GOVERNMENT OF
WESTERN AUSTRALIA

Waterwise Action Plan 3

KEP KATITJIN GABI KAADADJAN

GROWING WATERWISE COMMUNITIES IN BOORLOO (PERTH) AND BINDJAREB (PEEL) TO ADDRESS CLIMATE CHANGE

Acknowledgements

We acknowledge the Traditional Owners, the Whadjuk and Bindjareb peoples of the Noongar Nation, whose land and water this plan affects. We pay our respects to their Elders past and present, and we recognise the practice of intergenerational care for Country and its relevance to our work.

We seek to listen, learn, genuinely engage and build strong partnerships. We aim to provide sustainable opportunities for Aboriginal people within our workforce and through our business.

Country is a term used by Aboriginal people to describe the lands, sky, waterways and seas to which they are intrinsically linked. Wellbeing, law, place, custom, language, spiritual belief, cultural practice, material sustenance, family and identity are all interwoven with Country. Working with the community, we move forward with a shared commitment to protect and conserve Country for our future generations.

The Department of Water and Environmental Regulation (DWER) would like to acknowledge and thank everyone involved in the Danjoo Koorliny Walking Together Project and particularly the Danjoo Koorliny Co-Directors for their wisdom, guidance and advice in developing this plan.

DWER would like to acknowledge and thank the Bindjareb Elders, who have taught us so much about working together with respect and partnering to share knowledge systems and who are leading in so many ways. This learning is being carried forward in this plan.

Thanks also to the Waterwise Steering Committee and Waterwise Working Group of Waterwise program partner agencies for their time, commitment and collective direction and knowledge. It is through that collaboration that the Waterwise program is more than the sum of its parts. Particularly important is the coordinated, shared, across-water-portfolio approach to delivering waterwise outcomes between DWER and Water Corporation.

Waterwise program partner agencies:

- Department of Biodiversity, Conservation and Attractions (DBCA)
- Department of Communities (DoC)
- Department of Education (DoE)
- Department of Finance (DoF)
- Department of Local Government, Sport and Cultural Industries (DLGSC)
- Department of Planning, Lands and Heritage (DPLH)
- Department of Primary Industries and Regional Development (DPIRD)
- Department of Water and Environmental Regulation (DWER)
- DevelopmentWA (DevWA)
- METRONET
- Water Corporation (WC)

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Cover image by artist Darryl Bellotti

Contents

Vision - World-leading waterwise communities for Boorloo (Perth) and Bindjareb (Peel) by 2030.

Cover image:
By artist Darryl Bellotti

Message from the artist

What Kep Katitjin – Gabi Kaadadjan (water knowledge) means to me – Darryl Bellotti, Yamatji Noongar artist and designer

The terms Kep Katitjin and Gabi Kaadadjan, to me, mean life. In simple terms, it is the essence of what caring for Country is about. Water is life. The availability of water informed our ancestors' decisions in day-to-day life: when to hunt, where to hunt, what to hunt. Abundance, or lack thereof, is what determines where Noongar people would reside as they travel the landscape in a continual journey through the seasons. The Waugul, the Noongar Creator Spirit, is synonymous with the water sources; the rivers, the rains and the Great Lakes of Noongar Boodja, all share connection to the Waugul. It was the Waugul who bestowed Noongar with the responsibility of shaping and caring for the land and all that dwell upon it.

Without water, we cannot survive. We, as Indigenous and non-Indigenous people alike, now have the shared responsibility of carrying out that obligation for the survival of culture, the people, and all living things. We are the caretakers of the earth, and we haven't been living up to our sacred responsibilities. Now, with *Kep Katitjin – Gabi Kaadadjan Waterwise action plan 3*, we can begin to reclaim that position and ensure that our descendants have the knowledge they need to fulfil this obligation into the future.

Design of this document

Darryl Bellotti designed the art and colour for *Kep Katitjin – Gabi Kaadadjan Waterwise Perth action plan 2*. The department is honoured to have Darryl's art incorporated into *Kep Katitjin – Gabi Kaadadjan Waterwise action plan 3*. Darryl's message, on the back cover of this plan, describes his art and meaning for blue and teal colours. When designing this plan, green was chosen with the blue and teal to reflect the interconnectedness of water with green features of our environment. Water, urban greening and blue-green infrastructure are part of the solution to mitigate and adapt to climate change with multiple social, health, environmental and financial benefits.

See Noongar terms at the end of this plan.

Message from the Minister for Water

Water is fundamental to our environment, culture, society and economy.

HON SIMONE MCGURK MLA
Minister for Water; Forestry; Youth

The climate in Western Australia has warmed over the past century, with more accelerated warming since the 1970s along with long-term decline in rainfall.

The record long, dry summer–autumn of 2023–24 saw seasonal rainfall totals at 80–99 per cent below average. This, together with increasing demand for water resources from population growth, means not just less water in our rivers, streams and wetlands, but also reduced recharge of our groundwater.

Since 2019, the Waterwise program has used collaborative, cross-government approaches to respond to the impacts of climate change in Boorloo (Perth) and Bindjareb (Peel), on water resources, our quality of life and the environment we live in.

Kep Katitjin – Gabi Kaadadjan Waterwise action plan 3 is the next step in the Government of Western Australia's (State Government) long-term commitment to transform Boorloo and Bindjareb into leading waterwise communities.

This third plan outlines the actions the State Government will take, working together with local government, industry, Aboriginal people and the broader community, to deliver a climate-resilient and water-secure future.

With the current cost-of-living and housing supply pressures, it is critical that we invest in waterwise solutions for future generations. Longer, hotter, drier summers result in increased water use and higher energy and water consumption costs for households. Waterwise approaches will lead to cost savings for households, local governments and businesses.

Waterwise is also about designing our urban spaces to work with the existing conditions – starting from and maintaining our sense of place as a core waterwise principle. Initiatives that encourage water sensitive urban design, alleviate urban heat island effects, mitigate flood risks and increase our resilience to drought provide not only financial, but health, social, and environmental benefits.

Kep Katitjin – Gabi Kaadadjan Waterwise action plan 3 commits to scoping how we can best apply waterwise initiatives to select urban centres in regional Western Australia.

It is critical that solutions are both fit-for-purpose and fit-for-place, and that we honour and respect the deep knowledge and understanding that Aboriginal people provide in waterwise management, conservation and spiritual practices that have kept the Country and its people healthy and in balance for tens of thousands of years.

I am proud to support this ongoing initiative to create world-leading waterwise communities for Boorloo and Bindjareb by 2030.

What is waterwise

Waterwise cities are where communities care about and value water, while making best use of its various sources (groundwater, dams, stormwater, sea water and wastewater). The city serves as a catchment and provides healthy natural environments, supporting a range of cultural, social, ecological and economic benefits.

In Western Australia, 'waterwise' is a holistic approach to water in all its meanings and functions. Being waterwise is about showing experience, Katitjin–Kaadadjan (knowledge), good judgement and wisdom in how we connect to and manage our water resources. Water is our most precious resource and is integral to all aspects of our lives, from our physical and mental health to our local environment. Water is embedded in every single item that we purchase and consume.

Noongar people, as the first people of the Boorloo and Bindjareb regions, have been managing water for about 60,000 years. The conservation and spiritual practices of the Noongar people kept the Country and its people healthy and in balance. The spiritual connection to water is also present in many cultures: as a giver of life; birth and rebirth; for purity and healing; and as a connector.

Boorloo and Bindjareb's groundwater sustains wetlands, waterways and bushland, as well as our green spaces and trees.

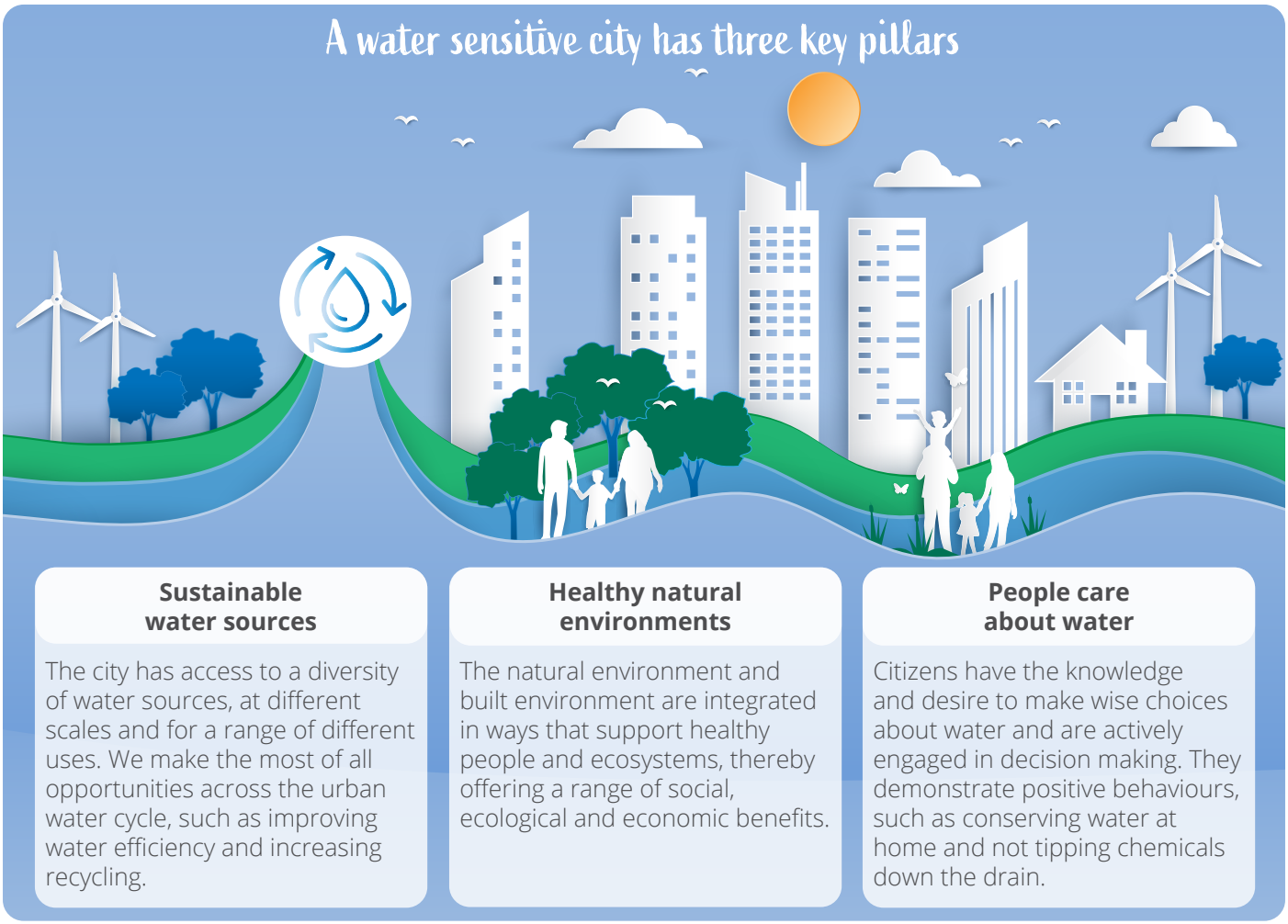


Figure 1: The three pillars of a water sensitive city. Adapted from: Cooperative Research Centre for Water Sensitive Cities Ltd. (n.d.) *Understanding Water Words - Glossary*, Water Sensitive Cities website, accessed 25 July 2024.

Groundwater supports agriculture in the Boorloo and Bindjareb regions, growing almost 20 per cent, by value, of Western Australia's fresh fruit and vegetables.

The State Government has used 'waterwise' as a water efficiency brand for decades, encouraging people to conserve their water use because of the impacts of climate change. It has since evolved to encompass the concepts that underpin water sensitive cities (Figure 1).

Being waterwise means thoughtfully deciding to use water in the best ways we can. We design and maintain our homes and communities to manage water on-site to provide amenity and green spaces, to benefit ecosystems and the economy, and to reduce water pollution. As we face a hotter, drier future because of climate change, wise uses of water include supporting biodiversity and the cooling of our environment.

A waterwise community is sustainable over the long term, economically productive, highly liveable and resilient to extreme weather events. It is a vibrant community where our connection with water enhances our quality of life. By adopting waterwise approaches, communities and the environment can become more climate resilient and make the Boorloo and Bindjareb regions sustainable and liveable places for future generations.

Figure 2 shows how waterwise features can be used in landscape design to reduce the need for irrigation by helping rainfall stay in the landscape to support greening, or recharge our precious groundwater reserves, rather than being channelled away. The carpark is designed so that polluted runoff will be filtered by vegetation and there is easy access to the natural amenity of the waterway. In instances of intense rainfall, the landscape manages flooding and aids infiltration. Waterwise design supports trees and vegetation that provide shade, cooling, habitat and connection to nature.

Figure 2: Waterwise features in landscape design

Drivers for waterwise communities

Climate adaptation and resilience

Boorloo and Bindjareb's future climate is projected to be hotter and drier, with more hot days and fewer cold days.[1] Less rainfall is projected in winter and spring (the Noongar seasons of Makuru, Djilba and Kambarang), with predictions that rainfall will come in shorter, more intense events. We are experiencing these changes now.

In south-western Australia, climate has warmed by about 0.9°C since national records began in 1910 (Figure 3), with a clear warming trend since the 1970s. Figure 4 illustrates that rainfall has declined significantly in south-western Australia over the same period. Projections suggest that these trends will only intensify. The Bureau of Meteorology reports that in Greater Perth (Boorloo and Bindjareb), the summer 2023–24 mean maximum temperatures were 1–3°C above average and seasonal rainfall totals were 80–99 per cent below the summer average rainfall at most sites.[2]

Annual mean temperature anomaly for south-western Australia (1910–2023)

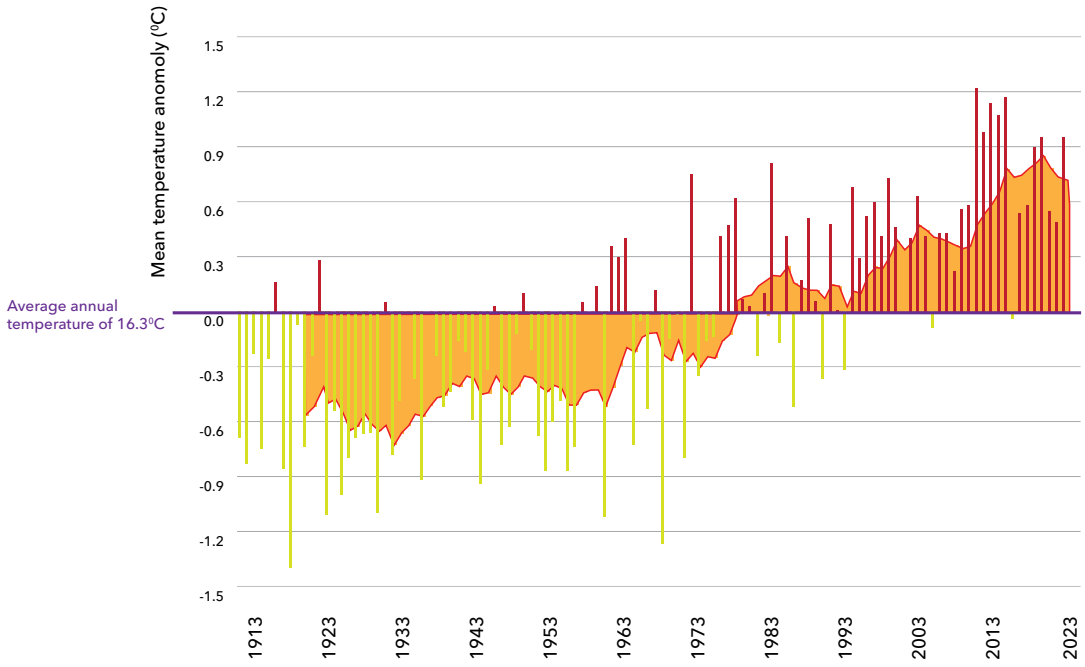


Figure 3: Average annual temperature anomaly in south-western Australia

Note: This figure shows the average annual temperature minus the 1961–90 average annual temperature (the anomaly) with a 10-year running average. When the annual average is less than the 1961–90 average value (16.3°C), the anomaly is a negative value.

Adapted from: Bureau of Meteorology (2024) CC BY, *Australian climate variability & change - Time series graphs*, BOM website, accessed 12 July 2024.

[1] Climate projections for Western Australia are summarised in *Western Australian climate projections*: Summary and supported by the *CSIRO's State of the Climate 2022* report.

[2] Bureau of Meteorology (2024) *Greater Perth in summer 2023-24*, BOM website, accessed 12 July 2024.

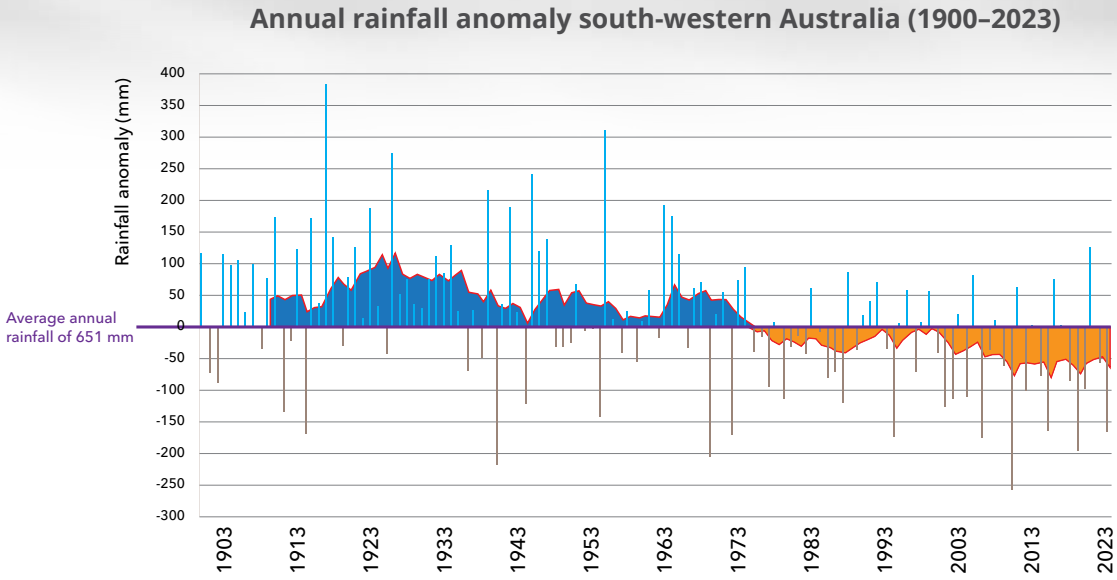


Figure 4: Rainfall anomaly (mm) in south-western Australia demonstrates a declining trend

Note: This figure shows the total annual rainfall minus the 1961–90 average annual rainfall (the anomaly) with a 10-year running average. When total rainfall is less than the 1961–90 average (651 mm), the anomaly is a negative value.

Adapted from: Bureau of Meteorology (2024) CC BY, *Australian climate variability & change - Time series graphs*, BOM website, accessed 12 July 2024.

A hotter, drier climate increases evaporation and water demand, decreases the amount of water that flows in rivers and streams, and reduces water infiltration and groundwater replenishment. Wetlands on the Swan Coastal Plain are expressions of groundwater at the surface. They are being impacted through a combination of urban development and drainage, declining groundwater levels and rainfall, and increased temperatures, and aquatic plants and animals are at risk (Figure 5). At the same time, water availability is critical to making our urban spaces more liveable in hotter conditions, enabling cooler and greener environments that help maintain and improve our physical and mental wellbeing.

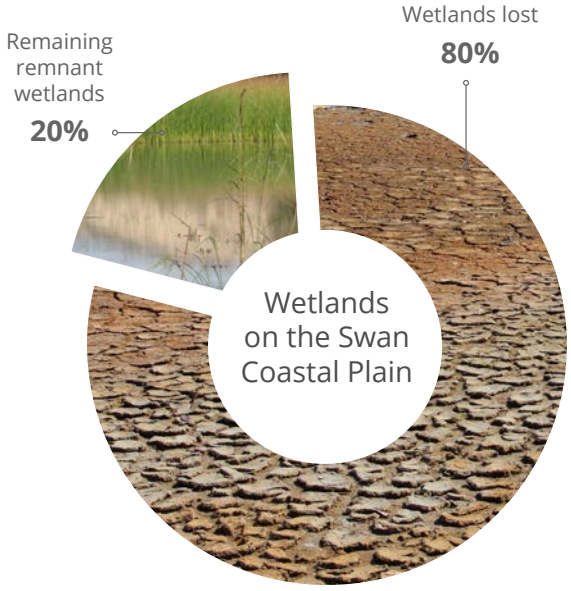


Figure 5: Percentage of wetlands lost on the Swan Coastal Plain[3,4]

The role of water sensitive urban design and waterwise approaches to mitigate urban heat, optimise infiltration to groundwater and manage stormwater is becoming even more vital to the way we adapt our urban spaces to respond.

Longer, hotter, drier summers result in increased water use and higher household energy and water consumption costs. Waterwise approaches at the household and building, and the precinct and suburb scales support urban greening to mitigate urban heat, providing not only financial, but health and social benefits (Figure 6). For example, one study found an average energy saving of 30 per cent for houses with shade trees.[5] Implementing waterwise design and approaches will ease cost-of-living pressures and pay dividends in the future.[6]

We all have a part to play across government, research and industry to ensure that the communities we are building now provide amenity and climate resilience.

[3] Jennings P (1988) as cited in Western Australian Museum (n.d.) *Wetland Conservation*, WAM website, accessed 23 July 2024.

[4] Wetland loss means the likely percentage of wetlands that have lost their hydrological or ecological function.

[5] Akbari H, Kurn D, Bretz S, and Hanford J (1997) 'Peak power and cooling energy savings of shade trees', *Energy and Buildings*, 25(2):139–148, doi:10.1016/S0378-7788(96)01003-1.

[6] Marsden Jacob Associates (2020) *Western Australia's nature-based outdoor economy: Key estimates and recommendations* SkillsIQ, accessed 25 July 2024.

Benefits of waterwise communities

Environmental

- Resilient ecosystems; provide habitat for threatened and endangered species
- Creates and conserves habitat patches, links habitat corridors
- Improves air quality – trees capture gaseous and particulate airborne pollutants
- Vegetation supports hydrological cycle – purifies water
- Drainage and stormwater management
- Cooling temperatures through evapotranspiration
- Noise reduction

Economic

- Tourism and economic generation
- Water sensitive urban design; vegetation slows the flow of water, helping with more effective and manageable flood control
- Energy consumption benefits; up to 30% of energy savings from green infrastructure in the form of shade trees

Image © DevWA

Social/health

- Proximity to green space promotes physical activity which can lower the risk of a range of health issues
- The health benefits of nature-based outdoor activity in Western Australia are estimated to be worth at least $208 million each year in avoided costs to the Western Australian healthcare system[7]
- Those living with a view of nature report lower levels of physiological stress and depression
- Urban heat island (UHI) effect; adding 10% of greenspace (trees) in high-density development can reduce local surface temperatures by 1.4°C on average. Parks can be up to 10°C cooler than an urban site elsewhere in a city or town
- Mental health benefits; promotes psychological and social wellbeing
- Increased workplace satisfaction and educational outcomes
- Subjective wellbeing (happiness and life satisfaction)
- Community and social health benefits; facilitates social interaction and reduces social isolation and loneliness

Figure 6: Benefits of waterwise communities

Adapted from: The Clean Air and Urban Landscapes Hub (n.d.) 'The benefits of urban greening', Urban Greening Resources, The Clean Air and Urban Landscapes Hub, accessed 24 July 2024.

[7] Marsden Jacob Associates (2020) *Western Australia's nature-based outdoor economy: Key estimates and recommendations*, SkillsIQ, accessed 25 July 2024.

Rebalancing our groundwater

Declining rainfall (15 per cent since 1975) and groundwater abstraction have contributed to more than 1,000 gigalitres of groundwater storage being lost from the Gnangara groundwater system's superficial aquifer since the 1980s. As a result, the health of our groundwater-dependent wetlands and vegetation is suffering, groundwater quality is reducing in some areas, and even with the impressive water use efficiencies gained to date, the long-term sustainability of the resource is still under threat. The goal of the 2022 *Gnangara groundwater allocation plan* is to rebalance the Gnangara groundwater system by 2032, to secure our lowest-cost and most accessible water source, and to support a healthy environment. This can only be achieved through a suite of measures focused on reductions in groundwater use.

Changes have also been introduced to help conserve groundwater right across the Boorloo and Bindjareb regions. These include the introduction of the two-day-per-week sprinkler roster for garden bores, water allocation planning in the Cockburn, Murray and Serpentine groundwater areas, and current water allocation planning for the Jandakot and Perth South groundwater areas.

The measures to manage the impacts of water use from the Gnangara groundwater system aim to protect wetlands like the beautiful Lake Yonderup in Yanchep National Park

Unnamed seasonal wetland, Drumpellier Drive, Whiteman

Climate actions in Western Australia

Kep Katitjin – Gabi Kaadadjan Waterwise action plan 3 complements the *Western Australian Climate Policy* (2020) and the *Climate Adaptation Strategy* (2023) and sets out the vital role that water can play in climate change adaptation and mitigation.

Local access to quality natural areas and green spaces are vital for our health and wellbeing. With more frequent hotter days, we need spaces that can provide this even in the heat of summer. About half this plan's actions seek to improve biodiversity, urban greening and tree canopy cover and help to mitigate urban heat impact (Figure 7). These activities demonstrate some of the breadth and depth of State Government and local government work to build climate adaptation and resilience.

More information about climate action being taken by the State Government can be viewed on the Climate Action in Western Australia website.

Water sensitive urban design retains water in the urban landscape, providing a mechanism to passively irrigate trees and vegetation, while also reducing urban temperatures through enhanced evaporation, transpiration and surface cooling. Green and blue in the landscape are intrinsically linked, and water bodies in themselves have an invaluable cooling function.

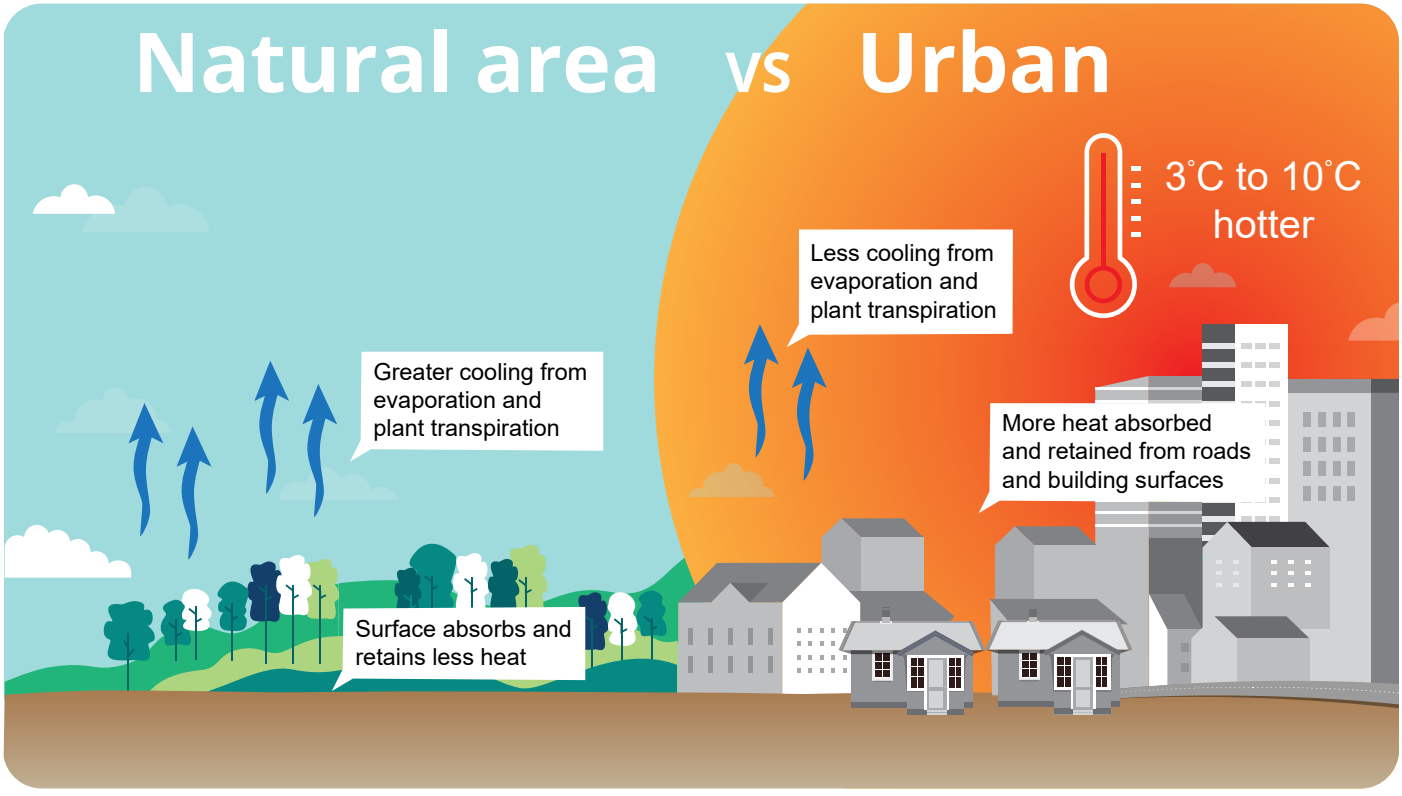


Figure 7: The urban heat island effect

Supply and demand

Western Australia's population is projected to grow from about 2,900,000 in 2024 to between 3,000,000 and 3,700,000 in the late 2030s (Figure 8). The growing demand for water, and the impacts of a drying climate on recharge to groundwater and surface water supplies, puts increasing pressure on existing water sources.

About 74 per cent of our water comes from groundwater and surface water supplies (Figure 9). The protection of these lower cost sources of water, implementation of waterwise practices and accessing of alternative water supplies are critical to ensure Boorloo and Bindjareb transition to leading waterwise communities by 2030.

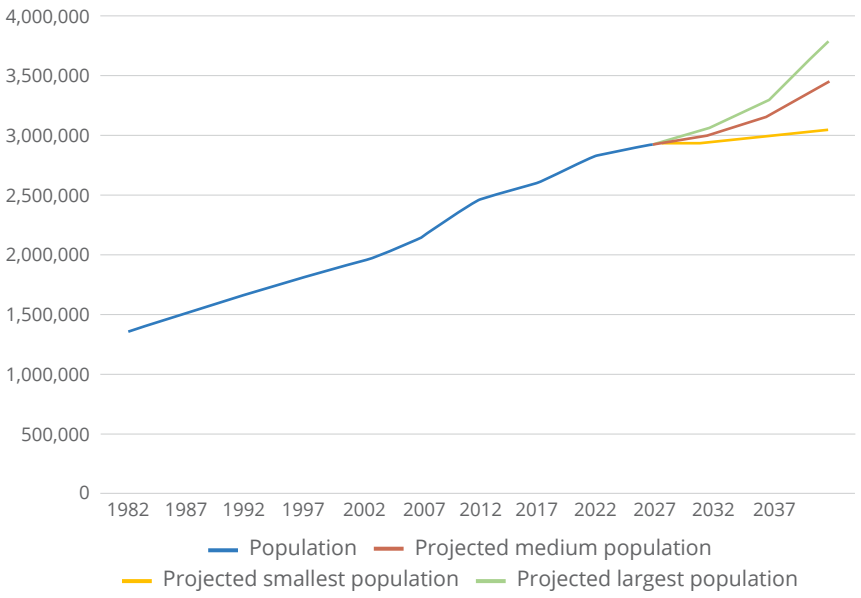


Figure 8: Western Australia's projected population growth to 2042
Adapted from: Australian Bureau of Statistics (2023) 'Western Australia', *Population projections, Australia*, ABS website, accessed 12 July 2024.

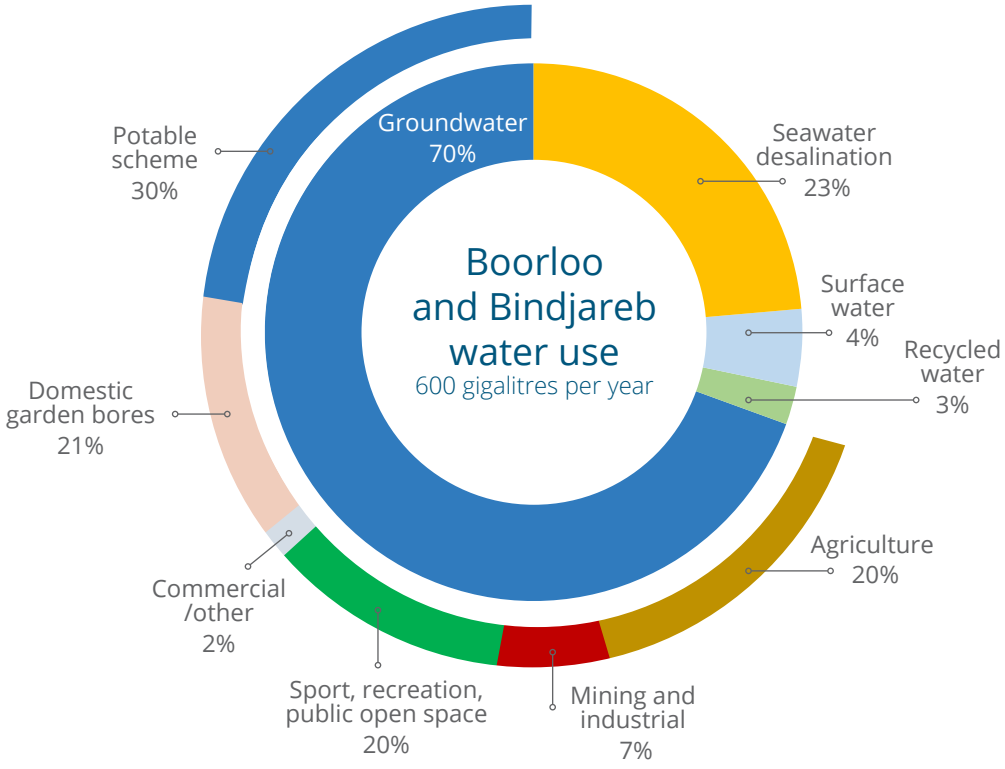


Figure 9: Boorloo and Bindjareb total water use (potable and non-potable) by source and by sector

Kep Katitjin – Gabi Kaadadjan Country

Kep Katitjin – Gabi Kaadadjan has so far focused its actions on the most densely populated Boorloo and Bindjareb regions of Western Australia. The plan uses the Noongar terms for these regions to pay respect to the Traditional Owners, as recognised by the Western Australian Parliament through the *Noongar (Koorah, Nitja, Boordahwan) (Past, Present, Future) Recognition Act 2016*.

Figure 10 shows the Perth and Peel regions and local government areas, sometimes known as 'Greater Perth'. The term 'Boorloo' often refers to the city of Perth, but this plan includes the city and the broader region. Bindjareb is the name for the Peel region. This map and its boundaries are used by the Australian and Western Australian governments; however, Bindjareb and Whadjuk Traditional Owners may have different boundaries for their Country. One of the guiding principles of this program is that 'everything is connected' and water does not recognise lines on a map as boundaries. In this work, it is useful to think about boundaries not as where things start and end, but where they meet, join and connect. This plan is being delivered by State Government agencies, so some of the actions are being implemented in Boorloo and Bindjareb, as well as across the state. Some of the actions apply to specific metropolitan areas.

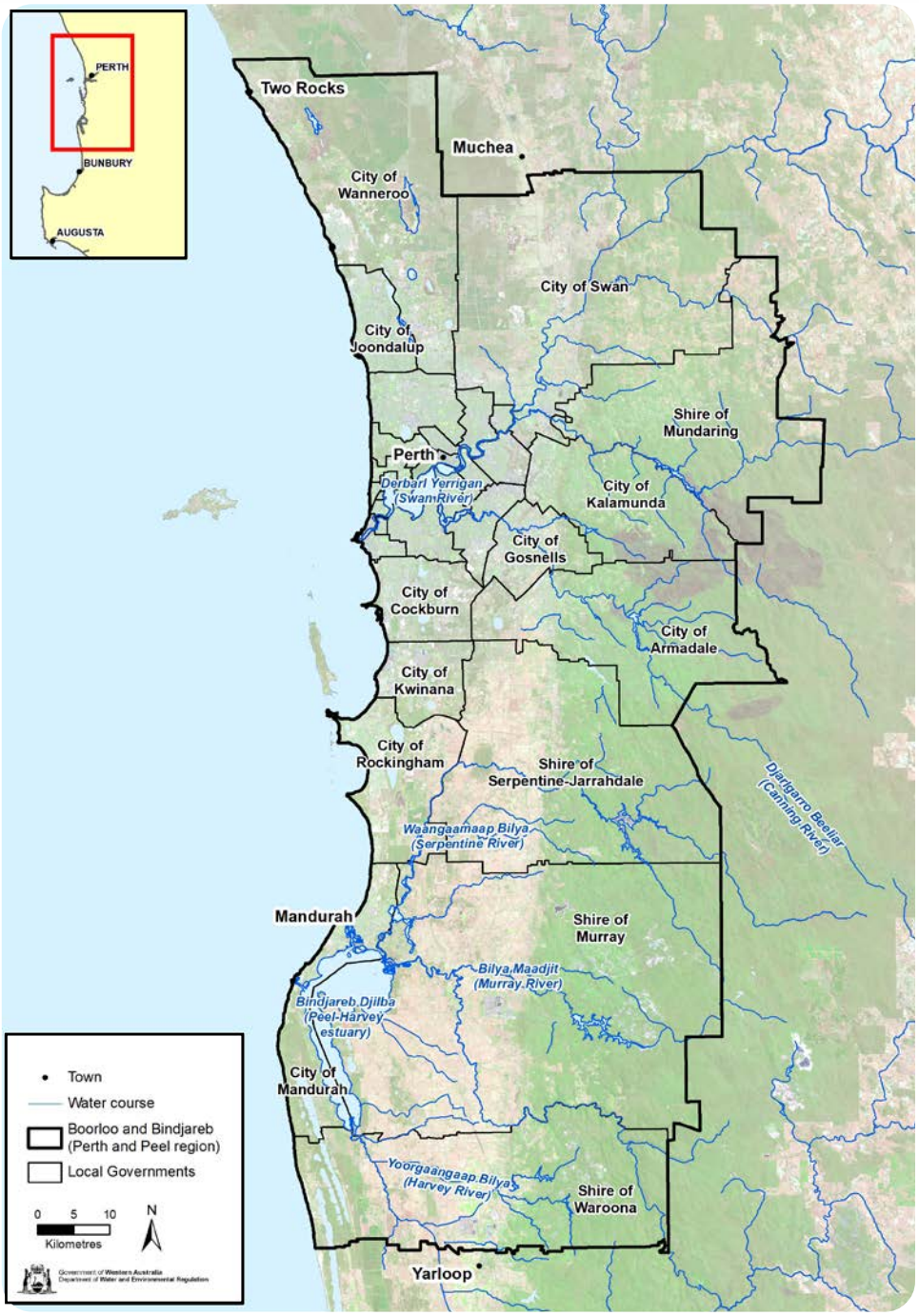


Figure 10: Map of the Boorloo and Bindjareb regions of Western Australia

Kep Katitjin and Gabi Kaadadjan – water knowledge

The previous plan was given the Noongar name 'Kep Katitjin – Gabi Kaadadjan', meaning 'water knowledge' in both the Whadjuk and Bindjareb dialects, to reflect the Country the plan covers; that is, the Boorloo (Perth) and Bindjareb (Peel) regions. We have graciously been given permission to continue to use those words.

The waterwise journey since 2019

The south-west of Western Australia is one of the world's regions most affected by climate change. In response to this pressing issue, the State Government committed to a coordinated, longer term approach to managing the region's water in the face of climate change and growing population and urbanisation pressures. The *Waterwise Perth action plan 2019* was the first of successive plans intended to transition Boorloo and Bindjareb to be leading waterwise communities by 2030. The initial eight participating agencies worked together to deliver waterwise outcomes for Boorloo and Bindjareb. The success of this across-government approach led to three more agencies joining the collaborative effort to deliver *Kep Katitjin – Gabi Kaadadjan Waterwise Perth action plan 2* (2022–24).

Figure 11 shows just some of the water efficiencies, urban greening, tree canopy and heat-mitigation outcomes – as well as community engagement and education – that have been achieved through the first two plans. In addition to these figures, this plan features numerous case studies that give a picture of how we are collectively delivering waterwise outcomes at all scales and in increasingly integrated and innovative ways. They demonstrate continuous improvement in our journey to leading waterwise communities by 2030.

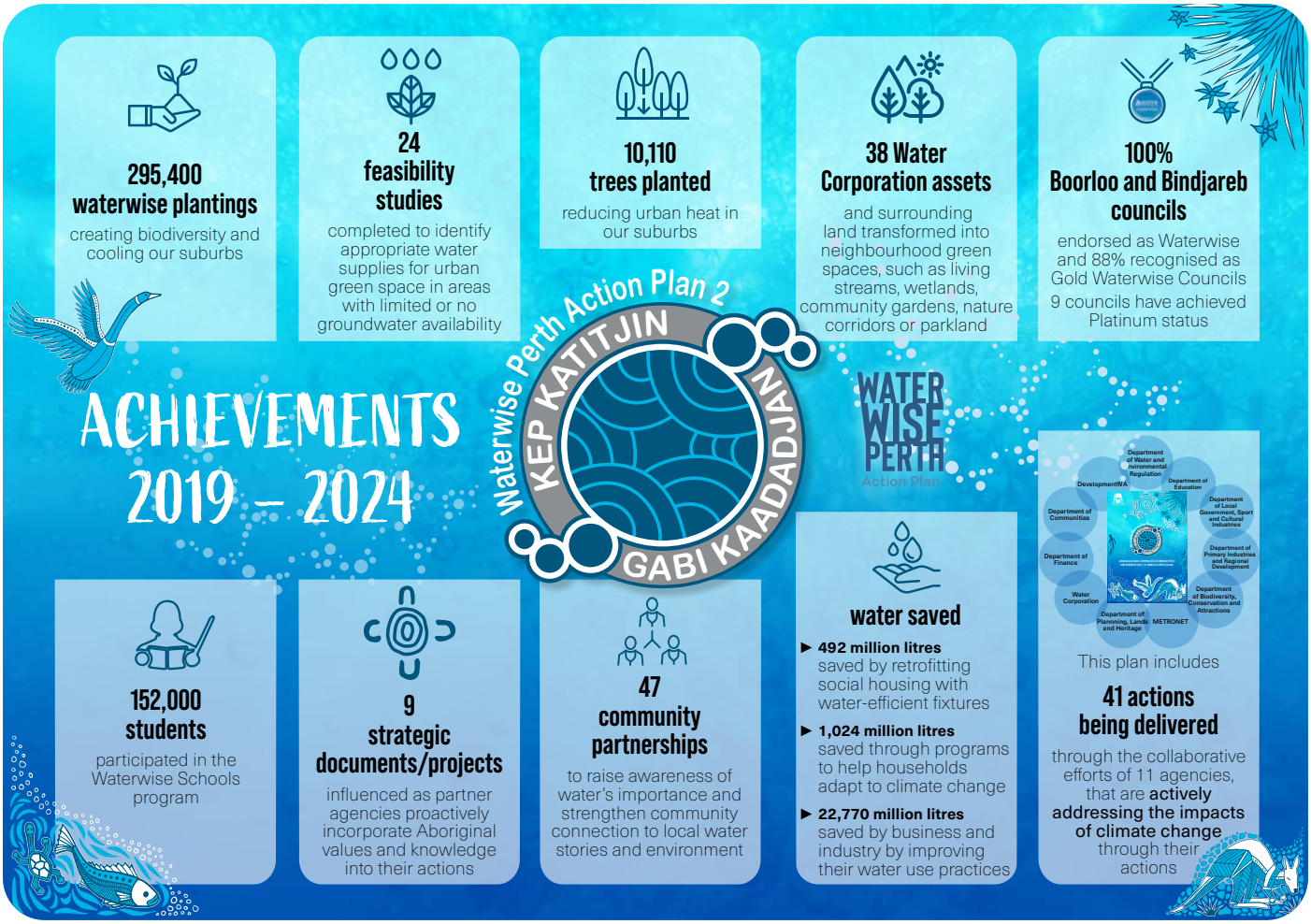


Figure 11: Waterwise action plan scorecard of achievements to June 2024

To read these case studies, please use this QR code or visit: Kep Katitjin – Gabi Kaadadjan Waterwise action plan 3

Green corridors at OneOneFive Hamilton Hill

Case studies

Foundational

- Stronger together on Bindjareb country (Action 1)
- Danjoo Koorliny walking together (Action 1)
- The Djarlgarro Bilya Waterways Project (Action 3)

Household and building

- Fresh take on waterwise gardens for social housing (Action 5)
- Helping households adapt to climate change (Action 7)
- A splash of colour (Action 9)

Precinct and suburb

- Waterwise Schools (Action 12)
- Waterwise Grounds – Bush Classrooms (delivered through the second Waterwise Plan)
- Lake Street Urban Stream (Action 16)
- Waterwise Greening Scheme creating more sustainable neighbourhoods (Action 17)
- River Protection Strategy for the Swan Canning River System (Action 18)

City and urban

- Water planning in a changing climate (Action 26)
- Support for local government water reductions (Action 28)

Government leading

- Water Sensitive Cities Benchmarking Index – how the indexing tool is driving change towards more waterwise communities in Boorloo and Bindjareb (Action 31)
- The University of Western Australia: Living Lab 3 'Urban Biodiversity in Design' (Action 32)
- METRONET sustainability (Action 35)
- Victoria Park-Canning level crossing removal (Action 35)
- East Village at Knutsford recognised as Western Australia's top waterwise development (Action 39)
- OneOneFive Hamilton Hill – Innovation through Demonstration (Action 39)
- State Football Centre Project (Action 40)

Waterwise garden

Kep Katitjin – Gabi Kaadadjan Waterwise action plan 3 (2024–27)

Integral to Kep Katitjin – Gabi Kaadadjan and flowing through the plan is the continuing commitment to walk together with Aboriginal people to care for Country and to heal the waterways and wetlands. We have an opportunity to make a further step change by continuing to incorporate Aboriginal values and knowledge in the design of the Waterwise program actions, acknowledging and respecting the wisdom that the world's oldest continuous living cultures bring to caring for our land and waters.

We are now halfway through our journey towards the 2030 targets. While so much has been achieved to date, the challenges and impacts of a drying climate and growing population on our precious water are as present as ever.

Kep Katitjin – Gabi Kaadadjan sets out continued responses to those challenges, strengthening and deepening actions and collaboration to ensure the outcomes are entrenched and sustainable. There is a continuity between the previous plan to this one with 35 actions retained and eight new actions included, detailed under their respective scales.

DWER Waterwise contributors with the Australian Water Awards

Water Corporation Waterwise contributors with the Australian Water Awards

AWA Organisational Excellence WA Award (2023) and the National AWA Award for Organisational Excellence (2024) for the *Waterwise Perth action plan 2019*

Across-government collaboration – more than the sum of its parts

Each of the 43 actions in this plan represents a specific project or program of work with clear deliverables. Delivery is either through agencies leading discrete parts of an action or co-delivering projects across partner agencies. The Waterwise program is promoting even greater integration, and there are opportunities for agencies that are not listed against certain actions to become involved in them as the plan progresses.

This approach includes the sharing and aligning of data and coordinating how we work with one another and stakeholders. Water practitioners, urban planners, local governments and industry recognise the need for change and a more collaborative, whole-of-system approach with place-based outcomes that integrate blue-green infrastructure to build greater resilience and regenerate our urban areas. The Waterwise program is seeking to deliver this.

Collaboration and walking together to determine a shared vision and objectives across all stakeholders are key foundations of this plan. This way of working enables innovation and delivers greater benefit for Boorloo and Bindjareb communities. It has been recognised by the Australian Water Association (AWA), with the *Waterwise Perth action plan 2019* winning the association's Organisational Excellence WA Award in 2023 and the national AWA Award for Organisational Excellence in 2024.

Urban Greening Strategy

Climate change will continue to increase the occurrence and severity of extreme heat impacts and will exacerbate the urban heat island effect, where buildings, concrete and a lack of vegetation leads to hotter areas during the day and night. Water in the urban landscape is essential to the health of trees and vegetation, and this in turn enhances their cooling potential. Put simply, there is no green without blue. This reinforces the importance of planning for blue–green neighbourhoods.

This is why the State Government has committed to prepare an Urban Greening Strategy for Boorloo and Bindjareb led by the Western Australian Planning Commission (WAPC) (Action 21). Development of the strategy will explore various elements aimed at enhancing tree canopy and creating more green spaces across the Boorloo and Bindjareb regions such as:

- tree canopy measurement and reporting
- education and awareness
- urban heat identification and mitigation
- green linkages (looking at underutilised State Government land for greening opportunities)
- the Urban Greening Grants Program.

The Urban Greening Strategy will take a whole-of-government approach to ensure new initiatives are coordinated and complement any existing greening programs.

Stirling Street in Bunbury, standing on Boulters Heights and looking across to Derbal Elaap (Leschenault inlet)

Extending waterwise benefits to regional Western Australia

The Waterwise program was recognised in recommendation 50b of Infrastructure Western Australia's *Foundations for a Stronger Tomorrow: State Infrastructure Strategy*, to develop and implement waterwise planning for regional areas where benefits can be demonstrated. The effects of climate change, its impacts on water availability and urban liveability, and the need to ensure water management practices are adaptive and responsive to this, extend further than Boorloo and Bindjareb.

The South West Land Division recently experienced its driest seven months on record. October 2023 to April 2024 was hot and dry, with rainfall ranging from below average to the lowest on record. Maximum temperatures were above average, with some areas reaching the highest temperature on record.

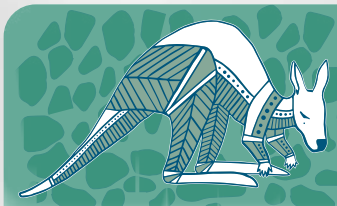
There are many learnings and initiatives under the Waterwise program that can be applied to help improve water availability, community amenity and health, and the environment. This plan includes an action to research, scope and engage on expansion to regional urban centres, to be delivered in the fourth waterwise action plan (2027–30).

This acknowledges the complexities of appropriate coordination and collaboration across partner agencies to make this happen and the need to walk together with First Nations peoples, integrating their values, knowledge systems and care for Country into our water planning and management.

Kep Katitjin – Gabi Kaadadjan – Waterwise action plan 3 – 2030 targets

1. Retrofit 10,000 State Government-owned social housing properties with water-efficient fixtures, with the goal that no public housing tenant receives higher water bills because of inefficient plumbing
2. Engage with 40,000 people in the community per year to increase community knowledge about water
3. Increase community water knowledge by 6.4% – from an index score of 7.00 out of 10 in 2024, to 7.45 out of 10 by 2030
4. 100% of Boorloo and Bindjareb Councils achieve Waterwise Gold status
5. Expand the reach of the Waterwise Schools Education Program to engage 50,000 students per year by 2030
6. 100% of irrigated open space audited and adopting waterwise management practices
7. 20 water efficiency audits completed for non-residential customers in the Water Efficiency Management Plan (WEMP) program
8. 50 land and water assets retrofitted to improve local community benefits of green spaces and improve ecosystem health
9. 100 measures to contribute to improved water quality, ecological health and/or amenity of the Swan Canning river system and other groundwater and surface water systems
10. Increase wastewater recycling from 21% in 2022 to 30% by 2030
11. 10% less groundwater used across the region
12. Adoption of water-efficiency infrastructure, soil amelioration and technology support programs in the Gnangara plan area
13. Best-practice waterwise policies integrated into all State Government urban water policies, guidelines and technical advice notes
14. 100% of government-led urban development in Boorloo and Bindjareb to be waterwise
15. Climate change management plans adopted by waterwise partner agencies, to meet or exceed State Government-endorsed climate change guidelines and standards
16. Achieve a static or decreasing trend in the average volume of residential water supplied per property (kL/property)

Yellow denotes new and amended 2030 targets to reflect the broader scope of actions.
Further explanation about targets 2, 3 and 16, is provided under ‘Household and building’ on page 32.



Case study
Water Sensitive Cities Benchmarking Index

Action 31 All targets

How the indexing tool is driving change towards more waterwise communities in Boorloo and Bindjareb

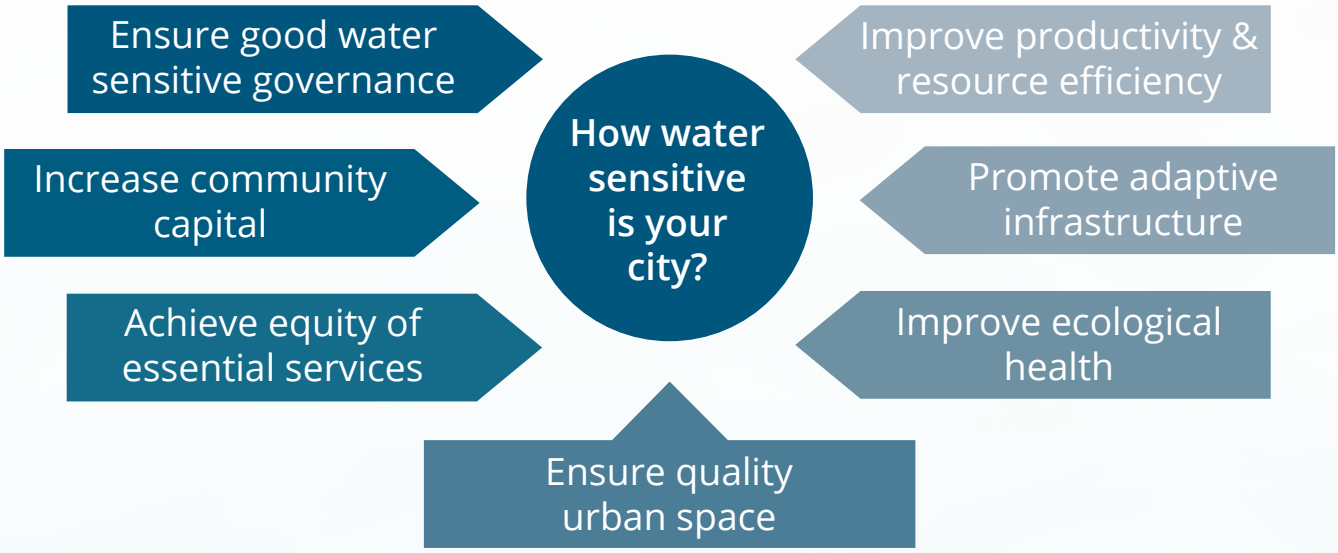


Figure 12: The seven goal areas of the Water Senstive Cities Benchmarking Index. Source: Cooperative Research Centre for Water Sensitive Cities Ltd. (n.d.) *Water sensitive cities index*, Water Sensitive Cities website, accessed 5 August 2024.

Our journey towards a water sensitive city has been accelerated by the tools, knowledge and partnerships created through our participation in the Cooperative Research Centre for Water Sensitive Cities (CRCWSC) (2012–21).

Learn more about how we have used the Water Sensitive Cities Benchmarking tool to guide our work: **Case study – Water Sensitive Cities Benchmarking Index**.

The Waterwise program will continue to benchmark the Boorloo and Bindjareb regions at appropriate intervals to track progress towards the 2030 targets.

The Derbarl Yerrigan winding its way through Whadjuk Noongar Boodja. Source: CRC for Water Sensitive Cities

Principles

Principles for how we think about, design and create waterwise communities help us address the impacts of climate change and act as the foundation for behaviour change and decision-making about what is important and valued.

Everything is connected – For Aboriginal and Torres Strait Islander peoples, connection and interdependence with the land and water is based on respect – as the land and water sustain and provide for the people, the people manage and sustain the land through culture and ceremony. Our city is built around connected ribbons of green (vegetation) and blue (water) through the landscape. People feel a sense of belonging and connection to the urban character of Boorloo and Bindjareb, reflecting its unique landscape and water environments.

Sense of place – Waterwise communities start with understanding the place we are standing on: from its cultural heritage – both ancient and modern – to its landform, plants and animals, groundwater, wetlands and waterways. Maintaining a sense of place is achieved by understanding the local conditions, including the movement and balance of water, and mimicking and enhancing natural systems when we change the landscape to develop our city. Water resources, challenges and opportunities are identified and addressed as early as possible in the planning process and at all subsequent stages.

Liveable – The urban environment is comfortable, safe and promotes health and wellbeing. Urban form and natural spaces are beautiful, resilient to climate change and support a vibrant community.

Resilient – The water elements of our urban spaces are multi-functional, designed to reduce risk to people and property and optimise benefits to the environment. Water infrastructure – both natural and built – is integrated into the urban landscape and helps us adapt to and manage the impacts of climate change and other shocks and stressors.

Sustainable – Water quantity and quality is managed to equitably meet the needs of people, production and the environment both now and in the future. Our water ecosystems are protected and thriving. By finding opportunities to reduce, reuse and recycle water across the whole water cycle, we ensure best use and recovery of water resources.

Prosperous – There is equitable access to safe and secure water supplies and essential services, across generations. Water is an economic enabler that supports a healthy natural environment for production, tourism and other benefits to the economy. Sustainable and efficient urban design and smart systems reduce and optimise the consumption of power and water.

Collaborative – Walking together to determine a shared vision and objectives. Government, businesses and the community play a role in progressing the objectives of waterwise communities. Collaboration across all stakeholders leads to innovative solutions to water and climate challenges and achieves greater overall benefit. The community values water and is well informed and aware of the impact and risks of climate change on water resources. People have the knowledge and desire to make wise choices about water, are actively engaged in decision-making and demonstrate positive behaviours to care for water resources and environments.

Foundational programs

Kep Katitijin – Gabi Kaadadjan Waterwise action plan 3 includes two foundational programs – Walking together and Application of the waterwise program to regional Western Australia – that connect with all other Waterwise programs and actions.

They bring together strategic and systems-change approaches with on-ground initiatives that thread Aboriginal knowledge into how we work and what we do.

Walking together

Walking together with Aboriginal people to incorporate traditional environmental knowledge into Waterwise program actions continues the foundational approach established during *Waterwise Perth action plan 2019* and that worked towards true partnership through *Kep Katitjin – Gabi Kaadadjan Waterwise Perth action plan 2*.

Kep Katitjin – Gabi Kaadadjan Waterwise Perth action plan 2 stated that "the Waterwise program of work has a unique opportunity to create change in our communities and cities" and made strategic commitments to walk together with Aboriginal people to do this and to heal the waterways.

These commitments continue into this third plan with three Aboriginal engagement actions that work at a systems-change scale and are intended to influence each of the actions in the plan. These commitments lay the foundation to explore how to change our systems and ensure that urban spaces reflect a sense of place based on the original vegetation, the natural flow of waterways and the First Peoples and their deep knowledge.

This commitment to walk together continues to be at the heart of this plan, begun together and going further forward. We have a shared vision of leading waterwise communities through improving our connection to water and Country, creating resilience to climate change and healing the harm that has been done. Honouring and acknowledging the kep katitjin/gabi kaadadjan that has been founded and proven over millennia is a bidi (path) to this vision.

Application of the Waterwise program to regional Western Australia

New to *Kep Katitjin – Gabi Kaadadjan Waterwise action plan 3* is an action to research, scope and engage on expansion to regional urban centres, to be delivered in the next waterwise action plan (2027–30).

We seek to apply the learnings and experience gained over the previous two action plans to regional urban centres, recognising the pressures of climate change impact across all of Western Australia, not just in Boorloo and Bindjareb.

Program area	#	Action description	Target	Lead
Foundational programs				
We will walk with Aboriginal people to incorporate traditional environmental knowledge into waterwise actions	1	Walk together with Aboriginal people on the journey to heal the waterways.	13	DWER / WC
	2	Increase understanding, value and recognition of Aboriginal cultures and cultural protocols, histories, knowledge and rights through cultural learning and engagement.	13	DWER
	3	Support, promote and share products and approaches that provide examples and good practice of Aboriginal and non-Aboriginal people working and walking together to care for boodja, kep and culture.	13	DWER / DBCA / WC / DoC / DPLH / DoE / METRONET
Application of Waterwise program to regional Western Australia	4	Research, scope and engage on expansion of the Waterwise program to regional urban centres, to be delivered in the next waterwise action plan (2027–30).	Scoping this action will identify targets	DWER / WC / DPIRD

Note: Darker shading indicates actions that continue or have evolved from *Kep Katitjin – Gabi Kaadadjan Waterwise Perth action plan 2.*

Walking together with Aboriginal people on the journey to heal the waterways' is at the heart of all the work to deliver this plan.

The following case studies show what is being achieved through the leading and remarkable work guided by the co-designed Bring Together Walk Together Aboriginal Partnership Framework between Bindjareb Elders and DWER. DWER's Waterwise Program Manager placement with Danjoo Koorliny Walking Together Towards 2029 and Beyond shows what can be achieved and has been a first for the Western Australian public service. These case studies demonstrate how our long-term commitments are changing our ways of working.

In addition, the Waterwise program partner agencies have worked in Boorloo and Bindjareb and across the state on numerous initiatives that consider how we can incorporate Aboriginal values into the way we think about water. Such initiatives are informing how we plan, build and manage our schools, transport and water infrastructure, and sporting centres and grounds. They demonstrate how this country's original cultures can be a foundation for a shared future together.

When we consider waterwise principles in design and delivery, so many of them are guided by Aboriginal environmental knowledge and wisdom. State Government agencies are committed to walking together and working with respect to integrate – or 'thread' – Aboriginal knowledge, values and caring for Country into all of our waterwise activities and learning as we go.

Figure 13: Noongar six seasons calendar
Source: Danjoo Koorliny (n.d.) *Indigenous Weather Knowledge*, Danjoo Koorliny website, accessed 26 July 2024.

The Noongar calendar is a way of bringing together Indigenous and western scientific knowledge. It demonstrates the profound understanding of the seasonal cycles in the south-west of Western Australia and illustrates a deep knowledge of that Country.

Creating our urban spaces with an understanding of 'sense of place' is an underpinning Waterwise program principle and the Noongar calendar gives us an insight into the seasonal changes and characteristics of the south-west. Understanding the rhythm and natural cycles prior to settlement can inform our responses to the contemporary challenges of the impact of urban growth and climate change on our water resources.

The Noongar calendar illustrates six different seasons in a yearly cycle. These are Birak, Bunuru, Djeran, Makuru, Djilba and Kambarang. Each of the six seasons represents and explains the changes we see annually in our natural environment. The flowering of many different plants, the hibernation of reptiles and the moulting of swans are all helpful indicators that the seasons are changing.

The Noongar seasons can be longer or shorter than the two months indicated for each and are experienced by what is happening and changing around us rather than by dates on a calendar. This six-season calendar is extremely important to Noongar people, as it is a guide to what nature is doing at every stage of the year, as well as understanding respect for the land in relation to plant and animal fertility cycles and land and animal preservation.[8]

For more information on Noongar culture, visit Kaartdijin Noongar – Noongar Knowledge.

[8] Danjoo Koorliny (n.d.) *Indigenous Weather Knowledge*, Danjoo Koorliny website, accessed 26 July 2024.

Case study
Stronger together on Bindjareb country

Action 1

Bindjareb Djilba Kaadadjan Bidi yarning circle with Winyama Pty Ltd on 30 November 2023 at Harvey Aboriginal Corporation's Boola Bidi Dreaming Centre | Front row: George Walley, Sharon Cooke | Middle row: Carol Vitale, Lesley Ugle, Brad Vitale, Franklyn Nannup, Rick Ugle, Kallan Nannup | Back row: Andrew Dowding (Managing Director, Winyama Pty Ltd); Robert Jetta, Theo Kearing, Phyllis Ugle, Karrie-Anne Kearing | Absent: Gloria Kearing, Jane Nannup, Adrianna Jetta

Bindjareb Djilba Kaadadjan Bidi yarning circle is gathering to heal waterways in Bindjareb country

Bindjareb Noongar Elders and young leaders come together from the Mandurah, Serpentine, Pinjarra, Waroona, and Harvey areas to participate in a Bindjareb-led yarning and governance circle – the Bindjareb Djilba Kaadadjan Bidi (Peel-Harvey estuary knowledge pathway). The yarning circle oversees our own overarching water plan the Bindjareb Gabi Wonga (Bindjareb Water Story) and the implementation of several Bindjareb-led actions in the Bindjareb Djilba (Peel-Harvey estuary) Protection Plan. The Bindjareb Djilba Kaadadjan Bidi yarning circles enable us to get together just like our old people who walked our country did. We are more resilient and stronger together for our Wirrin (spirit), boodja (country) and baalap (people).

Healthy Estuaries WA and the Bindjareb Djilba Protection Plan are walking with us in our Bring Together, Walk Together journey, putting culture first and listening to Bindjareb-led ways to address the challenges we face in looking after our important waterways. Together, with our partner Aboriginal organisations – Winjan Aboriginal Corporation, Murray Districts Aboriginal Association, Harvey Aboriginal Corporation and Waroona Aboriginal & Torres Strait Islander Corporation – we are achieving moorditj (great) outcomes for our people and waterways.

Mapping country to preserve cultural knowledge for future generations and empower our people in decision-making to heal the waterways

The Bindjareb Djilba Kaadadjan Bidi yarning circle is leading several initiatives on the journey to heal waterways, including mapping country to preserve cultural knowledge for future generations and empower our people in decision-making. In 2023 we engaged Winyama Pty Ltd to build our geospatial tool, the Bindjareb Kaadadjan Mia (the Bindjareb knowledge hub). The Bindjareb Kaadadjan Mia is owned and managed by our partner Aboriginal corporations to protect our cultural intellectual property. The direct-to-digital cultural mapping process can now be undertaken by our people, for our people. The Bindjareb Kaadadjan Mia is bringing about many benefits and has wide application to empower our people. Our geospatial tool enables us to:

- engage our elders to share their lived experiences and cultural knowledge
- encourage truth telling and healing
- share cultural knowledge with our young people
- train our young people to become geospatial professionals
- get our stories back and keep them safe for future generations
- map country to identify priority places to protect and manage
- plan and record activities of our Aboriginal Ranger Program
- keep records for our strategic projects
- share high-level cultural information to partners to embed cultural knowledge and values into decision-making
- better understand the cumulative impacts of land uses on cultural values.

HEALTHY ESTUARIES WA

Delivering on the

Bindjareb Djilba | Peel-Harvey estuary

Protection Plan

The importance of cultural knowledge in the journey to heal waterways

Bindjareb people have looked after the Djilba (estuary) for more than 60,000 years based on governance and lore. We have a continuing life commitment and cultural responsibility to the preservation of this area, and it holds great significance to us. The history of occupation has been unbroken where Bindjareb people have gathered for ceremonies along the estuary and the Harvey, Murray, and Serpentine rivers to hunt, fish, camp and look after country in rhythm with the Noongar Six Seasons. As we face the challenges of climate change and a drying climate, our cultural knowledge is important in the walking together journey to heal waterways.

The Bindjareb Djilba Kaadadjan Bidi yarning circle is funded by the Bindjareb Djilba Protection Plan and Healthy Estuaries WA program – State Government initiatives to improve the health of our estuaries.

Bindjareb Djilba (Peel-Harvey estuary)

Case study
Danjoo Koorliny walking together

Action 1

Danjoo Koorliny Co-Directors Carol Innes AM and Dr Noel Nannup OAM, Noongar Elder Carol Pettersen, Premier Roger Cook, Danjoo Koorliny Co-Directors Emeritus Professor Colleen Hayward AM and Dr Richard Walley OAM

Danjoo Koorliny is a bold, long-term, large-scale, Aboriginal-led systems change project to help all of us – in Western Australia, the rest of Australia and around the world – walk together as Aboriginal and non-Aboriginal people to co-create a better future for all. The first milestone is in 2029 (200 years of colonisation in Boorloo), and the project will go far beyond Western Australia's bicentenary. Begun in 2019 by Noongar leaders Dr Noel Nannup OAM, Dr Richard Walley OAM, Carol Innes AM and Professor Emeritus Colleen Hayward AM, it is based at The University of Western Australia's Centre for Social Impact, in the Business School.

In 2020, Bindjareb Elder George Walley and DWER officer Bronte Grant presented the co-authored Bring Together Walk, Together Framework at Danjoo Koorliny's Social Impact Festival Kep Water Symposium. This was the beginning of deeper working between DWER and Danjoo Koorliny, centring on including Danjoo Koorliny's invaluable advice and guidance in *Kep Katitjin – Gabi Kaadadjan Waterwise Perth action plan 2*, including suggesting its name and launching the plan.

Shortly after the plan's launch in October 2022, DWER's Waterwise Program Manager commenced a placement with Danjoo Koorliny, to more deeply deliver Aboriginal outcomes through the Waterwise program. Over the 18-month placement, together we reached thousands of people across the world, Australia and locally to share the importance of Aboriginal involvement in planning and delivery for water and the environment and how it can create systems change. Dedication of a government resource into an Aboriginal-led project has provided additional capacity and resources, and has allowed the department to directly access Aboriginal advice and guidance and learn Aboriginal ways of working. This has been translated back into projects and approaches, beginning to create change in the organisation and beyond.

Working together on kep and Boodja issues is a strong place to start healing – by healing Country together we can begin to heal the deep wounds and wrongs of the past. We know that Aboriginal people hold profound knowledge of Country that existed long before our newer scientific approaches and this knowledge is constantly found to be technically robust and indeed more connected and holistic than our current siloed and specific ways of empirical research. Increasingly we are recognising and appreciating that this knowledge is the right way for this Country, rather than our imposed European ways. The recognition of Noongar seasons for the south-west of Western Australia is an ideal example of this. For two centuries we have tried to work with four ill-fitting seasons on this Country and we are now recognising that seasonal changes are more subtle and more frequent.

The Waterwise program vision is for 2030 and aligns to the timeframe and path to the 2029 bicentenary. While 'walking together' means we move forward side by side, we recognise that who leads and who follows can and should change throughout the journey. A foundation of shared values, mutual respect and genuine collaboration that is rooted in deep listening and understanding is essential. Knowing when to lead, when to follow, and when to be alongside relies on trust and we acknowledge that we will not always get it right. However, through the exchange of knowledge, the sharing of power, and building of trust, we are navigating the complexities of partnership together.

Action 3

Case study
The Djarlgarro Bilya Waterways Project

Part of the Elders group, research team and Noongar artists involved in the Djarlgarro Bilya Waterways Project at one of their cultural mapping workshops in December 2023 © Cole Baxter | Front row, from left to right: Jill Abdullah, Irene Stainton AO, Peter Wilkes, Mort Hansen, Tanya Bodney | Back row: Emma Ligtermoet, Rohan Collard, Glenda Kickett, Cristina Ramalho, Rohin Kickett, Julianne Wade, Herbert Bropho, Brett Hill

The Djarlgarro Bilya Waterways Project is a highly collaborative, cross-cultural project that brought together researchers from UWA and members of Boorloo's Noongar community to record the Noongar cultural values of Boorloo's waterways. The project was initiated within the Clean Air and Urban Landscapes Research Hub of the National Environmental Science Program. The project extended beyond the life of the Hub through the support of several organisations within the Water Sensitive Transition Network, including Water Corporation, DBCA, DWER, DoC, DPLH, DoE, METRONET, City of Canning, Perth NRM and Urbaqua.

Under the guidance of a Cultural Advisory Group consisting of Vivienne Hansen, Irene Stainton AO, Glenda Kickett, Mort Hansen and Peter Wilkes, the project recorded the stories of connection with the Djarlgarro Bilya waterways of 13 Traditional Custodians and Knowledge Holders. In the stories, the Elders talked of their lived experience and connection with the waterways, their cultural knowledge of water and how the waterways are important to them, and their perspectives about caring for Boodja, working together and education. While the project focused on the Djarlgarro Bilya, the Canning River, the Elders shared many stories about places along the Swan and Avon rivers, depicting a connectivity of water and culture extending across the metropolitan area.

The project produced a book co-authored by the Elders, a large standalone cultural map artwork produced by two Noongar artists, and a set of short films of the Elders on Country. The Elders and researchers involved in this project believe that the book is a gift to all those that call Boorloo home.

The Elders shared their culture and grounded their stories and perspectives in places where most of us live, work, gather and relax, often without knowing the Noongar significance of those places. They hope this project will open a window for Boorloo's residents to view and understand a city and an environment in ways that they have not seen or understood before. They also hope this project will bring the Elders' values, place connections, perspectives and worldviews to the forefront of local and regional environmental management and planning. The materials recorded provide a foundation for other outputs the Elders would like to see produced soon, that would help to further elevate their voices and reach different audiences.

An important outcome of this project is learning how to work together. Key ingredients on this journey were deep listening and attention, trust, constantly learning from those involved and consequently adjusting the project's course, an active approach to 'decolonise' research, and a supportive network of stakeholders and funding agencies.

Waterwise action plan at a glance

Kep Katitjin – Gabi Kaadadjan is underpinned by a commitment to threading Aboriginal values and knowledge into Waterwise program actions. The plan at a glance shows the actions grouped into program areas that are colour coded to reflect the four delivery scales: household and building, precinct and suburb, city and urban, and government leading. Each bullet point is an action; actions in italics denote new actions, building on the previous waterwise action plan plans. More details are provided in the tables below.

Waterwise landscaping in progress

Kep Katitjin – Gabi Kaadadjan (Waterwise action plan 3)

Household and building

Since 2001, per capita scheme water demand within the Boorloo and Bindjareb regions has reduced by 32 per cent through using waterwise fixtures and fittings inside our homes and buildings, along with changes to irrigation practices such as the scheme water sprinkler roster.

More than 1,024 million litres of scheme water have been saved by households through actions under the Waterwise program between 2019 and the end of June 2024.

Over the past five years, the average volume of residential water supplied per property has been 224 kilolitres per year for Boorloo. Annual water use fluctuates however, depending on whether the region experiences a particularly hot and dry, or cooler and wetter year. The record long, dry summer-autumn of 2023–24 has seen annual residential water consumption per property rise. The challenge is to maintain water efficiency in a changing climate, as temperature and rainfall are big drivers of water use.

Kep Katitjin-Gabi Kaadadjan Waterwise Perth action plan 2 committed to developing a water efficiency target that was relevant to households. Considering the longer-term trends, a new target (16) – achieve a static or decreasing trend in the average volume of residential water supplied per property (kilolitres per property) – has been added to this third plan. This target, which applies to residential properties served by the Integrated Water Supply Scheme in Boorloo and Bindjareb, seeks to maintain or improve water efficiency in an increasingly hot and dry climate.

Community engagement and education is core to achieving the vision of waterwise communities. The following actions are applied at the household and building scale to continue to ensure that we use water wisely in our homes and gardens, prevent water pollution, understand groundwater is a precious and shared resource, and make positive changes that reflect how we value water and our natural environments – all of this builds resilience in the face of an increasingly hot and dry future.

Waterwise partner agencies undertake a range of initiatives to educate and engage the community. This includes educating school students, providing rebates and advice to empower homeowners to adopt waterwise practices, raising awareness of water efficiency standards, and delivering community education activities, citizen science projects, gardening workshops and community partnerships to care for our water and natural environments.

Two new targets (2 and 3) have been added to *Kep Katitjin – Gabi Kaadadjan Waterwise action plan 3* to measure both the scale and value of these activities. Actions under the Waterwise program reach tens of thousands of people each year. We have set a new target to engage with 40,000 people in the community per year to increase community knowledge about water.

In 2024, Water Corporation undertook community research to inform the redesign of the water knowledge survey to ensure we are measuring what matters and to set a more valuable target. The results have been used to set a new water knowledge benchmark and target in this third plan.

Program area	#	Action description	Target	Lead
Household and building				
We will ensure water efficiencies and waterwise design in and around our buildings	5	Retrofit of DoC social housing to water-efficient fixtures and fittings and empower tenants to be waterwise.	1 16	DoC / WC
	6	Improve water efficiency in waterwise built form through increased understanding and enhanced requirements of state and national regulatory frameworks such as the Water Efficiency Labelling and Standards (WELS) and the National Construction Code (NCC).	2 16	WC / DWER
We will raise awareness of the impacts of climate change, and we will change our behaviours to reduce impacts on our precious water resources	7	Deliver programs to help households adapt to climate change.	11 16	WC / DWER
	8	Encourage garden bore users to be waterwise and support Boorloo-Bindjareb households through Be Groundwater Wise initiatives.	2 11	DWER / WC
	9	Raise awareness of water's importance and strengthen community connection to local water stories and environment through community partnerships and programs.	2 3 9	WC / DBCA / DWER
	10	Develop a package of communications/messaging that can be used by Waterwise and Urban Greening Strategy partner agencies, to ensure consistent messaging around blue–green infrastructure.	2	DPLH / DWER

Note: Darker shading indicates actions that continue or have evolved from *Kep Katitjin – Gabi Kaadadjan Waterwise Perth action plan 2.*

Further information regarding the new action under the household and building scale:

Action 10: Collaborative and consistent messaging will be developed for the cross-government Waterwise and Urban Greening Strategy programs to ensure consistent language, communication and understanding is provided in relation to blue–green infrastructure.

This waterwise garden with native plants replaced a high-maintenance garden at a DoC-owned social housing property, reducing water consumption and providing space for the senior residents to enjoy.

Precinct and suburb

Local governments are essential to delivering waterwise communities through their key role in planning, decision-making, engaging residents and encouraging community action to create highly liveable, sustainable places to live. Local governments understand their community's needs and aspirations, as well as the conditions of their local area. A waterwise city does not look the same everywhere. It needs to be considered and planned in the context of the local waterwise vision and landscape.

The Waterwise Councils Program was established in 2009 to recognise the important role that local governments play in delivering community outcomes. *Kep Katitjin – Gabi Kaadadjan Waterwise action plan 3* continues to build on our successful partnership with local governments to deliver on-ground action at the precinct scale.

Aboriginal people have built knowledge, including at a local level, over generations. We can acknowledge and include this in our understanding of sense of place and in creating waterwise communities, including at a precinct and suburb scale.

We will continue to work with stakeholders to deliver Waterwise programs to deepen understanding of water in their community and environment. The actions at this scale also include partnerships with schools and industry groups, and initiatives to increase native vegetation, secure water for urban green space and improve the health of our rivers and wetlands. No organisation on its own can deliver on the complexity and scale required to tackle the challenge of a growing city facing the impacts of climate change.

An example of a successful partnership is the Waterwise Schools Education Program, which has reached more than 388,000 students across the state.

A Waterwise Schools immersive learning experience

Program area	#	Action description	Target	Lead
Precinct and suburb				
We will work with stakeholders to deliver waterwise programs	11	Implement the Waterwise Councils Program to recognise 100% of councils as Gold by 2030.	4 11	WC / DWER
	12	Expand the Waterwise Schools Education Program to reach 50,000 students per year by 2030 to deepen understanding of water in their community and environment.	5	WC / DoE
	13	Embed improvements in water management and practices for school grounds.	11 6	DoE / DWER
	14	Continue to support the golf course industry to achieve waterwise outcomes through the Waterwise Golf Program.	11 6	DWER

Program area	#	Action description	Target	Lead
Precinct and suburb				
We will work with stakeholders to deliver waterwise programs	15	Deliver the Waterwise Business 2.0 project to improve the on-boarding experience and increase knowledge for new businesses entering the Water Efficiency Management Plan (WEMP) program. This includes the provision of comprehensive business audits to identify water efficiency opportunities for 20 non-residential customers deemed eligible, based on their water use exceeding the 20,000 kilolitres per year threshold for participation in the WEMP program.	7	WC
We will create healthy, liveable communities and healthy water ecosystems	16	Partner with local government to improve urban liveability and ecosystem health by transforming 50 Water Corporation assets and surrounding land into neighbourhood green spaces, such as living streams, wetlands, community gardens, nature corridors or parkland by 2030.	8	WC / DWER
	17	Support local government to create cooler, greener and more sustainable neighbourhoods. By co-funding waterwise verges, street trees, plant sales, gardening workshops, demonstration gardens and garden competitions for the community through the Waterwise Greening Scheme.	4	WC
	18	Implement a River Protection Strategy for the Swan Canning river system to improve water quality, manage river flows, enhance biodiversity and amenity and build resilience to climate change.	9	DBCA
	19	Work with local governments and light industry operators through the Light Industry Program to reduce contaminants discharged to the environment and waterways.	9	DWER
	20	Establish a collaborative framework with water and environment agencies for improved catchment and drainage outcomes for the Swan Canning river system.	9 13	WC / DBCA / DWER
	21	Continue to work on the progression of the whole-of-government Urban Greening Strategy to support cool and green spaces in Perth and Peel.	13	DPLH
We will work towards water for the future	22	Identify appropriate water supplies for urban green space in areas with limited or no groundwater availability.	10 11	DWER / WC
	23	Deliver the Swan Valley North-East Corridor groundwater investigation project to clearly define the groundwater characteristics of the area, specifically the location and characteristics of the Wanneroo and Serpentine faults and the connectivity between aquifers.	10 11	DWER
	24	Develop a wastewater recycling action plan.	10	WC
	25	Investigate options to more effectively use stormwater to support urban greening	13	DPLH / DWER / WC

Note: Darker shading indicates actions that continue or have evolved from *Kep Katitjin – Gabi Kaadadjan Waterwise Perth action plan 2.*

A track leading to a yarning circle at the centre of a Waterwise Grounds bush classroom

An officer sampling soil and water for pollutants at a business in a light industrial area

Further information regarding the five new actions under the precinct and suburb scale:

Action 19. The Light Industry Program is a partnership between DWER and local governments. Light industrial activities can discharge contaminants into the environment via soil, stormwater drains and soak wells. Pollutants entering our waterways can impact animals, plants and people and render water unsafe for swimming or drinking. The program aims to educate light industry about ways to reduce the environmental impact of their activities, and DWER conducts unannounced light industry inspections.

Action 20. A collaborative framework will be established between Water Corporation, DBCA and DWER. It will serve to deepen collaborative working to achieve improved catchment and drainage outcomes for the Swan Canning river system.

Action 21. The State Government has committed to developing an 'Urban Greening Strategy' to promote and enhance tree canopy and greening across the Boorloo and Bindjareb regions. The new strategy will complement the '*Western Australian Climate Policy*' and '*Climate Adaptation Strategy*', seeking to improve the resilience of the state's cities and regions. Development of the strategy, to be led by the WAPC, will explore elements aimed at enhancing tree canopy and creating more green spaces across the Boorloo and Bindjareb regions.

Action 24. A wastewater recycling action plan will be developed to build on Water Corporation's success over the past 10 years in working with partners to increase the total volume of recycled water by almost 70 per cent across Western Australia. The recycling plan will assist them in achieving their commitment to target 10: Increase wastewater recycling from 21 per cent in 2022 to 30 per cent by 2030.

Action 25. An investigation into opportunities for more effective local and lot-scale use of stormwater will be undertaken to support and extend urban greening in Boorloo and Bindjareb. The investigation will also explore leading examples of stormwater-supported urban greening that can be used as model case studies for others to follow.

River Protection Strategy South Perth Swans. Credit: Veronica McPhail

City and urban

Planning at the city scale helps manage pressures on our water resources and enables the sustainable development of our urban communities. Water supply planning and sound groundwater planning, based on solid science and accounting for anticipated impacts of climate change, are key to ensuring the most efficient and sustainable use of our limited water resources. In addition, identifying potential water issues, such as drainage and flood patterns, as early as possible in the planning process (and at all subsequent stages) is a key principle of water sensitive urban design.

These approaches enable the environmental, social and economic benefits of water in our landscape to be maximised and enhance the long-term sustainability and health of ecosystems, delivering benefits and reducing costs to households. We have embedded waterwise outcomes and water sensitive urban design in policy and planning to help transition Boorloo and Bindjareb to leading waterwise communities by 2030.

A key challenge is identifying and managing the development of non-potable sources of water to meet rising demand in a way that enables us to bring our groundwater resources back to a more sustainable balance.

Waterwise nursery

Program area	#	Action description	Target	Lead
City and urban				
We manage our precious groundwater for all users	26	Review allocation limits across the Boorloo and Bindjareb regions to manage groundwater for its sustainable use in line with the impacts of climate change.	11	DWER
	27	Support horticultural water users in the Gnangara plan area to adjust to the effects of climate change and reductions in water licence allocations through best management practice water efficiency infrastructure, soil amelioration and technology programs.	11 12	DPIRD / DWER
	28	Support local governments, particularly those in the Gnangara plan area that are most impacted by the urban heat island effect, to develop a pathway to achieve reductions in their groundwater use.	11 12	DWER / WC
	29	Work with the commercial nursery and tree-farming sector to adopt waterwise standards in the industry.	12	DWER
We will improve the water and land use planning systems	30	Commence implementation of the water policies, guidance and technical advice review findings, to strengthen waterwise outcomes.	13	DWER

Note: Darker shading indicates actions that continue or have evolved from *Kep Katitjin – Gabi Kaadadjan Waterwise Perth action plan 2.*

Government leading

Since the development of the *Waterwise Perth action plan 2019*, we have heard from stakeholders in industry, academia, local governments and non-government organisations that they wanted to see government leading on waterwise cities – demonstrating how it could work in practice and trialling innovative approaches. The foundations of water efficiency and conservation mean we are valuing our precious resource and using it as best we can in our households and buildings. Actions at the precinct and suburb scale are considering our sense of place, water sensitive urban design and forming a vision for the local area.

These then need to be underpinned by data, planning, policy, guidance, Aboriginal and heritage values, and action at the city scale. All three scales come together at the government leading scale where truly innovative and waterwise developments can show the private sector that this can be achieved as mainstream practice, to contribute to a climate-resilient and water-secure Boorloo and Bindjareb.

Program area	#	Action description	Target	Lead
Government leading				
We will use research, data and information to achieve on-ground waterwise outcomes	31	Deliver Boorloo and Bindjareb's transition to waterwise communities through continued across-sector collaboration on leading waterwise research and mainstreaming initiatives.	All targets	DWER / WC / DBCA
	32	Collaborate with universities, local government and industry on sustainable design and management solutions for lawns in public green spaces in a changing climate.	11	DWER / WC
	33	Monitor and evaluate drainage retrofit projects to improve understanding of their design, maintenance, and operational requirements and/or ecological and water quality benefits.	13	DBCA / WC DWER
	34	Investigate the extent, distribution and types of plastic pollution in the Derbal Yiragan Djarlgarro (Swan Canning) Estuary and Bindjareb Djilba (Peel-Harvey) Estuary.	9	DWER / DBCA
We will show how waterwise outcomes can be delivered in Government work	35	Embed waterwise outcomes in the METRONET program of projects.	14	METRONET / DPLH
	36	Department of Education new school projects and major redevelopments will deliver exemplar waterwise outcomes.	14	DoE
	37	Embed waterwise principles in the Primary School Brief and Secondary School Planning Guide.	11 14	DoE
	38	Embed waterwise outcomes in government-led urban development in Boorloo and Bindjareb.	13 14	Development WA / DoC / DoF / DLGSC / METRONET

Program area	#	Action description	Target	Lead
Government leading				
We will show how waterwise outcomes can be delivered in Government work	39	Showcase Waterwise Developments to evaluate, share and inspire adoption in the private sector.	13 14	Development WA / WC / DoC
	40	State Government-funded infrastructure projects are to implement waterwise solutions to support water quality, enhance biodiversity and improve sustainable amenity for future generations.	11 14	DLGSC
We will ensure action on climate and water	41	Provide guidance for the water sector on how to use climate change projections for risk-based decision-making.	15	DWER
	42	Promote climate-resilient water resources.	15	DWER
	43	Water Corporation is to achieve net zero for scope 1 and 2 greenhouse gas emissions by 2035.	15	WC

Note: Darker shading indicates actions that continue or have evolved from *Kep Katitjin – Gabi Kaadadjan Waterwise Perth action plan 2.*

Further information regarding the new action under the government leading scale:

Action 34. DBCA and DWER are partnering to undertake sampling investigations to assess the levels of plastic pollution in two of our iconic estuaries, the Derbal Yiragan Djarlgarro and Bindjareb Djilba. Results from these investigations will help identify plastic pollution 'hotspots' and the main types of plastic found in these waterways, which will inform future approaches to reducing plastics entering these estuaries.

DBCA's Dr Peter Novak sampling for plastics on the Derbal Yiragan Djalgarro Estuary

Millers Pool in South Perth. Credit: New WAter Ways Inc.

Delivering

The waterwise principles set out in this plan apply to what we do and the way in which we do it. For waterwise, everything is connected. Hence this program of work is delivered across the State Government to identify synergies, areas where activities connect and where existing successes can be shared and replicated. Waterwise connects people through shared visions of better water and land management. Walking together with Aboriginal people means a commitment through the Waterwise program of work to converge water planning values and management with Aboriginal knowledge of caring for Country. The commitment to working collaboratively is based on a shared vision and objectives and an acknowledgement that to tackle such long-term and complex problems, input is needed from multiple points of view and experiences. Government, industry and the community all play a role in progressing the objectives of waterwise communities.

This program of work has been championed by the State Government and endorsed as a priority. Its implementation includes oversight from senior leaders of each agency involved and is underpinned by a monitoring and evaluation framework that tracks progress towards the 2030 targets outlined in this document.

Further to Waterwise program partner agency activities, the participation and leadership of local governments and the urban development industry in creating our waterwise communities has and will continue to be critical as we mainstream waterwise approaches and outcomes. The foundational role of the Water Sensitive Transition Network in positioning Boorloo as a leading waterwise city, and of transitioning Boorloo and Bindjareb to leading waterwise communities, has been essential in achieving the gains. Progress to date would not have occurred without this collective effort. One of the main success factors has been the capacity building and knowledge sharing to develop the skills and capabilities necessary to deliver waterwise outcomes. As reflected in the Water Sensitive Cities Index benchmarking scores for Greater Perth, through increased collaboration across the many stakeholders who shape our city, Boorloo is well on its way to becoming a leading waterwise city. *Kep Katitjin – Gabi Kaadadjan Waterwise action plan 3* is the next step in getting us there.

Working on the whole picture

Other policies and activities that are relevant to Kep Katitjin – Gabi Kaadadjan include:

Keep Australia Beautiful WA

Aboriginal Empowerment Strategy – Western Australia 2021-2029

Bindjareb Gabi Wonga

Bindjareb Djilba (Peel-Harvey estuary) Protection Plan

Draft State Planning Policy 2.9 Planning for Water

State Planning Policy 7.0 - Design of the built environment

Strategic policy – Protecting public drinking water source areas in WA

Vision and Transition Strategy for a Water Sensitive Greater Perth

Vision and Transition Strategy for a Water Sensitive Greater Perth – Implementation Plan 2022 - 24

METRONET Sustainability Strategy 2019–2021

Western Australian Climate Change Policy

Waste Avoidance and Resource Recovery Strategy 2030

Western Australia's Plan for Plastics

Healthy Estuaries WA

Swan Canning River Protection Strategy

State Infrastructure Strategy

Caring for Country together - Our sustainability framework
(Department of Education, November 2021)

Better urban forest planning - Perth and Peel

Bring Together Walk Together Aboriginal Partnership Framework

State of the Climate 2022

Waterwise Perth action plan 2019

Kep Katitjin - Gabi Kaadadjan Waterwise Perth action plan 2

Climate action in Western Australia

Climate Adaptation Strategy

Western Australian Climate Projections Summary

Perth and Peel Urban Greening Strategy

Glossary of Noongar terms

There are various terms to describe Australia's First Nations people and they have been used in their specific context throughout this plan. The term 'Indigenous' is frequently used in a national context, for instance in the *State of the Environment 2021* report. DWER uses the term 'First Nations' to describe Aboriginal and Torres Strait Islander people across the country. When referring to Western Australia, the term 'Aboriginal' is most common, and when we are describing work with Aboriginal people in south-west Western Australia, we use the term 'Noongar'. The Noongar Nation includes many peoples, language dialects and regions, and this plan covers Whadjuk and Bindjareb Country.

Note: Some of these terms are used in the case studies.

Baalap	People
Balga	Grass tree
Bidi	Path
Bindjareb	The Country, people and dialect of the Peel region
Bindjareb Djilba	Peel-Harvey estuary
Bindjareb Djilba Kaadadjan Bidi	Peel-Harvey estuary knowledge pathway
Bindjareb Gabi Wonga	Bindjareb water story
Bindjareb Kaadadjan Mia	Bindjareb knowledge hub
Bilya/beeliar	River
Bilya Maadjit	Murray River
Boodja	Country or land
Boorloo	Often refers to the city of Perth and for the purposes of this plan includes the city and the Greater Perth region
Danjoo Koorliny	One translation could be 'going together to the future' or 'moving together', or it could be simply translated as 'walking together'.
Djarlgarro Beeliar/Djarlgarro Bilya	Canning River
Djilba	Estuary; fish bream; and the Noongar season that falls around August/ September, sometimes known as the first Spring.
Derbarl Yerrigan/Derbal Yiragan	Swan River
Gabi	Water – Bindjareb dialect
Gabi Kaadadjan	Water knowledge – Bindjareb dialect
Kaadadjan	Knowledge – Bindjareb dialect
Kambarang	The Noongar season that falls around October/November, sometimes known as the second spring
Katitjin	Knowledge – Whadjuk dialect
Kep	Water – Whadjuk dialect
Kep Katitjin	Water knowledge – Whadjuk dialect
Makuru	The Noongar season that falls around June/July, the coldest and wettest season (Winter).
Mandjoogoordap	Mandurah
Moorditj	Great
Noongar	Traditional Owners of the south-west of Western Australia

Glossary of Noongar terms cont.

Wadjela	Non-Aboriginal person
Waugal/Wagyl	Noongar rainbow serpent and Dreamtime creation spirit. A snake or rainbow serpent recognised by Noongar as the giver of life, maintaining all fresh water sources.
Waangaamaap Bilya	Serpentine River
Whadjuk	The Country, people and dialect of the Greater Perth region
Wirrin	Spirit
Yoorgaangaap Bilya	Harvey River
Yuat	The Country, people and dialect north of Perth.

Abbreviations and acronyms

AWA	Australian Water Association
CMIP	Coupled Model Intercomparison Project
CRCWSC	Cooperative Research Centre for Water Sensitive Cities
DBCA	Department of Biodiversity, Conservation and Attractions
DLGSC	Department of Local Government, Sport and Cultural Industries
DoC	Department of Communities
DoE	Department of Education
DoF	Department of Finance
DPIRD	Department of Primary Industries and Regional Development
DPLH	Department of Planning, Lands and Heritage
DWER	Department of Water and Environmental Regulation
IWSS	Integrated Water Supply Scheme
Perth NRM	Perth Natural Resources Management
UDIA	Urban Development Institute of Australia
UWA	University of Western Australia
WC	Water Corporation
WELS	Water Efficiency Labelling and Standards
WEMP	Water Efficiency Management Plan
WSTN	Water Sensitive Transition Network

Message from the artist Darryl Bellotti

I chose to stay with the blues and teals. These colours are what comes to mind when I think of clean, fresh water. Of a refreshing drink. Of a cool swim on a hot day. Keeping to the blue colour scheme allows the mind to go to a place of tranquillity. That's what I think of when I experience those colours. The symbology in the logo symbolises the pooling of ideas. With reference to the two Noongar language groups of the Boorloo (Perth) and Bindjareb (Peel) regions, the two separate, but similar viewpoints come together and those ideas reverberate through the pool of water in the centre. Ripples swirl towards the centre and become as one. This is the way we need to be for the sake of our water sources.

The dual symbology also represents Indigenous and non-Indigenous ideas, ideals, and ideology in regard to water and water planning. The vegetation and animals are all significant to the story of water. As the seasons change, the importance of plants and animals shifts in terms of their usefulness to Aboriginal people and how abundant they may be during a particular season. The seasons determined where the water and food resources were readily accessible from the blooming of flowers to the rains and rivers, to the changes in diet, to the breeding of animals – all of this is dependent on the season and the availability of water. It was important for me to include various animals and plants in the artwork to tell this side of the water story.

Department of Water and Environmental Regulation

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