

# Yarra

## 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

We are all connected by water. It is essential for our life and liveability and prosperity.

The Yarra River holds a special place amongst the people of Melbourne and the Yarra region. Its catchment has sustained Aboriginal people for thousands of generations before European colonisation. Today, it is Melbourne's main source of drinking water, supports productive agriculture, including a world-famous wine industry and extensive horticultural enterprises. Its landscapes and open spaces are home to a great diversity of plants and animals and attract millions of visits for recreation and enjoyment of nature.

But we are facing pressures posed by climate change, rapid population growth and urbanisation, and these demand that we realign the way in which we plan and design our cities and manage our natural resources.

Integrated water management is about protecting water, our most vital resource, and enhancing our water system services so that life can continue, and be better, for our future generations.

The Yarra IWM Forum has taken up this responsibility with a pledge to work collaboratively to improve our water system practices and deliver bold 21st century solutions for stormwater management, water sensitive blue and green infrastructure, and sustainable land use planning that will ensure the communities across our catchment remain healthy, prosperous and among the world's most liveable.

As Chair of the Yarra IWM Forum, I acknowledge our shared commitment to protect the Yarra River, the one living and integrated entity that has fundamentally shaped this region for thousands of years, as well as Port Phillip Bay into which our catchment's rivers and creeks flow.

On behalf of the Forum, I am pleased to present this Strategic Directions Statement that prepares us to work across the planning and water sectors to collectively identify and progress IWM opportunities of the highest value and priority to our communities.

I would like to thank the individuals and organisations who contributed their time and expertise during the first phase of our journey as the Yarra IWM Forum.

Together we have built a strong foundation from which we will deliver on our vision for a world-leading water sensitive catchment.



**Chris Chesterfield**

Chair of the Yarra IWM Forum

# Acknowledgements

The inaugural Yarra Integrated Water Management Forum was convened in December 2017 with subsequent Forums meeting throughout 2018 to discuss and prioritise integrated water planning and management in the Yarra Forum Area.

The Forum Area encompasses Victoria's capital, Melbourne, the economic and employment hub of the state. One third of Victorians reside in the Yarra catchment. It is home to one of Australia's most iconic and culturally significant waterways, the Yarra River, which flows from its near natural upper reaches in the forested

Yarra Ranges down to Port Phillip Bay. The Yarra Forum Area will continue to experience substantial population and economic growth in the coming years. The preservation and management of the catchment's landscapes will have a positive impact on the region's world-renowned liveability and the long term health and security of its waterways.

The Forum covers the traditional lands of Kulin Nation, including the Wurundjeri people. The Forum Area is abundant in Aboriginal cultural sites with a majority of these found near waterways and the coast.

The Yarra IWM Forum acknowledges these Traditional Owners as traditional custodians who have managed land and water sustainably over thousands of generations and maintain an active connection to Country.

The Yarra Integrated Water Management Strategic Directions Statement has been developed by the Yarra Integrated Water Management Forum. Members of this Forum include the Chief Executive Officers and Managing Directors of the following organisations:





## Chapter 1

# The way forward

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

# Introduction

## Overview

The Yarra catchment is a richly diverse geographic area encompassing some of Victoria's most iconic landscapes and waterways. Magnificent old growth woodlands, lush rainforests and protected riverine environments meet fertile agricultural lands and populous cities throughout this vast region. Victoria's coastal capital, Melbourne, sits within the catchment and represents one of several Victorian cities undergoing rapid transformation. Considered alongside challenges posed by global climate change, growth and development is impacting on the health of waterways entering both the Yarra River and Port Phillip Bay. Balancing the needs and function of Yarra's water cycle with future growth and development is a complex challenge requiring careful management.

The region's water sector, local governments and Traditional Owners are working collaboratively to plan and deliver projects and strategies that will enhance the resilience and liveability of the Yarra catchment and deliver enduring environmental, economic and social benefits to local communities. Through ongoing engagement with their communities, these organisations have heard that thriving waterways are inextricably linked to community identity, amenity, value and sustained economic benefit for the Yarra catchment.

The way in which land use and water planning occurs will be fundamental to ensuring these aspirations are realised.

The water cycle in the Yarra catchment is overseen and managed by several agencies. Enhanced communication and collaboration is required to ensure plans and investments are optimised to enable shared community outcomes.

This approach is Integrated Water Management (IWM). A central premise of IWM is the overall acceptance that achieving liveability and resilience is a shared responsibility.

The *Integrated Water Management Framework for Victoria 2017* is designed to help local governments, water corporations, catchment management authorities, Traditional Owners and other organisations work together to ensure the water cycle efficiently contributes to the urban liveability of the region, with communities at the centre of decision-making.

To assist with this, IWM Forums have been established across the state to identify, prioritise and oversee the implementation of critical collaborative water opportunities

## Integrated Water Management

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.

## What is a Strategic Directions Statement?

This Strategic Directions Statement (SDS) articulates the regional context, shared vision and strategic water-related outcomes for the Yarra catchment.

It also includes a prioritised list of IWM opportunities developed in collaboration by the Yarra IWM Forum partners.

Partners of the Yarra IWM Forum are committing their best endeavours to:

- Ensure priority opportunities are progressed in line with the shared vision and strategic outcomes of the Yarra catchment; and
- 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 Yarra IWM Forum's current priorities and opportunities.

# Enduring collaboration

## How we're working together

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

The Forum brings together 28 organisations with an interest in water cycle management. These organisations include five water corporations, 19 local governments, the Port Phillip and Westernport Catchment Management Authority, representatives of Traditional Owner interests, the Department of Environment, Land, Water and Planning (DELWP) and the Victorian Planning Authority.

To ensure IWM is successful and enduring across the region, the Yarra IWM Forum partners commit to promote a collaborative and shared values culture within their own organisations and through their work with local communities and water cycle delivery partners

The Yarra IWM Forum is governed by an open and transparent IWM planning process.

This process assumes a holistic, whole-of-cycle approach to determine 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 catchment's water, resources and assets.

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 opportunities. This collaborative process allows for integrated solutions that respond to individual business needs, as well as the needs of the broader catchment.

The Yarra IWM Forum partners will continue to work together to build inter-organisational trust and develop productive, enduring relationships to realise the shared vision for integrated water management and delivery in the Yarra catchment.

Further information on the IWM Forum's governance and planning framework is outlined in the *Integrated Water Management Framework for Victoria 2017*, available on the internet at [www.delwp.vic.gov.au](http://www.delwp.vic.gov.au).

## Recognising Aboriginal values in water planning and management

The Yarra IWM Forum is committed to working in partnership with Aboriginal Victorians across landscapes, communities and natural resources.

The Forum recognises that Traditional Owners throughout the metropolitan Melbourne catchments, including the Wurundjeri, Bunurong and Wadawurrung people of the Kulin Nation, are unique to Country and their involvement in IWM planning will be specific to each planning area.

Organisations involved in IWM have obligations to involve Traditional Owners and consider Aboriginal values in their organisational activities. The Forum will continue to work with Traditional Owner groups to determine the appropriate approach and level of involvement in the broader IWM planning process for each Forum Area.



Victorian alpine region. Photographer: Ashley Dowle

## Guiding principles for collaboration

The purpose of the Yarra IWM Forum is to provide a collaborative platform for overseeing, supporting and, where necessary, facilitating water's contribution to resilience and liveability in Victoria.

Applying an Integrated Water Management (IWM) approach, the Forum will:

- Consider the collective community needs in the regional context and develop an overall strategic direction accordingly.
- Complement and feed into existing water and land planning processes, collaborative networks, forums and associations.
- Commit best endeavours to facilitate multi-stakeholder initiatives, share organisational expertise and advance sectoral learnings.
- Respect Traditional Owner rights in water management planning.
- Ensure multiple benefits can be delivered to the community and the economy.
- Optimise investment in water management projects and strategies to deliver multiple benefits and best community value solutions.



### IWM Forum governance structure

Further information on IWM Forum collaboration and planning can be found in Chapter 3 of this SDS.



Mortimor Reserve, Gembrook, Victoria. Photographer: Christian Pearson. Courtesy Melbourne Water



## Chapter 2

# IWM in the region

Understanding why an integrated approach to water planning and management is critical to achieve better economic, environmental, cultural and community outcomes for the Yarra catchment.

# Regional context

The Yarra IWM Forum Area covers an extraordinarily diverse area encompassing an array of culturally, environmentally and economically significant landscapes, as well as one of the world's most liveable cities in the Victorian capital, Melbourne. The catchment spans approximately 4,076 km<sup>2</sup>, extending from Melbourne's CBD in the south, north to the southern slopes of the Great Dividing Range. The eastern extent of the Forum Area follows through the foothills of the Victorian Alps to the surrounding Yarra Ranges National Park.

The Yarra catchment includes one of Australia's most iconic and culturally significant waterways, the Yarra River, which flows from its near natural upper reaches at Mt Baw Baw in the Yarra Ranges throughout the catchment to Port Phillip Bay.

The landscape of the Yarra catchment varies greatly from ancient woodlands, lush rainforests, grasslands and fertile agricultural lands, to Melbourne's densely populated and developed urban areas extending from central Melbourne.

The region sustains a range of leisure and recreational activities, including tourism, camping, cycling, hiking, boating and rowing. A strong service-based economy is characteristic of urban areas in the catchment whilst industry, construction, agriculture and viticulture are prevalent elsewhere.

The catchment includes areas of significant value where Aboriginal people have lived for thousands of years. The Yarra River formed the lifeblood of many Aboriginal communities and continues to hold significant value for culture and storytelling.

## Population

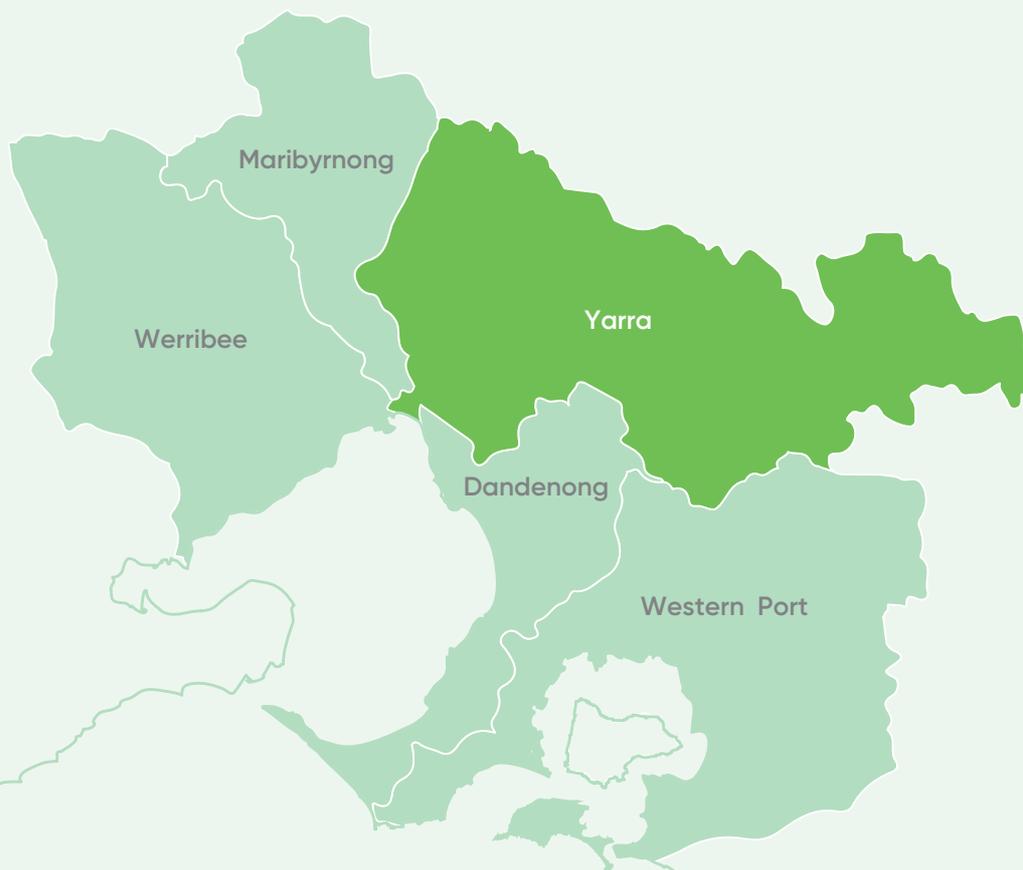
The Yarra IWM Forum Area is home to one third of Victoria's population, or approximately 1.8 million people. The catchment's population is predicted to reach 2.6 million by 2040. Substantial urban and greenfield growth will occur here in the next two decades.

Expanding satellite cities at Parkville, La Trobe and Monash will soon support more residents and provide employment opportunities for tens of thousands of people.

The densification of inner Melbourne and middle ring suburbs, coupled with rapid growth through outer catchment areas, including Craigieburn, Kalkallo, Wallan and Lilydale, highlights the need for integrated catchment planning and management to maintain and improve liveability for community wellbeing and economic prosperity.



Yarra Ranges National Park. Courtesy Creative Commons



**POPULATION GROWTH**

**1,800,000** NOW (2018)

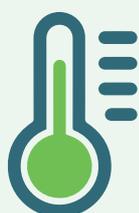
**2,600,000** BY 2040

**44% INCREASE**



**THE REGION**

- AGRICULTURE & VITICULTURE **57%**
- NATURAL VEGETATION **21%**
- URBAN AREAS **22%**



**TEMPERATURE**

AN INCREASE OF

**1.3°C**

BY 2040

**1** VICTORIAN HERITAGE RIVER

**3** SUB-CATCHMENTS



**24** TRIBUTARIES (YARRA SYSTEM)

**THE YARRA RIVER**



FEEDS

**9**

MAJOR RESERVOIRS



SUPPLIES

**70%**

OF MELBOURNE'S DRINKING WATER

**ECONOMY**



**3** NATIONAL EMPLOYMENT AND INNOVATION CLUSTERS

Source: Department of Environment, Land, Water and Planning  
Victoria in future 2016  
Healthy Waterways Strategy 2013/14-2017/18, Melbourne Water  
History of the Yarra River 2017, Melbourne Water

## Climate Change

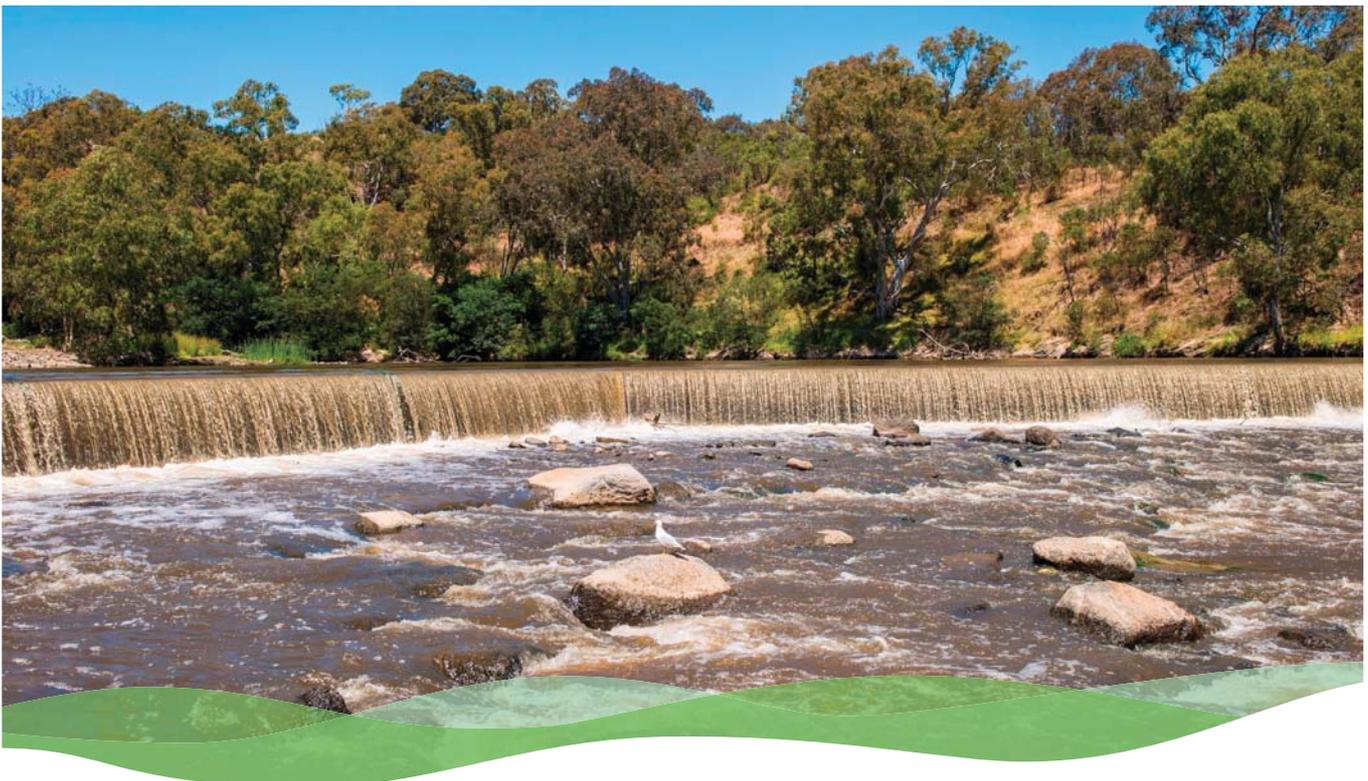
Together with the major population increases anticipated over the next two decades, climate change presents a critical challenge for the Yarra catchment. By 2040, temperatures across the region are expected to rise by an average of 1.3°C under a medium climate change scenario. The risk of fire in forests and grasslands in upper areas of the Yarra catchment will remain high under these conditions. The impact of the urban heat island effect will also increase, with greater density urban areas experiencing higher heat vulnerability than more rural areas. At present, heat waves in Melbourne have a greater negative effect on population health than any other climate-related issue. The ongoing availability of water in the environment will be vital to reduce the risk of heat stress and improve cooling in the most vulnerable areas of the catchment.

Whilst the region is predicted to see more frequent and intense rainfall events that will increase the risk of flooding, the Yarra catchment will experience a reduction in average annual rainfall by 2040. This change is consistent with conditions predicted across the state as Victoria becomes warmer and drier. Less rainfall in the future, combined with increased development and growing populations, will place more pressure on water services in the catchment.

Projections for Victoria's future climate indicate an increase in the frequency and intensity of wildfires for rural parts of the Yarra catchment and neighbouring regions in Australia's southeast. The increased risk of bushfire poses a serious threat to the catchment's communities, infrastructure and high-value native forests and ecosystems.

To meet the challenge of climate change and prepare Victoria's water system for a range of possible climate futures, climate change mitigation and adaptation actions will be embedded in all IWM Forum decisions.

A warming world will also impact the health and quality of waterways in the Yarra catchment. Increased stormwater flows from intense rainfall events, combined with excessive sediments in rivers and creeks, will impact natural ecosystems and marine environments reliant on the Yarra catchment's river system, including the Yarra River, as well as Port Phillip Bay. Opportunities to mitigate the effects of climate change through the preservation and management of Yarra's waterways and landscapes will have a positive effect on environmental and human health and the catchment's long term resiliency.



Dights Falls, Melbourne. Photographer: Christian Pearson. Courtesy Melbourne Water



The Yarra River flows through Melbourne. Photographer: Nils Versemann

# Vision and strategic outcomes

Working together, Yarra is a world-leading water sensitive catchment and our communities are healthy and thriving. We honour the land and the water of the Birrarung and its tributaries as the lifeblood of the catchment.

## Collaboration to develop the shared vision and strategic outcome areas

The IWM Forum demonstrates a robust and transparent process of collaboration amongst local governments and a range of stakeholders with an interest in water.

Central within this process are the community values, local interests and place-based opportunities represented by each Forum Member organisation.

The IWM Forum recognises the valuable contribution of these many and diverse actors in supporting a transformative approach to the planning and management of our wider water cycle. Each of these organisations played a leading role in determining a shared vision for IWM unique to each of the five metropolitan Melbourne catchments.

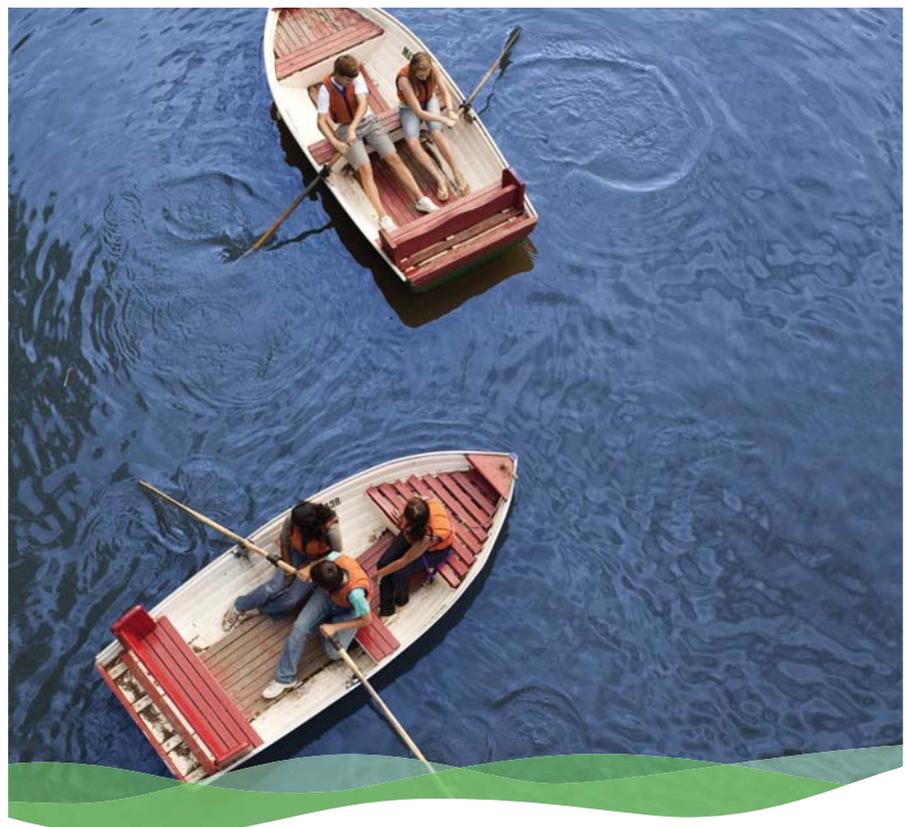
The seven primary strategic outcome areas to achieve this vision, as well as the secondary outcome areas nested beneath each primary area, were developed collaboratively by the IWM Forum partners.

These outcomes acknowledge the breadth of water plans, environmental strategies and land use plans developed by each partner organisation.

The Yarra IWM Forum acknowledges the commitment of the Yarra River Community Assembly to develop a 50-year community vision for the Yarra River. This vision informed the Yarra IWM Forum's vision for integrated water management in the catchment.

The *Yarra Strategic Plan (Wilip-gin Birrarung murrn)*, led by Melbourne Water, brings to life the 50-year community vision for the Yarra River and will guide future planning of the river corridor and each of its reaches.

Further information on the community vision is available at [www.imaginetheyarra.com.au](http://www.imaginetheyarra.com.au).



Yarra River.  
Photographer: Chris Kapa. Courtesy Melbourne Water

# Whole of River Vision

Our Yarra River, Birrarung, is recognised around the world as an iconic example of a nurturing relationship between a river and its community.

Flowing from source to sea, it is the resilient lifeblood of past, present and future generations of Victorians. It connects and enriches our flourishing city, suburbs, regions and beyond.

Our Yarra River, Birrarung, its essential role in our lives and its rich history, are respected, understood and protected. It has cared for us for thousands of years and will for thousands to come.

The vital and continued role of Traditional Owners as custodians of the River, and its role in their culture, is recognised and celebrated.

Our Yarra River, Birrarung and its diverse surrounding landscapes provide a place of refuge, recreation, learning and livelihood. It brings communities together and supports sustainable local economies.

Its clean waters and connected network of thriving green spaces nurture biodiversity, and deepen the relationship between people and nature.

Our Yarra River, Birrarung is respected as a sacred natural living entity and everyone takes responsibility for its care. Its health and integrity are paramount and uncompromised.

What is good for the Yarra is good for all.



Warrandyte State Park. Photographer: Christian Pearson.  
Courtesy Melbourne Water

# Strategic outcomes for IWM

## Outcomes



### Safe, secure and affordable supplies in an uncertain future

A diverse range of water supplies and resources for human, urban, industrial and agricultural consumption

Appropriate policy and regulation to enable water quality to meet regulatory standards and community expectations

Timely collaborative planning and management of water in its entirety

Secure fit for purpose water supplies for underpinning prosperity

Water protects green assets that enhance our community spaces

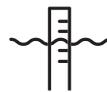


### Effective and affordable wastewater systems

Protect public health and deliver environmental outcomes and contribute to local amenity and communities

Fit for purpose sewerage systems service the community's expectations

Maximise resource opportunities to minimise waste and emissions



### Opportunities are optimised to manage existing and future flood risks and impacts

Appropriate levels of flood protection areas across the catchment, including climate sensitivity modelling

Community and property resilient to local flood risk and informed of increased impacts under climate change

Multi scale responses addressing different levels of risk

Maximise multiple benefits when mitigating flood risk (i.e. maximise adaptation measures)



### Healthy and valued waterways and marine environments

Waterbodies across the catchment are managed for long term ecological resilience, balancing the needs for regional flood mitigation, environment, agriculture, industry and urbanisation

Waterways across the catchment are managed to maintain and improve coastal and marine ecosystems in Port Phillip Bay

Manage impacts of nutrients, sediment, litter, and other pollutant discharges to both waterways and Port Phillip Bay

Traditional Owner and Aboriginal values, knowledge and practices are integrated and protected in waterway management and planning

The Yarra catchment is seeking to achieve seven strategic outcomes through IWM. Each of these will have a significant role in shaping the liveability, prosperity and resilience of Victoria's cities and towns.

These outcome areas provide a guide to identify and prioritise the various IWM opportunities included in Chapter 3 of this SDS.



### 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 urban and rural landscapes

Active and passive recreation supported by water

Improved connectivity and access for active transport links, including along waterway corridors

Retains water in the landscape for cooler, greener cities and towns

Waterways and coastal environments accessible as valuable open space

Aboriginal cultural values associated with landscapes and waterways protected

Balancing competing objectives to achieve ecological and human health outcomes through landscapes



### Community values are reflected in place-based planning

Diverse urban landscapes that reflect local conditions and community values

Empowered and engaged community involved in creating great places

Local water related risks and issues understood and managed

An engaged, knowledgeable and water literate community in the Yarra catchment acts to protect and promote waterway values

Planning and regulatory frameworks align to achieve community place based objectives



### Jobs, economic growth and innovation

Jobs and economic growth and innovation are supported by the water sector

Innovative planning and operation supports optimised investments

Strong governance, collaboration and performance, including organisations that lead/influence planning processes

Stronger collegiate engagement with Traditional Owners and Aboriginal Victorians to create employment and economic opportunities that lead to stronger communities

Recognising the value of water to leverage other investments

# The case for IWM in the Yarra catchment

Over the coming years, unprecedented change and growth in the Yarra catchment will put pressure on its water cycle and resources, impacting urban and rural landscapes and communities, areas of natural vegetation, marine environments and industries.

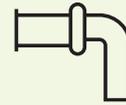
Translating community objectives for water management into practice will involve working across organisational boundaries to achieve the following strategic outcomes. These outcomes are aligned with those reflected in the strategic plans and environmental strategies of the Forum's partner organisations.



## Safe, secure and affordable supplies in an uncertain future

Five water corporations oversee water supply for the Yarra catchment: Melbourne Water, City West Water, South East Water, Southern Rural Water and Yarra Valley Water. The catchment contains several reservoirs, including Upper Yarra, Yan Yean, Maroondah and Sugarloaf, supplying the majority of metropolitan Melbourne water users. The Yarra River's near natural upper reaches in the mountain ash forests of the Yarra Ranges feed nine of Melbourne's major reservoirs, supplying 70 per cent of the city's drinking water.

Changes to the water cycle driven by anticipated population growth and climate change means more water will be needed across the catchment for urban, agricultural and environmental flow purposes. The catchment's residential population is expected to grow by 44 per cent by 2040, emphasising the need to diversify the water supply system and reduce dependency on reservoirs. There is an opportunity now to plan for the provision of secure water supplies for existing communities, industries and developing precincts into the future.



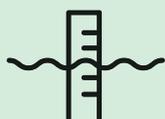
## Effective and affordable wastewater systems

Much of the Yarra catchment's urban wastewater is treated at either the Western Treatment Plant, located in Werribee, or the Eastern Treatment Plant, located in Bangholme, a southeast suburb of Melbourne. Both plants are operated by Melbourne Water.

Some of the catchment's wastewater is treated locally at various regional sewage treatment plants, including a number of Yarra Valley Water facilities.

The provision and efficacy of wastewater management services vary across the catchment. More than 14,000 properties in Yarra's outer northern and eastern suburbs use on-site domestic wastewater systems, or septic tank systems. Many of these are poor-performing and have the potential to pollute waterways, impacting public and environmental health.

In rural townships and less developed areas of the catchment, existing sewer capacity is constrained, with some areas managing wastewater through on-site wastewater management systems. In new growth areas, including the five precincts encompassing Fishermans Bend which will be home to an estimated 80,000 residents, planning for effective wastewater management will support a range of waste-to-resource opportunities for improved public health and environmental outcomes.



## Opportunities are optimised to manage existing and future flood risks and impacts

Since the early settlement of Melbourne on the banks of the Yarra River, the changing flows of the Yarra system have shaped how and where the city developed. Parts of the Yarra catchment remain prone to riverine flooding during periods of heavy and prolonged rainfall.

The Yarra catchment's biggest floodplain is 40 km long and stretches from Yarra Junction to Yering Gorge. The floodplain gives the world-famous Yarra Valley wine region its productive soils.

In recent decades, flows through the Yarra system have become highly regulated due to the construction of major water storages that capture natural run-off and allow for the controlled removal of water for consumptive use.

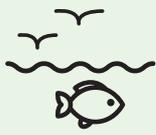
Stormwater flooding is prevalent in urban areas of the catchment. The ongoing development and growth of suburbs in metropolitan Melbourne contributes higher volumes of stormwater during periods of heavy rain, impacting the waterway health of the Yarra River and its tributaries.

There is a need to investigate improved floodwater harvesting capabilities in the Yarra catchment, particularly in developing urban centres where impervious areas and obstructions to flow paths, such as buildings, can alter the course of floodwaters and lead to increased risk and costs of property and infrastructure damage.

Re-use of stormwater will also support the maintenance of water-reliant facilities and amenities, such as irrigating sporting fields and gardens, and reduce demand on drinking supplies.



Raingarden at the Melbourne Cricket Ground. Photographer: Tony Proudfoot. Courtesy Melbourne Water



## Healthy and valued waterways and marine environments

The Yarra catchment contains an array of significant and biologically diverse waterways ranging from expansive rivers with variable flows to small ephemeral creeks and streams. All major waterways in the catchment eventually join the Yarra River, the largest river in Victoria. The Yarra flows 242 km from its origins in the forested Yarra Ranges National Park, located in north-eastern Victoria on the southern slopes of the Great Dividing Range. The river winds its way through metropolitan Melbourne, finally meeting the Maribyrnong River at the northernmost entry to Port Phillip Bay.

The Yarra River holds high cultural, social, economic and environmental value. It is designated as a Victorian Heritage River Area between Warburton, in the catchment's central east area, and Warrandyte, 24 km northeast of Melbourne. Other notable waterways in the catchment include the O'Shannessy River, Little Yarra River, Woori Yallock Creek, Watts River, Plenty River, as well as the Merri Creek and Darebin Creek.

In general, the water quality in the upper reaches of the Yarra catchment is good, however water quality for waterways located in urbanised and industrial areas within the mid and lower catchment declines significantly. Stormwater is one of the major sources of pollution to waterways in the region, transporting elevated levels of nitrogen and other nutrients, sediment and litter into Port Phillip Bay. Above average rainfall during

2016–2017 and associated runoff resulted in a slight decline in overall water quality in the Yarra catchment.

According to the 2016–2017 environmental report card for the catchment's waterways developed by the Environment Protection Authority Victoria, Melbourne Water and DELWP under the *Yarra and Bay Action Plan (2012–2017)*, approximately 43 per cent of waterways in the Yarra catchment are in very poor condition, with just over 3 per cent rated as near-natural and high quality. Over one quarter of waterways in typically rural areas on the urban fringe of the catchment are in good condition, meeting Victorian water quality standards.

IWM outcomes to achieve healthy and valued waterways and marine environments in the Yarra catchment complement Melbourne Water's draft *Healthy Waterways Strategy 2018*. The strategy focuses on protecting and improving waterways in the Port Phillip and Westernport region on behalf of the community. It identifies a range of priority areas and management actions for waterways, and many of these align with the strategic outcome areas and IWM opportunities identified by the Yarra IWM Forum Members and further detailed in Chapter 3.

The Yarra system holds significant recreation, nature conservation, scenic and cultural heritage attributes, supporting a range of iconic Australian animal species. These include the critically

endangered Leadbeater's possum, populations of platypus, a wide variety of birds, native fish and diverse populations of frog species. Macroinvertebrate populations are generally high in the upper reaches of the Yarra system due to better water and vegetation quality.

Urbanisation and climate change present significant challenges to the health of the Yarra catchment's waterways and marine environments. Nearly all the Yarra River's major tributaries have been dammed or altered for agriculture and urban development. Water quality, salinity levels and reduced river flows during periods of drought have led to declining platypus populations in some parts of the catchment, as well as increased chance of algal blooms in others. There is an opportunity to incorporate improved planning and waterway protection controls as the catchment continues to urbanise.

A further area of opportunity involves managing sediment and pollution from the Yarra River and its tributaries to the receiving waters of Port Phillip Bay. At present, the catchment contributes approximately 32 per cent of the nitrogen inputs to Port Phillip Bay, the largest of all contributing catchments, impacting the health of the bay's diverse marine ecosystems.



## Healthy and valued urban and rural landscapes

The landscape of the Yarra catchment is widely diverse, ranging from agricultural areas, extensive natural woodlands, grasslands and cool temperate rainforests, to densely populated urban areas, including Melbourne's central business district (CBD) and residential suburbs accounting for 22 per cent of the region.

The catchment covers an area of approximately 4,076 km<sup>2</sup>, and the majority of this, 57 per cent, is devoted to agriculture and viticulture. The Yarra Valley is one of the catchment's most fruitful growing areas, producing nursery plants and cut flowers, fruits and vegetables, dairy products and acclaimed cool climate wines. A further 21 per cent of the catchment has retained its natural vegetation and supports a diverse range of flora and fauna species. Spanning over 76,000 hectares across the upper reaches of the catchment, the Yarra Ranges National Park is home to a breadth of native plants, including Mountain Ash trees and verdant tree ferns. A diverse range of native animals and birds inhabit the area, including kangaroos, wallabies, wombats, echidnas, kookaburras, rosellas, lyrebirds and cockatoos.

The Yarra catchment encompasses part of Kinglake National Park, Mount Toolebewong State Forest, Kurth Kiln Regional Park, Plenty Gorge and Warrandyte State Park. In the mid and lower reaches of the catchment, extensive land clearing for rural and urban development has led to a decline in vegetation condition. Re-vegetation works aim to better connect habitats, stabilise animal populations and mitigate the heat island effect in developed areas.

The Yarra catchment continues to address challenges on the water cycle from increased pollution due to rapid urbanisation and agricultural activities which impacts the health of its urban and rural landscapes.

The high value associated with waterways, green wedges and woodlands in the Yarra catchment has led to many councils prioritising the protection of these areas and environmental assets.



Yarra Ranges National Park. Courtesy: Kevin Wells Photography



## Community values are reflected in place-based planning

The Yarra catchment area holds a wide range of values for Victorians, including agricultural, tourism, cultural heritage and recreation on and near the water's edge.

The catchment encompasses the traditional lands of the Kulin Nation, including the Wurundjeri people. Archaeological evidence shows that Aboriginal people lived and prospered in the Yarra catchment for at least the last 30,000 years. More than 3,000 Aboriginal cultural sites have been recorded in the Yarra catchment, with a majority of these found within 100 m of a permanent watercourse, swamp or ephemeral creek.

Known as Birrarung, a Wurundjeri word meaning river of mists and shadows, the Yarra River holds significant value as a key part of Aboriginal culture and storytelling. The river is the centrepiece of Wurundjeri Country and served as a key site for conducting ceremony, trading, fishing and hunting.

Other places of significance for Aboriginal people include Yarra Bend Park where the Merri Creek meets the Yarra River, Dights Falls just downstream from this confluence, as well as the sacred domain of the Bolin Bolin Billabong in the City of Manningham.

Local governments are working alongside their communities to maintain and improve liveability and prosperity of the Yarra catchment's communities and waterways during periods of growth. Urban development, small lot densification, renewal areas and activity centre development will comprise 70 per cent of growth in the region. Along with the densification of Melbourne's inner and middle suburbs, including the new residential and employment clusters at Fishermans Bend, areas of growth include the Craigieburn-Mickleham and Wallan regions and the middle ring suburbs of Kilsyth and Lilydale.

There is an opportunity to integrate water planning and management with incoming infill and greenfield development through the Yarra catchment. Examples include stormwater harvesting to irrigate parklands and sporting fields, the provision of community amenities with water features and the maintenance of open space and green wedges to support environmental health, liveability, recreation and cooling in the landscape.

The Yarra catchment supports numerous local advocacy initiatives driven by, or involving, communities concerned with water cycle outcomes. These groups are active in land and waterway protection, riparian planting and land management, community education and advocacy for healthy and thriving waterways.

There is strong stakeholder and community support for a new approach to protecting and

improving the Yarra River and its environs. Melbourne Water is working with representatives of Traditional Owner groups, communities, stakeholders and the Victoria Government on the development of the *Yarra Strategic Plan*, a key element of the *Yarra River Protection (Wilip-gjin Birrarung murron) Act 2017*. The Act strengthens the protection and management of the Yarra River and will help coordinate the responsible public entities that operate near its banks. The forthcoming *Yarra Strategic Plan* will provide a policy and planning framework to guide decision-making and provide future direction for land use and development in the river corridor. Ultimately, the plan aims to maintain, protect and celebrate the Yarra River and its parklands as highly valued natural assets that are critical to the future liveability and prosperity of Melbourne and the Yarra Valley.

Other collaborative initiatives that seek to elevate community priorities and outcomes, as well as maintain a relationship with the Yarra IWM Forum, include Melbourne Water's *Healthy Waterways Strategy Review* and the Metropolitan Partnerships process. The Yarra catchment covers the Northern, Eastern and Inner Metropolitan Partnerships, an initiative that brings together community and business representatives with state and local governments to identify priorities for jobs, services and infrastructure within the region. Among a range of priorities, the Partnerships provide advice to ensure ongoing environmental benefits and connections to the environment within each region.

### A healthy and iconic river for all Victorians now and for the future

The *Yarra Strategic Plan* is currently under development to ensure the long term protection of the Yarra River (Birrarung).

The plan will give effect to a long term community vision for the Yarra River and provide the basis for future planning of the river corridor and each of its reaches.

To deliver the plan and protect the Yarra River for future generations, the *Yarra River Protection (Willip-gin Birrarung Murron) Act 2017* identifies the Yarra River and the many hundreds of parcels of public land it flows through as one living, integrated natural entity for protection and improvement.

Woi-wurrung language is used in the title of the Act in recognition of Traditional Owners' custodianship of the river and connection to the lands through which the river flows.



Merri Creek.

Photographer: Christian Pearson.  
Courtesy Melbourne Water



### Jobs, economic growth and innovation

The Yarra catchment includes a major growth corridor in northeast Melbourne comprising several areas designated for significant population and economic growth. Three National Employment and Innovation Clusters (NEIC) are located within the Yarra Forum Area. The Parkville NEIC currently employs more than 40,000 people through a range of education, research, health, professional and technical industries. The La Trobe Employment Cluster is anticipated to grow from 35,000 people and 25,700 jobs currently to 100,000 people and 80,000 jobs in the future. Jobs and economic growth will also continue at the Monash NEIC, which has Melbourne's largest concentration of jobs outside the CBD. The Monash NEIC currently supports 75,000 jobs and contributes \$9.4 billion to the Victorian economy. The level and pace of growth in these areas will place greater pressure on the Yarra catchment's water systems and the security of supply to homes and businesses.

The second largest State Significant Industrial Precinct (SSIP) is found in the Yarra catchment at the Northern SSIP. This major industrial area is dominated by manufacturing, wholesaling and population services, and will continue to attract new investment and jobs to the Yarra catchment in the coming years.

The Yarra catchment also contains state and nationally significant infrastructure and commercial industries, including Melbourne's CBD, the economic and employment heart

of Victoria. Major roads and public transport networks span the catchment and keep Victoria on the move. The majority of Victoria's internationally-renowned universities, sporting centres, cultural facilities and museums are located here, drawing millions of local and international visitors each year. The international and domestic freight and shipping at the Port of Melbourne and the Yarra Valley agricultural area are other notable contributors to the region's economy.

Tourism is major economic driver for the Yarra catchment. Direct tourism in Melbourne and its surrounds was worth \$8.1 billion in 2015-16, sustaining 81,900 jobs for people employed directly by the tourism industry. Including flow on effects on related industries, total tourism was worth \$15.3 billion to the region's economy.

Agriculture and viticulture are other significant drivers of economic prosperity for the Yarra catchment. The Yarra Valley's locally and internationally recognised fine food and wineries attract more than 4.5 million tourists each year.

Secure water supplies and innovative water management infrastructure to support the Yarra catchment's key industries will be critical to its continued economic growth and success.



## Chapter 3

# IWM opportunities

A portfolio of priority IWM projects and strategies that the Yarra catchment's collaborative partners have committed their best endeavours to progress.

# Priority Portfolio

The following portfolio of priority projects and strategies represents a suite of IWM opportunities for which the Yarra IWM Forum's collaborative partners are committed to progress within the next 12 to 18 months.

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

Additional opportunities that require further assessment are included in the Appendix of this SDS.

In developing this portfolio, the collaborative governance of the Forum recognises the water cycle complexities of the region and considers the balance of outcomes, opportunities, roles and responsibilities for Forum Members and their communities.

A Forum Area (or catchment-wide) IWM Strategy is yet to be developed, however the Yarra IWM Forum has agreed to initiate development of a strategy over the next 12-18 months.

The projects and strategies listed within the Priority Portfolio have not been guided by an existing IWM Strategy, rather they were developed based on the experience and knowledge of the Forum Members, and in consideration of their potential to impact on the seven strategic outcomes for IWM sought for the Yarra region. In addition, consideration was given to the urgency of taking such actions, particularly where opportunities could be lost if no action was taken, as well as the level of commitment demonstrated by partner organisations to progress IWM initiatives over the next 12-18 months.

The IWM opportunities within acknowledge a number of existing metropolitan-wide strategies and plans, such as the *Melbourne Water Systems Strategy* and the draft *Healthy Waterways Strategy 2018*, as well as the clear and measurable targets identified in the existing strategies. Targets may include alternative water use and stormwater harvesting and infiltration. Further, climate change mitigation goals, including low emission IWM solutions and those that support urban cooling and greening, will be considered by the Forum during the evaluation of projects and strategies.

The IWM Forum recognises that the contribution of this Priority Portfolio to the seven strategic outcomes, including the targets identified in the existing metropolitan-wide strategies, has not yet been quantified. It is the intention of the Forum to consider a targeted evaluation of these IWM opportunities where the Forum agrees this is necessary. This work will occur in tandem with the development of a catchment-wide strategy.

The Forum acknowledges that this is a dynamic list of IWM opportunities and is subject to further assessment by the IWM Forum Members. The organisations listed as collaborative partners in the IWM Priority Portfolio have been identified by the Forum Members as important stakeholders to progress the individual initiative. For initiatives in initial stages of development, additional stakeholders may be included as the project progresses.

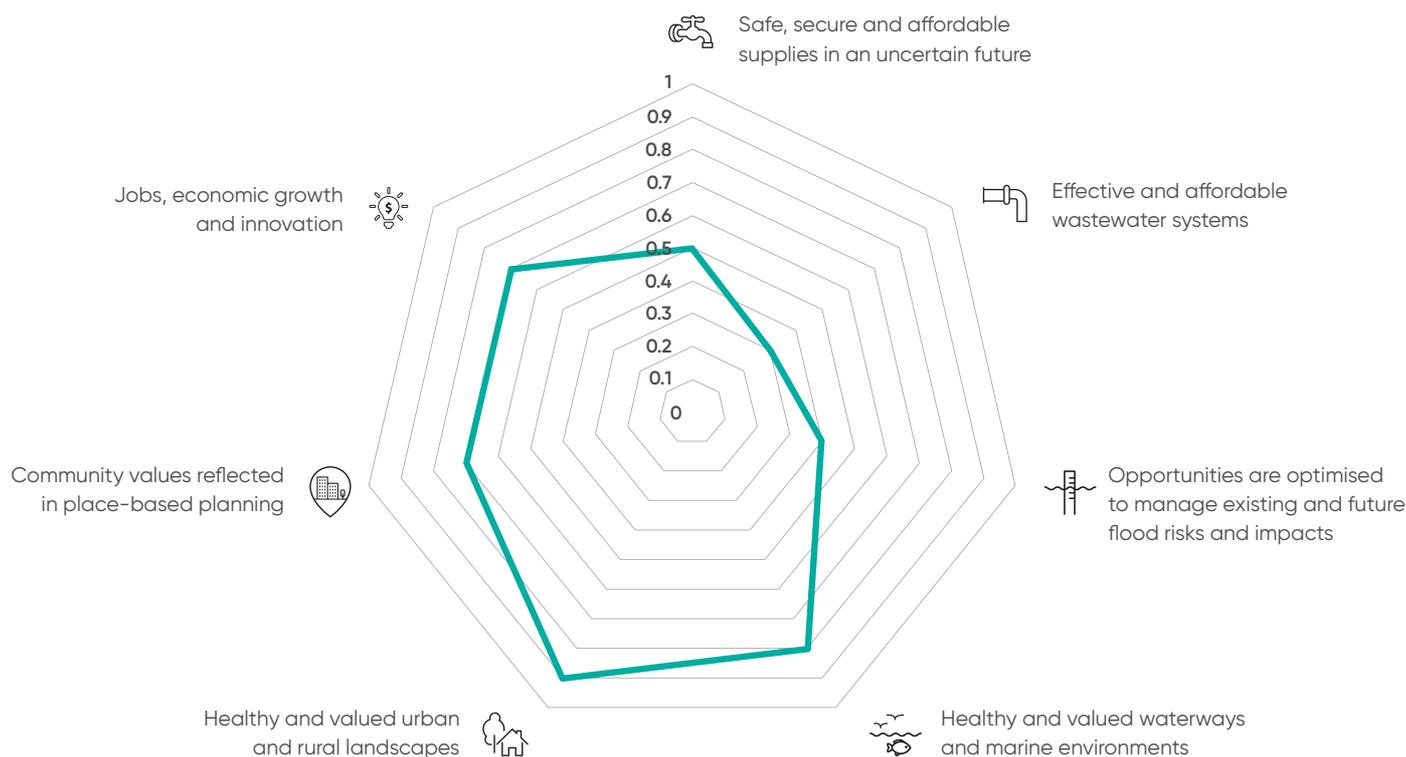
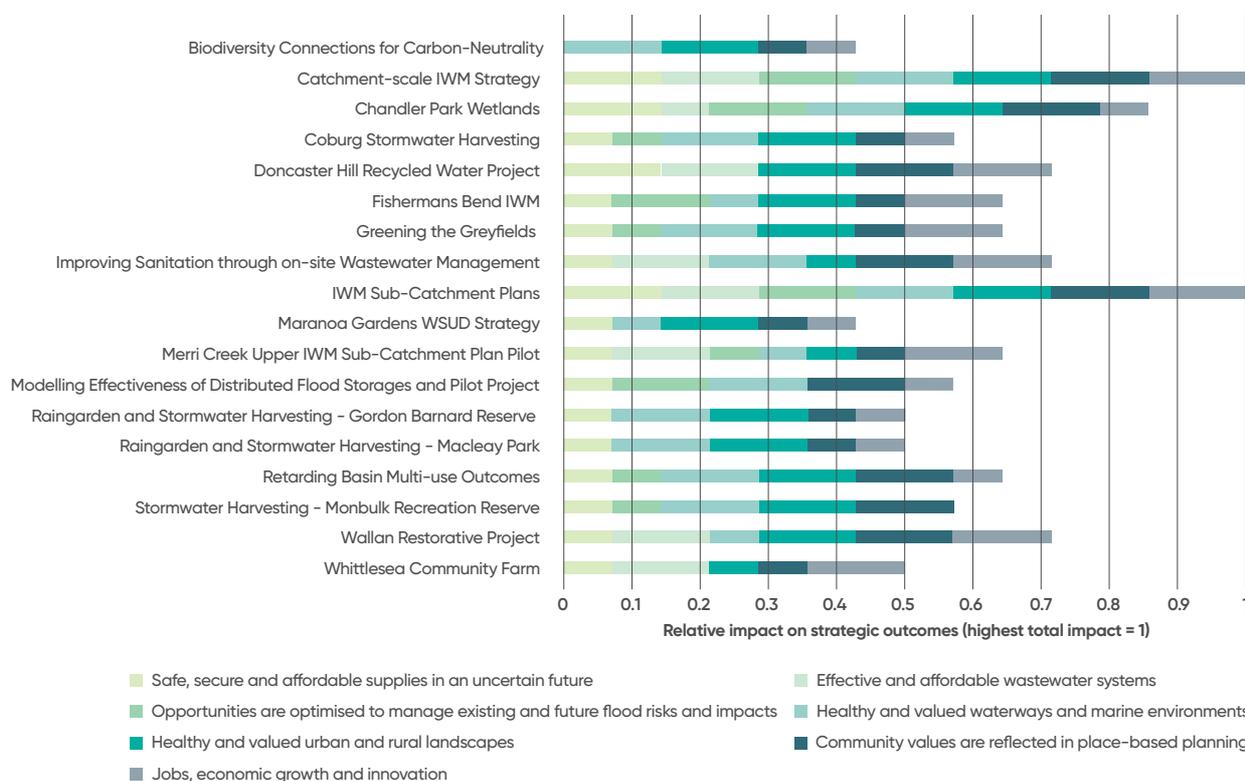
By co-delivering a range of water planning and management initiatives, the Yarra IWM Forum seeks to build on the strengths of the community, the water sector and governments to achieve better value and long term shared benefits for the region.

The Yarra IWM Forum presents an unparalleled opportunity for these organisations to build lasting partnerships across sectors and geographical boundaries to enhance, accelerate and generate greater visibility for water cycle initiatives that will improve Victoria's resilience and liveability.



Yan Yean Reservoir. Photographer: Ric Wallis. Courtesy Melbourne

# Impact of IWM opportunities on the Forum's strategic outcomes



# IWM opportunities: An overview of projects and strategies

IWM opportunity	Strategic outcomes								Location	Spatial scale
Biodiversity Connections for Carbon-Neutrality									Yarra Forum Area	Forum area
Catchment-scale IWM Strategy									Yarra Forum Area	Forum area
Chandler Park Wetlands									Chandler Park, Kew	Sub-catchment
Coburg Stormwater Harvesting									Coburg	Sub-catchment
Doncaster Hill Recycled Water									Doncaster Hill Recycled Water	Urban renewal
Fishermans Bend IWM Plan									Fishermans Bend	Sub-catchment
Greening the Greyfields									Ringwood	Urban renewal
Improving Sanitation through on-site Wastewater Management									Park Orchards	Sub-catchment
IWM Sub-Catchment Plans									Metropolitan Melbourne	Sub-catchment
Maranoa Gardens WSUD Strategy									Balwyn	Sub-catchment
Merri Creek Upper IWM Sub-Catchment Plan Pilot									Merri Creek Upper catchment	Sub-catchment
Modelling Effectiveness of Distributed Flood Storages and Pilot Project									Yarra catchment	Sub-catchment
Raingarden and Stormwater Harvesting - Gordon Barnard Reserve									Balwyn North	Sub-catchment
Raingarden and Stormwater Harvesting - Macleay Park									Balwyn North	Sub-catchment
Retarding Basin Multi-Use Outcomes									Various	Sub-catchment
Stormwater Harvesting - Monbulk Recreation Reserve									Monbulk	Sub-catchment
Wallan Restorative Project									Wallan	Urban renewal
Whittlesea Community Farm									Whittlesea	Lot scale

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



Low High

Level of shading refers to the degree of impact the IWM opportunity has on each strategic outcome area. Dark shading represents highest impact.

Collaborative partners	Status
Port Phillip and Westernport CMA (PPWCMA), Melbourne Water, Yarra Valley Water, Wurundjeri Land and Compensation Cultural Heritage Council (L&CCHC), Bunurong Land Council Aboriginal Corporation (LCAC)	
Yarra IWM Forum member organisations	
City of Boroondara, Melbourne Water, Wurundjeri L&CCHC	
Moreland City Council, Melbourne Water, Yarra Valley Water, community groups	
Yarra Valley Water, Whitehorse Council, Manningham Council, Wurundjeri L&CCHC	
South East Water, City of Melbourne, Melbourne Water, City of Port Phillip, Fishermans Bend Task Force, Bunurong LCAC, Wurundjeri L&CCHC*	
Maroondah City Council, Swinburne University, Yarra Valley Water, Wurundjeri L&CCHC, Bunurong LCAC	
Yarra Valley Water, Councils, Environment Protection Authority (EPA), Wurundjeri L&CCHC	
Yarra Valley Water, Melbourne Water, Councils, Essential Services Commission, Victorian Planning Authority (VPA), Wurundjeri L&CCHC, Bunurong LCAC, Urban Development Institute of Australia, Association of Land Development Engineers	
City of Boroondara, Wurundjeri L&CCHC*, Bunurong LCAC	
Yarra Valley Water, Melbourne Water, Wurundjeri L&CCHC, Hume City Council, Whittlesea City Council, Mitchell Shire Council	
Melbourne Water, Yarra Valley Water, South East Water, Wurundjeri L&CCHC, Bunurong LCAC	
City of Boroondara, Melbourne Water, Wurundjeri L&CCHC	
City of Boroondara, Melbourne Water, Wurundjeri L&CCHC*	
Melbourne Water, Councils, water corporations, Wurundjeri L&CCHC, Bunurong LCAC	
Yarra Ranges Council, Melbourne Water, Yarra Valley Water, Wurundjeri L&CCHC	
Yarra Valley Water, Melbourne Water, Mitchell Shire Council, Wurundjeri L&CCHC	
Yarra Valley Water, City of Whittlesea, Wurundjeri L&CCHC, Whittlesea Community Connections	

\*The Wurundjeri Land and Compensation Cultural Heritage Council Aboriginal Corporation will remain informed of progress related to this IWM opportunity.

**Project opportunity status**



**Strategy opportunity status**



# Priority Portfolio of IWM opportunities

All the IWM opportunities included in the Priority Portfolio demonstrate value for the Yarra catchment. All projects and strategies will be enhanced and accelerated by collaboration and visibility through the IWM Forum process.

They will all benefit from additional resources and support through the

IWM Forum, and from generating new, or enhancing existing, cross-organisational collaboration.

Some projects and strategies in the Priority Portfolio offer unique additional values. These include: the potential to generate important cross-organisational learnings and capacity-building benefits for current

and future IWM initiatives; the ability to be a mechanism for further IWM advocacy and policy innovation; and a contribution of substantial benefits to the region as a whole, or specifically to its iconic natural assets, including the Yarra River.

## ACTION 1

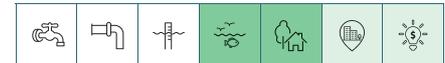
### Biodiversity Connections for Carbon-Neutrality

Victoria's water authorities are committed to becoming carbon neutral. Achieving this will require various actions to reduce carbon emissions. It will also likely require some offsetting of carbon emissions.

Work has been under way over the past two years between water authorities and catchment management authorities to develop and trial arrangements that see carbon offsets being achieved through revegetation that can also provide other environmental and social benefits for local communities.

A number of potential 'nature links' have been identified in the Yarra catchment as priority sites for major revegetation due to their importance for connecting existing habitat and enabling movement of fauna across landscapes. These sites include areas of the Merri Creek, along the middle Yarra River, sites from Kinglake to Warrandyte, and sites at Yellingbo. Revegetation in these areas could help boost population of threatened species and increase the resilience of landscapes to future climate threats.

This collaborative project will trial a process for revegetation in the priority areas. It will also assess the costs and benefits to enable improved decision-making regarding carbon offsets through revegetation works in the future.



**Status**



**Collaborative Partners**

Port Phillip and Westernport CMA (PPWCMA), Yarra Valley Water, Melbourne Water, Bunurong Land Council Aboriginal Corporation (LCAC), Wurundjeri Land and Compensation Cultural Heritage Council (L&CCHC)

**Location**

Yarra Forum Area

**Spatial scale**

Forum area

## ACTION 2

### Catchment-scale IWM Strategy

A catchment-scale IWM Strategy will support the Yarra IWM Forum Members to effectively contribute to the achievement of the Forum's vision and strategic outcomes. This project will define a plan to deliver an IWM Strategy in collaboration with all Yarra IWM Forum Members and Working Group members.

A catchment-scale IWM Strategy should consider developing a framework to inform/guide investment decisions regarding place-based IWM initiatives.



**Status**



**Collaborative Partners**

Yarra IWM Forum member organisations

**Location**

Yarra Forum Area

**Spatial scale**

Forum area

## ACTION 3

### Chandler Park Wetlands

This project aims to develop a constructed wetland to treat stormwater runoff from a 120-hectare urban catchment in Kew. The project proposes to divert stormwater from the Melbourne Water Kew regional drain and treat it prior to discharge to the Yarra River.

In addition to improving the health of the Yarra and Port Phillip Bay, the project will enhance wildlife habitats and create recreational and learning opportunities for site users and the wider community. The wetlands will also help minimise use of drinking water for environmental purposes.

The Chandler Park Wetlands was selected as one of Boroondara's highest priority water sensitive urban design opportunities through a multi-criteria analysis. Its strategic position within the Yarra River corridor made it a priority site amongst more than 20 potential sites for stormwater harvesting and a fit for purpose re-use asset. The removal of harmful pollutants from stormwater passing through the wetlands will ultimately support improved waterway health for the Yarra River and Port Phillip Bay.

<b>Status</b>						
<b>Collaborative Partners</b>	City of Boroondara, Melbourne Water, Wurundjeri L&CCHC					
<b>Location</b>	Chandler Park, Kew					
<b>Spatial scale</b>	Sub-catchment					

## ACTION 4

### Coburg Stormwater Harvesting

The suburb of Coburg, 9 km north of Melbourne's CBD, is a key activity centre within the Moreland City Council area. The suburb contains one of Council's highest profile recreation reserves, Coburg City Oval, as well as two other well-used open spaces at the DeChene Reserve and McDonald Reserve. Together, these three reserves consume over 30 ML of drinking water for irrigation each year. Located on or close to a major drainage pipeline, the Harding Street Main Drain, this project leverages an opportunity to develop stormwater harvesting systems to supply stormwater for irrigation of the reserve areas.

In addition to the potable water savings and stormwater improvement outcomes, this project also explores opportunities to activate underused spaces within the reserves, using urban and landscape design to improve local amenity. Co-design approaches with project partners and community groups will ensure local values are incorporated with integrated water management objectives for long term community liveability and environmental benefits.

<b>Status</b>						
<b>Collaborative Partners</b>	Moreland City Council, Melbourne Water, Yarra Valley Water, Wurundjeri L&CCHC, community groups					
<b>Location</b>	Coburg					
<b>Spatial scale</b>	Sub-catchment					

## ACTION 5

### Doncaster Hill Recycled Water Project

This project proposes to deliver Class A recycled water to one of Melbourne's fast growing urban renewal precincts. Recycled water will replace the use of drinking water for uses including garden watering and toilet flushing. With 70 per cent of Melbourne's future growth to occur in infill areas, the Doncaster Hill Project is an important test case demonstrating the challenges of delivering water related liveability outcomes via an integrated approach to water cycle management in an infill growth area. Partners will explore opportunities for the initial project concept (centred around Doncaster Hill) to be broadened to realise benefits for a broader community of interest in the vicinity of Koonung Creek Linear Park, Koonung Creek Parklands, Eastern Freeway Linear Reserve and the proposed site of the North East Link road project. Opportunities include park amenity and drought-proofing community parks and sports grounds and exploring the integration of rainwater and recycled water management into apartments, and knowledge transfer across IWM Forums.

<b>Status</b>						
<b>Collaborative Partners</b>	Yarra Valley Water, Whitehorse Council, Manningham Council, Wurundjeri L&CCHC					
<b>Location</b>	Doncaster, Box Hill North					
<b>Spatial scale</b>	Urban renewal					

## ACTION 6

### Fishermans Bend IWM Plan

Fishermans Bend is Australia's largest urban renewal project covering approximately 480 hectares in the heart of Melbourne. The area will be developed to accommodate more than 80,000 residents and thousands of jobs and services. An integrated water management strategy is required for the region to ensure innovative IWM principles can help make Fishermans Bend a world-class water-sensitive region.

The plan includes a sewer mining plant to provide recycled water to all new buildings for use in toilets, laundry facilities and to irrigate open space. The plan envisions the installation of building-scale rainwater tanks to collect water from building roofs, providing flood mitigation benefits, as well as an additional source of water for non-potable uses. The Fishermans Bend IWM Plan will align with the vision and strategic outcomes of the Yarra IWM Forum.

						
<b>Status</b>	<div style="width: 100%; height: 10px; background-color: #ccc;"></div>					
<b>Collaborative Partners</b>	South East Water, City of Melbourne, Melbourne Water, City of Port Phillip, Fishermans Bend Task Force, Bunurong LCAC, Wurundjeri L&CCHC*					
<b>Location</b>	Fishermans Bend					
<b>Spatial scale</b>	Sub-catchment					

## ACTION 7

### Greening the Greyfields

As populations and land values increase, many land owners are choosing to demolish their houses and subdivide their lots to accommodate more dwellings. The current trend can result in poor urban design, loss of vegetation and overdevelopment of small lots with limited liveability benefits. It can also bring an influx of new residents to an area where local infrastructure and amenities, such as public transport, parking or open space areas, cannot keep pace with growth.

Greening the Greyfields is an Australian Government-funded project aimed at resolving challenges with infill development by promoting sustainable housing regeneration in the middle suburbs.

This project will take a holistic precinct-wide approach to re-development by working with landowners and local governments to design better housing outcomes for privately owned land.

By amalgamating lots and developing complementary designs at the precinct-scale, the project explores the potential to increase the quantity, quality and diversity of housing in the Yarra catchment. It also aims to better integrate IWM principles and water-sensitive infill development practices into existing neighbourhoods.

						
<b>Status</b>	<div style="width: 100%; height: 10px; background-color: #ccc;"></div>					
<b>Collaborative Partners</b>	Maroondah City Council, Swinburne University, Yarra Valley Water, Wurundjeri L&CCHC, Bunurong LCAC					
<b>Location</b>	Ringwood					
<b>Spatial scale</b>	Urban renewal					

## ACTION 8

### Improving Sanitation through on-site Wastewater Management

This project seeks to address the environmental and health risks posed by inadequate onsite wastewater treatment (septic) systems.

The value of on-site wastewater treatment and re-use, including for gardens and park irrigation, has historically not been permitted. However, complete or partial use of wastewater can reduce demand on potable drinking sources, and reduce costs associated with sewage. Treated wastewater can also provide local communities and property owners with a highly valued resource. This project intends to give customers greater choice and involvement in decisions regarding on-site wastewater management.

Yarra Valley Water (YVW) is currently trialling the installation, operation and maintenance of YVW-owned and operated on-site wastewater treatment systems in the Park Orchards Community Sewerage Area. Together with collaborative partners, YVW is developing an alternative to market available on-site treatment systems as a means to provide a reliable, low-operating cost, long life on-site treatment systems.

						
<b>Status</b>	<div style="width: 100%; height: 10px; background-color: #ccc;"></div>					
<b>Collaborative Partners</b>	Yarra Valley Water, Councils, Environment Protection Authority (EPA), Wurundjeri L&CCHC					
<b>Location</b>	Park Orchards					
<b>Spatial scale</b>	Sub-catchment					

## ACTION 9

### IWM Sub-Catchment Plans

This project will develop place-based IWM Sub-Catchment Plans to clearly convey planning requirements and the infrastructure investment sequencing information. It will provide a coordinated, consistent and proactive approach from water authorities, catchment managers and local governments in relation to water resources planning and management for specified areas across Metropolitan Melbourne. IWM Sub-Catchment Plans will integrate and extend the existing management and funding frameworks to enable efficient investment decisions and support multiple benefits. Each plan will show the planning and development requirements for each land parcel, including proposed IWM assets, such as water supply, sewer networks, flood protection, drainage requirements, and alternative water source infrastructure, and any contribution rates required from developers.

The Merri Creek Upper IWM Sub-Catchment Plan will be the pilot project for this strategy.

						
<b>Status</b>						
<b>Collaborative Partners</b>	Yarra Valley Water, Melbourne Water, Councils, Essential Services Commission, Victorian Planning Authority (VPA), Wurundjeri L&CCHC, Bunurong LCAC, Urban Development Institute of Australia, Association of Land Development Engineers					
<b>Location</b>	Metropolitan Melbourne					
<b>Spatial scale</b>	Sub-catchment					

## ACTION 10

### Maranoa Gardens WSUD Strategy

Maranoa Gardens is a prized historic botanical gardens 15-km east of Melbourne. This project investigates the development of a Water Sensitive Urban Design (WSUD) strategy to increase water use efficiency at the gardens, one of the highest water usage sites in the City of Boroondara.

A WSUD strategy for Maranoa Gardens will increase local water harvesting capabilities for use in the irrigation and maintenance of unique native landscapes through the grounds. Stormwater capture and treatment will also reduce contaminated runoff to local waterways and into Port Phillip Bay.

						
<b>Status</b>						
<b>Collaborative Partners</b>	City of Boroondara, Wurundjeri L&CCHC*, Bunurong LCAC					
<b>Location</b>	Balwyn					
<b>Spatial scale</b>	Sub-catchment					

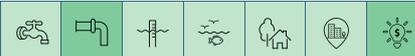
## ACTION 11

### Merri Creek Upper IWM Sub-catchment Plan Pilot

The Merri Creek Upper sub-catchment will be a pilot site for the implementation of IWM Sub-catchment Plans in a predominantly greenfield development setting.

The sub-catchment is undergoing significant development as part of the North Growth Corridor Plan to expand transport, housing, employment and lifestyle opportunities in Melbourne's northern growth areas.

This plan represents a pilot project for the broader IWM Sub-catchment Plan strategy for Metropolitan Melbourne.

						
<b>Status</b>						
<b>Collaborative Partners</b>	Yarra Valley Water, Melbourne Water, Wurundjeri L&CCHC, Hume City Council, Whittlesea City Council, Mitchell Shire Council					
<b>Location</b>	Merri Creek Upper Catchment					
<b>Spatial scale</b>	Sub-catchment					

## ACTION 12

### Modelling Effectiveness of Distributed Flood Storages and Pilot Project

Research by DELWP and Melbourne Water has shown that distributed flood storages have potential to provide shared benefits. This project will build off this research, considering other key initiatives, to develop a smart tank implementation pilot, by identifying a pilot catchment/catchments within the Yarra catchment that address existing flood issues and the legacy of future development.

To do this, modelling and investigation of distributed storages will ascertain shared benefits of water security, waterway health and flood protection considering growth and climate change. Developing the pilot will be done through engagement with practitioners, planners, policy makers and community. Shared learnings from the pilot will be shared extensively with industry to enable broader adoption of the developed planning and implementation practices.

						
<b>Status</b> <span style="display: inline-block; width: 20px; height: 10px; background-color: #c8e6c9;"></span>						
<b>Collaborative Partners</b>		Melbourne Water, Yarra Valley Water, South East Water, Wurundjeri L&CCHC, Bunurong LCAC				
<b>Location</b>		Yarra catchment				
<b>Spatial scale</b>		Sub-catchment				

## ACTION 13

### Raingarden and Stormwater Harvesting - Gordon Barnard Reserve

The Gordon Barnard Reserve is a popular green open space and sporting reserve in Balwyn North. This project proposes a raingarden system at the reserve to meet more than 70 per cent of its annual irrigation demands, keeping fields green and providing liveability and urban cooling benefits to the region.

The project includes the installation of a gross pollutant trap, as well as a 290m<sup>2</sup> raingarden and tertiary treatment that will remove 133 kilograms/year of total nitrogen from stormwater entering local waterways, as well as supply 7.5 ML/year of treated stormwater for reuse at the reserve.

						
<b>Status</b> <span style="display: inline-block; width: 20px; height: 10px; background-color: #c8e6c9;"></span>						
<b>Collaborative Partners</b>		City of Boroondara, Melbourne Water, Wurundjeri L&CCHC				
<b>Location</b>		Balwyn North				
<b>Spatial scale</b>		Sub-catchment				

## ACTION 14

### Raingarden and Stormwater Harvesting - Macleay Park

The Macleay Park raingarden system will treat stormwater from a 149 hectare urban catchment in Balwyn North. It includes a gross pollutant trap, a 450 m<sup>2</sup> raingarden and tertiary treatment that will remove 114 kilograms/year of total nitrogen from urban stormwater entering local waterways and eventually Port Phillip Bay. The raingarden will supply approximately 11.4 ML/year of treated stormwater for reuse at Macleay Park, about 70 per cent of its annual irrigation demand.

						
<b>Status</b> <span style="display: inline-block; width: 20px; height: 10px; background-color: #c8e6c9;"></span>						
<b>Collaborative Partners</b>		City of Boroondara, Melbourne Water, Wurundjeri L&CCHC				
<b>Location</b>		Balwyn				
<b>Spatial scale</b>		Sub-catchment				

## ACTION 15

### Retarding Basin Multi-Use Outcomes

Melbourne Water is currently developing principles and a prioritisation tool to identify when and what type of community infrastructure is appropriate at different flood retarding basin sites. There is an opportunity to partner with local governments and other organisations to implement findings from this work, and to explore recreation, open space, water harvesting and distribution outcomes.

This project will investigate opportunities for multiple and additional land uses of Melbourne Water-owned retarding basin land. Opportunities include stormwater harvesting and reuse, passive and active open space, stormwater treatment, biodiversity.

The outcomes of this strategic study could facilitate on-ground works that will require collaborations with local government, retailers and community, as well as a dataset that captures a ranking and/or prioritisation of retarding basins based on multi-use benefit opportunities, and agreed principles and a tool to guide and assess multiple land use of retarding basins for Melbourne Water.

<b>Status</b>	<div style="width: 100%; height: 10px; background-color: #c8e6c9;"></div>
<b>Collaborative Partners</b>	Melbourne Water, Councils, water corporations, Wurundjeri L&CCHC, Bunurong LCAC
<b>Location</b>	Various
<b>Spatial scale</b>	Sub-catchment

## ACTION 16

### Stormwater Harvesting - Monbulk Recreation Reserve

The project aims to maximise stormwater as a resource and use a distribution network to irrigate sports field at Monbulk Recreation Reserve. Preliminary investigations have indicated the 14-hectare urban catchment could supply 6.4 ML/ year of water to the irrigated oval with 80 per cent reliability, reducing dependence on potable supplies to keep fields green. The project would also reduce stormwater flows to Sassafra and Emerald Creeks, improving the ecological values and water quality of these waterways.

<b>Status</b>	<div style="width: 100%; height: 10px; background-color: #c8e6c9;"></div>
<b>Collaborative Partners</b>	Yarra Ranges Council, Melbourne Water, Yarra Valley Water, Wurundjeri L&CCHC
<b>Location</b>	Monbulk
<b>Spatial scale</b>	Sub-catchment

## ACTION 17

### Wallan Restorative Project

The Wallan Sewage Treatment Plant (STP) will be connected to the metropolitan sewer network by 2021. At this time, the STP will become a sewer mining plant and whilst the entire site will be required to maintain an odour buffer, there is an opportunity to repurpose the existing irrigation land and winter storage lagoons for other benefits. With development set to occur on all sides of the treatment plant soon, this project will explore the opportunities and constraints associated with the site, to develop a concept design of what could be possible. This could include: rehabilitation of the former Hernes Swamp, naturalisation of Taylors Creek, stormwater treatment wetlands and creek diversions for treatment and water quality improvement, stormwater detention and flood mitigation for the Upper Merri sub-catchment, biodiversity and habitat development, community access and eco-tourism, as well as Traditional Owner economic opportunities.

<b>Status</b>	<div style="width: 100%; height: 10px; background-color: #c8e6c9;"></div>
<b>Collaborative Partners</b>	Yarra Valley Water, Melbourne Water, Mitchell Shire Council, Wurundjeri L&CCHC
<b>Location</b>	Wallan
<b>Spatial scale</b>	Urban renewal

## ACTION 18

### Whittlesea Community Farm

This project explores the development of a proposal for the Whittlesea Community Farm and Food Distribution Network to use recycled water and other local resources to grow and provide fresh fruit, vegetables and cooked food to people in need across the City of Whittlesea.

<b>Status</b>	<div style="width: 100%; height: 10px; background-color: #c8e6c9;"></div>
<b>Collaborative Partners</b>	Yarra Valley Water, City of Whittlesea, Wurundjeri L&CCHC, Whittlesea Community Connections
<b>Location</b>	Whittlesea
<b>Spatial scale</b>	Lot scale

# Strategic enablers to put IWM into practice

The IWM Forums were established in Victoria to identify, coordinate and prioritise place-based and catchment-wide opportunities that would most benefit from collaborative water cycle planning and management.

Alongside these opportunities, the IWM Forum Members identified a range of barriers that could prevent effective implementation of IWM across metropolitan Melbourne and regional Victoria.

The DELWP Water and Catchments Group is responsible for addressing these barriers to implementation in a holistic manner alongside relevant government organisations involved in land use planning and land management.

Advisory groups drawing on industry and independent expertise support DELWP in the development and implementation of strategic initiatives to fill knowledge gaps and address issues identified through the IWM Forum process.

Barriers to IWM are reviewed, with local implications and potential state-wide resolutions, or strategic enablers, discussed. These discussions will help DELWP determine potential options for policy reform and associated areas of impact for industry sectors and organisations.

Advisory groups provide advice regarding areas where planning, water, local government and other arms of government need to work more collaboratively to maintain and enhance the liveability and resilience of Victoria's cities and towns.



Docklands Park wetlands. Photographer: Dani De Rose

# Success stories

## Cleaner Creeks, Everyone's Business

The Merri Creek is prized by communities for its recreational, cultural and environmental value. But as urban and industrial development grows closer to the well-loved creek and its bushland surrounds, high levels of stormwater pollution carrying toxic solvents, heavy metals, fuels, oil and grease, have impacted the health and quality of this inner-city waterway.

To raise awareness of the impact of polluted stormwater on the Merri Creek and its receiving waters downstream, Hume City Council and Melbourne Water launched an on-site educational engagement program aimed at industrial estate businesses throughout the northern Melbourne suburbs of Campbellfield and Craigieburn.

Working off the success of a similar engagement initiative in the City of Whittlesea, Cleaner Creeks project officers visited over 200 high pollution risk businesses to encourage better work site management and pollution prevention practices with the aim of improving the quality of stormwater run-off discharged to Merri Creek.

Regular and informal site visits gave the industrial business community the opportunity to raise pollution management concerns unique to their business and together with council officers, collaboratively negotiate practical solutions to mitigate waterway pollution.



Drainage outfall at Merri Creek prior to the intervention.  
Courtesy Centre for Aquatic Pollution Identification and Management

As the educational engagement program progressed, water quality sampling revealed a reduction in the concentrations of some pollutants entering the Merri Creek. The site visits also helped initiate conversations with the industrial business community on the importance of environmental protections in industrial areas, with broader amenity improvements arising from the removal of dumped waste and vehicle wrecks in the vicinity of the Merri Creek.

Since the implementation of the Cleaner Creeks initiative, collaboration has also increased between Hume City Council and other councils with large industrial estates, such as the City of Whittlesea and the City of Greater Dandenong, who continue to share knowledge and engagement tactics to encourage better industrial pollution and stormwater management across the region.

## IWM in the North Growth Corridor

Greater Melbourne's population is anticipated to grow by almost 70 per cent to around 8 million people by 2051. To accommodate this growth, more than one million new dwellings across the metropolitan area will be needed. Most residential development will take place in greenfield growth areas, including over 160,000 new dwellings estimated for the North Growth Corridor (NGC), a new housing, employment and transport growth zone extending from Craigieburn to Wallan.

Bringing water, sewerage and drainage services to these new areas presented an opportunity for Yarra Valley Water, together with Melbourne Water, local and state governments and other stakeholders, to proactively protect key waterways in the growth zone while integrating best practice water management plans through the corridor.

Following a study into alternative IWM servicing options for the corridor, the collaborative project partners found that the provision of recycled water for non-potable uses, combined with stormwater harvesting through the region, would provide maximum benefit to new communities and the environment.

The outcomes of the study have led to the development and implementation of the third-pipe recycled water scheme which, when delivered in full, will provide 6 GL/year of non-potable water to the North Growth Corridor and save costs by deferring significant water infrastructure and avoiding or significant and sewerage infrastructure. New residents and businesses will have access to recycled water for use in garden irrigation, flushing toilets and a range of other non-potable sources.

Future work in the growth corridor will involve further development of stormwater management and harvesting options to protect highly valued waterways in the north, many of which eventually flow to Port Phillip Bay.



Recycled water for car washing. Courtesy Yarra Valley Water



Bioretention swale. Courtesy Waterway Ecosystem Research Group, University of Melbourne

### Catchment-scale stormwater control restores Little Stringybark Creek

The Little Stringybark Creek is a small stream in the Dandenong Ranges, about 40 km east of Melbourne's CBD. It flows into the Stringybark Creek, which joins the Yarra River just south of Yarra Glen township. Located near grazing land, suburban residential communities and commercial industrial land, Little Stringybark Creek was known to be heavily degraded and in poor ecological condition due in part to pollutants carried through volumes of urban stormwater flowing through the catchment.

Beginning in 2008, Melbourne Water embarked on a wide-ranging stormwater control experiment with the University of Melbourne aimed at restoring the hydrology, water quality and ecological function of Little Stringybark Creek.

Together with Yarra Valley Water, Yarra Ranges Council and with support from the Victorian and Federal Governments, the experiment saw

the installation of a variety of stormwater control measures, such as rainwater tanks and raingardens, across private and public land in the suburb of Mount Evelyn, located in the upper part of the Little Stringybark Creek catchment.

Through a targeted community engagement and education program, the collaborative partners provided information, financial incentives and technical support to encourage community members to effectively capture, treat and use stormwater on their property. Nearly one third of properties in the catchment took part in the experiment, installing various stormwater control measures to treat and use stormwater runoff from their land. Council also installed 88 stormwater treatment systems in the public realm, including 15 large precinct raingardens and 62 streetscape raingardens and underground infiltration systems.

Together, the public and private stormwater control measures saved around 35–50 ML/year of potable water and infiltrated about

45–60 ML of stormwater into the ground, recharging natural groundwater and stream baseflows. Researchers found that both water quality and the hydrological regime of the Little Stringybark Creek had improved, bringing the water cycle closer to its near natural state.

Amid the success of the creek restoration project, Little Stringybark Creek Environmental Significance Overlay (ESO) was developed to trial a new standard for land use planning and stormwater management. The Little Stringybark Creek ESO applied a planning control over developments in the catchment, requiring stormwater control and runoff treatment measures of all works creating more than 10m<sup>2</sup> of impervious surfaces.

To date, Melbourne Water and the Yarra Ranges Council are working to pursue the permanent adoption of the ESO requirements to continue to effectively control runoff in the catchment and protect the Little Stringybark Creek.

# Continued success through collaboration

IWM is an evolving process that seeks to coordinate and balance many views and interests in the water sector around common goals and agreed outcomes.

IWM Forums collaborate and oversee ongoing IWM planning. The IWM Forum cycle is summarised at right.

Phase One of the IWM Forum cycle has established an enabling environment for Victoria's water sector stakeholders to develop shared IWM objectives and overcome sectoral, institutional and geographic boundaries through collaboration. This phase was guided by the experience and knowledge of the Forum Members.

Phase Two of the IWM Forum cycle will assume a more strategic approach to successful IWM implementation and planning for the Forum Area. This phase will include the development of catchment-wide IWM strategy to inform IWM investments.

Phase Two will also provide an opportunity for IWM Forum Members to update relevant organisational policies, plans and strategies to reflect the outcomes of the IWM Forum.

It is anticipated that the IWM Forum collaborative partners will continue use their best endeavours to advance priority IWM initiatives through regular meetings and future Forums.

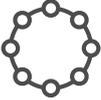
Forum Members will also assess the feasibility of additional IWM opportunities identified in Phase One (refer to Appendix).

Phase Two will create an opportunity to evaluate and share learnings from Phase One to benefit stakeholders. It will also optimise resources and explore the development of innovative tools and approaches that plan for, and respond to, water supply and demand in the future.

Phase Three prepares the Forum to refresh the Strategic Directions Statement and review the progress of strategic enablers for IWM.



Albert Park Lake. Photographer: Chris Kapa. Courtesy Melbourne Water

	Outcomes	Participants
<b>Phase I</b>		
	<p><b>Establish</b></p> <p>Organisational leaders come together in collaborative IWM Forums and Working Groups to discuss integrated water management challenges, opportunities and priorities for each region</p>	<p>Preliminary work on regional characterisation and collaborative governance</p> <p>Agree vision, objectives and goals</p> <p>Agree criteria for selection and prioritisation of IWM opportunities</p> <p>IWM opportunities identified and prioritised</p> <p>Collaboratively develop and endorse Strategic Directions Statement for each region</p>
		<p>Local governments</p> <p>Catchment Management Authorities</p> <p>Water corporations</p> <p>Traditional Owners</p> <p>Department of Environment, Land, Water and Planning</p> <p>Chair</p> <p>Others as relevant</p>
↓		
<b>Phase II</b>		
	<p><b>Planning</b></p> <p>Cultivate a collaborative culture to progress IWM opportunities</p>	<p>Co-design and agree on Terms of Reference, governance structure, stakeholder engagement and/or community participatory planning guidance for IWM project/strategy</p>
		<p>Collaborative partners</p> <p>Community representatives</p> <p>Others as relevant</p>
↓		
	<p><b>Progress</b></p> <p>Forum Members use best endeavours to progress IWM opportunities to next stage</p>	<p>IWM Project Groups initiate work as per identified project/strategy status, including: feasibility assessment; technical and economic analysis; cost allocation; business case development</p> <p>Strategic enablers for IWM progressed by DELWP with support from Forum Members</p> <p>IWM Project Groups report progress to IWM Forums</p>
		<p>Collaborative partners</p> <p>Individual organisations who have committed to a project/strategy</p> <p>Community representatives</p> <p>Relevant stakeholders</p>
↓		
	<p><b>Incorporate</b></p> <p>Collaborative Partner organisations incorporate relevant elements of IWM in their own plans, guidelines or frameworks</p>	<p>IWM Project Groups to take IWM commitments (projects and strategies) to their Board or Councils for investment endorsement</p> <p>IWM Project Groups incorporate elements into their own organisational planning systems, e.g. Council and corporate plans, Construction Guidelines, etc.</p> <p>Report back to IWM Forum</p>
		<p>Individual organisations who have committed to deliver a project/strategy</p>
↓		
	<p><b>Realise</b></p> <p>IWM benefits are realised following implementation of project/strategy</p>	<p>Application of practical IWM tools and innovative approaches</p> <p>Additional community value added through participatory planning</p> <p>Monitoring and evaluation of key measures and outcomes</p> <p>Economic savings through shared resources, costs, etc.</p> <p>Improved resilience and liveability of cities and towns</p>
		<p>Collaborative partners</p> <p>Individual organisations who have committed to a project/strategy</p> <p>Community representatives</p> <p>Others as relevant</p>
↓		
<b>Phase III</b>		
	<p><b>Prepare</b></p> <p>IWM Forums prepare to refresh the Strategic Directions Statement</p>	<p>Collaborative partners prepare for next round of IWM Forums</p> <p>IWM Forums collaboratively review key learnings and outcomes from Phase I &amp; II, including catchment-scale IWM Strategy and progress on strategic enablers</p> <p>Next round of IWM opportunity identification and prioritisation</p>
		<p>Collaborative partners</p>



#### Next 12-18 months

The feasibility of IWM opportunities will be continually reviewed and assessed in Phase II to confirm the need for specific IWM projects/strategies



# Appendix

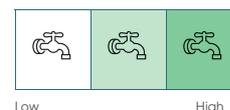
## Additional IWM opportunities in the Yarra catchment

Action	IWM opportunity
19	Albert Park Lake Stormwater Harvesting
20	Alternative Water Supply – Royal Botanic Gardens
21	Best Practice Stormwater Management from Public Realm
22	Coldstream Water Recycling Scheme
23	Consistency of Drainage Policy
24	Drinking Water Quality Improvements
25	Edwardes Lake Stormwater Quality Monitoring
26	Flood Protection Smart Technology
27	Gardiners Creek Revitalisation
28	Greater Broadmeadows IWM Plan
29	Hazelwynde Water Sensitive Community
30	Jones Park Wetland and Stormwater Harvesting
31	Lilydale Quarry Development – Kinley
32	Land Subject to Inundation Overlay Update
33	Maximising the Value of Reticulated Sewerage in Monbulk

The following list of additional IWM opportunities was identified by the Yarra IWM Forum in the first phase of the IWM Forum cycle. The list captures potential future priorities for the Yarra IWM Forum.

Further assessment will be required by the collaborative partners to progress these opportunities through the IWM Forum.

**Shade scale**



Level of shading refers to the degree of impact the IWM opportunity has on each strategic outcome area. Dark shading represents highest impact.

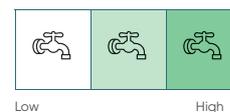
Collaborative partners	Strategic outcome areas						
City of Melbourne, City of Port Phillip, South East Water, Wurundjeri L&CCHC*, Bunurong LCAC, Parks Victoria							
City of Melbourne, Melbourne Water, City West Water, Royal Botanic Gardens, South East Water, Bunurong LCAC, Wurundjeri L&CCHC*							
Moreland City Council, Melbourne Water, councils, Wurundjeri L&CCHC, Bunurong LCAC, Victorian Planning Authority (VPA), Environment Protection Authority (EPA)							
Yarra Ranges Council, Melbourne Water, Yarra Valley Water, Wurundjeri L&CCHC, agricultural property owners							
City of Whitehorse, Municipal Association of Victoria (MAV), Wurundjeri L&CCHC, Bunurong LCAC, councils							
Melbourne Water, Port Phillip and Westernport Catchment Management Authority (PPWCMA), Yarra Valley Water, Wurundjeri L&CCHC, agricultural landowners, Yarra Ranges Council							
Darebin City Council, Merri Creek Management committee, Wurundjeri L&CCHC, Friends of Edgars Creek, Melbourne Water, Whittlesea City Council, Yarra Valley Water							
Maroondah City Council, Melbourne Water, Wurundjeri L&CCHC, Bunurong LCAC							
City of Monash, City of Whitehorse, Melbourne Water, City of Stonnington, Bunurong LCAC, Wurundjeri L&CCHC*							
Yarra Valley Water, Hume City Council, Melbourne Water, Wurundjeri L&CCHC, VPA							
Yarra Valley Water, Mitchell Shire Council, Melbourne Water, Wurundjeri L&CCHC, VPA, developers, community							
Moreland City Council, Melbourne Water							
Yarra Valley Water, Yarra Ranges Council, Melbourne Water, Wurundjeri L&CCHC, Bunurong LCAC, land owners and developers							
Melbourne Water, City of Melbourne, Councils, Wurundjeri L&CCHC, Bunurong LCAC							
Yarra Valley Water, Yarra Ranges Council, Wurundjeri L&CCHC, Bunurong LCAC, EPA							

\*The Wurundjeri Land and Compensation Cultural Heritage Council Aboriginal Corporation will remain informed of progress related to this IWM opportunity.

# Additional IWM opportunities in the Yarra catchment (continued)

Action	IWM opportunity
34	Merlyston Creek Naturalisation and Box Forest Road Retarding Basin Wetland and Stormwater Harvesting
35	Moomba Park Wetland and Stormwater Harvesting
36	Plan for Flood Protection from Sea Level Rise
37	Planning Controls Strengthened to Regulate Discharge from Sites
38	Reservoir Wetlands
39	Sewer Heat Recovery
40	Stormwater Harvesting for a Variety of Uses in the Northern Growth Corridor
41	Swift Parrot Landscape Protection
42	Update of STORM Tool
43	Urban Cooling Program
44	Warburton Hospital Development IWM Opportunities
45	Waste to Energy Project - Lilydale
46	WSUD Asset Management Process Mapping and Gap Analysis
47	Yarra Catchment Nature Links

**Shade scale**



Level of shading refers to the degree of impact the IWM opportunity has on each strategic outcome area. Dark shading represents highest impact.

Collaborative partners	Strategic outcome areas						
Moreland City Council, Melbourne Water							
Moreland City Council, Melbourne Water							
City of Melbourne, Melbourne Water, City of Port Phillip, Bunurong LCAC, Wurundjeri L&CCHC, Fishermans Bend Task Force							
Melbourne Water, councils, MAV, Bunurong LCAC, Wurundjeri L&CCHC, VPA							
Darebin City Council, Melbourne Water, Yarra Valley Water, Wurundjeri L&CCHC, community groups							
City West Water, Melbourne Water, Yarra Valley Water, Wurundjeri L&CCHC, Bunurong LCAC, private and public industry							
Yarra Valley Water, Melbourne Water, Hume City Council, Mitchell Shire Council, Whittlesea City Council, Wurundjeri L&CCHC, VPA							
PPWCMA, Wurundjeri L&CCHC, Landcare groups							
Melbourne Water, DELWP, City of Port Phillip, councils, Wurundjeri L&CCHC, Bunurong LCAC							
Melbourne Water, Wurundjeri L&CCHC, Bunurong LCAC, councils							
Yarra Valley Water, Yarra Ranges Council, Melbourne Water, Wurundjeri L&CCHC, developers							
Yarra Valley Water, Yarra Ranges Council, Wurundjeri L&CCHC							
City of Boroondara, City of Casey, City of Monash, City of Whitehorse, Melbourne Water, Bunurong LCAC, Wurundjeri L&CCHC							
PPWCMA, Melbourne Water, Councils, Landcare groups, Wurundjeri L&CCHC, Bunurong LCAC							

\*The Wurundjeri Land and Compensation Cultural Heritage Council Aboriginal Corporation will remain informed of progress related to this IWM opportunity.

# Glossary of terms

## **Aboriginal Victorians**

An Aboriginal Victorian is a person of Aboriginal descent who identifies as an Aboriginal and is accepted as such by the Victorian Aboriginal community in which he or she lives.

## **Algal blooms**

A rapid increase in the population of algae that can occur in waterways, often caused by excess nutrients (particularly phosphorus and nitrogen).

## **Allocation**

Water that is actually available to use or trade in any given year, including new allocations and carryover.

## **Assets**

Assets are resources that provide benefit. This includes, for example, infrastructure such as treatment plants, pipes and pumps, water assets such as dams, bores and wetlands, and community assets such as sporting facilities, public gardens and street trees. Natural assets are assets of the natural environment, for example waterways and vegetation, also known as natural capital.

## **Aquifer**

An underground layer of rock or sediment that holds water and allows water to flow through it.

## **Biodiversity**

The numbers and variety of plants, animals and other living beings, including micro-organisms, across our land, rivers and oceans. It includes the diversity of their genetic information,

the habitats and ecosystems in which they live and their connections with other life forms.

## **Catchment**

An area where water falling as rain is collected by the landscape, eventually flowing to a body of water such as a creek, river, dam, lake or ocean; or into a groundwater system.

## **Catchment management authorities (CMAs)**

The *Catchment and Land Protection Act 1994* established 10 catchment and land protection regions, each with a catchment management authority responsible for the integrated planning and coordination of land, water and biodiversity management.

## **Central business district (CBD)**

Melbourne's original 'Hoddle Grid' street layout bounded by the Yarra River, Spring Street, La Trobe Street and Spencer Street, as well as the triangular area to the north bounded by Victoria, Peel and La Trobe streets.

## **Climate change**

A long term change of the earth's temperature and weather patterns, generally attributed directly or indirectly to human activities such as fossil fuel combustion and vegetation clearing and burning.

## **Climate change mitigation**

Actions that prevent or reduce emissions of greenhouse gases that contribute to climate change.

## **Coastal flooding**

Inundation along the coastline mainly due to flooding from the sea associated with storm surge. It may also include additional flooding caused by heavy rainfall.

## **Community**

Includes individuals, public and private landholders, community groups and business owners.

## **Connectivity**

Connections between natural habitats, such as a river channel and adjacent wetland areas. Connectivity is a measure or indicator of whether a waterbody (river, wetland, floodplain) has water connections or flow connections to another body.

## **Department of Environment, Land, Water and Planning (DELWP)**

Supports Victoria's natural and built environment to ensure economic growth and liveable, sustainable and inclusive communities. The Water and Catchments group of the Department assists the Minister for Water, develops and implements state policies and programs, and oversees the administration of organisations including catchment management authorities.

## **Ecosystem**

A dynamic complex of plant, animal, fungal and microorganism communities and the associated non-living environment interacting as an ecological unit.

### **Entitlement (or water entitlement)**

Authorisation to take water issued in accordance with the *Water Act 1989*. It includes bulk entitlements, environmental entitlements, water shares, and surface water and groundwater licences (also known as take and use licences).

### **Environmental water**

Water to support environmental values and ecological processes.

### **Fit for purpose (water quality)**

Water of a quality that is appropriate for its intended use.

### **Flash flooding**

Sudden and unexpected flooding caused by sudden local heavy rainfall or rainfall in another area. Often defined as flooding which occurs within six (6) hours of the rainfall event.

### **Floodplain**

Low-lying land adjacent to a river or stream with unique ecosystems dependent on inundation from flood events.

### **Flow**

Movement of water – the rate of water discharged from a source, given in volume with respect to time.

### **Gigalitre**

One billion (1,000,000,000) litres. One gigalitre is the equivalent of approximately 400 Olympic size swimming pools.

### **Green-blue infrastructure**

Green infrastructure refers to key vegetation features such as street trees, parklands, grassed sports fields and vegetated walls. Blue infrastructure refers to key waterways, wetlands, recreational lakes, stormwater retarding basins, or other water body features. Green-blue infrastructure brings these assets together through integrated approaches to deliver community benefits.

### **Greenfield land**

Undeveloped land identified for residential or industrial/commercial development, generally on the fringe of metropolitan Melbourne.

### **Groundwater**

All subsurface water, generally occupying the pores and crevices of rock and soil.

### **Growth areas**

Locations on the fringe of metropolitan Melbourne designated in planning schemes for large-scale transformation, over many years, from rural to urban use.

### **Heritage River Area**

Land in particular parts of rivers and river catchment areas in Victoria which have significant nature conservation, recreation, scenic or cultural heritage values. These areas are identified and protected under the *Heritage Rivers Act 1992*. There are 18 Heritage River Areas in Victoria.

### **Impervious area**

A surface or area within a catchment that significantly restricts the infiltration of water. Impervious surfaces can include concrete, road surfaces, roofs and saturated ground such as a lake or pond.

### **Infill**

Development of unused or underutilised land in existing urban areas.

### **Infrastructure**

Basic facilities and networks needed for the functioning of a local community or broader society.

### **Integrated water management (IWM)**

A collaborative approach to planning that brings together all elements of the water cycle including sewage management, water supply, stormwater management and water treatment, considering environmental, economic and social benefits.

### **Integrated Water Management Forum**

A meeting of urban water management organisations to identify, prioritise and commit to the investigation of integrated water management opportunities.

### **Integrated water management opportunity**

A servicing need that has the potential to leverage broader benefits when undertaken collaboratively, using an integrated water management approach.

### **Irrigation district**

An area declared under the *Water Act 1989* that is supplied with water by channels and pipelines used mainly for irrigation purposes.

### **Liveability**

A measure of a city's residents' quality of life, used to benchmark cities around the world. It includes socioeconomic, environmental, transport and recreational measures.

### **Megalitre (ML)**

One million (1,000,000) litres.

### **Metropolitan Melbourne**

The 31 municipalities that make up metropolitan Melbourne, plus part of Mitchell Shire within the urban growth boundary.

### **National employment and innovation clusters (NEIC)**

Designated concentrations of employment distinguished by a strong core of nationally significant knowledge sector businesses and institutions that make a major contribution to the national economy and Melbourne's positioning in the global economy.

### **Open space**

Includes land reserved for natural landscape, parklands, recreation and active sports, as well as waterways and bays.

### **Potable**

Water of suitable quality for drinking.

### **Productivity**

The economic value produced for an hour of work or a dollar of investment. Increasing productivity is a key source of economic growth and competitiveness.

### **Project**

A planned set of interrelated tasks or activities to be executed over a defined period and within certain cost and other considerations, to achieve a goal.

### **Rainwater**

Water that has fallen as rain or has been collected from rainfall.

### **Ramsar Convention**

Defined by section 4 of the *Commonwealth Water Act 2007* as the Convention on Wetlands of International Importance especially as Waterfowl Habitat done at Ramsar, Iran, on 2 February 1971.

### **Ramsar wetlands**

Wetlands of international importance, designated under the Ramsar Convention.

### **Recreational water or recreational benefits**

The objectives and benefits that recreational users and community members associate with the use of water, reservoirs and waterways for recreational activities. These objectives and benefits include wellbeing and enjoyment, derived from social interaction, physical activity and relaxation associated with activities including sporting events, fishing, water skiing and rowing, camping, walking and gathering with friends and family. It also includes flow-on economic benefits to local communities from visitors to regional areas to make the most of these opportunities.

### **Recycled water**

Water derived from sewerage systems or industry processes that is treated to a standard appropriate for its intended use.

### **Regional Victoria**

Includes all municipalities outside metropolitan Melbourne (except part of Mitchell Shire within the urban growth boundary).

### **Reservoir**

Natural or artificial dam or lake used for the storage and regulation of water.

### **Resilience**

The capacity of individuals, communities, institutions, businesses, systems and infrastructure to survive, adapt and grow, no matter what chronic stresses or shocks they encounter.

### **Riparian**

Refers to land or vegetation that adjoins a river, creek, estuary, lake or wetland.

### **Riverine flooding**

Inundation of normally dry land occurring when water overflows the natural or artificial banks of a creek or river. Also called main channel flooding.

### **Runoff**

The portion of rainfall which actually ends up as streamflow, also known as rainfall excess.

### **Sewage**

Wastewater produced from households and industry.

### **Sewerage**

The pipes and plants that collect, remove, treat and dispose of liquid urban waste.

### **State-significant industrial precincts (SSIP)**

Strategically located land available for major industrial development linked to the Principal Freight Network and transport gateways.

### **Stormwater**

Runoff from urban areas. The net increase in runoff and decrease in groundwater recharge resulting from the introduction of impervious surfaces such as roofs and roads within urban development.

### **Stormwater flooding**

Inundation by local runoff. Stormwater flooding can be caused by local runoff exceeding the capacity of an urban stormwater drainage system or by the backwater effects of mainstream flooding causing the urban stormwater drainage system to overflow.

### **Strategy**

A high-level direction designed to achieve an outcome, or a set of outcomes related to IWM, over a defined time period for a defined geographic location.

### **Traditional Owners**

People who, through membership of a descent group or clan, are responsible for caring for Country. Aboriginal people with knowledge about traditions, observances, customs or beliefs associated with a particular area. A Traditional Owner is authorised to speak for Country and its heritage.

### **Urban greening**

Growing plants wherever possible in cities to contribute to urban vegetation coverage, and providing a connection to nature.

### **Urban heat-island effect**

When the built environment absorbs, traps, and in some cases directly emits heat, causing urban areas to be significantly warmer than surrounding non-urban areas.

### **Urban renewal**

The process of planning and redeveloping underutilised medium and large-scale urban areas, precincts or sites for mixed land-use purposes.

### **Urban water cycle**

The cycle of water through urban environments. Distinguished from the natural urban water cycle by the transfer of water through built infrastructure and the high runoff rates generated by impervious surfaces.

### **Use (water use)**

The volume of water diverted from a stream or groundwater bore. It is not the same as 'use' by the end consumer of the water.

### **Wastewater**

Water that has had its quality affected by human influence, deriving from industrial, domestic, agricultural or commercial activities.

### **Water corporations**

Victorian Government organisations charged with supplying water to urban and rural water users. They administer the diversion of water from waterways and the extraction of groundwater. Formerly known as water authorities.

### **Water infrastructure**

Facilities, services and installations needed for the functioning of a water system.

### **Water sector**

Organisations involved in water management, including water corporations, local government and catchment management authorities.

### **Water sensitive urban design (WSUD)**

Integrating the urban water cycle into urban design to minimise environmental damage and improve recreational and aesthetic outcomes.

### **Waterways**

Rivers and streams, their associated estuaries and floodplains (including floodplain wetlands) and non-riverine wetlands.

### **Waterway condition/ waterway health**

Waterway condition (or waterway health) is an umbrella term for the overall state of key features and processes that underpin functioning waterway ecosystems (such as species and communities, habitat, connectivity, water quality, riparian vegetation, physical form, and ecosystem processes such as nutrient cycling and carbon storage).

### **Wetlands**

Areas, whether natural, modified or artificial, subject to permanent or temporary inundation, that hold static or very slow-moving water and develop, or have the potential to develop, biota adapted to inundation and the aquatic environment. Wetlands may be fresh or saline.

