# Coliban

# STRATEGIC DIRECTIONS STATEMENT

2022



Integrated Water Management Forums



Environment, Land, Water and Planning

# ACKNOWLEDGEMENTS

The Coliban Integrated Water Management 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 Integrated Water Management Forum proudly acknowledges Victoria's Aboriginal communities and their rich culture, and pays its respects to their Elders past and present. The forum also recognises the intrinsic connection of Traditional Owners to Country and acknowledges their contribution to the management of land, water and resources. We acknowledge Aboriginal people as Australia's first peoples and as the Traditional Owners and custodians of the land and water on which we rely. We recognise and value the ongoing contribution of Aboriginal people and communities to Victorian life and how this enriches us. We embrace the spirit of reconciliation, working towards the equality of outcomes and ensuring an equal voice.

This Strategic Directions Statement has been developed by the forum, which includes the following organisations:



This publication has been endorsed by all Coliban IWM Forum partners with the exception of those who have abstained. All partners listed in this publication were engaged in its development and are committed as project delivery partners. Each Forum partner also acknowledges their mutual commitment to increase the integration of Traditional Owner priorities and values into future opportunities for integrated water management in the Coliban region.

The new Department of Energy, Environment and Climate Action (DEECA) was established on 1 January 2023. This department includes the previous functions of the Department of Environment, Land, Water and Planning, excluding the Planning portfolio and those areas supporting it which are now part of the new Department of Transport and Planning.

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Bendigo Regional Employment Precinct
Macedon Ranges North IWM Plan
Servicing Small Townships



# FOREWORD

Water is fundamental to the people and natural environment of our beautiful region, which 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 part of the mission of the Coliban Integrated Water Management Forum.

For me, the defining feature of our work in the forum is the manner in which it formalises the informal mechanisms currently operating across our region. We are working together towards shared goals and responsibilities to provide sustainable and healthy water for our environment and our people, in spite of the challenges of a changing climate. The forum acknowledges these working relationships and prompts us to seek more collaborators in our community.

We remember the adversity faced during the Millennium Drought and how that period galvanised action for building infrastructure to underpin our water security. Many members of the forum have been involved with the emergency responses to flooding and storm events, such as those of early 2011 and June 2021, and the localised flash-flooding that occurs in built-up environments. Our group has first-hand knowledge of environmental degradation of our waterways and the projected impacts of a changing climate on our water resources. And, importantly, there is a deep understanding of the positive benefits that communities receive from green spaces and the presence of water in the environment.

We are blessed to have First Nations communities who have a strong knowledge of and connection to Country, and many leaders who deeply understand the challenges presented by our water variability. They are strategic thinkers who are committed both to short-term pragmatic solutions and longerForeword

term strategic requirements to move our region to one where water is sustainably sourced, used, managed and valued. Our region benefits enormously from the leadership connections and existing working relationships between organisations, that include local government, water corporations, catchment management authorities, Traditional Owner groups and the Victoria State Government's central policy and an enabling unit in the Department of Environment Land Water and Planning. All these participants play a specific role and have a deep understanding of each element of our water cycle.

I acknowledge all the work our forum member agencies do, thank them for their involvement in preparing this Strategic Directions Statement, and wish them well in their ongoing efforts.

We are better together. My ongoing desire is that the formalised relationships and focus made possible by the forum provides greater understanding, support and inspiration that will help us all as we work together towards a sustainable water future.

Dawson

**Jenny Dawson** Chair, Coliban Integrated Water Management Forum

# **EXECUTIVE SUMMARY**

The Integrated Water Management Framework for Victoria (2017) is designed to help regional stakeholders 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 Coliban Integrated Water Management Forum is one of 10 regional integrated water management (IWM) forums across Victoria that are realising the local implementation of the framework.

### 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.

The 2018 Strategic Directions Statement (SDS) articulated the collaborative intent and shared agreement of all stakeholders involved in the Coliban IWM Forum. This 2022 SDS update provides a progress report on the forum's activity, its changing priorities, and future opportunities. It describes the water security challenges and opportunities of the region, sets the strategic direction for the next few years, and outlines the 'best endeavours' or ways in which IWM is and will be applied through projects proposed, in progress and completed for the region.

### Key themes and challenges

The forum's experience since establishment has highlighted the need to focus its vision to address three key areas of greatest need

- We need water for landscapes, for people and for the environment, and for healing Country.
- With a growing regional population in both large and small settlements, the Coliban region needs to do more with the water it has, and manage and plan accordingly.
- Hotter, drier conditions and strong community expectations for greater climate action means we need to act now to adapt to a rapidly changing climate and mitigate impacts.

The priorities and projects of the forum have been developed to meet these emerging challenges.

Section of Bendigo Creek. Credit: Bryley Savage





### **IWM opportunities**

Fifteen opportunities have been identified in the region and these have been grouped into three themes that respond to the above challenges:

#### Water for people, environment, and healing Country

- 1. Implementing the Reimagining Bendigo Creek Plan
- 2. Wanyarram Dhelk Starting the Healing
- 3. Castlemaine Stormwater Outfall Retrofit Scheme and Pilot Program
- 4. Forest Creek Revitalisation Project
- 5. Echuca Aquatic Reserve

#### Making more of water resources in a changing climate

6. Improved Drought Resilience for Bendigo with Managed Aquifer Recharge

Region wide 12 8

- 7. Diversifying Water Supply for the Castlemaine Botanical Gardens
- 8. Diversifying Water Supplies for Parks and Gardens
- 9. Increased Flows in the Coliban River for Cultural and **Ecological Benefits**
- 10. Managing Trentham Stormwater Quality and Quantity for Healthy Waterways
- 11. Recycled Water for a Greener Echuca

#### Integrated planning for a sustainable future

- 12. Water Sensitive Urban Design for New or Upgraded Developments (Land and Buildings)
- 13. Bendigo Regional Employment Precinct
- 14. Macedon Ranges North IWM Plan
- 15. Servicing Small Townships

# **Coliban Integrated Water Management Forum** Strategic Directions Statement 2022 summary

We work collaboratively with partners across the water cycle to find new ways to share resources and conserve water for multiple community and environmental benefits.

We work to meet the water needs of a changing region.





\* Population data: Victoria In Future 2019

\* Temperature and rainfall range are highest and lowest predictions for Campaspe and Loddon catchments. Predictions represent the annual average relative to the year 1995. Source: Guidelines for Assessing the Impact of Climate Change on Water Availability in Victoria, November 2020.

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#### 1. Implementing the Reimagining Bendigo Creek Plan

Further work on the revitalisation of Bendigo Creek, to heal the catchment, enhance cultural values and build connections to the creek.

#### 2. Wanyarram Dhelk - Starting the Healing

Restoring the environmental and Dja Dja Wurrung cultural values of an urban drain and peri-urban waterway guided by the Dhelkunya Dja Country Plan.

3. Castlemaine Stormwater Outfall Retrofit Scheme and Pilot Program

> Retrofitting stormwater outfalls around Castlemaine to prevent pollution

Forest Creek Revitalisation Project 4.

> Rehabilitation of a channelised section of urban Forest Creek.

5. Echuca Aquatic Reserve

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Program to improve the environmental and social values at the Echuca Aquatic reserve.

6. Improved Drought Resilience for Bendigo with Managed Aquifer Recharge

> Taking excess water from reservoirs in the Campaspe system and storing it underground for later reuse

#### 7. Diversifying Water Supply for the **Castlemaine Botanical Gardens**

Exploring options to use recycled water for irrigation and other uses at the gardens.

**Diversifying Water Supplies for Parks** and Gardens

Providing a wider range of water supply

valued green spaces during dry periods.

**Cultural and Ecological Benefits** 

and ecological benefits while increasing

hydroelectric plant at Lake Eppalock.

and peri-urban development.

water supplies.

the operational flexibility by reinstating the

options – such as stormwater, recycled water

and groundwater - to maintain the health of

Increased Flows in the Coliban River for

Increase flows in the Coliban River for cultural

Managing Trentham Stormwater Quality

Managing threats to the catchment from urban

and Quantity for Healthy Waterways

**Recycled Water for a Greener Echuca** 

Investigating the feasibility of supplying recycled water to existing and new public open

spaces, to reduce the demand on potable

#### 12. Water Sensitive Urban Design for New or Upgraded Developments (Land and Buildings)

**TEMPERATURE** 

**AN INCREASE OF** 

**IN COLIBAN BY 2040** 

Helping councils incorporate water sensitive urban design into new developments or upgrade projects such as roads or councilowned buildings.

#### 13. Bendigo Regional Employment Precinct

Designing a best-practice industrial precinct that demonstrates water-sensitive urban design, zero carbon and circular economy.

#### 14. Macedon Ranges North IWM Plan

An IWM plan to explore opportunities and solutions in the face of a drying climate and rapid urban growth around the towns of Woodend and Kyneton.

#### 15. Servicing Small Townships

Facilitating the potential growth of small towns in the region by providing innovative reticulated water and sewer systems.



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# BETTER TOGETHER: INTEGRATING WATER MANAGEMENT ACROSS VICTORIA

#### The first water custodians

First Nations clans have been living in balance with the natural environment in Victoria, practising culture, caring for Country and waterways, and maintaining sophisticated water management systems for tens of thousands of years.

More than 6,000 years ago, the Gunditimara worked with the waterways along the Budj Bim lava flow in south-western Victoria, engineering an extensive and sophisticated aquaculture system to trap, store and harvest kooyang - short-finned eel. That system still lives and operates, the Budj Bim Cultural Landscape is now an UNESCO World Heritage List site.

Within north central Victoria, the Dja Dja Wurrung (Yes Yes speaking) Jaara (people of this Country) believe that all of Country has Murrup (spirit), all things from creation are made of the same source of life. Water has spirit. For the Taungurung, the First People of the rivers and mountains, 'Our waterways are the lifeblood of Country; they are the blood and tears of our ancestors." Yorta Yorta people conserved the landscape and waterways for thousands of generations. 'We are freshwater people that maintained and occupied a landscape containing floodplains and grasslands that continue to provide an abundance of natural resources that are easily accessible throughout the seasons.<sup>1</sup> These lands and waters are also part of the history, life and continuing and culture of the Barapa Barapa, Wamba Wemba, Wadi Wadi people and clans represented by Barengi Gadjin Land Council (Wotjobaluk, Jaadwa, Jadawadjali, Wergaia and Jupagulk).

#### Pressures emerge and evolve

European settlement and the gold rush of the 1850s saw thousands of people flock to Victoria to seek their fortunes. This created many towns, yet also had large and long-lasting impacts on the creeks and gullies, and displaced Traditional Owners from their Country.

Victoria's regional towns and cities have thrived with the provision of urban drinking water and sanitation services. Irrigated agriculture and dryland farming have both played important roles in Victoria's history and growth. Today, Victoria is the nation's largest food and fibre exporter.<sup>2</sup> Much of the water flowing into the Murray-Darling Basin System comes from the Victorian High Country and underpins irrigated agriculture in several states.

The complex challenges of water management continue throughout the state: we have lived through the Millennium Drought and experienced flooding, bushfires and extreme weather. We have seen the consequences of the overuse and overallocation of water in one area affecting the availability and/or quality of water in another. Significant investment and interventions have been required to start the return of water to our rivers and floodplains, yet more remains to be done.

Water managers are now operating in an increasingly complex and uncertain environment. The drivers of change are both social and environmental. They include climate change, population growth, shifting migration patterns associated with the coronavirus pandemic, economic challenges, and policy changes. But our beautiful state remains a wonderful place to live, and we continue to see the population increase. Regional Victoria is expected to grow from 1.5 million people in 2015 to 2.2 million over the next 30 years to 2051.<sup>3</sup>

The liveability of our regional towns and cities, and the health of our environment and economy, depend on the availability of water. Access to water is also important for social wellbeing and holds intrinsic cultural value for Traditional Owners. Therefore, we need an integrated and collaborative approach to adapt to change and maximise value across the whole water cycle.

#### What is IWM? How can it help address challenges?

The current water supplies and liveability of towns and cities owe much to the collaborative work done to date by water corporations, local and state government, planning and development authorities, communities and, in recent decades, catchment management authorities. While we face the challenges of population growth, climate change and natural disasters, we can also build on the benefits of past experiences and established relationships while increasingly, we seek to learn from Traditional Owners. Together, we can make decisions today that we will celebrate in the future.

Integrated water management considers all parts of the water cycle as an integrated system to optimise the environmental, cultural, social and economic outcomes for our communities.



While everyone has a responsibility to conserve and protect water, there are a number of key groups charged with making decisions about water within each region. These include:

- Traditional Owner groups, who have a deep knowledge of and connection to the region's waterways, other water resources and Country:
- water corporations, which manage the water storage, water supply, and wastewater services
- local governments, which manage surface water drainage, protect local waters from degradation and pollution, oversee onsite domestic wastewater planning, regulate local development, and undertake strategic planning for future growth

### What is integrated water management?



Missed opportunities to use all sources of water

Figure 1: How does IWM work? Conventional water management saw a more siloed approach to water management, with a single supply source and two discharge systems to move stormwater and wastewater away as quickly as possible, resulting in missed opportunities to use all sources of water. The IWM approach brings water managers together to plan and deliver new opportunities to provide broader benefits to the community. Listening to and consulting with Victorian communities about how they want water managed is critical to informing IWM decision making. Communities are directly consulted on IWM plans and through existing catchment management authority, water corporation and local government strategies.

• catchment management authorities, which plan for flood management and work with landholders to consider the interactions of land, water, and biodiversity.

The decisions these groups make individually, can have significant impacts on the quality and availability of the water for others in the catchment and further downstream. So, it makes sense they collaborate towards common goals to maximise water saving and reuse and share the benefits (Figure 2).

IWM is an approach that can be applied at multiple scales from water planning at the local park, right up to the wholeof-catchment. IWM can connect climate-change adaptation, planning and open space, water security and other strategies, so that collaborators can add value to each other's projects.

Better together: IWM formalises collaborations to use all water sources for multiple community & environmental benefits:

Urban greening, cultural benefits, healthy waterways, flood prevention, e-cient inv estment, improved water security, liveable and resilient communities

North Central Regional Catchment Strategy

Victorian Food and Fibre Export Performance Report 2019-20

Victoria in Future 2019

### How are we delivering IWM statewide?

To facilitate IWM across Victoria, the Victorian Government's Department of Environment, Land, Water and Planning (DELWP) supported the establishment of IWM forums across 10 regions of Victoria (Figure 3). These forums bring together leaders of the local water sector to explore, prioritise and oversee the development of local IWM opportunities. Prioritised opportunities are managed and implemented by dedicated working groups and are captured within individual IWM plans. Where appropriate, the forums involve other organisations and groups that are not part of the water sector but have direct or indirect interests in water management and land use planning, such as community and Indigenous groups, planning authorities, Department of Transport, developers, educational institutions, or large landholders. Being collaborative, IWM builds on existing partnerships and planning processes, and aims to break down silos between independently operating water decision-makers – encouraging forum members to consider the water cycle of their own service delivery, and the interdependencies or overlaps with other members (Figure 2). Forum members consider waters in rivers, streams and bays, wastewater, drinking water, stormwater, and water treatment processes.

While collaboration can take more time and effort, working together achieves better outcomes for the environment, society, and the economy by finding mutually beneficial ways to share water, assets, and costs.

Dja Dja Wurrung cremeony on Bendigo Creek. Credit: City of Greater Bendigo





Figure 3 : IWM forum regions of Victoria, which are based around water corporation boundaries

### Strategic outcomes

The Integrated Water Management Framework for Victoria (2017) proposed several strategic water-related outcomes that will deliver on the vision in the State water plan, Water for Victoria (2016), to 'build resilient and liveable cities and towns'. These strategic outcomes provide a way to identify the multiple economic, social and environmental benefits that can come from a single initiative. The original framework included five such strategic outcomes that have since been expanded to seven. The identification of strategic outcomes will continue to evolve as the water management context changes and the sector innovates.

Proposed project opportunities are assessed and prioritised against how well and how many of these strategic outcomes they meet.

Find out more about how Victoria is applying IWM through the *Integrated Water Management Framework for Victoria* (2017). Visit: www.water.vic.gov.au



#### The strategic outcomes are:



**safe, secure and affordable supplies in a changing future** – indicated by the amount of water conserved or diverse water volume supplied to meet an identified demand.



**effective and affordable wastewater systems** – ensuring environmental and public health standards are met, while maximising resource recovery.



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**manage flood risks** – resilience to existing and future flood risk.



**healthy and valued landscapes** – maximising the connectivity, accessibility, greening and vegetation, cooling, aesthetic and/or recreational values of landscapes.

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**Traditional Owner and community values reflected in place-based planning** – ensuring that different communities are considered and included in planning and design, and provided with watersystems literacy to enable involvement.



**jobs, economic opportunity and innovation** – recognising that water management is an integral part of economic growth.

# **Strategic Directions Statement** - how IWM is happening in the region

This SDS articulates the collaborative intent and shared agreement of all stakeholders involved in the forum. It describes the water security challenges and opportunities in the region, sets the strategic direction for the next few years, and outlines the 'best endeavours' or ways in which IWM is and will be applied through opportunities that are proposed, in-progress or completed in the region.

This is the first update to the Coliban region's SDS produced in 2018, and includes:

- an update on progress to date
- case studies illustrating IWM in the region
- details of planned and potential opportunities designed to meet the strategic outcomes and key challenges over the next three to five years.

This SDS has been developed to complement the other plans and strategies that apply to the region for water, climate change, First Nations' rights and catchment management (Figure 4).

Figure 4 : The SDS and related water policies, strategies and plans of the region.

Water for Victoria

strategic plan for management of our water resources, now and into the future.

50-year State Government

#### **Integrated Water** Management Framework for Victoria

Framework to help deliver the Water for Victoria plan to maintain and enhance the liveability, prosperity and resilience of Victoria's cities and towns

#### Relevant plans and strategies in place in the region



#### Coliban Water Urban Water Strategy and **Greater Melbourne Urban Water and System** Strategy

A detailed 50-year forecast of water demands for local communities, along with supply options to meet these demands. Developed by water corporations.



### **Caring for Country Plans**

Guiding and promoting the awareness, investment and rights of Aboriginal people and culture, working together now and for future benefits.

#### Northern Region Sustainable Water Strategy

Long-term plans and statutory processes for state-wide water resource planning to secure the water future of Victoria's regions.

#### North Central Regional Catchment Strategy A framework for actions to improve and

protect the Catchment's natural resources

(water, land, biodiversity). Looking after these precious natural resources underpins the social, cultural and economic wellbeing of the diverse communities that make up the Catchment. Incorporating climate change, it is a partnership approach to catchment resilience.



### Loddon Mallee Climate Ready Plan The Loddon Mallee Climate Ready Plan aims to

strengthen the resilience of our people, places and sectors to become climate ready. Uniting individual, community and agency approaches.

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Local government plans and strategies Various strategies, plans, guidelines and other

documents that have connections to the water cycle. Examples include open space plans, local climate change adaptation strategies, and natural disaster management plans.

# WATER IN THE COLIBAN REGION

The Coliban region is home to nearly 200,000 people, a diversity of plant and animal life, and the waters from the spring and spa region in the south to the Murray River and its floodplains on the border with New South Wales in the north.<sup>4</sup> The area encompasses the lands and waters of the Dja Dja Wurrung, Yorta Yorta, Taungurung and Barapa Barapa Country, whose ancestors and their descendants are the Traditional Owners of this Country.

It supports irrigated agriculture including dairy, orchards and intensive animal farming, as well as dryland cropping. Tourists and day-trippers come year-round to visit the resorts and finedining attractions of picturesque towns, the wonder and wildlife of the Wombat State Forest and other beauty spots, Indigenous cultural heritage sites, historical goldrush towns, popular fishing and kayaking locations, and Bendigo's many attractions.

Waterbirds of state and national significance flock to the region's wetlands, including cormorants, great egrets, herons, royal and yellow spoonbills, and brolgas. The Northern Plains Grasslands, a critically endangered ecosystem, is home to the plains wanderer. Other local wildlife includes kangaroos, squirrel gliders, growling grass frogs, Bogong moths, and other keystone and iconic species.

Commonwealth Bureau of Meteorology



# 2022 Coliban IWM Forum SDS

embers of urban and peri-

The health and liveability of our thriving region is underpinned by water, from the provision of safe drinking water and the management of stormwater and wastewater in urban areas to the rivers, rainfall and other environmental flows that support ecosystems, landscapes and wildlife. Important river systems include the Loddon, Campaspe, Avoca, and Murray River systems, which support the Goulburn-Murray Irrigation District. Rainfall in the region can range from an average of more than 1000 mm annually in Trentham to less than 400 mm per year in Boort; and a drier future is predicted<sup>.5</sup>. Consequently, water management is key to the region's long-term future.

#### Campaspe River, Doaks Reserve. Credit: DELWP

Victoria in Future 2019

# **A CHANGING REGION**

The Coliban IWM Forum has been operating for four years, providing experience to draw on and projects to build upon. In addition, major disruptions, such as natural disasters and the coronavirus pandemic, have highlighted the need for the forum to sharpen its focus, rescope projects and prioritise activities to address three key challenges or themes.

### Water for people, environment and healing Country

# We need water for landscapes, for people and for the environment, and for healing Country.

Victoria in Future (2019) predicted an average regional population growth of one and a half per cent annually from 2018 to 2036. The first two years of this period saw growth exceed expectations. More recently, the global coronavirus pandemic led to a substantial increase in the number of people migrating from Melbourne to Victoria's regional areas, and closed international borders have resulted in a domestic tourism boom. Visitors and permanent residents alike need drinking water supplies and wastewater management. Providing cost-effective water services in small towns and rural hamlets is a particularly challenging necessity. People also value healthy parks, waterways and landscapes for recreation and to improve local beauty and liveability.

Australian Bureau of Statistics 2010. 1301.0 - Year Book Australia. 2009–10

Green spaces with shade and cooling vegetation are becoming vitally important as the Coliban region experiences a greater number of days of extreme heat. More Victorians died from heat-related illnesses in the fortnight leading up to the Black Saturday bushfires than the number who perished in the fires themselves.<sup>6</sup> This makes 'green infrastructure', such as parks, wetlands and nature reserves, potentially life-saving community assets.

More broadly, some past and current land-use practices and extreme weather events have degraded important ecosystems. IWM offers opportunities to heal Country, rehabilitate and revitalise landscapes, change flows and keep water in nature for longer. The IWM forums were formed specifically to 'build resilient and liveable cities and towns' under the *Integrated Water Management Framework for Victoria* (2017). As such, the projects focus on urban and urban-serving areas. However, the forum works in the context of recognising agricultural water needs, which are a significant contributor to the Coliban region's economy, and environmental water needs across the whole catchment. Growth impacts catchments, making the need

Bendigo Creek earth works. Credit: Djandak



to consider and manage its repercussions for the water cycle urgent.

Traditional Owners are taking an increasingly active and leading role in water management. There is growing recognition of the right of Traditional Owners and First Nations to selfdetermination and their inherent obligations to continually speak for and look after the Country of their ancestors for current and future generations. Traditional Owners in the Coliban region are taking more of a leadership role. The region's Registered Aboriginal Parties work to uphold the interests of their nations and exercise their obligations to care for Country. This includes active involvement in natural resource management through joint management agreements and legislative rights to public land.

Victoria is the first state to progress Treaty discussions, the First Peoples' Assembly of Victoria has formed, and there is increasing understanding among Victorians of Indigenous rights, connection to Country, and the need for inclusion, consultation, and reconciliation. IWM is increasingly being considered in this context.

The following projects fall under the theme of 'water for people, environment, and healing Country':

- Implementing the Reimagining Bendigo Creek Plan
- Wanyarram Dhelk Starting the Healing
- Castlemaine Stormwater Outfall Retrofit Scheme and Pilot
  Program
- Forest Creek Revitalisation Project
- Echuca Aquatic Reserve

## Making more of water resources in a changing climate

#### A growing population and a hotter, drier future under climate change mean the Coliban region needs more water, and to do more with the water it has.

The Coliban region is already experiencing the consequences of climate change, with a 53% reduction in long-term stream flow into the upper region's storages since 1996. Further reductions are projected. Some of Coliban Water's urban-water supply systems are forecast to have a shortfall in the next 50 years. A 'business as usual' approach to water management will not allow the region's reduced supply to meet existing or growing demand.

It is also likely the effects of heatwaves, fire, flood and drought in the region will worsen and become more frequent due to climatic change. This will significantly impact ecosystems and communities in the region. Future fires will require water for firefighting. Fires and other natural disasters will demand increased capacity to manage water quality in the catchment to deal with dirty-water events. Changing weather patterns will also influence the growing seasons for agriculture and the timing of periods of high water demand. These challenges, and approaches to addressing them, are detailed further in the North Central Regional Catchment Management Strategy, online at northcentral.rcs.vic.gov.au.

IWM will assist in monitoring and adapting to climate change as a shared responsibility.

There is also an opportunity to make better use of water resources, considering both water quality and quantity, and directing water that's fit-for-purpose to where it's needed. This involves exploring opportunities to substitute captured stormwater or treated recycled water for potable water where drinking quality is not required. It also involves seeing discharges and wastewater as opportunities to increase water in the environment, rather than just problems to solve.

The following projects fall under the theme of 'making more of water resources in a changing climate':

- Improved Drought Resilience for Bendigo with Managed Aquifer Recharge
- Diversifying Water Supply for the Castlemaine Botanical Gardens
- Diversifying Water Supplies for Parks and Gardens
- Increased Flows in the Coliban River for Cultural and Ecological Benefits
- Managing Trentham Stormwater Quality and Quantity for Healthy Waterways
- Recycled Water for a Greener Echuca

# Integrated planning for a sustainable future

# We are experiencing significant growth in both large and small settlements. We need to manage and plan accordingly

The Coliban region is experiencing industrial growth, as well as residential growth. Bendigo is expected to grow to the size of Geelong. Land is opening for residential development around Bendigo and the larger towns. The smaller towns are growing, too. Many new residents are arriving from Melbourne with expectations of urban-style water services. There is a pressing need to ensure the long-term sustainability of accommodating this growth.

The following projects fall under the theme of 'integrated planning for a sustainable future':

- Water Sensitive Urban Design for New or Upgraded Developments (Land and Buildings)
- Bendigo Regional Employment Precinct
- Macedon Ranges North IWM Plan
- Servicing Small Townships

One implication of growth is the increasing use of farm dams. The region already has a large and unsustainable number of farm dams. It's anticipated this policy challenge will be addressed through other organisations and regulations. The forum, however, will continue to have an interest in this type of water use.



# POPULATION GROWTH 199,000 (2021) 238,000 BY 2036<sup>7</sup> 20% INCREASE

CONDITIO	ION OF WATERWAYS <sup>8</sup> CAMPASPE      LODDON        7%      0%        1000000000000000000000000000000000000	
	CAMPASPE	LODDON
GOOD:	7%	0%
MODERATE:	39%	41%
POOR:	33%	26%
	340/	30%



TEMPERATURE AN INCREASE OF

**IN COLIBAN** 

**BY 2040<sup>9</sup>** 

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CHANGE IN RAINFALL BY 2040 DECREASE BY 15% WITH MORE-INTENSE RAINFALL IN SOME YEARS'

<sup>7</sup> Victoria in Future 2019

<sup>8</sup>Third Index of Stream Condition report – ISC North Central

<sup>9</sup>Temperature and rainfall predictions represent the highest and lowest predictions for Campaspe and Loddon catchments. They represent the annual average relative to the year 1995. Source: Guidelines for assessing the impact of climate change on water availability in Victoria, November 2020.

# **PROGRESS SO FAR**

The first Coliban IWM Forum SDS was published in September 2018. It articulated the regional context, the shared vision and the strategic water-related objectives for the region. It also listed IWM opportunities as ready-to-advance projects developed in collaboration by the forum partners. It can be viewed online at www.water.vic.gov.au





- All of the councils and many other forum members have IWM at the forefront of their thinking and several are implementing IWM projects independently. The projects past, current and future listed in this document and endorsed by the forum members are those that benefit from a collaborative, multiparty approach.
- Our first SDS identified 15 opportunities that reflect the Coliban IWM Forum's initial priorities. Most of these opportunities are underway or completed. Progress made on the 2018 SDS IWM opportunities is summarised in Table 1 on page 17. Five opportunities, including the Reimagining Bendigo Creek project, have been completed. You can read more about that project on page 18. An extension of that project is also proposed in this SDS. Six more projects are well underway, including the Managed Aquifer Recharge Potential in the Coliban Region project, which serves as an important early demonstration project for other regions with highly-developed aquifers. Read about this project on page 20.
- The Coliban IWM Forum is flexible and responsive to the changing needs and priorities of local governments and other members. Some projects were delayed as forum members dealt with greater than expected population growth and the impacts of the coronavirus pandemic. Two projects have been rescoped and are included in this SDS, and a final two have been set aside in order to direct resources to higher priority projects.



### Table 1: A summary of the status of IWM opportunities listed in the forums 2018 SDS.

IWM opportunity	Status
Reimagining Bendigo Creek	Completed
Wanyarram Dhelk	Completed
Growing Newbridge Sustainably	Completed
Water for Now and into the Future in Castlemaine	Completed
Upper Coliban Integrated Catchment Plan	Completed
Aboriginal Water Assessment – Campaspe River	Underway
Implementation of the Transition Strategy for a Water Sensitive Bendigo	Underway
Campaspe: Planning for Future Water Management	Underway
Managed Aquifer Recharge Potential in the Coliban region	Underway
Planning for Sustainable Water Management	Underway
Lake Eppalock Hydro-electricity Project: For Country and Environment	Underway
Macedon Ranges Northern Region IWM Plan	Not started
Greening Trentham for Water Security and Healthy Waterways	Not started
Lake Eppalock Water Quality Assessment	Not started
Hanging Rock Reserve Alternative Water Supply	Not started

#### Notes

- Strategic plan developed to retrofit the catchment, keeping water in the landscape longer. Received funding. See case study on page 18.
- For the projects next stage see page 24
- Wanyarram Dhelk means to Heal Water and is a priority for Djaara (as defined in Delkunya Dja – Dja Dja Wurrung Country Plan). This project provided the first step in the restoration of Bendigo Creek, removing silt and starting to return the creek to a more natural form.
- For the projects next stage see page 24
- A business case and report were prepared, outlining the feasibility of supplying the township of Newbridge with a secure water supply and associated water and sewerage infrastructure.
- An integrated water study was completed which helped to identify opportunities for further detailed investigation as part of this SDS. These include:
- Castlemaine Stormwater Outfall Retrofit Scheme and Pilot Program
- Forest Creek Revitalisation Project
- Developing an Alternative Water Supply for the Castlemaine **Botanical Gardens**
- See page 26 and page 29.

This project was incorporated into the Campaspe IWM Framework (implemented through the Goulburn Broken IWM Forum). The framework was completed in 2020 and is now being applied at Campaspe Shire Council.

Measures and prioritises river and wetland health so that Traditional Owners can more effectively participate in water planning and management.

This project has received some funding, further investigation into concepts and priority water sensitive urban design sites is required.

Funded and underway, with community education elements ongoing.

This project has produced a decision support tool. See case study on page 20.

It has led to a new project: Improved Drought Resilience with Managed Aquifer Recharge for Bendigo. See page 28.

Working towards planning mechanisms for councils for residential and commercial/industrial developments.

Assessment of cultural and environmental values and business case complete.

It has led to a new project: Increased flows in Coliban River for Cultural and Ecological Benefits. See page 30

Project is included in refreshed SDS. See page 35

Project has been re-scoped and included in refreshed SDS See page 31

Superseded to direct resources to more urgent priorities

Superseded to direct resources to more urgent priorities

## Case study

# **Reimagining Bendigo Creek**

#### Dja Dja Wurrung's vision

There is a rippling along the Bendigo Creek, there is now undulation. Sounds, when there was none. There is a familiar sense of reawakening as we walk along the banks. There is open, clean water, verged by grasses and reeds that are strong and healthy like us. The Creek is healing and so are we.

Activity and conversation, voices of the community, people and children, looking for and anticipating life and movement within the Creek, hoping for new interactions. We now have a place to gather, to listen and to share.

The familiar sense and smell of smoke is around us, but not heat, a sweetened cleansing smell that is recognisable to us all, not feared, but welcoming and healing. You are amongst Cultural practice.

The ground is clean, and thick with Kangaroo Grass that gently brush against our hands and feet, there are now sensations underfoot, crinkling and crunching in the new life and healing, colours are yellow and as bright as the sun, they are unavoidable in their numbers. What was lost, has now returned.

Cultural practices and ceremony supports healing, and encourages cultural interaction, facilitating reconciliation and greater returns to the community.

#### Collaboration to heal Country

The Reimagining Bendigo Creek Plan (2020) marks a turning point in the creek's history by articulating a long-term vision to revitalise the urban creek. The immediate mission is to 'change people's hearts and minds to take united action, so that in a

generation's time Bendigo Creek will be a healthy, connected and nurturing place'. To guide this, the Plan focuses on the three goals of Catchment, Connections and Culture. These goals aim to restore an urban catchment to slow and heal water, create human connections to the creek, and celebrate Aboriginal and migrant cultures along the creek.

An 18-month co-design process with the Traditional Owners – Djaara (Dja Dja Wurrung Clans Aboriginal Corporation) – relevant agencies and the community developed the Reimagining Bendigo Creek Plan. The process enabled the Djaara to articulate their vision for Bendigo Creek, facilitated the community to identify their values and aspirations for the creek, and built collective commitment amongst key stakeholders to implement the plan.

Key lessons from the co-design process include to:

- listen with an open heart and mind
- be flexible and allow plenty of time
- develop a comprehensive engagement process and trust each other to see it through
- enable culturally safe environments that allow Elders the time and space to discuss the project and their aspirations for Country deeply
- have a core team of mixed skills and backgrounds to implement the co-design process.

The project was funded via the IWM forum and supported by partner contributions. The Reimagining Bendigo Creek Plan (2020) is available to view online at www.bendigo.vic.gov.au



Call Martin and Martin Wanyarram Dhelk (meaning 'good waterhole'), Phase 2 render, Bendigo Creek. Courtesy: City of Greater Bendigo

### Case study

# Managed aquifer recharge potential in the Coliban region

A demonstration of the technical feasibility of an approach with state-wide importance

A new assessment tool has been developed to help water corporations considering managed aquifer recharge (MAR) as an option for saving water in times of plenty - to reduce water use from rivers, dams, and lakes in times of drought. MAR is where water is purposefully put in a groundwater aquifer, with the intention of extracting and using that water later. To be successful, all MAR projects must find a source of water, an aquifer that can store the water and a use for the water when it is extracted.

Goulburn-Murray Water worked with Implementation partners Coliban Water, the North Central Catchment Management Authority, and consultants RMCG and Aquade, to develop and test the 'Managed Aquifer Recharge Decision Support Tool' for use across Victoria. The project tested the technical feasibility of the tool, using the Lower Campaspe Valley Water Supply Protection Area as a case study. The case study recommended that a business case be developed.

The tool provides much-needed information and guidance to water corporations and other organisations considering MAR projects, including:

- identifying the capacity and nature of aquifers
- identifying and quantifying potential sources of recharge water
- aquifer charging strategies
- 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.

The Lower Campaspe Valley case study aimed to find a way to safeguard Bendigo's water security in future droughts. It identified 16 possible options and shortlisted plausible approaches for more detailed assessment. The case study found that MAR is a viable means of improving Bendigo's water security during drought.

Ultimately, by further integrating groundwater and surface water management, this tool aims to support water corporations and other organisations to boost the reliability of urban water supplies across the state.

The next stage of this initiative is outlined on page 28.

The Campaspe River near Goornong, overlying deeper water-tran Credit: Scott Ridges, Goulburn-Murray Water.



# **IWM OPPORTUNITIES**

IWM opportunities that link to and address challenges for the region were identified and developed by the nominated practitioners of the forum's participating organisations.

A summary of the priority IWM opportunities is shown in Table 2, with more detail in the following section. This list is dynamic and will continue to be updated to reflect the forum's priorities and opportunities as they arise.

Partners are committing their 'best endeavours' to ensure priority projects and strategies are moved forward, in line with the shared vision and strategic outcomes of the forum.

#### Table 2: IWM opportunities 'ready-to-advance' in the Coliban region

IWM opportunity			Stra	tegic oı	utcomes			Location	Scale
1. Implementing the Reimagining Bendigo Cree Plan	k Œ	ΞŊ		₹. ₽		$\bigcirc$	- \$ \$ \$ \$	Bendigo	City
2. Wanyarram Dhelk - Starting the Healing	Ē.	ΞĴ	~=~	~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~	( <sub>)</sub>	$\bigcirc$		Bendigo	Waterway
3. Castlemaine Stormwater Outfall Retrofit Scheme and Pilot Program	Ĩ,	Ξŋ	~=~		( <sub>C</sub>	$\bigcirc$		Castlemaine	Town
4. Forest Creek Revitalisation Project	r R	ħ				$\bigcirc$		Castlemaine	Waterway
5. Echuca Aquatic Reserve	œĽ	ΞĴ			(ja	$\bigcirc$		Echuca	Precinct
6. Improving Drought Resilience for Bendigo wit Managed Aquifer Recharg	h 🖏	Ξŋ		, , , , , , , , , , , , ,	( <sub>A</sub>	$\bigcirc$	° <b>(\$)</b> °	Bendigo and surrounds	Region
7. Diversifying Water Supply for the Castlemaine Botanical Gardens	œĽ	⊐'n		~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~	(A)	$\bigcirc$	°\$)°	Castlemaine	Precinct

IWM opportunity			Stra	tegic oı	ıtcomes			Location	Scale
8. Diversifying Water Supplies for Parks and Gardens	R.	Ξŋ	~=~	\$`````````````````````````````````````	(j <sub>e</sub> t	$\bigcirc$	\$ • \$	Coliban region	Service area
9. Increased Flows in Coliban River for Cultural and Ecological Benefits	r.	۳J		\$ \$ \$	(j <sub>cj</sub>	$\bigcirc$	° <b>(\$)</b> °°	Coliban River	Waterway
10. Managing Trentham Stormwater Quality and Quantity for Healthy Waterways	Ĩ,	ΞŊ	~=~	\$ {{	( <sub>C</sub> )	$\bigcirc$		Trentham	Town
11. Recycled Water for a Greener Echuca	r.	ΞŊ	~=~	\$ \$ \$	(j <sub>c</sub> ,	$\bigcirc$		Echuca	Town
12. Water Sensitive Urban Design for New or Upgraded Developments (Land and Buildings)	r.	ΞŊ	~	\${{	Ŷ <sub>Ĺ</sub>	$\bigcirc$		Coliban region	Forum area
13. Bendigo Regional Employment Precinct	œ.	ΞŊ	~	, } ₽	(frid	$\bigcirc$	- - - - - - - - - - - - - - -	Marong (Bendigo)	Precinct
14. Macedon Ranges North IWM Plan	R.	HL ا		, }} ₽	(f <sub>6</sub> )	$\bigcirc$		Northern Macedon Ranges	Region
15. Servicing Small Townships	œ.	Ξŋ	~=~		(friday)	$\bigcirc$		Taradale and Elphinstone	Town

Shade scale



safe, secure and affordable supplies in a changing fu	iture
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- effective and affordable wastewater systems
- manage flood risks

Æ

ΞŊ

т Ф healthy and valued waterways and waterbodies

	healthy and valued landscape
$\bigcirc$	traditional owner and community values reflected in
- \$-	jobs, economic opportunity and innovation

place-based planning

# WATER FOR PEOPLE, ENVIRONMENT AND HEALING COUNTRY

## Implementing the Reimagining Bendigo Creek Plan

In 2019-2020, the City of Greater Bendigo, Djaara (Dja Dja Wurrung Clans Aboriginal Corporation), key regional agencies and the local community co-designed the Reimagining Bendigo Creek Plan. The plan provides a long-term vision for the revitalisation of Bendigo Creek by setting goals with respect to healing the catchment, enhancing cultural values along the creek and building connections to the creek.

A key strategy of the plan is to retrofit the catchment so that it acts more like a sponge, so that water is kept in the landscape longer and is cleaned via ecosystem services. To put this strategy into action, partner organisations will install water-sensitive urban-design infrastructure and reinstate riparian habitats. This will be guided by traditional ecological knowledge and underpinned with community engagement.

Priority projects include:

- detailed design and construction of instream works for Bendigo Creek
- building of the Long Gully constructed wetlands
- installation of an 'Internet-of-Things' sensor network to improve monitoring of catchment health – a prototype has been produced, a monitoring plan developed, and sensor locations will be identified
- design and investigation of the feasibility of renaturalising Back Creek
- development of the scope and masterplan for a cultural trail along Bendigo Creek, including connecting with Wanyarram Dhelk and designing the 'low-line' cycling route.

The next steps will be to develop a project brief, enable a Djaara advisory committee to lead the design process, and procure a consultant.

٣Ţ	ŋ	~			$\bigcirc$				
Statu	S		Implem	Implementation					
Lead	agency		City of Greater Bendigo and Djaara (Dja Dja Wurrung Clans Aboriginal Corporation)						
Imple partn	mentatio	on	North Central Catchment Management Authority, DELWP, Coliban Water, Parks Victoria, La Trobe University						
Locat	ion		Bendigo						
Scale			City						



# Wanyarram Dhelk – Starting the Healing

This phase of Wanyarram Dhelk will focus on sediment capture and management, to enable Bendigo Creek to start being turned from an urban drain into a valued vibrant waterway.

This project will:

- establish a chain of instream sediment ponds that will be used to capture and manage sediment entering Bendigo Creek
- design and reinstate riparian areas
- investigate, identify and reduce current sediment hotspots in the Bendigo catchment
- work with partners to develop a stormwater management plan for the surrounding areas.

This project will build on the recent work completed by Water Tech, including concept designs and site surveys. It will be an important step in the restoration of Bendigo Creek and a key first step in implementing the Reimagining Bendigo Creek Plan. It is guided by the Dhelkunya Dja Country Plan 2014-2034.

The preliminary stage will be revisiting the existing concept plans and working with key stakeholders to develop and progress to detailed design. This will include scoping the stormwater management plan, planning and approvals for the proposed works, and implementation following that. The majority of the survey, flood modelling and approvals process is well progressed as part of the preparation work already completed.

٣Ţ	Ξŋ	~		( <sub>A</sub>	$\bigcirc$	\$ \$ \$			
Statu	5		Implem	Implementation					
Lead	agency		Djaara ( Aborigi Dja Dja (Djanda	Dja Dja W nal Corpo Wurrung k)	/urrung C pration) ar Enterpris	lans nd es			
Imple partn	Implementation partners			City of Greater Bendigo, North Central Catchment Management Authority, Coliban Water, Environment Protection Authority Victoria					
Locat	ion		Bendigo	)					
Scale			Waterway						

# Castlemaine Stormwater Outfall Retrofit Scheme and Pilot Program

Retrofitting stormwater outfalls around Castlemaine was identified as a key outcome of the Castlemaine Urban Waterways Management Plan which was completed as part of the 2018 Water for Now and into the Future in Castlemaine project.

Multiple stakeholders who attended the Opportunities Identification Workshop identified litter in the creeks, as well as erosion and sediment as key issues in Castlemaine. To mitigate this, gross pollutant traps (GPTs) and erosion remediation works are proposed in the form of rockwork and vegetation to help stabilise soil and prevent erosion.

As a pilot program, based on catchment analysis and site inspections, five sites have been identified in Castlemaine as having potential opportunities for rectifying outfalls and installing GPTs to minimise associated litter and sediment in the creek.

This could be a pilot program across the region, or specific to Castlemaine. The next steps involve securing funding for detailed design work, construction and monitoring.

r.	ΞŊ		\$ \$ \$		$\bigcirc$				
Statu	S		Identified						
Lead	agency		Mount Alexander Shire Council						
Imple partn	ementatio ers	on	North Central Catchment Management Authority						
Locat	ion		Castlemaine						
Scale			Town						

# Forest Creek Revitalisation Project

This revitalisation project is focused on the rehabilitation of a channelised section of urban Forest Creek, Castlemaine, and will:

- create a more natural stream channel while managing stormwater, flood and fire risk
- facilitate community engagement by linking key trails, interpretative signage and citizen science projects
- increase community awareness of the cultural significance of Forest Creek
- manage sediment and ongoing weed issues
- create an enhanced aquatic habitat
- improve natural habitat and create a wildlife corridor.

The project evolved from an investigation by Professor Ian Rutherfurd entitled *Options for the Management of Forest Creek in Urban Castlemaine* (2018). It provides Traditional Owner and community benefit by improving the ecology and accessibility of Forest Creek, including a link to a significant site for the Djaara people, Booladj Kiarp Bolealon.

The preliminary stage of the project is well established with the development of an options paper and convening of an Implementation Strategy Group with representatives of Djaara (Dja Dja Wurrung Clans Aboriginal Corporation), Mount Alexander Shire Council, DELWP, North Central Catchment Management Authority, Castlemaine Landcare and Friends of Campbells Creek.

The next stage involves concept and detailed designs, Traditional Owner and community consultations, gaining required approvals and refining costings. The following implementation phase will include preparatory works such as reed and weed removal, creation of a natural stream morphology, installation of litter controls, revegetation, interpretive signage and associated works. There will be on-going monitoring of completed works.

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Statu	S		Commi	Committed					
Lead	agency		Djaara ( Aborigi	Djaara (Dja Dja Wurrung Clans Aboriginal Corporation)					
Imple partn	mentatic ers	on	Mount Alexander Shire Council, North Central Catchment Management Authority, Friends of Campbells Creek, Castlemaine Landcare Group						
Locat	ion		Castlemaine						
Scale Waterway									

### **Echuca Aquatic Reserve**

The redevelopment of the Echuca Aquatic Reserve is a threeyear program to improve its environmental and social values. The reserve offers nature and parklands with a wetland overlooking the Murray River and supports regional tourism with event opportunities (such as the Riverboats Music Festival), ecology education excursions, passive recreation and small functions (such as wedding ceremonies).

The redevelopment includes rehabilitation of the wetlands to treat urban stormwater, construction of shared pathway compiant with the *Disability Discrimination Act 1992*, native vegetation planting, protection of existing large River Red Gum trees, the addition of further public use facilities such as seating and BBQs, and a proposed Indigenous trail.

The design phase is underway and will be followed by the construction of pathways, redevelopment of parkland area and rehabilitation of wetlands. The final phase is the development and construction of the proposed Indigenous trail. Given that the Murray River is part of NSW, the project will continue to work with WaterNSW, which operates NSW's river systems.



r.	ΞŊ	~=~	\$ \$ \$	(f <sub>6</sub> )	$\bigcirc$				
Status			Implementation						
Lead	agency		Campas	pe Shire	Council				
Imple partn	Implementation partners			Yorta Yorta Nation Aboriginal Corporation, Coliban Water					
Location Echu				Echuca					
Scale	e Precinct								

# MAKING MORE OF WATER RESOURCES IN A CHANGING CLIMATE

## Improved Drought Resilience for Bendigo with Managed Aquifer Recharge

This project will develop a business case for a managed aquifer recharge (MAR) project, which aims to improve Bendigo's water security during drought. The proposed MAR project aims to take excess water from reservoirs (available under Coliban Water's bulk entitlement) in the Campaspe water supply system and store up to 15 gigalitres of it underground for later reuse. The benefits of the proposed project include:

- providing water for critical green spaces in Bendigo, Huntly, Axedale, Marong, Heathcote and surrounds, to support regional liveability during dry periods
- supporting the health of the Campaspe River by reducing the potential for leakage to the groundwater and potentially providing a source of supply to the Campaspe River in addition to existing environmental flows
- supporting groundwater users in the Lower Campaspe Valley by maintaining groundwater levels and reducing the potential for saline groundwater intrusion
- providing a more reliable water supply for Bendigo, Huntly, Axedale, Marong, Heathcote and surrounds during drought.

This initiative builds on previous work that developed a Managed Aquifer Recharge Decision Support Tool, which was tested on a Lower Campaspe Valley case study (see page 20). The case study found that managed aquifer recharge is a viable means of improving Bendigo's water security during drought and recommended that a business case be developed.

Status	Identified					
Lead agency	Coliban Water					
Implementation partners	Goulburn-Murray Water, City of Greater Bendigo, North Central Catchment Management Authority, Environment Protection Authority Victoria					
Location	Bendigo and surrounds					
Scale	Region					

Aquifer recharge, Campaspe River near Goornong. Credit: Scott Ridges, Goulburn-Murray Water



# Diversifying Water Supply for the Castlemaine Botanical Gardens

Diversifying water supply for the Castlemaine Botanical Gardens is identified as a key outcome of the 2018 Castlemaine Urban Waterways Management Plan which was completed as part of the 2018 Water for Now and into the Future in Castlemaine project. The Coliban Water Urban Water Strategy (2022) has also short listed the expansion of water networks in Castlemaine and Kyneton by 2037.

The industrial district of Castlemaine is a concentrated area of industrial and open space, making it ideal for recycled water. Class A or B recycled water can substitute for a potable water supply for the irrigation demands of the Botanical Gardens and non-potable uses in commercial buildings such as toilet flushing.

- The proposed assets investigated for this district were a:
- pipeline of at least 3.5 km for recycled water for non-potable uses
- supply of recycled water for non-potable uses.

The alignment from the Castlemaine Waste Water Treatment Plant to the industrial district provides opportunity for other areas of Castlemaine to be connected to the recycled water network.

Further investigation is needed to determine the viability of the recycled water scheme, exploring the availability and timing of likely recycled water, potential users, treatment requirements, the location of a storage tank and alignment of the recycled water main, and the pumping requirements needed. Finally, the financial feasibility of this option would depend on the outcome of a cost-benefit analysis of the proposed recycled water scheme compared to the stormwater harvesting opportunities. The next steps involve scoping of the project with collaborative partners and confirmation of commitment, followed by securing

funding and commitment to implement the feasibility study.

٣Ţ	ΞŊ		~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~	() Li	$\bigcirc$					
Statu	Status			Identified						
Lead	Lead agency			Mount Alexander Shire Council, Coliban Water						
Implementation partners			To be determined							
Location			Castlemaine							
Scale			Precinct							

# Diversifying Water Supplies for Parks and Gardens

This project aims to identify and aid in securing a variety of water supplies for priority community assets, allowing water security during dry periods.

A diverse range of water supply sources (e.g. stormwater, recycled water, groundwater) can provide greater water security for highly valued green spaces (such as ovals, public open spaces, gardens, recreational water bodies) during drought, and reduce the pressure on potable water supplies.

The objectives are to engage with local governments to identify priority community assets that use potable water during periods of water shortage, assess water use requirements, consider and compare diverse water sources and demand saving initiatives, and provide support to community groups to secure funding and implement works.

r.	ΞŊ				$\bigcirc$			
Status		Identified						
Lead agency			To be determined					
Implementation partners			Coliban Water, local government					
Location			Coliban region					
Scale		Service area						



## Increased Flows in Coliban River for Cultural and Ecological Benefits

This project aims to increase flows in the Coliban River for cultural and ecological benefits while increasing the operational flexibility of managing water resources by reinstating the hydroelectric plant at Lake Eppalock.

The Coliban River flows are limited to passing flows and spills from Malmsbury Reservoir. *North Central CMA Region Environmental Water Management Plan for the Coliban River* (2016) notes that the river is flow stressed and does not have sufficient water for the environment to maintain and improve its ecological values.

There is an opportunity for Coliban Water to release water from Malmsbury Reservoir to increase flows to Lake Eppalock, and then pump water from Lake Eppalock to Bendigo via the Goldfields Superpipe. To off-set pumping costs and avoid carbon emissions it is proposed to reinstate the hydroelectric plant at Lake Eppalock.

This initiative builds on previous work undertaken through the Coliban IWM Forum, which developed a business case for the project Lake Eppalock Hydroelectricity Project: For Country and Environment. This work also found that an agreement between Coliban Water, the North Central Catchment Management Authority and the Victorian Environmental Water Holder would need to be established and that the project would be a significant cost for Coliban Water. However, if capital funding could be secured for the project on the basis of environmental, cultural and renewable energy benefits then it would be more favourable.

The next stage is to establish the required agreement, then secure funding, followed by the construction of the hydroelectric plant.

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Status	Identified
Lead agency	Coliban Water
Implementation partners	North Central Catchment Management Authority, Victorian Environmental Water Holder, Djaara (Dja Dja Wurrung Clans Aboriginal Corporation), Goulburn-Murray Water
Location	Coliban River
Scale	Waterway

# Managing Trentham Stormwater Quality and Quantity for Healthy Waterways

The township of Trentham, in the peri-urban boundary of Melbourne, is facing high population growth in the coming years. The upper Coliban catchment supplies drinking water for Trentham and is the subject of significant investment for Coliban Water, North Central Catchment Management Authority, DELWP and local government.

The Trentham Stormwater Quality and Quantity for Healthy Waterways project aims to make informed decisions about managing threats to the catchment resulting from urban and peri-urban development now and into the future. The approach is based on assessing the likelihood of drivers of change, for example, urban development influencing streamflow, and the consequence of these changes, such as degraded waterway health and water quality.

The outcome will be the development of a stormwater management plan for the residential and urban areas of the Trentham township. It is expected that the plan will inform water planning for urban growth for similar townships across the region.



The steps for this project include:

- 1. narrow down the extent of assessment (i.e. township boundaries) based on the *Upper Coliban Land Use Risk Assessment Scoping Study* (2020)
- 2. engage with the Trentham Sustainability Group to identify community aspirations
- 3. confirm funding requirements for proposed project phases and any in-kind contribution opportunities
- 4. commit to the project and start briefings.

r.	ΞŊ		, ∽ ¢		$\bigcirc$				
Status			Identified						
Lead agency			Coliban Water, North Central Catchment Management Authority						
Implementation partners			Hepburn Shire Council, Goulburn-Murray Water						
Location			Trentham						
Scale			Town						

Quarry Street Reserve Lake, Trentham. Credit: Darcy Whiffin, DELWP

# Recycled Water for a Greener Echuca

With a changing climate the long-term security of potable water supply is becoming a major issue. Coliban Water projections for Echuca show that under high climate change supply scenario, there is a potential for a shortfall in potable water supply as soon as 2028.

The aim of this project is to investigate the feasibility of supplying recycled water to existing and new public open space to reduce the demand on potable water supplies. It recognises the value of diverse water to reduce the reliance on drinking water and continue to irrigate key public open spaces for a greener, healthier Echuca.

The developing Echuca West precinct has been selected as a feasibility test site. It is close to the Echuca West Water Reclamation Plant and the potential reduction in demand for potable water could allow the area to accommodate up to 5,000 new homes.

The feasibility study will:

- develop a concept design plan for a staged recycled water scheme based on priorities, resources and demand nodes
- modify existing Coliban Water agreements to allow for an allocation of recycled water to be available for use by Council
- investigate upgrades to the Echuca West Water Reclamation Plant, to enable the supply of fit-for-purpose recycled water.

٣Ţ	ΞŊ			( <sub>A</sub>	$\bigcirc$				
Status			Implementation						
Lead	Lead agency			Campaspe Shire Council					
Imple partn	Implementation partners			Coliban Water, Yorta Yorta Nations Aboriginal Corporation					
Location			Echuca						
Scale			Town						

Echuca Aquatic Reserve. Credit: DELWP



# INTEGRATED PLANNING FOR A SUSTAINABLE FUTURE

## Water Sensitive Urban Design for New or Upgraded Developments (Land and Buildings)

Population growth in the region has occurred more rapidly than projected, particularly during the coronavirus pandemic. This more-urgent demand for new housing places pressure on councils. This project aims to provide support and assistance for councils to incorporate water sensitive urban design (WSUD) into new developments or upgrade projects (such as roads or council-owned buildings).

Examples include:

- passive irrigation of street trees saves other water for irrigation and supports long-term health of the trees to provide better urban heat reduction and amenity, while also reducing stormwater runoff
- porous pavements allows water to seep into the ground, reducing surface runoff and helping prevent flooding. It also keeps moisture in the soil profile for longer, reducing the need for supplementary watering and helping with urban cooling
- capturing rainfall at the lot level using tank or grey water for flushing toilets reduces demand on the potable system
- planning and developing wetlands and other WSUD assets utilise developer contributions.

It is anticipated that a consultant would be procured to help councils identify and implement the required steps to increase uptake of WSUD. The scope of works will be dependent on participating councils and their level of experience in implementing WSUD. One potential output is the preparation of a business case for councils to submit to their own organisations to increase WSUD into their operations.

This project is included as a statement of the Coliban IWM Forum's recognition of the importance of WSUD and supporting councils as they embed this approach into their planning and operations.

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Status		Identified							
Lead	Lead agency			To be determined					
Implementation partners		on	To be determined						
Location		Coliban region							
Scale		Forum area							

# Bendigo Regional Employment Precinct

The City of Greater Bendigo is proposing to create the Bendigo Regional Employment Precinct. The project aims to create a large industrial precinct (280 hectare), attract new industries and create regional jobs. The initiative will see the City of Greater Bendigo partner with the private sector and government agencies to drive an innovative model of finance and delivery.

The city will utilise an environmentally sustainable approach to design a best-practice industrial precinct that demonstrates water-sensitive urban design, zero carbon and circular economy. To support this, a detailed investigation and plan is required to identify and develop innovative IWM options. This will include identifying and evaluating options for:

- diverse water supply, including stormwater harvesting and/or wastewater reuse
- retaining, treating and reusing wastewater and biosolids onsite
- flood management and reducing water quality impacts on the local waterway
- reducing urban heat generated from the industrial precinct.

The preferred options will then be progressed into planning policy, precinct design controls, infrastructure funding models, concept design and preliminary costings.

Status	Committed						
Lead agency	City of Greater Bendigo						
Implementation partners	Victorian Planning Authority, Coliban Water, North Central Catchment Management Authority						
Location	Marong (Bendigo)						
Scale	Precinct						

## Macedon Ranges North IWM Plan

This project is the development of an IWM plan for the northern part of the Macedon Ranges Shire Council area. The IWM plan will explore opportunities and solutions to meet IWM objectives in this region in the face of a drying climate and rapid urban growth around the towns of Woodend and Kyneton.

The region covers a significant portion of the upper Campaspe River catchment. A key focus will be the protection and enhancement of waterway and catchment health whilst servicing the water and sewerage needs of the local communities.

The region overlaps the jurisdictions of two water corporations, Coliban Water and Greater Western Water. This joint IWM plan will allow for collaboration to determine and progress the best outcomes for the region and the community regardless of jurisdictional boundaries.

A working group will be formed to confirm the scope and structure of the plan and funding will be identified.

Status	Identified				
Lead agency	Macedon Ranges Shire Council				
Implementation partners	Greater Western Water, Coliban Water, North Central Catchment Management Authority, Djaara (Dja Dja Wurrung Clans Aboriginal Corporation), Taungurung Land and Waters Council				
Location	Northern Macedon Ranges				
Scale	Region				



Golden Square render. Courtesy City of Greater Bendigo

### Servicing Small Townships

Small towns need modern domestic water supplies and wastewater and sanitation services to ensure protection of environmental and public health, by reducing the risks that come with unsafe drinking water and poorly managed sewage. Limitations in these services is an issue for local governments.

Smaller townships are also potential growth areas, that can accommodate new housing both for residents and 'tree changers' moving away from cities. However, these small towns need reticulated water supplies and wastewater and sanitation services provided to facilitate growth. There is an opportunity to do this in an innovative manner through IWM.

Taradale and Elphinstone, with populations of about 450 and 550 people respectively, are two such towns and are the subjects of an initial scoping project to explore cost-effective provision of water to townships of this size.

The forum recognises this need, and that the Taradale and Elphinstone project will need to be broadened to other towns too. Fortunately, there are examples of such projects in the Goulburn Broken and North East IWM regions that the Coliban IWM Forum can draw on.

This project is included here as the forum's statement of intent to address this challenge collaboratively as opportunities become available. It is anticipated this project will be driven by local governments, with the support of an IWM Officer, currently being recruited.

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Status		Identified						
Lead agency	Local governments							
Implementation partners		Coliban Water						
Location		Taradale and Elphinstone						
Scale		Town						



Integrated Water Management Forums



Environment, Land, Water and Planning