

Coliban

STRATEGIC DIRECTIONS STATEMENT

SEPTEMBER 2018



Integrated Water
Management Forums



Environment,
Land, Water
and Planning

Integrated Water Management is a collaborative approach to water planning and management that brings together organisations with an interest in all aspects of the water cycle.

It has the potential to provide greater value to our communities by identifying and leveraging opportunities to optimise outcomes.

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Foreword

Water is fundamental to the social fabric of our communities, who depend on water to grow and thrive. Ensuring that our large cities and small regional towns have the resilience needed to be healthy, active and engaged communities is a long term goal of the Coliban IWM Forum.

Integrated Water Management (IWM) was first introduced into the Coliban region in 2016 for the four largest urban water supply systems in the region – Bendigo, Echuca, Castlemaine and Kyneton. Since then, there has been a profound shift in the thinking, conversation and level of engagement that has seen IWM being recognised and becoming part of a new way for regional and urban planning.

The Coliban region has also recently benefited from the participation of Bendigo as the first Victorian regional city, and Australia's first inland city, in a project led by the Cooperative Research Centre for Water Sensitive Cities. This project created a shared vision and transition strategy for Bendigo to achieve an envisioned future state of becoming a water sensitive city.

The highly collaborative approach of that project involved many of the Coliban IWM Forum members, and it affirmed the enabling role of IWM in transforming cities and towns to being resilient and liveable under all predicted climate futures, so that they continue to prosper and be great places to live and work.

It is my pleasure to present the Strategic Direction Statement for the Coliban IWM forum, which is an outstanding example of regional collaboration by a diverse Forum membership with interests in land, water, waterways, the urban built form, and community health and wellbeing. The Statement identifies many important and innovative opportunities, backed by the Forum, that can substantially transform and enhance the role that water plays as an essential part of our region's way of life.

I wish to thank the Coliban IWM Forum members for their commitment, energy and enthusiasm, and for sharing their considerable knowledge and experience of the region in developing this Statement. The future vision and exceptional strategic regional response that has been endorsed by the Forum delivers outcomes and benefits for both current and future generations.

I also wish to acknowledge and thank Mick Bourke, who served as the inaugural Chair of the Coliban IWM Forum, for his encouragement, guidance and contribution when the Forum was first formed and undertook the initial work that has culminated in this compelling Statement for our region.



Jeff Rigby
Interim Chair of the Coliban
IWM Forum

Acknowledgements

The Coliban IWM Forum covers Dja Dja Wurrung, Yorta Yorta, Taungurung and Barapa Barapa country, whose ancestors and their descendants are the traditional owners of this country.

The Coliban Strategic Directions Statement has been developed in collaboration with:

The meetings of the Forum and individual meetings with project sponsors have developed initiatives into mature project themes.

Collaboration and cross-pollination have been a key outcomes of the Forum, with ideas being shared and improved by input from project partners.





Early morning mist on Lauriston Reservoir (2011). Courtesy: Coliban Water

At a glance

The Coliban Integrated Water Management (IWM) Strategic Directions Statement highlights the key challenges in the region and identifies collaborative opportunities that can improve resilience and liveability in the region's cities and towns.

Vision

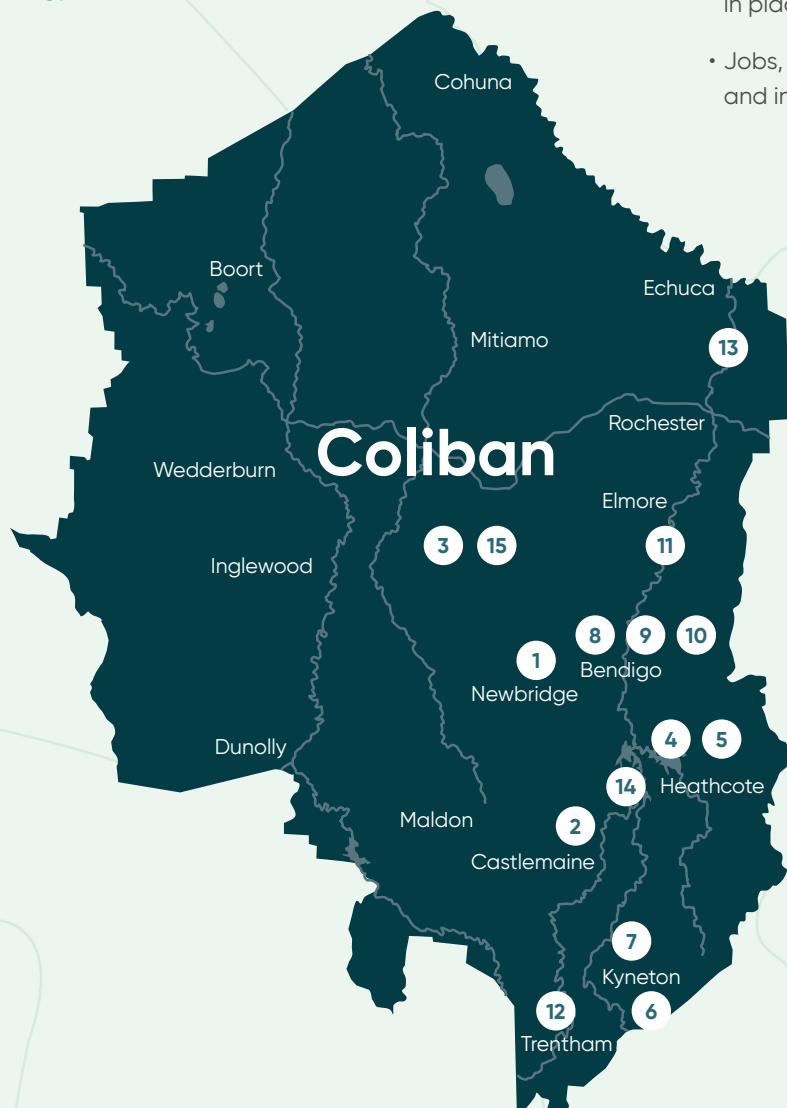
Resilient and liveable communities.

Purpose

Working together to create water cycle outcomes that support the future health and resilience of our environment and communities.

Strategic outcomes:

- Safe, secure and affordable supplies in a changing future.
- Effective and affordable wastewater systems.
- Manage flood risks.
- Healthy and valued waterways and waterbodies.
- Healthy and valued landscapes.
- Traditional owner and community values reflected in place-based planning.
- Jobs, economic opportunity and innovation.



IWM opportunities

Forum partners will commit their best endeavours to ensure priority projects and strategies are progressed in line with the shared vision and strategic outcomes identified by the Coliban IWM Forum. The key IWM opportunities include (in no priority order):

1 Growing Newbridge Sustainably

A feasibility study to consider supplying the township of Newbridge with a secure water supply and associated water and sewerage infrastructure. It will also look at alternative measures such as stormwater harvesting.

2 Water for Now and into the Future in Castlemaine

Undertake an Integrated Water Management Plan for the township of Castlemaine, encompassing all relevant IWM components. The key issues to be resolved include ensuring adequate protection of the waterways from urban stormwater and recycled water releases as well as providing a climate resilient water supply to irrigate green spaces and for industrial reuse.

3 Planning for Sustainable Water Management

Enforcement of existing planning policy for IWM is currently a challenge. This is an opportunity to link with wider state-wide work to pilot new planning approaches in the Coliban Forum area.

4 Lake Eppalock Hydro-electricity Project: For Country and Environment

This scheme considers an environmental water release from Malmsbury Reservoir to the Coliban River to enhance environmental and cultural values, while also utilising releases via a hydroelectric scheme at Lake Eppalock.

5 Lake Eppalock Water Quality Assessment

A better water quality monitoring regime for Lake Eppalock will help to support water supply and recreation while improving ecological outcomes in downstream waterways.

6 Hanging Rock Reserve Alternative Water Supply

Development of a business case to underpin the utilisation of recycled water from the Woodend Recycled Water Plant

for irrigation of the Hanging Rock Reserve to benefit waterway health and enhance this important location.

7 Macedon Ranges Northern Region IWM Plan

This project involves the development of an IWM Plan for Kyneton and revisiting and reconfirming the outputs from the Woodend IWM plan as priorities. The Plan will consider priorities for water supply, waterway health and amenity.

8 Implementation of the Transition Strategy for a Water Sensitive Bendigo

The transition strategy sets out short and medium term strategic priorities for Bendigo. The next step is to take the strategy into implementation and create governance structures for ongoing action.

9 Re-imagining Bendigo Creek

This project proposes to address the unrealised opportunity that a restored and revitalised waterway presents to the Bendigo community, from the perspective of liveability, waterway health, aesthetics, urban planning and community input, and balancing challenges such as urban flooding.

10 Wanyarram Dhelk

This project complements the re-imagining of the Bendigo Creek project by delivering targeted improvements. These will establish a predominately vegetated, biologically diverse waterway that supports the wider community's interests, whilst offering educational pathways opportunities to support the cultural aspirations of the Dja Dja Wurrung Traditional Owners.

11 Aboriginal Water Assessment – Campaspe River

This project is one of a series of Aboriginal Waterway Assessments that looks to initially support the capturing of cultural values along waterways by multiple Traditional Owner groups. The Campaspe River has been initially selected.

12 Greening Trentham for Water Security and Healthy Waterways

This project will undertake a water supply security assessment for the township of Trentham, where groundwater is declining and alternative water sources are needed to support key green assets. There are also opportunities to improve stormwater quality through integrated water management.

13 Campaspe: Planning for Future Water Management

This strategic framework will provide the local link between the state government's direction as set out in *Water for Victoria*, and provides a voice for the community along with the delivery of place-based initiatives.

14 Upper Coliban Integrated Catchment Plan

The Upper Coliban catchment provides raw water for drinking water purposes for more than 130,000 people as well as having a range of additional environmental, social, cultural and economic values. This project supports the Upper Coliban Integrated Catchment Plan by protecting the catchment and in turn the quality and quantity of drinking water.

15 Managed Aquifer Recharge Potential in the Coliban Region

Detailed examination of the potential for Managed Aquifer Recharge (Campaspe Deep Lead) in the Coliban Region that may help develop an information suite and governance requirements to support decisions around managed aquifer recharge schemes. With the goal to boost the reliability of urban water supplies across the State by integrating groundwater and surface water management, this project will form one of two case studies across northern Victoria.



Chapter 1

The way forward

An unprecedented opportunity to progress water cycle planning and management in Victoria through collaboration.

Introduction

Integrated Water Management is a collaborative approach to water planning that brings together organisations that influence all aspects of the water cycle. It has the potential to provide greater value to our communities by identifying and leveraging opportunities to optimise the outcomes of the water cycle.

Overview

The *Integrated Water Management (IWM) Framework for Victoria* (September 2017) is designed to help regional stakeholders to work together, ensuring the water cycle contributes to the liveability of towns and cities in Victoria, with communities at the centre of decision making.

The central premise of an IWM approach is the overall acceptance that managing urban liveability and resilience is a shared responsibility and that water is a key enabler to achieving these shared aims.

To facilitate this, IWM Forums have been established across the state to identify, prioritise and oversee the implementation of critical collaborative opportunities. This Strategic Directions Statement has been produced by the Coliban IWM forum to capture and communicate those opportunities.

IWM seeks to build on existing partnerships and planning processes. In the Coliban region regional stakeholders, such as local government authorities, North Central Catchment Management Authority and water corporations, engage with their communities regularly to improve service delivery and urban planning. Community aspirations are embedded in the strategies and operational plans for organisations throughout

the region. These aspirations reflect a desire for liveable and productive places and vibrant communities. The way in which we plan and use water is fundamental to ensuring these aspirations are realised.

IWM in the region is also strengthened by the formation of the North Central Catchment Partnership under the Victorian Government's *Our Catchments, Our Communities Integrated Catchment Management Strategy for Victoria (2016–19)*.

What is a Strategic Directions Statement?

This Strategic Directions Statement (SDS) articulates the regional context, the shared vision and the strategic water-related outcomes for the Coliban IWM Forum region.

This SDS includes a list of IWM opportunities, including projects and strategies, developed in collaboration by the Coliban IWM Forum partners.

Partners of the Forum are committing their organisations to apply their best endeavours to:

- Ensure priority projects and strategies are progressed in line with the shared vision and strategic outcomes of the Coliban IWM Forum; and to
- Support DELWP to progress priority strategic enablers for IWM in Victoria.

It is envisaged that the SDS will be a living document which will be updated to reflect the Coliban IWM Forum's priorities and opportunities.



Bendigo Aquatic Centre. Courtesy: Coliban Water

Enduring collaboration

How we're working together

The Coliban IWM Forum identifies, coordinates and prioritises areas that would most benefit from collaborative and place-based water management planning and delivery.

To ensure IWM is successful and enduring across the region, the Coliban IWM Forum partners have committed to the promotion of a collaborative and shared values culture within their own organisations and beyond through their work with key water cycle delivery partners and local communities.

The Coliban IWM Forum is governed by an open and transparent IWM planning process (Figures 1 and 2). This process assumes a holistic, whole-of-cycle approach to determining water cycle solutions, considering regulatory accountabilities and service delivery responsibilities.

Each organisation has an important role to play in the decision-making and management of the water, resources and assets for the entire catchment.

Collaboration across IWM Forum partners will ensure balanced consideration of the complex economic, environmental, cultural, and community benefits and impacts associated with the range of proposed IWM projects and work programs.





The Coliban IWM Forum partners will continue to work together to build inter-organisational trust and develop productive, enduring relationships to realise the shared vision for the region.

Further information on the IWM Forum's governance and planning framework is outlined in the *Integrated Water Management Framework for Victoria*, available at <https://www.water.vic.gov.au/liveable/resilient-and-liveable-cities-and-towns/iwm-framework>.



Figure 1 IWM Forum governance structure

Figure 2 IWM Forum planning and delivery process.

	Outcomes	Participants
Phase I		
	Establish	
	Organisational leaders come together in collaborative IWM Forums and Practitioner Workshops to discuss integrated water management challenges, opportunities and priorities for each region	Local governments Catchment Management Authorities Water corporations Traditional Owners Department of Environment, Land, Water and Planning Chair Others as relevant
	Preliminary work on regional characterisation and collaborative governance	
	Agree vision, objectives and goals	
	Agree criteria for selection and prioritisation of IWM opportunities	
↓		
Phase II		
	Plan and Develop	
	IWM Project Groups form to develop an implementation approach for prioritised projects	Collaborative Partners DELWP Relevant stakeholders
↓		
	Incorporate	
	Collaborative Partner organisations incorporate relevant elements of IWM in their own plans, guidelines or frameworks	Individual organisations who have committed to a project
	IWM Project Groups to take IWM commitments (projects and strategies) to their Board or Councils for endorsement	
↓		
	Deliver	
	IWM Project Groups progress with delivery of projects and strategies	Individual organisations who have committed to a project Community representatives DELWP Others as relevant
	IWM projects, strategies/plans are implemented	
	Additional community value added through participatory planning	
	Monitoring and evaluation of key measures and outcomes	
	Application of practical IWM tools and innovative approaches	
	Economic savings through shared resources, costs, etc.	
Improved resilience and liveability of cities and towns		
IWM Project Groups prepare for next round of opportunity identification and prioritisation		



Chapter 2

IWM in the region

Understanding why an integrated approach to water planning and management is critical for the Coliban IWM Region now and for the future.



Upper Coliban Reservoir spilling (2010). Courtesy: Coliban Water

Vision and outcome areas for the Coliban IWM Forum Region

Outcomes



Safe, secure and affordable supplies in a changing future



Effective and affordable wastewater systems



Managed flood risks



Healthy and valued waterways and water bodies

Objectives

A diverse range of fit for purpose water supplies and resources are utilised

Meets public health and environmental standards and drives incremental improvement through a risk-based approach to wastewater management

Appropriate levels of flood protection to the region's towns and cities

Waterway health is maintained and improved for environmental and human use

Water quality meets regulatory standards and community expectations

Supporting effective sewerage systems and driving innovation where appropriate

Community and property resilience to local flood risk now and in the future

Waterways are accessible as valuable open space and managed to provide for community values including biodiversity links and recreation

Actively promote and incentivise water efficiency to reduce demand

Optimised small town domestic wastewater in unsewered towns

Efficient and effective urban drainage that enhances urban landscapes

Traditional Owner and Aboriginal values, knowledge and practices associated with waterways and waterbodies are understood, protected and enhanced

The reliability of the resource matches the users and customers need

Waterway riparian land will be improved to allow waterway, wetland and waterbody protection and improvement

'Fit-for-purpose' water available to maintain green community assets to benefit public health and well-being

Stormwater management practices will contribute to enhancing waterway health

Vision

Resilient and liveable communities.

Purpose

Working together to create water cycle outcomes that support the future health and resilience of our environments and communities.

IWM Outcome Areas

The region is seeking to achieve seven key outcomes through IWM. Each of these will have a significant role in shaping the liveability, prosperity and resilience of our cities and towns. These outcome areas provide indicators to assess the effectiveness of the various IWM opportunities, recognising that these outcomes are in themselves co-dependant.



Low-emission solutions

IWM opportunities that minimise the release of greenhouse gas (GHGs) emissions will be considered by the Forum as solutions are evaluated for implementation.



Healthy and valued landscapes

Effective use of planning scheme to embed integrated water management

Manage and create public open space and land to retain moisture for cooler, greener cities and towns

Public open greenspace, parks and reserves connects people, landscapes and water bodies, and provides active recreational, passive transport links and refuge on hot days

Connect and enhance biodiversity corridors across the catchment to connect townships, communities and rural areas to support climate change resilience and protection of raw water supplies

Traditional Owner and Aboriginal values associated within landscapes are understood, protected and enhanced



Traditional owner and community values reflected in place-based planning

Diverse urban landscapes that reflect local conditions and collective values

Empowered and engaged communities and Traditional Owners

Local water related risks and issues understood and managed

Traditional Owner and aboriginal values are understood, recognised and integrated throughout the planning and delivery process



Jobs, economic opportunity and innovation

Jobs and economic opportunities are supported by water

Innovative planning and operation

Identify and promote water sensitive industry

Regional context

The Coliban IWM Forum region covers an area of approximately 16,500 square kilometres, extending from Woodend, Kyneton and Castlemaine in the south to the Murray River on the border with New South Wales in the north. The south-west of the area is bound by the Avoca River, while the Campaspe River is to the east of the region. The Loddon River runs south to north through the centre of the region.

The landscape and climate of the region varies between the goldfields in central Victoria among the headwaters of the area and the floodplains along the Murray River. In the south of the region, the annual rainfall is around 1000 mm, while in the north it is as low as 350 mm. Land use is highly varied throughout the area, ranging from forests in the south to broadacre dryland and irrigated farming in the north.

Population

The region has an estimated population of 185,000, which is forecast to grow to 250,000 by 2040. This growth will be felt across a majority of the major urban centres of the region, with the highest growth predicted in Bendigo, Castlemaine, Kyneton and Echuca.ⁱ

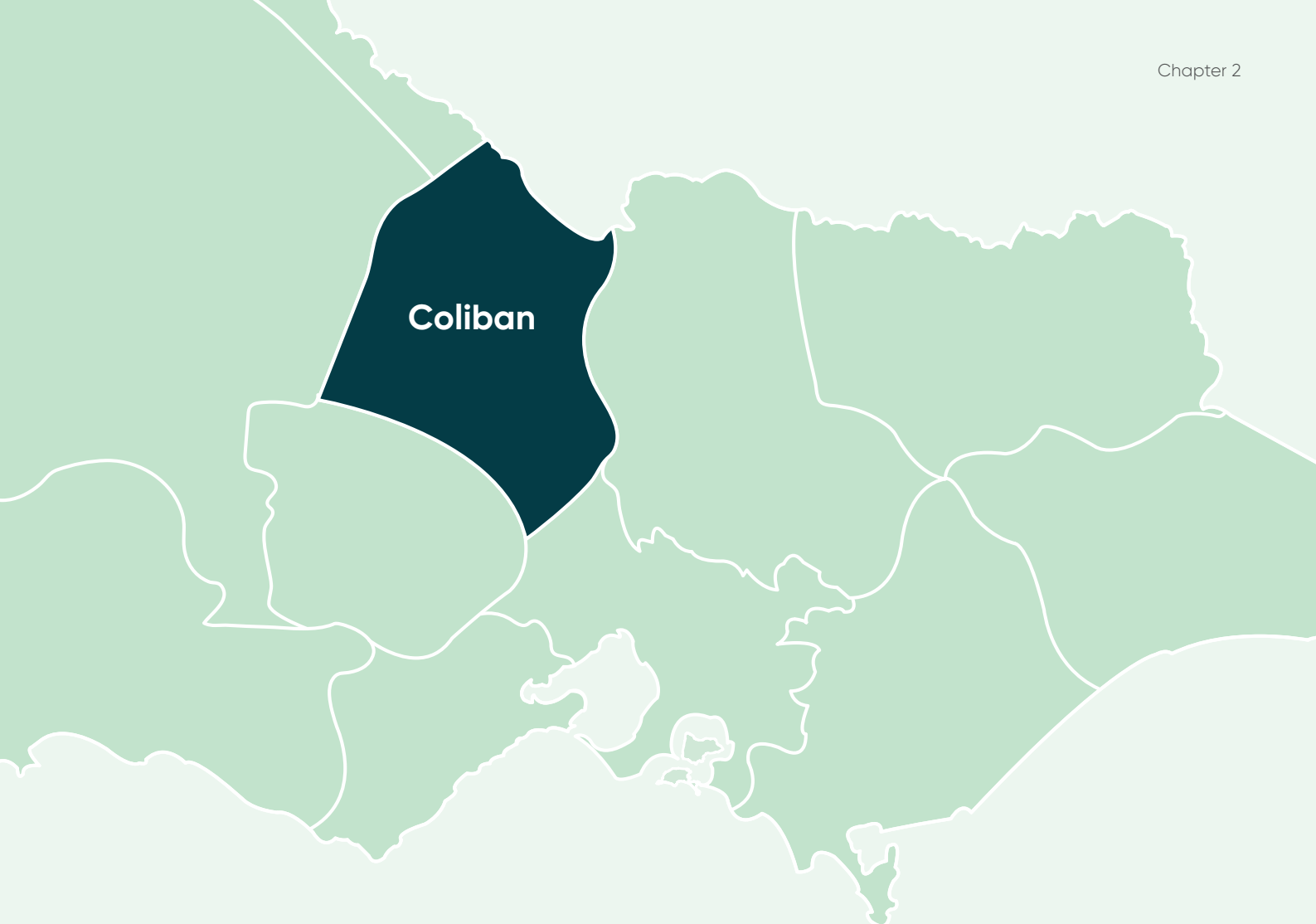
Climate change

The Coliban Region faces a warmer and drier future. By 2070, average annual temperatures across the region are projected to rise by 1.6°C to 2.7°C (median value). This will be amplified in urban centres due to the prevalence of darker and harder surfaces, leading to environmental and human health impacts. Ensuring the provision of fit for purpose water for the region's urban greening will be a key priority in enhancing liveability and resilience for the community and environment.

The average annual rainfall is predicted to decrease by five per cent by 2070 (median value) – primarily impacting the 'cool' season – while there is also an expectation of a year-round increase in temperatures. This presents a challenge for the region, as there will be an increased demand for urban water resulting from population growth together with a hotter drier climate.ⁱⁱ



Aerial view of Lauriston Reservoir (2009). Courtesy: Coliban Water



POPULATION GROWTH

185,000 NOW (2018)

250,000 BY 2040 ¹



35%
INCREASE

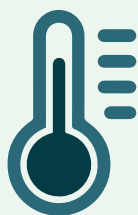
WATERWAYS

43,000 KM

MOST IN 'MODERATE'
STREAM CONDITION ²



TEMPERATURE



1.6–2.7°C

INCREASE

BY 2070 ³

CHANGE IN RAINFALL



5%

DECREASE

BY 2070 ⁴

¹ Victoria in Future

² North Central CMA

^{3&4} DELWP (2017) Guidelines for assessing the impact of climate change on water availability in Victoria

The case for IWM in the Region



Safe, secure and affordable supplies in a changing future

The Coliban Region has historically experienced water supply challenges, with an extensive network of water supply transfers being conducted during the goldrush as part of the Coliban system of waterworks. Today, the Coliban system's raw water supply sources are spread out across Victoria through connected networks in northern Victoria (Murray and Goulburn systems and groundwater sources) and western Victoria (Wimmera Glenelg system) in the Grampians.

Potable water services are currently provided to 50 cities and towns in the region via 20 water treatment plants. The Coliban Region has an extensive network of more than 1000 rural water users, utilising raw and recycled water supplies for irrigation, community amenity and stock watering.

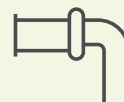
The water supply in the region faces several challenges over the next 50 years from climate change and

a steadily increasing population. Baseline demand is forecast to increase by over 30,500 ML per year by 2065. Urban water supply is relatively secure, though some scenarios could result in shortfalls. By 2040 the shortfall in supply could reach approximately 17,600 ML per year across the nine water supply systems under current entitlements. By 2065 this potential shortfall could double. Without intervention this magnitude of shortfall would result in unacceptable levels of water restrictions and potentially constrain economic growth. The provision of alternative water sources and demand management are key strategies to avoid shortfalls.ⁱⁱⁱ

A current water security project in the region is the South West Loddon Pipeline Project. The project will introduce flexibility in the available water supply to the west of the region.



Watering. Courtesy: Coliban Water



Effective and affordable wastewater systems

There are reticulated sewage systems to 61,000 properties across 26 cities and towns in the region. These systems collect and treat sewage at 17 Wastewater Management Facilities^{iv}. In addition to these facilities there are many small towns in the region which typically use onsite septic systems to treat their wastewater. Small town wastewater management is a common issue across the region from an environmental, health, technical, governance and financial perspective. Some councils have domestic wastewater management plans in place to help to manage these systems.

There are 17 water reclamation plants in the Forum area, delivering Class B and Class C water for irrigation purposes. Coliban Water also operates a recycled water factory in Bendigo which produces Class A water which is distributed via the recycled water pipeline network and used by sporting clubs, Council, schools, rural customers and businesses for watering recreational turf, parks and gardens, irrigation of crops, car washing, road works and dust suppression. Around 3,900 ML of recycled water is used in the region per year, while a further 6,400 ML of recycled water is returned to waterways.



Manage flood risks

Floodplains are a valuable part of the ecosystem in the Coliban region. Flooding provides essential nutrients to rivers, wetlands, and the region's agricultural land, but major flood events can also have significant impacts to property, community infrastructure and agricultural economies. In an urban context, flooding is more of a challenge. The major urban centres of Bendigo, Echuca, Castlemaine and Kyneton, as well as many smaller centres, are located on waterways and floodplains and have a legacy of flooding problems due to past alterations of natural water courses and due to the proximity of urban development. Climate change is forecast to bring more intense rainfall events and will create further challenges when coupled with increasing urban growth.

It is essential to manage the economic, social, environmental and cultural values from floodplains in a balanced way whilst having regard for their inherent risks. This will be particularly relevant in the context of increased extreme rainfall events, urban growth and increased imperviousness in catchments.

The *North Central Regional Floodplain Management Strategy 2018-2028* has identified actions to reduce flood risk across the Coliban region. Among others, the Strategy includes actions to investigate local reservoirs as flood retention basins, maintaining waterways and drains for flood risk reduction purposes, and designing or constructing new flood mitigation measures in Castlemaine and Dunolly. These and similar actions within the Strategy's Regional Work Plan provide opportunities for collaborative approaches that reduce flood risk through integrated water management techniques.



Healthy and valued waterways and water bodies

The health, wellbeing and prosperity of our communities depend on healthy waterways and catchments. Waterways, wetlands and waterbodies of the region are embraced by the urban and rural communities for their aesthetic, recreational, tourism and restorative appeal. These values are challenged by poor water quality and are suffering from degradation due to uncontrolled stock access, land clearance, surface water runoff from impervious surfaces, untreated stormwater and wastewater discharges.

Waterways form a culturally important and significant part of country for Traditional Owner groups in the region. Empowering Traditional Owners to restore and enhance waterways and riparian land, such as Bendigo Creek, will support healthy water to flow into the country of neighbouring traditional owner groups and the restoration of significant sites downstream such as Kow Swamp.

The North Central Catchment Management Authority (CMA) has identified several priority rivers in the Coliban region as part of the *Waterways Strategy*, including the Campaspe, Avoca and Loddon Rivers. Smaller waterways are also recognised as priorities such as

Little Coliban River, Coliban River, Five Mile Creek and Kangaroo Creek in the south and Serpentine Creek in the north.

The long-term vision of the *Waterways Strategy* is:

'Waterways will be managed sustainably to maintain and improve their ecological diversity and function while also supporting the regional community's economic, cultural, recreational, and amenity use'.

These waterways have significant environmental values requiring protection and enhancement through a partnership approach. North Central CMA also identifies a series of priority wetlands in the region including the internationally significant Ramsar-listed Gunbower Forest wetlands in the north east along with numerous swamps and lagoons throughout the region. The region's riverine assets support threatened species (including Growling grass frog, Murray cod, Silver perch and Golden perch).

Given the Murray River borders the region to the north, opportunities progressed through the Coliban IWM Forum may interact with and consider the impact to the Murray Darling Basin Plan.



Bendigo Creek. Courtesy: City of Greater Bendigo



Healthy and valued landscapes

Integrated water management recognises that land, water and biodiversity are all part of a connected environment. A healthy environment underpins the regional economy and provides social and recreational values that benefit the community. Maintaining and improving the health of the Coliban catchment is essential to sustain the environment and the liveability of the region into the future.

Healthy landscapes are valued in the Coliban region. Many areas of public land are under Aboriginal Title and are frequently visited and viewed as important to the character of the region.

The planning and management of public land can continue to consider opportunities to support integrated water management. Healthy green and well-connected public open space and recreational areas can be integrated into the urban and adjacent rural landscapes and waterways, contributing towards liveability and resilience.

A number of councils are playing leadership roles for Victoria to promote healthy and valued landscapes, integrating land use and water planning. The *Visioning and Transition Strategy for a Water Sensitive Bendigo*, the *Distinctive Landscapes Bill* for Macedon Ranges Shire Council and *Upper Coliban Integrated Catchment Plan* are all firsts for Victoria.



Traditional Owner and community values reflected in place-based planning

The relationship between public health and wellbeing, and the environment is becoming increasingly recognised as an area of importance. The creation of greener neighbourhoods and providing communities with access to waterways and green space has the potential to support environmental, social and economic outcomes.

The Coliban region covers the traditional lands of Dja Dja Wurrung, Yorta Yorta, Taungurung and Barapa Barapa people, and the many rivers in the area contain a rich and diverse range of important cultural heritage sites.

Restoration of traditional functions of creeks and rivers can be contrasted with increased urban surrounds, but there are opportunities to optimise different outcomes through a collaborative process. Bendigo Creek is currently the focus of rejuvenation. The project Wanyarram Dkelk incorporates Traditional Owner and community values into works on the Bendigo Creek.



Jobs, economic growth and innovation

Major industries in the region include manufacturing (including food and meat processing) and defence contracts, transport and agriculture. One of the economic strengths of the region is its diversity. The regional economy is projected to grow and education, tourism, construction and hospitality have all showed higher growth in recent times than traditional industries for the area.

Water plays a key role in supporting industry in the region. The significant tourism and recreation economy in the region is also strongly linked to the health and amenity provided by the region's waterways, lakes and towns. Raw water supplies also support agricultural economies across the region. As water supply challenges emerge, there is opportunity for innovation and collaboration with industry to ensure economic development and water planning are coordinated.

Managing groundwater from Bendigo mines

Groundwater is naturally-occurring within Bendigo's network of disused and abandoned mines. It has been recovering to natural levels since mining ceased in 2011. The groundwater has elevated levels of salt, arsenic, other heavy metals and hydrogen sulphide gas. Without intervention, groundwater would flood the Central Deborah Gold Mine tourist attraction and flow into local waterways which would create environmental and amenity impacts.

The interim solution has been put in place until June 2021 through a partnership between DELWP and Coliban Water. The interim solution pumps groundwater from the mine voids beneath Central Bendigo and sends it to the New Moon Groundwater Treatment Plant in Eaglehawk for treatment. DELWP is working with the community, stakeholders and local agencies to identify a long-term solution for groundwater management.

Success stories

There has been a significant effort over the years by state and local government, regional agencies, communities, planning bodies and boards to identify what we need to do to address the challenges and opportunities in the region. Two recent case studies are outlined below.

Vision and Transition Strategy for a Water Sensitive Bendigo

In collaboration with local stakeholders, the Cooperative Research Centre (CRC) for Water Sensitive Cities developed a vision and transition strategy which defines a vision of a water sensitive future for Bendigo, and outlines the broad steps Bendigo should take to enable a transition towards this future. It is the outcome of nine months of research, analysis and engagement with 31 community champions and 47 leading thinkers from across water, planning, development and the environment in Bendigo.

The project developed and applied methods and tools of the CRC for Water Sensitive Cities designed to consider a city's long-term water aspirations, benchmark current water sensitive performance and explore strategic priorities for the short- to medium-term that will be important in pursuing its water sensitive city vision. These approaches have helped situate Bendigo on its water sensitive city transition journey and identified the critical interventions to enable progress.

Upper Coliban Integrated Catchment Plan

Lead by the North Central CMA and Coliban Water, the *Upper Coliban Integrated Catchment Plan* was developed in collaboration with the catchment stakeholders in



Bendigo WSC case study. Courtesy: City of Greater Bendigo

2015–16. The Plan is an example of collaboration leading to on-ground action being implemented. The Upper Coliban catchment provides raw water for drinking water purposes for over 130,000 people as well as having a range of additional environmental, social, cultural and economic values. The catchment faces known threats from existing and future developments, uncontrolled livestock access to waterways and riparian areas, and from climate change.

The Plan involves a range of on-ground actions (stock exclusion from waterways, riparian regeneration and revegetation, willow removal) and additional municipal planning scheme amendments through development of Environmental Significance Overlays

to protect raw water supplies. In addition, it proposes supporting community education, extension and compliance activities.

Protecting the catchment as the first and most important barrier in a multiple barrier approach is strategic from both a risk management and cost-effectiveness perspective. This Integrated Catchment Management Plan was undertaken in a robust and integrated manner that serves as a model for how organisations and communities can work together to manage precious natural resources in the face of current and future development pressures.



Chapter 3

IWM opportunities

A portfolio of IWM projects and strategies for which IWM collaborative partners have committed themselves to applying their best endeavours to progress.

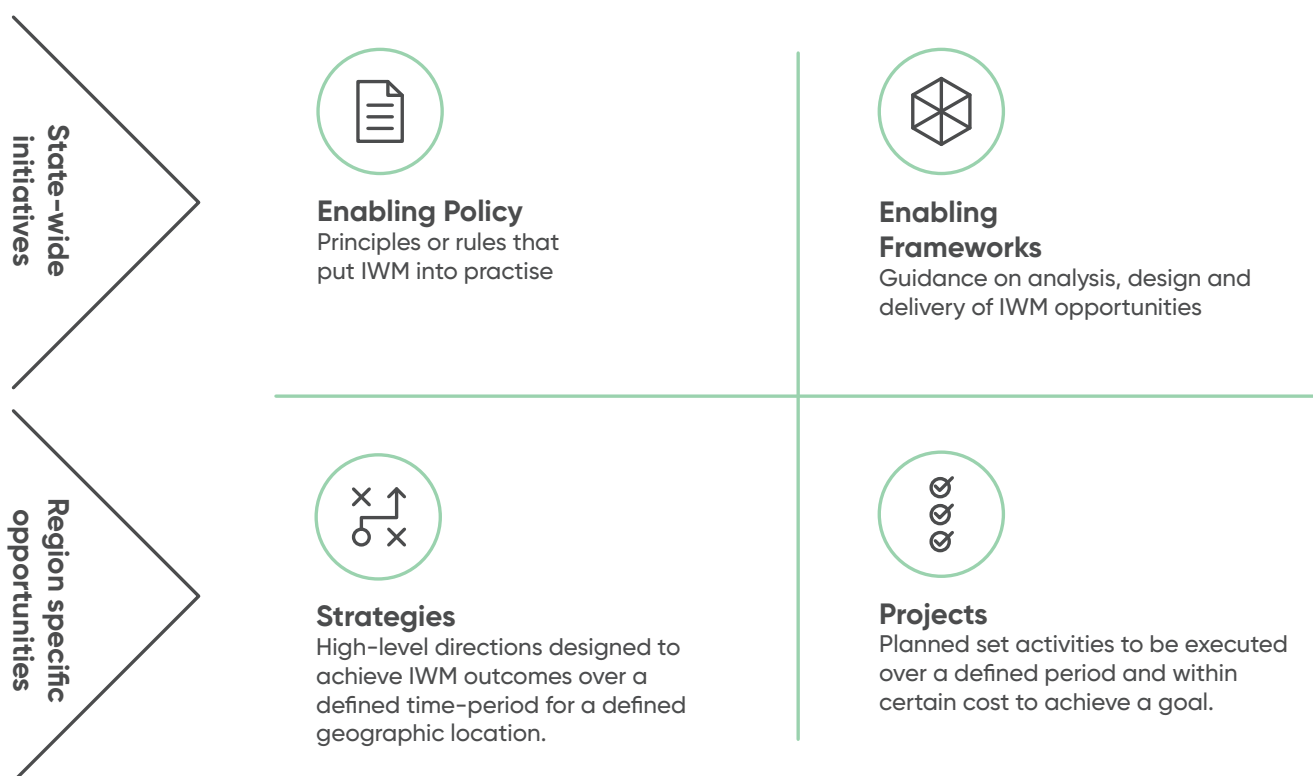
State-wide and region specific initiatives

This document outlines priority IWM opportunities for the Coliban region. These include both strategies that will direct IWM in the region and specific projects that will deliver on-the-ground outcomes. To ensure IWM opportunities are successful and delivered efficiently, work is also being done at a state-wide level.

Across Victoria, IWM Forum members are identifying a range of strategic policy and framework enablers to address barriers to integrated water management and planning and achieve water related benefits in priority areas. A prioritised list of enabling policies and frameworks is being consolidated by DELWP.

A Resilient Cities and Towns (RCT) Reference Group was established to support the implementation of integrated water management and planning across the state. The Reference Group provides advice to DELWP on the development and implementation of key initiatives in relation to policy, processes or knowledge gaps.

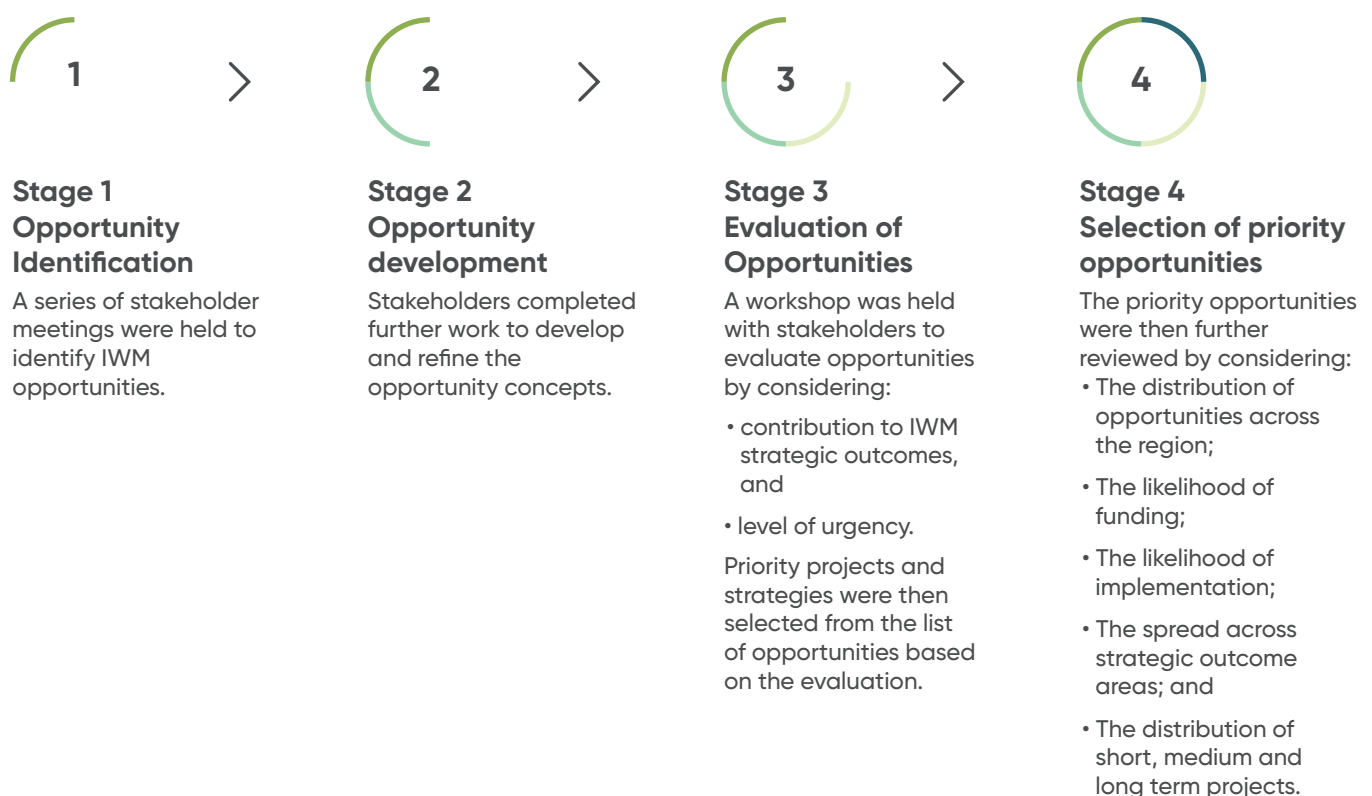
Figure 3 IWM framework at a State-wide and regional level.



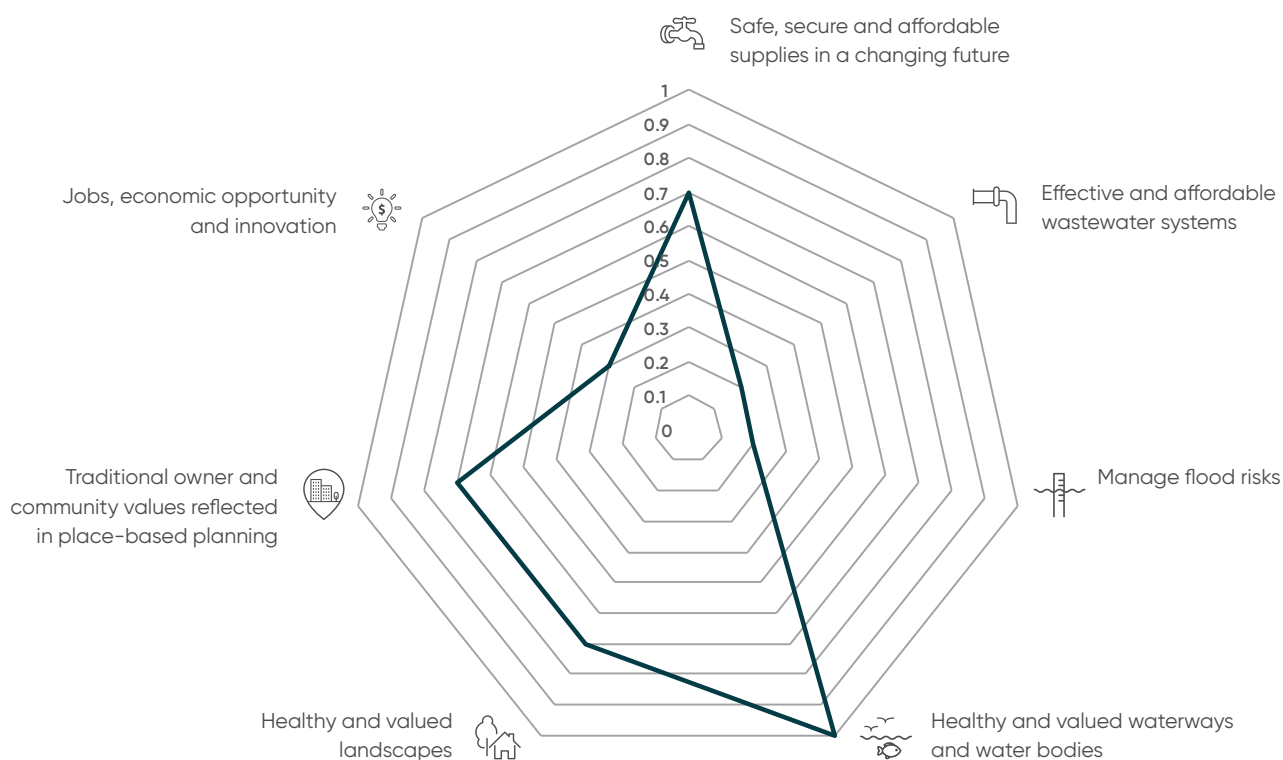
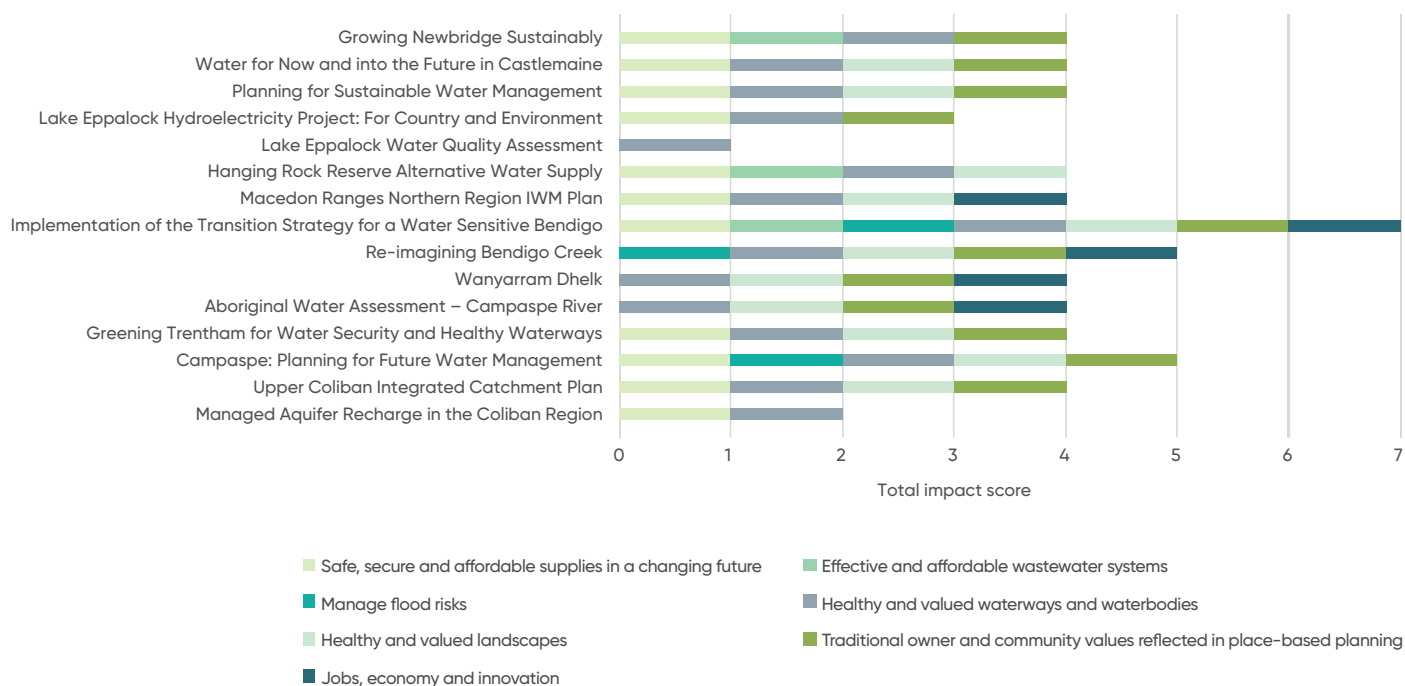
IWM opportunities: How were they selected?

IWM opportunities that link to and address IWM challenges for the region were identified and developed by the nominated practitioners of participating organisations. The process was an iterative, transparent and inclusive approach, as outlined in Figure 4. This list of opportunities is dynamic and will be reviewed and updated as required to reflect the Forum's priorities.









































































































Figure 4 The IWM opportunity prioritisation process



Impact of IWM opportunities on the Forum's strategic outcomes

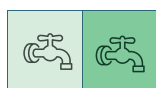


IWM project & strategy opportunities – overview

IWM opportunity	Strategic outcomes							Location
Growing Newbridge Sustainably								Newbridge
Water for Now and into the Future in Castlemaine								Castlemaine
Planning for Sustainable Water Management								Forum area
Lake Eppalock Hydroelectricity Project: For Country and Environment								Lake Eppalock and Coliban River
Lake Eppalock Water Quality Assessment								Lake Eppalock
Hanging Rock Reserve Alternative Water Supply								Woodend and Hanging Rock
Macedon Ranges Northern Region IWM Plan								Woodend and Kyneton
Implementation of the Transition Strategy for a Water Sensitive Bendigo								Bendigo
Re-imagining Bendigo Creek								Bendigo
Wanyarram Dhelk								Bendigo
Aboriginal Water Assessment – Campaspe River								Upper Campaspe
Greening Trentham for Water Security and Healthy Waterways								Trentham
Campaspe: Planning for Future Water Management								Municipality of Campaspe
Upper Coliban Integrated Catchment Plan								Upper Coliban Catchment
Managed Aquifer Recharge in the Coliban Region								Campaspe Deep Lead Aquifer

The status of each IWM opportunity included in the Priority Portfolio reflects the phase of work to be undertaken in this time period.

Shade scale



No Impact Impact

A summarised list of priority IWM opportunities is shown in the table below, with more detail in the following section. Please note that this list is dynamic and will continue to be updated to reflect the current Coliban IWM Forum's priorities and opportunities.

Partners of the Forum are committing their best endeavours to ensure priority projects and strategies are progressed in line with the shared vision and strategic outcomes of the Coliban IWM Forum.

Scale	Lead agency for collaborative opportunity	Status
Town/City	Loddon Shire Council	<div><div></div><div></div></div>
Town/City	Mt Alexander Shire Council	<div><div></div></div>
Forum area	Mt Alexander Shire Council	<div><div></div></div>
Sub-catchment	Coliban Water	<div><div></div><div></div></div>
Sub-catchment	Coliban Water	<div><div></div></div>
Sub-catchment	Western Water	<div><div></div><div></div></div>
Sub-catchment	Macedon Ranges Shire Council	<div><div></div></div>
Town/City	City of Greater Bendigo	<div><div></div><div></div><div></div><div></div><div></div></div>
Town/City	City of Greater Bendigo	<div><div></div><div></div><div></div></div>
Sub-catchment	Djandak	<div><div></div><div></div><div></div><div></div></div>
Sub-catchment	Yorta Yorta Nations AC	<div><div></div></div>
Town/City	Hepburn Shire Council	<div><div></div></div>
Sub-catchment	Campaspe Shire Council	<div><div></div><div></div><div></div></div>
Sub-catchment	North Central Catchment Management Authority	<div><div></div><div></div><div></div><div></div><div></div></div>
Forum area	Goulburn Murray Water	<div><div></div></div>

Project opportunity status



Strategy opportunity status



IWM project and strategy opportunities – in depth

ACTION C1








Growing Newbridge Sustainably

Newbridge is a town where growth is restricted due to a lack of a water security and sewerage infrastructure. The proposed Loddon Southwest Scheme provides a new opportunity to look at a reliable water supply for the town. The potential for collaborative opportunities has not been holistically considered to date.

A feasibility study has been completed to consider supplying the township of Newbridge with a secure water supply, and associated water and sewerage infrastructure. The business case builds on the feasibility study.

Next steps

1. Complete Business Case
2. Assess recommendations and depending on outcomes formulate steps to implement, including economic analysis

      	
Status	<div><div></div><div></div></div>
Lead Agency	Loddon Shire Council
Implementation Partners	Coliban Water, Grampians Wimmera Mallee Water
Location	Newbridge
Timeframe	Business Case underway
Scale	Town/City

ACTION C2








Water for Now and into the Future in Castlemaine

This project will see the development of an Integrated Water Management Plan for the township of Castlemaine, encompassing all relevant IWM components. The key issues to be resolved are ensuring adequate protection of the waterways from urban stormwater and recycled water releases, flood management, as well as providing a climate change resilient water supply to irrigate green spaces and for industrial reuse.

The project will assess options and identify key opportunities for a resilient water supply for green spaces and industry and determine appropriate targets and sustainable development guidelines required to protect waterway health. This will be completed in collaboration with project partners to assess their relative merits including cost effectiveness.

Next steps

1. Secure commitment and funding from collaborative partners
2. Gap/ data analysis of current plans/ guidelines/ strategies
3. Commission and complete study, integrating work from previous reports
4. Incorporate priority actions into organisations planning cycles
5. Oversee implementation of priority actions Final Recommendations Report delivered

      	
Status	<div><div></div><div></div></div>
Lead Agency	Mt Alexander Shire Council
Implementation Partners	Coliban Water, North Central CMA, Dja Dja Warrung, DELWP Loddon Mallee, VicRoads, Landcare Groups, Community and user groups of open spaces
Location	Castlemaine
Timeframe	2019
Scale	Town/City

ACTION C3

Planning for Sustainable Water Management

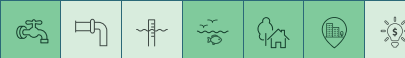
Many Councils across the state have concerns that they do not have sufficient planning controls/mechanisms in place for residential and commercial/industrial developments or are actively enforced by Council.

Whilst there is a prerequisite for all developments to meet the Integrated Water Management requirements of state planning schemes (clause 56.07), many Councils do not have IWM or WSUD clauses in their planning systems, or they are not actively enforced.

This is an opportunity to link with wider state-wide work to pilot new planning approaches in the Coliban forum area.

Next steps

1. DELWP to commission and undertake assessment of various local stormwater & IWM planning controls/mechanisms across the state. This piece of work will assess the effectiveness and provide recommendations.
2. Council partners in the Coliban Forum to consider how recommendations can be applied in the forum area.

						
Status		<div></div>				
Lead Agency		Mt Alexander Shire Council				
Implementation Partners		Coliban Water, North Central CMA, DELWP, VicRoads, Landcare Groups, Community and user groups of open spaces				
Location		Forum area				
Timeframe		Unknown – dependant on State policy progress				
Scale		Forum area				

ACTION C4

Lake Eppalock Hydroelectricity Project: For Country and Environment

The project aims to optimise water resource operational flexibility while also deriving cultural and ecological benefits. There are currently no environmental or cultural use water entitlements held in Malmsbury Reservoir, or any of the three Coliban River storages except for passing flows. The VEWH's Seasonal Watering Plan 2017- 18 states, there is "insufficient water available to meet all the environmental water requirements for the Coliban River". Additionally, Lake Eppalock is underutilised as a supply for Bendigo due to high electricity prices and subsequent carbon emissions from pumping.

The North Central CMA, VEWH and Coliban Water (CW) have discussed the possibility of releasing water from Malmsbury Reservoir to the Coliban River for flow into Lake Eppalock, then pumping this water to Bendigo through a hydroelectric plant. This allows for the transfer of water to Bendigo using the Coliban River instead of the Coliban Main Channel, which would provide environmental and cultural benefits to the Coliban River.

The hydroelectric plant at Lake Eppalock would enable a parcel of water to serve multiple purposes. It would also result in an increase in water security by introducing further operational flexibility, particularly in the Southern Coliban.

Next steps

1. Undertake hydroelectric plant revised concept
2. Business case development

						
Status		<div></div>				
Lead Agency		Coliban Water				
Implementation Partners		North Central CMA, Dja Dja Wurrung Clans Aboriginal Corporation (DDWCAC), Victorian Environmental Water Holder (VEWH), GMW, DELWP				
Location		Lake Eppalock and Coliban River				
Timeframe		Business case development to commence early 2018/19 FY, with project to run beyond 2020.				
Scale		Sub-catchment				

ACTION C5

Lake Eppalock Water Quality Assessment








Lake Eppalock has historically suffered from poor water quality and is known to strongly stratify over the period when it is heavily used for water supply and recreation. Limited data is collected to enable informed decision making as to the best offtake to use for water supply and for the river release.

Large water storages also suffer from a chronic risk of poor water quality events e.g. cyanobacteria (aka blue-green algae), anoxic water, release of heavy metals into the water column and high nutrient loads. This chronic risk threatens beneficial uses such as recreation and potentially impacts on public safety. Water utilities face increased capital and operational costs to upgrade water treatment plants and costs associated with additional treatment. These costs are ultimately passed onto customers.

The project aims to obtain data that, over time, will allow for the development of predictive models of lake behaviour and the capacity in near real time to manage offtakes to improve raw water quality in supply to Bendigo or released downstream of Lake Eppalock. The project would utilise existing knowledge to refine the optimal monitoring regime. In later years there is scope to broaden the analysis into catchment scale options to manage this chronic risk.

Next steps

1. Secure commitment from stakeholders and funding
2. Undertake collation of relevant water industry research
3. Scope out an appropriate monitoring program of the water column at Lake Eppalock
4. Purchase and install monitoring equipment on the outlet tower
5. Monitor and analyse data at least on an annual basis (frequency of sampling to be determined)

						
Status		<div></div>				
Lead Agency		Coliban Water				
Implementation Partners		GMW, North Central CMA, DELWP, Industry Associations, user groups, Lake Eppalock Advisory Group				
Location		Lake Eppalock as a pilot site, but with State-wide relevance				
Timeframe		2018-2020				
Scale		Sub-catchment				

ACTION C6

Hanging Rock Reserve Alternative Water Supply

Woodend's Recycled Water Plant produces Class C recycled water. The recycled water is supplied to the local golf club and the two recreational facilities in town, however much of this water is released to Five Mile Creek, the upper reaches of the Campaspe catchment. As the town's population increases, the volume of recycled water generated requires amendments to the EPA License, expansion of winter storage capacity and increased recycled water demand and/or upgrading the treatment capacity.

Hanging Rock Reserve is approximately 8 kilometres from the Woodend Recycled Water Plant. The reserve relies on irrigation to sustain the site's racecourse, picnic grounds and events space (the East Paddock). The site currently sources water from a dam fed by rainwater as well as a licensed extraction from Smoker's Creek which is a tributary of Five Mile Creek. An alternative water source for the site's irrigation needs will reduce reliance on the creek and dam while enhancing the site's climate resilience. Additionally, there are benefits for enhancing waterway health to removing the upstream offtake from the waterway and instead utilising water of a lesser quality which would otherwise be discharged to the waterway.

Next steps

1. Secure commitment and funding from collaborative partners
2. Commission and complete business case for the supply of recycled water from the Woodend Recycled Water Plant to Hanging Rock Reserve.
3. Incorporate priority actions into organisations planning cycles.
4. Oversee implementation of business case recommendations.

							
Status		<div><div></div><div></div></div>					
Lead Agency		Business case					
Implementation Partners		Macedon Ranges Shire Council, DDWCAC, Taungurung CAC, DELWP, Wurundjeri					
Location		Woodend and Hanging Rock					
Timeframe		2020 (funding dependent)					
Scale		Sub-catchment					



Water tank. Courtesy: Coliban Water

ACTION C7


Macedon Ranges Northern Region IWM Plan

Woodend and Kyneton will continue to evolve over the next 20 years, with significant growth and development expected in Kyneton in particular. Changing populations and development will put pressure on stormwater, wastewater and recycled water infrastructure and also on receiving environments. The health of Five Mile Creek and the Campaspe River have also been assessed as “poor” or “moderate”. A holistic assessment of all options available in the localised area to improve the health of these waterways has not been completed to date. As Woodend and Kyneton are within the same sub-catchment, combining these IWM Plans into one project enables consideration of IWM outcomes in a holistic manner.

This project involves the development of an IWM Plan for Kyneton, building on the existing Coliban Water investigation, and revisiting and reconfirming the outputs from the Woodend IWM plan as priorities.

Next steps

1. Identifying level of commitment and resourcing required from Traditional Owner organisations to support programs
2. Secure commitment and funding from collaborative partners
3. Commission and complete study
4. Incorporate priority actions into organisations planning cycles
5. Oversee implementation of priority actions Final Recommendations Report delivered

						
Status		<div></div>				
Lead Agency		Macedon Ranges Shire Council				
Implementation Partners		Western Water, Coliban Water, North Central CMA, GMW, DDWCAC, Taungurung CAC				
Location		Woodend and Kyneton				
Timeframe		2019				
Scale		Sub-catchment				



Bendigo creek. Courtesy: City of Greater Bendigo

ACTION C8

Implementation of the Vision and Transition Strategy for a Water Sensitive Bendigo

In collaboration with local stakeholders, the Cooperative Research Centre (CRC) for Water Sensitive Cities developed a Vision and Transition Strategy (published July 2018) which defines a vision of a water sensitive future for Bendigo, and outlines the broad steps Bendigo should take to enable a transition towards this future.

Now that the strategy is finalised, there is a need to establish a clear governance arrangement to support the implementation of the strategy. Working in collaboration, stakeholders will prioritise and implement actions arising from the short and medium term strategic priorities identified in the plan.

Next steps

1. Identify and set up a long-term governance arrangement for the strategy
2. Prioritise actions for implementation
3. Develop lessons learnt to be applied to other towns in the region

Status	<div> <div></div> <div></div> <div></div> <div></div> </div>					
Lead Agency	City of Greater Bendigo					
Implementation Partners	CRC for Water Sensitive Cities, Coliban Water, North Central CMA, Dja Dja Wurrung CAC					
Location	Bendigo					
Timeframe	2018-2020					
Scale	Town/City					

ACTION C9

Re-imagining Bendigo Creek

The project proposes to address the unrealised opportunity that a restored and revitalised urban waterway presents to the Bendigo community, from the perspective of liveability, health and wellbeing, waterway health, aesthetics, urban planning, heritage (indigenous and European) and community input, and balancing challenges such as surface water runoff affecting stormwater quality and volume.

The project will align with, and build on, the joint Dja Dja Wurrung CAC and North Central CMA Wanyarram Dhek project (see below), integrate with the Joint Management Plan and consider the interface between the urban environment and bushland surrounding Bendigo. The community and stakeholders will be engaged in re-imagining the Bendigo Creek which is the city's most prominent urban waterway.

Next steps

1. Socialise proposal with key stakeholders and refine based on feedback
2. Secure commitment and funding from various stakeholders
3. Commission and undertake project to produce strategy and implementation plan

Status	<div> <div></div> <div></div> <div></div> </div>					
Lead Agency	City of Greater Bendigo					
Implementation Partners	North Central CMA, DDWCAC, CW, DELWP Loddon Mallee, Heritage Victoria, broader community and stakeholders					
Location	Bendigo					
Timeframe	2018-2019					
Scale	Town/City					

ACTION C10

Wanyarram Dhelk

The project aims to return the Bendigo Creek landscape to a more natural vegetated waterway. Further, this initiative will provide a focal point for the Re-Imagining Bendigo Creek project to build conversations on the potential of the waterway to support and promote cultural, environmental, recreational, and educational values through improving the health and value of waterways and the landscape.

Wanyarram Dhelk provides multiple measurable benefits including storage capacity for public open space irrigation demands, community engagement in open spaces, cool zones for local residents, youth pathways and environmental appreciation, while improving and complimenting cultural and amenity values of the area.








The next stage of the project will complete research and analysis needed to enable the final design and construction of in-stream frog ponds. The rehabilitation of the creek to perform natural functions will improve water quality, holding capacity and system ecology. This builds from preliminary feasibility work already completed.

The objectives are to establish a predominately vegetated, biologically diverse waterway that supports the wider communities' interests, whilst offering educational pathway opportunities and supporting the cultural aspirations of the Dja Dja Wurrung Traditional Owners outlined in the Dhelkunya Dja Country Plan 2014 – 2034.

A pilot of the concept has been completed in Long Gully (a tributary to Bendigo Creek) with outstanding results in improved water quality and broader environmental amenity. The Bendigo Creek reach proposed for restoration has had significant preparatory works to improve off-stream storm water.

Next steps

1. Secure additional funding
2. Proceed to full scale project implementation

						
Status		<div><div></div><div></div><div></div><div></div><div></div></div>				
Lead Agency		Djandak				
Implementation Partners		Dja Dja Wurrung Clans Aboriginal Corporation, DELWP, COGB, North Central CMA, Weeroona College, Eaglehawk College				
Location		Bendigo				
Timeframe		2018				
Scale		Sub-catchment				

ACTION C11

Aboriginal Waterway Assessment – Campaspe River


Conversations and shared understanding of how water is managed, shared and passed on between Traditional Owners is a vital part of ensuring healthy and valued waterways. Through walking together and sharing understanding of the values of waterways between traditional owner groups not only are the values of water in place understood but also the values and obligations to other groups of how water is passed on through the landscape.

This project is one of a series of Aboriginal Waterway Assessments that looks to initially support the capturing of cultural values along waterways by multiple Traditional Owner groups. This initial capturing of cultural values and condition will support a shared conversation on the needs of water passing through the system and how this can be maintained. The project will go beyond a standard Aboriginal Waterway Assessment, with the view to inform policy on the cultural values of waterways across multiple Traditional Owner groups.

The Campaspe River will be assessed in a reach which form the boundary between Taungurung CAC and Dja Dja Wurrung CAC to support conversations around the sharing of water. There is an opportunity for Yorta Yorta Nations to undertake an assessment on the lower Campaspe to build the conversation to be one about the passing on of water.

Next steps

1. Refine scope with collaborative partners

							
Status		<div></div>					
Lead Agency		Yorta Yorta Nations AC					
Implementation Partners		Djandak, Taungurung CAC, Barapa Land and Water, Water for Country, North Central CMA, MLDRIN, FTOCV, GMW, Coliban Water					
Location		Upper Campaspe					
Timeframe		2018–2019 (funding dependent)					
Scale		Sub-catchment					



Wanyarram Dhelek – Frog Pond. Courtesy: DDW

ACTION C12

Greening Trentham for Water Security and Healthy Waterways

The town of Trentham suffers from a declining reliability of groundwater supply, which has potential to affect the township in the coming years based on current population growth which also critically affects the ability for irrigation of green space. Water quality is also an important component, restoring the health of urban waterways of Trentham by managing stormwater to replicate a near-natural water balance will also assist water security.

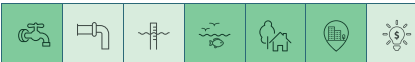
This project is to undertake a water supply security assessment for the township of Trentham, encompassing all relevant IWM components, including appropriate controls and targets for the management of stormwater releases to waterways.

This will include potable and non-potable water and nutrient balance, wastewater management and recycled water demand assessment, stormwater management for waterway protection, opportunities to restore the health of urban waterways, stormwater reuse opportunities, flooding and waterway health and liveability aspects of the water cycle in the township.

The project has strong links with the Upper Coliban IWM Plan and could also integrate learnings from the Wanyarram Dhelk project.

Next steps

1. Secure commitment and funding from collaborative partners
2. Identify level of commitment and resourcing for traditional owner participation in the process
3. Commission and complete study
4. Incorporate priority actions into organisations planning cycles
5. Oversee implementation of priority actions
6. Final recommendations report delivered

						
Status	<div></div>					
Lead Agency	Hepburn Shire Council					
Implementation Partners	Coliban Water, North Central CMA, GMW, DELWP					
Location	Trentham					
Timeframe	2019 (funding dependent)					
Scale	Town/City					



Class A recycled water. Courtesy: Coliban Water

ACTION C13

Campaspe: Planning for Future Water Management

This framework will establish a strategic direction and engagement process with the intent to embed integrated water management across Campaspe Shire Council.

The strategic framework will provide the local link between the state government's direction set in *Water for Victoria* and providing a voice for the community and traditional owners and the delivery of placed based initiatives.


The project scope will achieve the following:

- Identify projects that meet the Campaspe Shire Council's strategic direction and provide outcomes that improve the liveability for the community
- Provide a prioritised IWM project list to be budgeted and delivered by Campaspe Shire Council and key partners
- Align Campaspe Shire Council's strategic processes, policies, services, capital delivery and asset management processes with IWM
- Work with key agencies and authorities to consider their role in the leadership of IWM Planning and Delivery, including coordination with the Goulburn Broken IWM Forum
- Embed the value of IWM within the Shire and its key stakeholders by focusing on education
- Identify key actions to empower Traditional Owners in participating in IWM.

Campaspe Shire Council secured commitment and co-funding from all implementation partners in June 2018.

Next steps

1. Commission work and develop framework
2. Incorporate recommendations and prioritised projects into Campaspe Shire Council and other key stakeholder processes

						
Status	<div> <div></div> <div></div> <div></div> </div>					
Lead Agency	Campaspe Shire Council					
Implementation Partners	GBCMA, North Central CMA, Coliban Water, Goulburn Valley Water, DELWP, DDWCAC, Barapa Barapa, Yorta Yorta NAC					
Location	Municipality of Campaspe Shire					
Timeframe	2018-2019					
Scale	Sub-catchment					

ACTION C14

Upper Coliban Integrated Catchment Plan

The Upper Coliban catchment provides raw water for drinking water purposes for over 130,000 people as well as having a range of additional environmental, social, cultural and economic values. The catchment faces known threats from existing and future developments, uncontrolled livestock access to waterways and riparian areas and from climate change.


In response to the threats facing the catchment, Coliban Water and the North Central Catchment Management Authority (CMA), with active participation of other stakeholders (landholders, local Landcare groups, local and Victorian government agencies and Goulburn Murray Water), undertook a comprehensive analysis of the benefits and costs of protecting and enhancing the Upper Coliban catchment. As a result, this Integrated Catchment Management Plan was developed.

This project will implement the Upper Coliban Integrated Catchment Plan. The Plan has a 20-year horizon and has been developed around three specific, measurable, achievable, realistic and time-bound goals which address future development pressures, waterway protection and habitat connectivity goals.

The Plan involves a range of on-ground actions (stock exclusion from waterways, riparian regeneration and revegetation, willow removal) and additional municipal planning scheme amendments through development of Environmental Significance Overlays to protect raw water supplies. In addition, it proposes supporting community education, extension and compliance activities.

Next steps

1. Secure long-term funding
2. Staged implementation of actions

						
Status	<div> <div></div> <div></div> <div></div> <div></div> <div></div> <div></div> </div>					
Lead Agency	North Central CMA					
Implementation Partners	Coliban Water, Dja Dja Wurrung CAC, DELWP, Macedon Ranges Shire, Hepburn Shire, Landcare Groups					
Location	Upper Coliban Catchment					
Timeframe	Over 15 years, with initial stage in next 2 years					
Scale	Sub-catchment					



Malmsbury Reservoir. Courtesy Coliban Water

ACTION C15

Managed Aquifer Recharge for the Coliban Region

Water resources in the Coliban Region face a range of pressures. Managed Aquifer Recharge (MAR) can provide a tool to help in critical periods by providing a reservoir that stores excess water for later use, thereby reducing pressure on river systems.

Currently, information on likely aquifers likely to support MAR is limited and has no consistent information available to Water Corporations or other interested parties who may wish to consider development of a MAR Scheme. There is also an absence of relevant case studies that also may help to inform acceptability criteria.








The Campaspe Deep Lead downstream of Lake Eppalock is a proposed as a case study in the Coliban Region to develop information and provide a template for further application.

Issues to be dealt with include::

- Identifying the capacity and nature of the aquifer
- Identifying and quantifying potential sources of recharge water
- Development of generalised aquifer charging strategies (timing, quantity, sources)
- Addressing policy issues including re-injection of treated water, or water with different characteristics
- Addressing the need to integrate stored water management with existing groundwater management plans
- Development of systems of accounting within the requirements of the Murray Darling Basin SDLs – partitioning of water recharged so not counted as extracted groundwater.

Next steps

1. Secure funding
2. Scope case studies and broader state-wide learnings

						
Status <div></div>						
Lead Agency		Goulburn Murray Water				
Implementation Partners		Coliban Water				
Location		Coliban Region				
Timeframe		2018-2020				
Scale		Forum area				

References

- i Coliban Water (2017) *Urban Water Strategy*.
- ii DELWP (2016) *Climate Ready Victoria – Loddon Mallee Fact Sheet*.
- iii Coliban Water (2017) *Urban Water Strategy*.
- iv Coliban Water (2017) *Urban Water Strategy*.
- v North Central Catchment Management Authority (2014) *Waterways Strategy*.

