

# Water Forever Whatever the weather

Drought-proofing Perth



water forever the next decade



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# Achieving security in a new era of water supply

In response to our drying climate, the Water Corporation has embarked on a ten-year plan to drought-proof Perth by 2022 so that sufficient water supplies are maintained, whatever the weather.

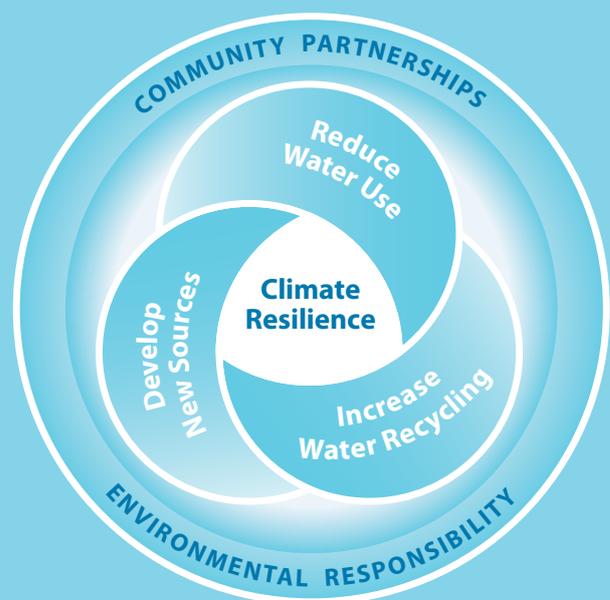
Some of our traditional water sources from shallow groundwater and dams, that have served Perth well since its foundation, will in future take more of a back seat and make way for a new range of sources and improved efficiencies in the way we use our vital resource, including greater recycling of treated wastewater.

This new era of water supply will see seawater desalination become a major source, along with an expansion program costing almost half a billion dollars to draw more water from Perth's very deep aquifers. It will bring greater protection for our shallow aquifer fed wetlands environment and remove the need for more severe water restrictions. Our effective two days a week sprinkler roster, embraced by the community, will stay as part of our way of life.

In future, there will also be more flexibility as we can use dams to supply lower cost water when it rains or, to store production from the new sources for use later.

But in the interests of sustainability, our response to reduced rainfall must remain focused on the need for all sectors of our community to be more efficient in the ways we use water, and simply to use less. The Water Corporation will continue to support programs to help achieve these objectives.

## Towards Climate Resilience





## Foreword

Nothing is more important to Western Australians than security of our water supply.

As we experience an increasingly dry climate, evidenced by dwindling inflow to our dams, we must re-think the way we source water.

That is why the Water Corporation is developing new major sources that greatly reduce our dependence on rainfall. For the first time we will not have to rely so much on the dams and the shallow groundwater sources that have supplied us so well up until now.

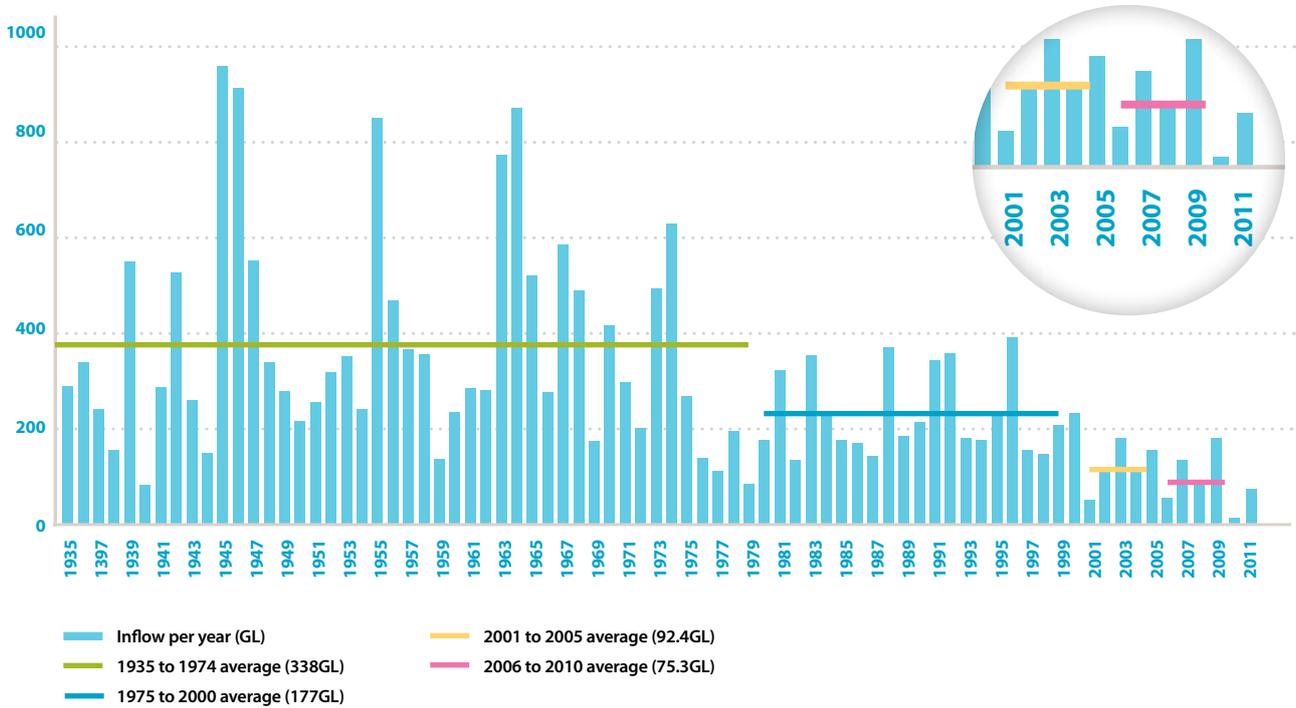
This Water Corporation brochure outlines the plan that will, over the next ten years, transform our water supply through new investment in Perth's deep underground aquifers, the evolution of groundwater replenishment as a major new source and expansion of desalinated seawater capacity.

But while we will have much greater security of supply, water is still a precious resource in our dry part of the world, and we must continue our efforts to use it wisely and maintain the impressive savings that have been achieved in recent years.

**Bill Marmion MLA**

Minister for Environment; Water

**Historical annual streamflows into Perth dams (Gigalitres per year)**



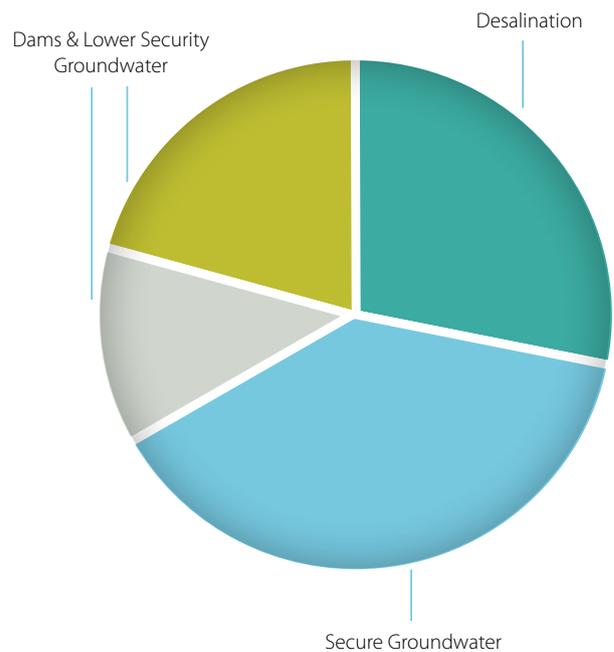
# A challenging decade

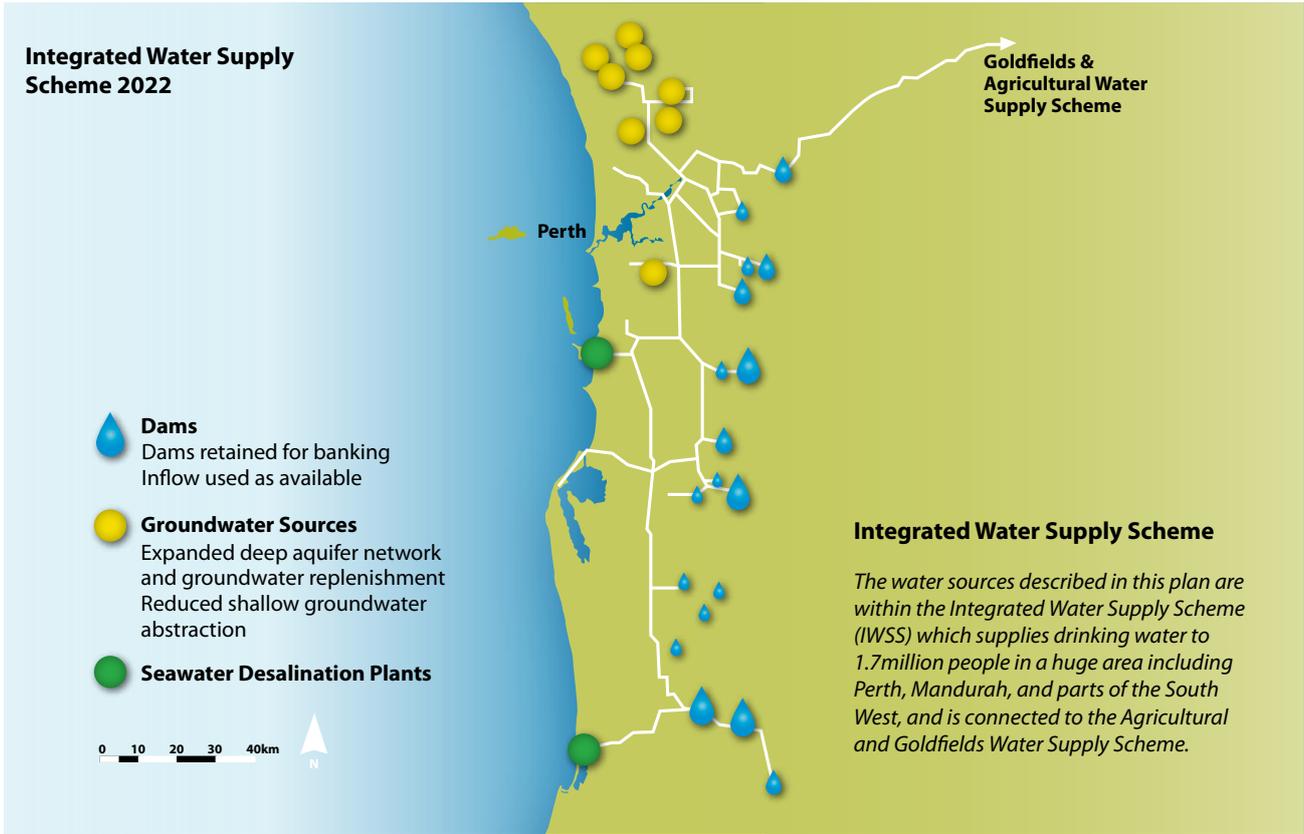
The next decade will be challenging for Perth’s water supplies.

Our climate has been changing for several decades, but this change has become more noticeable in the past ten years, presenting us with new challenges. Reduced rainfall, and changes in rainfall timing have greatly reduced run-off into our dams around Perth and dramatically reduced their role in our drinking water supplies. We simply can no longer rely upon our dams.

Despite significant reductions in water use in Perth in recent years we still need to continue to invest in new water sources that are independent of the climate. Our ten-year plan allows us to reduce our reliance on dams and groundwater from our shallow aquifers that also supply wetlands and lakes.

## Current Water Sources



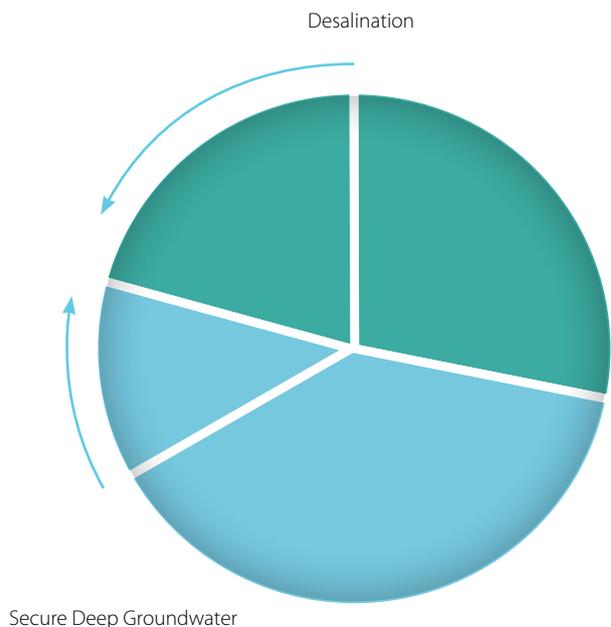


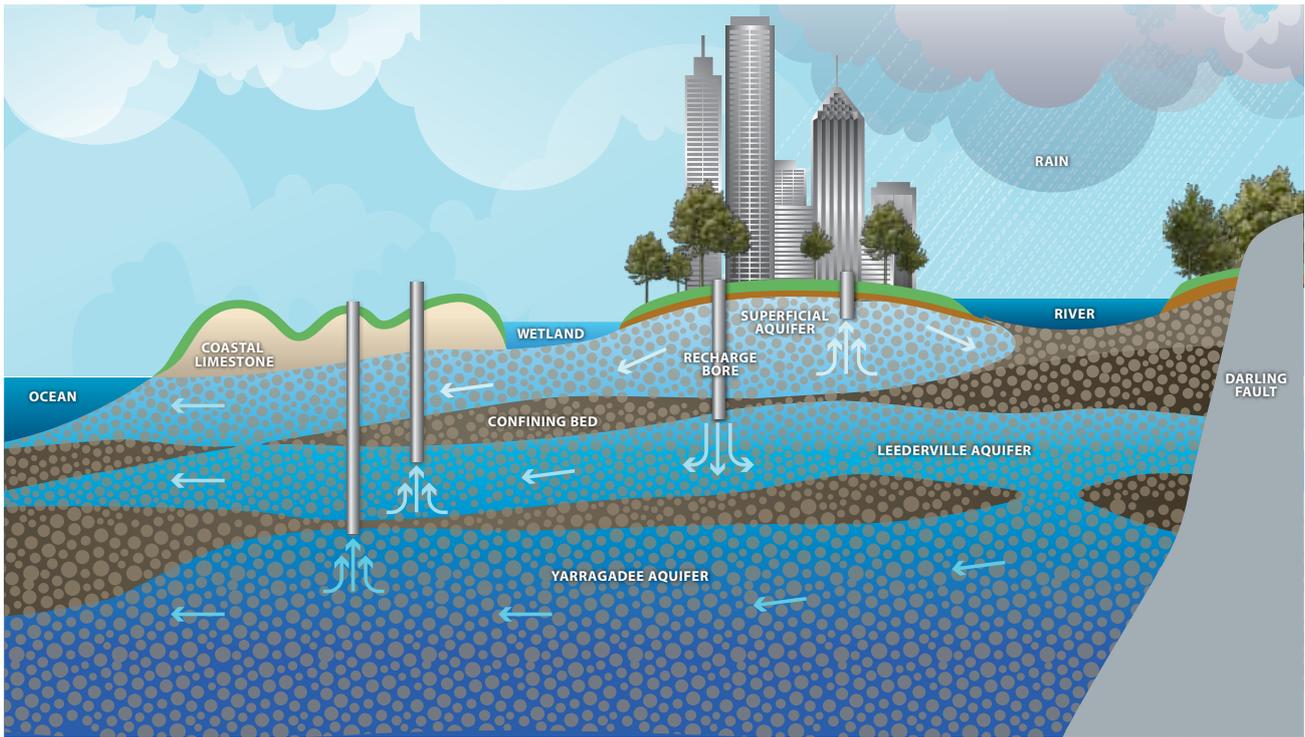
# Our ten year plan

Our ten-year plan, working within Water Forever, is designed to sustainably drought-proof our city against the full range of climate scenarios. We will achieve this by:

- Transferring our groundwater abstraction to the deeper aquifers to protect the groundwater environment and secure our groundwater supplies
- Replenishing our deep aquifers with recycled water through a new groundwater replenishment scheme
- Expanding seawater desalination capacity to offset the declining inflow to our dams
- Continuing to make gains in water use efficiency, while preserving our outdoor lifestyle and enabling continued growth of our beautiful city and state
- Using wastewater recycling as a resource for industry, public open spaces and agriculture

## New Water Sources





Through an expansion program the Water Corporation will draw more water from Perth's deep aquifers.

## Perth's underground water system

*Our groundwater system, which remains vital to meeting our water needs, is made up of many layers with largely separate aquifers.*

*The superficial aquifer stretches across the coastal plain. Many thousands of bores draw on this aquifer for home gardens, horticulture, schools, parks and playing fields. Inland from the coast the water table is close to the surface in some places, and the*

*aquifer supports some of our wetlands and lakes. At the coast this water discharges to the ocean. Perth also has very deep aquifers. Water in the deepest, the Perth Yarragadee Aquifer, is very old and provides a robust supply even in dry years because of its vast storage and limited connection to the surface environment. The Water Corporation is the only significant user of this aquifer.*

*The Leederville Aquifer, sits above the Perth Yarragadee and is also very large. It is connected to the surface in some areas, and has many users, mainly industry, horticulture and public water supply.*

## Transferring groundwater abstraction to the deeper aquifers

Over the past ten years, we have expanded our use of the deepest and most robust groundwater supplies in the Perth Yarragadee and Leederville Aquifers and accessed water from the coastal superficial aquifers that would have otherwise discharged into the ocean.

At the same time, we have reduced our groundwater use from the superficial inland aquifers, reducing impacts on some of our wetlands and lakes. We now only rely on this type of groundwater in the very driest of years, and then only for about 10 per cent of our supply needs. Our ten-year plan will avoid the need to use this groundwater source altogether.

Over the next ten years we will invest in a new expanded deep groundwater network and transfer our abstraction to the deeper aquifers so that our groundwater use will not affect the natural environment. We are committed to an investment program costing almost half a billion dollars. This will progressively deliver the following by 2022:

- Replenish the deep Leederville and Perth Yarragadee Aquifers with recycled water through our new groundwater replenishment scheme
- Draw water from the replenished deep aquifers only in places that are appropriate for local demand and have no new impacts on the surface environment, commencing by 2016.



- Develop new coastal superficial groundwater schemes to use water currently flowing naturally into the ocean at Eglinton and Yancheep
- Reduce groundwater abstraction from environmentally sensitive areas.

### Groundwater replenishment

By safely replenishing the deep Yarragadee and Leederville aquifers with highly treated recycled water, we will be able to take more water out without affecting the natural environment.

Water movement through groundwater is very slow, and it will take many years before recycled water reaches drinking water bores.

As a first step in the transition to a sustainable and secure groundwater future, we are conducting a Groundwater Replenishment Trial where treated wastewater from the Beenyup Wastewater Treatment Plant is further treated to International and Australian standards for drinking water before being recharged into the Leederville Aquifer at a depth of 120 to 220 metres.

When the trial is complete in December 2012, along with our regulators the Water Corporation will assess whether groundwater replenishment can be a sustainable water option for Western Australia. Based on our experience so far, the Water Corporation will be recommending a transition from the trial to a long-term operating scheme.

If the scheme becomes fully operational, groundwater replenishment would contribute about 10 per cent of our total water supply.

Community support for groundwater replenishment is a key factor in gauging the trial's success. An extensive community engagement program is keeping the community and stakeholders informed about its progress.

A custom-built Visitor Centre at Beenyup has attracted strong interest, with visits from many people and school groups. Generally it has been found that support for groundwater replenishment increases significantly once people are informed and concerns are addressed.



## Expanding climate-independent desalination

Expansion of the Southern Seawater Desalination Plant (SSDP) is the first stage of our updated water strategy. We will double its capacity to 100 gegalitres a year.

By the end of 2012, climate-independent seawater desalination from our two major plants will produce half of Perth's water needs – about 150 billion litres a year. Desalination will remain a cornerstone of our water supply system for many years to come.

Desalination is a relatively energy intensive water source. However, with the advancement of desalination technology across the world, we are continually improving the energy efficiency of our plants. We believe the SSDP is the most energy-efficient large scale plant of its type in the world, and 100 per cent of its energy use will be offset by purchasing renewable wind and solar power.

Beyond this, there is the option of developing further plants some distance from Perth. An important consideration in any new source is establishing the necessary water transportation infrastructure.

## Reducing water use

Since 2001, Perth's average water use per person has decreased by almost 30 per cent, yet Perth remains one of the highest water using cities in Australia.

Our aim is to help Perth households and businesses use even less water by:

- Influencing urban planning for increased density, water sensitive urban design, climate resilient gardens and making better use of stormwater and drainage water in local areas
- Maintaining a major program of initiatives and incentives such as Showerhead Swap and our one-on-one H2omeSmart water efficiency mentoring programs to help households improve their water use efficiency and reduce demand on our water supply schemes.
- Helping business and industry to reduce water use and make greater use of recycled water
- Partnering with key waterwise specialists (e.g. garden centres and plumbers) to promote water efficient products and services



- Promoting water efficient practices through our advertising and marketing campaigns (such as “Target 60”), including adherence to appropriate sprinkler rosters
- Reviewing metering and billing practices to ensure they provide information to support water conservation
- Increasing our efforts to reduce system losses through techniques such as pressure management.

### Increasing water recycling

Increasing recycling of Perth’s treated wastewater is strongly supported by the Western Australian community and is an important part of our supply strategy over the ten years.

We are looking for opportunities to increase the amount of recycled water used to irrigate public parks and gardens and working with industry to replace their use of drinking water with recycled alternatives.

The Water Corporation is currently supplying recycled water to industry from the Kwinana Water Recycling Plant (KWRP) and for irrigation of parks, sportsgrounds and public open spaces.

Since 2004, the KWRP has been supplying up to 6 gigalitres a year of high grade recycled water to industry, which is around 2% of Perth’s total scheme water use. Industries outside the metropolitan area also use recycled water for their processes including the Boddington Gold Mine and the Alcoa Refinery in Pinjarra.

Every recycling scheme across the State is different and the appropriate level of treatment and application must be closely regulated in order to safeguard human health and our environment.



## Preserving our dams

The way we use our dams will change into the future due to expected low inflow from catchments in most years. Dams will assume a bigger role as storage reservoirs for climate-independent, year-round water production from our new sources before it is distributed to our customers in periods of greater demand.

Dams also help us to move water around, including supplying towns in the Goldfields and Agricultural areas through CY O'Connor's famous pipeline.

Over the past 10 years we have invested to connect to more southern dams. This provides greater flexibility and security of water supply to Perth as well as for towns in the south west of Western Australia.

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