

Environmental Sustainability Strategy

February 2024



We acknowledge the Bindjareb and Wilman peoples of the Noongar nation as the Traditional Owners of the land on which the Shire of Murray stands. We acknowledge their connection to land, sea and country and pay our respects to their elders, past, present and emerging.





A message from the Shire President

It is a pleasure to present our Environmental Sustainability Strategy; our organisation-wide commitment to supporting a sustainable future.

Environmental sustainability is integral to Murray's ongoing liveability and prosperity. With our vision for Murray as an outstanding place for community, lifestyle and opportunity, embedding sustainable practices into our planning and decision-making is critical for long-term success.

We know this is a priority for the community and as a Council, we are astutely aware of our responsibility to meet the needs of today's society without compromising the needs of future generations.

This Environmental Sustainability Strategy outlines how we will seek outcomes in six critical areas. These being energy and climate, water, waste, biodiversity, sustainable community and internal governance.

It outlines our environmental goals and planned outcomes, as well as tangible performance indicators that will measure and demonstrate our progress.

Aligned to our Council Plan 2023/2033, we have confidence this strategy will help us deliver on a critical community aspiration - which is to ensure our natural environment is cared for and appreciated.

This aspiration was articulated to us through 1,476 surveys, public workshops and our first youth summit, and is something we are eager to see come to fruition through this dedicated strategy.

Shire President
Councillor David Bolt

1



Introduction

Page 5

2



Purpose

Page 6

3



Strategic context

Page 9

4



Environmental context

Page 12

5



Key challenges

Page 17

6



Tackling the challenges - focus areas

Page 24



Introduction

The Shire of Murray's environment is diverse, from its forests and bushland to its waterways and urban environments. The natural environment sustains all life - it provides access to clean water, air and food and it also underpins our economy and the liveability of our Shire. Protecting and maintaining our natural environment is essential if we wish to continue to support the liveability and prosperity of the Shire. We do however, face many environmental challenges, whether these be to our natural areas from past and current use, or from the global threat of climate change. These challenges will invariably continue as our population grows.

Our Environmental Sustainability Strategy provides a vision, objectives and actions, as well as targets and a monitoring and reporting framework to help advance environmental sustainability across the Shire. It outlines actions required for Council to integrate sustainable practices into its operations, as well as its community programs and services. The Strategy aligns with key Federal, State and Regional government environmental policies and requires the Shire to work in partnership with the community, private sector and other levels of government to ensure that we continue to protect and enhance our environment for current and future generations.

Community consultation has highlighted the importance of building environmental sustainability into decision making. An increased focus on environmental concern is reflected in the Shire of Murray Council Plan, including the increased prominence of Sustainable Development and the Planet. This Plan was informed by the community who clearly articulated that a major concern was for the Environment.

Purpose

The concept of environmental sustainability emerged in 1987, when the World Commission on Environment and Development created the concept of 'sustainable development'. It means actions that meet the needs of present generations without compromising the needs of future generations.

Sustainability has three distinct but interrelated components:

Economic sustainability

Ensuring economic prosperity can be maintained over time.

Social sustainability

Ensuring all people, now and in the future, have their basic needs met.

Environmental sustainability

Ensuring non-human elements of nature, like air, water and biodiversity remain healthy over time.

Community wellbeing is directly linked to our natural environment. As such, having a healthy, high functioning environment supports a vibrant and fulfilled community.



The purpose of this Environmental Sustainability Strategy is to provide a framework to progress the Shire of Murray and its community towards a more sustainable future. To achieve this, the strategy concentrates on six focus areas, which align with Council's priorities in the environmental sustainability space:



Energy and climate



Water



Waste



Biodiversity

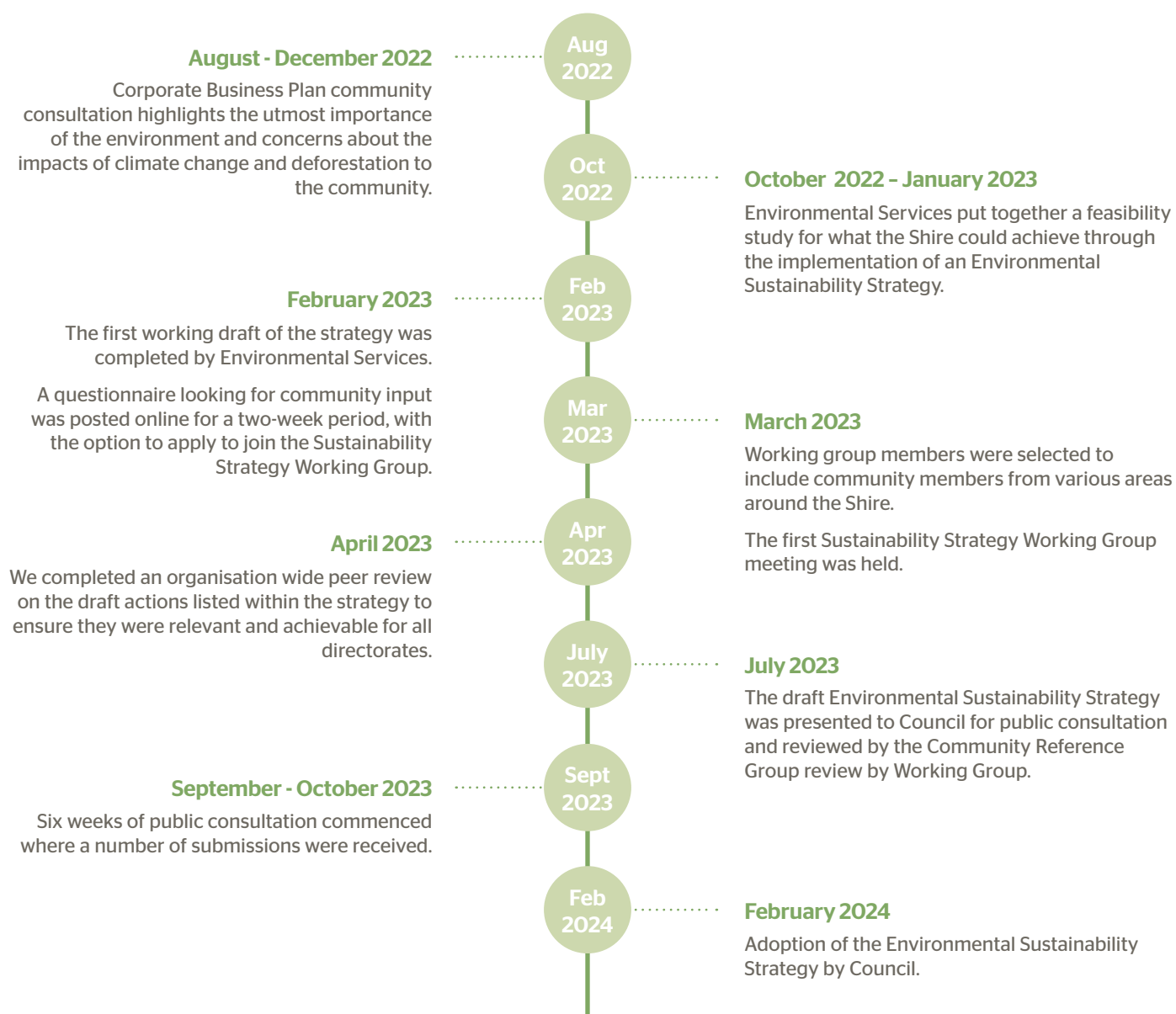


Community



Governance

How the strategy was prepared



What you told us

Through consultation in connection to the Council Plan for the Future, six workshops including a first youth workshop and a Traditional Owners workshop, the responses to the Environmental Sustainability Strategy Questionnaire by 90 seminar attendees is summarised below.



What does sustainability mean to you?

90%+ of answers related to the ability to exist with minimal impacts on the environment, responsible consumption, waste management and support for future generations.

One response highlighted continuous growth and that was in the context of quality of life.

What role do you see the Shire of Murray Council playing in sustainability?

The themes were leadership, innovation, engagement and enforcement.

“They need to be change makers and strong leaders and change what has always been done. Simply because it has always been done does not mean it is right. This is not sustainable thinking.”

What initiatives related to sustainability would you like to see Council undertake?

Some responses were area specific highlighting current big topics in the Shire: namely Alcoa, mining and water quality. Other initiatives related to the introduction of FOGO bins (a third of responses), feral animal control and composting.

Would you be interested in reducing your electricity and gas bills by making changes to your home?

The responses to this were overwhelmingly positive.

What information and resources would you like to see from the Shire about sustainable living?

Incentives, anything to help reduce resource consumption, practical cost information, native garden promotion and holding unsustainable developers to account.

What are your environmental concerns for the area covered by the Shire of Murray?

Answers were consistently either protection of forest from mining or protection of waterways, with various different ideas and issues for each. One answer related to waste management.

What can the Shire do to improve the natural environment in your area?

There were some interesting responses here, not all are suitable for a sustainability strategy but all can be taken on notice. Again, there was an even split between forests and waterways with Alcoa and erosion being the major specific concerns. Also included was specific weed management and the provision of bird habitat.



Strategic context

This strategy has been prepared as an easily read and shared guide, for use by Council, external stakeholders and the community, to hold the Shire of Murray accountable in working towards its vision and long-term targets for environmental sustainability.

The Shire of Murray's approach to environment sustainability seeks to communicate the importance of the intrinsic connection between the environment, society and the economy, emphasising the need for environmental considerations to be at the forefront of all Council decisions.

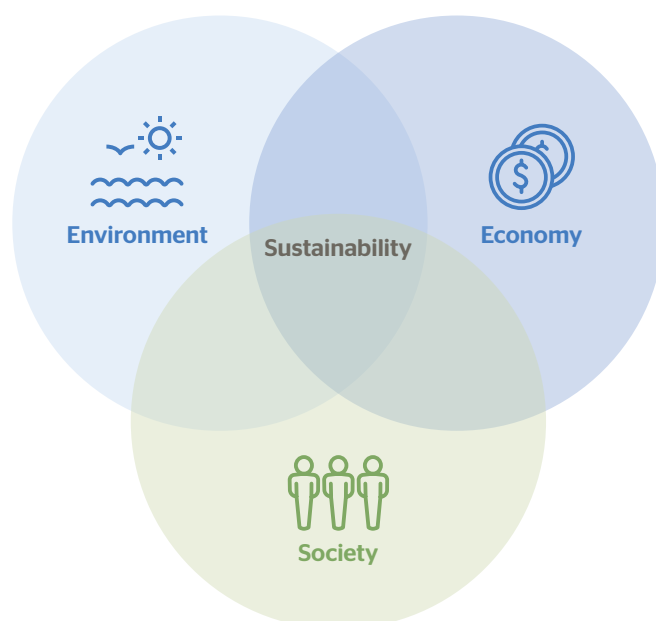
Council acknowledges that we alone cannot fix the environmental and climate issues we are all facing on a global scale. Therefore, it is our mission to provide leadership in an innovative, efficient and reliable manner to enhance our environment and community wellbeing while assisting the community to be more aware of the changes they can make to help protect the environment.

This ten-year strategy sets the long-term strategic goals we will use to achieve environmental sustainability across Council and is designed to fit with Council's Plan for the Future (2023). It aims to highlight key goals we are committing to achieving, embed environmental considerations into all Council decision making, and deliver on our sustainability commitments in the form of measurable actions.

Strategic alignment

The Environmental Sustainability Strategy aligns with:

- Shire of Murray Council Plan
- Local Planning Strategy
- Local Biodiversity Strategy
- Federal, state and regional documents



United Nations Sustainable Development

In 2015 the 2030 Agenda for Sustainable Development was adopted by all United Nations members, including Australia. It recognises that building peaceful and inclusive societies, ending poverty, protecting human rights and sustaining economic growth, must go hand in hand with strategies that protect our planet and natural resources, improve health and education all while tackling climate change.

At its core, the agenda introduces 17 Sustainable Development Goals (SDGs) as an urgent call for action by all countries in a global partnership. In September 2015, Australia agreed to work at all levels of government to implement the SDGs and meet sustainability targets by 2030.



How do we fit in with the rest of the world?

International conventions, agreements, legislation & policy

Kyoto Protocol

United Nations Framework Convention on Climate Change
Paris Agreement

United Nations Sustainable Development Goals

Ramsar Convention on Wetlands

Japan-Australia Migratory Bird Agreement (JAMBA)

China-Australia Migratory Bird Agreement (CAMBA)

Republic of Korea-Australia Migratory Bird Agreement (ROKAMBA)

Commonwealth context

Environment Protection and Biodiversity Conservation Act 1999

Renewable Energy Target Scheme

Threatened Species Action Plan 2022-2032

Western Australian context

Western Australian Climate Policy 2020

Soil and land conservation act 1945

Conservation and Land Management Act 1984

Biosecurity and Agriculture Management Act 2007

Local Government Act 1995

Environmental Protection Act 1986

Aboriginal Heritage Act 1972

Climate Resilient WA 2022

Biodiversity Conservation Act 2016

Planning and Development Act 2005

Rights in Water and Irrigation Act 1914

Local context

Bindajareb Djilba Protection Plan

Bilya Maadjit Murray River Action Plan

Waangaamaap Bilya Serpentine River Action Plan

Environmental context

The Shire of Murray is located 85km south of Perth, Western Australia, in the heart of the Peel Region.



Murray's natural assets

Covering an area of **1,821km²** the Shire consists of 6 major suburbs:

Pinjarra at its centre

North Dandalup

The adventure town of Dwellingup

Ravenswood

The equestrian hub of Coolup

North and South Yunderup bounded by the idyllic shores of the Peel-Harvey Estuary



The region features a diverse range of urban, rural, forest, riverine and estuarine environments with land used predominantly for agriculture, mining, forestry, tourism and conservation.

The Shire of Murray is renowned for its rich history and rural charm, bringing in an estimated



365,000

domestic and international visitors each year

70,913

Estimated population by 2051

Population



19,292

Current population

4.6%
Projected growth rate

Geomorphology and climate

Most of the Shire of Murray municipal lies within the Peel-Harvey catchment on the Swan Coastal Plain and is largely used for agriculture. The eastern portion of the Shire is made up of the granitic and sedimentary outcrops of the Darling Scarp, an area heavily exploited by forestry and mining industries. The Swan Coastal Plain has been significantly cleared, modified and drained, with less than 20% of the natural vegetation remaining today.


Murray has a warm temperate climate with historic average temperatures ranging from:

 **12.7°C** min. **29.8°C** max.
Summer

 **5.5°C** min. **15.1°C** max.
Winter

Extreme temperatures - highs and lows

 **43.5°C**
Summer

 **-3.9°C**
Winter

Average annual rainfall

 **683.4** mm
Pinjarra

 **1224.5** mm
Dwellingup

Wetlands and waterways

The Shire of Murray lies within the Peel Harvey catchment and the floodplain of the two major waterways that dissect the region: The Serpentine and Murray rivers. These large rivers flow down from the Scarp, into smaller tributaries and wetlands before reaching the Peel-Harvey Estuary. Historically, majority of the western side of the Shire was seasonally inundated palusplain. The name Pinjarra comes from 'Bindjarup' which means 'place of swamps'.

The Peel Inlet-Harvey Estuary, commonly known as the Peel-Harvey Estuary or Bindjareb Džilba, is the largest and most biodiverse estuarine system in the south-west of Western Australia. Along with Lake Mealup and Lake McLarty, the Peel-Harvey Estuary forms part of the Peel-Yalgorup system, which is recognised under the Ramsar Convention as a system of wetlands of international significance for migratory birds. The Peel-Harvey itself has been valued at over 20 billion dollars in terms of what it provides economically to the Peel region and wider Australia. (Economic Evaluation - Peel-Harvey Waterways, Urbis 2023).

Assets


Bindjareb Boodja
"Swamp Country"


Ramsar listed Peel-Harvey catchment



Important wetlands
kidneys of the land

2 
Rivers

3 
Reservoirs


Sustainable Commercial Fisheries

Threats


Climate change
Sea level rise, increased severe weather events, erosion & flooding


Rising air & water temperatures


Declining water quality


Loss of vegetation


Pest plants & animals


Increasing population & development pressure

Northern Jarrah forest

Situated 266m above sea level on the Darling Scarp, lies the unique northern Jarrah forest of the south-west. These forest and woodland ecosystems have evolved over millions of years and are renowned for their high biodiversity and species richness. The Jarrah forest provides recreational, cultural and socio-economic benefits to the Shire of Murray, with the local and regional communities placing a very high value on this incredibly unique ecosystem.

Assets



Threats



IPCC has indicated this specific eco region is one of the most threatened in the world by the implications of climate change



Significant plants, animals and ecosystems

Within the many varying ecosystems of the Shire of Murray, live a range of significant plants, mammals, birds, insects and reptiles that are protected under the State Biodiversity Conservation Act 2016 and the federal Environment Protection and Biodiversity Conservation Act 1999.

Additionally, there are a number of significant threatened ecological communities (TEC) recorded in the region that are protected under the aforementioned State and Commonwealth legislation. These communities are identified as being subject to processes that threaten to significantly modify or destroy them across their range, with most of these communities either naturally restricted in distribution or have now been significantly cleared. Threatened ecological communities and significant plants and animals found in Murray are identified below.

Threatened ecological communities



Marri - Gras tree

Woodlands and shrublands dominated by *Corymbia calophylla* (Marri) and *Xanthorrhoea preissii* (Balga).



Claypans of the Swan Coastal Plain

Occur where clay forms and impermeable layer close to the surface. They are the most diverse of the Swan Coastal Plain wetlands and contain many endemic local species.



Banksia Woodlands

Woodland community with species rich dense shrubland dominated by *Banksia attenuata*, *Banksia menziesii* and *Banksia illicifolia*.



Marri - Kingia

Woodland community with common native taxa including: *Corymbia calophylla* (Marri), *Kingia australis* (Kingia), *Banksia nivea* (Honeypot Dryandra), *Philotheca spicata* (Pepper and Salt), and *Xanthorrhoea preissii* (Balga).



Tuart Forest

Woodland or forest community comprised of *Eucalyptus gomphocephala* (Tuart) trees as the primary defining feature. Often found with *Agonis flexuosa* (Peppermint), *Banksia grandis* (Bull Banksia), *Banksia attenuata* (Candlestick Banksia) or *Eucalyptus marginata* (Jarrah).



Temperate and Subtropical Coastal Saltmarsh

Community consists of saltmarsh and associated organisms in areas under regular or intermittent tidal influence. Coastal Plain wetlands and contain many endemic local species.

Significant plants and animals



Tall Donkey Orchid

Threatened - rare or likely to become extinct



Carnaby's Black Cockatoo

Endangered



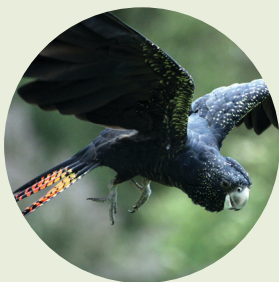
Graceful Sun Moth

Endangered



***Synaphea stenoloba*.
Synaphea Sp. pinjarra
and fairbridge farm**

Critically endangered



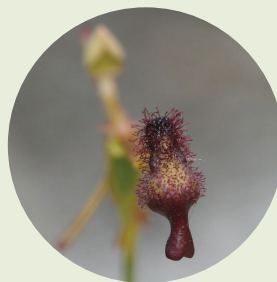
Forest Red-Tailed Black Cockatoo

Vulnerable



Western Ringtail Possum

Critically endangered



Glossy-leaved Hammer Orchid

Endangered



Baudin's Black Cockatoo

Vulnerable



Chuditch

Vulnerable



Grand Spider Orchid

Endangered



Australasian Bittern

Endangered



Red-tailed Phascogale

Conservation dependant and vulnerable

Other conservation significant species

Animals

- Mainland Quokka (threatened)
- Brushtail Phascogale (conservation significant)
- Quenda (Priority 4)
- Rakali (Priority 4)

Migratory shorebirds

- Blue Billed Duck
- Wood Sandpiper
- Common Greenshank
- Eastern Curlew
- Osprey
- Bar-tailed Godwit
- Red-necked Stint

Flora

- Purdie's Donkey Orchid (endangered)
- Blenospora doliiformis (Priority 3)
- Hemigeina microphylla (Priority 3)
- Jumping Jacks (Priority 3)

Photo credit: Graceful Sun Moth (credit David Pike), Glossy-leaved Hammer Orchid, Grand Spider Orchid (credit Justin Brown), Baudin's Black-Cockatoo (credit Keith Lightbody, birdlife.org.au), Chuditch (credit AWC, www.australianwildlife.org), Australasian Bittern (credit Andrew Silcocks, birdlife.org.au), Red-tailed Phascogale (credit Laurence Berry AWC, www.australianwildlife.org).

Key challenges

Western Australia is already experiencing the impacts of climate change and over time the state will likely continue to see:



Increase in average annual temperatures

Extreme weather events

Decreased rainfall

Longer fire seasons

Sea level rise

“We are the first generation to feel the impact of climate change and the last generation that can do something about it.”

Barack Obama

Across the Shire the impacts associated with climate change are wide-ranging and significant. The response of the Shire in the face of these risks will have a considerable influence over the capability of our community, economy and environment to adapt.

The most recent IPCC report (February 2022) highlighted several of these risks, with major concerns for Murray being:

Sea level rise

Although not directly bordering the Indian Ocean, much of the Shire is considered coastal as it sits adjacent to the tidally influenced Peel-Harvey Estuary and is therefore impacted directly from rising sea levels and future extreme events which drive erosion and inundation. These coastal and riverine areas include key habitats, low lying developed areas, significant infrastructure, aboriginal heritage sites, heritage listed buildings and areas of natural beauty.

Impacts are anticipated to continue as sea levels are predicted to rise at an increasing rate (Intergovernmental Panel on Climate Change, 2021). The management of the estuarine and riverine areas and foreshore reserves throughout the region, and the mitigation of the coastal hazard risk posed to the community, is therefore integral to the Shire's ongoing and future success.



Drying climate

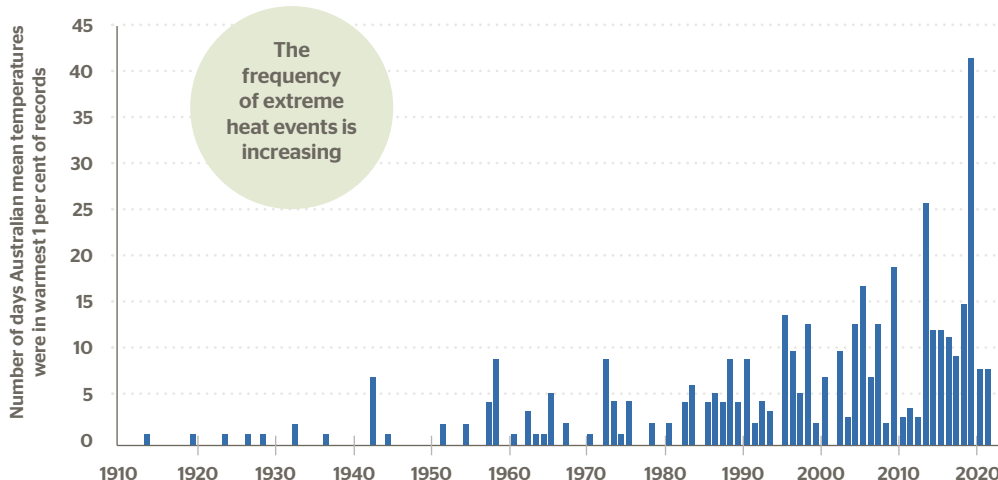
The southwest of Western Australia has been identified as a global drying hotspot, with the impacts of a drying climate projected to worsen over the next century. The overall trend since the 1970s has been one of declining rainfall, reduced river flows, increasing heatwaves and bushfires and chronic drought due to climate change.

The frequency of extreme heat events is increasing

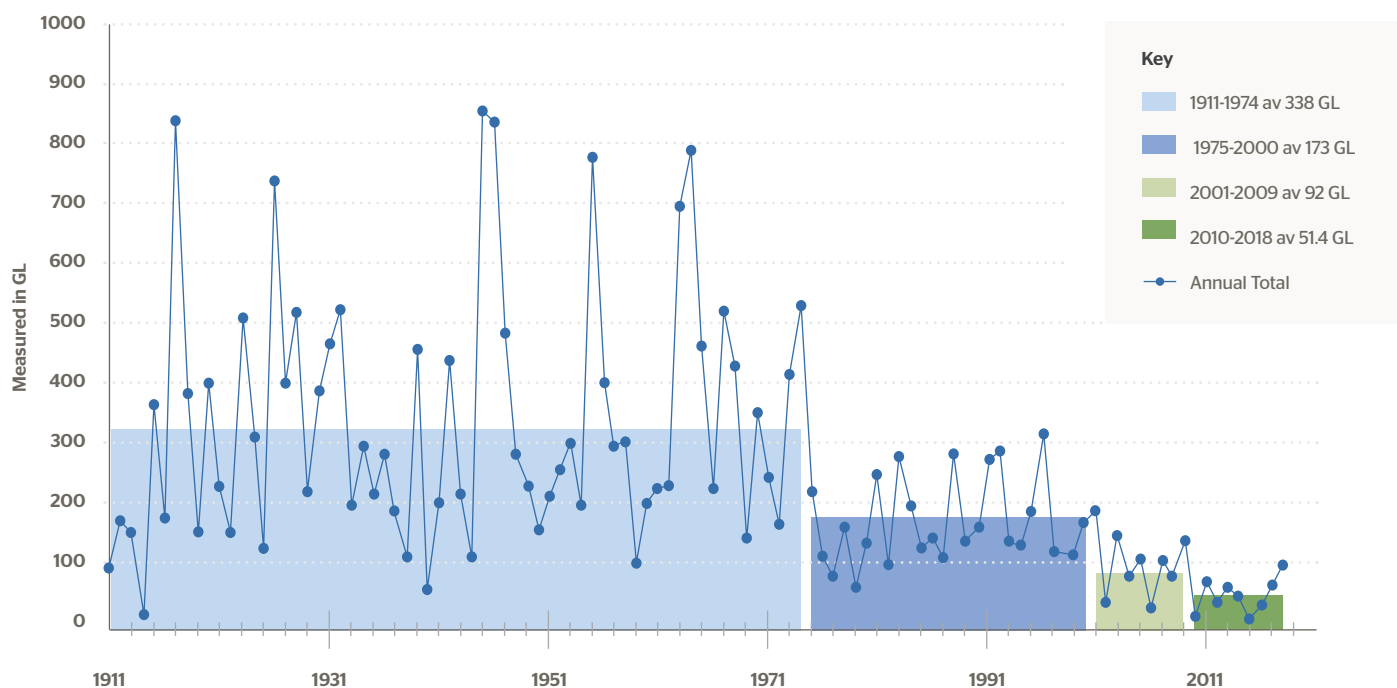
Number of days each year where the Australian area-averaged daily mean temperature for each month is extreme (extremely warm days). Extremely warm days are defined as those where daily mean temperatures are the warmest 1 per cent of days for each month, calculated for the period from 1910-2021.

© Australian Government

Source: Bureau of Meteorology



As our climate continues to dry, it will impact greatly on local water availability, biodiversity, community lifestyle and wellbeing, industry, culture as well as all water dependent ecosystems in the Shire of Murray. The figure below demonstrates the change in water streamflow into dams in the south-west of Western Australia, detailing a continued decline since the 1970s.



Streamflow into south-west Western Australian dams 1911-2018. © 2019 Water Corporation of Western Australia.

Extreme events

Heatwaves, major storms, south tracking tropical cyclones and bushfires are expected to increase in number and severity in the future, with the number of days exceeding 40 degrees per annum expected to also increase. This can lead to an exasperation of droughts, erosion and other systemic responses to environmental stress.

Low socio-economic and more isolated communities are at a much higher risk from these impacts. Therefore, community connectedness, shaded access corridors, health facilities and addressing car dependency are strategically important for many of these situations.



Water quality

Over the 1970s-1980s, significant nutrient loads from agricultural practices within the river catchments saw the ecosystems of the Peel-Harvey Estuary collapse, requiring intervention works that resulted in the Dawesville Cut in 1991. The Dawesville Cut, while a solution for one historic problem, has had its own set of environmental implications with flow-on effects, including increased salinity, which we continue to see and manage today. To this day, the management of the Peel-Harvey system remains challenging.

Of our numerous challenges, nutrient export from livestock into our waterways and river systems continues to be at the forefront of targeted water quality management. A significant portion of the land that borders the Murray and Serpentine River systems are privately owned rural properties that, as historically permitted, continue to allow livestock access to riparian areas and direct access to the river. While the extent may not be as great as 50 years ago, the nutrient input and riverbank erosion from these land uses continue to degrade the water quality within the region and within the Peel-Harvey system.



Mosquitos

Mosquitoes are a key challenge within the Shire of Murray, with high mosquito numbers causing a major nuisance and creating a threat to human health with mosquito borne diseases such as Ross River Virus. Most mosquito breeding in the Shire occurs in stagnant water that accumulates in swampy areas alongside the Peel-Harvey Estuary, Murray and Serpentine Rivers and, during periods of high tides and warm weather. The two most commonly found species of mosquito found within Murray are *Aedes camptorhynchus* and *Aedes vigilax*, both often found in high numbers during summer, winter and spring. Mosquitoes are likely to increase in numbers as a result of climate change, which is expected to increase temperatures, sea levels and tides.

At present, the Shire of Murray in collaboration with the Department of Health, the City of Mandurah and City of Rockingham, operate a mosquito management program that monitors and treats mosquito larvae when mosquitoes reach high numbers. A helicopter is used to treat larvae with larvicides designed specifically for mosquitoes, and the aim is not to eradicate mosquitoes, just to reduce numbers below nuisance thresholds. It is important to note that mosquitos are also a part of the ecosystem and are an important food-source for aquatic fauna as well as terrestrial birds and bats.



Ongoing loss of native vegetation

Since European settlement, over 80% of the original native vegetation on the Swan Coastal Plain has been cleared and historically, large areas of land within the Shire of Murray were cleared or parkland cleared for agricultural purposes. Prior to European Settlement there were approximately 170,111 hectares of native vegetation in the Shire of Murray, today only half of that remains and often in a significantly modified state.

The Northern Jarrah Forest and the many wetlands within the Shire make up a large portion of the remaining native vegetation. With the continued threat of climate change, population growth and development, reduced rainfall and water flows, clearing of vegetation and mining, the Shire is at constant risk of ongoing loss of native vegetation and loss of habitat for local native species.

The Northern Jarrah forest ecosystem is projected to transition to a new state or collapse due to hotter and drier conditions with more fires. (6th Climate Change Assessment Report, International Panel on Climate Change 2022).



Pest plants and animals

Pest plants and animals impact greatly on both biodiversity and agriculture in the Peel region and are a serious problem within the Shire of Murray. Dominant weed species frequently encountered include Narrow-leaf Cotton Bush, Cape Tulip, Watsonia and Patterson's Curse; while the most common animal pest species include feral rabbits, foxes, deer and pigs. The Shire of Murray is impacted by several species from other parts of Australia, such as River Red Gum (*Eucalyptus camaldulensis*), Flinders Range Wattle (*Acacia iteaphylla*) and the Sydney Golden Wattle (*Acacia longifolia*); the first often cross-breeding with our local native flooded-gums (*Eucalyptus rudis*), producing a hybrid species with limited ecological value to the natural area.

Landowners have a legal obligation under the Biosecurity and Agriculture Management Act 2007 (BAM Act) to take all reasonable steps to control, manage or eradicate regionally declared pest plants and animals.



Overstocking, land degradation & erosion

Farming and equine based industries are a key feature of the Peel region with the Shire of Murray being the destination of choice for keeping horses and equestrian related activities. These land uses can cause environmental degradation with inappropriate manure and pasture management, composting methods, fly populations, increased nutrient loads, excessive water use, the and spread of invasive weeds and diseases.

Overstocking is a key challenge in the Shire of Murray, particularly in rural residential developments. Over time, overstocking can cause soil erosion, damage to wetlands and vegetation and increase nutrient loads entering groundwater and watercourses (including the Peel-Harvey Estuary). These nutrients, once in the environment, can reduce water quality, cause algal blooms and change conditions for aquatic flora and fauna which can impact local biodiversity.



Phytophthora Dieback

The presence of Phytophthora Dieback, particularly the species *Phytophthora cinnamomi* is an increasing risk to biodiversity within the Shire of Murray. Over 40% of WA native plant species are susceptible including many species in our Northern Jarrah forests.

The introduced pathogen spreads via root-to-root contact and by transfer on muddy shoes, tires, and animals. Once an area is infested with Phytophthora there is a notable increase in plant death, permanent decline in biodiversity, change in vegetation composition and reduced native animal populations.



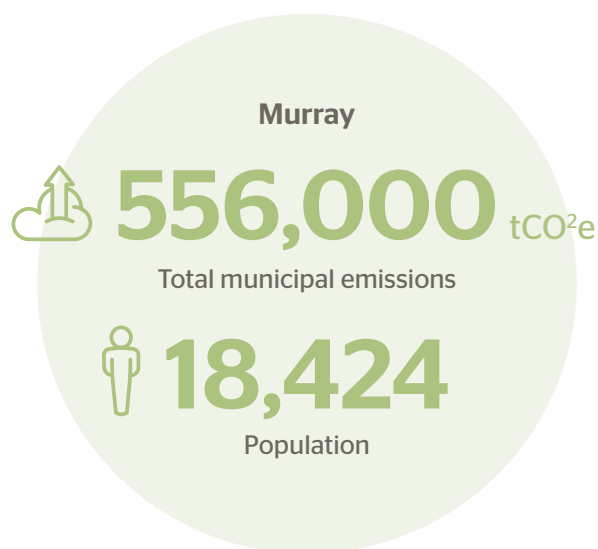
Population growth & development pressure

Over the next 50 years, the population in the Shire of Murray is expected to rise exponentially. The current projections based on future development and population forecasting put the number at around 70,000 residents by 2050 from below 20,000 at the time of writing. The challenge here lies with continuous residential and commercial development pressure to cater for this increase while also meeting the communities needs and protecting the environment.

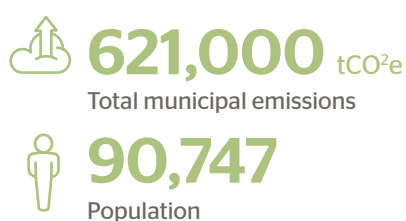
Emissions reduction

The total emissions for the whole of the Shire of Murray in 2020/2021 were 556,000 tonnes of carbon dioxide equivalents (tCO₂e) or approximately 15 tCO₂e per person. The highest emitters for the Shire being Electricity (41%) and Transport (38%), both of which are also our biggest challenges in regards to reducing emissions.

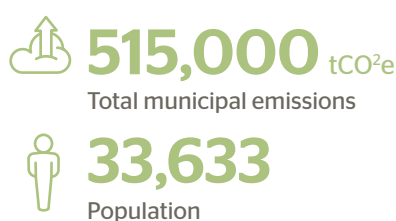
The Shire of Murray produces higher total emissions per person compared to some other Local Government Areas such as the City of Mandurah and Shire of Serpentine-Jarrahdale that have larger populations and produce less emissions per person. Murray also tracks similarly to similar councils such as Northam.



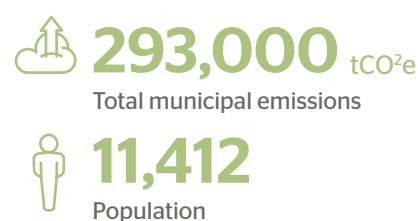
Mandurah



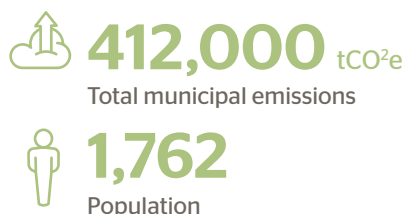
Serpentine - Jarrahdale



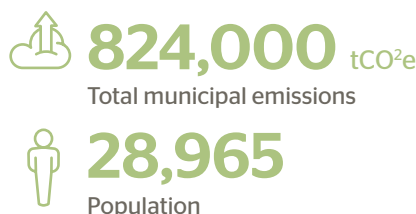
Northam



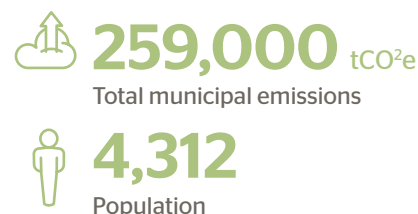
Boddington



Harvey



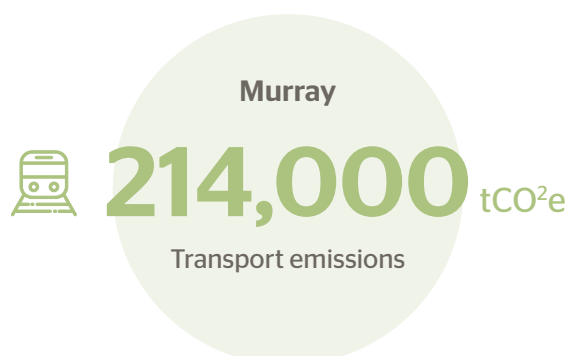
Waroona



Transport

With transport emissions contributing 17% of the States total greenhouse gas emissions this is a key area of focus. The Shire of Murray is highly dependent on private vehicles for transport and faces risks in this area as the transport sector undergoes transformation to reduce emissions, such as electrification and low-emission vehicles. This potentially poses both economic and social risks as well as any environmental impacts.

The Shire of Murray is geographically the largest Council in the Perth and Peel metropolitan area, covering an extent of 1,821km² of land. Therefore, one of the Shire's biggest challenges is reducing emissions produced from the increasing number of private and commercial vehicles that move throughout the Shire. With expansive distances to cover and a lack of alternative modes of transport our ability to influence this directly is both through lobbying and the provision of infrastructure and locations for public transport improvement and EV use into the future.



Mandurah



Harvey



Waroona

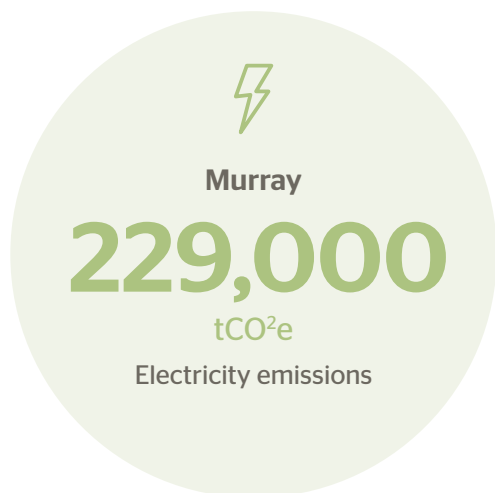


Serpentine - Jarrahdale



Electricity

Electricity production is the Shire of Murray's highest emissions producer with a total emission of 229,000 tCO₂e in 2020/2021. Within the Shire the largest producer of those emissions is our street lighting and industry. During the 2022/2023 financial year the Shire used 837,598kWh of electricity on street lighting alone, equating to a total of 459 tCO₂e emissions produced.



Mandurah

322,000 tCO₂e
Electricity emissions

Harvey

195,000 tCO₂e
Electricity emissions

Waroona

126,000 tCO₂e
Electricity emissions

Serpentine - Jarrahdale

119,000 tCO₂e
Electricity emissions

Gas emissions



Mandurah

42,000 tCO₂e
Gas emissions

Harvey

15,000 tCO₂e
Gas emissions

Waroona

10,000 tCO₂e
Gas emissions

Serpentine - Jarrahdale

8,000 tCO₂e
Gas emissions

Waste



Mandurah

21,000 tCO₂e
Waste emissions

Harvey

9,000 tCO₂e
Waste emissions

Waroona

3,000 tCO₂e
Waste emissions

Serpentine - Jarrahdale

12,000 tCO₂e
Waste emissions

Tackling the challenges

In the next section of the Environmental Sustainability Strategy, six focus areas have been outlined that aim to guide Council's current and future actions in working towards achieving our sustainability goals and overcoming key challenges. Each action is measurable and achievable, fitting in to Council planning from top to bottom by implementing a triple bottom line approach to all decision making.

Although the long-term goals may seem aspirational, the actions are specific, measurable, achievable, realistic and time measured. Where possible longer-term actions are quantified, however these are likely to stay under development throughout the lifetime of this strategy and as such will be subject to revision and refinement.

While actions are categorised in to the six focus areas, it is important to note that with some actions there are overlaps and connections between one or multiple categories.

Each focus area will identify the following:

- Relevant Sustainable Development Goals
- Position statement
- In brief
- Long-term goals
- Recent achievements
- Performance indicators
- Actions and future aims

1 Energy and climate action

2 Sustainable management of water

3 Sustainable management of waste

4 Conservation of biodiversity

5 Sustainable community

6 Internal governance

Focus areas





1

Energy and climate action

Energy and climate action

Relevant Sustainable Development Goals



Position statement

**Council
will reduce
greenhouse gas
emissions and help
build a climate
resilient Shire**

Climate Change and Biodiversity loss are the defining challenges of the 21st century. Climate Change impacts affect all aspects of life: the economy, social wellbeing and the environment. The best time to act was yesterday, the next best time is now.

Council acknowledges that while it is a global issue, we also have our part to play in mitigating its effects and managing its impacts. The Shire of Murray itself has high emissions for its population compared to other Australian local governments, much of this is due to isolated locations, car dependence and a lack of public transport options.

The Shire of Murray is projected to grow significantly over the next few decades, it is therefore imperative that we lay the groundwork now to ensure that this is done in the most sustainable way and that we provide leadership by example in reducing our impacts.

Long-term goals

- Net zero by 2050
- Net zero corporate

Recent achievements

- 5 Council buildings with solar PV installed
- New Ravenswood Community Centre built with solar passive design

Performance indicators (by 2033)

- Council greenhouse gas emissions are actively reduced
- Resilience to climate change and extreme events is built in the home and in community shared spaces



Actions	Measurement	Timeline	Cost	Responsibility
1.0 Conduct site analysis to identify suitable locations for EV charging stations	Analysis completed	1-2 years	\$10,000	Economic Development
1.1 Advocate for fast-charging stations for electric vehicles in Dwellingup and Pinjarra.	Fast charging stations installed	2-5 years	Internal	Economic Development
1.2 Incorporate use of best practice energy efficiency measures for all new Shire facilities.	Extent of measures implemented	1-2 years	Internal	Building/ Infrastructure
1.3 Install renewable energy (solar PV and battery storage) on Shire buildings where feasible	Number of buildings incorporating renewable energy facilities	1-2 years	Dependant on location	Building
1.4 Undertake a business case to convert street lighting lamps to LED.	Business case completed	1-2 years	\$10, 000	Infrastructure
1.5 Consolidate future urban growth toward existing settlements with a structure that encourages active transport modes.	Framework adopted	2-5 years	Internal	Planning
1.6 Advocate for progressive improvements in public transport services to key settlements.	Increased public transport options available (bus stops, train stops, frequency, etc.)	Ongoing	Internal	Economic Development/ Strategic Planning
1.7 Prepare Precinct Structure Plans for key Activity Centres that focus on encouraging increased walkability, cycling and public transport ridership.	Precinct structure plans adopted	Ongoing	Internal	Planning
1.8 Finalise and progressively implement the Coastal Hazard Risk Management and Adaptation Plan.	Recommendations implemented	Ongoing	Budgeted	Environment
1.9 Undertake a Shire wide energy audit and develop appropriate benchmark reduction targets.	Audit completed, targets adopted	1-2 years	Budgeted	Environment
1.10 Prepare environmentally sustainable buildings local planning provisions	Policy adopted	2-5 years	Internal	Planning
1.11 Review and progressively implement the Murray Long Term Cycle Network Plan	Plan Implemented	Ongoing	Budgeted	Infrastructure
1.12 Advocate for electric or hydrogen vehicles within the waste collection contract	Extent of advocacy	5-10 years	Contract	Fleet



A scenic photograph of a riverbank with lush green trees and a large circular overlay containing the number 2. The overlay is semi-transparent and has a blue border. The background shows a calm river reflecting the surrounding greenery, with a large tree trunk on the left and a rocky bank in the foreground where four people are sitting.

2

Sustainable management of water

Sustainable management of water

Relevant Sustainable Development Goals



Position statement

Council will sustainably manage water assets to ensure current and future community, environmental and economic needs are met



128.5 km

Riverine foreshore



162.6 km²

Conservation wetlands



2

Rivers

3

Reservoirs

4

Aquifers

Water is essential for all life on earth. Access to safe, clean, reliable drinking water and environmental water supplies are vital to the health of both the community and the environment, yet are increasingly becoming a scarce resource.

Having a healthy environment contributes to community wellbeing and is a major attraction for both residing in, and visiting the Shire of Murray. Community has consistently raised the importance of our waterways. In a drying climate sustainably managing our water for the community, industry, and the environment itself is of key importance to the Shire. Our wetlands, rivers, parks, gardens, recreation areas and public open spaces all depend on a well-functioning water cycle to support these areas year-round and into the future.

Alongside water availability, it is essential that these natural areas as well as our urban and agricultural areas have access to good quality water. Historical and current land uses have significantly impacted water quality in the Peel-Harvey catchment which is why improving water quality is a renewed focus of the Shire of Murray.

Long-term goals

- To have sustainably managed local water resourcing to support the environment and the community into the future

Recent achievements

- Implementation of a Waterwise Verge Program
- New Ravenswood Community Centre built with a third pipe and water tank
- Installation of water tanks at the Yunderup Sports and Recreation Club
- Drainage intervention program for preservation of Lake Mealup

Performance indicators (by 2033)

- Implemented Water Sensitive Urban Design across all developments
- Increased water efficiencies
- Reduction in Council and community water use

Actions	Measurement	Timeline	Cost	Department
2.0 Implement water sensitive urban design initiatives in development and capital works projects	Initiatives completed	Ongoing	Internal	Environmental/ Infrastructure
2.1 Survey & model Pinjarra drainage network to identify opportunities for sustainable upgrades	Surveys completed	5-10 years	Internal	Infrastructure
2.2 Advocate for further investment to advance water initiatives to meet the needs of future development and industry	Investment received	Ongoing	Internal	Economic Development/ Strategic Planning
2.3 Review the Murray District Drainage Strategy and develop a costed works program to improve priority catchments	Program completed	2-5 years	\$20,000	Infrastructure /Environment
2.4 Implement and promote the Waterwise Verge Rebate Program	Waterwise verges adopted	Ongoing	\$5,000	Environment
2.5 Incorporate use of best practice water efficiency measures across all new Council facilities and progressively upgrade existing facilities	Extent of measures adopted	Ongoing	\$10,000+	Building
2.6 Continue to work with key stakeholders to plan for future water resource outcomes	Water resources secured	Ongoing	Internal	Strategic Planning
2.7 Undertake a Shire wide water audit and develop appropriate benchmark reduction targets	Audit undertaken, targets adopted	1-2 years	Internal	Environment
2.8 Provide information to the community on water resource management and efficiency in the home	Community reach	Ongoing	Internal	Communications /Environment





3

Sustainable management of waste

Sustainable management of waste

Relevant Sustainable Development Goals



Position statement

Council is committed to becoming a circular economy by reducing the generation of waste to landfill



In 2022/23

4634

Tyres recycled



In 2022/23

1979

Mattresses recycled



In 2021/22

686.5 kg

Waste generated per capita



18%

Recycle bin contamination

Waste is more than a local problem, it's a global issue. Increasing populations sees an increase in the amount of waste being produced - most notably plastics - and the impact this has on the environment.

Filling the land with waste is becoming less desirable as Council recognises the impacts that landfill-associated greenhouse gas emissions have on global warming and the environment. For a better future, we need to act collectively to reduce our waste production and support a circular economy. The Shire of Murray currently sends waste to landfill however this waste will be diverted to Waste to Energy upon completion of the facility in 2024. A full review of FOGO will be undertaken within the next two years and will consider the impacts on current contract arrangements and the financial impost on the community.

Long-term goals

- Achieve a circular economy

Recent achievements

- Adoption of Waste Strategy and Education Plan
- Review of 2017 Corio Road Transfer Station Infrastructure Plan
- E-waste recycling implemented at Corio Road Transfer Station and within verge collection contract

Performance indicators (by 2033)

- Waste reduction of in all Council operated buildings
- Improved rates of recycling by Council operations
- Reduction in recycle bin contamination to 10% or less



Actions		Measurement	Timeline	Cost	Department
3.0	Maintain an alliance with Rivers Regional Subsidiary to manage the waste to energy contract and other waste initiatives	Alliance maintained	Ongoing	Internal	Waste
3.1	Review Corio Road Transfer Station Infrastructure Plan including investigating battery, tech and other forms of recycling	Revised plan adopted	Ongoing	Budgeted	Waste
3.2	Implement education programmes including recycling, composting, waste education and partner with local schools and community groups	Community reach	Ongoing	Budgeted	Waste/ Communications
3.3	Improve waste management practices through diversion, reuse and recycling	Per capita reduction achieved	2-5 years	Internal	Waste
3.4	Undertake an assessment of the technical and financial implications of introducing a three bin FOGO system, incorporating the commitment to the Waste to Energy facility	Assessment completed	1-2 years	\$10,000	Environment/ Waste
3.5	Undertake an internal Shire wide waste audit to develop appropriate benchmark reduction targets/ diversion, reuse and recycling	Audit completed	2024-2033	Internal	Waste
3.6	Implement actions from the Waste Strategy and Education Plan	Actions implemented	Ongoing	As required	Waste
3.7	Investigate and promote at home and community composting options	Investigation completed	2-5 years	Internal	Environment/ Waste



A full-page background image of a dense forest with tall, slender trees and lush green foliage. Sunlight filters through the canopy, creating a warm, dappled light effect. A large, semi-transparent blue circle is centered on the page, containing the number 4 and the title text.

4

Conservation of biodiversity

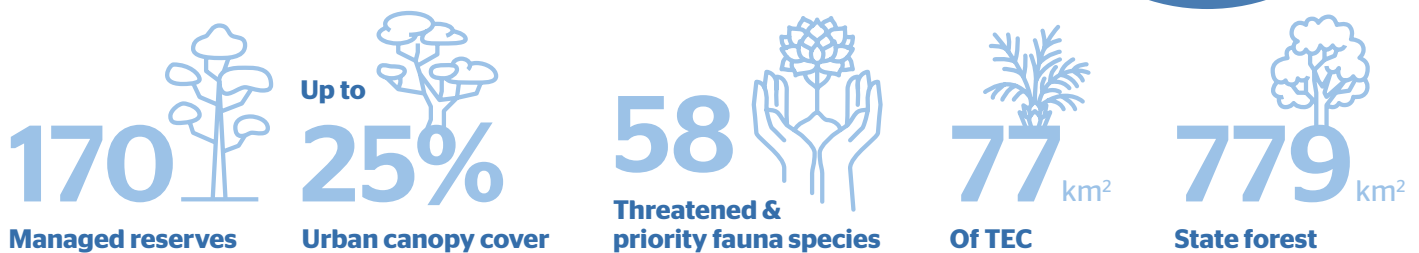
Conservation of biodiversity

Relevant Sustainable Development Goals



Position statement

Council will continue to protect and enhance natural areas and help maintain high biodiversity values for future generations



Over the last 200 years, there has been extensive loss of native vegetation from clearing for urban development, forestry, agriculture and mining. This amount of clearing is also typically accompanied by widespread land degradation and a substantial decline in biodiversity.

The Shire of Murray is renowned for its high biodiversity, species richness, variety of ecosystems and diversity of threatened ecological communities. Our waterways, wetlands, forests, nature reserves and street scapes are critical to our health and wellbeing as well as many native plant and animal species. These natural areas provide habitat, food, clean air and water, flood mitigation, act as a carbon sink and play a role in community wellbeing and education.

Long-term goals

- Achieve a net gain of biodiversity in the Shire of Murray by protecting and enhancing natural areas
- Increase urban canopy to over 40% by 2050

Recent achievements

- Development of a Local native species guide for residential and commercial use
- 470 metres of brush-walling installed to prevent erosion along the Murray River
- 23,000 seedlings planted in 2022/2023

Performance indicators (by 2033)

- Improved community connectedness with nature and knowledge of environmental processes
- Increased diversity, extent, connection and quality of native vegetation



Actions	Measurement	Timeline	Cost	Department
4.0 Implement the Local Biodiversity Strategy	Actions undertaken	Ongoing	Budgeted	Environment
4.1 Support existing and develop new programs to incentivise and facilitate the protection and rehabilitation of natural areas on private land	Hectares protected	Ongoing	\$10,000 with additional funding options	Environment
4.2 Continue to rehabilitate and protect natural areas on public land focusing on key biodiversity targets (i.e. TEC, riparian, linkages)	Hectares protected	Ongoing	Budgeted	Environment
4.3 Advocate to Department of Biodiversity and Conservation to appropriately classify Old Growth Forest within a protection zone within the review of the Forest Management Plan	Extent of advocacy	1-2 years	Internal	Strategic Planning
4.4 Advocate for improved post-mining rehabilitation of the Jarrah Forrest	Extent of advocacy	Ongoing	Internal	Strategic Planning
4.5 Prepare and implement Shire of Murray Reserve Management Plans	Plans adopted and actions implemented	Ongoing	\$30,000	Environment
4.6 Continue to support biosecurity programs managing pest plants and animals, including stray domestic cats	Programs completed	Ongoing	\$10,000	Environment
4.7 Review the Local Planning Framework to identify opportunities to protect significant trees across the Shire	Framework adopted	1-2 years	\$10,000	Planning
4.8 Undertake a review of natural vegetation corridors to inform the development of a Greenbank Protection and Offset Strategy	Review completed	2-5 years	\$10,000	Infrastructure
4.9 Investigate the feasibility of a fish ladder at the Pinjarra weir through engagement with relevant stakeholders including Peel-Harvey Catchment Council and Traditional Owners	Investigation completed	2-5 years	\$5,000	Infrastructure/ Environment
4.10 Increase urban canopy through street tree planting program	Street trees planted	Ongoing	Budgeted	Infrastructure/ Environment
4.11 Develop a supporting planning framework to facilitate increased urban tree cover	Framework completed	Ongoing	Internal	Planning
4.12 Participate in the WALGA Urban Forest Working Group	Participation	1-2 years	Internal	Planning/ Environment
4.13 Investigate options for fauna corridors as part of road design	Investigation completed	Ongoing	Internal	Infrastructure/ Environment
4.14 Support Peel-Harvey Catchment Council programs to assist farmers in adopting sustainable practices and reduce nutrient exports from agriculture in the Peel-Harvey Catchment	Programs supported	Ongoing	Internal	Environment



5

Sustainable community

Sustainable community

Relevant Sustainable Development Goals



Position statement

Council will guide the community in building a resilient and sustainable future

10

Waterwise verges adopted

270

Students at 2023 tree planting day

100+

Volunteers at Clean Up Australia day

2

Healthy Habitats properties

4

Residents Community Workshops in 2022

Sustainable communities centre around the principles of living within our environmental limits. Sustainable design means meeting the current needs of the community without compromising future generations - creating a balance between environmental protection, social wellbeing and economic growth.

Opportunities exist within the Shire of Murray, to engage, encourage and educate the community on appreciating and protecting the natural environment. The Shire is also ready to work alongside key local environmental groups in conserving and enhancing our natural areas, to work actively with Traditional Owners in working on country, and to introduce planning frameworks that facilitate best practice in sustainability. The Shire also intends to lobby for state changes that impact the Murray community and in particular for the Metronet to come to Pinjarra and for Light Rail from Pinjarra to Mandurah.

Long-term goals

- Community transition away from non-renewable resources

Recent achievements

- 10 Waterwise verges adopted
- 270 Students at 2023 Schools Tree Day planting event
- Over 100 volunteers at Clean up Australia day events
- 2 Healthy Habitats properties
- 4 Community Workshops for residents held in 2022

Performance indicators (by 2033)

- Environmental sustainability and sustainable homes are widely accepted by the community
- An increase in the use of public transport, bikes and walking



Actions	Measurement	Timeline	Cost	Department
5.0 Continue to manage and monitor mosquito populations	Mosquito numbers	Ongoing	\$60,000	Health
5.1 Support volunteer planting days with a broad cross section of the community including local schools	Events completed	Ongoing	\$10,000	Environment/ Community Development
5.2 Develop and implement a public Communications Strategy to promote Sustainability	Strategy adopted	2-5 years	Internal	Communications
5.3 Develop education and behaviour-change programs to support local residents and businesses to tackle climate change through clean energy, energy efficiency and sustainable transport	Programs adopted	5-10 years	Budgeted	Environment/ Communications
5.4 Support and involve youth representation in community sustainability decision making and implementation	Community reach	2-5 years	Internal	Community Development
5.5 Create more access points to natural areas within the Shire	Increased access	5-10 years	Budgeted	Infrastructure/ Environment/ Community Development
5.6 Assist the community with future climate-based disaster management	Community reach	5-10 years	Budgeted	Rangers
5.7 Provide information to the community on ways to reduce living costs and greenhouse gas emissions through building design, retrofits, and behaviour changes	Community reach	Ongoing	Internal	Environment/ Communications/ Community Development
5.8 Investigate opportunities for sustainable ecotourism	Investigation completed	2-5 years	Internal/ Budgeted	Economic Development
5.9 Promote environmentally significant events (local, state, nations and global)	Community reach	Ongoing	Internal	Communications
5.10 Develop a program for formal Shire recognition for organisations that demonstrate innovation to reduce energy use	Program completed	5-10 years	Internal	Environment



6

Internal governance

Internal governance

Relevant Sustainable Development Goals



Position statement

Council is committed to being a resourceful, resilient and accountable organisation that focuses on environmentally sustainability

To provide quality of life outcomes, the Shire of Murray must stay abreast of and adapt to changes in the political, environmental, social, technological, economic and legal landscape. The Shire must also respond to changing community expectations.

In order to provide leadership in sustainability to the wider community, it is crucial that the Shire of Murray involves the guiding principles of sustainability at the forefront of all internal decision making. By building a triple bottom line approach within internal Council processes, we can help to ensure that environmental considerations are a top priority in every Council decision moving forward, to turn Murray into a sector leader in this field.

This will provide a strong foundation for the Murray community, encouraging and demonstrating to residents how they can live a more sustainable lifestyle, as the Shire leads by example.

Long-term goals

- Environmental sustainability is integrated across all aspects of Council

Recent achievements

- The Shire of Murray plan for the Future (June 2023) was adopted highlighting how Murray intends to become a catalyst for community change

Performance indicators

- Environmental sustainability is considered the highest priority throughout all Council decision making
- Annual public reporting on the implementation and progress of actions from the Environmental Sustainability Strategy



Actions	Measurement	Timeline	Cost	Department
6.0 Promote and maintain a culture shift towards including sustainability into decision making at all levels of Local Government and supporting a triple bottom line approach	Approach adopted	Ongoing	Internal	Governance/ Environment
6.1 Annually monitor and report on the Sustainability Strategy and related outcomes using key performance indicators and make this available to the public	Review completed	Ongoing	Internal	Environment
6.2 Promote cross Council collaboration in dealing with climate change	Partnerships developed	1-2years	Internal	Environment/ Planning/ Infrastructure
6.3 Consider environmental impact in all council decision making	Best practice adopted	1-2 years	Internal	Governance
6.4 Review the Shire's Purchasing Policy to ensure that it incorporates best practice sustainable purchasing initiatives	Review completed	2-5 years	Internal	Governance
6.5 Review the Shire's Light Fleet Purchasing Policy to ensure that it incorporates best practice sustainable purchasing initiatives	Targets adopted	5-10 years	Internal	Fleet/Governance
6.6 Implement energy and water auditing of Shire facilities including in real-time for major assets	Auditing completed	2-5 years	\$10,000	Environment
6.7 Participation in WALGA's climate change education course for Elected Members	Course completed	1-2 years	Internal	Council
6.8 Encourage and support existing and the establishment of new 'friends of' groups	Groups supported and established	2-5 years	Internal	Environment/ Community Development

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