

Northern Mallee

STRATEGIC DIRECTIONS STATEMENT

2026

Integrated Water Management Forums

VICTORIA State Government | Energy, Environment and Climate Action

ACKNOWLEDGEMENTS

We acknowledge and respect Victorian Traditional Owners as the original custodians of Victoria's land and waters, their unique ability to care for Country and deep spiritual connection to it. We honour Elders past and present whose knowledge and wisdom has ensured the continuation of culture and traditional practices. The Northern Mallee Integrated Water Management Forum is committed to genuinely partnering with Victorian Traditional Owners and Victoria's Aboriginal community to progress their aspirations.

This Strategic Directions Statement has been developed by the Northern Mallee Integrated Water Management Forum, which includes the following organisations:

GANNAWARRA Shire Council

Mildura Rural City Council

SWAN HILL Rural City Council

LOWER MURRAY WATER

North Central CMA

FIRST PEOPLE OF THE MILLEWA-MALLEE ABORIGINAL CORPORATION

mallee catchment management authority

VICTORIA State Government | Energy, Environment and Climate Action

© The State of Victoria Department of Energy, Environment and Climate Action September 2026.

Creative Commons

This work is licensed under a Creative Commons Attribution 4.0 International licence, visit the Creative Commons website (http://creativecommons.org/licenses/by/4.0/).

You are free to re-use the work under that licence, on the condition that you credit the State of Victoria as author. The licence does not apply to any images, photographs or branding, including the Victorian Coat of Arms, and the Victorian Government and Department logos.

ISBN 978-1-86520-058-3 (print)

ISBN 978-1-86520-059-0 (pdf/online/MS Word)

Disclaimer

This publication may be of assistance to you but the State of Victoria and its employees do not guarantee that the publication is without flaw of any kind or is wholly appropriate for your particular purposes and therefore disclaims all liability for any error, loss or other consequence which may arise from you relying on any information in this publication.

To receive this document in an alternative format, phone the Customer Service Centre on 136 186, email customer.service@deeca.vic.gov.au, or contact National Relay Service on 133 677 www.relayservice.com.au. Available at DEECA website www.deeca.vic.gov.au

Cover photo: Aerial view of Swan Hill township and Pioneer Settlement Jetty. Credit: Visit Victoria

TABLE OF CONTENTS

Foreword 1

Executive summary 2

Vision 2

Key themes 2

IWM opportunities 3

Better together: integrated water management in Victoria 6

The first water custodians 7

A unique environment 7

What is IWM? How can it help address challenges? 7

How are we delivering IWM state-wide? 8

Strategic outcomes and regional objectives 9

Strategic Directions Statement – how IWM is happening in the region 11

Water in the Northern Mallee region 13

A changing region 14

The Northern Mallee is already experiencing the impacts of climate change 14

Healing Country and enhancing the natural environment 14

Responding to changes in irrigation water availability 15

Improving liveability across the Northern Mallee 15

Investing in planning for urban development 15

Greener and cooler neighbourhoods – increasing tree canopy across urban areas in Mildura 16

Lake Hawthorn and Lake Ranfurly Integrated Water Management Plan 18

IWM opportunities 20

Water Sensitive Urban Design Guidelines for Dry and Semi-arid Regions 22

Know Your Flow – Driving Water Wise Behaviour Change in Northern Victoria 23

Water Trading Strategy for Community Benefit 24

Green Spaces Audit 25

IWM Plans – Urban Centres (Mildura) 26

IWM Plans – Urban Centres (Swan Hill) 27

Urban Oasis – Cool and Green Spaces for Drought Resilient Communities (Kerang) 28

Enhancing Community Recreation Through Rural Drainage Reuse 29

Best Practice Drought Resilience Planning and Implementation 30

Lake Hawthorn's Pipeline Potential – Feasibility Study and Implementation 31

Harnessing the Eco-Tourism Potential of Kerang Wetlands 32

Little Murray, Big Future: Urban Waterway Restoration 33

Swan Hill Stormwater Harvesting 34

Native Fish and Wetland Recovery 35

Traditional Owner Partnerships 36



Paddle boarding at Lake Boga. Credit: Swan Hill Rural City Council



FOREWORD

Water is the lifeblood of the Northern Mallee. It sustains our communities, supports our industries, nourishes our landscapes. Water underpins the cultural and spiritual connections of Traditional Owners to Country. In a region defined by its climate extremes, ecological diversity, and agricultural productivity, the way we manage water is not just a technical challenge, it's a shared responsibility and a profound opportunity.

At the heart of this region flows the mighty Murray River. More than just a waterway, the Murray is a cultural icon, an ecological artery, and an economic engine. It has shaped the lives and livelihoods of generations, providing water for towns, farms, and industries, while holding deep spiritual significance for Traditional Owners whose connection to the river stretches back tens of thousands of years. The health of the Murray is inseparable from the health of our region. Its flows, wetlands, and floodplains are vital to nature, tourism, agriculture, and community wellbeing.

This Strategic Directions Statement (SDS) marks a significant milestone in our journey toward integrated water management (IWM) across the Northern Mallee. It reflects the collective efforts of local councils, water corporations, Traditional Owners, catchment management authorities and government agencies who have come together with a common purpose: to shape a resilient, liveable, and sustainable future for our region through smarter, more collaborative water management.

The Northern Mallee faces unique pressures: low rainfall, high evaporation, and increasing demand for water from both urban and agricultural sectors. Climate change is intensifying these challenges, placing greater strain on our water systems and ecosystems. At the same time, we are seeing extraordinary innovation and leadership across the region: from water-sensitive urban design in our towns, to regenerative farming practices on our lands, and cultural water initiatives led by Traditional Owners. These efforts demonstrate what is possible when we work together with a common vision and intent.

This SDS sets out our vision and identifies priority opportunities for IWM that reflect local values, aspirations, and knowledge. It is not a static document, it is a living framework that will guide our actions, inform our investments, and evolve as our region grows and adapts. Importantly, it recognises that water connects us all. Whether we are managing stormwater in our streets, restoring wetlands, or planning for future growth, our decisions must be integrated, inclusive, and forward-thinking.

I want to acknowledge the engagement and contributions of all partners involved in this process. Your insights, experience, and commitment have shaped a strategy that is grounded in local context and driven by a shared purpose. I also extend my gratitude to the Traditional Owners of the Northern Mallee, whose enduring connection to water and Country continues to enrich our understanding and guide our stewardship.

As Chair, I am proud to present this SDS and invite all stakeholders, government, industry, community, and Traditional Owners, to continue walking this path together. The challenges ahead are complex, but the opportunities are immense. By embracing IWM, we can build a future where water supports thriving communities, healthy ecosystems, and enduring cultural connections across the Northern Mallee.



Sharyon Peart

Chair, Northern Mallee IWM Forum

EXECUTIVE SUMMARY

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

The Northern Mallee Integrated Water Forum is one of 10 regional integrated water management (IWM) Forums established across Victoria that are realising the implementation of the framework.

Vision

The Northern Mallee is a resilient, liveable region where integrated water management is embedded in how we work – collaboratively, adaptively and place-based – enhancing water security, supporting Traditional Owners' connection to Country, sustaining healthy environments, and recognising the needs of communities, agriculture, industry, now and for future generations.

Key themes

The IWM Forum has focused on prioritising opportunities that are relevant and adaptable across the entire region. It seeks to design and deliver projects that have regional impact and provide benefits to multiple communities. The Forum endeavours to embed Traditional Owner partnerships and community education within all projects, wherever opportunities allow.

Alongside these overarching priorities, the Forum has identified four key focus areas for project prioritisation:

- **Equity:** water should not become a privilege for the wealthy; it is important to ensure equitable distribution and access for all.
- **Climate change preparedness:** the region is already experiencing the effects of climate change, underscoring the importance of being proactive in building regional resilience.
- **Sustainable resource management:** water management needs to be sustainable, with an emphasis on water conservation and the implementation of nature-based solutions.
- **Economic and social resilience:** water management should enhance liveability, creating economic and social opportunities to improve overall community well-being, drive tourism and deliver regional growth.

Boating on Kangaroo Lake. Credit: Gannawarra Shire Council



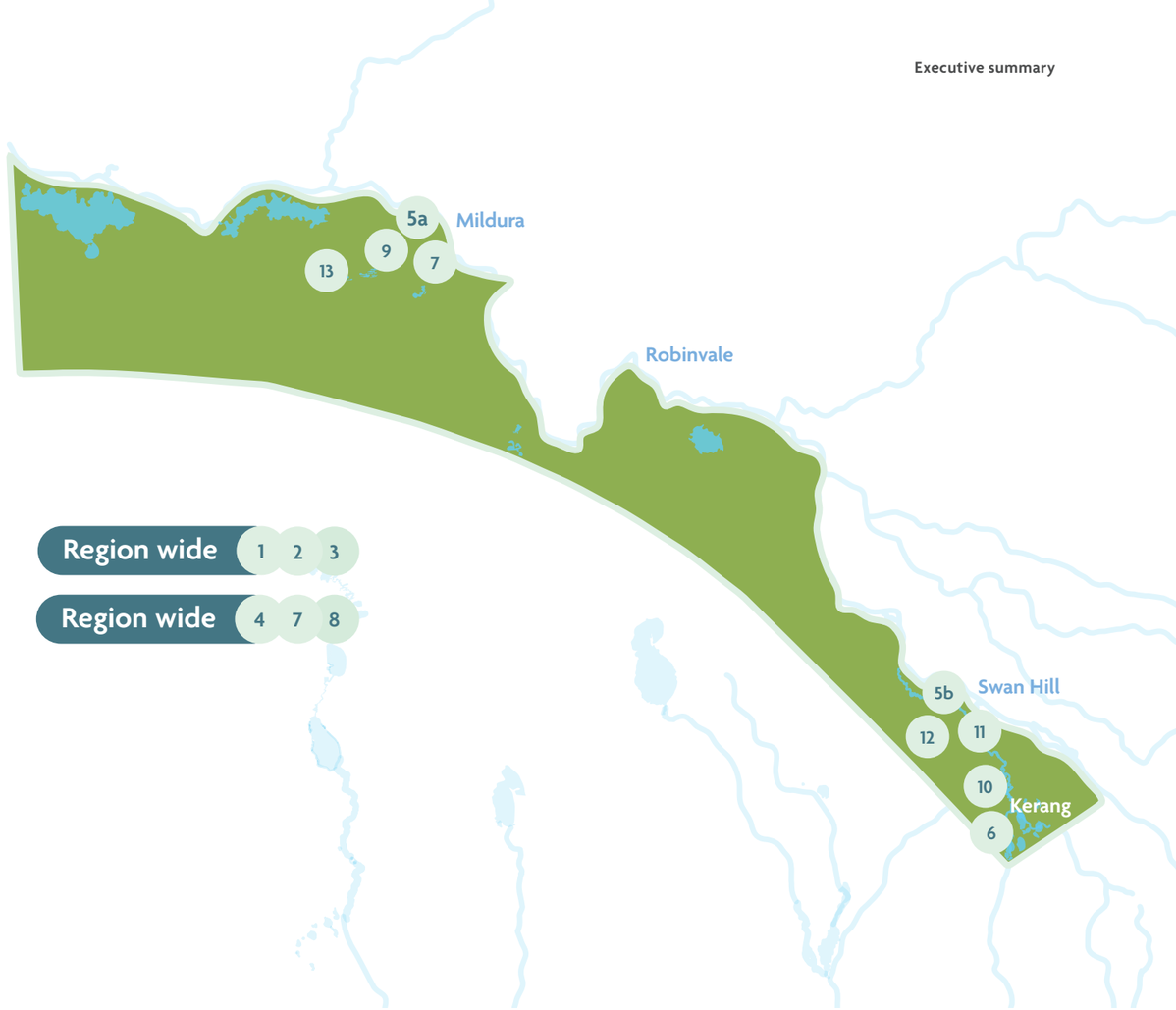


Figure 1 : Locations of IWM opportunities across the Northern Mallee region. Locations are approximate or representative.

IWM opportunities

Fourteen opportunities have been identified in the region, the locations of which are shown in Figure 1. These are all priority projects that emerged from workshops and discussions with Forum members. The projects have been included based on their relevance and potential impact across the broader region. Where a project delivers benefits to a specific area, the lessons learned will be shared across the entire Northern Mallee region.

Regional enablers

1. Water Sensitive Urban Design Guidelines for Dry and Semi-Arid Regions
2. Know Your Flow – Driving Water Wise Behaviour Change in Northern Victoria
3. Water Trading Strategy for Community Benefit
4. Green Spaces Audit

Supporting our regional cities and towns

5. IWM Plans – Urban Centres (Mildura, Swan Hill)
6. Urban Oasis – Cool and Green Spaces for Drought Resilient Communities (Kerang)
7. Enhancing Community Recreation Through Rural Drainage Reuse
8. Best Practice Drought Resilience Planning and Implementation

Delivering benefits in key regional locations

9. Lake Hawthorn's Pipeline Potential – Feasibility Study and Implementation
10. Harnessing the Eco-tourism Potential of Kerang Wetlands
11. Little Murray, Big Future: Urban Waterway Restoration
12. Swan Hill Stormwater Harvesting
13. Native Fish and Wetland Recovery
14. Traditional Owner Partnerships

Northern Mallee Integrated Water Management Forum

Strategic Directions Statement 2026 summary

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

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

POPULATION GROWTH

81,739 (2021)

86,984 BY 2036

5.5% INCREASE

CHANGE IN RAINFALL

DECREASE BY 15.0%
BY 2040

DECREASE BY 19.1%
BY 2065

TEMPERATURE

AN INCREASE OF
0.7-1.7°C
BY 2040*

AN INCREASE OF
1.2-3.0°C
BY 2065*

* Population data: Victoria In Future 2023
* Guidelines for Assessing the Impact of Climate Change on Water Availability in Victoria 2025 - temperature and rainfall predictions are for the Lower Murray catchment and represent the annual average at 2040 and 2065 relative to the year 1995.





Region wide 1 2 3

Region wide 4 7 8

1. **Water Sensitive Urban Design Guidelines for Dry and Semi-Arid Regions**

   Practical guidelines tailored for dry and semi-arid regions of Victoria.

2. **Know Your Flow – Driving Water Wise Behaviour Change in Northern Victoria**

   Understanding community water use patterns to drive behaviour change.

3. **Water Trading Strategy for Community Benefit**

   Investigating a structure to generate water savings with reinvestment for community and environmental benefits.

4. **Green Spaces Audit**

   Investigation of all public green spaces across the region for improved water efficiency and blue green infrastructure opportunities.

5. **IWM Plans – Urban Centres (Mildura, Swan Hill)**

   IWM plan development using a staged, principles-based approach, commencing with Mildura and Swan Hill.

6. **Urban Oasis – Cool and Green Spaces for Drought Resilient Communities (Kerang)**

   Supporting greening across Northern Mallee towns to create cooler, more liveable public spaces, starting in Kerang.

7. **Enhancing Community Recreation Through Rural Drainage Reuse**

   Delivering climate-resilient water supplies for community spaces, starting at Red Cliffs Golf Club.

8. **Best Practice Drought Resilience Planning and Implementation**

   Identifying strengths, gaps and opportunities to improve alignment across the Northern Mallee.

9. **Lake Hawthorn's Pipeline Potential – Feasibility Study and Implementation**

   Refurbishment and replacement of pumping and water delivery infrastructure on the Lake's northern edge.

10. **Harnessing the Eco-Tourism Potential of Kerang Wetlands**

    Enhancing natural, cultural and tourism values of key wetland sites.

11. **Little Murray, Big Future: Urban Waterway Restoration**

    Urban waterway restoration to support healthier waterways, landscapes and recreation in Swan Hill.

12. **Swan Hill Stormwater Harvesting**

    Investing the feasibility of stormwater harvesting and storage in Swan Hill for green space irrigation.

13. **Native Fish and Wetland Recovery**

    Restoring and enhancing culturally significant landscapes and native fish populations through addressing cultural water planning, cultural flows readiness and on ground works.

14. **Traditional Owner Partnerships**

    Forum partners working with Traditional Owners to strengthen partnerships, support meaningful participation, and embed self-determined cultural values and knowledge in IWM planning, decision making and project delivery.

BETTER TOGETHER: INTEGRATING WATER MANAGEMENT IN THE NORTHERN MALLEE

The first water custodians

The First Nations communities of the Northern Mallee have been living in balance with the natural environment in the region, practicing culture, caring for Country and waterways and maintaining sophisticated water management systems for tens of thousands of years.

The Northern Mallee region is rich in significant Aboriginal cultural values, which are increasingly threatened by urbanisation, population growth and climate change. The Forum recognises that learning from, and drawing on, the expertise and practices that promote these cultural values is integral to best practice IWM throughout the region.

A unique environment

The Northern Mallee lies within the Northern Riverine Plain, which encompasses the entrenched floodplain of the Murray River, a defining feature of the region. The area is ecologically important for its extensive floodplain and aquatic habitats, which support significant populations of rare and threatened plant and animal species. Three of the Murray Darling Basin Authority's eight Living Murray 'icon' sites, recognised for their high ecological value and cultural significance, occur in the region: Lindsay, Wallpolla and Mulcra Island; Gunbower-Koondrook-Perricoota Forests, and the Hattah Lakes. The Hattah-Kulkyne Lakes system, a series of perennial and intermittent freshwater lakes fed mainly from the Murray River via Chalka Creek, includes 12 lakes listed as Wetlands of International Importance under the Ramsar Convention. The region also supports the Ramsar-listed Kerang Wetlands on the lower reaches of the Avoca and Loddon Rivers and the Pyramid Creek near Kerang, which comprise 23 named lakes, marshes and swamps that vary in area, depth and salinity.

Pressures emerge and evolve

European settlement of the region commenced with pastoralists in the 1840s and 1850s, followed by agricultural settlement in the early 1890s, with railway lines and government-backed schemes facilitating wheat farming and population growth.

Since the 1880s, the Murray River region in north-west Victoria has been one of the state's most important agribusiness and horticultural areas. The region's towns and cities have thrived with the provision of drinking water and sanitation services, while both irrigated agriculture and dryland farming have played vital roles in Victoria's economic development. The Mallee region forms a key part of Victoria's food bowl and contributes to Victoria's position as Australia's largest food and fibre exporter[1], producing over 90 percent of all Victoria's grape and nut production[2].

The natural character of the Northern Mallee region has been shaped by its climate of temperature extremes, low rainfall, and its underlying geology and hydrology, giving rise to a series of unique ecosystems and natural features. As a consequence, the region faces numerous challenges from droughts, floods, dust storms, and soil erosion, and was significantly impacted through the Millennium Drought.

These challenges are foremost in the minds of the region's water managers, who are grappling with the impacts of climate change, population growth, and shifting migration patterns.

As a semi-arid region of Victoria, the liveability of Northern Region's towns and cities and the health of its environment and economy depends on the availability of water, the Murray River being the lifeblood of the community. The river's proximity not only supports a thriving a horticultural sector, it also contributes to some of the lowest urban water prices in Australia. Beyond its economic and environmental importance, access to water is also important for social wellbeing and holds intrinsic cultural value for region's Traditional Owners.

An integrated and collaborative approach to water management will enable the region to adapt to these challenges and optimise opportunities across the water cycle supporting regional prosperity and liveability.

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

1 Victorian Food and Fibre Export Performance Report 2022-23
2 Mallee Regional Catchment Strategy 2021-27

What is IWM? How can it help address challenges?

An IWM approach involves the collaboration of organisations with interest across all aspects of the water cycle. This allows for opportunities to be collectively identified and leveraged to optimise water cycle planning and management.

A central premise of an IWM approach is recognising that the conservation and protection of water is a shared responsibility. The liveability of towns and cities owes much to the collaborative work that has been undertaken to date by water corporations, local and state government, planning and development authorities, catchment management authorities and Traditional Owners.

IWM can be applied at multiple scales from local parks right up to the whole of catchment. It connects climate change adaptation, planning policies, water security and other strategies to enable collaborators to add value to each other's projects.

Water is a key enabler for optimising social, environmental, economic and cultural outcomes across communities. IWM is designed to assist stakeholders in working together, ensuring that the water cycle contributes to the liveability and resilience of towns and cities, with communities central to decision making. It aims to remove siloed action by independent water decision-makers and encourages consideration of the interdependencies and overlaps that exist between organisations (Figure 2). This is a fundamental shift in the way that water management and land use planning are understood and undertaken across Victoria.

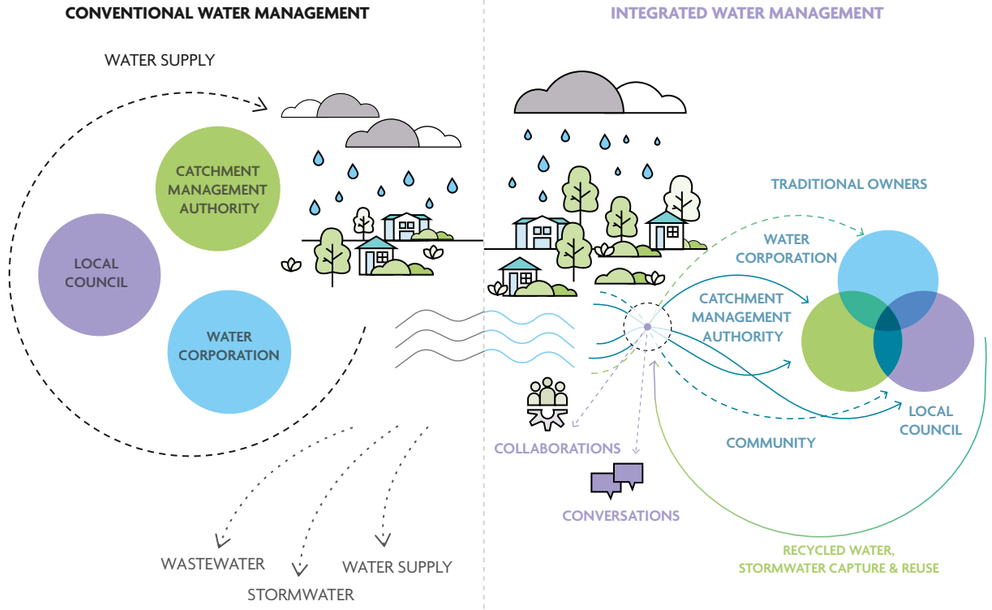


Figure 2 : How does IWM work? Conventional water management saw a more siloed approach to water management, with a single supply source and two discharge systems to move stormwater and wastewater away as quickly as possible, resulting in missed opportunities to use all sources of water. The IWM approach brings water managers together to plan and deliver new opportunities to provide broader benefits to the community. Listening to and consulting with Victorian communities about how they want water managed is critical to informing IWM decision making. Communities are directly consulted on IWM plans and through existing catchment management authority, water corporation and local government strategies.

How are we delivering IWM state-wide?

To facilitate IWM across Victoria, the Victorian Government's former Department of Environment Land Water and Planning supported the establishment of 10 IWM Forums in regional Victoria (Figure 3), in addition to five metropolitan IWM Forums in Greater Melbourne.

The Forums bring together leaders of local water sector organisations to explore, prioritise and oversee the development of local IWM opportunities. Prioritised opportunities are managed and implemented by dedicated Working Groups and are captured within individual IWM plans. Where appropriate, Forums involve other organisations and groups that are not part of the water sector but have direct or indirect interests in water management and land use planning, such as community and indigenous groups, planning authorities, other government departments, developers, educational institutions, or large landholders.

Being collaborative, IWM builds on existing partnerships and planning processes, and aims to break down silos between independently operating, water decision-makers – encouraging Forum members to consider the water cycle of their own service delivery, and its interdependencies or overlaps with other members (Figure 2). Forum members consider waters in rivers, streams and bays, wastewater, drinking water, stormwater, and water treatment processes. While collaboration can take more time and effort than planning for just one water service in isolation, working together achieves better outcomes for the environment, society, and economy by finding mutually beneficial ways to share water, assets, and costs.

Since 2017, the Victorian Government has provided $72.8 million in funding for 176 priority IWM projects, with 126 of these conducted in the regions[3]. The IWM Program has engaged over 100 organisations through the IWM Forums to deliver water related liveability outcomes across Victoria.

3 https://www.water.vic.gov.au/our-programs/integrated-water-management

Construction of the Sunraysia Water Efficiency Project. Credit: Lower Murray Water





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

Strategic outcomes and regional objectives

The *Integrated Water Management Framework for Victoria* (2017) proposed several strategic water-related outcomes that will deliver on the vision in the State water plan, *Water for Victoria* (2016), to 'build resilient and liveable cities and towns'.

These strategic outcomes provide a way to identify the multiple economic, social and environmental benefits that can come from a single initiative. The original framework included five such strategic outcomes that have since been extended to include eight. The IWM outcomes and what they mean to the Northern Mallee region are outlined in Table 1.

The identification of strategic outcomes will continue to evolve as the water management context changes and the sector innovates.

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

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

Table 1: The eight IWM outcomes and associated objectives for the Northern Mallee IWM Forum region.

Outcome	Objective
Safe, secure and affordable supplies in a changing future Resilient, diverse, affordable water for all needs, now and future.	Ensure the provision of safe water through efficient use of non-potable water sources and innovative urban water reuse practices, protecting public health and the environment. Strengthen water security by adopting resilient technologies (e.g. modular desalination powered by solar energy) to address climate variability and changing demand. Develop self-sustaining water management models that optimise cost-efficiency and affordability while leveraging renewable energy and resource reuse strategies.
Effective and affordable wastewater systems Protected environmental and public health, while maximising resource recovery.	Identify and implement efficient, affordable water treatment technologies that safeguard environmental and public health. Explore and adopt beneficial reuse options for biosolids from water treatment. Promote water efficiency and conservation through the sustainable reuse of recycled water.
Flood management Managed risks, while recognising the role of flooding in healthy catchments.	Implement integrated approaches to manage floodplains effectively, balancing environmental, social and economic outcomes. Promote and support the capture and reuse of stormwater to enhance water security and reduce flood risk. Adopt diverse flood management approaches beyond levees to enhance resilience, adaptability and landscape health.
Healthy and valued waterways and waterbodies Sustained and enhanced waterways and waterbodies, providing ecological and community well-being.	Support community wellbeing and mental health through improved access and quality of green and blue spaces. Manage the impact of salinity to protect ecosystems, agriculture and water resources.
Healthy and valued landscapes Ecological health and community values maintained and enhanced in diverse landscapes.	Develop green oasis areas to provide respite from hot conditions – cooling towns and improving liveability. Support efficient gardens that conserve resources while enhancing community and private spaces. Foster resilient landscapes capable of adapting to climate variability and extremes, including droughts and flooding, to sustain ecosystems and communities.
Community values reflected in place-based planning Community values embedded in localised, sustainable, and responsive planning.	Empower communities with the knowledge and skills to use water efficiently and sustainably, fostering a culture of wise water use.
Strong partnerships with Traditional Owners Self-determined Traditional Owner knowledge and values are supported and integrated in processes and decision-making.	Support self-determined Traditional Owner values, needs and aspirations associated with water and landscapes.
Jobs, economic opportunity and innovation Sustainable local economies sustained through innovation, jobs, and improved water practices.	Foster sustainable local economies by supporting innovative technologies and approaches to water management that support resilience and long-term prosperity in the Northern Mallee region.

Strategic Directions Statement – how IWM is happening in the region

This SDS outlines the collaborative intent and shared agreement of all stakeholders involved in the Northern Mallee Forum. It describes the water security challenges and opportunities in the region, sets the strategic direction for the coming years and details the best endeavours in which IWM is and will be applied to proposed projects.

While this is the first SDS to be established for the Northern Mallee region, the Forum has recently engaged with six collaborative projects that successfully secured grant funding in previous rounds.

In addition, numerous related projects, initiatives and strategies have been developed and implemented across the Northern Mallee region that advance regional IWM objectives. This SDS complements these efforts, offering an opportunity to build upon collaborative projects that benefit the region.

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

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

Water for Victoria

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

Integrated Water Management Framework for Victoria

Whole-of-catchment water planning and management to maintain and enhance the liveability, prosperity and resiliency of Victoria's cities and towns. Applied through five metropolitan and 10 regional IWM Forums.

2026 Northern Mallee IWM Forum SDS

– A statement of agreement between forum members of urban and peri-urban IWM priorities and collaborative projects.

Related plans and strategies in place in the region

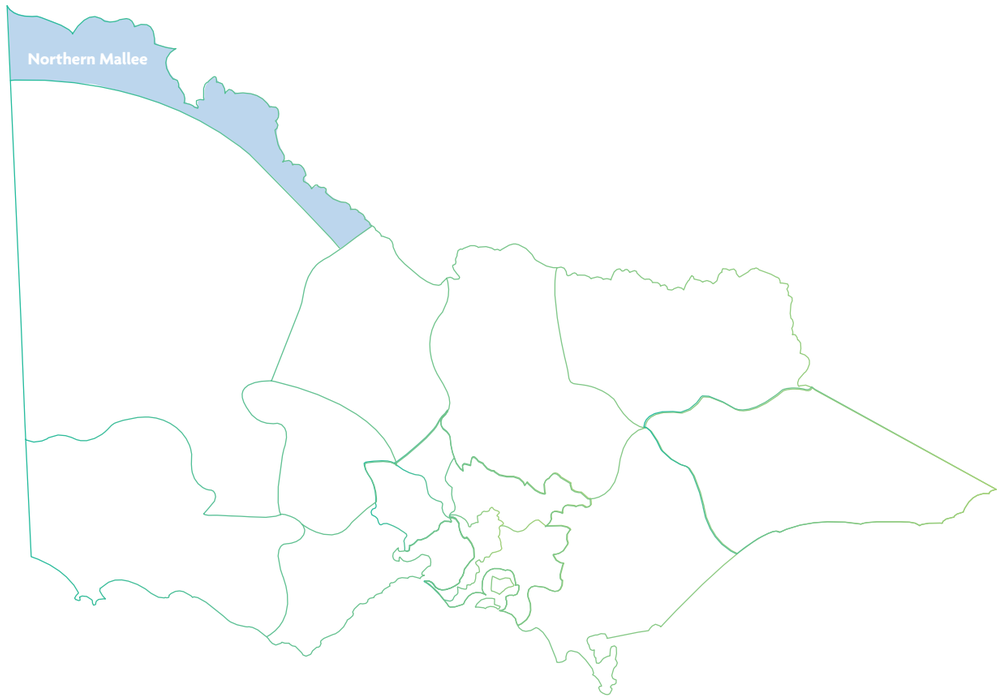
Lower Murray Urban Water Strategy 2022
A detailed 50-year strategy outlining projected water demands, supply options and system actions to ensure reliable, sustainable water and sewerage services for local communities.

Water is Life: Traditional Owner Access to Water Roadmap
A strategic framework to increase Traditional Owner access, roles and decision-making in water management, recognising custodianship of Country and supporting cultural, environmental and economic outcomes across shared water systems.

Northern Region Sustainable Water Strategy 2009
A statutory, long-term regional water planning strategy guiding sustainable use of water resources, setting policies and actions across all sources and users to manage availability and secure water for communities, industry and the environment.

Mallee and North Central Regional Catchment Strategy 2021-27
Overarching regional frameworks guiding coordinated management of land, water and biodiversity; by setting shared priorities, aligning investment and partnerships, and strengthening catchment resilience through integrated stewardship and climate-responsive planning.

Local government plans and strategies
Various strategies, plans, guidelines and other documents that have connections to the water cycle. Examples include open-space and stormwater management plan; local climate change adaptation strategies and natural disaster management plans.



POPULATION GROWTH

81,739 (2021)

86,984 BY 2036

5.5% INCREASE

TEMPERATURE

AN INCREASE OF

0.7-1.7°C

BY 2040*

AN INCREASE OF

1.2-3.0°C

BY 2065*

CHANGE IN RAINFALL

DECREASE BY 15.0%

BY 2040

DECREASE BY 19.1%

BY 2065

WATERWAY CONDITION

EXCELLENT:	0%
GOOD	0%
MODERATE:	8%
POOR:	50%
VERY POOR:	28%
INSUFFICIENT DATA:	14%

* Population data: Victoria In Future 2023
* Waterway condition: Third Index of Stream Condition report - ISC Mallee region
* Guidelines for Assessing the Impact of Climate Change on Water Availability in Victoria 2025 - temperature and rainfall predictions are for the Lower Murray catchment and represent the annual average at 2040 and 2065 relative to the year 1995.

WATER IN THE NORTHERN MALLEE REGION

The Northern Mallee IWM Forum region covers an area of approximately 12,232 square kilometres in the north-western corner of Victoria. It is bordered by the Murray River to the north and South Australia to the west.

Agricultural production is a major economic driver in the region, supported by substantial irrigation water supplies from the Murray River. The Mallee is recognised as a globally competitive food bowl, with some of Victoria's most productive horticultural land located around Mildura, Robinvale and Swan Hill. The region is also known for its major national parks and national significant wetlands which provide habitat for a diverse range of native plant and animal species, many of which are threatened or unique to the region, such as the nationally listed Regent Parrot[4].

Water availability is an ever-present challenge for communities along the Murray. As a finite resource, water must be carefully prioritised to balance the needs of agricultural production, urban areas and environmental sustainability, while promoting the aspirations of Traditional Owners. Managing these competing demands requires careful decision-making to ensure the long-term health and viability of the region's ecosystems and communities. Many wetlands which would have received natural flows in most years are now only inundated during major flood events or when water for the environment is delivered by water managers.

The Northern Mallee is Victoria's hottest and driest region. Mildura receives 286 mm of average annual rainfall and Swan Hill 349 mm, far lower than 648 mm in Melbourne. Average January temperatures are 32.6°C in Mildura and 31.4°C in Swan Hill – more than 5°C higher than Melbourne. These conditions, combined with high evapotranspiration rates, contribute to significant water loss from open storage and landscape surfaces. Coupled with low urban water pricing, they also contribute to some of the highest urban water usage in the state.

While water supplies for the region's cities and towns are largely secured through high reliability water entitlements, there is a growing recognition that using water efficiently requires a whole of community approach. Utilising fit for purpose water, whether raw water, recycled water, stormwater, groundwater or potable water is an ongoing ambition. However, this can be challenging given the relative abundance of raw water availability in non-drought years, which can reduce the incentive to invest in alternative sources.

Parts of the region also face challenges related to ageing water infrastructure. Irrigation systems, particularly if older and unmodernised, can be inefficient in delivering water with losses occurring through evaporation and leakage. Sewage management presents another constraint with many small towns relying on septic tanks instead of reticulated sewerage.

The region supports a vibrant and productive population of 81,739 people across the Mildura, Swan Hill and Gannawarra local government areas. As the population continues to grow, high-quality active and passive open spaces become increasingly important with sport and recreation playing a key role in the life of the community. Many residents across the Northern Mallee also rely on these towns and their green spaces as places of respite during drought conditions, which can significantly affect mental health and wellbeing. Ensuring these open spaces are well-maintained and sustainably managed is vital for supporting both the physical and mental health of the community, while also enhancing the social resilience and overall liveability of the region.

4 Threatened species listed under the *Environment Protection and Biodiversity Conservation Act 1999*

A CHANGING REGION

The Northern Mallee is already experiencing the impacts of climate change

The impacts of climate change are already being felt across the Northern Mallee region. According to the Bureau of Meteorology, the region is already experiencing an increase in consecutive hot days above 38°C and more frequent spring frosts[5]. A warming climate is likely to further exacerbate the Northern Mallee's current conditions, characterised by low, unreliable rainfall and high summer temperatures.

The region has always needed to innovate in response to hot and dry conditions and continues to be a leader in this space. The Mallee Regional Innovation Centre[6], opened in 2019, demonstrates the region's commitment to combining world-leading research capabilities with local knowledge to drive positive change in four focal areas of water, horticulture, energy and the environment.

Adapting to climate change is a shared responsibility. The IWM Forum recognises this and ensures that all partners are actively engaged in discussions and projects to develop preparedness and resilience across the region.

5 Mallee Regional Weather and Climate Guide 2019
6 https://eng.unimelb.edu.au/mric

Healing Country and enhancing the natural environment

The Northern Mallee region is located on the land of the Latji Latji, Ngintait, Nyeri Nyeri, Wadi Wadi, Dadi Dadi/ Tati Tati, Barapa Barapa and Wamba Wemba Peoples. Traditional Owners have lived in this region for millennia and their cultural knowledge provides unique insights to heal Country for current and future generations. In recent times, Traditional Owners of the Northern Mallee region have been active in environmental management projects, and ongoing efforts to protect and restore the natural environment consistent with their cultural values.

IWM offers further opportunities for Traditional Owners to inform the development of projects across the region and for cultural values to be considered in the protection and restoration of natural environments, waterways and ecosystems. Traditional Owners are well placed to take an increasingly active and leading role in water and waterway management.

Water play park on the banks of the Murray River, Mildura. Credit: Mildura Rural City Council





A changing region

Irrigated horticulture near Robinvale. Credit: Lower Murray Water

Responding to changes in irrigation water availability

As highlighted above, the region is home to nationally significant irrigated horticulture and agriculture, underpinned by access to reliable water. However, this reliability is increasingly under threat as climate change continues to impact water availability across the region. To address this challenge, irrigation infrastructure must be modernised and made more efficient to reduce losses and ensure more water is available to support the health of the region's rivers and wetlands.

Improving liveability across the Northern Mallee

Significant progress has been made in the Northern Mallee region to enhance liveability by ensuring communities have access to cool and green public spaces. A systems-thinking approach is increasingly recognised as beneficial in addressing interconnected regional challenges including housing, health, crime prevention and overall community wellbeing. IWM has an important role to play in addressing these challenges.

Across various local government areas, a range of projects have focussed on improved urban amenity and accommodating the needs of growing populations, to ensure the region remains resilient in the face of a changing climate.

Over the past 20 years, there has been a noticeable shift in community attitudes and expectations, with greater acceptance of the importance of maintaining green public spaces, particularly during drought conditions, over private residential gardens. This underscores the recognised value placed on shared community spaces and highlights the critical role that accessible, well-managed green spaces will continue to play in supporting wellbeing and liveability across the region.

Investing in planning for urban development

Investing in water sensitive development has become a key priority for the Northern Mallee region ensuring the necessary infrastructure is provided to support a growing population. Water-sensitive urban design has been integrated into development strategies across local government areas. While the region can continue to draw on national or international examples of best practice, it is important to localise these solutions to meet the specific needs of the region. The IWM Forum provides an avenue to help promote greater collaboration and knowledge-sharing among partners to develop effective, locally tailored solutions which maximise water efficiency and availability.

Case study

Greener and cooler neighbourhoods – increasing tree canopy across urban areas in Mildura

Mildura Rural City Council has developed its inaugural Urban Forest Strategy[7]. This is a nature-based strategy that aims to mitigate summer heat and climatic impacts, as well as providing a range of social, cultural and economic benefits.

The core objective of the strategy is to increase the net green tree canopy cover across the urban areas of the Mildura Council region. Urban forests offer long-term benefits such as a reduced urban heat island effect, improved air quality and enhanced stormwater management. The strategy aims to increase tree canopy cover in urban areas to 30 percent, contributing to the liveability and climate resilience of Mildura's urban areas.

The Council is also delivering the 'Cool It Program,' which aims to provide quality tree cover to neighbourhoods[8]. Since the program's launch in 2019, more than 60 streets across the region have received new plantings. This initiative is helping to improve shade and walkability, address the impacts of climate change and enhance streetscape amenity.

7 Mildura Rural City Council, Urban Forest Strategy 2024
8 Cool It Program - Mildura Rural City Council



Jacaranda trees along Deakin Avenue, Mildura. Credit: Department of Energy, Environment and Climate Action

Case study

Lake Hawthorn and Lake Ranfurly Integrated Water Management Plan

Lake Hawthorn and Lake Ranfurly are ecologically significant wetlands located near the Mildura township within the broader Murray River floodplain in north-west Victoria. Both lakes play vital roles in the regional water cycle, supporting biodiversity and cultural values while also functioning as important evaporation basins for stormwater and salinity management. To guide the long-term management of these interconnected values, the Mallee Catchment Management Authority developed an Integrated Water Management (IWM) Plan that provides a strategic framework to enhance environmental, cultural and hydrological outcomes through a coordinated approach.

Lake Hawthorn is a shallow, saline wetland that supports a diverse range of waterbirds, including species listed under international agreements such as the Ramsar Convention and the Japan-Australia Migratory Bird Agreement (JAMBA). Its ecological health depends on groundwater conditions, salinity levels and seasonal water availability. The IWM Plan highlights the importance of environmental watering to maintain habitat quality for breeding and migratory birds, while ensuring the lake continues to function effectively as a stormwater management basin that reduces flood risk across the surrounding landscape.

Lake Ranfurly is also a saline wetland with high biodiversity value and plays a key role as an evaporation basin for irrigation drainage disposal and groundwater inputs from the Mildura-Merbein Salt Interception Scheme. It provides critical habitat for threatened flora and fauna and is of significant cultural importance to Traditional Owners. The IWM Plan incorporates Traditional Owner knowledge and priorities, strengthening partnerships and supporting respectful stewardship of Country.

The plan outlines key objectives such as restoring natural hydrological regimes through managed environmental flows, enhancing habitat connectivity and vegetation diversity, supporting recreational use while protecting ecological values, and promoting community engagement and citizen science initiatives. It also responds to key challenges including climate variability, stormwater and salinity management, and the need to balance competing water demands. By aligning with broader regional strategies and applying adaptive management principles, the IWM Plan for Lake Hawthorn and Lake Ranfurly demonstrates a model for sustainable wetland conservation in semi-arid landscapes.



Aerial of houses overlooking Lake Hawthorn. Credit: Lower Murray Water

IWM OPPORTUNITIES

Opportunities that link to and address IWM challenges for the region were identified and developed by practitioners of organisations participating in the Forum's Practitioner Group.

A summary of the priority IWM opportunities is shown in Table 2. These collaborative IWM opportunities can improve resilience and liveability in the towns and rural areas of the region.

The projects are dynamic and will continue to be updated to reflect the Forum's priorities and opportunities as they arise. Partners of the Forum are committing their 'best endeavours' to work together to ensure priority projects and strategies are progressed in line with the shared vision and strategic outcomes of the Forum.

Shade scale

- High impact
- Medium impact
- Low impact
- To be determined

- Safe, secure and affordable supplies in a changing future
- Effective and affordable wastewater systems
- Flood management
- Healthy and valued waterways and waterbodies
- Healthy and valued landscapes
- Community values reflected in place-based planning
- Strong partnerships with Traditional Owners
- Jobs, economic opportunity and innovation

Birds eye view of Reedy Lake on dusk. Credit: Lower Murray Water



Table 2: IWM opportunities 'ready-to-advance' in the Northern Mallee region.

IWM opportunity	Strategic outcomes	Location	Scale
Water Sensitive Urban Design Guidelines for Dry and Semi-arid Regions		**Whole region**	**Forum area**
Know Your Flow – Driving Water-Wise Behaviour Change in Northern Victoria		**Whole region (pilot TCB)**	**Forum area**
Water Trading Strategy for Community Benefit		**Whole region (pilot in Swan Hill)**	**Forum area**
Green Spaces Audit		**Whole region**	**Forum area**
IWM Plans – Urban Centres (Mildura, Swan Hill)		**Mildura and Swan Hill**	**Town**
Urban Oasis – Cool and Green Spaces for Drought Resilient Communities (Kerang)		**Whole region**	**Forum area**
Enhancing Community Recreation Through Rural Drainage Reuse		**Whole region (pilot in Red Cliffs)**	**Forum area**
Best Practice Drought Resilience Planning and Implementation		**Whole region**	**Forum area**
Lake Hawthorn's Pipeline Potential – Feasibility Study and Implementation		**Mildura**	**Forum area**
Harnessing the Eco-tourism Potential of Kerang Wetlands		**Kerang - Back Swamp and Middle Reedy Lake**	**Town**
Little Murray, Big Future: Urban Waterway Restoration		**Swan Hill**	**Town / Precinct**
Swan Hill Stormwater Harvesting		**Swan Hill**	**Precinct**
Native Fish and Wetland Recovery		**Latji Latji, Ngintait and Nyeri Nyeri Country**	**Precinct / Landscape**
Traditional Owner Partnerships		**Whole region**	**Forum area**

Water Sensitive Urban Design Guidelines for Dry and Semi-arid Regions

This timely project addresses a critical gap in the application of Water Sensitive Urban Design (WSUD) in dry climates and semi-arid climates, such as those experienced in northern Victoria's Mallee region. Existing WSUD frameworks have largely been designed for areas with higher rainfall and are not practical for drier climates, leaving councils, water corporations, CMAs, and Traditional Owners without adequate tools or guidance to implement sustainable and climate-responsive urban water practices in these regions.

To bridge this gap, the project seeks to provide a dedicated set of WSUD guidelines suited to Northern Victoria's environmental, cultural and climatic conditions. These guidelines will support councils and other regional partners to better manage water in urban environments while promoting resilience to climate variability. The guidelines will embed WSUD principles into urban planning and decision making and support green-blue infrastructure specific to dry or semi-arid environments (taking into account regionally specific elements such as species selection, and evaporation rates etc.). It will also incorporate the knowledge, values and priorities of Traditional Owners, and support IWM and capacity building across jurisdictions.

The project will also draw on technical expertise from design practitioners and researchers to ensure the guidelines are both practical and grounded in local evidence.

This project is particularly timely, given the urgent need to ensure future urban planning and design incorporates best practice WSUD for future town expansion in the region.

Next steps

1. Define the scope for the project and key steps to oversee and coordinate the development of the guidelines, aligned to the region's requirements
2. Research similar dry climate WSUD approaches both nationally (i.e. South Australia) and overseas, and
3. Engage key stakeholders and implementation partners.

Status	Identified
Lead agency	Mildura Rural City Council
Implementation partners	Swan Hill Rural City Council, Gannawarra Shire Council, Mallee Catchment Management Authority, North Central Catchment Management Authority, First People of the Millewa Mallee Aboriginal Corporation
Location	Whole region
Scale	Forum area

Native vegetation planted at Mildura South Wetlands. Credit: Mildura Rural City Council





Irrigation channel. Credit: Lower Murray Water

Know Your Flow – Driving Water Wise Behaviour Change in Northern Victoria

Know Your Flow is a regional initiative designed to improve water literacy, reduce consumptive demand and support climate-resilient communities across the Northern Mallee.

Publicly reported data shows Lower Murray Water's urban customers have the highest average annual potable water use in Victoria (480 kL per year), nearly double the next highest region. Recent prolonged dry and hot conditions have further increased household consumption.

These trends reflect the Mallee's semi-arid climate, characterised by high temperatures, high evapotranspiration, low humidity and variable rainfall, alongside rising overnight minimum temperatures increasing reliance on air conditioning.

This project assesses residential water use to inform targeted behaviour change and customer education. Participating households receive insights into indoor and outdoor water use, including comparisons between evaporative and refrigerated air conditioning, highlighting higher potable water demand associated with evaporative cooling.

In its first year, the project will be piloted to test the methodology, refine engagement and validate insights, before extending across the 14 townships supplied by Lower Murray Water. Analysis will estimate end uses and key drivers, supported by leak detection and real-time usage feedback.

Findings from the pilot will inform future targeted communication and education and will be shared with councils, Catchment Management Authorities, Traditional Owners and partners to support region-wide demand management and inform regionally important projects including Water Sensitive Urban Design (WSUD) guidelines for dry and semi-arid environments.

Next steps

1. Baseline assessment and data scan including a review billing, meter, climate, and comparable data to establish water use baseline and identify gaps
2. Recruit a statistically representative, randomised household sample across identified pilot towns
3. Implement an incentivised participation program
4. Data collection using digital meters, customer surveys and smart observations to track water use
5. End use consumption analysis and reporting of consumption pattern
6. Pilot behaviour change and education initiatives through a trial of targeted water saving approaches, digital feedback tools and direct outreach, and
7. Regional integration and future planning.

Status	Identified
Lead agency	Lower Murray Water
Implementation partners	Gannawarra Shire Council, Swan Hill Rural City Council, Mildura Rural City Council
Location	Whole region (pilot TBC)
Scale	Forum area

Water Trading Strategy for Community Benefit

This initiative will establish a Community of Practice with Northern Mallee IWM Forum representatives to support the collective development, testing and implementation of new approaches to water savings and reinvestment. The group will share lessons, build capability, support joint problem-solving, and monitor implementation and outcomes across the region.

The project aims to explore if the Northern Mallee's geographical location and connection to Victoria's mature water market can generate measurable and valuable water savings or offsets. This includes reducing river extractions and recognising return flows as an offset that can create value within a broader water savings model. The intention is to establish a structure whereby these savings or offsets can be reinvested for community benefit.

The Community of Practice will help investigate and refine concepts similar to those used in North East Water's return flow operations, with the goal of establishing a sustainable funding model for future water projects. It will also explore the potential to quarantine verified savings or offsets for community benefit, such as maintaining water access during drought.

Where water is physically returned to waterways, local conditions, water quality and any treatment requirements will need to be considered. This initiative has the potential to deliver quadruple bottom line benefits and once a concept is proven, a toolkit could support broader roll-out.

Next steps

1. Establish a Community of Practice to explore concept development opportunities, including project scope and scale and testing with partners
2. Undertake a feasibility assessment for identified concepts at specific locations, e.g. Swan Hill and stormwater harvesting for use/river take savings, and
3. Develop a detailed business case and identify pilots for implementation before broader roll out.

Status	Identified
Lead agency	Swan Hill Rural City Council
Implementation partners	Lower Murray Water, Goulburn-Murray Water, Mildura Rural City Council, Swan Hill Rural City Council, Gannawarra Shire Council, Mallee Catchment Management Authority, North Central Catchment Management Authority
Location	Whole region (pilot in Swan Hill)
Scale	Forum area

Green Spaces Audit

The green spaces audit will establish a regional evidence base to improve the performance, resilience and liveability of public open spaces across participating municipalities. It will identify and document parks, gardens and reserves to provide a consistent understanding of their distribution, function and condition.

A central focus of the project is drought preparedness and urban resilience to climate variability. The audit will assess current water use and management practices, including irrigation sources, efficiency and reliance on potable water. It will identify where green spaces are most vulnerable during prolonged dry conditions and examine blue-green infrastructure, such as stormwater harvesting, wetlands, raingardens and passive irrigation, to understand how these assets support water security, urban cooling and landscape health.

Green spaces are critical community assets, particularly during drought, when they provide shade, cooling, recreation and social connection, supporting physical and mental wellbeing. Building on this baseline, the audit will identify priority opportunities to improve water efficiency through alternative supplies, strengthen urban cooling, enhance biodiversity and habitat connectivity, improve public amenity, and integrate Traditional Owner values and priorities.

The findings will inform coordinated planning and investment across Northern Mallee IWM Forum partners, supporting a strategic, place-based approach to greening towns, strengthening climate resilience and the transition to more water-sensitive, liveable and ecologically valuable urban environments.

Next steps

1. Collate green space, stormwater and asset information for the region
2. Determine baseline functionality of existing assets, stormwater management and connectivity of green spaces
3. Identify locations for redesign, upgrades and maintenance opportunities to enhance overall water efficiency, asset performance, urban cooling and amenity, and biodiversity values, and
4. Prepare detailed report for future implementation.

Status	Identified
Lead agency	To be confirmed
Implementation partners	Lower Murray Water, Mildura Rural City Council, Swan Hill Rural City Council, Gannawarra Shire Council, Mallee Catchment Management Authority, North Central Catchment Management Authority, First People of the Millewa Mallee Aboriginal Corporation
Location	Whole region
Scale	Forum area

Kayaker on still waters of Lake Charm. Credit: Gannawarra Shire Council



IWM Plans – Urban Centres (Mildura)

This project aims to develop IWM plans for key towns across the Northern Mallee region, addressing local challenges in sustainable and equitable water resource management. It will begin with a plan for Mildura, identifying priority projects including considerations of Lake Hawthorn's complex land tenure arrangements and reviewing actions from previous plans (e.g., Lake Hawthorn and Lake Ranfurly Integrated Management Plan).

The Mildura plan will guide the staged development of IWM plans across the Northern Mallee, using a principles-based approach adaptable to both larger towns and smaller communities such as Lake Boga, Nyah, Nangiloc-Colignan, and Lake Cullulleraine. This approach bridges the overarching intent of this SDS with delivery of place-based water initiatives. Further, it ensures that community voices and those of Traditional Owners are central to the planning and implementation process, and that future investments are locally relevant, effective, and aligned with community priorities.

There is also potential for broader collaboration across IWM Forum boundaries, particularly where Northen Mallee Councils have towns (such as Ouyen, Murrayville, Cohuna and Manangatang) that sit in the neighbouring Wimmera and Coliban Forum regions.

Next steps

1. Engagement of key stakeholders to develop place-based IWM principles specific to the Northern Mallee
2. Development of an IWM plan for Mildura, including consideration of current plans and projects, and
3. Use of the developed Mildura plan as a guide for the development of regionally specific IWM plans.

Status	Identified
Lead agency	Mildura Rural City Council
Implementation partners	Lower Murray Water, Mallee Catchment Management Authority, First People of the Millewa Mallee Aboriginal Corporation
Location	Mildura
Scale	Town

Mildura Riverfront Precinct and township. Credit: Admedia



IWM Plans – Urban Centres (Swan Hill)

Using the principles-based approach developed in the previous phase of this project an IWM plan will be developed for Swan Hill. This project supports the overarching intent of the SDS by enabling locally based IWM solutions.

A key priority will be assessing the feasibility of stormwater harvesting and treatment in the town's southwest. Options mays include modifying the southern drainage outlet to the Little Murray River and incorporating wetland treatment and design, similar to arrangements at the northern outlet.

This initiative could deliver multiple benefits, including improved water quality for local waterways and enhanced amenity for the community. Multiple stakeholders are expected to benefit from this collaborative initiative, including developers (who may have access to better local amenity), and water management agencies (North Central Catchment Management Authority, Goulburn-Murray Water or Lower Murray Water) through reduced river pollution and enhanced river water quality outcomes.

Leveraging work done in other regions, this project will demonstrate the benefits of local stormwater capture, treatment and reuse, underpinned by a robust cost-benefit analysis.

Community engagement, including strong collaboration with Traditional Owners, will be central to the planning and delivery focus, ensuring future investments are locally relevant, effective, and aligned with community priorities. It will also embed IWM into Council's strategic planning, policy development, service delivery, capital works, and asset management processes.

Next steps

1. Examination of the inclusion of past stormwater management plans and/or studies (past or planned) into the IWM plan, and
2. Engagement of key stakeholders and implementation partners.

Status	Identified
Lead agency	Swan Hill Rural City Council
Implementation partners	North Central Catchment Management Authority, Lower Murray Water
Location	Swan Hill
Scale	Town



Winter sunrise over Swan Hill and the Murray River. Credit: © BendigoAerial / Adobe Stock

Urban Oasis – Cool and Green Spaces for Drought Resilient Communities (Kerang)

This project aims to expand the existing stormwater basin at Riverside Park Reserve Sporting Precinct to increase retention and ensure a more reliable water supply for irrigating sporting fields at Kerang's Riverside Park Reserve. The precinct currently uses stormwater for irrigation, and expanding the basin will enhance supply during drought and summer conditions when mains water availability may be limited. The site also presents potential to support the Native Fish Recovery Program by functioning as a surrogate habitat for native fish.

The project will expand the existing stormwater basin to increase storage capacity and capture surface runoff from the Kerang township via an optimised piping system. Works will also include native vegetation planting to support stormwater treatment, cooling and habitat connectivity, along with installation of boundary fencing.

These upgrades will improve the reliability of stormwater supply for irrigation, particularly during dry periods, reducing reliance on town supply and strengthening drought resilience. Consistent irrigation will enhance the quality and usability of sporting fields, supporting turf condition, surface safety, and overall amenity for users. The project will reduce impacts of stormwater discharge to the Loddon River and downstream Ramsar-listed wetlands and deliver biodiversity benefits, including using the basin for native fish recovery and habitat improvement.

Further phasing of this project will be rolled out to other towns to expand the network of Urban Oases across Victoria's north.

Next steps

1. Collation of background material and pre-existing strategies
2. Seek funding to deliver Kerang project, and
3. Apply key learnings from Kerang to other Northern Mallee towns (including Swan Hill).

Status	Identified
Lead agency	Gannawarra Shire Council
Implementation partners	Lower Murray Water, North Central Catchment Management Authority, Riverside Park Reserve Committee
Location	Kerang
Scale	Precinct

View over Kerang township towards Foster's Swamp. Credit: Lower Murray Water



Enhancing Community Recreation Through Rural Drainage Reuse (pilot in Red Cliffs)

This project will deliver a climate-resilient, fit-for-purpose water supply model for regional golf courses, sporting precincts and adjacent green spaces through the reuse of rural irrigation drainage water, blended with raw water. A pilot at the Red Cliffs Golf Club will assess technical feasibility, regulatory compliance, and service reliability.

The scheme redirects drainage flows from the Red Cliffs Irrigation District via a dedicated pipeline to on-site storage for irrigation of fairways and greens. By leveraging existing infrastructure, the project provides a cost-effective alternative to traditional water sources and reduces dependence on raw irrigation supplies during drought and water restrictions.

Regional golf clubs and sporting precincts are vital community assets, providing open space, health and wellbeing benefits, social connection, and hosting significant local and regional events. Without secure, fit-for-purpose water supplies, their long-term viability is at risk.

The project also supports broader environmental and cultural outcomes, including recognition of Traditional Owner values and habitat enhancement, with many of the region's golf clubs located near riparian corridors and wetlands, enabling water reuse to contribute to connected environmental systems.

The Red Cliffs pilot aims to demonstrate a scalable model for drainage water reuse that strengthens regional water security, providing a cost-effective solution that builds on existing infrastructure and aligns with IWM principles.

This collaborative project involves local golf clubs, Lower Murray Water, Councils, Catchment Management Authorities and Traditional Owners including native title holders First People of the Millewa-Mallee Aboriginal Corporation, with lessons informing broader regional application. It supports multiple public value outcomes by strengthening climate resilience, supporting community wellbeing, and improving adaptive water use and integrated management of recreational and environmental assets.

Next steps

1. Formation of project group including Red Cliffs Golf Club, Lower Murray Water, Mallee Catchment Management Authority and Mildura Rural City Council
2. Complete technical assessments including drainage water quantity, reliability, quality and blending requirements
3. Complete site-specific study
4. Development of an implementation plan for Red Cliffs Golf Club
5. Undertake constructions works (Red Cliffs Golf Club and Lower Murray Water)
6. Identify other regional golf clubs and green spaces and apply learnings from Red Cliffs pilot (if successful), and
7. Exploration of whether return flow credits can be granted for any high-quality rural drainage reuse water.

Status	Identified
Lead agency	Lower Murray Water
Implementation partners	Councils, Mallee Catchment Management Authority, North Central Catchment Management Authority, First People of the Millewa Mallee Aboriginal Corporation, Golf and other sporting clubs
Location	Whole region (pilot in Red Cliffs)
Scale	Forum area

Best Practice Drought Resilience Planning and Implementation

The Northern Mallee region is facing increasing challenges from prolonged periods of dry weather and drought, and shifting climate patterns, making drought resilience a critical priority for the region. With the region's communities, agricultural systems, and environment vulnerable to water scarcity, a coordinated and forward-looking approach is essential.

This project aims to deliver best practice in regional drought resilience by fostering collaboration across multiple agencies. It will involve collating existing resources and reviewing current drought management plans across the region (e.g., Mallee Drought Resilience Plan) to identify strengths, gaps and opportunities for greater alignment.

Key areas of focus will include the expanded use of alternative water sources to reduce reliance on potable water supplies, and identification of capital works that can enhance climate resilience and drought preparedness for local communities. Examples include blue-green infrastructure in urban developments that promotes urban cooling. For example, the Mildura Rural City Council is looking at introducing drought tolerant plants for future public green amenities and the use of raw water and other alternative water for irrigating public open spaces.

The Forum acknowledges the importance of a coordinated regional approach and the shared responsibility of Forum organisations to contribute to the allocation, monitoring, and communication of water resource use. A key outcome of the project will be the development of a unified drought response and management strategy, designed for adoption by each of the participating partners.

The project also presents potential for broader collaboration across IWM Forum boundaries, particularly with neighbouring regions such as the Wimmera and Coliban, to strengthen drought resilience in northwest Victoria.

Next steps

1. Definition of the scope for the project and key steps to oversee and coordinate the development of best practice in regional drought resilience
2. Examination of past plans and/or studies (e.g., Mallee Drought Resilience Plan) to build upon and support implementation, and
3. Engagement of key stakeholders and implementation partners.

Status	Identified
Lead agency	To be confirmed
Implementation partners	Lower Murray Water, Mildura Rural City Council, Swan Hill Rural City Council, Gannawarra Shire Council, Mallee Catchment Management Authority, North Central Catchment Management Authority
Location	Whole region
Scale	Forum area



Lake Hawthorn and shoreline, Mildura. Credit: Lower Murray Water

Lake Hawthorn's Pipeline Potential – Feasibility Study and Implementation

The Lake Hawthorn Pipeline Potential project is currently investigating the feasibility of repurposing disused irrigation infrastructure to deliver reliable and cost-effective water for the environment to Lake Hawthorn. It will also explore the potential for improved flood mitigation in the surrounding areas.

This project will focus on detailed investigations to refurbish or replace obsolete pumping infrastructure on the lake's northern edge. Outcomes will support enhanced environmental water delivery and assess opportunities for flood mitigation contributing to both the wetland's ecological condition, as well as urban water management.

Based on the success of this project, similar investigations will be explored for other high value wetlands and waterways in the region, including Cardross and Koorlong Lakes, Chaffey and Johnsons Bend on the Murray River, as well as rehabilitation of the Murrayville wetland as part of the neighbouring Wimmera SDS. Key learnings will be shared more broadly through the Northern Mallee Forum to support the management of similar challenges across the Swan Hill and Gannawarra local government areas.

Next steps

1. Development of a feasibility study to assess infrastructure risks, design upgrade options, estimated costs, and review land and statutory approval requirements, and
2. Implementation of the preferred option.

Status	Implementation
Lead agency	Mallee Catchment Management Authority
Implementation partners	Lower Murray Water, Goulburn-Murray Water, Mildura Rural City Council, First People of the Millewa Mallee Aboriginal Corporation, Parks Victoria
Location	Mildura
Scale	Precinct



Kayaker on Reedy Lake surrounded by wetland birdlife. Credit: Gannawarra Shire Council

Harnessing the Eco-Tourism Potential of Kerang Wetlands

Kerang's proximity to multiple natural wetlands, including the Kerang Wetlands Ramsar site, provides strong potential for eco-tourism. This project aims to enhance the natural, cultural and eco-tourism values of key wetland sites in Kerang, including Town/Back Swamp and Middle Reedy Lake. It seeks to deliver on opportunities previously identified through North Central Catchment Management Authority's (e.g., Kerang Wetlands Ramsar Site Action Plan 2017-25) and Gannawarra Shire Council works.

Historically, a diversity of land managers and the absence of a coordinated plan have led to ad-hoc wetland restoration and infrastructure investment. This project will address these challenges by developing a comprehensive plan to harness the broader eco-tourism potential of the many natural wetlands within a 20km radius of the Kerang township – assessing the current ecological condition, actions required for restoration and the potential to support eco-tourism while maintaining the natural and cultural values and its ecological character.

Plan implementation will include works that aim to improve site access and enhance visitor experience through construction of all-access walking tracks, updated bird hides, interpretive signage and targeted weed control and revegetation. The project will also support water and cultural literacy, ensuring that these factors are considered alongside tourism development.

This project seeks to collaborate with a range of partners and land managers including some from outside the Forum organisations; this could include the Department of Environment, Energy and Climate Action, Goulburn-Murray Water, Kerang Landcare and Parks Victoria. Lessons learned and outcomes will be shared with broader IWM Forum partners to guide future wetland enhancement and eco-tourism development across the region.

Next steps

1. Establishment of a working group comprising key implementation partners, and
2. Collaboration in the development of a detailed project plan, design and costings for infrastructure upgrades.

Status	Identified
Lead agency	North Central Catchment Management Authority
Implementation partners	Gannawarra Shire Council, Lower Murray Water, Department of Environment, Energy and Climate Action
Location	Kerang – Back Swamp and Middle Reedy Lake
Scale	Town

Little Murray, Big Future: Urban Waterway Restoration

The *Little Murray, Big Future* project will restore an 8 kilometre reach of the Little Murray River in Swan Hill – a locally significant anabranch of the Murray River with important ecological, recreational and cultural values.

The project aims to improve declining native fish populations, erosion and waterway amenity values to support healthy, thriving landscapes and a vibrant eco-tourism sector based on recreational fishing. It will also complement current Swan Hill Rural City Council works to improve public amenities along the Little Murray River.

The project will increase instream habitat for native fish by adding woody structures with nesting boxes and replanting aquatic plants on benches, creating critical nesting, nursery and resting areas. Riparian vegetation will be improved by controlling willows and boxthorn and revegetating the riverbanks, with additional strategies considered to help manage erosion.

While North Central Catchment Management Authority will lead project delivery, Swan Hill Rural City Council and Traditional Owners will play a key role in maximising shared outcomes. Lessons learned will be shared with Northern Mallee IWM Forum partners to strengthen regional collaboration and guide the adaptation and replication of urban waterway restoration projects across the Forum region.

Next steps

1. Engagement of Traditional Owners, Councils and additional stakeholders and/ or beneficiaries
2. Development of an integrated restoration plan, and
3. Completion of capital works and consideration of applicability to other sites across the region.

Status	Identified
Lead agency	North Central Catchment Management Authority
Implementation partners	Swan Hill Rural City Council, Wamba Wemba Aboriginal Corporation, VRFish
Location	Swan Hill
Scale	Town / Precinct



Murray Cod sculpture in Swan Hill. Credit: Department of Energy, Environment and Climate Action

Swan Hill Stormwater Harvesting

This project will explore how alternative water sources can be utilised to promote sustainable water use and enhance liveability in the region, with a particular focus on investigating stormwater harvesting and storage opportunities for irrigating green spaces in southwest Swan Hill.

A detailed feasibility study will be undertaken to assess opportunities for capturing stormwater runoff from existing and future residential areas located to the south of the township, which would otherwise discharge to the Murray River. The study will also evaluate storage options, to enable reuse of captured stormwater by providing an alternative water source for irrigating high-value public spaces, including the Swan Hill Racecourse, parks, and nearby sporting precincts. Design and construction will follow once feasibility is proven.

Harvesting stormwater is expected to provide a variety of benefits for the community and local environment by reducing reliance on potable water and easing demand on the Murray River system, improving waterway health by decreasing stormwater discharge, and enhancing amenity of highly valued public open space.

Next steps

1. Complete a feasibility study, and
2. Implement the preferred option from the study.

Status	Identified
Lead agency	Swan Hill Rural City Council
Implementation partners	Lower Murray Water, North Central Catchment Management Authority, Department of Environment, Energy and Climate Action
Location	Swan Hill
Scale	Precinct

Yamagata Garden along the Little Murray River, Swan Hill. Credit: Department of Energy, Environment and Climate Action



Native Fish and Wetland Recovery

This First People of the Millewa Mallee Aboriginal Corporation led project aims to protect, restore and enhance culturally significant wetlands, waterways, floodplain habitats and native fish recovery areas across Latji Latji, Ngintait and Nyeri Nyeri Country. The project involves using six map-based priority areas, including the Karadoc Area, Lindsay Island, Merbein Area, Mulcra Island, Nichols Point / Kings Billabong and Wallpolla Island, as the initial framework for First People of the Millewa Mallee Aboriginal Corporation governance, partner scoping and staged delivery. The project is framed as an opportunity to address cultural water planning, cultural flows readiness and wetland/native fish recovery, with a focus on Traditional Owner governance, cultural heritage protection, Ranger-led monitoring, on-Country works and climate resilience.

Next steps

1. Confirm First People of the Millewa Mallee Aboriginal Corporation governance, cultural authority, Free, Prior, and Informed Consent for data permissions and spatial data quality assurance for the six priority areas
2. Confirm priority wetlands, reaches, native fish focus areas and cultural water objectives with Traditional Owner and partner technical input, and
3. Convene partner for scoping activities and prepare the Cultural Flows Readiness Framework, technical scope, full-cost budget and funding pathways.

Status	Identified
Lead agency	First People of the Millewa Mallee Aboriginal Corporation
Implementation partners	Mallee Catchment Management Authority, Mildura Rural City Council, Lower Murray Water, Murray-Darling Basin Authority, Trust for Nature, Parks Victoria, Department of Environment, Energy and Climate Action, Victorian Environmental Water Holder, Commonwealth Environmental Water Holder
Location	Latji Latji, Ngintait and Nyeri Nyeri Country
Scale	Precinct / Landscape

Traditional Owner Partnerships

This initiative recognises that strong and enduring partnerships with Traditional Owners are fundamental to IWM in the Northern Mallee. It provides a shared commitment from Forum partners to Traditional Owners – both those already represented in the Forum and others across the region – to work respectfully and collaboratively with Traditional Owner groups to identify, develop and lead IWM opportunities that reflect self-determined goals, values and priorities.

It will focus on creating the conditions for meaningful and culturally appropriate participation in IWM planning, decision making and project delivery. This includes strengthening relationships, supporting early and ongoing engagement, improving access to information, resources and opportunities, and embedding Traditional Owner knowledge and cultural values into water management practices.

Forum partners recognise the need to build their own capability to work effectively in partnership. This includes developing cultural competency, adapting governance and planning processes, and creating pathways that enable Traditional Owners to influence and lead IWM priorities over time.

This approach acknowledges that Traditional Owner participation will occur at different paces and in different ways, and must be guided by readiness, trust and mutual understanding. It recognises the ongoing impacts of colonisation and commits partners to working respectfully and at an appropriate pace to support self-determination.

This initiative is an ongoing enabling commitment, rather than a single project, that will support the identification and progression of place based IWM opportunities as they emerge.

Next steps

1. Establish shared principles for engagement and partnership with Traditional Owners across the Forum region that recognise Traditional Owner rights, authority and self-determination
2. Engage with Traditional Owner groups to understand priorities, readiness and preferred pathways for involvement
3. Identify opportunities to support early and ongoing involvement in existing and emerging IWM projects
4. Build capability across partner organisations, including cultural competency and governance improvements, and placeholder list, and
5. Develop a flexible, ongoing program of work to support Traditional Owner-led IWM opportunities.

Status	Identified
Lead agency	To be confirmed
Implementation partners	All Forum partners
Location	Whole region
Scale	Forum area



Bird life at Lake Hawthorn, Mildura. Credit: Lower Murray Water



Integrated Water
Management Forums

VICTORIA
State
Government

Energy,
Environment
and Climate Action