

# Water Forever: South West

Final Report



# Executive Summary

Water Corporation has undertaken a planning study of water needs and sources for our South West customers for the next 50 years to ensure that reliable drinking water supplies are maintained in a sustainable way.

The planning takes into account a number of pressing issues, principally the drying climate, population growth, changes in the way water services are delivered, and changes in technology and lifestyles.

We recognise the transition to a climate resilient future will be a shared journey. Extensive stakeholder and community consultation has already taken place, including a community attitudes survey. The community will continue to have an important role, particularly with improving efforts to reduce water use and adopting a new mindset for waterwise behaviours.

We are working in partnership with all community sectors, including households, business, industry, agriculture, schools, all tiers of government, and academic and research institutions.

The most likely scenario for the longer term is that there will be less rainfall, so we need to be prepared. We are also expecting hotter weather and more droughts.

Limited water resources will be exacerbated by growing demand from industry and agriculture.

The challenge for us is to provide drinking water:

- in an even drier climate
- with twice as many people, and
- with less environmental impact.

The planning study covers the 31 South West towns we currently supply with water sourced from groundwater and surface water, and includes wastewater services in Bunbury and Busselton. It does not include areas where Aqwest and Busselton Water provide water services.

Over the next 50 years, water demand in the study area may more than double from 12 billion per year to nearly 30 billion litres (see Figure 1). To meet this challenge we have adopted a portfolio approach that focuses on climate resilience by:

- reducing water use
- increasing water recycling, and
- developing new water sources.

Figure 1 Current Water Corporation water supply and projected demand for Water Corporation customers

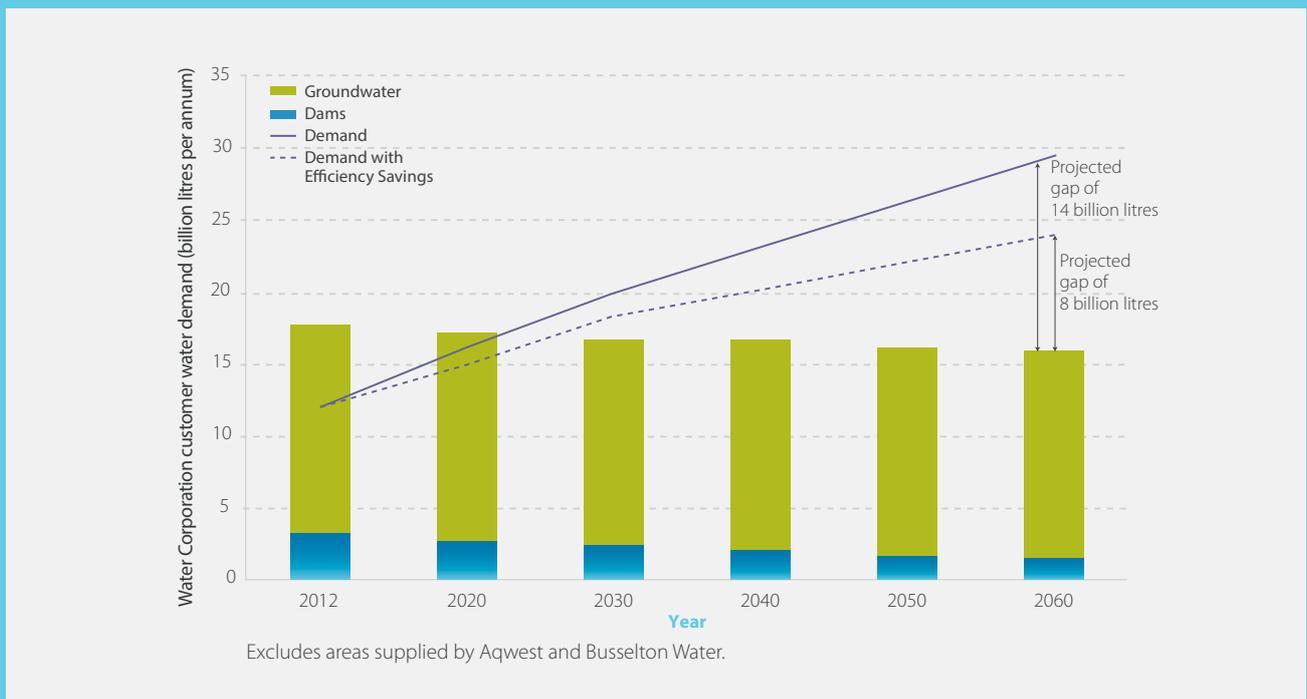


Figure 2 Water Forever: South West planning study area



## The drying climate

It is now well established that rainfall in the South West of Western Australia has decreased as part of the drying climate. This has been happening since the 1970s and has greatly reduced streamflows into dams and lowered regional groundwater levels.

Based on work completed by the Commonwealth Scientific Investigation and Research Organisation (CSIRO) and the Bureau of Meteorology, this trend is expected to continue over the next 50 years. This will have a significant effect on water availability for all sectors, including households, business and industry, local government, mining and agriculture, as well as the environment.

The CSIRO South West Sustainable Yields Project (2009) outlined climate projections and the associated impact on yields for both surface water and groundwater resources to 2030. The results highlight that the impact on water resources varies with location.

The CSIRO groundwater modelling to 2030 has shown that areas are less affected by a drying climate where each winter's rainfall is able to refill shallow unconfined aquifers. This is most common in sandy areas with high water tables and no perennial vegetation. Parts of the Swan and Scott Coastal Plain meet this requirement. It also found that for an area south of Bunbury, the water table under the Swan Coastal Plain remains stable under all climate scenarios.

Much of the Blackwood plateau is under native woodland and has deeper and often clayey soils and, as a result of a drier climate, there will be a greater impact on groundwater levels. For example, CSIRO estimates groundwater flows into the Blackwood River may decrease by between 20 and 30 per cent under a drier climate.

Public drinking water supply is not the only area that will be impacted by a drier climate. Our customers use 7 per cent of surface water and 7 per cent of groundwater in the South West; so other users, such as agriculture, mining, industry and local governments, will need to develop discrete strategies.

A warmer, drier climate may also increase the frequency and intensity of bushfires. Higher temperatures and reduced soil moisture could increase the challenge of undertaking controlled burns for fuel reduction.

Our natural environment will have to adapt to a drier climate. The drying climate will increase stress on native vegetation and in turn its susceptibility to other pests. For example, during the dry winter of 2010, vegetation deaths were recorded even in drought tolerant species of the northern jarrah forests.

For *Water Forever: South West* we used the CSIRO's 'dry climate' projections and considered if the water supply options were rainfall dependent or not.

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## Regional setting

The South West region is internationally recognised as a biodiversity 'hot spot' and highly valued for its natural beauty from forests to Geopraphe Bay. It has the most diversified economy of all regions in WA with some of its key industries including agriculture, viticulture, mining, tourism and fishing. The region's wineries produce over 20 per cent of Australia's premium wine.

Population growth across the South West region varies but there has been strong growth in the City of Bunbury, City of Busselton and the Shires of Harvey, Capel, Dardanup and Augusta-Margaret River.

The most significant areas for future growth are along the coastal strip from north of Bunbury to Dunsborough. These areas are currently supplied from groundwater and already account for over 65 per cent of water demand in the study area.

We expect capacity of the Capel and Dalyellup schemes will need to be increased in about five years depending on population growth and water use efficiency, followed by Eaton-Australind around 2030.

In contrast, inland towns represent a significantly smaller proportion of the region's population and have not experienced the same rapid urbanisation. These towns are largely supplied by surface water dams and the recent drying climate has triggered ongoing investment in water supply systems to provide water security.

Schemes like the Warren-Blackwood Regional Water Supply Scheme make up less than 15 per cent of the total water demand of Water Corporation customers in the South West. Between now and 2030, water demand in these areas is not expected to grow rapidly as a result of population growth — the trigger for a new water source is likely to be the result of a series of several dry winters.

## Creating a portfolio of water options

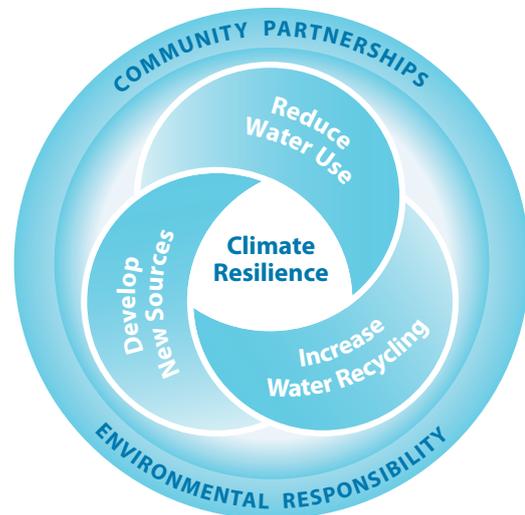
The timing of new sources is dependent on many factors including population growth, water usage, reliability of supply, and rainfall.

Based on past experience, we know that developing a portfolio of options is a robust approach that gives us the flexibility to adapt to unforeseen changes.

We have undertaken a sustainability assessment of 80 options which could help meet future water demand. The results from this assessment have been considered and incorporated into the options for this final report.

This study has also highlighted the geographical variation of different options across the South West. For example, rainwater tanks are more effective in areas of high rainfall, groundwater is only available in certain areas, and large-scale water recycling is more viable in areas near Bunbury and Busselton where large volumes of wastewater are available.

We have grouped the report into the key areas of reducing water use, increasing water recycling and developing new sources, and all three areas will be required to achieve climate resilience. Figure 3 shows the location of potential water supply and water recycling options, as well as the groundwater sub-areas.



## Reduce water use

Over the last five years, our customers in the South West have reduced their water use by 15 per cent, which has allowed for the total water demand to remain generally constant despite a growing population.

However, water use efficiency varies between towns and, while it has been improving, there is scope for additional water savings to be made compared to other regions around the state.

To achieve future water security, we propose to extend this figure and set a target of 25 per cent reduction in water use per person to 2030. This can be achieved through targeted application of established programs (for example, Waterwise programs and sprinkler rosters), and also by continuing to implement technologies such as data logging and leak detection.

Community support is vital to achieving water use efficiency improvements.

## Increase water recycling

About 28 per cent of the South West region's treated wastewater is recycled each year. This recycled water is used to irrigate woodlots, golf courses and public open space.

We provide free recycled water 'at the gate' of our wastewater treatment plants for schemes which benefit the community, for example watering on public open space. However, the user is responsible for building the necessary infrastructure to transfer and use this recycled water.

Figure 3 Potential water source options for South West towns



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As traditional sources for drinking water supplies come under increasing pressure, water recycling will become a more viable and cost effective option.

Groundwater replenishment has been included in the portfolio of options as a climate independent source for areas near Bunbury, Busselton-Dunsborough and Margaret River. This process is where treated wastewater is further treated to drinking water standards and recharged into a groundwater system. The water is stored in the aquifer and taken out some time later for further treatment and supply to a drinking water system.

Some other water recycling options included in this final report do not necessarily increase the amount of drinking water available, while others would be dependent on factors such as development, legislation and funding.

## *Develop new sources*

In the South West, water is sourced from dams and groundwater, and supplied locally or through an integrated scheme.

The options presented in this final report are for local sources to supply local towns or areas and the State Government's position is that the South West Yarragadee aquifer is for local use only. We have no plans to pump water from the South West Yarragadee Aquifer to Perth and it is not a potential option being considered as part of this project.

The section on developing new sources has an overall summary of options and then focuses on five sub-regional areas: towns on the Swan Coastal Plain, Collie, Margaret River-Augusta, Warren-Blackwood, and Pemberton-Northcliffe-Quinninup. A snapshot of water demand in these areas is provided in Table 1.

The three main water source options presented in the final report are for surface water, groundwater and seawater desalination.

Surface water sources (dams) remain important east of the Darling Scarp where there is limited groundwater. While dams will continue to play a role as a water source for some locations, we expect they will become less reliable and increasingly used for storage and in conjunction with other sources.

Surface water schemes in the Great Southern Towns Water Supply scheme and the Warren-Blackwood Regional Water Supply Scheme are more susceptible to a series of dry winters than towns supplied with groundwater.

Our initial community engagement indicated that there is community support for surface water sources, and we have included an additional four in this final report — Gregory Brook, Nannup Brook, Camp Creek and Northcliffe Dam.

However, comment on the draft report indicated some stakeholders are concerned about new dams and the associated limitations on recreational activity.

Groundwater is a major water source for the South West and we have included several options to expand groundwater where it is available.

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The Department of Water (DoW) sets limits on the amount of groundwater that can be abstracted by various users through its allocation plan. It has reserved about 9 per cent for future public water supplies in the South West region. The allocation for our customers is 14.7 billion litres per year, which is about 7 per cent of the total amount of groundwater made available by DoW.

The DoW's South West allocation plan reserves groundwater to meet town water demand to 2034.

As a result of strong water efficiency gains by customers, the existing public groundwater reserve is estimated to be able to meet regional demands beyond this timeframe if groundwater is available and allocations are not reduced.

For seawater desalination, we have included options for micro desalination plants on the west coast, south coast and at Windy Harbour, and also an option for water from the Southern Seawater Desalination Plant near Binningup to be used to supplement water supply to areas such as Eaton-Australind if required.

Other new source options include groundwater replenishment, reducing evaporation from dams, catchment management, groundwater trading and bulk water purchase.

## **Integrating water supply schemes**

There are already several integrated schemes in the South West region, however, the region generally is characterised by multiple locations and water sources, with little inter-connection.

While there are benefits to integrating water supplies, constructing pipelines is capital intensive and there can be substantial operational costs because of the distances the water needs to be pumped.

We looked at several options to inter-connect towns in the South West and assessed these against a 50-year timeframe and under various growth, climate and water use efficiency scenarios.

The volume of water being moved between the water sources significantly influences the cost-effectiveness of integration options. Where there is a large population, high demand for water and scarce local sources, an integrated scheme may be the most cost-effective option.

The options presented in this final report (see pages 68–71) are to supplement the Great Southern Towns Water Supply Scheme, expand the Warren-Blackwood Regional Water Supply Scheme, and to connect Pemberton, Manjimup Dam, Northcliffe and Quinninup.

We also assessed a scenario that integrates climate independent sources such as micro seawater desalination plants and groundwater replenishment schemes. With the cost estimated to be \$1.6 billion, there are many local water sources and water efficiency measures that could be implemented before a fully integrated system would be justified.

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## Environmental responsibility

Using less water is a significant step towards climate resilience and lessening our physical impact on the environment.

Some other ways we are working to improve environmental outcomes include:

- investing in renewable energy such as wind, wave, solar and biomass
- becoming more energy efficient
- caring for bushland under our protection
- monitoring ocean discharge to ensure it is an appropriate quality
- monitoring vegetation and groundwater levels,

- promoting research in water sensitive urban design, and
- protecting the purity of public drinking water sources through drinking water catchment protection.

## Community partnerships

To deal with the challenges ahead, we all will need to change the way we use water.

We are committed to continuously engaging with Western Australians on water issues that affect them. This includes ensuring the public can have input into plans like *Water Forever: South West*, educating the community on how to reduce water use and engaging with local communities about new and improved water or wastewater infrastructure.

**Table 1** Regional overview for towns serviced by Water Corporation

	Number of water connections	Annual per person water use	Current water supply capacity*	Current water use	Estimated demand at 2060
		(thousand litres per year)		(million litres per year)	
<b>Towns on the Swan Coastal Plain</b>					
Eaton, Australind, Burekup, Roelands and Brunswick Junction	11,200	161	6,600	4390	12,160
Dunsborough – Yallingup Supplemented by bulk water supply from Busselton Water	4,600	171	1,450	1420	3680
Dalyellup	2,200	180	1,170	1080	3120
Donnybrook	1,100	146	450	360	820
Capel	930	145	400	300	950
Boyanup	390	190	325	160	420
Peppermint Grove Beach	340	117	150	100	180
Dardanup	200	123	75	50	140
<b>Warren-Blackwood area</b>					
Bridgetown, Greenbushes, Hester, Balingup, Kirup, Mullalyup and Boyup Brook	2,500	116	1,450	620	1240
Nannup	320	209	1,240	150	220
Manjimup	2,300	144	515	720	910
<b>Margaret River-Augusta area</b>					
Margaret River, Cowaramup, Prevelly, Gnarabup	4,400	126	2,000	1080	3180
Augusta	1,100	113	320	265	480
<b>Collie area</b>					
Collie and Allanson	3,900	133	15,500	1100	1780
<b>Pemberton – Northcliffe – Quinninup area</b>					
Pemberton	440	162	250	150	170
Northcliffe and Quinninup	210	71	Water carted	28	60
<b>Total</b>				12,000	29,500

Note: numbers have been rounded and the 'Estimated demand at 2060' does not include further water use efficiency gains

\* Current supply capacity includes surface water yield and water treatment plant capacity.

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