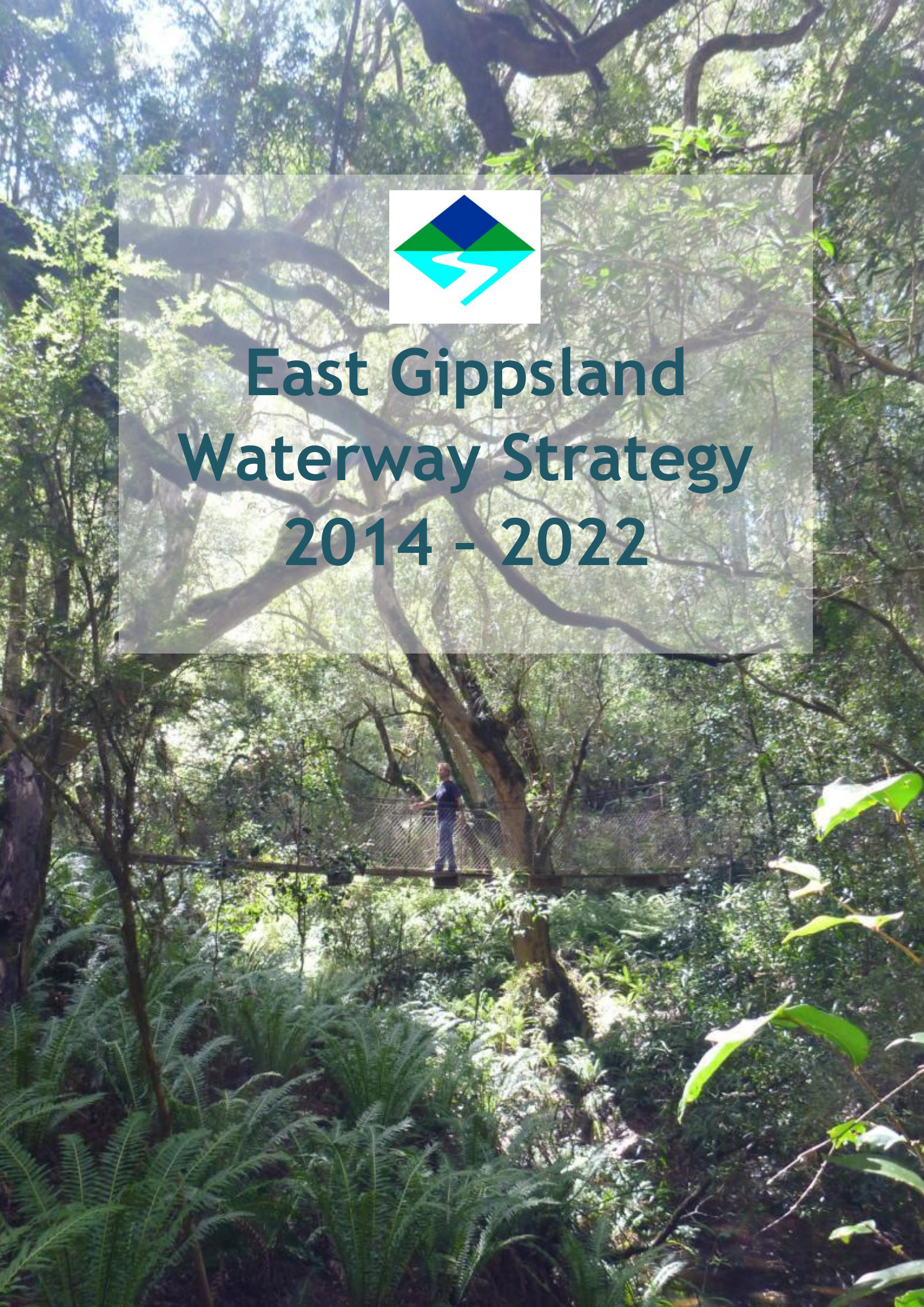

East Gippsland Waterway Strategy 2014 - 2022

Acknowledgement of Country

We acknowledge the contribution and pay our respects to the native title holders, the Gunaikurnai people and to all Traditional Owners and Aboriginal groups and their respective organisations of the land and waterways of the Gippsland and East Gippsland regions and extend this to their elders both past and present, who have made a considerable contribution and effort over the years towards water management.

Published by:

East Gippsland Catchment Management Authority,
574 Main Street,
Bairnsdale. Victoria 3875

Please cite this document as: EGCMA (2013) *East Gippsland Waterway Strategy,* East Gippsland Catchment Management Authority, Bairnsdale.

Specific references to funding levels in this strategy are for indicative purposes only. The level of government investment in this strategy is contingent on budgets and government priorities.

All photos and maps courtesy of East Gippsland Catchment Management Authority.

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Vision

This strategy's vision for the management of East Gippsland's waterways is:

East Gippsland's rivers, estuaries and wetlands are valued and well-managed, so that communities can enjoy the current and future benefits that healthy waterways provide.

Chairman's foreword

This *East Gippsland Waterway Strategy* provides a framework for the East Gippsland Catchment Management Authority; in partnership with other agencies, stakeholders, traditional owners and the regional community to manage our rivers, estuaries and wetlands over the next eight years.

The final strategy considered the feed-back we received during the course of the previous strategy and all submissions received during this strategy development.

Delivery of this strategy through the various initiatives, programs and projects will follow these key engagement principles.

- We will embed community engagement and build partnerships in all that we do
- Our people will be actively supported to engage communities and to build partnerships
- Our community engagement and partnership approaches will be well planned, tailored, targeted, and evaluated
- We will provide meaningful opportunities for our communities and partners to contribute to strategies and initiatives
- We will work transparently and respectfully with our communities and partners, and establish clear roles and expectations

I would like to commend this strategy to the community of East Gippsland on behalf of the East Gippsland Catchment Management Authority Board who are charged with monitoring implementation over the next eight years.

Dr Peter Veenker, Chair

East Gippsland Catchment Management Authority

Summary

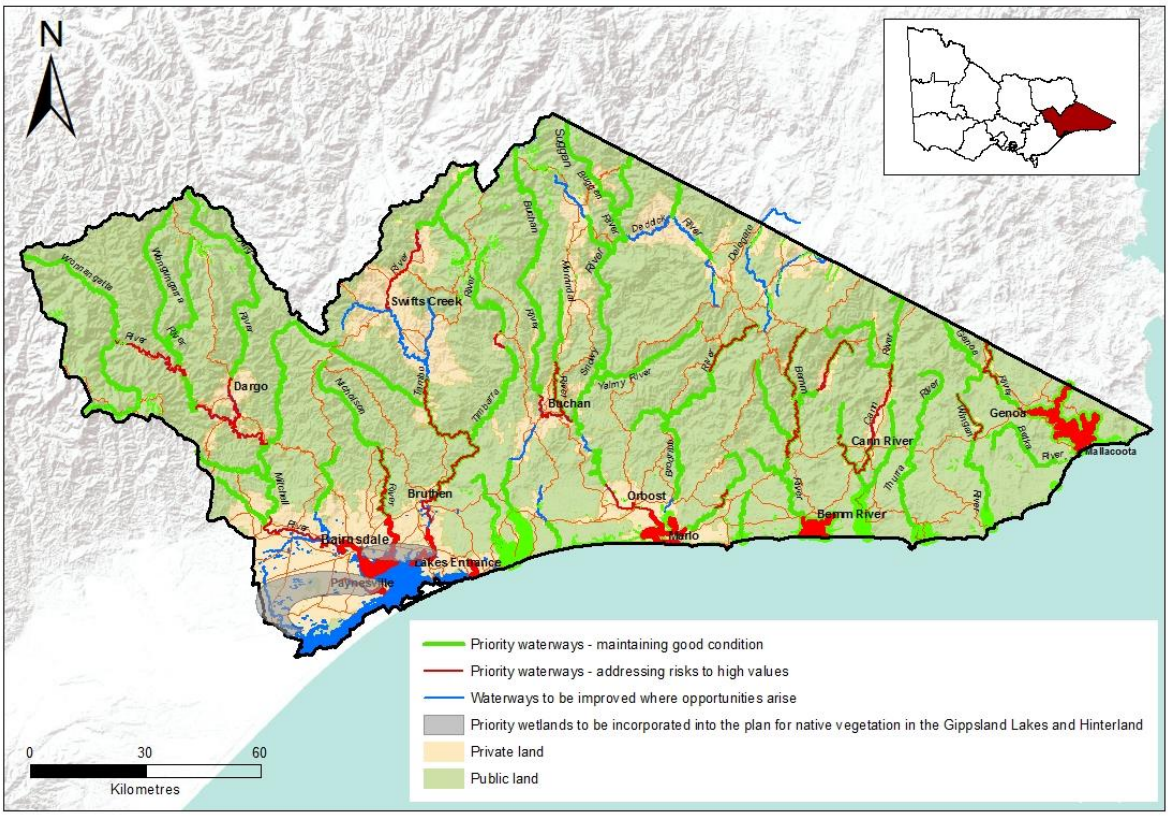

Figure 1.1 Map of the East Gippsland region's priority waterways

East Gippsland's waterways are remarkable 'natural assets' of Victoria, with the highest proportion of streams in 'Excellent' or 'Good' condition in the state (approximately 82%) according to the *Index of Stream Condition* criteria (2010). The region contains a Ramsar listed wetland system (incorporating the Gippsland Lakes and Lake Tyers), six declared 'Heritage Rivers', and many national parks and reserves. A large proportion (~83%) of the region is public land, stretching from sub-alpine environments to the coast.

Our waterways provide many of Victoria's best fishing, swimming, camping, boating and scenic attractions. The health of these waterways underpins many aspects of tourism, jobs and investment in the region.

The purpose of this strategy is to ensure that the future management of our waterways keeps providing these important environmental, social, cultural and economic values. The strategy builds on the *East Gippsland Regional River Health Strategy (2005–2010)*, but has a broader scope, now including the management of wetlands and estuaries as well as rivers.

The strategy provides a framework for the East Gippsland Catchment Management Authority, in partnership with other natural resource management agencies, traditional owners, the regional community and other stakeholders to improve the health of the region's waterways over the next eight years. It delivers key elements of the state-wide approach outlined in the *Victorian Waterway Management Strategy* (DEPI 2013a).

The strategy identifies the region's high value waterways, based on environmental, social and economic values. It identifies six high level regional goals and it identifies priority waterways for targeted management over the next eight years. The prioritisation of waterways was carried out in accordance with the regional goals, by identifying which waterways related to the values represented by each goal, and what the risks were to these waterways. Targets were identified for each priority waterway.

The regional goals are:

1 Maintain the condition of all waterways which are in near-natural condition.

2 Improve the condition of 'regionally important'[1] waterways, defined for their social, economic and environmental values.

3 Maintain or improve the condition of waterways within urban water supply catchments to maximise water quality.

4 Improve the resistance[2] and resilience[3] of waterways within cleared land to reduce the risk of bed and bank instabilities, for public benefit.

5 Manage priority invasive plant and animal species that are damaging the health of waterways, using the biosecurity approach.

6 Where appropriate, improve connections within and among rivers, estuaries and wetlands and between these waterways and terrestrial native vegetation.

The views of the East Gippsland community were collected through ongoing regular consultation with landholders and through two community forums held in March 2013. The views of agencies, stakeholders and traditional owner groups were collected through consultation throughout the development of the strategy. These views, alongside the objectives and guidance of other relevant strategies, such as the *East Gippsland Regional Catchment Strategy* (EGCMA 2013), the *Gippsland Lakes Environment Strategy* (GLMAC 2013), the *Gippsland Sustainable Water Strategy* (DSE 2011) and the *Invasive Plants and Animals Plan* (EGCMA 2011) were also considered in prioritising waterways.

Targets for priority waterway relate to:

- targeted control of priority invasive plant and animal on priority waterways
- establishing priority waterway frontages under a management agreement, and fencing, revegetation and complementary weed control
- investigating the effect of barriers on fish species and prioritising actions in lower Prospect (Boggy) Creek and in the Buchan River and removing the fish barrier on the Nicholson River
- installing waterway structures (rock beaching) on the lower Mitchell, lower Tambo, lower Nicholson and the lower Snowy estuaries.

[1] *For the definition of 'Regionally important waterways' see the glossary*

[2] *The ability of a waterway to withstand erosive forces during high flows*

[3] *The ability of a waterway to recover after disturbance without intervention*

- installing waterway structures (large wood) on the lower Mitchell River and estuary, lower Tambo River and estuary and the lower Snowy estuary
- investigating the stability of, and prioritising actions for, the lower Mitchell River, minor Gippsland Lakes tributaries and on Cobbannah and Tonghi creeks
- monitoring bed stability on Forge Creek
- investigating flow paths into floodplain wetlands and prioritising actions for the lower Mitchell River, Skull Creek, lower Tambo and lower Snowy rivers
- developing and implementing a monitoring plan for the lower Mitchell River and estuary
- working with partners to conduct surveillance and control of priority pest plants and animals in Ewing's Marsh and remote coastal priority wetlands
- developing and implementing rehabilitation plans for the lower Mitchell and Tambo waterways
- completing and implementing a lower Snowy River and wetland monitoring and investigation plan and prioritise actions
- incorporating priority wetlands into the 10-year plan for the establishment and maintenance of native vegetation in the Gippsland Lakes and Hinterland.
- supporting Parks Victoria in implementing the *Victorian Alpine Peatlands Spatial Action Plan* (McMahon et al 2012)
- working with partners to manage community access on the lower Tambo estuary
- implementing the estuary opening protocols on the Lake Tyers and lower Snowy estuaries and on Sydenham and Mallacoota inlets.

Introduction

The waterways – rivers, estuaries and wetlands – of East Gippsland are the lifeblood of our region. The health of our waterways is vital for sustaining our quality of life and the environmental values of the region's significant natural assets.

The region contains a Ramsar listed wetland system (incorporating the Gippsland Lakes and Lake Tyers), six declared 'heritage rivers', and many national parks and reserves, stretching from sub-alpine environments to the coast. It is one of the few places on mainland Australia where such continuity of natural ecosystems – from the alps to the sea – still exists.

Our waterways provide many of Victoria's best fishing, swimming, camping, boating and scenic attractions. The health of these waterways underpins many aspects of tourism, jobs and investment in the region.

The purpose of this strategy is to ensure that the future management of our waterways keeps providing these important environmental, social, cultural and economic values. The 1997 to 2009 drought, recent bushfires and major floods have provided invaluable experiences and lessons that have been incorporated into this new *East Gippsland Waterway Strategy* (EGWS).

The strategy provides a framework for the East Gippsland Catchment Management Authority, in partnership with other natural resource management agencies, traditional owners, the regional community and other stakeholders to improve the health of the region's waterways over the next eight years.

1 Document structure

This document is in two main parts.

Part A (Chapters 1 – 4) provide:

- a regional overview of East Gippsland's waterways, and their environmental, social and economic values
- an overview of the threats to those values
- a discussion of the implications of extreme events such as bushfires and floods
- a list of the achievements in waterway health management over the last eight years since the first *East Gippsland Regional River Health Strategy* was published
- a discussion of the legislation and policy relevant to this document
- a discussion of the roles and responsibilities of partners
- a discussion of the challenges and opportunities in managing the region's waterways
- a discussion of the approach used in developing this strategy
- a review of the *East Gippsland Regional River Health Strategy 2005–2010* (EGRHS).

Part B (Chapters 5 – 8) looks at:

- for individual basins and the Gippsland Lakes
  - values and threats

  - achievements in waterway health improvement since 2004
  - management priorities
  - targets
- how the recommended actions will be carried out
- monitoring, evaluation and reporting, including:
  - identifying gaps in knowledge and the research needed to fill them
  - adaptive management
  - the process for reviewing the effectiveness of this strategy
- the consultation process.

Part A – Context, regional overview and guiding principles

2 East Gippsland's waterways

2.1 Description of waterways

About 83% of the land is in public ownership, mainly as state forests, national and coastal parks, and marine national parks.

The waterways of East Gippsland are in general in much better condition than in other regions of Victoria. Some 82% of total stream length is in 'Excellent' or 'Good' condition, as defined by the *Index of Stream Condition 2010* (DEPI 2013b).

There are 468 km of riparian frontage fenced preventing livestock access to waterways[4].

East Gippsland is one of the few places on mainland Australia where continuity of natural ecosystems – from the alps to the sea – still exists.

Grazing occupies the largest area of private land, and there are significant productive areas of irrigated horticulture and dairying on the floodplains, especially the Snowy and Mitchell rivers.

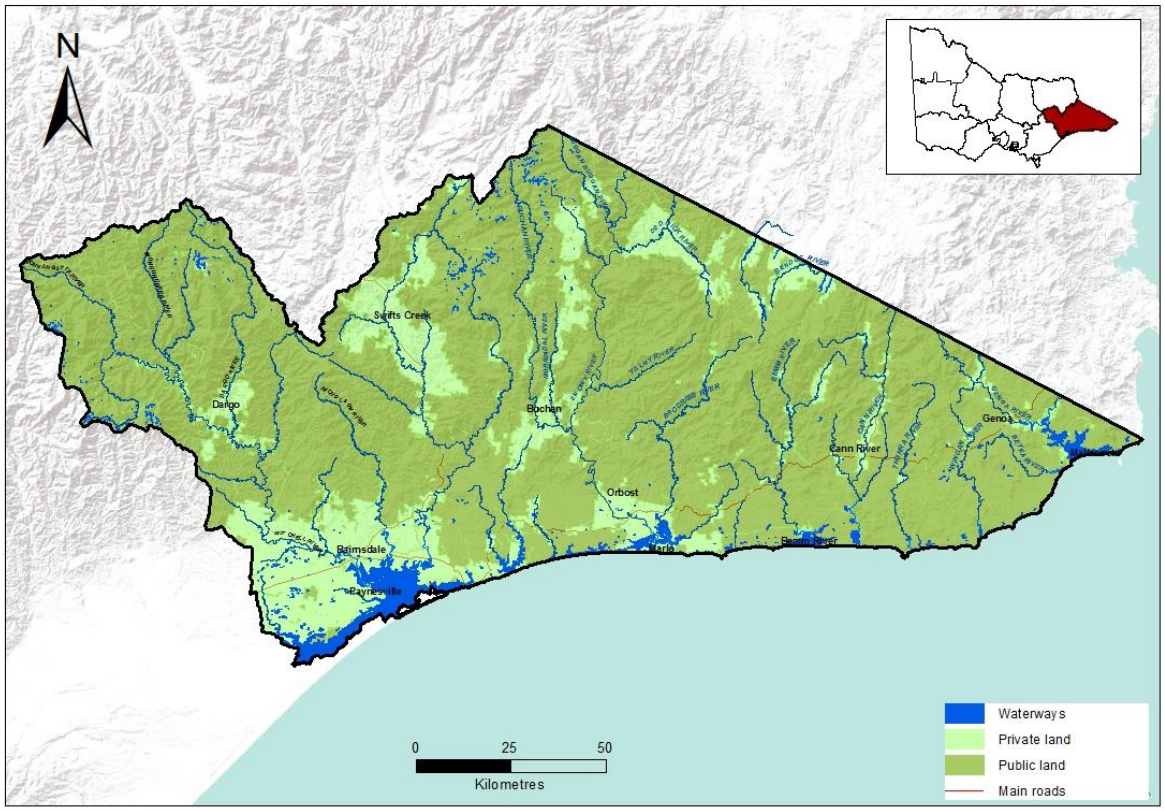

Figure 2.1 Map of the East Gippsland region's waterways

[4] EGCMA Frontage condition fencing data – August 2013

2.2 Overview of values

The rivers, estuaries and wetlands of East Gippsland are remarkable natural assets of the entire Victorian community.

Six of East Gippsland's rivers are listed under the *Victorian Heritage Rivers Act* and the Mitchell River is one of the largest unmodified river systems in the state. Several catchments are almost totally free of human disturbance, and East Gippsland has a higher proportion of streams in 'Excellent' or 'Good' condition, than the rest of the state.

The estuaries of the region include the internationally significant Ramsar listed Gippsland Lakes, the nationally significant Snowy River estuary and Sydenham Inlet and smaller estuaries that are in close to pristine condition. The region's estuaries provide important waterbird habitat, especially during drought. They are also vital for numerous fish species, mostly of recreational significance.

Coastal wetlands are often ecologically associated with estuaries. Many are of national or international importance for waterbirds and provide critical refuge habitat for numerous species of flora and fauna. Wetlands on the plains are generally smaller in size, and often temporary. They are numerous and diverse and support a diverse range of native species, especially invertebrates, waterbirds, frogs, reptiles and plants, including many of national and state conservation significance. Sub-alpine wetlands are also generally small in size at the individual scale, but are distributed over large areas. They are recognised as a 'nationally endangered ecological community' that provides critical habitat for threatened and non-threatened species such as frogs, reptiles and plants. They also regulate the movement of water, sediment and nutrients.

Important community values of East Gippsland waterways include being sources of water for rural and urban use and being a focus for tourism and recreation.

The waterways of east Gippsland are valued by the local community, visitors to the region, and the broader Australian community. The health of these waterways underpins many aspects of regional tourism, jobs and investment, particularly in coastal areas such as the Gippsland Lakes. Fishing, swimming, camping and boating are all popular in East Gippsland.

The region's waterways supply drinking water to our urban centres, and water for stock and for irrigated agriculture.

The wider community are important partners in waterway management in East Gippsland. The EGCMA maintains continuous engagement with the community through numerous activities including community and landholder discussions. Community views on this strategy were sought through community forums at the beginning of strategy development.

2.2.1 Aboriginal culture and Country

Aboriginal people have a strong cultural connection to waterways and to the landscape of the East Gippsland region. Waterways are important and culturally significant places for Aboriginal people for many reasons such as travelling routes, food sources, camping sites, meeting places and for ceremonies and stories.

Protecting cultural heritage and maintaining 'connection to Country' are fundamental to retaining cultural links for present and future generations of Aboriginal people, since their culture and environment are so closely linked.

As part of the development of this strategy, traditional owners groups were widely consulted, building on the consultation conducted and described in the development of the *Gippsland Sustainable Water Strategy* (Technical Report 1: Indigenous Engagement Summary). During consultation a wide range of views were expressed. One theme common to all groups was the importance of respect for Country, culture and environment. Some issues specific to individual groups reflected connections to specific places and different water related aspirations.

Access to waterways

A key aspiration for Aboriginal people is to have access to waterways in their Country. Connection to Country is diminished when Aboriginal people cannot have access to significant and sacred sites. Connection to Country is important for the health of communities, for language and for maintaining the link between these elements and Aboriginal culture. This was emphasised through both previous and present consultations with Aboriginal groups.

Improving Aboriginal capacity, consultation and partnerships

Aboriginal people have a legitimate aspiration to participate in the management of natural resources such as waterways, and this aspiration is acknowledged by natural resource management agencies. Aboriginal participation in natural resource management (NRM) will be improved by meaningful engagement in decision making processes and the encouragement of opportunities for Aboriginal people to work in the NRM sector. Sharing of both current and traditional knowledge between agencies and Aboriginal people will lead to improved management of the environmental health of our waterways.

2.2.2 Native title

In October 2010, the federal court made a determination (FCA1144) that native title exists over much of Gippsland and is held by the Gunaikurnai people (those persons who identify as Gunai, Kurnai, or Gunai/Kurnai). The court recognised the Gunaikurnai Land and Waters Aboriginal Corporation as the sole holder and representative body of these native title rights and interests on behalf of all Gunaikurnai people.

At the same time, the State of Victoria entered into a recognition and settlement agreement with the corporation under the *Traditional Owner Settlement Act 2010*. The agreement includes:

- a number of cultural recognition and strengthening initiatives
- the transfer to joint management of 10 parks and reserves to the Gunaikurnai and establishment of a traditional owner land management board
- rights to use crown land for traditional purposes, including hunting, fishing, camping and gathering in accordance with existing laws
- funding for economic development to meet their obligations under the agreement.

These outcomes settle a native title claim dating back to 1997. The agreement only applies to crown land. There is no effect on private land, and all existing rights and interests in crown lands and national parks are protected.

The Gunaikurnai Land and Waters Aboriginal Corporation is also the appointed Registered Aboriginal Party under the *Aboriginal Heritage Act 2006* for the Gunai/Kurnai native title area.

As the recognised traditional owner entity for the Gunaikurnai native title determination area, Gunaikurnai Land and Waters Aboriginal Corporation is responsible for native title, cultural heritage, land, natural resource management, business, employment, economic development and capacity building matters that affect the Gunaikurnai community.

The areas subject to the Gunaikurnai native title consent determination and settlement agreement are fully detailed in the federal court's formal consent determination. The external boundary of the determination area extends from Yarragon east to Orbost, and from Mt Hotham south to the coast between Toora and Marlo. The Gunaikurnai native title determination area thus extends across most of the western half of the region.

In the east of the region, there are a number of Aboriginal groups asserting interest in claiming recognition as traditional owners.

2.3 Overview of threats

The main threats to waterway values that apply to the whole of East Gippsland are:

- invasive plants, including new and emerging plants
- the spread and increasing populations of invasive animals
- the potential effects of climate change on flow regimes, water temperatures, aquatic and riparian vegetation and the frequency and severity of bushfire.

In the forested uplands of the region, the principal threats to waterway values are invasive plants and animals (particularly weeds). Management of these threats requires integrated management of catchments at a landscape scale (see Section 3.5).

In the Snowy and lower Mitchell rivers, altered flow regimes have significant effects on waterway health.

Within the cleared areas of the region, the main threats to waterway values are:

- degraded habitats caused by loss of native vegetation remnants and clearing of riparian zones
- reduction in water quality and increase in salinity – due to factors such as stock access, floods, bushfires
- altered physical form due to erosion and sedimentation, including the effects of past mining activities
- in the alpine peatlands – bushfire, pest plants, pest animal grazing
- in the wetlands of the plains – clearing, drainage, pest plants, water extraction (surface and groundwater), grazing (livestock and pest animals)

- in the coastal wetlands – sea level rise, clearing, drainage, coastal development, pest plants, grazing (livestock and pest animals).

Additional threats which are specific to estuaries include:

- changed river flow regimes
- inappropriate estuary mouth openings
- sea level rise
- coastal development.

Threats that are specific to individual basins are further described in the appropriate sections of Chapter 5.

2.4 Extreme events

In East Gippsland, floods and bushfires are the 'extreme events' that need to be dealt with. They are both a natural part of East Gippsland's environment. Waterways have evolved with natural flood and bushfire cycles and are adapted to benefit and recover from these periodic disturbances.

2.4.1 Bushfires

Large areas of the region were burnt by the major fires in the 2002–03 and 2006–07 summers in the alpine fires, and more recently in 2011 at Tostaree.

Fire management (including planned burning) is an essential part of the life of the East Gippsland bush. Effective fire management promotes the resilience and health of natural ecosystems by creating desirable growth stage distributions.

However, waterways and their catchments are particularly vulnerable to high intensity large scale bushfires, particularly if they are followed by flooding. This combination of fire and flooding has the potential to transport large quantities of sediments and nutrients from burnt catchments and have a significant effect on waterway health

2.4.2 Floods

Over the last 25 years, East Gippsland has experienced more significant floods than the rest of Victoria. Major floods occurred in the region in 1990, 1998, 2007 and 2011.

Runoff from mountainous catchments travels quickly down the steep and narrow mountain valleys. The resulting floods in the upper catchment build rapidly and have significant power but often do not last long. In contrast, floods in the lowlands of the region typically have longer durations. Drainage of floodwaters from lowland floodplains is often delayed by high sea levels resulting from the same weather situations responsible for the flood-producing rains.

The 2007 flood in the Mitchell river had particularly significant effects on the community and in the Gippsland Lakes. The flood occurred less than six months after the 2006–07 bushfire, and caused large scale erosion, and transport of sediment downstream to the Gippsland

Lakes. Regional urban water supplies, drawn from the Mitchell River, were severely affected for more than six months.

2.4.3 Effects of floods and bushfires

The adverse effects of floods on waterway condition and values are primarily related to accelerated rates of river channel erosion, which can be exacerbated by past clearing of native riparian vegetation. This type of damage includes:

- avulsion (the abandonment of the main river channel in favour of a new course)
- erosion and mobilisation of sediment resulting in:
  - channel widening
  - infilling of large pools by sediment
  - loss of vegetation and in-stream habitat
  - infrastructure damage
- damage to native riparian vegetation
- loss of large wood for in-stream habitat
- loss of or damage to fences protecting riparian vegetation.

Floods can also:

- affect estuaries and wetlands, primarily by carrying large amounts of sediment and nutrients into them, especially after bushfires.
- accelerate the spread of invasive species
- cause debris to accumulate above bridges or culverts, threatening their integrity
- cause waste from sewage treatment facilities to enter waterways
- kill livestock and destroy various high value crops.

2.4.4 Reducing the adverse effects of floods and bushfires on waterways

The damage to waterways caused by floods can be reduced by works such as erosion control works and small grade control structures, and by measures which protect or improve vegetation on river banks, such as fencing, revegetation, native vegetation improvement, weed management and provision of off-stream stock watering infrastructure.

If significant flood damage has occurred to waterways, flood recovery activities may be necessary with the provision of additional government funding.

Fire management aims to protect water supplies and their catchment from large scale bushfires. Fire recovery activities in East Gippsland need to be timely and effective, as floods following large bushfires have high potential to affect communities and environments by transporting large quantities of sediment and nutrient from burnt catchments and assisting the wider spread of invasive plants.

2.5 Achievements 2004-2012

The EGCMA captured the intent of the previous River Health Strategy priorities in a series of 'catchment goal' targets, which set five-year targets for mitigating the major threats to rivers across East Gippsland. The following management achievements were made against these targets by the EGCMA. These have contributed to improvements in waterway health in East Gippsland:

- In 2010, 82% of waterway length was rated in 'Excellent' or 'Good' condition (Victorian Index of Stream Condition) up from 77% of waterway length in 2004
- 96% of willow treatment targets and 59% of fencing targets, set as catchment goals by the EGCMA, were achieved
- 100% of revegetation targets for the Snowy floodplain reach and 34% of revegetation targets for the Nicholson catchment, set as catchment goals by the EGCMA, were achieved
- willow control was carried out on over 80% of rivers
- revegetation and complementary weed control was completed on 330 km of riparian frontage (approximately 5% of total riparian frontage)
- 464 large wooden structures were installed into river beds (to improve fish habitat)
- 8,853 engagement activities and community and landholder discussions took place[5].

3 Context

3.1 Legislation and policy

The preparation of the *East Gippsland Waterway Strategy* is a statutory requirement under the *Water Act 1989*. This strategy will replace the *East Gippsland Regional River Health Strategy* (EGCMA 2005). The EGWS has been prepared in accordance with the *Victorian Waterway Management Strategy* (VWMS; DEPI 2013a), the *East Gippsland Regional Catchment Strategy* (EGCMA 2013) and the G*ippsland Region Sustainable Water Strategy* (DSE 2011).

The *Victorian Waterway Management Strategy* updates the *Victorian River Health Strategy* (VRHS; NRE 2002) and provides the framework to guide the EGCMA in partnership with the community, to manage rivers, estuaries and wetlands to support environmental, social and economic values. It aims to ensure that water and waterways are managed in accordance with the relevant Victorian Government policies listed below.

The *East Gippsland Regional Catchment Strategy*, updated in 2013, is the overarching strategy under which are a range of sub-strategies and action plans, (such as this EGWS) for the East Gippsland region. The long-term objectives and priorities for action in the East Gippsland RCS that relate to waterways will be implemented through the EGWS.

[5] EGCMA ACE database

The G*ippsland Region Sustainable Water Strategy* developed in 2011, investigates the range of potential changes to water availability under several climate change scenarios, examines future consumptive demand and environmental needs and sets out proposed options to balance and secure water for all users.

Other important federal and state government legislation, policies and initiatives relevant to the preparation of the EGWS and considered during the development of this strategy are shown in Appendix 1.

3.2 Functions of the EGCMA

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

The main business undertakings of the Authority in achieving the vision of the Regional Catchment Strategy for 'a rich, biologically diverse region, managed on sound scientific principles in a way that responds to the values and needs of its human communities; a place where residents and visitors alike respect and conserve its natural wealth, as a foundation of the well-being; a place whose people, acting for all Australians, accept collective responsibility for the region's future' are set out in governing legislation. These are:

1. *CALP Act 1994*:

Coordinating the Regional Catchment Strategy and supporting plans

We complete the Regional Catchment Strategy and associated action plans and oversee implementation, monitoring and evaluation.

Community Engagement

We help build government and community cooperation in maintaining our natural resources.

2. *Water Act 1989* - Caretaker of River Health:

On-ground river health works

We oversee river health works guided by the Regional River Health Strategy through our own contractors, partner agencies and organisations.

Statutory Functions

We license works on waterways and assess planning referrals on floodplains.

Community Engagement

We help build government and community cooperation in maintaining and improving the health of our rivers.

Under Part 10 of the *Water Act 1989*, CMAs are also designated with specific responsibility for the management of waterways, drainage and floodplains.

The functions that CMAs undertake include:

- 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, licences to take and use water and construct dams, for water use and other waterway health issues
- identifying regional priorities for environmental watering and facilitating water delivery
- providing input into water allocation processes
- developing and coordinating regional floodplain management plans
- responding to natural disasters and incidents affecting waterways such as bushfires, floods and algal blooms
- undertaking community participation and awareness programs.

3.3 Review of the River Health Strategy 2005–2010

3.3.1 Catchment goals

After the release of the *East Gippsland Regional River Health Strategy*, the EGCMA developed a number of 'catchment goals' in 2007. These were a series of high level goals derived from the strategy, to be achieved between 2007 and 2012. These goals provided a more suitable target framework for monitoring, evaluating and reporting than the targets highlighted in the Regional River Health Strategy. The goals were developed by examining the highest priority threats outlined in the strategy and developing some achievable landscape scale targets to address these threats.

3.3.2 Review

In 2008 the EGCMA commissioned Alluvium Consulting to evaluate progress towards targets contained in the EGRHS to date. The scope of the review included evaluation of the catchment goals and the effectiveness of waterway management activities and works undertaken in that period. This review is documented in Travis et al. (2008).

The main findings of the review were that:

- the catchment goals:
  - link to the regional priorities outlined in the EGRHS
  - address high priority threats
  - focus the EGCMA efforts in an appropriate direction to achieve good river health outcomes for the region
- some of the catchment goals were in need of further refinement.

However, the initial targets set in the EGRHS were found to be:

- unrealistic
- too numerous, detailed and unnecessarily complex
- unsuitable for implementation

- difficult to measure progress against (in particular measurement of change in resource condition against which targets were set).

Field assessments of on-ground work were evaluated and most were found to be of a high standard. Alluvium Consulting made a number of recommendations to address any issues identified.

A number of further recommendations were made, relating to revising the catchment goals, developing activity plans at a reach scale, increasing the focus on fostering relationships with landholders, evaluating the effectiveness of projects over time and improving the implementation of on-ground works.

Based on these recommendations:

- the catchment goals were appropriately revised
- annual planning at the reach scale is now conducted, continually updated and implemented
- monitoring and evaluation of projects was improved by conducting condition assessments of past works to evaluate progress over time.

All the recommendations on improving the implementation of on-ground works were carried out.

3.3.3 Achievements against targets between 2004 and 2013

Between 2004 and 2013, the EGCMA has been very successful at meeting the catchment goals.

Catchment goal	% of target achieved
Willow treatment	96
Fencing	59
Revegetation (Nicholson River)	34
Environmental water reserve establishment	100

As outlined in Section 3.3.2, the targets set in the EGRHS in 2005 were unrealistic.

However a coarse assessment of the achievements against these targets was made.

Target	% of target achieved*
Willow management	90
Riparian weed management	70
Revegetation	30
Presence of trout	100
Presence of carp	0
Water quality monitoring	50
Bed and bank stability management	40
Environmental water reserve	100

Target	% of target achieved*
establishment and flow studies	
Algal blooms	50
Fish barriers	50

**rounded to nearest 10%*

The reason that more than 40% of the EGRHS targets weren't achieved was that they were no longer considered appropriate and were not retained as strategic priorities when the catchment goals were developed.

A number of riparian weed management targets were related to treatment of poplar, which was no longer considered a priority weed as its invasiveness, distribution and effect on river health were not as severe as other weeds such as willows.

The majority of revegetation targets were not completed because natural regeneration was possible at many sites from naturally available seed sources.

A small number of the targets within the river health strategy related to carp removal which is not technically feasible.

A final review of the EGRHS was not conducted. This was because the catchment goal targets which were derived from it replaced the targets from the river health strategy in providing strategic direction.

3.3.4 Incorporation of knowledge gained from reviews of the EGRHS

The Department of Environment and Primary Industries (DEPI) also commissioned a review of all nine regional river health strategies (DSE 2007a). The recommendations of this review were considered together with those from Alluvium Consulting and with comments from staff about the past river health strategy and catchment goals, when developing this new strategy.

These factors are described below:

- The EGRHS clearly documented how it was developed, how priorities were identified and what assumptions were made (DSE 2007a). Although there were clear links between the vision, regional priorities and targets, these were not described, and a future strategy would benefit from a clear program logic linking the vision, regional priorities and targets at different scales.
- The cost and time estimates to implement all the originally targeted actions were unrealistic (Travis et al. 2008). Future targets should be achievable (based on past expenditure) within the timeframe of the strategy.
- Targets set in the EGRHS were too numerous, unnecessarily complex and difficult to measure progress against. The catchment goals which replaced them were much more appropriate. Therefore, as was the case with the catchment goals, targets in this new waterway strategy should be:
  - clear, succinct and measurable (based on actions and not on condition change, which is difficult to quantify)
  - set at an appropriate scale for more effective implementation (reach level targets were too detailed and regional scale targets were too high level)

  - capable of being adapted when extreme events occur, including being able to take advantage of any opportunities that may arise after the event (e.g. pest plant management).

- The monitoring of targets should be outlined within the strategy.

3.4 Opportunities and challenges

3.4.1 Opportunities

The unique nature of East Gippsland, with more than 80% of land area in public ownership, as principally state forests and national and coastal parks, provides a number of opportunities for waterway health management:

- the ability to work on a larger spatial scale, over longer timeframes, and take a 'whole of catchment' scale perspective, from the headwaters to the receiving environment
- the ability to be more strategic in pest management, working on causes, not just reacting to symptoms:
  - prioritising 'new and emerging' threats while eradication is still an option
  - working on pathways of spread of invasive plants
- the ability to work in partnership with other public land managers to address landscape scale threats
- the feasibility of reconnecting river corridors and wetlands within catchments that are largely forested, with few cleared sections where small communities exist.

3.4.2 Challenges

Access into much of the area is limited, with many river and stream reaches accessible only on foot or by paddling. There are a number of small, isolated communities along remote river valleys, particularly in the north and east of the region. Particular challenges include:

- the difficulty of managing waterways in this large, remote and inaccessible landscape
- the landscape-scale magnitude of many of the threats
- the logistics of surveillance and monitoring
- the small populations within isolated communities.

3.5 Management of invasive plants and animals

The EGCMA defines objectives for our response to invasive plants and animals in the *East Gippsland Invasive Plants and Animals Plan*, based on the bio-security approach.

The bio-security approach recognises the benefits of prevention and early intervention in the management of invasive plants and animals. It is based on risk management principles which highlight that prevention and eradication of new high-risk species will generally be more cost effective than managing invasive species once they have become widely established.

In East Gippsland, with many high quality assets in good condition, such as national parks, the rationale for early intervention is particularly strong. Acting early, while infestations are small and manageable is a very effective and efficient approach to maintain the values of these high quality assets.

The EGCMA's invasive plants and animals plan presents four goals:

Goal 1:Foster partnerships among landowners and land managers for effective management of invasive plants and animals in East Gippsland

Goal 2: Prevent the introduction of new high risk invasive plant and animal species

Goal 3: Eradicate, or contain, specific high risk invasive plants and animals

Goal 4: Protect high value assets of the region from invasive plants and animals threat.

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4 Approach

4.1 Overview of approach

This waterway strategy was prepared in accordance with the requirements of the *Victorian Waterway Management Strategy* (DEPI 2013a). As shown in Figure 4.1 there is a hierarchy of detail in the document, going from the broadest level of the 'regional vision' to the finest level of 'activity targets'. The program logic underscoring this approach is described in Section 7.1.

At a regional scale, the 'vision' describes the long-term aim of waterway management. The 'regional goals' (Section 4.2) help to identify priority values and threats, and in identifying priority waterways, through a value and risk based prioritisation process.

At a waterway scale, the strategy proposes 'long-term condition targets', 'management outcome targets' and 'activity targets' for each of the priority waterways identified through the prioritisation process.

Information on environmental, social and economic values of waterways and on threats to waterway health were collected at various scales within the 'Aquatic value identification and risk assessment' (AVIRA) framework and database, where risks were assessed.

This risk assessment framework, combined with the guidance provided by the regional goals, helped to first identify priority waterways and then identify all three levels of targets associated with the priority waterways, illustrated in Figure 4.1

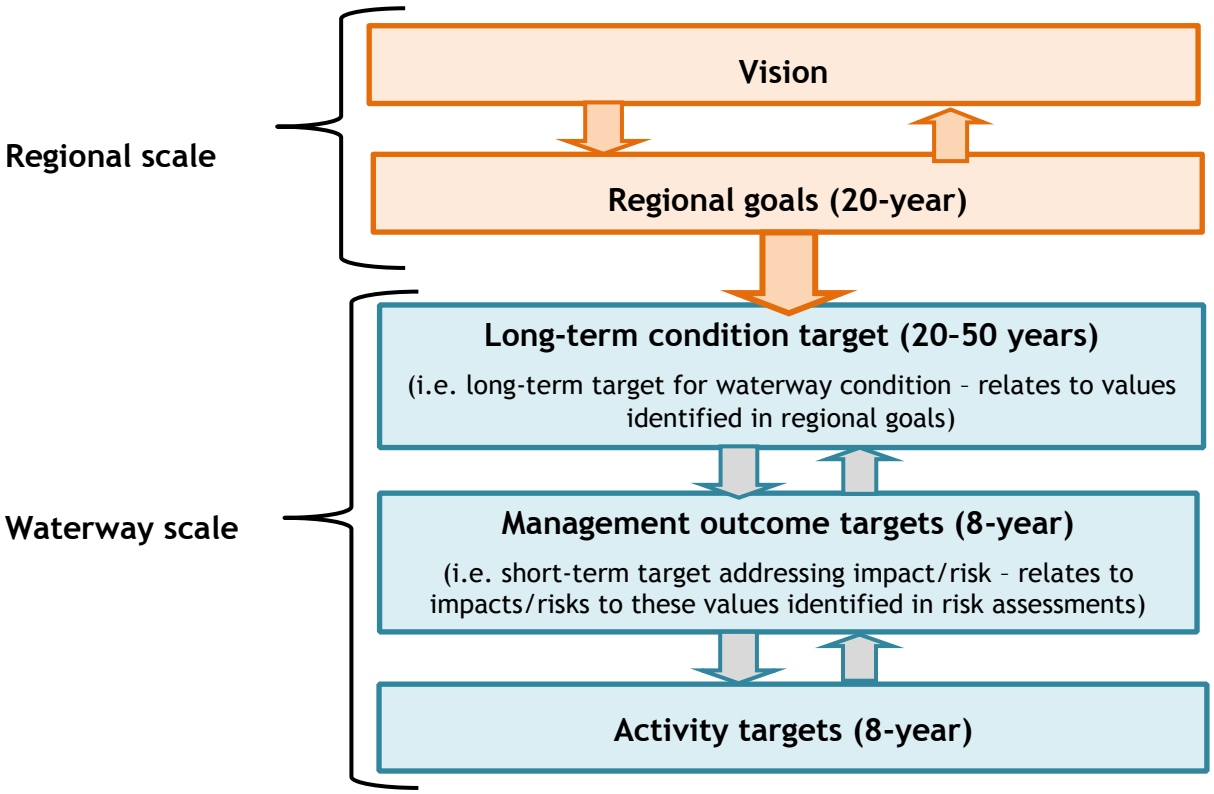

Figure 4.1 Logic framework, linking vision, regional goals and targets

4.2 Regional goals

To achieve its vision, the EGCMA has defined a series of 'regional goals' to assist in prioritising waterways and activities. The goals apply to a 20-year timeframe and are linked ***up*** to the vision and ***down*** to the targets (condition, outcome and activities) within the logic framework. The six regional goals are listed in the box.

1 Maintain the condition of all waterways which are in near-natural condition.

2 Improve the condition of 'regionally important' waterways[1], defined for their social, economic and environmental values.

3 Maintain or improve the condition of waterways within urban water supply catchments to maximise water quality.

4 Improve the resistance[2] and resilience[3] of waterways within cleared land to reduce the risk of bed and bank instabilities, for public benefit.

5 Manage priority invasive plant and animal species that are damaging the health of waterways, using the biosecurity approach.

6 Where appropriate, improve connections within and among rivers, estuaries and wetlands and between these waterways and terrestrial native vegetation.

[1] *For the definition of 'Regionally important waterways' see the glossary*

[2] *see the glossary*

[3] *see the glossary*

4.3 Guiding principles

In addition to the regional goals, the following principles guide the development and implementation of management programs within the strategy:

- **Community engagement and partnerships** - The following principles underpin our approach to community engagement and the establishment and management of our partnerships. They reflect our focus on achieving integrated natural resource management through effective facilitation and coordination. Our CMA strategies, initiatives, programs and projects will all evidence these principles at work.
  - We will embed community engagement and build partnerships in all that we do
  - Our people will be actively supported to engage communities and to build partnerships
  - Our community engagement and partnership approaches will be well planned, tailored, targeted, and evaluated
  - We will provide meaningful opportunities for our communities and partners to contribute to strategies and initiatives
  - We will work transparently and respectfully with our communities and partners, and establish clear roles and expectations

- Waterway management will continue to be a partnership between government, industry, non-governmental organisations, community groups, and the broader community. Communities will have the opportunity to be involved in all phases of waterway management.
- **Integrated catchment management** – management of waterways will occur within a broader framework of integrated catchment management, recognising the importance of waterways as a connection between catchments, coasts and the receiving marine environment, groundwater, and the influence of land use and catchment condition on waterway condition.
- **Appropriate tools** – the full complement of available tools and approaches will be considered for improving waterway condition, including: direct investment in on-ground works, grant and incentive programs, management agreements and covenants, market-based instruments, information and extension program, and regulatory controls.
- **Value for money** – investment will be directed to management actions that provide the most efficient and effective long-term improvements in waterway condition and the greatest community gain (including opportunities for multiple benefits).
- Development and implementation of this strategy will:
  - facilitate regional decision making with community input
  - incorporate a risk-based approach to identify 'high value waterways' and priority management actions
  - consider environmental, social and economic values of waterways
  - integrate on-ground works with the management and delivery of environmental water
  - ensure efficient and effective management of the environmental water reserve
  - include maintenance as a vital activity to secure both past and future investment in on-ground works
  - be flexible in response to seasonal climatic variation and plan for the potential effects of climate change.
- **Evidence-based decision making** – best available knowledge will underpin decision making, policy and waterway management programs.
- **Adaptive management** – policy and programs are part of a broader framework of adaptive management (supported by effective monitoring, reporting, evaluation and research) to ensure continuous improvement.
- **Cross-boundaries and borders** – improve cross-boundary and cross-border cooperation, particularly where critical to achieving regional goals.
- **Resistance and resilience** – through the establishment of suitable in-channel and riparian vegetation, waterway management activities will aim to:
  - increase the capacity of waterways to resist damage during floods
  - increase the resilience of waterways, (i.e. their ability to recover after floods, without intervention).

- **Structural interventions –** will only be deployed where:
  - the establishment of in-channel and riparian vegetation cannot provide adequate stability to the waterway; or,
  - where the magnitude of the direct risk to public infrastructure justifies such intervention.

4.4 Prioritisation and strategy development

The region's priority waterways and targets were identified through a sequence of steps, illustrated in Figure 4.2 . Using the regional goals, the 'high value' waterways were determined, based on their social, economic and environmental values (described in Section 4.5). The information on values was collected and input into the AVIRA database. This provided an initial list of priority waterways in the region.

Next, each regional goal was examined and the important values relating to each goal were identified (using the information collected in the AVIRA database). Waterways where these values occurred were selected for further prioritisation.

The risks to these particular values (relating to the regional goals) were then assessed within the AVIRA framework. The technical feasibility of addressing these risks, and the confidence that the threat was related to the decline in value were also considered in the assessment. Waterways identified with 'near-natural' condition were identified at this stage, and categorised as priority waterways for maintaining good condition (priority waterways with low risk to values, Table 4.1). Waterways with high values and high risks to values were also identified at this point.

After the risk analysis, several other factors were considered. These were:

- Are there already works in progress in this waterway, and what stage is the work at?
- Has there been past investment of public money in the waterway – was it successful and is it functioning well?
- Is the waterway close to a threshold of change or 'tipping point' (e.g. is there a high risk of the waterway channel changing course, or erosion being initiated?).
- Is the local community likely to support working to a successful outcome?
- Is an investigation into the identified risks required? Is the cause of the risk understood?
- What is likelihood of the intervention being successful? Is it good value for money?
- What are the consequences if nothing is done?
- Does the waterway cause a risk to another priority waterway?
- Is the waterway mostly in a forested catchment, with some relatively small gaps where connectivity could be improved?
- In the case of estuaries, is the shoreline retreating? Is this a natural process?

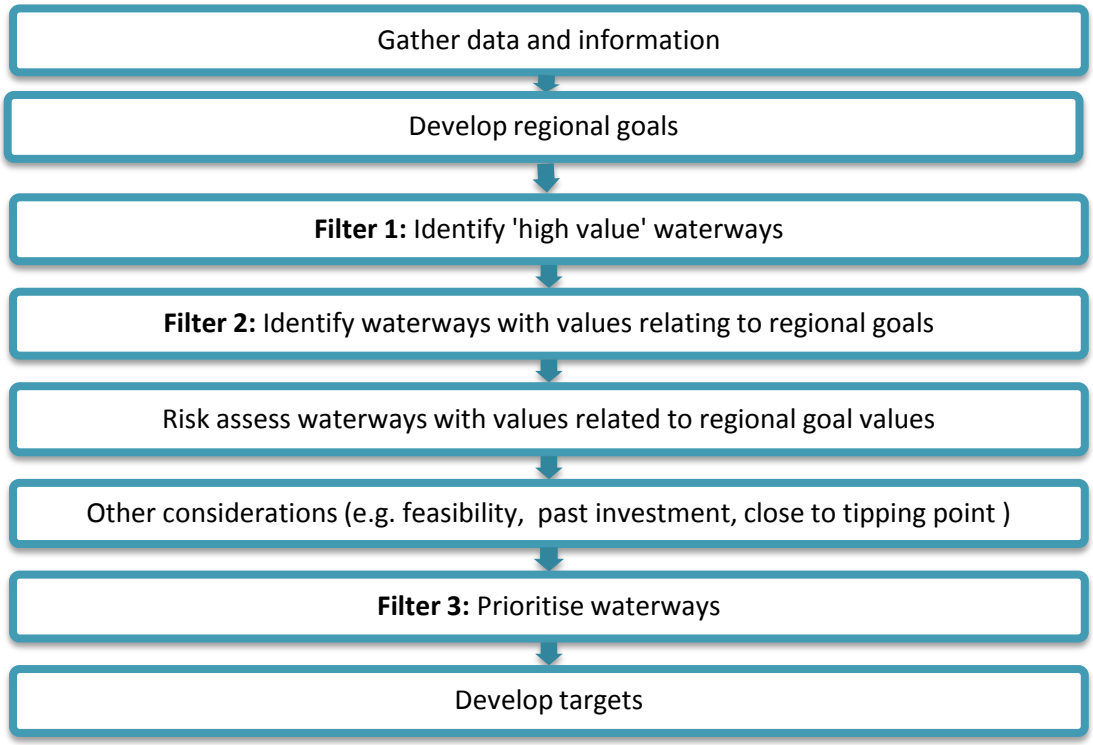

Figure 4.2 Process for identifying priority waterways and targets

The final list of priority waterways was then developed by considering the results of the risk analysis and the 'other considerations' described above. Broad categories of management activities were then determined for the priority waterways, using the criteria described in the *Victorian Waterway Management Strategy* (reproduced below in Table 4.1).

Targets were developed for the priority waterways, using the guiding principles, the risk analysis and the 'other considerations'.

Table 4.1 Summary outcomes of the priority setting process provided in the Victorian Waterway Management Strategy

	Low risk to values	High risk to values
Priority waterways	Management activities to maintain waterway condition	Management activities to reduce threats to waterway condition
Other waterways	Not a priority within the eight-year planning period	Management activities only if they: • reduce threat to high value waterways • provide connectivity • protect public infrastructure or reduce risks from extreme events • maintain or strengthen community commitment to improving the condition of local waterways • are required to meet statutory or regulatory obligations

4.5 High value waterways

The *Victorian Waterway Management Strategy* defines 'high value waterways' as having one or more of the following characteristics:

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

High value waterways include waterways important for their high social and economic values, as well as waterways with high environmental values, including those in near-natural and ecologically healthy condition.

Individual high value waterways were identified using information on the values of each river, estuary and wetland system. Information was collected at different scales, for example, data on rivers was gathered at a 'reach' scale (as defined through the *Index of Stream Condition*), data on estuaries was collected at an individual estuary scale, and data on wetlands was grouped at a sub-catchment scale.

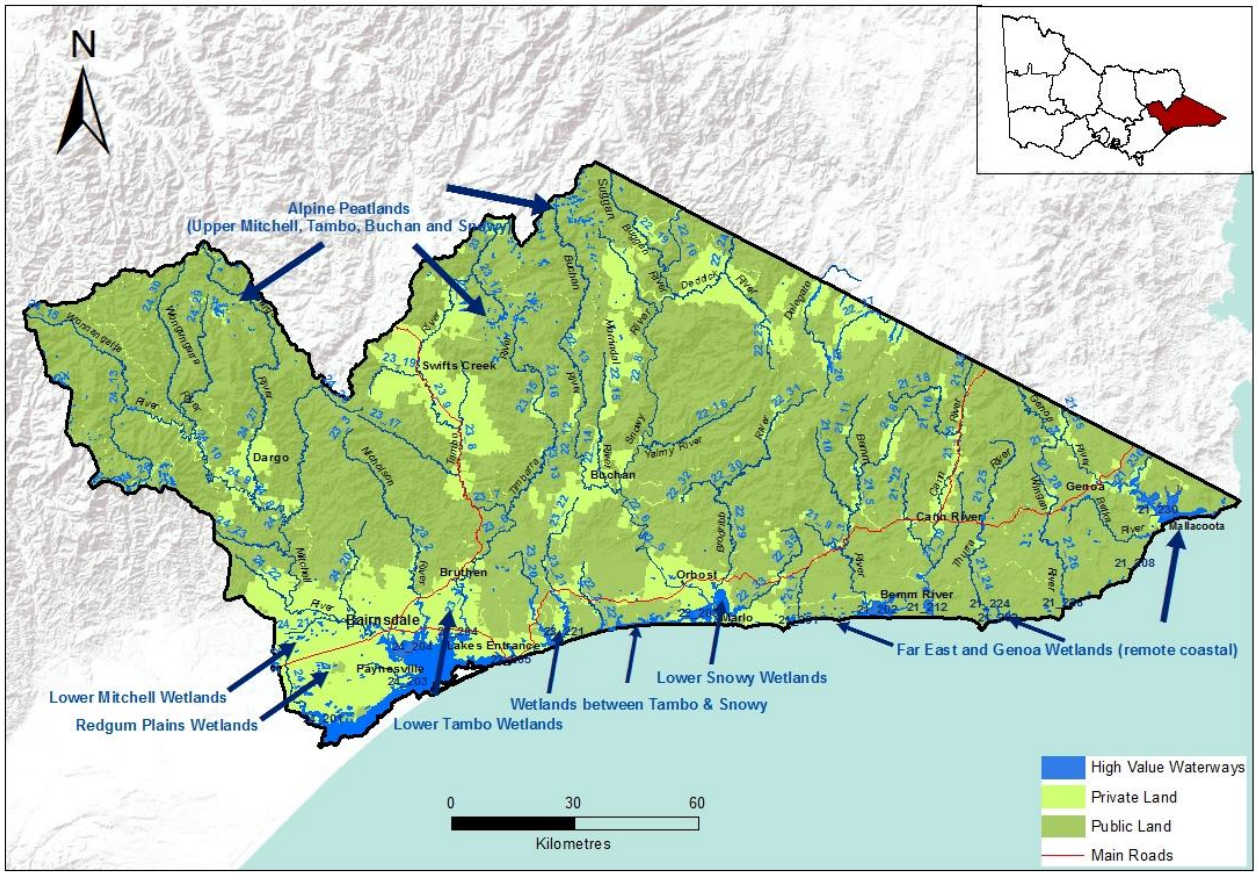

Figure 4.3 Map of East Gippsland's high value waterways

Part B – Waterway health programs and priorities

5 Priority waterways and targets 2014–22

This section looks at the priority waterways and targets for:

- the Mitchell Basin
- the Tambo Basin
- the Gippsland Lakes
- the Snowy Basin
- the Far East Basin

5.1 Scale and types of priorities

5.1.1 Scale of prioritisation

Rivers, estuaries and wetlands are prioritised at different scales, based on how information on values and risks was collected.

Rivers are prioritised at a 'reach' scale, the length of which is based on the natural features of the river or the adjacent land use. Reaches used in the development of this strategy are those used for *Index of Stream Condition* monitoring.

Estuaries are prioritised at a system scale. For example, the whole lower Snowy estuary is treated as one system, although it extends up into the Brodribb River and Cabbage Tree Creek catchments.

Wetlands are prioritised at a sub-catchment scale. For example, the values of all the wetlands of the Redgum Plains were examined together, and those with known high values were mapped as the priority wetlands and risk assessed together. Therefore, the priority wetlands within the Redgum Plains are treated as one entity.

5.1.2 Types of priorities

Priority rivers, estuaries and wetlands were identified based on the prioritisation process outlined in Section 4.4. Two broad types of priority were identified.

The first type of priority relates to maintaining good condition (i.e. those with 'low risk to values' in Table 4.1) which are associated with the first regional goal 'maintaining the condition of waterways in near-natural condition'. This priority relates to those waterways within forested catchments.

The second type of priority relates to those waterways with high values and high risks (i.e. those with 'high risk to values' in Table 4.1). The waterways have values associated with one of the regional goals where the value identified within the goal is at risk. These waterways are within cleared land.

Some priority waterways have both types of priority associated. These are waterways with both cleared and forested sections, both considered a priority. Note that there may be forested reaches with cleared sections, where the cleared section is not considered a priority.

5.2 Development of targets

Targets were developed for each of the priority waterways. Activity (output) and outcome targets were developed based on the results from the risk analysis of each priority waterway, conducted using the AVIRA framework and database. They were also informed by the guiding principles, the consultation process with partners and the community, as well as by the 'other considerations' outlined in Section 4.5. Long term condition targets were informed by the assumptions outlined in the conceptual models for rivers and estuaries (DSE 2012a).

5.3 Fishery management priorities

On 5 December 2013, Fisheries Victoria and the EGCMA convened a public workshop, advertised regionally, with key recreational fishing representatives and community members. The purpose of the workshop was to identify fisheries management priorities for the region, related to the improvement of fish habitat and overall waterway health, aligning with the purpose of the EGWS. The proposals from this forum were reviewed by Fisheries Victoria against Fisheries Victoria's strategic priorities project feasibility criteria and are captured as fishery management priorities. The outcomes of this workshop builds on past fishery management planning processes, in particular the East Gippsland Fishery Management Plan (DPI 2012), Lake Tyers Fisheries Reserve Management Plan (DPI 2007) and Mallacoota Inlet Fisheries Reserve Management Plan (DPI 2006).

1. Promote recreational fisher awareness of, and participation in, Regional Waterway Strategy actions through recreational fishing peak bodies, regional consultation forums and public media.
2. Promote recreational fisher awareness of, and engagement in, the management of the Lake Tyers Coastal Park regarding angling, camping and vehicle access and culturally and linguistically diverse signage
3. Support the revegetation, fencing and strategic access to riparian strips of key river reaches as specified in the EGCMA Regional Waterway Strategy (e.g. Lower Tambo, Mitchell and Nicholson Rivers).
4. Identify, review and further investigate the critical habitat needs of key recreational fish species (e.g. juvenile and adult black bream) and seagrass health in key recreational fisheries of the EGCMA region (e.g. lower Gippsland Lakes).
5. Work with recreational fishers and the EGCMA to remove key fish barriers to fish migration and habitat use (e.g. Nicholson Dam).
6. Recognise and promote partnerships between recreational fishers and natural resource advocacy groups (e.g. Fishcare, Waterwatch, Landcare, Fish Habitat Network etc.) to improve waterway health.

5.4 Waterways of the Mitchell Basin

5.4.1 Description

Figure 5.1 Priority waterways in the Mitchell Basin, displaying ISC reach numbers

The Mitchell River rises in the Great Dividing Range near Mt Hotham and flows into the Gippsland Lakes some 10 km south of Bairnsdale. The basin area is 5,042 km^2 (504,200 ha), of which 74% is public land. The basin includes some streams, such as Toms Creek and Forge Creek, which are not tributaries of the Mitchell River.

Apart from small areas of cleared land along the Dargo and Wonnangatta rivers, the upper catchment is predominantly forested public land.

At Tabberabbera the river enters the Mitchell River National Park where it flows through spectacular gorges. Below the national park, the river enters its floodplain. In this section, the river has cut a steep sided valley over three kilometres wide in places. Sediment deposits here have made this a fertile area for intensive agriculture.

The large catchment area, steep gradients in the upper section and the relatively short distance between the upper catchment and the floodplain lead to rapid increases in river levels after heavy rain.

The Mitchell River contributes substantial flows to the Gippsland Lakes so the health of its catchment is important in maintaining the condition of the Ramsar listed lakes and fringing wetlands.

The basin is a proclaimed water supply catchment upstream of the water supply off-take at Glenaladale.

Alpine peatlands, commonly referred to as ‘bogs’ and ‘fens’, occur in drainage lines, seeps or sheltered areas on the high altitude parts of the upper Mitchell catchment (Snowy Plains within the Mitchell catchment and the Dargo High Plains). Wetlands in the lower Mitchell Basin can be divided into two distinct types: floodplain ‘billabongs’ on the floodplains that are filled by overbank flooding, and swamps, marshes and isolated depressions or drainage lines that are seasonally filled by rainfall but not by river water.

5.4.2 Values

Environmental values

Table 5.1 shows the 2010 *Index of Stream Condition* (DEPI 2013b) assessment compared to the 2004 assessment. The areas rated as ‘Moderate’ were in cleared areas in the floodplain along the Lindenow Flats and Skull Creek, along Toms Creek and along Forge Creek.

Table 5.1 Reach condition in the Mitchell Basin based on ISC criteria

Index of Stream Condition	Excellent or Good %	Moderate %	Poor %
2010	88	12	0
2004	72	25	3

Condition improvements were most evident in many cleared areas in the upper catchment, and in upstream sections of the tributaries in the lower catchment (such as Prospect Creek and Iguana Creek).

The Mitchell River was recognised as a 'heritage river' by the Land Conservation Council in 1991 for its social and environmental values. It was also nominated as an 'iconic' river in the *Victorian River Health Strategy* (NRE 2002) due to its high conservation value, naturalness of flows and size.

In addition, the Land Conservation Council nominated four sub-catchments in the basin as 'essentially natural catchments'.

Some of the important environmental values associated with waterways within the basin are:

- warm temperate rainforest in the Mitchell gorge
- Australian Grayling habitat
- native fish diversity including regionally significant populations of river blackfish and Australian bass
- the essentially natural conditions of the Mitchell River in the gorge
- significant remnant vegetation near rivers and in and adjacent to wetlands, at Tom's Creek and Forge Creek
- the 'chain of ponds' morphology of lower Toms Creek
- Alpine and Mitchell River national parks.

Social values

The Mitchell River and its basin are an important social asset. The community values the river and the lakes into which it flows for fishing, canoeing, boating, camping, hiking, sporting activities, picnics, sightseeing and game hunting.

Many community groups, such as Landcare and angling clubs, are involved with improving the health of the river.

Economic values

There is highly productive agricultural land adjacent to much of the river, in particular the Lindenow Flats which are used for intensive vegetable growing. The river is also an important source of water for urban and rural communities.

5.4.3 Threats

The principal threats to environmental, social and economic values in the waterways of the Mitchell Basin are:

- the spread and increasing populations of invasive animals
- invasive plants
- increasing salinity in the estuary and wetlands
- degraded water quality (nutrients and sediment)
- the effects of grazing stock on riparian and wetland vegetation
- altered freshwater inflows and wetland wetting/drying cycles

- loss of native vegetation remnants and clearing of riparian and wetland buffers
- soil compaction, salinity and erosion
- disturbance of acid sulfate soils
- changes to land form and local drainage including small dam construction, land levelling and, cropping
- the potential effects of climate change
- continued change in salinity levels in the Gippsland Lakes and its effect on ecological communities, particularly in wetland and estuarine environments
- inappropriate fire regimes
- development and population growth
- disturbance from recreational activities.

5.4.4 Achievements

Achievements on waterways in the Mitchell Basin 2004–2012

2,054	km of willow control
435	km of weed control
24	km of revegetation
87	km of stock exclusion fencing
64	large wood structures installed

5.4.5 Priority waterways

Priority rivers, estuaries and wetlands that were identified in the Mitchell Basin, are shown in Figure 5.1. The reach numbers are referred to in Table 5.2.

Priorities relating to maintaining good condition are found within the forested catchments of the Mitchell, Wonnangatta, Moroka, Wongungarra, Crooked, Dargo, and Wentworth rivers, and Iguana, Cobbannah and Prospect creeks.

Priority waterways with high values and high risks include the lower Mitchell River and estuary, Forge Creek, the Mitchell, Wonnangatta Valley, Dargo River through the township, Newlands Arm and Jones Bay.

5.4.6 Targets

Table 5.2 Targets for priority waterways in the Mitchell Basin

Long-term condition (>20 years)	Outcome target (8 years)	Activity (output) target (8 years)		Location and priority reach number
• The condition of forested priority waterways and of alpine wetlands is maintained • The condition of riparian vegetation is improved in priority cleared waterways, providing habitat for native animals, and improving resistance and resilience, reducing risk of instability • The condition of the in-stream habitat is improved in the Lower Mitchell, providing habitat for native fish and invertebrates • The condition of significant wetlands of the Lower Mitchell and Gippsland	**Flora and fauna**			
	• Species control (woody weeds) on priority rivers leading to reduced cover of high priority weeds • Livestock grazing restricted (species control) on over 75 % of waterway frontages in cleared sections of priority reaches specified • Extent, structure and diversity of vegetation on riparian corridors improved within cleared sections of selected priority waterways (Forge Creek, lower Mitchell, Wonnangatta and Dargo rivers, Lower Mitchell estuary) leading to improvements in in-stream habitat and bank stability • No decline in water quality within the Wonnangatta valley (R12)	M1	• 1,100 ha weed control on high priority woody weeds (willow) surveyed and maintained in forested priority reaches	Forested sections of the upper Mitchell, Prospect (Boggy) and Iguana creeks,, Wonnangatta, Cobbannah, Wentworth, Dargo, Moroka, Crooked and Wongungarra rivers(R7, 10, 13, 14, 15, 20, 22, 23, 24, 25, 27, 28, 29, 30)
		M2	• 50 km riparian fences installed to prevent stock access	Forge Creek (R3), Lower Mitchell river and estuarine reaches (R5, 6, 204), Wonnangatta River (R11, 12) and Dargo river through township (R26)
		M3	• 100 ha established under management agreement	Forge Creek (R3), Lower Mitchell river and estuarine reaches (R5, 6, 204), Wonnangatta River (R11, 12) and Dargo river through township (R26)
		M4	• 60 ha vegetation established and • 60 ha complementary weed control on non-woody weeds established	Lower Mitchell river and estuarine reaches (R5, 6, 204), Wonnangatta River (R11, 12) and Dargo river through township (R26)
		M5	• 20 ha woody weed (willow) maintenance on previously controlled sites	Lower Mitchell (R5 and 6)
		M6	• 70 ha weed control on high priority woody weeds (willow) treated	Lower Mitchell (R5 and 6), Upper Mitchell (R8 and 9) and Dargo River (R26)

Long-term condition (>20 years)	Outcome target (8 years)	Activity (output) target (8 years)		Location and priority reach number
Plains is improved • Improved water regime at critical times of year in the waterways of the Lower Mitchell • Fish populations can move freely within Prospect (Boggy) Creek at critical times of year • The condition of the in-stream habitat is improved in the Lower Mitchell, providing habitat for native fish and invertebrates • The bank condition of the Lower Mitchell estuary is improved providing resistance and resilience, reducing the risk of instability	• Species control (woody weeds) on priority rivers leading to reduced cover of high priority weeds • Extent, structure and diversity of vegetation on riparian corridors improved within cleared sections of selected priority waterways (Forge Creek, lower Mitchell, Wonnangatta and Dargo rivers, Lower Mitchell estuary) leading to improvements in in-stream habitat and bank stability • Extent, structure and diversity of vegetation in lower Mitchell and Gippsland Plains priority wetlands improved and connected to riparian corridor or remnant vegetation where appropriate	M7	• 8 ha weed control on high priority woody weeds (willow and poplar)treated	Lower Mitchell estuary (R204)
		M8	• Develop and implement rehabilitation plan for the Lower Mitchell waterways	Lower Mitchell river and estuarine reaches (R5, 6 and 204) and Lower Mitchell wetlands
		M9	• Priority wetlands incorporated into 10-year plan on the establishment and maintenance of native vegetation on the Gippsland Plains with additional consideration of their values and connectivity	Priority wetlands on the Redgum Plains, Lower Mitchell Wetlands
		M10	• Support Parks Victoria to implement relevant priority actions in the *Victorian Alpine Peatlands Spatial Action Plan* (McMahon et al 2012)for the Upper Mitchell alpine wetlands	Priority alpine wetlands in the Upper Mitchell
	Barriers			
	• Fish passage in Prospect (Boggy) Creek is not obstructed by waterway structures at critical times of year.	M11	• Investigate effects (fish sp.) of barrier and prioritise actions	Lower Prospect (Boggy) Creek (R19)
	Physical form			
	• The stability of the banks of the Lower Mitchell estuary is improved	M12	• 1.6 km waterway structures (rock beaching) installed	Lower Mitchell estuary (R204)
	• Extent, structure and diversity of available in-stream habitat improved in the Lower	M13	• 80 waterway structures (large wood) installed	Lower Mitchell river and estuary (R5 and 204)

Long-term condition (>20 years)	Outcome target (8 years)	Activity (output) target (8 years)		Location and priority reach number
	Mitchell • The stability of Cobbannah creek, the Lower Mitchell and minor Gippsland Lakes is understood, and of Forge Creek is monitored and an appropriate response is taken.	M14	• Investigate stability and prioritise actions	Lower Mitchell (R5 and 6), minor Gippsland Lakes tributaries and Cobbannah Creek (R23)
		M15	• Monitor bed stability	Forge Creek (R3)
	Flow			
	• Hydraulic connection between waterway and significant floodplain wetlands is maintained or improved	M16	• Investigate flow paths into floodplain wetlands and prioritise actions	Lower Mitchell (R5) and Skull Creek (R21)
	• Improved understanding of environmental water requirements and risks incorporated in the management of water extraction	M17	• Develop and implement monitoring plan for the lower Mitchell	Lower Mitchell river and estuarine reaches (R5, 6 and 204)

5.5 Waterways of the Tambo Basin

5.5.1 Description

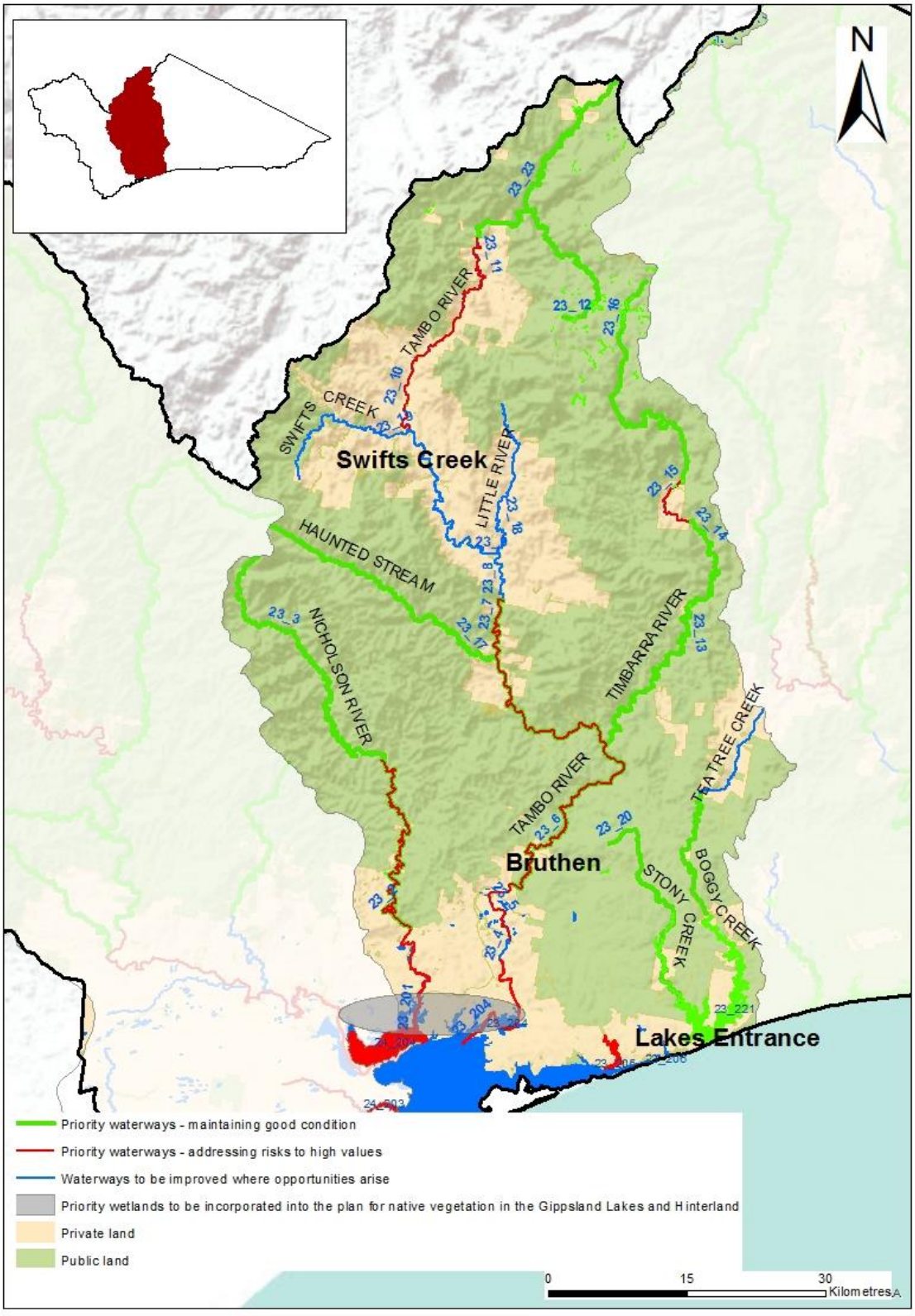

Figure 5.2 Priority waterways in the Tambo Basin, displaying ISC reach numbers

Much of the upper catchment of the Tambo River is forested and in good condition. However, extensive erosion has resulted in sediment transportation downstream. Historically, the main sources of sediment have been the alluvial gold mining operations in the 1890s, land clearing for agriculture, the destruction of pasture and vegetation by rabbits and poorly managed logging operations. More recently, the main sources of sediment have resulted from catchment disturbance and hydrology changes from bushfires followed by major floods.

Below Bruthen, the river enters its floodplain, eventually flowing into Lake King in the Gippsland Lakes.

The Nicholson River rises in forested areas and flows into Lake King.

In the forested upper catchment, the banks are generally stable and the river contains large quantities of logs, so good habitat is available for fish and other aquatic animals.

A small (640 megalitre) drought reserve storage dam presents a restriction to fish migration along the river.

The basin area is 3,465 km^2 (346,500 ha), of which 66% is public land.

5.5.2 Values

Environmental values

Table 5.3 shows the 2010 *Index of Stream Condition* (DEPI 2013b) assessment compared to the 2004 assessment. Most of the reaches classified in 'Excellent' or 'Good' condition were in the upper catchment and in the waterways between the Tambo and Snowy rivers. The reaches classified as in 'Moderate' condition were in the floodplain along the Bruthen Flats and some cleared parts of the upper catchment.

Table 5.3 Reach condition in the Tambo Basin based on ISC criteria

Index of Stream Condition	Excellent or Good %	Moderate %	Poor %
2010	71	29	0
2004	69	25	5

Between the assessments, improvements occurred in:

- the Tambo River between Swifts creek and Ensay – from 'Poor' to 'Moderate' rating
- waterways between the Tambo and Snowy rivers – 'Moderate' to 'Good' rating
- a number of upper catchment streams such as the upper Nicholson, mid Tambo and Haunted Stream – from 'Good' to 'Excellent' rating.

Some of the important environmental values associated with waterways within the basin are:

- significant wetlands into which the basin drains, including Lake Tyers and the Gippsland Lakes
- the Timbarra River, Haunted Stream and Stony Creek which were identified in the *East Gippsland Regional River Health Strategy* as 'ecologically healthy rivers'

- the Tambo River delta which is listed (DSE 2003) as a site of state geomorphological significance
- the Alpine National Park
- significant amphibians and waterway birds in the lower Nicholson and lower Tambo rivers and in Stony Creek
- significant migratory fish in the mid and upper Tambo River and in the Timbarra River
- significant waterway birds in the mid Tambo River
- significant ecological vegetation classes.

Social values

The Tambo and Nicholson rivers and their basin are an important social asset. The community values the basin and the lakes into which it drains for fishing, canoeing, boating, camping, hiking, sporting activities, picnics, sightseeing and game hunting.

Many community groups, such as Landcare and angling clubs, are involved with improving the health of the river.

Economic values

The Nicholson and Tambo catchments are a proclaimed water supply catchment.

There is productive land on the Bruthen flats, at Ensay and at Swifts Creek.

5.5.3 Threats

The principal threats to environmental, social and economic values in the waterways of the Tambo Basin are:

- the spread and increasing populations of invasive animals
- invasive plants, including new and emerging plants
- willow infestations
- stream bed instability (lower Nicholson River, Tea Tree Creek, Swifts Creek)
- degraded riparian and in-stream habitat (lower Nicholson, Lower Tambo) and vegetation condition also deteriorating in mid Tambo
- increasing salinity in estuaries and wetlands
- degraded water quality (nutrients and sediment)
- the effects of grazing stock on riparian and wetland vegetation
- more variable freshwater inflows and their effect on vegetation communities
- loss of native vegetation remnants and clearing of riparian zones
- soil compaction, salinity and erosion
- disturbance of acid sulfate soils
- the effects of climate change

- continued change in salinity levels in the Gippsland Lakes and its effect on ecological communities, particularly in wetland and estuarine environments
- inappropriate fire regimes
- development and population growth
- disturbance from recreational activities.

5.5.4 Achievements

Achievements on waterways in the Tambo Basin: 2004-2012

1,077	km of willow control
70	km of weed control
16	km of revegetation
14	km of stock exclusion fencing
155	large wood structures installed

5.5.5 Priority waterways

Priority rivers, estuaries and wetlands that were identified in the Tambo Basin, are shown in Figure 5.2. The reach numbers are referred to in Table 5.4.

Priorities relating to maintaining good condition are found within the forested catchments of the Nicholson, Brodribb, Timbarra and Tambo rivers, Stony and Boggy Creek and Lake Tyers estuarine system.

Priority waterways high values and high risks include the lower Nicholson, Tambo rivers, the mid Tambo above Bruthen and the upper Tambo above Swifts Creek as well as the Mississippi Creek estuary, and a small section of the Timbarra, prioritised for both the connectivity it could provide, and the threats it may cause the forested sections upstream and downstream.

Some priority waterways have both types of priority associated. These are waterways with both cleared and forested sections, both considered priorities.

5.5.6 Targets

Table 5.4 Targets for priority waterways in the Tambo Basin

Long-term condition (>20 years	Outcome target (8 years)	Activity (output) target (8 years)		Location and priority reach number
• The condition of forested priority waterways and of alpine wetlands is maintained • The condition of riparian vegetation is improved in priority cleared waterways, providing habitat for native animals, and improving resistance and resilience, reducing the risk of instability • Fish populations can move freely within the Nicholson system at critical times of year • The Timbarra river has a continuous riparian zone from the confluence with the Tambo through to the headwaters • The condition of the in-stream habitat is improved in the Lower Tambo, providing habitat for native fish	**Flora and fauna**			
	• Species control (woody weeds – willow) on priority rivers leading to reduced cover of high priority weeds • Livestock grazing restricted (species control) on 50% of waterway frontage area in cleared sections of specified priority reaches. • Extent, structure and diversity of vegetation on riparian corridors improved within cleared sections of selected priority reaches leading to improvements in in-stream habitat and bank stability • Extent, structure and diversity of vegetation in Lower Tambo and Gippsland Plains priority wetlands improved and connected to riparian corridor or remnant vegetation where appropriate	T1	• 40 km riparian fences installed to prevent stock access	Nicholson River, Tambo and Timbarra rivers and Stony and Boggy Creek and Lower Tambo estuarine reach (R2, 5, 6, 10, 11, 15, 20, 21 and R204)
		T2	• 150 ha established under management agreement	Nicholson River, Tambo and Timbarra rivers and Stony and Boggy Creek and Lower Tambo estuarine reach (R2, 5, 6, 10, 11, 15, 20, 21 and R204)
		T3	• 70 ha vegetation established and • 70 ha complementary weed control on non-woody weeds established	Nicholson River, Tambo and Timbarra rivers and Stony and Boggy Creek and Lower Tambo estuarine reach (R2, 5, 6, 10, 11, 15, 20, 21 and R204)
		T4	• 50 ha weed control on high priority woody weeds (willow) treated	Tambo and Timbarra rivers (R5, 10, 11 and 15)
		T5	• 750 ha weed control on high priority woody weeds (willow) surveyed and maintained	Forested sections of the Nicholson, Tambo and Timbarra rivers, Stony and Boggy Creek and Haunted Stream (R2, 3, 6, 7, 12, 13, 14, 16, 17, 20 and 21)
		T6	• 8 ha weed control on high priority woody weeds (willow and poplar) treated	Lower Tambo estuarine reach (R204)
		T7	• Develop and implement rehabilitation plan for the Lower Tambo	Lower Tambo river and estuarine reaches (R5 and 204) and Lower Tambo wetlands

Long-term condition (>20 years	Outcome target (8 years)	Activity (output) target (8 years)		Location and priority reach number
• The physical form of the Lower Tambo is improved leading to improved resistance • The condition of significant floodplain wetlands is improved with natural water regimes		T8	• Support Parks Victoria to implement relevant priority actions in the *Victorian Alpine Peatlands Spatial Action Plan* (McMahon et al 2012) for the Upper Tambo alpine wetlands	Priority alpine wetlands in the Upper Tambo
	Barriers			
	• Fish passage in the Nicholson is not obstructed by waterway structures at critical times of year.	T10	• Remove fish barrier	Nicholson River (R2)
	Physical form			
	• The stability of the banks of the Lower Tambo and Nicholson estuaries are improved.		• 1.6 km waterway structures (rock beaching) installed	Lower Tambo and Nicholson estuary (R201 and 204)
	• Extent, structure and diversity of available in-stream habitat improved in the Lower Tambo	T11	• 80 waterway structures (large wood) installed	Lower Tambo river and estuarine reach (R5 and R204)
	Flow			
	• Waterway and significant floodplain wetlands are hydraulically connected so that wetland values are maintained or improved	T12	• Investigate flow paths into floodplain wetlands and prioritise actions	Lower Tambo River (R5)
	• Appropriate estuary opening regime is maintained	T13	• Implement estuary opening protocols	Lake Tyers estuary (R221)
	Community			
	• Appropriate access available to the public	T14	• Work with partners to manage community access	Lower Tambo estuarine reach (R204)

5.6 Gippsland Lakes

5.6.1 Description

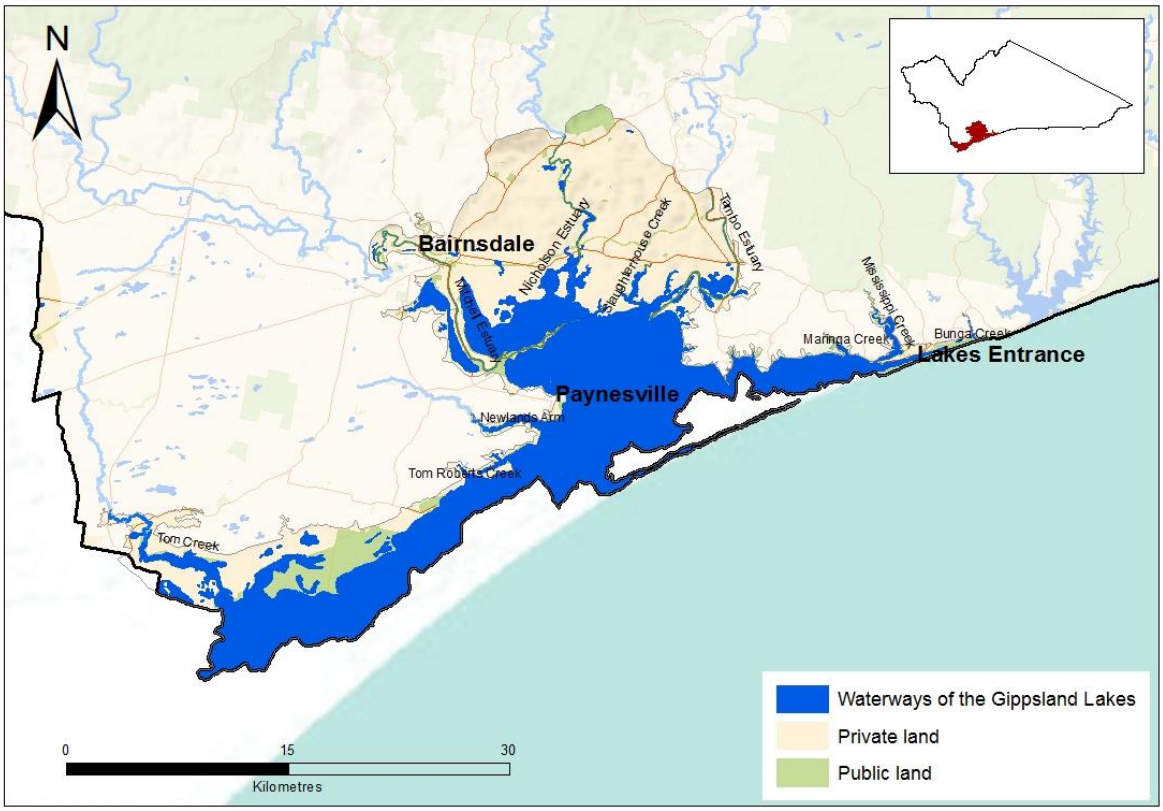

Figure 5.3 Waterways of the Gippsland Lakes

The Gippsland Lakes system is a large estuarine complex which extends between Sale in the west and Lakes Entrance in the east, spanning the regional boundary between the West and East Gippsland catchment management authorities. The lakes are listed under the Ramsar Convention as a wetland of international importance because they are a particularly good representative example of wetlands characteristic of the biogeographical region, they regularly support substantial numbers of waterbirds including during critical life stages and drought, they support threatened species, and are an important site for fish populations. The lakes are also highly valued for recreational pursuits such as boating and fishing, landscape appeal for urban development, game hunting and nature appreciation.

The maintenance of an artificially permanent connection to the Southern Ocean at Lakes Entrance changed the Gippsland Lakes system from naturally fresh–brackish to truly estuarine. The entrance creates the broad patterns of *spatial* variability in salinity across the system (nearing marine in the east and freshwater dominated in the west). Changes in freshwater inflows (for instance, due to floods, droughts, freshes) create *temporal* variability in salinity and water levels. The high variability in the salinity over space and time results in a wide diversity of environments, and creates the unique character of the system.

5.6.2 Values

The lakes system is composed of three main environments: main lakes, fringing wetlands and estuarine river reaches. The main lakes are permanently inundated and include the deep waters of Lake Victoria and Lake King, and shallow Lake Wellington and Jones Bay. The former are generally strongly stratified outside periods of low freshwater inflow. Saline stratification, along with increased nutrient availability, are important factors in the susceptibility of the lakes to algal blooms. Seagrass beds and biofilms are critical to the ecological functioning of the main lakes. Waterbirds including Black Swans and fish such as Black Bream are heavily reliant on seagrass beds for food and shelter. Other important habitats in the main lakes include open water which provides feeding areas for dolphins and fish-eating birds such as Pelicans, Cormorants and Terns, and mud and sand flats which are dominated by invertebrate communities and wading birds.

The estuarine river reaches are an extension of the main lakes as they offer contiguous habitat and support very similar recreational opportunities: principally boating and fishing. They are defined by the upstream extent of saline intrusion through the entrance. The salt–freshwater interface is an area of high ecological productivity for microscopic floating plants and animals, and a very important spawning habitat for Black Bream. Fringing *Phragmites* reed beds and submerged logs provide feeding and sheltering habitat for invertebrates and fish. The estuarine river reaches are highly susceptible to shoreline erosion due to loss of riparian vegetation and boat traffic.

Fringing wetlands are associated with the main lakes and the estuarine river reaches. Unlike these habitats, many of the fringing wetlands dry out at times. Freshwater and variably saline wetlands occur towards the western end of the Gippsland Lakes system or in close proximity to tributaries where they receive regular freshwater inflows. Hypersaline wetlands predominate in the east or in areas with no regular freshwater source. Freshwater wetlands are dominated by submerged and emergent plant species such as *Vallisneria*, *Myriophyllum*, *Triglochin*, sedges and rushes. Hypersaline wetlands support salt marsh dominated by *Sarcocornia*, unvegetated salt pans ,and shallow seasonal pools covered with benthic algae or salt tolerant aquatic plants. Variably saline wetlands are characterised by stands of *Phragmites* and *Melaleuca*, with the nature of the understory reflecting their salinity history. All wetland types support important, albeit different, waterbird populations.

5.6.3 Threats

Significant and extensive modifications have occurred in the Gippsland Lakes' catchments since European settlement, particularly in the Lake Wellington catchment in the west. 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 effects on the system, such as an increased frequency and severity of blue–green algal blooms, heavy metal contamination and reduced frequency and duration of wetland inundation.

Climate change poses a significant potential challenge to the future management of the Gippsland Lakes. The combination of increased temperature, reduced rainfall, increased incidence of drought, floods, and fires, 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.

5.6.4 Management priorities

The environmental values of the Gippsland Lakes are currently managed through the *Gippsland Lakes Ramsar Site Strategic Management Plan* (DSE 2003), as well as the *Gippsland Lakes Environment Strategy* (GLMAC 2013) and the *Gippsland Sustainable Water Strategy* (DSE 2011). Work to revise the Ramsar site management plan has begun, with the updated plan scheduled for completion by December 2014. The updated plan will identify strategic priorities for maintaining or improving the ecological character of the Gippsland Lakes and is scheduled for completion by December 2014.

5.7 Waterways of the Snowy Basin

5.7.1 Description

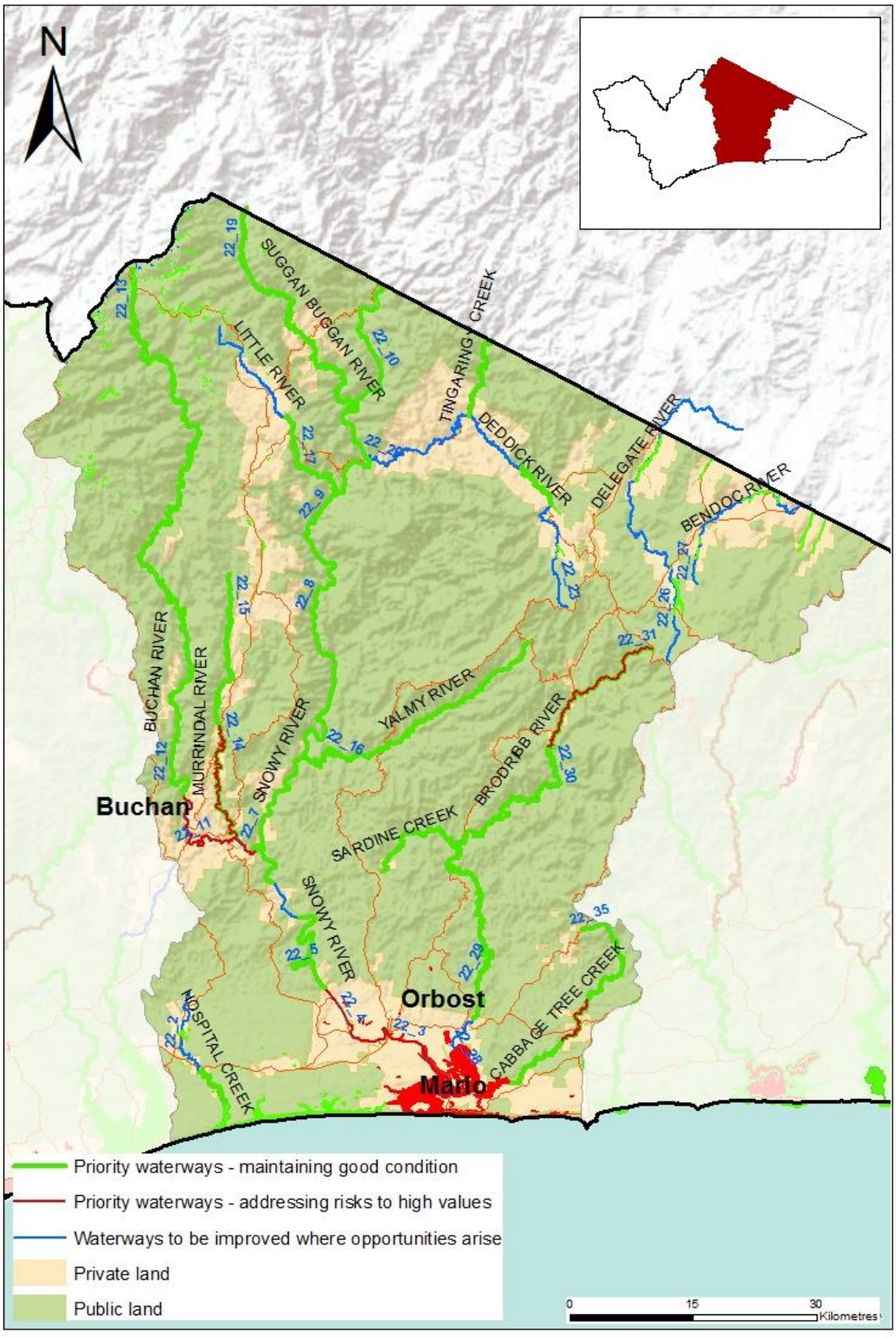

Figure 5.4 Priority waterways in the Snowy Basin, displaying ISC reach numbers

The Snowy River starts on the slopes of Mount Kosciuszko and flows into Bass Strait at Marlo, south of Orbost. The basin area is 6,711 km^2 (671,100 ha) of which 73% is public land.

Water is collected in the alpine section of the basin in New South Wales as part of the Snowy Mountains Scheme. Much of this water is diverted out of the Snowy catchment and into the Murray and Murrumbidgee rivers. This has greatly altered the flow regime in the Snowy River.

Controls on development, and the withdrawal of grazing rights in the late 1950s, have helped to maintain this part of the catchment in good condition, despite pressure from invasive plants and animals.

Below Jindabyne Dam, the river descends through the Beloka Gorge and the Monaro Tableland. This area is mainly used for sheep and cattle grazing.

The river then enters a mountainous region that includes the Snowy River Gorge. Much of this area falls within the Alpine National Park, and further south, the Snowy River National Park. Much of the upper-mid Snowy catchment was severely affected by bushfires in 2002 and 2003.The river emerges on to its floodplain at Jarrahmond, north of Orbost. Between Jarrahmond and the estuary at Marlo the river passes through rich floodplains used mainly for cattle grazing, dairying and vegetable growing.

Extensive works are continuing to rehabilitate this section of the river.

Significant Victorian tributaries of the Snowy River include the Buchan, Yalmy, Murrindal, Suggan Buggan, Deddick and Delegate rivers.

5.7.2 Values

Environmental values

Table 5.5 shows the 2010 *Index of Stream Condition* (DEPI 2013b) assessment compared to the 2004 assessment.

Most of the reaches classified in ‘Excellent’ or ‘Good’ condition by the criteria were in tributaries – Buchan, Murrindal, Yalmy, Deddick, Little and Brodribb rivers and in Cabbage Tree Creek.

The main stem of the Snowy was classified as in either ‘Moderate’ or ‘Poor’ condition. The floodplain of the lower Snowy and the cleared section at the south of the Snowy River national park is in ‘Poor’ to ‘Very poor’ condition.

The river is classified as in ‘Moderate’ condition through the national park, but from the Deddick River confluence to the border, it is classified in ‘Poor’ condition. The Suggan Buggan river is also classified as in ‘Poor’ condition.

Between the assessments, improvements occurred in:

- the main stem of the river through the national park – from ‘Poor’ to ‘Moderate’ rating
- the Buchan River, along the cleared section near the township – from ‘Moderate’ to ‘Good’ rating
- the upper Brodribb River – from ‘Good’ to ‘Excellent’ rating

- Cabbage Tree Creek (near the Princes Highway) – from 'Good' to 'Excellent' rating.

Table 5.5 Reach condition in the Snowy Basin based on ISC criteria

Index of Stream Condition	Excellent or Good %	Moderate %	Poor or Very poor %
2010	73	21	6
2004	69	22	9

However, the condition of the floodplain of the lower Snowy River has declined from a rating of 'Moderate' condition to 'Poor' condition, under the ISC criteria.

The Snowy, Suggan Buggan, Berrima and upper Buchan rivers were recognised as 'heritage rivers' by the Land Conservation Council in 1991 for their social and environmental values.

Some of the important environmental values associated with waterways within the basin are:

- significant migratory fish throughout the system (Australian Grayling), and Cox's Gudgeon in the Buchan river
- significant invertebrates – Alpine Spiny Crayfish and Eastern Freshwater Shrimp sporadically recorded scattered throughout the system
- significant birds such as the Eastern Great Egret, Lewin's Rail and Australasian Bittern (lower Snowy River) and White Bellied Sea Eagle
- significant flora (lower Snowy River)
- significant ecological vegetation classes (Cabbage Tree Creek)
- significant reptiles such as the Alpine Bog Skink and Alpine Water Skink near the upper Buchan River
- significant amphibians in the lower Snowy River (Green and Golden Bell Frog)
- Grey Headed Flying Fox in the (Deddick River and Cabbage Tree Creek)
- significant wetlands associated with the lower Snowy River.

Social values

The Snowy River and its basin are an important social asset. The community values them for fishing, canoeing, boating, camping, hiking, sporting activities, picnics, sightseeing and game hunting.

Many community groups, such as Landcare and angling clubs, are involved with improving the health of the river.

Economic values

The catchments of the Brodribb and Buchan rivers are proclaimed water supply catchments.

There is productive land in the Snowy River floodplain.

5.7.3 Threats

The principal threats to environmental, social and economic values in the waterways of the Snowy Basin are:

- the spread and increasing populations of invasive animals
- invasive plants, including new and emerging plants
- willow infestations (Snowy and Deddick rivers)
- stream bed instability (Snowy and Deddick rivers)
- bank instability (Deddick River)
- degraded riparian and in-stream habitat (Snowy and Deddick rivers)
- the altered flow regime and increasing salinity in the lower Snowy River
- reduced flows as a result of the Jindabyne hydro-electric dam
- acid sulfate soils
- the potential effects of climate change
- inappropriate fire regimes (much of the upper Snowy catchment was severely affected by bushfires in 2002/2003)
- disturbance from recreational activities.

5.7.4 Achievements

Achievements on waterways in the Snowy Basin: 2004-2012

3,271	km of willow control
787	km of weed control
255	km of revegetation
96	km of stock exclusion fencing
138	large wood structures installed

5.7.5 Priority waterways

Priority rivers, estuaries and wetlands that were identified in the Snowy Basin, are shown in Figure 5.4. The reach numbers are referred to in Table 5.6.

Priorities relating to maintaining good condition are found within the forested catchments of the Buchan, Murrindal, Yalmy, Snowy and Brodribb rivers.

Priority waterways with high values and high risks include the lower Snowy, the lower Buchan and Murrindal rivers and the Snowy estuary and wetlands.

Some priority waterways have both types of priority associated, where they have both forested and cleared sections, considered to be a priority.

5.7.6 Targets

Table 5.6 Targets for priority waterways in the Snowy Basin

Long-term condition >20 years)	Outcome target (8 years)	Activity (output) target (8 years)		Location and priority reach number
• The condition of forested priority waterways and of alpine wetlands and Ewing's Marsh is maintained • The condition of riparian vegetation is improved in priority cleared waterways, providing habitat for native animals, and improving resistance and resilience, reducing the risk of instability • The Buchan river has a continuous riparian zone from the confluence with the Snowy through to the headwaters. • Water quality in the Lower Snowy is improved for consumption, recreation and	**Flora and fauna**			
	• Species control (woody weeds willow) on priority rivers leading to reduced cover of willow • Livestock grazing restricted (species control) on 75% of waterway frontages in cleared sections of priority reaches • Extent, structure and diversity of vegetation on riparian corridors improved within cleared sections of selected priority reaches leading to improvements in in-stream habitat and bank stability • Improved understanding of environmental water and management requirements of the lower Snowy wetlands • Improved understanding of the risks to the condition of Ewing's Marsh • Species control (pest plants and animals) on Ewing's marsh leading to reduced cover or population of high priority pest plants and animals	S1	• 40 km riparian fences installed to prevent stock access	Buchan, Brodribb and Murrindal rivers and Cabbage Tree Creek (R11, 14, 31 and 34) and Lower Snowy estuary (R203)
		S2	• 60 ha established under management agreement	Buchan, Brodribb and Murrindal rivers and Cabbage Tree Creek (R11, 14, 31 and 34) and Lower Snowy estuary (R203)
		S3	• 40 ha vegetation established (in-fill planting)	Lower Snowy river (R3 and 4)
		S4	• 200 ha weed control on high priority non woody weeds	Lower Snowy river and estuary (R3, 4 and 203)
		S5	• 30 ha vegetation established and • 30 ha complementary weed control on non-woody weeds established	Buchan, Brodribb and Murrindal rivers and Cabbage Tree Creek (R11, 14, 31 and 34) and Lower Snowy estuary (R203)
		S6	• 50 ha weed control on high priority woody weeds (willow) treated	Brodribb river, Cabbage Tree Creek (R31 and 34) and Lower Snowy river and estuary (R3, 4 and R203)
		S7	• 20 ha weed control on high priority wood weeds (willows, hawthorn, box elder, desert ash) treated	Buchan river (R11)

Long-term condition >20 years)	Outcome target (8 years)	Activity (output) target (8 years)		Location and priority reach number
significant flora and fauna • Fish populations can move freely within the Buchan system at critical times of year • The trajectory of condition improvement on the waterways of the lower Snowy is maintained		S8	• 1100 ha weed control on high priority woody weeds (willow)surveyed and maintained	Forested sections of Hospital Tingaringy, Sardine and Cabbage Tree Creek and in the Snowy, Buchan, Yalmy, Little, Deddick, Murrindal, Brodribb and Suggan Buggan rivers (R1, 5, 7, 8, 9, 10, 12, 13, 14, 15, 16, 17, 19, 22, 24, 29, 30, 31, 32, 33, 34 and 35)
		S9	• 150 ha weed control on high priority woody weeds (willow)surveyed and maintained to protect priority reaches	Cleared sections of non-priority reaches Snowy, Deddick, Delegate and Bendoc rivers (R6, 18, 20, 21, 23, 25, 26, 27)
		S10	• Support Parks Victoria to implement relevant priority actions in the *Victorian Alpine Peatlands Spatial Action Plan* (McMahon et al 2012) for the mid Snowy alpine wetlands	Priority alpine wetlands in the Mid Snowy catchment
		S11	• Investigate condition of lower Snowy wetlands and prioritise actions	Lower Snowy priority wetlands
		S12	• Work with partners to conduct surveillance and control of pest plants and animals in wetlands.	Ewing's marsh
	Barriers			
	• Fish passage in Buchan River is not obstructed by waterway structures at critical times of year	S13	• Investigate condition and effects (fish sp.) of barrier and prioritise actions	Buchan River (R11)

Long-term condition >20 years)	Outcome target (8 years)	Activity (output) target (8 years)		Location and priority reach number
• The condition of the in-stream habitat is improved in the Lower Snowy estuary, providing habitat for native fish • The physical form of the Lower Snowy estuary is improved leading to improved resistance • The condition of the waterways of the waterways of the Lower Snowy is improved with improved water regimes	**Physical form**			
	• The stability of the banks of the Lower Snowy estuary is improved • Extent, structure and diversity of available in-stream habitat improved in the lower Snowy estuary	S15	• 2 km of waterway structures (rock beaching) installed	Lower Snowy estuary (R204)
		S16	• 40 waterway structures (large wood) installed	Lower Snowy estuary (R204)
	Flow			
	• Improved understanding of environmental water requirements of the lower Snowy waterways • Improved consideration of requirements and risks of the Victorian reaches of the Snowy River in environmental water management • Waterway and significant floodplain wetlands are hydraulically connected so that wetland values are maintained or improved • Appropriate estuary opening regime is maintained	S17	• Complete and implement a lower Snowy River and wetland monitoring and investigation plan	Lower Snowy river (R3 and 4), estuary (R204) and wetlands
		S18	• Investigate flow paths into floodplain wetlands and prioritise actions	Lower Snowy (R3 and 4)
		S19	• Implement estuary opening protocols	Lower Snowy estuary (R204)

5.8 Waterways of the Far East Basin

5.8.1 Description

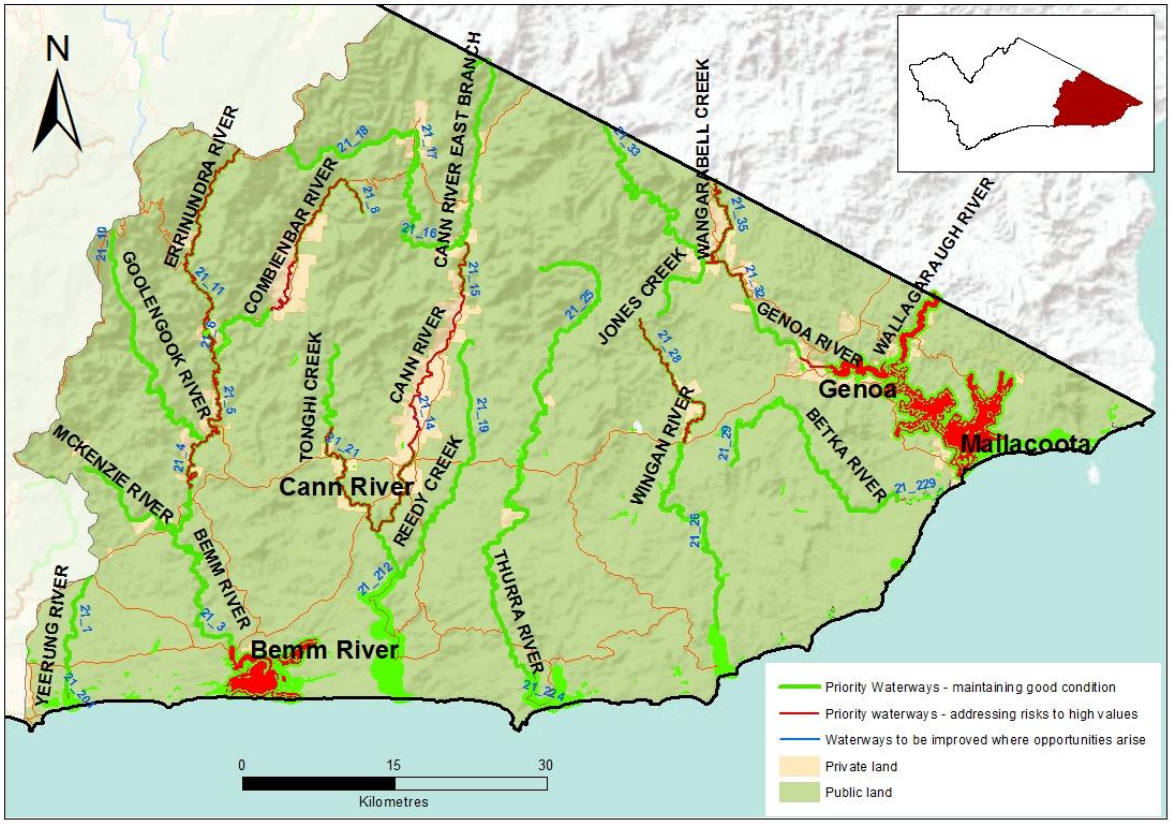

Figure 5.5 Priority waterways within the Far East Basin, displaying ISC reach numbers

The Far East Basin includes the catchments of the Cann, Thurra, Wingan, Betka and Genoa rivers. The basin area is 4,708 km^2 (470,800 ha), of which 88% is public land.

The Cann River catchment contains the forested upland areas on the New South Wales border and the cleared agricultural land on the floodplain. The river flows into Tamboon Inlet, a coastal lagoon that is intermittently open to the ocean.

Public land in the catchment includes sections of Coopracambra and Croajingolong national parks. These remote areas support a number of ecosystems including eucalypt forests, heathlands, rainforests, granite peaks and coastal headlands. These ecosystems support a diversity of flora and fauna.

The fertile Cann River floodplain supports dairying and beef cattle grazing.

The Thurra and Wingan rivers and their tributaries flow through predominantly public land, including the Alfred National Park and parts of the Coopracambra and Croajingolong national parks. These rivers terminate in coastal inlets that are intermittently open to the sea.

The Betka River passes through the Croajingolong National Park and flows into an estuary that is intermittently open to the sea.

The Genoa River starts in southern New South Wales near Bombala and flows into Mallacoota Inlet. Large tracts of its catchment are public land, including Coopracambra and Croajingolong national parks.

There are also large areas of state forest in the Genoa and Wallagaraugh catchments in Victoria. There are small pockets of freehold land mainly used for grazing at Wangarabell, Stony Creek, Genoa, Gipsy Point, Johnson Bridge and Maramingo.

5.8.2 Values

Environmental values

Table 5.7 shows the 2010 *Index of Stream Condition* (DEPI 2013b) assessment compared to the 2004 assessment. All of the reaches, except for the lower Genoa River, are classified in 'Excellent' or 'Good' condition.

Table 5.7 Reach condition in the Far East Basin based on ISC criteria

Index of Stream Condition	Excellent or Good %	Moderate %	Poor or Very poor %
2010	98	2	0
2004	98	2	0

Between the assessments:

- the Cann River upstream of the Tonghi Creek confluence has improved from rating of Moderate' to a rating of 'Good'
- the lower Genoa River has declined from a rating of 'Good' to a rating of 'Moderate', most likely due to the sand slug moving downstream.

Some of the important environmental values associated with waterways within the basin are:

- the Genoa, Bemm, Goolengook, Arte and Errinundra rivers have been identified as 'heritage rivers'
- significant ecological vegetation classes – 'Montane Riparian Woodland' in the Cann River east branch, Thurra River and Wingan River
- site of geological and geomorphological significance – Genoa Gorge
- significant wetlands
- significant amphibians such as the Green and Golden Bell Frog, Dendy's and Martin's toadlets
- significant reptiles such as the Swamp Skink, (Reedy Creek, Betka River)
- significant birds such as the Eastern Bristlebird, Black Bittern, Square Tailed Kite, White Bellied Sea Eagle
- significant migratory fish such as the Australian Grayling and Cox's Gudgeon
- significant flora such as Bent Pomaderris, Forrester's Bottlebrush, Genoa River Correa and Betka Bottlebrush

- significant mammals such as the Grey Headed Flying Fox
- remote coastal estuaries and wetlands.

Social values

The Far East Basin is an important social asset. The community values them for fishing, canoeing, boating, camping, hiking, sporting activities, picnics, sightseeing and game hunting.

Economic values

The catchment of the Betka River is a proclaimed water supply catchment.

5.8.3 Threats

The principal threats to environmental, social and economic values in the waterways of the Far East Basin are:

- degraded in-stream habitat in the lower Cann River and the east branch of the Cann River, and in the Bemm, Combienbar and Genoa rivers
- new and emerging weeds
- willow infestations (Genoa River and Tonghi Creek)
- stream bed and bank instability (Tonghi Creek and the east branch of the Cann River)
- livestock access (Bemm and Combienbar rivers and the east branch of the Cann River).

5.8.4 Achievements

Achievements on waterways in the Far East Basin: 2004–2012

1,215	km of willow control
886	km of weed control
32	km of revegetation
61	km of stock exclusion fencing
107	large wood structures installed

5.8.5 Priority waterways

Priority rivers, estuaries and wetlands that were identified in the Far East Basin, are shown in Figure 5.5. The reach numbers are referred to in Table 5.8.

Priorities relating to maintaining good condition, are found in every system within the Far East Basin (Yeerung, Bemm, Cann, Thurra, Wingan, Betka and Genoa systems, and every estuary within the basin is a priority for maintaining good condition.

Priority waterways with high values and high risks include Sydenham and Mallacoota Inlets, the upper Bemm, Errinundra, Combienbar, Cann, Wingan and Genoa rivers and

Wangarabell creek. Almost all of these priority waterways are also a priority for maintaining good condition as these waterways have both forested and cleared sections, both considered to be a priority.

5.8.6 Targets

Table 5.8 Targets for priority waterways in the Far East Basin

Long-term condition (>20 years)	Outcome target (8 years)	Activity (output) target (8 years)		Location and priority reach number
	Flora and fauna			
• The condition of forested priority waterways and remote coastal wetlands is maintained • The condition of riparian vegetation is improved in priority cleared waterways, providing habitat for native animals, and improving resistance and resilience, reducing the risk of instability • The Combienbar River has a continuous riparian zone from the confluence with Bemm River through to the headwaters. • The condition of the in-stream habitat is	• Species control (woody weeds – willow) on priority rivers leading to reduced cover of high priority weeds • Livestock grazing restricted (species control) on 75% of waterway frontages in cleared sections of priority reaches • Extent, structure and diversity of vegetation on riparian corridors improved within cleared sections of selected priority reaches leading to improvements in in-stream habitat and bank stability	FE1	• 60 km riparian fences installed to prevent stock access	Cleared sections of the Bemm, Combienbar, Errinundra, Cann and Wingan rivers and Tonghi and Wangarabell Creek (R4, 5, 7, 8, 11, 14, 15, 20, 21, 27, 28, 35) and at the Lower Bemm, Wallagaraugh and Genoa estuaries (R202 and 230)
		FE2	• 200 ha established under management agreement	Cleared sections of the Bemm, Combienbar, Errinundra, Cann and Wingan rivers and Tonghi and Wangarabell Creek (R4, 5, 7, 8, 11, 14, 15, 20, 21, 27, 28, 35) and at the Lower Bemm, Wallagaraugh and Genoa estuaries (R202 and 230)
		FE3	• 100 ha vegetation established and • 100 ha complementary weed control on non-woody weeds established	Cleared sections of the Bemm, Combienbar, Errinundra, Cann and Wingan rivers and Tonghi and Wangarabell Creek (R4, 5, 7, 8, 11, 14, 15, 20, 21, 27, 28, 35) and at the Lower Bemm, Wallagaraugh and Genoa estuaries (R202 and 230)
		FE4	• 100 ha weed control on high priority woody weeds (willow) treated	Combienbar (R7), Cann (R14) and Genoa (R30)

Long-term condition (>20 years)	Outcome target (8 years)	Activity (output) target (8 years)		Location and priority reach number
improved in the Genoa and Cann rivers	• Improved understanding of the risks to the condition of priority remote coastal wetlands • Species control (pest plants and animals) on priority wetlands leading to reduced cover or population of high priority pest plants and animals	FE5	• 1200 ha weed control on high priority woody weeds (willow) surveyed and maintained	Forested sections of the Yeerung, Bemm, Combienbar, McKenzie, Goolengook, Errinundra, Cann, Thurra, Wingan, Betka and Genoa rivers and Reedy, Tonghi, Jones and Wangarabell creeks (R1, 2, 3, 4, 5, 6, 8, 9, 10, 11, 12, 13, 15, 16, 17, 18, 19, 20, 21, 22, 23, 24, 25, 26, 27, 28, 29, 30, 31, 32, 33, 34, 35)
		FE6	• Work with partners to conduct surveillance and control of pest plant and animals in wetlands	Remote coastal wetlands likely to be in near-natural condition between Cape Conran and the border with NSW.
	Physical form			
	• The stability of Tonghi creek is understood, and an appropriate response is taken.	FE7	• Investigate stability and prioritise actions	Tonghi Creek (R20 and 21)
	Flow			
	• Appropriate estuary opening regime maintained	FE9	• Implement estuary opening protocols	Sydenham and Mallacoota inlets (R202 and 230)

6 Implementation

6.1 Roles and responsibilities

The EGCMA, as the waterway management authority for the region, will be the lead agency implementing the *East Gippsland Waterway Strategy*. The strategy will be implemented as a sub-strategy of the *Regional Catchment Strategy*, through established partnerships with:

- agencies with water management, land management or other relevant legislated responsibilities
- communities
- other stakeholders such as non-government organisations, Landcare and other community groups.

The size of the region, its large areas of remote and inaccessible public land and its relatively small population have highlighted partnerships and collaboration as being the most effective approach. Many issues requiring management act at a scale which is beyond the ability of individuals, or individual agencies, to address.

The RCS implementation arrangements include the establishment of program working groups (PWGs), made up of representatives from partners. PWGs are responsible for:

- development of appropriate targets
- implementation of projects and activities to achieve targets
- coordinating the implementation of projects and activities
- monitoring and reporting on implementation progress against targets
- regularly reviewing, updating and renewing targets.

PWGs and partners will be accountable for reporting on progress against targets to the EGCMA Board. The Board will maintain a regional 'Targets register' of current NRM targets.

The details of the roles and responsibilities of partners are given in Appendix 4.

6.2 Tools and approaches

6.2.1 Tools

The East Gippsland waterway management program will consider the full range of tools and approaches available to maintain or improve the environmental condition of waterways and use the most appropriate tool or approach for each situation. This includes:

- market-based instruments
- direct government investment in on-ground works or environmental water management
- research
- information provision

- community involvement
- regulation.

The role for government in waterway management is described in the *Victorian Waterway Management Strategy (DEPI 2013a)*.

6.2.2 Approach

The annual management activities of the regional waterway management program will be flexible in order to respond to the prevailing climatic conditions and to extreme events.

Annual planning activities will:

- recognise the long-term objectives and outcomes described in this EGWS and G*ippsland Region Sustainable Water Strategy*
- set short-term management aims through annual planning processes that reflect whether the current conditions are drought, dry, average or wet
- adapt management activities to prevailing climatic conditions in any year
- monitor conditions and develop drought, flood or bushfire response plans as required
- improve community awareness of the need to adapt management actions depending on current climatic conditions
- support the delivery of a fire management program which aims to minimise the impact of major bushfires on human life, communities and infrastructure while maximising biodiversity outcomes.

6.2.3 Maintenance

The aim of the strategy is to maintain and improve waterways. Maintenance of the systems together with maintenance of previous investment is a critical element of the EGCMA's role. Maintenance of past investment includes:

- riparian works (control of pest plants and animals, maintaining effectiveness of fencing and restricting grazing)
- structural works (ensuring ongoing functioning as intended).

6.2.4 Practices

The EGCMA will ensure that all waterway management activities are implemented within the requirements of relevant legislation, regulation and policy frameworks, particularly EGCMA policies and the *Technical Guidelines for Waterway Management* (DSE 2007b)

6.3 Resourcing

The implementation of this waterway strategy will be influenced by available funding and resources. Investment proposals to support actions within the strategy will be developed as investment opportunities arise. Where relevant, project investment proposals will be prepared in conjunction with PWGs and other delivery partners.

7 Monitoring, evaluation and reporting

The EGCMA will monitor, evaluate and report on the implementation of the EGWS through a number of processes described in sections 7.1, 7.2 and 7.3. These processes are in accordance with the program logic and the associated assumptions on which the strategy is based (these are described below). The monitoring, evaluation and reporting (MER) processes will comply with the DEPI *MER Framework* (DSE 2012b), and will sit within an EGCMA MER framework (under development), which will support the planning, implementation and review of the EGWS.

7.1 Program logic

Program logic is an approach to planning that uses a diagram to illustrate the rationale for a program and to express how change is expected to occur. It describes how specific management activities and outputs will be delivered. Over the eight-year planning period, these activities (outputs) and outcomes are assumed to collectively contribute to either maintaining or improving the environmental condition of waterways. This leads to the assumption that in the long-term, this will ensure that East Gippsland's waterways can continue to support environmental, social, cultural and economic values.

The program logic for *the East Gippsland Waterway Strategy* is shown in Figure 7.1.

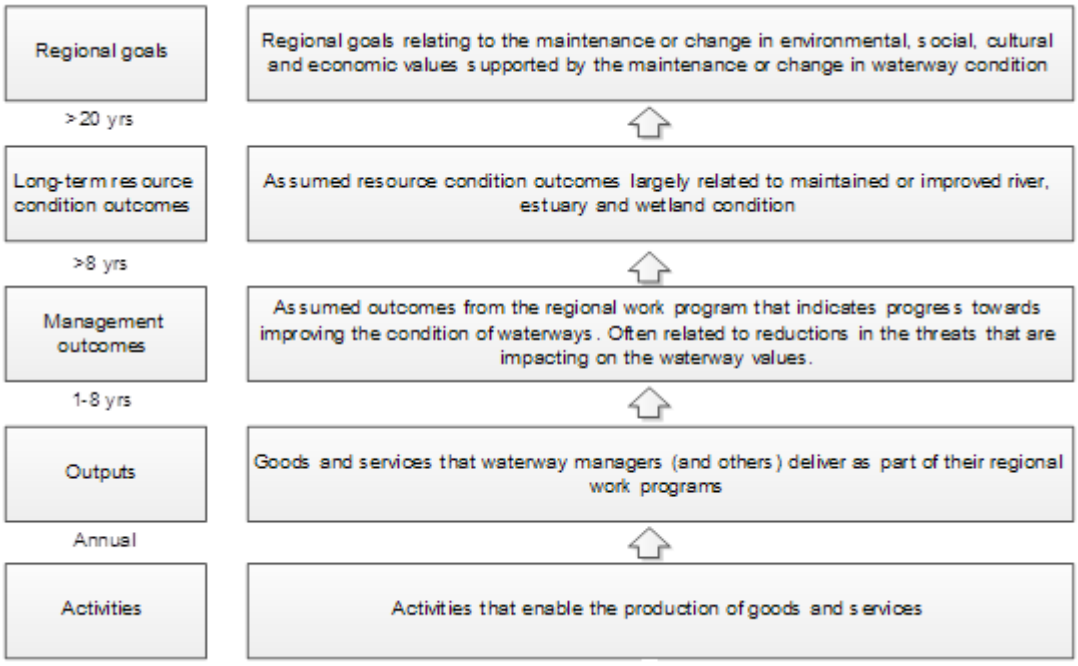

Figure 7.1 Program logic for the East Gippsland Waterway Strategy

At the highest level of the program logic, the regional goals were developed by the EGCMA and align with the management objectives for Victoria's waterways which is that 'Victoria's rivers, estuaries and wetlands are healthy and well-managed; supporting environmental, social, cultural and economic values that are able to be enjoyed by all communities.'

The long-term resource condition outcomes align with the policy statement in the *Victorian Waterway Management Strategy* relating to the management objective which states that

'Management activities will be targeted towards maintaining or improving the environmental condition of priority waterways to provide public benefit'

The management outcomes, outputs and activities focus primarily on the levels within the program logic that are measurable over the eight-year implementation period.

7.2 Monitoring

Waterway condition change is monitored through the Victorian Waterway Management Program through the Index of Stream Condition, Index of Wetland Condition and Index of Estuarine Condition monitoring programs which are conducted at a reach or waterway scale.

In addition, the EGCMA conducts waterway condition monitoring on cleared river reaches at a landholder scale, as part of its obligations under the Victorian Water Group Investment Framework funding. The 'Works monitoring method' was developed by the Victorian river health industry (CMAs, Melbourne Water and DSE) to measure current condition and condition change at the landholder scale, pre– and post–river health works.

The EGCMA monitors the condition of upland (forested) and remote waterway in a number of ways:

- aerial surveillance (two–yearly or when required after major floods or bushfires)
- on-ground and on-water surveillance
- information from our NRM partners and the community.

The EGCMA monitors water quality of rivers and estuaries throughout the region, through the Gippsland Regional Water Monitoring Partnership and through the Waterwatch program.

The EGCMA also monitors the condition of assets including fencing, revegetation and engineered works completed by the EGCMA to date. The asset monitoring is undertaken on a three–yearly basis. This monitoring is also conducted on known affected sites, after moderate or major flood or fire events. A maintenance program is then developed from the condition monitoring of assets, post-event.

As part of the development of its MER framework, the EGCMA is working with partners to develop a standardised approach for wetland and estuary monitoring.

7.3 Evaluation

A series of evaluation questions will be developed to assess the effectiveness of the EGWS implementation. Evaluation questions provide the basis for assessing the extent to which the outcomes have been achieved at each level of the program logic for the EGWS. They also address assumptions in the program logic and their evaluation provides direction and improved knowledge for subsequent planning cycles. Data from our monitoring activities will be used to answer evaluation questions.

The evaluation questions developed for the EGWS address the following five categories:

- **Impact** – changes to resource condition, management activities or institutions
- **Appropriateness** – addressing the needs of beneficiaries and against best practice

- **Effectiveness** – achievement of desired management outputs and resource condition objectives
- **Efficiency** – value or return from investment
- **Legacy** – after the activity or program ends.

7.4 Reporting

Reporting is an important tool to ensure accountability for the investment of government funds into waterway management activities. Over the long term, consistent and effective reporting provides evidence to evaluate the effectiveness of the EGWS. Three types of reporting will support this evaluation and accountability process:

- annual management reporting
- resource condition reporting
- reporting on EGWS targets.

Annual management reporting focuses on financial reporting and on outputs achieved in the region for the financial year. Financial audits are required to ensure that reported expenditure is accurate and accountable. This provides assurance that investment in delivering outputs has been strategic, cost effective and consistent.

Resource condition reporting is conducted through the Victorian Waterway Management Program. This involves the collection, analysis and reporting of information on the condition of Victoria's waterways every eight years, subject to available funding. This reporting, combined with regional knowledge, provides the data to assess the condition of waterways over the long term and the effectiveness of the EGWS.

Reporting on EGWS targets will occur at different intervals depending on the target level. Reporting on outputs will occur annually in the annual investment reports and in the EGCMA annual report. Reporting against EGWS management outcome targets will occur following the final review of the strategy in 2020. The EGCMA will also support reporting of management outcome targets for the VWMS in 2016 and 2020.

Stakeholders will be kept informed on the progress of the strategy through the reporting mechanisms outlined above and through targeted engagement outlined in the EGCMA communications and engagement plan.

7.5 Knowledge gaps and research

Through its history of waterway management in the region, the EGCMA and its predecessors have developed an understanding of the region's waterways. However, knowledge gaps are likely to be identified through monitoring and evaluation activities.

The EGCMA takes the following actions, where critical gaps in knowledge are identified:

- addresses the gap by obtaining external expert knowledge
- targets activities to build local knowledge and understanding

- records and collates information relating to the knowledge gap, relaying it back to DEPI for further research.

The EGCMA works with its NRM partners, DEPI and the tertiary education sector to identify areas for further research.

7.6 Adaptive management

Adaptive management has become a fundamental principle of waterway management in East Gippsland. Within the waterway management program, a 'learning by doing' ethos is applied, resulting in a culture of continuous improvement.

Waterway management involves working within an environment with many external factors such as variable seasonal conditions, flood and bushfires, requiring an adaptable approach.

Monitoring, evaluation and reporting are integrated into the adaptive management cycle presented in Figure 7.2. The cycle includes:

- **Strategy and planning** – planning for waterway management through the regional waterway strategy with priorities and regional targets
- **Implementation and monitoring** – government and other investment in regional priorities, implementation of priority management activities, intervention monitoring and long-term resource condition assessment
- **Evaluation and reporting** – management reporting, resource condition reporting, program evaluation and improvement

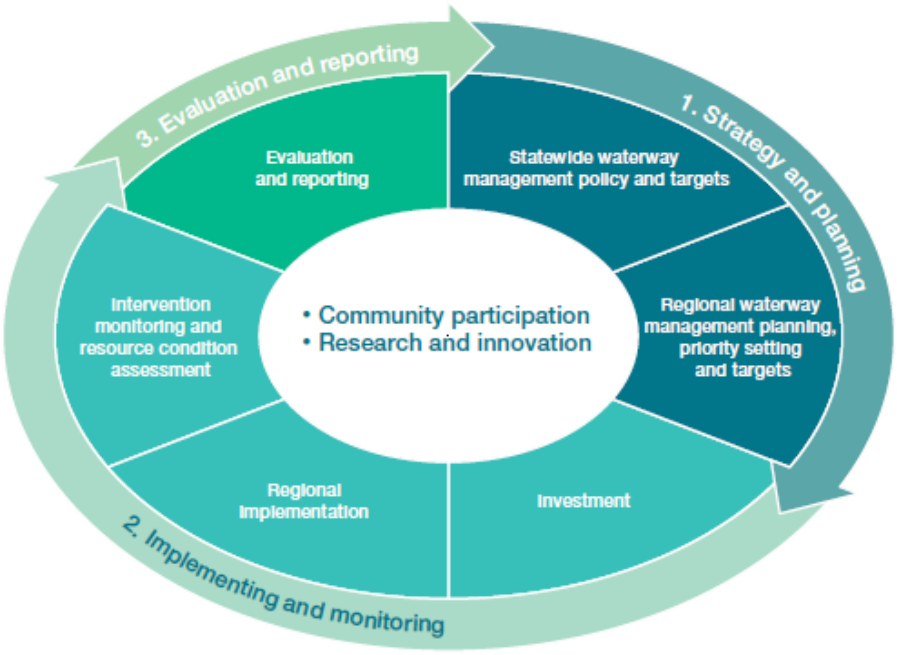

Figure 7.2 The eight-year adaptive management cycle of the Victorian Waterway Management Program and the EGWS

7.7 Strategy review

Internal reviews will assess interim progress towards implementing management activities outlined in the EGWS. More detailed reviews will be undertaken in year four of the EGWS cycle and at the end of the EGWS cycle. The intent of the annual and four-year review will be to assess progress and to consider any new information on values and threats and external factors. The four-year review may lead to the EGCMA choosing to change or update the management activities to be undertaken during the final years of implementation in response to new knowledge and support of an adaptive approach.

The final review at the end of the strategy will focus on capturing all of the knowledge gained during implementation of the strategy and progress against all of the targets. This will ensure that there is a clear record of lessons learned and an evidence base for updating or changing regional programs and management approaches in the future.

8 Consultation

The EGCMA has sought to consult with a broad spectrum of community members and with stakeholders throughout the implementation of the previous river health strategy and through the development of this waterway strategy.

The authority has consulted with traditional owners, the Gunaikurnai Land and Waters Aboriginal Corporation, who have joint management of 10 parks and reserves within the state, eight of which are within East Gippsland. The authority has also consulted with a number of East Gippsland's Aboriginal community groups which were past Registered Aboriginal Party applicants, through one-on-one meetings.

A community forum was held in March 2013 in Bairnsdale and Orbost, advertised in local media, where EGCMA staff and Board members talked to participants about what they would like to see improved on waterways. A number of phone and email submissions were also made and all submissions were logged (25 in total) and considered in the development of the strategy.

A workshop with Fisheries Victoria and recreational fishers was held in December 2013 in Lakes Entrance, to identify fishery management priorities, as outlined in section 5.3.

A series of one-on-one meetings was conducted with stakeholders and regional partner organisations, particularly delivery partners in waterway management, to ensure that their views and priorities were incorporated into the development of the strategy, where appropriate and feasible.

The EGCMA engages with many landholders, partners and stakeholders in waterway health management in the region through our day-to-day operations and ensures community and stakeholder views expressed are continuously recorded. These views were also considered in the strategy development.

The draft waterway strategy was released for a four-week public consultation period and was promoted in regional media and on the EGCMA website. A briefing and question and answer session was held for regional agencies, and community meetings were held across the region.

Appendices

Appendix 1: Policy and legislation used in the strategy development

Federal and state government legislation, policies and initiatives relevant to the preparation of the EGWS and considered during the development of this strategy are shown below.

Legislation	**Policies, strategies and initiatives**
Aboriginal Heritage Act 2006	*China–Australia Migratory Birds Agreement* (CAMBA), 1986
Climate Change Act 2010	*Convention on Wetlands of International Importance* (Ramsar Convention, 1971)
Catchment and Land Protection Act 1994	*Directory of Important Wetlands of Australia*, Date, 2001
Coastal Management Act 1995	*Gippsland Lakes Environment Strategy*, 2013
Conservation, Forests and Lands Act 1987	*Gippsland Lakes Ramsar Site Strategic Management Plan*, 2003
Environment Protection Act 1970	*Intergovernmental Agreement on a National Action Plan for Salinity and Water Quality*, 2000
Environment Protection and Biodiversity Conservation Act 1999 (Cwlth)	*Japan–Australia Migratory Birds Agreement* (JAMBA), 1974
Fisheries Act 1995	*National Water Initiative*, 2004
Flora and Fauna Guarantee Act 1988	*National Water Reform*, 1994
Heritage Rivers Act 1992	*State Environment Protection Policy* (Waters of Victoria), 2002
National Parks Act 1975	*Victorian Biodiversity Strategy*, 1997
Native Title Act 1993	*Victorian Coastal Strategy*, 2008
Planning and Environment Act 1987	
Sustainable Forests (Timber) Act 2004	
Traditional Owner Settlement Act 2010	
Water Act 1989	
Wildlife Act 1975	

Appendix 2: High value waterways

The table below lists the environmental, social and economic values of East Gippsland's high value waterways

Waterway			Environmental values					Social values			Economic values		
Basin	Name	Number	Formally recognised significance	Represent-ativeness	Rare or threatened sp/ communities.	Naturalness	Landscape features	Activity	Place	People	Water	Power generation	Other resources
Mitchell	Toms Ck	24_1			✓	✓		✓	✓	✓	✓		
Mitchell	Toms	24_2				✓		✓	✓	✓			
Mitchel	Forge Ck	24_3			✓	✓	✓	✓	✓	✓			
Mitchell	Mitchell River	24_5	✓	✓	✓	✓	✓	✓	✓	✓	✓		
Mitchell	Mitchell River	24_6, 7, 8	✓		✓	✓	✓	✓	✓	✓	✓		
Mitchel	Wonnangatta River	24_9,13,14,15	✓	✓	✓	✓	✓	✓	✓	✓			
Mitchel	Wonnangatta River	24_10	✓	✓		✓	✓	✓	✓	✓			
Mitchel	Wonnangatta River	24_11	✓	✓		✓	✓		✓	✓			
Mitchel	Wonnangatta River	24_12	✓	✓		✓	✓	✓	✓	✓	✓		
Mitchell	Prospect (Boggy) Ck	24_19			✓	✓	✓	✓	✓				
Mitchell	Prospect (Boggy) Ck	24_20			✓	✓		✓	✓	✓			✓
Mitchel	Skull Ck	24_21				✓			✓				
Mitchel	Iguana Ck	24_22			✓	✓		✓	✓	✓	✓		✓
Mitchel	Cobbannah Ck	24_23	✓		✓	✓		✓	✓	✓	✓		
Mitchel	Wentworth River	24_24	✓		✓	✓	✓	✓	✓	✓			
Mitchell	Wentworth River	24_25				✓	✓	✓	✓	✓			
Mitchell	Dargo River	24_26		✓	✓	✓	✓	✓	✓	✓			
Mitchel	Dargo River	24_27	✓	✓	✓	✓	✓	✓	✓	✓			
Mitchell	Moroka River	24_28	✓		✓	✓		✓					
Mitchel	Crooked River	24_29	✓		✓	✓	✓	✓					✓
Mitchell	Wongungarra River	24_30	✓		✓	✓	✓	✓					
Mitchell	Mitchell/Nicholson Estuary	24_204	✓	n/a	✓	n/a	✓	✓	✓	✓	✓		
Mitchell	Newland's Arm Estuary	24_203	✓	n/a	✓	n/a	✓	✓	✓	✓			
Mitchell	Toms Creek Estuary	24_201	✓	n/a	✓	n/a		✓	✓	✓	✓		✓
Mitchell	Redgum Plains Wetlands	Systems		n/a	✓	n/a	✓	n/a	n/a	n/a	n/a	n/a	n/a
Mitchell	Lower Mitchell Wetlands	Systems		n/a	✓	n/a	✓	n/a	n/a	n/a	n/a	n/a	n/a
Mitchell	Upper Mitchell Wetlands	Systems	✓	n/a	✓	n/a		n/a	n/a	n/a	n/a	n/a	n/a

Waterway			Environmental values					Social values			Economic values		
Basin	Name	Number	Formally recognised significance	Represent -ativeness	Rare or threatened sp/ comms.	Naturalness	Landscape features	Activity	Place	People	Water	Power generation	Other resources
Tambo	Nicholson River	23_2			✓	✓	✓	✓	✓	✓	✓		
Tambo	Nicholson River	23_3				✓	✓	✓	✓	✓	✓		✓
Tambo	Tambo River	23_4, 5			✓		✓	✓	✓	✓	✓		
Tambo	Tambo River	23_6,11			✓	✓	✓	✓	✓	✓	✓		✓
Tambo	Tambo River	23_7, 12	✓		✓	✓	✓	✓	✓	✓	✓		✓
Tambo	Tambo River	23_8, 10				✓	✓	✓	✓	✓	✓		
Tambo	Tambo River	23_9			✓	✓	✓	✓	✓	✓	✓		
Tambo	Timbarra River	23_13	✓		✓	✓	✓	✓	✓	✓			
Tambo	Timbarra River	23_14, 15				✓	✓	✓	✓	✓			
Tambo	Timbarra River & Haunted Stm	23_16, 23_17			✓	✓	✓	✓	✓	✓			
Tambo	Little River	23_18				✓	✓	✓	✓	✓	✓		✓
Tambo	Swifts Ck	23_19	✓			✓		✓	✓		✓		
Tambo	Stony Ck	23_20	✓		✓	✓	✓	✓	✓	✓	✓		✓
Tambo	Boggy Ck	23_21			✓	✓	✓	✓	✓	✓	✓		
Tambo	Tea Tree Ck	23_22			✓	✓	✓	✓	✓	✓			
Tambo	Tambo River	23_23			✓	✓	✓		✓	✓			
Tambo	Tambo River Estuary	23_204	✓	n/a		n/a	✓	✓	✓	✓	✓		
Tambo	Mississippi Ck	23_205	✓	n/a	✓	n/a	✓	✓	✓	✓			
Tambo	Bunga Ck	23_206	✓	n/a	✓	n/a	✓	✓	✓	✓			
Tambo	Lake Tyers	23_221	✓	n/a	✓	n/a	✓	✓	✓	✓			✓
Tambo	Lower Tambo Wetlands	Systems		n/a	✓	n/a	✓	n/a	n/a	n/a	n/a	n/a	n/a
Tambo	Upper Tambo Wetlands	Systems	✓	n/a	✓	n/a		n/a	n/a	n/a	n/a	n/a	n/a
Tambo	Wetlands between Tambo & Snowy	Systems	✓	n/a	✓	n/a	✓	n/a	n/a	n/a	n/a	n/a	n/a

Waterway			Environmental values					Social values			Economic values		
Basin	Name	Number	Formally recognised significance	Represent -ativeness	Rare or threatened sp/ comms.	Naturalness	Landscape features	Activity	Place	People	Water	Power generation	Other resources
Snowy	Hospital Ck	22_1, 2			✓	✓		✓	✓	✓	✓		✓
Snowy	Snowy River	22_3	✓		✓	✓	✓	✓	✓	✓	✓		
Snowy	Snowy River	22_4	✓		✓	✓		✓	✓	✓	✓		
Snowy	Snowy River	22_5	✓		✓	✓		✓	✓	✓			
Snowy	Snowy River	22_6	✓			✓		✓	✓	✓			
Snowy	Snowy River	22_7, 8, 9	✓		✓	✓		✓	✓	✓			
Snowy	Snowy River	22_10	✓		✓	✓	✓	✓	✓	✓			
Snowy	Buchan River	22_11	✓		✓	✓		✓	✓	✓	✓		
Snowy	Buchan River	22_12			✓	✓		✓	✓	✓	✓		
Snowy	Buchan River	22_13	✓		✓	✓	✓	✓	✓	✓	✓		
Snowy	Murrindal, Yalmy & Little Rivers	22_14, 16, 17	✓		✓	✓		✓	✓	✓			
Snowy	Murrindal River	22_15				✓		✓	✓	✓			✓
Snowy	Suggan Buggan, Deddick Rivers	22_19, 22	✓		✓	✓	✓	✓	✓	✓			
Snowy	Deddick River	22_20	✓		✓	✓		✓	✓	✓			
Snowy	Deddick River	22_23	✓		✓	✓			✓	✓			
Snowy	Tingaringy Ck	22_24	✓			✓	✓		✓	✓			
Snowy	Delegate River	22_25	✓			✓		✓	✓	✓			
Snowy	Delegate River	22_26	✓		✓	✓		✓	✓	✓			
Snowy	Bendoc River	22_27			✓	✓		✓	✓	✓			
Snowy	Brodribb River	22_28	✓		✓	✓	✓	✓	✓	✓	✓		
Snowy	Brodribb River	22_29, 30, 31	✓		✓	✓		✓	✓	✓	✓		
Snowy	Sardine Ck	22_32	✓		✓	✓			✓	✓	✓		✓
Snowy	Cabbage Tree Ck	22_33	✓		✓	✓	✓	✓	✓	✓			
Snowy	Cabbage Tree Ck	22_34			✓	✓		✓	✓	✓			
Snowy	Cabbage Tree Ck	22_35				✓		✓	✓	✓			
Snowy	Lower Snowy Estuary	22_203	✓	n/a	✓	n/a	✓	✓	✓	✓	✓		
Snowy	Lower Snowy Wetlands	System	✓	n/a	✓	n/a	✓	n/a	n/a	n/a	n/a	n/a	n/a

Waterway			Environmental values					Social values			Economic values		
Basin	Name	Number	Formally recognised significance	Represent -ativeness	Rare or threatened sp/ comms s	Naturalness	Landscape features	Activity	Place	People	Water	Power generation	Other resources
Far East	Yeerung River	21_1	✓		✓	✓		✓	✓	✓			
Far East	Bemm River	21_2	✓			✓		✓	✓	✓			
Far East	Bemm River	21_3, 4, 5	✓		✓	✓		✓	✓	✓	✓		
Far East	Combienbar River	21_6			✓	✓		✓	✓	✓			
Far East	Combienbar River	21_7				✓			✓	✓			✓
Far East	Combienbar River	21_8				✓		✓	✓	✓			✓
Far East	McKenzie River	21_9			✓	✓		✓	✓	✓			
Far East	Errinundra & Goolengook Rivers	21_10, 11	✓		✓	✓		✓	✓	✓			
Far East	Cann River	21_12, 13, 16			✓	✓		✓	✓	✓	✓		
Far East	Cann River	21_15			✓	✓		✓	✓	✓	✓		✓
Far East	Cann River	21_17				✓			✓	✓	✓		
Far East	Cann River	21_18				✓		✓	✓	✓	✓		
Far East	Reedy & Tonghi Ck	21_19, 20			✓	✓		✓	✓	✓			
Far East	Tonghi Ck	21_21				✓		✓	✓	✓	✓		
Far East	Tonghi Ck	21_22			✓	✓		✓	✓	✓	✓		
Far East	Cann River East Branch	21_23	✓		✓	✓		✓	✓	✓	✓		
Far East	Thurra River	21_24	✓	✓	✓	✓	✓	✓	✓	✓			
Far East	Thurra River	21_25		✓	✓	✓		✓	✓	✓			
Far East	Wingan River	21_26	✓		✓	✓	✓	✓	✓	✓			
Far East	Wingan River	21_27, 28			✓	✓		✓	✓	✓			
Far East	Betka River	21_29	✓		✓	✓	✓	✓	✓	✓	✓		
Far East	Genoa River	21_30			✓	✓	✓	✓	✓	✓	✓		
Far East	Genoa River	21_31	✓		✓	✓		✓	✓	✓	✓		
Far East	Genoa River	21_32			✓	✓		✓	✓	✓			
Far East	Genoa River & Jones Ck	21_33, 34	✓		✓	✓		✓	✓	✓			
Far East	Wangarabell Ck	21_35			✓	✓		✓	✓	✓	✓		
Far East	Yeerung Estuary & Shipwreck Ck	21_201, 208	✓	n/a		n/a	✓	✓	✓	✓			
Far East	Mueller, Sydenham, Wingan Inlets	21_202,203 226	✓	n/a	✓	n/a	✓	✓	✓	✓			
Far East	Tamboon Inlet & Thurra River	21_212, 224	✓	n/a	✓	n/a	✓	✓	✓	✓	✓		
Far East	Mallacoota Inlet	21_230	✓	n/a	✓	n/a	✓	✓	✓	✓	✓		✓
Far East	Far East and Genoa Wetlands	Systems	✓	n/a	✓	n/a	✓	n/a	n/a	n/a	n/a	n/a	n/a

Appendix 3: Assumptions

Assumptions relating to strategy development:

- That the information collected within the AVIRA database is correct. A subset of the information has been evaluated through site assessments on ground for four river reaches and were found to be robust.
- That the AVIRA risk assessment process will adequately identify the important risks to waterways in the region

Assumptions related to Targets

- That activities highlighted will lead to waterway health maintenance or improvement, as outlined in program logic (Chapter 4) and conceptual models (DSE, 2012a).
- Quantities calculated for each activity were rounded down. This was done in the following fashion:
  - >1000 - rounded down to the nearest 100
  - <1000 and >100 - rounded down to the nearest 50
  - <100 and >10 - rounded down to the nearest 10
- **Fencing targets:**
  - Targets were based on frontage condition survey updated in August 2013, using GIS datasets that related to the aforementioned survey and Index of Stream Condition imagery to define frontages that require priority fencing within reaches (this was then saved as a GIS shapefile).
  - Frontages included as targets were priority reaches (defined as 'addressing risks to high values') identified as having fencing condition as poor, none and unknown
    Exceptions:
  - Snowy Basin (R14): No frontage survey data was available – fencing target was estimated using the length of the reach (only one side).
  - Snowy Basin (R34): No frontage survey data was available – EGCMA fencing works dataset was used instead.
  - Snowy Estuary: No frontage survey data was available – fencing target estimated at 1km per year over 8 years
  - Far East Basin(R15, 20, 21): : No frontage survey data was available – – fencing target was estimated based on 30% of one side of the reach length
  - Far East (R35): No frontage survey data was available – desktop analysis undertaken to identify likely fencing opportunities.
- **Management agreement targets:**
  - Targets were calculated based on the area between the proposed fence and the river edge
    Exceptions:
  - Snowy Basin (R14) and Far East Basin (R20, 21): No frontage survey data was available – management agreement target based on the assumption that 1km of reach is equal to 1ha under agreement.
  - Snowy Estuary: No frontage survey data was available – management agreement target estimated at 1km per year over 8 years
- **Vegetation Establishment and complementary revegetation targets**
  - Targets were calculated as half the area of crown frontage under agreement. This assumes that some sites will not require active revegetation owing to (i) natural regeneration where there is a good seed source nearby or (ii) the geography of the land (e.g. limestone cliffs)
    Exceptions:

  - Snowy Basin (R3 and 4): Target was based on the assumption that 5ha of infill planting a year would be completed for the next 8 years
  - Snowy Estuary : Target based on approximations made for the Snowy rehabilitation project (approx. 10-15% of the area under agreement)
- **Willow control targets for crown frontage on cleared land**
  - Mitchell Basin (R5 and 6): Target relating to initial willow treatment was based on the assumption that 1ha willow control be completed each year. Target relating to maintenance on previously controlled sites was based on a number of selected sites getting three treatments in 8 years (including primary treatment once).
  - Mitchell Basin (R8, 9 and 26); Tambo Basin (R5,10, 11 and 15) and Snowy Basin (R3, 4, 6, 11, 18, 20, 21, 23, 25, 26, 27):Target based on assumption of one willow control pass throughout the entire reach over 8 years
  - Lower Mitchell Estuary and Lower Tambo Estuary: Target based on assumption of 1ha to be completed each year
  - Far East (R7, 14, 30): Target based on assumption of three willow control passes on each reach over 8 years
- **Willow control targets for forested rivers on public land**
  - Target based on two willow control passes over the length of the reaches in 8 years
- **Non woody weed control targets**
  - Snowy Basin (R3 and 4): Target based on the area of all sites, dropping back to maintenance regime
- **Waterway structure (large wood) targets**
  - Targets estimated at 20 structures per 4 years over 8 years for each reach.
- **Waterway structure (rock beaching) targets**
  - Mitchell: Target estimated as 400m to be completed every second year (4 years)
  - Nicholson and Tambo estuary: Target estimated as 400m to be completed every four years per reach.
  - Snowy Estuary: Target estimated by estimating gaps in the existing rock beaching

Appendix 4: Workshop on East Gippsland's recreational fishery management priorities

Acknowledgements

Workshop attendees: Russell Conway and Trevor Buck (VRFish), John Harrison, Ray Schmidt, Gary Verrall and John King (Lake Tyers Beach Angling Club), Paul Faulkner (Gippsland Combined Anglers), Linton Barr (Around the Jetties Newsletter), Michael McDonald and Frank Greenhalgh (Unaffiliated anglers), Blaithin Ni Ainin and Graeme Dear (East Gippsland Catchment Management Authority), Renae Ayres (Arthur Rylah Institute, Fish Habitat Network), Dick Brumley, Anthony Forster and Taylor Hunt (Fisheries Victoria).

Workshop invitees: Australian Trout Foundation, Futurefish Foundation, Native Fish Australia, Lower Tambo Landcare Group, Bill McCarthy and Peter Courtney (Fisheries Victoria), Matthew Renshaw (EGCMA), Barry Inkster (Unaffiliated angler), Tim Bull (Local MP), Council of Victorian Fly Fishing Clubs Inc., Gippsland Angling Clubs Association, Gippsland Lakes Fishing Club Inc. and Omeo Angling Club, Paynesville Angling Club Inc. An advertisement was also placed in the East Gippsland News inviting interested members of the public to attend the workshop.

Background

Recreational fishing makes an important social and economic contribution to Victorian regional communities. In particular, the East Gippsland Catchment Management Authority (EGCMA) region provides popular native and trout recreational fishing opportunities.

The Department of Environment and Primary Industries (Fisheries Victoria) is focused on managing fisheries in a balanced way to ensure ecological sustainability and social and economic outcomes. Fisheries Victoria is also responsible for implementing state government initiatives to improve recreational fishing opportunities by supporting fish habitat recovery works, improving angler access and facilities, fish stocking, protecting fisheries resources and education and compliance activities.

Recreational fishing is highly dependent on the health of the environment including the availability of suitable habitat, water quality and water flow regimes to sustain productive fisheries. Recreational fishers acknowledged this critical dependency in surveys (2009 and 2012) that revealed "repairing where fish live" was the most important recreational fishing investment priority. To improve habitat outcomes on the ground, there is mutual benefit in Fisheries Victoria and recreational fishers working with the EGCMA to identify and collaborate on habitat related projects that lead to better fishing outcomes.

Key recreational fisheries in the East Gippsland Catchment

The EGCMA region includes many popular recreational fisheries. In 2012, a survey of recreational fishers highlighted that the Region is Victoria's most highly valued for estuarine fishing and features the second most popular estuary in the state (Mallacoota Inlet). Important fisheries in the region as identified in the survey include the Gippsland lakes and inflowing rivers such as Mitchell, Nicholson and Tambo, Mallacoota Inlet including Genoa and Wallagaraugh Rivers, Sydenham Inlet including Bemm River, and the Snowy River.

A more complete assessment of Victoria's recreational fishing waters can be found in a Guide to Inland Angling Waters of Victoria at: www.dpi.vic.gov.au/fisheries/recreational-fishing/inland-angling-guide

Appendix 5: The East Gippsland Waterway Strategy in context

This diagram shows how state and regional strategies influence the EGWS within an integrated waterway management framework.

Appendix 6: Roles and responsibilities of partners

The table below lists the organisations that will work with the EGCMA in implementing this strategy and their roles and responsibilities.

	Partners	Roles, responsibilities and links with waterways
State government agencies and statutory bodies	Department of Environment and Primary Industries	The Department of Environment and Primary Industries is the lead agency for waterway management. It is responsible for the development of waterway policy, coordination of regional delivery and prioritisation of government investment in waterways. DEPI is also responsible for other aspects of natural resource management that are of relevance to waterways, including: • sustainable management of Victoria's water resources • overseeing the catchment planning framework to promote integrated catchment management throughout Victoria • management of biodiversity • management of public land, including waterways on public land and bushfire management on public land • delivery of sustainability and environment services at the regional level, including some services that relate to waterway management. • manage fisheries and recreational fishing in waterways to optimise economic and social value while ensuring the sustainability of resources • investing in and delivering farming programs on private land where there are waterways • overseeing the management of biosecurity, including aquatic invasive species.

	Partners	Roles, responsibilities and links with waterways
	Environment Protection Authority Victoria	The EPA is an independent body responsible for the protection and improvement of Victoria's environment by establishing environmental standards, regulating and working with organisations to meet these standards. Their roles and responsibilities include: • identifying the beneficial uses of water environments and the level of environmental quality needed to protect them through the State Environmental Protection Policy (Waters of Victoria) (EPA 1995) • setting statutory standards for acceptable water quality and indicators of water quality • investigating water quality incidents classified as 'pollution' • using mandatory and regulatory mechanisms, such as licensing and other discretionary tools to assist in the achievement of water quality objectives • acting in partnership with DEPI and regional bodies to monitor water quality and waterway health, and enables problem solving approaches and independent audits of impacts on the environment and the protection of beneficial uses.
	Parks Victoria	Parks Victoria manages parks and conservation reserves in which many waterways are located, including national, state, wilderness, metropolitan and regional parks, marine national parks and sanctuaries and conservation and natural features reserves. They create, manage and maintain visitor sites and manage a range of assets, including visitor facilities and access points, piers and jetties, sporting facilities and navigation aids, many of which are associated with waterways.
	Gippsland Coastal Board	The Gippsland Coastal Board is one of three regional coastal boards formed under the *Coastal Management Act 1995* reporting to the Minister for Environment and Climate Change. The Gippsland Coastal Board's principal role is to implement the *Victorian Coastal Strategy*, provide advice to the minister and the Victorian Coastal Council, and prepare and implement regional coastal plans. Another main activity is facilitating improved coastal management through liaison with industry, government and the community.
	Victorian Environmental Water Holder	The Victorian Environmental Water Holder is appointed under the Water Act 1989 to manage Victoria's environmental water entitlements. The Victorian Environmental Water Holder works with the waterway managers, Commonwealth Environmental Water Holder, Murray–Darling Basin Authority. Storage operators and land managers to ensure environmental water entitlements are used to achieve the best environmental outcomes.

	Partners	Roles, responsibilities and links with waterways
National or other state authorities	Murray–Darling Basin Authority	The Murray–Darling Basin Authority was established under the federal *Water Act 2007* as an independent, expertise based statutory agency. The primary roles of the authority as outlined in the *Water Act 2007* (Cwlth) include: • preparing and reviewing the basin plan • measuring, monitoring and recording the quality and quantity of the basin's water resources • supporting, encouraging and conducting research and investigations about the basin's water resources • developing equitable and sustainable use of basin water resources • disseminating information about the basin's water resources • engaging and educating the Australian community about the basin's water resources.
Water Corporations	East Gippsland Water and Southern Rural Water	Water corporations in Victoria are established under the *Water Act 1989* and provide a range of water services to customers within their service areas. East Gippsland Water and Southern Rural Water provide a combination of irrigation services, domestic and stock services, bulk water supply services and urban water and wastewater services in the East Gippsland region. Their link with the EGWS includes: • broader catchment health and improved water quality links to water supply. • water reform, operational role in environmental water management.
Local government	East Gippsland Shire Council	Councils are involved in the management of waterways in Victoria through their role as responsible planning authorities, managers of stormwater drainage and onsite domestic wastewater systems, users of integrated water systems, land managers, emergency management bodies, and supporters of community groups. Specifically with regard to waterways, local government has the following roles and responsibilities: • incorporate waterway restoration and catchment management objectives, priorities and actions into statutory planning processes • undertake floodplain management and flood warning in accordance with the *Victoria Flood Management Strategy* • develop and implement urban stormwater plans • manage on-site domestic wastewater systems • manage adjoining waterways under committees of management • manage rural drainage schemes where appropriate.

	Partners	Roles, responsibilities and links with waterways
Traditional owners	Traditional owner boards and councils	Traditional owners with recognised native title rights or formal agreements with the state are important in land and water management. Joint management cooperative management agreements can involve establishment of majority traditional owner boards or councils that prepare management plans and/or provide advice about the management of specific areas.
Community	Landholders	Landholders are vital to successful implementation of this strategy, as most works are on crown land adjoining privately owned land that require partnerships with adjacent landholders, and their land management practices have a vital role in catchment health. Under the *Catchment and Land Protection Act 1994* landholders are required to: • protect water resources • avoid causing or contributing to land degradation which causes or may cause damage to land of another owner • conserve soil • eradicate regionally prohibited weeds and prevent the growth and spread of regionally controlled weeds • prevent the spread of, and as far as possible eradicate, established pest animals.
	Individuals	Community members have an important role in protecting waterway health by avoiding and reporting pollution, reducing resource consumption and contributing to environmental management processes.
	Community groups	Community groups (such as Landcare, Waterwatch, EstuaryWatch, 'Friends of' groups) participate in regional planning, priority setting and the implementation of regional works programs, participate in monitoring waterways condition and undertake projects in priority areas.
	Industry	Industry can assist in the protection and improvement of waterways by managing its activities in accordance with the principles of ecologically sustainable development and minimising adverse effects on the environment by the implementation of best practices, in accordance with 'duty of care' responsibilities and good corporate citizenship.

Shortened forms

AVIRA	Aquatic value identification and risk assessment
DEPI	Department of Environment and Primary Industries *formerly* Department of Sustainability and Environment
DSE	Former Department of Sustainability and Environment
EGCMA	East Gippsland Catchment Management Authority
EGRHS	*East Gippsland Regional River Health Strategy*
EGWS	*East Gippsland Waterway Strategy*
GHD	GHD consulting firm
ISC	2010 *Index of Stream Condition* (Department of Environment and Primary Industries 2013)
MER	Monitoring, evaluation and reporting
NRM	Natural resource management
PWG	Program working group
VWMS	*Victorian Waterway Management Strategy*

Glossary

AVIRA	Aquatic value identification and risk assessment framework
Freshes	The first seasonal 'flush' of water through a waterway
Regionally important waterways	Regionally important: Waterways with (i) formally recognised significance (Heritage and Icon rivers, East Asian Australasian Flyway Sites, Ramsar listed waterways, Directory of important wetlands of Australia), (ii) geomorphic significance, representative rivers, important bird habitats, and (iii) waterways adjacent to private land with multiple significant species or communities present; (iv) rivers and estuaries with multiple high social values known to be present and ((v) waterways with high economic values (waterways serving as rural water sources for agricultural production and waterways with commercial fishing activities).
Resistance	The ability of a waterway to withstand erosive forces during high flows.
Resilience	The ability of a waterway to recover after disturbance without intervention.

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