

Water



Where there once an annual average of **420 GL** of rainwater ran into Perth dams, planning is now based on just **25 GL per year**.¹ Now more than ever, it is essential to **thoroughly understand and manage existing natural water systems**. The beneficial use of natural resources should be managed through holistic, adaptive and resilient approaches that recognise and address the competition for resources and changing availability.



What IWA heard

During consultation on the draft strategy, stakeholders expressed significant interest in water trading, which has resulted in a clearer indication that recommended legislative reforms facilitate a balanced approach to water trading. Some stakeholders queried the purpose of a state water strategy. In response, recognition is now given to the value of information in existing plans while retaining the view that government should provide long-term strategic direction for the water sector that extends beyond water-allocation planning.

While the importance of protecting strategic groundwater resources was recognised, feedback suggested that the protection of surface water was also important. In response, the definition of strategic water resources has been broadened. Stakeholders expressed concern about the recommendation relating to the review of the Jandakot groundwater system and associated land development, noting that considerations in the Strategy should be of a more strategic nature and not apply to one specific area only. In response, IWA refocused this recommendation to assess strategic values relating to water and land-use planning and broadened its application.

Stakeholders also identified a need for greater recognition of the cultural and spiritual value of water for Aboriginal people, which has been addressed in additional content and amendments to relevant recommendations.

Water is one of society’s most vital commodities and the state’s future economic and population growth is highly reliant on the availability and security of suitable water at an economically viable price. Major impacts of climate change on the state’s traditional water sources will require increasingly innovative solutions to ensure adequacy of long-term water supply and to enable the state to sustain its economy, environment and way of life for years to come.

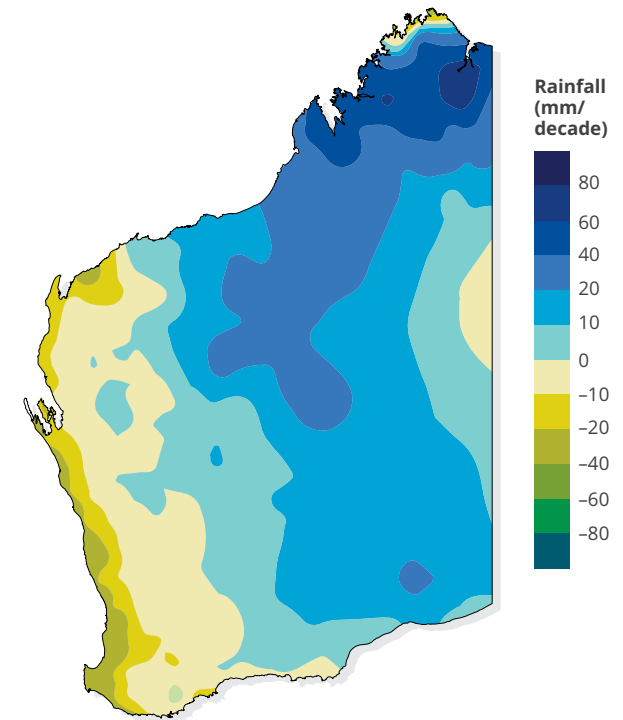
A coordinated, resilient and integrated water sector is essential for:

- ensuring water resources are sourced, allocated, distributed and used responsibly and sustainably
- ensuring a secure supply of quality drinking water to meet the demands of a growing population
- maintaining and enhancing fit for purpose water for commercial, industrial, agricultural, public amenity and liveability purposes
- providing integrated wastewater services (including treatment) to protect public health and the environment
- ensuring the efficient provision of irrigation and drainage services.

Along with population growth, economic growth and land development, climate change is now a critical consideration for water planning. Across the south-western and coastal parts of the state, a substantial reduction in rainfall trends over the past 50 years (Figure 36) has impacted availability of both surface and groundwater.

Where there was once an annual average of 420 GL of water running into Perth dams, planning is now based on just 25 GL per year.²

Figure 36: Trend in total annual rainfall, 1970 to 2020³





Since 1980, water tables across the Gnangara Mound have fallen by up to 10 metres – a 1,000 GL loss of aquifer storage.⁴ The state's increasingly drying climate is driving the need to invest in alternative, climate-independent water sources, principally desalination (from seawater and other brackish sources) and recycling of wastewater. As the resilience of water resources and supply networks continues to be tested by

the impacts of climate change and population growth, the need to build innovation and address resilience has never been more pronounced. Adaptive planning for future water needs is required if WA is to remain globally competitive and support population and economic growth. Compared to many other locations around the world that have experienced water supply challenges due to a drying climate, WA has

performed well in ensuring an effective and affordable water supply through measures such as water efficiency, desalination plants and groundwater recharge.

An understanding of the cultural and spiritual value of water to Aboriginal people is important when planning for the management of the state's water resources. There are many studies that examine water as a feature of the Indigenous cultural landscape and pay attention to the symbolic attachment to water bodies and the role of water in connecting people. Studies also reveal the material use of water according to Indigenous custom.⁵ The *National Water Reform 2020 inquiry report* has a strong focus on recognising Aboriginal and Torres Strait Islander interests in water, upholding the aspirations of Closing the Gap to maintain their distinctive relationship with water.⁶ This includes targets to increase Aboriginal and Torres Strait Islander legal rights to land and waters. The first WA *Closing the Gap Jurisdictional Implementation Plan* sets out the strategies and actions to achieve these targets. The 2020 Yamatji Nation Indigenous Land Use Agreement demonstrates progress in this area, providing members of the Yamatji Nation access to and rights to trade the use of 25.8 GL of groundwater under the Yamatji Strategic Aboriginal Water Reserve, 200 km north of Perth. In November 2021, a resource company secured the first lease of 560,000 kL, realising an opportunity for the Yamatji Southern Regional Corporation to generate economic revenue from the reserve.⁷



Scheme supplied water

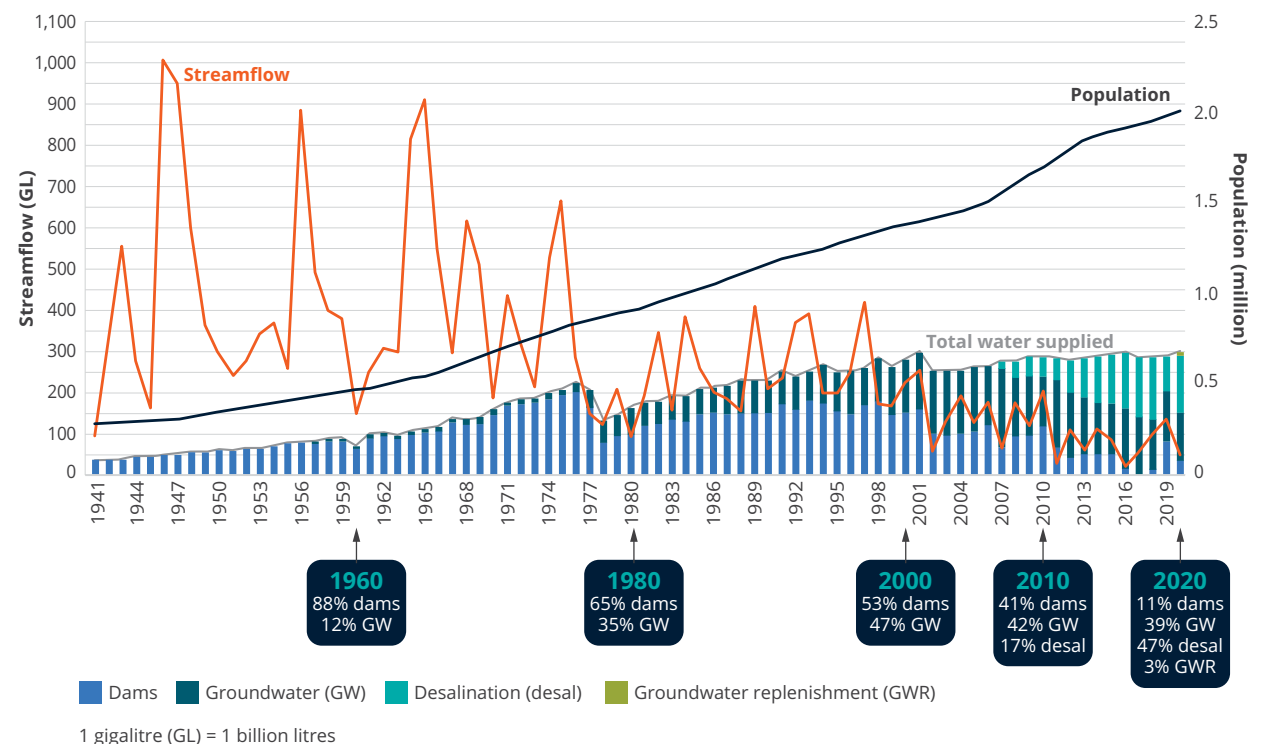
Although it is not the only public water supply scheme in the state, the Integrated Water Supply Scheme (IWSS) is a critical, centralised infrastructure network providing water to more than 2 million people in Perth, the Goldfields and surrounding agricultural regions and parts of the South West and Great Southern regions.⁸ It was originally designed to access and distribute surface and groundwater as the primary sources for potable and non-potable purposes but is now being supplemented by alternative sources. Two seawater desalination plants produce approximately 47% of the IWSS water supply, and an innovative groundwater replenishment scheme (where treated wastewater is recharged into groundwater supplies) supplements the IWSS (Figure 37). The primary source of groundwater is the Gngangara groundwater system, supplying approximately 120 GL or 37% of the IWSS drinking water per year.⁹ However, it is predicted that even with successful demand management and maximum production from existing sources, a new water supply source, or increased demand restrictions, will be required within 10 years.¹⁰

Capital investment by the principal water service provider, the Water Corporation, across all activities, comprised 9% of the WA Government's 2021–22 Asset Investment Program, with an average annual investment of more than \$750 million over the past 10 years. Commitments to water network and supply projects, which will provide greater certainty

for the IWSS as it continues to be impacted by the effects of climate change, amount to approximately \$497 million over the 2021–22 State Budget and forward estimates.

Major water source augmentations are expensive, with a future third desalination plant for the IWSS expected to cost well over \$1 billion. Desalination and groundwater recharge are also energy-intensive and costly water source solutions. Alongside the requirement to supply water and wastewater services, service providers also need to reduce their carbon emissions and adopt low-carbon practices and technologies as they move towards meeting the WA Government's net zero emissions by 2050 aspiration. Planning for new, climate-independent water sources will need to maximise energy efficiency and source renewable energy supplies. The WA Government's 2021–22 budget aligns with this approach, with a commitment of \$1.4 billion for a third desalination plant which will be fuelled by renewable energy.

Figure 37: Composition of drinking water supply by source in the Integrated Water Supply Scheme, 1941 to 2020¹¹



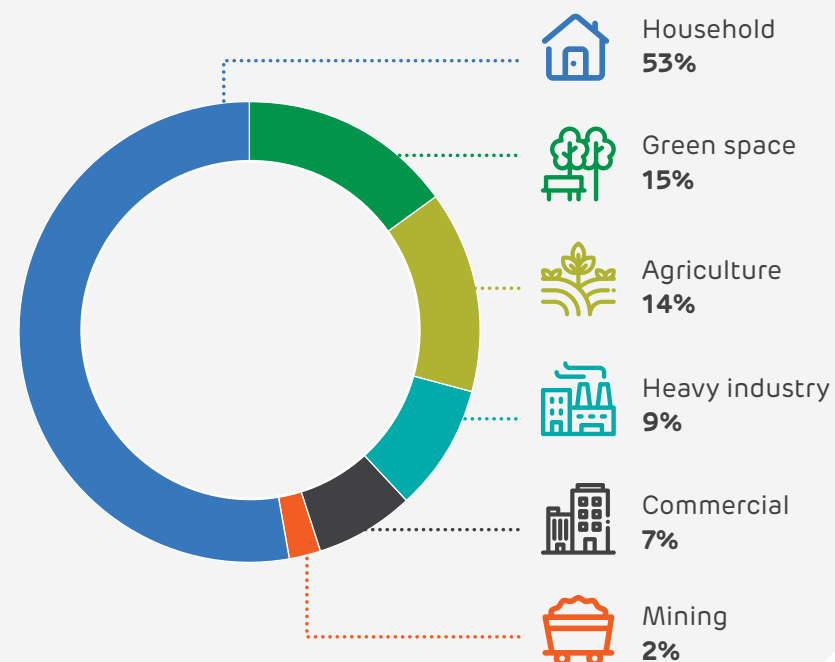
Self-supplied water

While most of the state's metropolitan water is supplied through water supply networks (generally potable), the majority of water statewide is sourced directly from the environment by the end user. Self-supplied use is where water is drawn directly by individuals, local governments and industrial, commercial or agricultural enterprises using their own water supply infrastructure, such as bores and/or dams. For example, in the Perth metropolitan area where a total of around 600 GL of water is used each year, approximately half is distributed via the large IWSS and most of the remainder involves users directly accessing their own supply of groundwater. It is estimated that garden bores collectively draw around 90 GL of groundwater taken from aquifers in the Perth to Mandurah area.¹² Self-supplied groundwater is generally used on an 'as is/where is' basis and plays an important role in supporting industry and economic growth and enhancing the liveability of communities. From 2014 to 2018, approximately 47% of total water use in Perth and Peel was attributed to uses other than household use (Figure 38).¹³ In 2019–20 it was estimated that 650 GL of irrigation water was consumed within WA each year, either through self-supply arrangements or supplied by irrigation cooperatives.¹⁴

While urban water security is largely managed through schemes, water for agriculture is often self-supplied as groundwater or surface water under licence, although there are some areas in the state (unproclaimed areas) where water can be taken without a licence. There are also instances in proclaimed areas where exemptions may apply and where licences are not required, such as some domestic garden bores and where water is being taken from certain shallow aquifers. Statewide, water that is self-supplied by local governments, landowners and industries using their own water infrastructure comprises 65% of water use.

As a critical step in water source planning, it is essential to thoroughly understand and manage existing natural water systems. The beneficial use of natural water resources should be managed through holistic, adaptive and resilient approaches to water resource planning and allocation that recognise and address the competition for resources

Figure 38: Water used by sectors in Perth and Peel (average 2014 to 2018)¹⁵



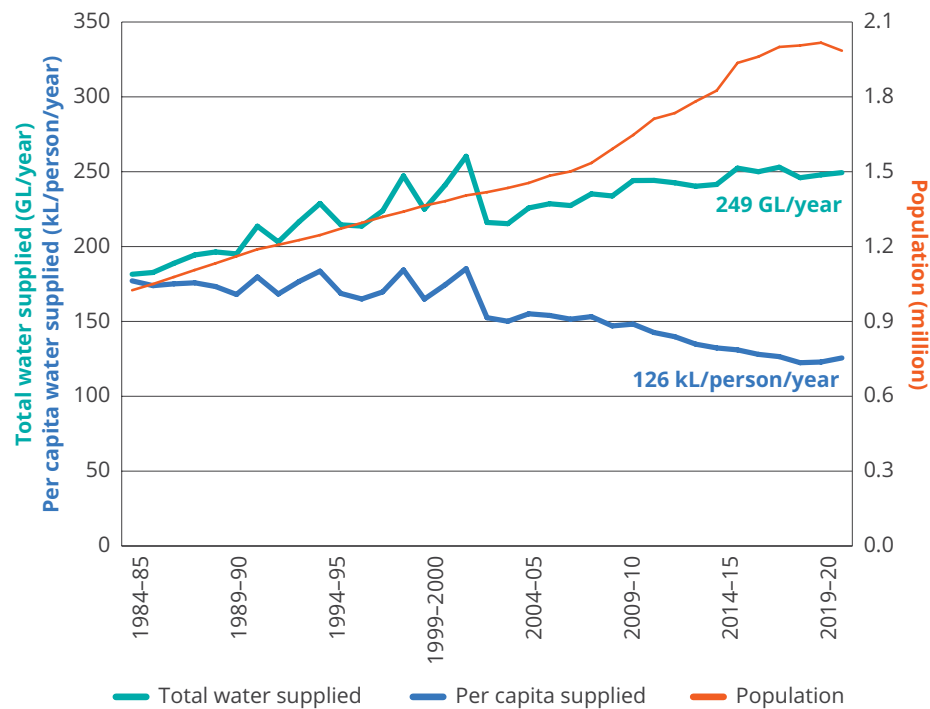
and changing availability. This is currently managed in part through the preparation and implementation of water-allocation plans. To ensure adequate and timely responses to changing circumstances, it is important that these plans are updated on a regular basis, especially for strategic water resources.

While demand management measures have been successful for scheme water (Figure 39), similar measures have not been broadly implemented for many self-supplied users.¹⁶ There are opportunities to achieve greater



water efficiency in areas of self-supplied use, as evidenced by data that suggests that households with a garden bore use 3 to 4 times more water on their lawns and gardens than households using scheme water.¹⁷ Robust monitoring and licensing regimes help to understand how much water is being drawn and for what uses. This is particularly important for critical water resources and those under pressure. Compliance and enforcement mechanisms for unlicensed water use are limited, presenting challenges for improving and incentivising further water efficiency gains.

Figure 39: Integrated Water Supply Scheme (total water supplied), 1984–85 to 2019–20¹⁸



Fit for purpose water and the circular economy

With water shortages common in Australia and other countries, there has been significant focus on the concept of fit for purpose water. This approach matches water of a certain quality to an appropriate use. *Waterwise Perth: two year action plan* acknowledges the potential of alternative (other than scheme or self-supplied water) non-potable water sources to water public open space, sporting grounds and recreational venues.¹⁹ The plan aims for a target of 45% of the projected gap between future water demand and supply to be met by recycled and alternative water supplies, including groundwater replenishment.²⁰ Other jurisdictions also recognise this opportunity, with the Victorian Government exploring pricing mechanisms, innovation and infrastructure solutions that will make better use of stormwater and recycled water to support urban greening and reduce pressure on drinking water supplies.²¹

The advantages of large-scale, interconnected, urban water schemes are recognised, and the state’s water entities have been successful in providing continuous and high-quality potable water to the most populated areas of WA, while also improving water efficiencies in a sector heavily impacted by a drying climate. However, as the impacts of climate change become more pronounced, it will be essential to adopt total water cycle thinking and appropriately use all available water sources, such as stormwater and wastewater, while driving more efficient practices. These opportunities and challenges will be pronounced in low-density population areas, new developments on the urban fringe, locations where there is a higher proportion of non-potable use and where large centralised systems are under pressure. Peri-urban agriculture is an example of where alternative fit for purpose water sources could supplement existing supplies. In these locations, opportunities may exist for smaller, integrated, decentralised systems to meet non-potable water needs, and for sectors that have historically depended on self-supplied groundwater to invest in systems and more effectively manage their water and wastewater. Ensuring planning and regulatory frameworks enable investment in alternative water sources will be important to optimise fit for purpose water use.



Driven by the reduced availability of groundwater and changes to environmental regulations, the Kwinana Water Reclamation Plant **recycles wastewater to supply 16.7 ML per day** of treated, industrial-grade water to industries within the Kwinana industrial area for non-potable use. This water is supplied at a lower cost than scheme water, reducing the demand on scheme and groundwater.

Pricing of wastewater services can also have an impact on the development of alternative sources of non-potable water. The uptake of infrastructure projects that produce and distribute non-potable alternatives such as rainwater, greywater and recycled wastewater has been slow for several reasons, including economic feasibility and regulatory barriers (for example, regulatory barriers to the introduction of new technologies). Wastewater services are currently priced based on gross rental values. This approach fails to recognise the true costs of service provision and leads to distortions in servicing particular geographic areas and the

amount recovered through pricing. Where these distortions exist, it is very difficult to enable alternative servicing or supply models that may feasibly deliver fit for purpose water, improving long-term sustainability and enhancing circular economy outcomes. Importantly, solutions that are developed need to be, among other things, conscious of water quality (health and environmental considerations), energy use and relative costs.

In addition to fit for purpose water, opportunities exist to integrate water, energy and waste to make better use of waste products and reduce

WA's carbon footprint. The Waste chapter highlights the need to reduce and reuse waste, and recognises the potential value of waste from both environmental and economic perspectives. Circular economy principles look beyond the take-make-use-dispose extractive industrial model, designing out waste and pollution and keeping products and materials in use for as long as is practicably possible and regenerating natural systems. A sustainable and circular approach to water management recognises the finite nature of water resources and the potential value of wastewater and other by-products.



While circular economy concepts such as water recycling, reuse of waste by-products and conversion of waste to energy are already being adopted to some extent in WA, there is no indication whether there is a long-term objective to realise the full potential of a circular economy in the water sector. This could include recovery of nutrients or other beneficial products from waste streams, such as phosphate for use in fertiliser or magnesium from desalination plant brine. Potential efficiencies can reduce environmental impacts and evidence-based assessments should be used to identify where circular economy options are beneficial. To fully embrace the circular economy concept, a major step change would be required across several sectors and may require changes in legislation.



Bunbury Water Resource Recovery Scheme

As part of its Integrated Water Management Strategy, Aqwest is implementing the Bunbury Water Resource Recovery Scheme, with \$14.1 million allocated from the state government's WA Recovery Plan.

The scheme will provide 5.6 ML of recycled water per day to irrigate public open spaces in Bunbury and to use on major infrastructure projects such as the Bunbury Outer Ring Road.

The project involves construction of a new water recycling facility, adjacent to the Bunbury Wastewater Treatment Plant, and associated pipelines. This will alleviate the need to draw high-quality drinking water from the Yarragadee Aquifer (which is experiencing reduced recharge due to a drying climate and associated saltwater intrusion) and reduce the amount of treated wastewater discharged into the ocean.

Valuing the 'true cost' of groundwater resources (such as environmental impact and long-term sustainability), as compared to the current low economic cost of extracting and treating groundwater, remains a challenge.

WA Government support in responding to community expectations for sustainable water use practices has allowed this step forward in integrated water management in Bunbury.

Coordination and collaboration with multiple stakeholders, including the City of Bunbury, Water Corporation, Main Roads WA, and the departments of Health, and Water and Environmental Regulation, is set to bring benefits to both public and private sectors, delivering a more sustainable water future and a greener Bunbury.

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The National Water Initiative provides guidance on best-practice water pricing including how to set tariffs in circumstances where there are large monopoly water service providers and an absence of water trading.²² Principles include (but are not limited to) cost recovery, 2-part tariff structures, cost-reflective tariffs and pricing transparency. In its assessment of jurisdictions' performance against these benchmarks, Infrastructure Australia found that WA pricing was lacking in transparency and that there was insufficient evidence to determine whether prices are set to meet full cost recovery.²³ A more transparent approach to the cost of water supply and wastewater services, and how it relates to water pricing, would enable a better understanding of the true value of water, wastewater and the impacts on consumer behaviour.



A clearly articulated statewide direction for the water sector, integrated with other sectors, would support a **coordinated and contemporary approach to water management** and guide the way WA accesses and uses water.

In its *Reforming urban water* report, Infrastructure Australia identified the importance of the separation of powers between owner, operator and regulator for best-practice regulation and efficient service delivery. Between the water regulator and water service providers in WA, the lead entity for various policy and planning matters is not always well defined, evidenced by the range of planning documents outlined in Figure 40.

A range of agencies are involved in environmental regulation and, according to Infrastructure Australia's assessment, this sometimes results in conflict that may be restricting the ability to meet best practice. Further to this, while the Economic Regulation Authority, as the independent economic regulator, plays a role in licensing, it only has a limited review and advisory role in price setting.

Legislation, regulation and planning

There is currently no contemporary, long-term, statewide direction for the water sector. The last state-level water strategy has not been refreshed for 14 years. In the past, water government trading enterprises (GTEs) produced comprehensive long-term planning documents, such as Water Corporation's Water Forever suite. These plans play an important role in setting the direction for the water service providers to plan their infrastructure and service delivery programs. They should not, however, be mistaken for the government's strategic position on the state's long-term water future. As GTEs, water utilities are corporate entities with specific commercial objectives. It is important for the government, through its primary water policy agency, to provide strategic direction and guidance for water utilities and other water sector participants. A strengthened water policy and planning function (dealing with economic, social and environmental factors) within the Department of Water and Environmental Regulation is required to complement its regulatory and environmental role. This will provide appropriate planning for changing climatic, economic and social conditions throughout the state and consideration of circular economy and sustainability principles.

To further enable a progressive, resilient water sector, a modern legislative framework is required. Water resource legislation is currently complex and comprises 6 separate Acts – some more than 100 years old. While some reform measures have been progressed, there is further work to be done to develop a framework that is flexible, progressive and capable of managing water today and in the future. Legislative reform should provide the regulatory framework to deliver the state's long-term strategic water aspirations.

Governance

The IWSS is the largest water supply scheme in WA and delivers 298 GL of water per year to more than 2 million people. Other major schemes managed by the Water Corporation include the Great Southern Towns Water Supply Scheme, the Lower Great Southern Towns Water Supply Scheme and the Goldfields and Agricultural Water Supply Scheme (which is part of the IWSS).



Beyond the major schemes and water GTEs, several smaller suppliers provide drinking water to the public in parts of regional WA. Examples include local governments, resource sector companies and those supplying drinking water to remote Aboriginal communities.

The water sector is highly regulated to ensure water resources are managed sustainably, environmental impacts are controlled, consumer interests are protected and drinking water quality standards are maintained. However, not all services are regulated, with some service providers explicitly exempted from licensing requirements, such as in some remote communities, local governments and tourism developments. Key water regulators in WA include:

- **Department of Water and Environmental Regulation** is responsible for the sustainable management and protection of water resources, including preparation of strategies, policy and regulation.
- **Economic Regulation Authority** manages licensing of water services, including issuing licences, monitoring compliance and ensuring appropriate customer service mechanisms are in place. The state government can refer matters to the Economic Regulation Authority to conduct inquiries. In 2017, the Economic Regulation Authority conducted an inquiry into efficient costs and tariffs of the Water Corporation, Aqwest and Busselton Water.
- **Department of Health** regulates health-related elements of drinking water, wastewater and recycled water according to the *Australian Drinking Water Guidelines*. All recycled water schemes must be approved by the Department of Health in accordance with the *Health Act 1911*.

Licensed water service providers deliver services that include distribution of potable and non-potable water, water treatment and storage, wastewater and wastewater treatment, and drainage. The state's primary water services are provided by the following GTEs:

- **Water Corporation** is the state's principal licensed water service provider, servicing an area of 2.6 million square kilometres ranging from Perth to Kalgoorlie and parts of the South West and Great Southern regions. It owns and manages the IWSS.



- **Aqwest** is a licensed water service provider servicing the Greater Bunbury region, which extends from Myalup and Harvey in the north, and south to Capel.
- **Busselton Water** is a licensed water service provider servicing the Busselton area, which extends from Capel in the north, and south to Augusta.

In addition, large volumes of irrigation water are supplied by licensed irrigation cooperatives in the South West, Gascoyne and Kimberley regions.



Recommendations

Legislation, regulation and planning

Current regulatory and legislative frameworks have not kept pace with important improvements in modern water resource management and should be reviewed to support the uptake of new technological advancements and the application of a sustainable and circular approach to water services.

Existing legislation contains limited tools to empower the regulator to establish and enforce water allocations and trading arrangements that support the movement of water to its most valuable use. Provisions do not adequately enable creation of statutory water entitlements nor facilitate adjustment of available water volumes to accommodate changing conditions (for example drought or long-term climate change). More secure water entitlements, coupled with regulatory mechanisms to protect non-economic beneficial uses, such as water for public open space and cultural purposes,

would encourage investment in water licence transfers and result in water moving to its highest value use. Allowing for trading of water in projects operating under existing state agreements, where there are opportunities to reuse excess water from mining operations for other beneficial uses, should also be addressed. Reforms should enable new water management approaches, such as treatment of wastewater, reinjection into the ground and recovery as a resource, as well as provide longer-term security of allocations and entitlements for water users.

Successive state governments since 2007 have been progressing a suite of reforms; however, this has not yet resulted in a contemporary and consolidated Water Resources Management Act. Review and consolidation of the suite of water resources management legislation, including the *Rights in Water and Irrigation Act 1914*, should be progressed as a matter of priority. These changes are required to support contemporary water management practices, more efficient investment in water sources and use, improved management of population growth, enhanced ability to deal with changes to practices and technology and better protection of the condition of water resources.²⁴



While it is recognised that water sector participants undertake a raft of planning activities, there are gaps in the published strategic planning framework that make it difficult to navigate and the framework would benefit from a clearer, long-term, statewide direction (Figure 40).

There is a need to consider the state’s long-term water future, explore how efficiencies can be achieved through sector integration and plan for future economic uses, particularly in relation to emerging water-intensive industries such as hydrogen production. A statewide water plan was last released in 2007 and has not been refreshed since. Strategies, initiatives and targets identified in this plan should be reviewed and updated to set a contemporary vision for water in WA. Strategically important water resources such as those experiencing strong competition for allocation, those that are critical to communities and industry and/or those that have significant environmental or cultural value, should be defined and identified in a state water strategy.

Regional water strategies are also outdated, do not cover the full extent of the state’s regions and do not adequately address the contemporary needs of regional communities, industries and agriculture. It is important for government (as a water service provider), communities and businesses to have increased certainty of their water security through robust planning that is based on up-to-date evidence and considers local circumstances and needs. Regional water plans should identify how water for communities and businesses will be delivered and managed, how economic prosperity will be supported and how social, cultural and environmental values of water will be balanced and protected. The *Waterwise Perth: two year action plan* has a vision for 2030 and a 2-year action plan that is strongly focused on metropolitan water efficiency measures and proposes welcome planning and policy review measures. It would be worthwhile applying a similar approach in regional areas and extending this beyond urban considerations.

What people use water for is just as important as how much water they use. Planning and regulatory frameworks should support the preservation of existing, good-quality water for drinking purposes

by enabling investment in appropriately scaled, decentralised systems that distribute water for fit for purpose non-potable uses, including agriculture. The frameworks should consider infrastructure provision proactively to ensure that servicing proposed land developments are given early consideration of source availability (particularly for watering of public open space). This will help achieve long-term sustainability and resilience of WA’s water supply networks. Furthermore, the current pricing structure for wastewater and drainage services introduces distortions that may be obstructing the development of innovative, low-cost water recycling schemes.

Figure 40: Recently published strategic water plans

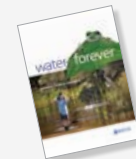


Waterwise Perth: two year action plan (DWER 2019)

Regions: Perth and Peel

Planning horizon: 2-year plan with a 10-year outlook

Focus: Water efficiency



Water Forever suite (Water Corporation 2009+)

Regions: Perth and Peel

Planning horizon: 50 years

Focus: Climate resilience, reduce water use, increase water recycling, develop new sources



Water for growth: urban (DWER 2016)

Regions: WA’s cities and towns

Planning horizon: 35 years

Focus: Urban water demand and supply



Regional water supply strategies (DWER)

Regions: Kimberley (2010), Pilbara (2013), Great Southern (2014), Mid West (2015), South West (2015)

Focus: Medium-term and long-term resource options

Recommendation 48

Modernise legislative, regulatory and planning frameworks for water resources and water services by:

- a. prioritising the development and introduction to Parliament of consolidated and modernised water resources management legislation that:
 - supports contemporary, best-practice and responsible water resource management
 - improves the definition and security of water entitlements
 - facilitates a balanced approach to water trading (including addressing barriers in state agreements)
 - responds to evolving conditions such as climate change
 - considers the cultural and spiritual value of water to Aboriginal people when making allocation or other resource decisions
- b. developing, publishing and implementing a 20-year state water strategy, in collaboration with all relevant stakeholders, including Aboriginal groups, that:
 - considers economic, social and environmental factors, including population growth, industry needs (such as growing a hydrogen industry) and key shocks and stresses, including climate change
 - defines and identifies strategic water resources
 - sets objectives and measurable targets to achieve long-term water security for the state, considering circular economy principles and multi-source water planning
 - identifies appropriately scaled solutions (local, decentralised or large scheme) that deliver optimised outcomes
 - articulates a planning and policy framework, identifying the roles of all levels of government, the water services sector and the private sector to support state development objectives
 - is reviewed and refreshed on a 5-year cycle
- c. developing, publishing and implementing 10+ year regional water plans (including for Perth and Peel) in collaboration with all relevant stakeholders, including Aboriginal groups, that:
 - align with the state water strategy, regional land use plans and other relevant policies
 - respond to the economic, social and environmental drivers and issues of each region
 - consider outcomes of the strategic review of water and land-use values (see Recommendation 53)
 - are based on up-to-date science and evidence
 - address water allocation and supply, and set out infrastructure and investment requirements
 - are prioritised according to level of risk and need and are refreshed on a 5-year cycle
- d. including provisions in planning and regulatory frameworks that enable investments in appropriately scaled, locally integrated alternative water supplies and wastewater systems
- e. consistent with Recommendation 26 in the Planning and coordination chapter, clearly articulate water resource needs, drainage and infrastructure requirements in land-use and infrastructure servicing plans. Planning should ensure that:
 - there is early consideration of the locational availability of water resources and servicing options so that the real capital and operational costs to government are known before making planning decisions
 - opportunities to collaborate with the energy sector to plan, access and/or generate renewable energy solutions are identified
 - opportunities to use integrated water cycle planning approaches at a community level are adopted to match demand with the most appropriate source of water that is available.



Demand management

Effective water resource management is essential to safeguard the productive and sustainable use of existing water sources, particularly where WA's natural water resources are under pressure from reduced rainfall and recharge and a range of consumptive uses. In addition, significant ecosystems are dependent on groundwater and require careful management. Responsible management of natural water resources can potentially defer the need to invest in costly, climate-independent water supply infrastructure such as desalination plants.

Reducing water use is a critical element of long-term water management. A range of efficiency programs and campaigns to reduce use of scheme water have already been implemented in WA with considerable success. Water demand management programs such as Waterwise (established by the Water Corporation) have been successful in reducing consumer use of scheme water, using a range of initiatives such as sprinkler rostering, educational programs and incentivisation of water-efficient appliances in homes and businesses. The Water Corporation's Waterwise programs should not be confused with the *Waterwise Perth: two year action plan*, which is a plan for Perth to address the drying climate by changing the way water is managed in the urban landscape and to transition Perth to a waterwise city. The success of the Waterwise programs is easily understood, as scheme water is a product in a commercial model that is measured and charged accordingly.

Pricing is also a lever that can influence water use behaviour. The National Water Commission found that consumption-based pricing in other jurisdictions has contributed to a 'consistent pattern of reduced water consumption'.²⁵

Where users access water directly through self-supply, the same pricing levers are not available. While it is acknowledged that self-supplied water does not have the benefit of scheme treatment and is generally only suitable for non-potable uses, in the interest of managing such a critical resource, self-supplied water (in the context of all users), should be appropriately valued. Applying measures that lead to the highest value use of the resource would be a responsible approach. There are a range of existing and potential mechanisms, such as licensing and allocation, metering, compliance, charging and water trading, that should be further considered. Any proposed reforms should take into consideration the need to support non-economic beneficial uses, such as public amenity, cultural values and environmental protection.

The Gnangara groundwater system is Perth's largest and lowest-cost source of good-quality water. In 2019–20, approximately 275 GL was drawn from the Gnangara system, of which 40% was used by Water Corporation for potable water distribution through the IWSS.²⁶ The remainder was drawn directly by self-supplied users – 13% by unlicensed stock and domestic bore users and 47% on licensed use for public open space and recreation, agriculture and businesses.²⁷



As climate and other factors place the Gnangara groundwater system under increased pressure, it is important that land-use and water-allocation planning adapts and keeps pace. The last publicly available allocation plan for Gnangara was released in 2009, but in November 2021 the WA Government released the draft Gnangara groundwater allocation plan for public comment.

This plan estimates that to protect groundwater levels and maintain a reliable water supply, there is a need to reduce groundwater abstraction by 54 GL per year over the next decade.²⁸ To safeguard this critical water resource, it is necessary to finalise and implement the plan to successfully rebalance water use and availability.

Recommendation 49

Support the long-term sustainable use and management of the state's strategic water resources by:

- a. reviewing self-supply arrangements for strategic water resources (as identified in the proposed state water strategy) across the state, with the Gngangara groundwater system as a priority, to:
 - quantify the amount of water being used for self-supply purposes from each strategic water source, through monitoring and metering
 - understand the economic, environmental, cultural and social value of each strategic water resource to the region and the state
 - understand future use scenarios and any impacts on the timing and scale of major investment in future water supply infrastructure, such as desalination plants
 - consider possible policy and regulatory approaches that could be implemented to ensure long-term sustainable outcomes
 - outline mechanisms to achieve improved water-use efficiency (such as improved licensing, metering, pricing, trading and compliance measures)
- b. based on the outcomes of the review in Recommendation 49a, implementing recommended reform measures
- c. finalising and implementing the Gngangara groundwater allocation plan.

Recommendation 50

Manage water demand by:

- a. reviewing and implementing the *Waterwise Perth: two year action plan* to further improve urban water efficiency
- b. developing and implementing plans, similar to the *Waterwise Perth: two year action plan*, for regional areas where benefits can be demonstrated
- c. implementing and, where necessary, introducing expanded water efficiency programs, such as the water government trading enterprises Waterwise programs, to offset the development of new water sources
- d. reducing water consumption through education and improved consumer awareness, including by increased use of smart meters, and applying digital technologies to optimise asset performance.

Long-term climate-independent water security

While protection of groundwater systems is essential, there is a recognised need to plan for climate-independent water sources to supplement surface and groundwater sources to ensure WA's long-term water security.

The Perth and south-western coast water security initiative is listed on Infrastructure Australia's *Infrastructure priority list 2021* as a high-priority initiative. It highlights the need to consider the impacts of declining groundwater availability for non-potable uses on urban liveability. As a result, development where alternative water supplies are needed may be constrained or more costly.

Investigations into alternative water sources, such as additional desalination plants, wastewater recycling and groundwater replenishment programs, should identify sustainable and cost-effective ways to augment supply.

With the mix of supply now including an increasing amount of costly desalinated water, the true cost of water, along with sustainability and resilience benefits, should be considered when undertaking feasibility and options assessments.



Recommendation 51

Ensure long-term water security through the timely planning and delivery of climate-independent infrastructure that provides fit for purpose and sustainable water services, including:

- a. continuing detailed planning and business case development for an additional desalination plant to increase the volume of desalinated water supply to the Integrated Water Supply Scheme and meet medium-term demand projections. Planning and business cases should demonstrate how the use of renewable energy and the application of energy-efficient design, technologies and practices are being used to achieve a target of net zero emissions by 2050
- b. further investigating wastewater recycling opportunities and groundwater replenishment schemes
- c. based on needs identified in the proposed state water strategy and regional water plans (see Recommendations 48b and 48c) and subject to business cases, implementing climate-independent water supply solutions in regional communities as required.



Water for agriculture and food

Providing water for agriculture and food production is complex, particularly considering the state's diverse climate and water resource availability.

Water is a critical input for agricultural production and plays an important role in food security. Traditional agrifood regions are under increasing pressure to both maintain and grow existing production levels.

While climate change, and in some cases urban encroachment, are impacting the water availability in the south-western portion of the state, some eastern areas are constrained by water quality issues where most of the available water is too saline for agricultural production. Other areas, particularly in the north of the state, have both land and water resources that could support new agrifood production but require significant investment in technology and infrastructure projects to realise the opportunities.

New and alternative water sources and distribution networks should be considered to improve the industry's resilience to the impacts of climate change. This should be supported by a focus on sustainable farming techniques and modern on-farm water infrastructure to ensure water efficiency and industry self-sufficiency. It is also important to support the network of community water supplies managed by the state government, which provide emergency stock water, reliable supplies for firefighting and irrigation of regional sporting facilities and community greenspaces.

Evidence-based analysis is required to assess competing proposals for agricultural water infrastructure projects. A strategic assessment framework is needed to determine priorities based on potential value to the state, assessing viability and sustainability, and considering social, economic, environmental and cultural impacts. This will provide certainty for agribusiness, boost economic development in regional communities and support robust decision-making that may help to access funding assistance, including private agribusinesses and federal funding opportunities.

Recommendation 52

Guide investment in water infrastructure projects that enable climate resilient and self-sustainable agriculture and food industries in peri-urban and regional areas by developing a prioritisation framework. The framework should:

- be consistent with regional water planning (see Recommendation 48c)
- prioritise investment in locations that are strategically aligned with agriculture and food industry opportunities (see the Regional development chapter)
- consider social, economic, environmental and cultural impacts and opportunities.

Strategic value of land use and water

The availability of urban land for development is diminishing, particularly in the Perth metropolitan area. Much of the remaining land has some form of development constraint, including the protection of public drinking water source areas. While the importance of maintaining adequate supplies of drinking water is critical, consideration of the strategic value of water sources and land should be integrated. Water-protection measures and land-use responses should be based on risk assessments that are informed by current and robust scientific evidence, contemporary development and building techniques, and strategic valuations of land and water in the current and projected demand and supply context.

Public drinking water source areas are surface water catchments and groundwater resources that provide drinking water to cities, towns and communities throughout the state. There are many of these areas across WA, some of which are under pressure for land development due to their proximity to high-quality infrastructure and urban amenity, such as the Jandakot and Gnangara groundwater systems. The Department of Water and Environmental Regulation's policy on development in these areas notes a presumption against the intensification of land uses, to which the land-use planning system responds. The framework for the protection of public drinking water resources is extensive and includes instruments such as legislation, strategic policies and water quality protection notes. These instruments guide and assign priority areas to land within public drinking water source areas to protect the source from contamination.

This priority is reflected in the land-use planning system to ensure that public drinking water source protection areas are considered at all stages of the planning process. A suite of state planning policies protect public drinking water source areas from development and land uses that may have a detrimental impact on the water resource.



These policies address protection of all public drinking water source areas, the Peel Harvey coastal plain catchment, the Swan Canning river system and sensitive water resources. These policies are intended to ensure that planning and development considers water resource management, with an emphasis on the prevention of risks to water quality.

With growing pressure on urban land availability, an integrated strategic evaluation of water and land values is needed to develop a balanced and strategic level understanding of risks and benefits, and to inform the land-use and water-protection policy framework, including the preparation of integrated regional plans (see Recommendation 28) and regional water plans (see Recommendation 48c). Such an evaluation should be undertaken collaboratively by WA Government agencies that are responsible for land-use planning and the protection of public drinking water source areas, in consultation with relevant GTEs. The clear articulation of government's strategic position will optimise land-use outcomes while ensuring secure provision of good-quality water for generations to come.

Recommendation 53

Determine whether current policy settings remain appropriate by undertaking an integrated strategic review of water and land-use values in the Jandakot and Gnangara groundwater protection areas. The review should consider:

- balancing costs, benefits and risks across all economic, social and environmental factors
- a strong up-to-date expert evidence base
- contemporary building and development options to adequately mitigate any risks to groundwater quality
- climate change factors
- the future role of the groundwater systems as part of the Integrated Water Supply Scheme's broader water supply over the medium to long term, including potential alternative water supply options.

