An overview of current and future water management plans in Western Australia.
From the Hon. Colin Barnett MLA, Premier of Western Australia

Western Australia’s growing prosperity is dependent on secure and sustainable water supplies.

*Water for Growth* outlines the strategic vision for our State’s water future and, region by region, details how the Liberal National Government is progressing water initiatives to support Western Australia’s growth and development.

Our increasing population and demand from our resources and energy sectors are putting pressure on government to source and secure water sources across Western Australia.

The growth in Western Australia’s agriculture and food producing capacity will also increase the demand for water in the coming decade. It is estimated that around 80 Gls of new water sources in the Kimberley and up to 200 Gls of surplus mine dewater in the Pilbara alone will be needed as part of a bigger plan to triple the State’s agricultural export value and double the contribution of this sector to regional economies by 2050.

As part of this Government’s investment in water security, we are undertaking a program of State-wide scientific assessments of new and existing water sources. Critical scientific information will be the foundation from which both industry and government can make efficient and strategic decisions. It will also provide a clear indication of what the State needs to do to meet future water supply challenges.

I am confident that *Water for Growth* will provide a valuable roadmap on how the State Government is working to secure Western Australia’s water future.
From the Hon. Mia Davies MLA, Minister for Water, Forestry for Western Australia

Here in Western Australia, water has always been the key to our growth. Our economic, regional and urban development is driven by our ability to find and use water.

As our population and economy continue to grow, demand for water will increase. The investment decisions made by Government, business and industry will be determined by access to the right quality water in the right location.

That is why we have brought together the State Government’s latest water investigation and supply planning initiatives into one strategic document, Water for Growth.

Western Australia has a history of extensive research in water resource use and management. This has led to a detailed understanding of the location and accessibility of the State’s known water resources. For the first time this data is publicly available, giving the community access to information on current and future water availability.

This Government has also made a major investment to continue building on this knowledge, providing an ongoing and comprehensive picture of our water resources.

There is currently over $30 million committed to groundwater investigation and assessment projects underway to secure our water future.

In coming months, a range of new projects will commence as part of the Royalties for Regions funded Water for Food initiative.

From the Kimberley to the South Coast we are making decisions that require confidence in current and future water availability.

We will continue to make sure these decisions are grounded in the most up-to-date water advice available, so that we will all have the water we need to continue to grow as a community and as a State.
The Department of Water takes seriously our responsibility for managing water as a resource for sustainable, productive use.

The State’s water stocks underpin Western Australia’s economy, our population and the liveability of our towns and cities today, and into the future.

Cutting edge science is being used to build an unprecedented knowledge bank of these valuable water resources. We are now making it available online at the click of a computer mouse to industry and investors, to provide confidence and certainty for decisions about new projects, further expansion and development.

Last year we launched the Water Information Reporting portal – a free, fully automated online service that provides instant access to over 115,000 water monitoring sites and more than 60 million measurements.

This year, the Water Resources Inventory 2014 provides detailed information about the State’s groundwater and surface water resources – where each resource is located, how much water is available, its quality and the level of technical information held about it. The inventory is available on our website at www.water.wa.gov.au

The State’s investment in water investigation supports plans for water resource and supply options to meet demand over a 30 year horizon.

We are removing red tape, reforming policy and regulation to provide greater certainty for the State’s water-dependent industries.

Through this investment in science, knowledge, technology and policy, Western Australians can have confidence in the sustainability and productivity of one of the State’s most important and valuable resources – water.
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Water for growth

Twenty first century science is being used to visualise, explore and create new possibilities using water as an enabler for growth and development over the next 30 years and beyond.

The Government has significantly increased its investment in water investigation and assessment to ensure Western Australia has the best and most up-to-date information about all of its water stocks.

More than $25 million has been allocated from Royalties for Regions for water investigations across the State on top of $7 million to refine the scientific investigation of the important deeper Gnangara aquifers in metropolitan Perth.

This investment will increase under the statewide Water for Food program, which will identify opportunities within irrigated agriculture and food production sectors.

Water for Food is a program of water investigation and planning to support expansion of existing food production precincts and the development of new ones to tap into the growing demand for Australian produce.

Along with existing available water supplies, Water for Food is part of a massive push to find and bring more water to the irrigated agricultural sector in WA’s regional areas. This will support increased agricultural diversification and production, substantially lifting the State’s volume of exports in livestock and horticultural produce.

The story of the Perth to Kalgoorlie pipeline, opened in 1902, is indelibly etched in our history and highlights how vision, matched with engineering and hydrological know-how, can change the course of history.

That pipeline which serves tens of thousands of people along the way, took five years to build and cost around $5 million (about $15 billion in today’s money).

It was a controversial and expensive project, which required the development of new technology.

The success of the pipeline saw potable water pumped 600 kms to pour life into the parched interior. Sustainable water supply underpinned a wave of flourishing growth across the eastern goldfields, allowing the State to tap into the treasure trove of the Golden Mile, while Kalgoorlie’s population expanded to 30,000.

In the same way that CY O’Connor’s pipeline is a monument to the innovative spirit of yesteryear, we are equally committed today to identifying and deploying sustainable water supplies to support the State’s economic growth.

In the Pilbara, approximately 160 Gl/yr of mainly fresh water is licensed for pumping from mines that operate below the water table.

At Rio Tinto’s Marandoo mine near Tom Price, up to 30 Gl of fresh water is pumped from the mine each year, with some re-injected into the Tom Price town groundwater reserve, and the remainder used to grow fodder, using centre pivot irrigators.

Fodder production and an associated biofuel trial using part of the 60 Gl of fresh water discharged from the Woodie Woodie manganese mine east of Marble Bar on the edge of the Great Sandy Desert are further examples of water use innovation.

Advanced technology is being used to identify, define and allocate more water to enable economic development. Western Australia’s Department of Water is looking ahead to optimise existing supply and ensure water is available when and where it is needed into the future.

Around the State, annual abstraction of surface water and groundwater is managed responsibly to maintain renewable water resources that can supply ongoing use. As demand increases, the proportion of alternative sources in the water supply mix will increase, but local natural sources, managed sustainably, will continue to provide the most accessible and cost effective foundation to meet local water needs.
Cutting-edge water supply planning is underway to identify potable and fit-for-purpose water supply options that will ensure sustainable development and prosperous communities.

Targeted resource investigations by the Department of Water are in place and extend from the Kimberley to the Great Southern.

Bores are being drilled to identify previously unknown or poorly understood groundwater resources and to assess their water quality or suitability for recharge with recycled water to enable sustainable supplies into the future.

This includes large regional resources like the West Canning Basin north east of Port Hedland which has an estimated 50 Gl per annum already allocated for industry, mining and agriculture and a further 50 Gl/yr available for abstraction. Add to this the Hamersley Ranges aquifers east of Karratha where a sustainable allocation volume of 30 Gl per annum has been identified.

Both groundwater systems present an opportunity for an integrated pipeline system to service Port Hedland and Onslow/Karratha respectively for community, industry and potentially irrigated agriculture supply.

Surplus water harvesting opportunities in the South West, and finding innovative solutions to improve salinity in Wellington Dam near Collie are also in focus. The paleochannels of the Murchison and the potential of the artesian resource of the Gascoyne are also being examined.

A new analysis of world food requirements* provides a sobering reminder of what is needed. It says 70 per cent more food will need to be produced from less arable land and basic resources like water.

*The DuPont-commissioned Economic Intelligence Unit report, Feeding Asia-Pacific (2014).
The Department of Water is taking forecasting techniques to a new level with a market-focused demand and supply model to predict water trends up to 50 years in advance.

The Department of Water is working with industry and other government agencies to collect and collate the latest information on current and forecast demand for all water purposes – including industry, agriculture, public open spaces and scheme water.

Current water consumption information is being combined with economic growth and population scenarios to improve the accuracy of demand and supply forecasts and identify potential gaps well ahead of time. We are breaking new ground internationally in the application and integration of climate modelling to water allocation planning.

This information is being used to ensure that the government has a clear plan of resource and supply options to meet demand into the future, and that investigations are targeting the most prospective areas.
Kimberley

GEOGRAPHY AND POPULATION
- WA’s most northern and only tropical region
- 424,517 km²
- Remote and sparsely populated
- Estimated 35,700 people
- Aboriginal people make up roughly half the population and represent 30 traditional language groups and 100 communities of various population sizes

LANDSCAPE
- A mixture of savannah grasslands, ranges, golden beaches and tropical gorges
- Much of the flora and fauna is unique to the region

CLIMATE
- Wet season spans October to March and includes tropical rains, high humidity and cyclones (which present access and mobility challenges)
- Dry season is April to September which is cooler and less humid

MAIN INDUSTRIES
- Agriculture, predominantly pastoral (85 per cent)
- Resources including minerals and mining and future on and offshore gas production
- Aquaculture including fishing and pearling
- Tourism

Harnessing the potential
The Kimberley is a vast region with significant potential in terms of minerals and energy as well as an expanding beef industry. The Department of Water is investigating options for dry season irrigation to support the expansion of irrigated agriculture in the West Kimberley. Opportunities are being explored for field trials and research into irrigated feed production which could enable further development of viable cattle operations and increased participation, including by Aboriginal pastoralists, in the world demand for beef product.

The expansion of the Ord River Irrigation Area is already underway. The State Government has invested $311 million through the Royalties for Regions program and a further $11.5 million through the Department of State Development for the delivery of key infrastructure to expand the Ord Irrigation Scheme. A National Partnership Agreement between the State and Federal Governments has seen the investment of an additional $195 million of federal funding in social and community infrastructure in Kununurra, Wyndham and surrounding communities. Significant upgrades have been made to school and health facilities, social and transitional housing, Kununurra airport and the Port of Wyndham.

Water availability

<table>
<thead>
<tr>
<th>Water resource</th>
<th>Total allocation limits Gl/yr</th>
<th>Water available for use Gl/yr</th>
<th>Water quality</th>
</tr>
</thead>
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<tr>
<td>Shallow aquifers</td>
<td>301</td>
<td>250</td>
<td>Mostly fresh</td>
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<td>Middle aquifers</td>
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<td>26</td>
<td>Fresh to brackish</td>
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<td>Groundwater total</td>
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<td>Surface water total</td>
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<td>529</td>
<td>Fresh</td>
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</table>

Water in east Kimberley
The current surface water allocation limit of 865 Gl/yr downstream of the Ord River Dam is a reliable supply for existing users. It will provide for a substantial expansion of irrigation in Western Australia and enable 210 GWh/yr of electricity to be generated at the Ord River Dam Power Station. The power station currently supplies electricity to the towns of Kununurra and Wyndham and the Argyle Diamond Mine.

There is enough water with the existing Ord River Dam infrastructure and allocation limits to meet the water needs of current irrigated agriculture and that planned for Western Australia under the Ord River Irrigation Expansion, including for crops with high water needs such as sugar cane. Water demand for existing and future irrigation and current obligations to hydropower generation mean the existing water resources are essentially committed. Water infrastructure development and water resource management options are now being explored and costed to increase the water supply from the Ord River Scheme in the medium term, including irrigation expansion into the Northern Territory.

There are several options being investigated including increasing storage at Lake Argyle, investigating groundwater options, optimising crop demand management and changing the pattern of hydropower releases.
Water in west Kimberley

Broome is a growing regional town and its surrounding areas have potential for increased business and industry development. The town, surrounding communities and pastoral and horticultural industries, rely on groundwater for drinking and industry needs.

Groundwater is reserved for town growth and the Department of Water is working with industry to secure resource options to meet growth in mining, industrial and agriculture projects.

A Royalties for Regions funded groundwater investigation into the Broome and Wallal aquifers on the Dampier Peninsula north of Broome is assessing the potential for further groundwater abstraction and reducing the risks of salt water intrusion into the aquifers. This will help to protect the resource, cultural values and water-dependent environment while providing for an expanding and diversified economy into the future.

While there are large volumes of surface water in the Fitzroy River itself, the groundwater sources in the Fitzroy Valley and the Canning Basin are the focus of current and proposed future investigation work. Royalties for Regions programs are fast-tracking groundwater investigations to underpin mosaic irrigated fodder production and high-value cropping on a number of strategically-located pastoral stations in the west Kimberley.
Pilbara

GEOGRAPHY AND POPULATION

- 507,896 km²
- 48,610 permanent residents
- Most inhabitants in the western third of the region
- Includes historic towns like Cossack, along with a number of Aboriginal communities

LANDSCAPE

- Three distinct areas: a vast coastal plain, inland ranges and arid desert extending to the centre of Australia
- One of the oldest geological regions in WA at 3.4 billion years
- Includes the Dampier archipelago which is home to pristine reefs and islands
- Home to three national parks: Millstream-Chichester, Karlamilyi and Karajini

CLIMATE

- Distinct wet and dry seasons
- High temperatures can reach 50 degrees Celsius, whilst the wet season can include floods and cyclones

MAIN INDUSTRIES

- The region is an economic powerhouse for Australia – producing 53 per cent of WA’s total mineral and petroleum production
- Construction
- Export (two of Australia’s largest ports are located at Dampier and Port Hedland)
- Tourism
- Potential for irrigated agriculture

Harnessing the potential

While mining is the backbone of the Pilbara region, water is driving an increasingly diversified economy. The Department of Water and industrial stakeholders are working together to maximise the productive value of water and ensure that recycling and reuse are now the norm. Major initiatives are the use of mine dewatering for agriculture and securing public water supplies in the region for the next 50 years.

The Pilbara Cities initiative is driving the development of sophisticated and livable centres of population offering a real alternative to a fly-in-fly-out lifestyle.

The Department of Water is working to support this vision by investigating and planning for the water supply options that will be needed during the next 30 years and beyond.

The program of investigation and assessment is delivering the water to meet regional economic growth for the mining and agriculture industries and the Pilbara Cities vision. More than $109 million has been allocated through the Royalties for Regions program for Pilbara Cities infrastructure.

Coastal cities and ports

Much work has been done in ensuring the demand for coastal town schemes of the West Pilbara and Port Hedland to service the growing population and support the region’s service industries, as well as to meet the dust suppression requirements of the port.

New water supplies are currently being developed to supply the needs of the Pilbara for the next decade. In April 2014 the Premier and the Minister for Water officially opened Rio Tinto Iron Ore’s new 10 Gl/yr borefield in the Lower Bungaroo Valley, which now supplies its port and urban needs in the west Pilbara. Additionally, 5 Gl/yr has been made available by the Department of Water for the Water Corporation to expand the existing Yule and De Grey River borefields, increasing supply to Port Hedland. There is potential for a further 2 Gl/yr expansion of the De Grey borefield.

Based on the knowledge gained in developing the borefield at Bungaroo, the Department of Water has started a Royalties for Regions funded investigation to identify groundwater resources in similar valleys in the north-west area of the Hamersley Range. The preliminary assessment has shown potential for around 10 Gl/yr which could be piped to Onslow and 20 Gl/yr which could be piped directly into the West Pilbara scheme. These volumes could secure Karratha and Onslow’s supplies to 2050.

In the long term, the West Canning Basin will become increasingly important as a water source. Investigations have already delivered 20 Gl/yr for irrigated agriculture and mining, reserved 10 Gl/yr for scheme water in Port Hedland and identified 20 Gl/yr for mining development. In 2012 the Department of Water started a Royalties for Regions funded project to confirm the potential yield of the central part of the West Canning Basin in the Sandfire area. The Wallal Sandstone in this region holds artesian water, which means it is under pressure and flows freely to the surface once a bore is drilled. It appears likely that a total of up to 100 Gl/yr could be extracted sustainably from the West Canning Basin.

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<tr>
<th>Water resource</th>
<th>Total allocation limits Gl/year</th>
<th>Water available for use Gl/year</th>
<th>Water quality</th>
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<tbody>
<tr>
<td>Shallow aquifers</td>
<td>143</td>
<td>39</td>
<td>Fresh to brackish</td>
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<tr>
<td>Middle aquifers</td>
<td>1</td>
<td>0</td>
<td>Mostly saline</td>
</tr>
<tr>
<td>Groundwater total</td>
<td>144</td>
<td>39</td>
<td></td>
</tr>
<tr>
<td>Mine dewater surplus</td>
<td>-</td>
<td>160</td>
<td>Variable</td>
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</table>

Water availability

Water resource: Shallow aquifers; Middle aquifers; Groundwater total; Mine dewater surplus; Total allocation limits Gl/year: 143, 1, 144, -; Water available for use Gl/year: 39, 0, 39, 160; Water quality: Fresh to brackish, Mostly saline, Variable.
Pilbara hinterland

Water stored in irregular fractures and fissures in the fractured rock across the central Pilbara also provides significant groundwater. The Department of Water is working with the mining industry, which is accessing ore bodies while managing minesite and cumulative impacts of dewatering on the environment and cultural heritage sites.

The continued growth of iron ore mining has seen more water abstracted at mine sites in the inland Pilbara and an increased volume of dewater surplus to mine requirements. There is the potential to use surplus water from mine dewatering operations to support agricultural precincts and local drinking water supplies in the Pilbara region. An irrigated fodder project has been established at Marandoo, near Tom Price using mine dewater.

The Royalties for Regions program is funding an irrigated agricultural trial at the Woodie Woodie mine, east of Marble Bar. The Department of Water is working in partnership with industry and other agencies to build on the potential to expand irrigation using mine dewater projects and will seek to identify water resources and investment opportunities for precinct development.

Mining activity has also seen an increased supply of potable water to mining camps and villages.

Water planning and groundwater investigations are also underway for the main inland towns of Newman, Tom Price, Paraburdoo, Marble Bar and Nullagine. Of the inland towns, Newman is expected to experience the greatest growth from its current population of 7000 permanent and 4000 fly-in fly-out workers, to 15,000 people by 2035.

The department is working with water service providers and mining companies to ensure increases in demand are managed in these towns and water is reserved for this growth.
GEOGRAPHY AND POPULATION

Located in the North West of WA, the Gascoyne captures 600 kms of Indian Ocean coastline

137,938 km²

9,561 residents concentrated in Carnarvon, Exmouth, Denham, Gascoyne Junction and Coral Bay

LANDSCAPE

Incorporates famous tourist landmarks including Ningaloo Reef, Shark Bay, Monkey Mia, Coral Bay, the Kennedy Ranges and Mt Augustus

Gascoyne River and its tributaries form the main river system

CLIMATE

Enjoys around 320 days of sunshine a year

Monsoonal storms and cyclones bring torrential rainfall between November and April

MAIN INDUSTRIES

Tourism

Horticulture

Mining

Fishing

Pastoral

Harnessing the potential

The highly-productive Carnarvon irrigation district is a key foodbowl area for Western Australia producing more than $100 million per annum in horticulture products. The State and Commonwealth Governments have jointly funded flood protection works to safeguard regional infrastructure and food supplies from the Carnarvon irrigation district for domestic and export markets. The complex flood management works are a critical component of the Gascoyne Foodbowl Initiative, helping to deliver a robust and resilient horticultural industry and assuring the economic future of the community.

The $60 million flood mitigation works help protect valuable production land and key infrastructure. A new $19.9 million irrigation pipeline funded by the State and Federal Governments and the local water cooperative was completed in 2012.

Lower Gascoyne River and Carnarvon

The shallow aquifer system under the Lower Gascoyne River has provided a relatively fresh and reliable water supply to the town of Carnarvon and its surrounding horticultural district since the town was founded in 1883. However, constant growth of the Carnarvon horticulture district combined with variable and unreliable river recharge events has placed an increasing amount of pressure on the resource, with water quality and quantity the major limitations to the system.

Water resources of the Lower Gascoyne River are well understood, with scientific investigations by the Department of Water, its predecessors and partner agencies dating as far back as the 1950’s. Methods employed included hydrology/hydrogeology modelling, bore exploration, water quality monitoring, aerial electromagnetic assessment, water use monitoring, climate prediction, soil and erosion studies, drought studies and water allocation planning.

Through the Gascoyne Foodbowl Initiative an additional 4 Gl/yr of water has been identified for the expansion of the horticultural district by an additional 400 hectares. Investigation and construction of infrastructure is underway to deliver this additional water and land for irrigated agriculture. Further groundwater drilling investigations upstream of Rocky Pool along the alluvial aquifer will increase confidence in water availability to expand irrigated agriculture or fodder production further.

Other resource and supply options being considered for irrigated agriculture include expansion of borefields on the north side of the river, and improved delivery to optimise both scheme and self-supply water. A total of 1.8 Gl of groundwater is reserved for additional public supply for town growth.

Water availability

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<tr>
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<td>51</td>
<td>Fresh to saline</td>
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<tr>
<td>Middle aquifers</td>
<td>73</td>
<td>8</td>
<td>Saline</td>
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<td>Deep aquifers</td>
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<td>Brackish to saline</td>
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<tr>
<td>Groundwater total</td>
<td>144</td>
<td>60</td>
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</table>
The Carnarvon Artesian Basin is located along the coast extending from close to the Murchison River in the south to the mouth of the Fortescue River in the north. The region may support irrigated agriculture if the potential yield and quality of the artesian aquifer is adequate.

There is potential for pastoral industry development in the Gascoyne, with investigation into water availability and quality to support alternate crops and diversification of pastoral activity, including irrigated fodder to support a cattle feed-on sector.

A decade ago, the State Government and industry closed and sealed free-flowing pastoral bores in the Carnarvon Artesian Basin to protect the resource for the future.

The bore capping program is estimated to save 8 GL/yr of water from being lost to evaporation each year and up to 55 GL/yr in sub-surface leakage.

The Department of Water will be undertaking an assessment and groundwater investigation program to identify areas where water quality will support development.

Water for Gascoyne

The Gascoyne region has a population of less than 10,000 people shared mainly across the major towns of Carnarvon, Exmouth, Denham and Coral Bay.

The region’s plans for growth include tapping into the expanding resource sectors in the Pilbara and Midwest including the expansion of the off-shore oil and gas activity north of the Gascoyne.

There are also aspirations to diversify the region’s traditional pastoral grazing activities through improved integrated and irrigated feed production.

Current water resource assessment indicates plenty of water of variable quality.

This water will increase opportunities for irrigated agriculture for the lower Gascoyne River and for grazing opportunities between the Gascoyne and Wooramel Rivers.
Mid West

GEOGRAPHY AND POPULATION

/ 466,766 km²
/ Population has increased steadily over the past 20 years and is currently around 55,609
/ Resource projects, enviable lifestyle, proximity to the metropolitan area, social infrastructure and relatively cheap housing are attracting retirees and those looking for a sea-change

LANDSCAPE

/ Covers the relatively flat northern wheatbelt and large areas of pastoral woodland with eroded ancient ranges
/ Other features include river valleys, gorges and salt lakes

CLIMATE

/ Mild mediterranean climate with hot, dry summers and mild, wet winters
/ Inland areas have a more arid climate

MAIN INDUSTRIES

/ Mining
/ Broad scale agriculture and pastoralism
/ Fishing
/ Tourism

Water availability

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<tr>
<td>Groundwater total</td>
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<tr>
<td>Mine dewater surplus</td>
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Harnessing the potential

The Mid West’s growing economy is made up of mining and agriculture with mining providing over $2.7 billion a year in sales and agriculture between $600-800 million a year.

Current mining includes iron ore (hematite), mineral sands, gold and other base metals including zinc, copper, nickel and lead. Agriculture production includes wheat, livestock and horticulture.

The aspirations of the mining and agricultural industries in the Mid West region has brought focus onto the need for more water to be available to support both sectors to grow.

While there is plenty of water still available for allocation in the region, using this water can have quality and distance challenges. Uptake of known and allocated water resources has reached full capacity in some areas necessitating more investigations into new water sources.

Mining industry expansion and development

The Government is planning for a projected significant expansion of the mining industry in the Mid West. Forecast growth is largely related to a proposed increase in the mining of magnetite ore bodies, which require water for processing and refinement before export. There is also planned expansion of uranium, vanadium and coal.

This growth is projected to accelerate substantially when proposed Oakajee port, rail and industrial estate facilities are developed. The region’s water demand could more than double over the next 30 years if the industry projections are realised.

Demand for water of varying quality will increase to meet the needs of the mining operations themselves, industrial processing, cooling, dust suppression and the needs of other industries associated with mining.

Proposed iron ore mines in the region are generally distant from fresh groundwater sources. In 2012 a Royalties for Regions funded project was initiated to locate groundwater resources that formed in ancient river channels (palaeochannels) in the inland Murchison district of the Mid West.

As part of this project, an expansive aerial electromagnetic survey started in 2014 to map the channels for potential water sources. The Department of Water has conducted a similar study in the Casuarina area of the Mid West to quantify the resource and the variability in quality.

This is a major step towards realising new water supplies that can be piped to mining and industry locations to meet the estimated 90 Gl/yr increase in demand.
Intensive agriculture

The Mid West region contains the complex and multi-layered sedimentary aquifers of the Carnarvon and Northern Perth Basins. Large volumes of groundwater are available for further licensing throughout the region, and useful volumes at a local scale will vary significantly.

New horticultural, tree crop, stock fodder and bioenergy industries are looking to the Mid West for expansion opportunities.

Water resource options for meeting this demand include groundwater from the northern Perth Basin.

Water for Mid West

The growth of the largest urban centre, Geraldton, and other Mid West towns, including the SuperTowns of Jurien Bay and Morawa, is expected to increase scheme water demand by a further 9 GL/yr by 2043.

There is currently 18.5 GL/yr available for public water supply to meet the increased scheme demand to Geraldton, Dongara and Morawa with 7GL reserved for public water supply for Jurien Bay and surrounding areas.

In partnership with the Cooperative Research Centre for Water Sensitive Cities, the Department of Water is supporting the region’s largest town to implement the Greater Geraldton water planning and management strategy.

This program lays the foundation for non-scheme water use that will conserve potable water to meet the drinking water demands as the population grows from 35,000 to 100,000.
Wheatbelt

GEOGRAPHY AND POPULATION

Located across the central wheat-growing areas to the north and east of the Perth metropolitan area.
Covers 155,256 km².
Home to 69,000 people from diverse backgrounds.
Population is widely dispersed with around 16,000 people living in the main service areas of Northam, Narrogin, Merredin and Moora.

LANDSCAPE

The Wheatbelt is named for its extensive production of broadscale crops, as well as mixed stock and cropping.
The Avon Valley – close to Perth – is known for its rolling hills, winter green farmland and woodland-covered landscapes.
Includes the coastal strip between Guilderton and Jurien Bay.
Areas of the eastern Wheatbelt are rich in minerals, including gold, nickel and ore.

CLIMATE

Hot, dry summers and mild winters.
Summer temperatures average 17-34 degrees and winter 5-17 degrees Celsius.
Average of 170 clear days per year.

MAIN INDUSTRIES

WA’s most significant broadscale agricultural region with over 4,000 farming properties covering a total of 12 million hectares.
Coastal fishing.
Mining (gold, nickel, iron ore, mineral sands).
Developing industries include aviation, construction and renewable energy.

Water availability

<table>
<thead>
<tr>
<th>Water resource</th>
<th>Total allocation limits Gl/year</th>
<th>Water available for use Gl/year</th>
<th>Water quality</th>
</tr>
</thead>
<tbody>
<tr>
<td>Shallow aquifers</td>
<td>239</td>
<td>88</td>
<td>Fresh to saline</td>
</tr>
<tr>
<td>Middle aquifers</td>
<td>49</td>
<td>6</td>
<td>Fresh to brackish</td>
</tr>
<tr>
<td>Deep aquifers</td>
<td>62</td>
<td>37</td>
<td>Fresh to saline</td>
</tr>
<tr>
<td>Groundwater total</td>
<td>350</td>
<td>133</td>
<td></td>
</tr>
</tbody>
</table>

Harnessing the potential

Already a massive food bowl, the Government (under the Water for Food program) is investigating water supply options to open up an additional 2,500 hectares of land for irrigated agriculture.

The Department of Water manages the Farm Water and Rural Community grant schemes on behalf of the Government.
The program targets dryland agricultural regions of the State which receive less than 600 millimeters of annual average rainfall and have no access to a reticulated water service. The objective of the program is to increase self-sufficiency and optimise the efficient use of all available non-potable water supplies. This is achieved through improved water resource planning and the provision of rebates and grants to develop both on and off farm water supplies.

Central and eastern Wheatbelt

In the central and eastern part of the Wheatbelt region, most rivers are saline and saline groundwater is found in the widespread fractured rock aquifers, so local water use is very low. A significant area of the Wheatbelt is serviced by scheme water from the Goldfields pipeline and other scheme systems supplied from dams in the Darling Range.
Farmers and small townsites not on scheme water use surface dams and granite rock catchments for watering stock and local drinking water supplies. These farm supplies are not licensed by the Department of Water.
Coastal groundwater for intensive agriculture and drinking supply

Significant fresh groundwater and surface water occurs in the coastal areas of the Wheatbelt region from Gingin to Jurien Bay on the coastal plain. The northern Perth Basin stores significant groundwater in a succession of sedimentary aquifers.

Groundwater in the Gingin area is in high demand for various industries including agriculture, horticulture, mining and coastal lifestyle developments. Currently about 141 Gl/year is licensed to these sectors.

The expansion of the suburbs north of Perth and ongoing growth in horticultural production through Perth’s northern corridor to Gingin and Badgingarra is increasing demand for quality groundwater resources in the coastal part of the Wheatbelt region. In addition, new horticultural, tree crop, stock fodder and bio-energy industries are looking to the northern Perth Basin for expansion opportunities.

The Department of Water estimates 90 Gl/yr of water to be available in the region, and 41 Gl/yr of this water is set aside for future scheme water supply.

An 18 month, $4.5 million groundwater investigation in the north Gingin area is assessing the volumes of available water and how it can be used to meet future scheme needs and demand for high quality water for horticultural expansion and general agricultural use.

Inland reserves

Desalinating an estimated 20 Gl/yr of saline or brackish groundwater reserves in the Wheatbelt is one option that has been assessed for supplying more water for agricultural production and other uses in the region.

A Department of Water study into the use of brackish water in the Wheatbelt has shown opportunities for future local scale desalination schemes using improved technology to deliver extra water across the region.

Development in advanced pre-treatment and desalination technology for inland groundwater is being pursued with the assistance of government funding through the National Centre for Excellence in Desalination, based at Murdoch University.
**Perth**

**GEOGRAPHY AND POPULATION**
- Extends along the coast from Joondalup to Rockingham and east to Mundaring
- Population is approximately 1.6 million people

**LANDSCAPE**
- Set on the Swan River and incorporating diverse landscapes
- Inner city: Perth city and surroundings including apartments with river views, restored character homes and funky café strips
- The Hills: bush or semi-rural
- Swan Valley: wine growing region and rural lifestyle

**CLIMATE**
- Hot mediterranean climate
- Summers are hot and dry, lasting from December to late March, with February being the hottest month of the year
- Winters are relatively mild and wet

**MAIN INDUSTRIES**
- Business and government
- Service industries
- Manufacturing
- Horticulture

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**Water availability**

<table>
<thead>
<tr>
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</thead>
<tbody>
<tr>
<td>Shallow aquifers</td>
<td>325</td>
<td>66</td>
<td>Fresh to brackish</td>
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<tr>
<td>Middle aquifers</td>
<td>67</td>
<td>2</td>
<td>Fresh to brackish</td>
</tr>
<tr>
<td>Deep aquifers</td>
<td>60</td>
<td>1</td>
<td>Fresh to saline</td>
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<tr>
<td>Groundwater total</td>
<td>452</td>
<td>69</td>
<td></td>
</tr>
<tr>
<td>Surface water</td>
<td>36</td>
<td>-</td>
<td>Mostly fresh</td>
</tr>
</tbody>
</table>

**Harnessing the potential**

The State Government is planning to accommodate a city of 3.5 million people. This long term, visionary planning is for a city that maintains a strong balance of community, industry and the natural environment. The development and maintenance of public parklands are an intrinsic part of this vision.

**Strong population growth**

Scheme water currently services more than two million people in the Perth, Peel, Wheatbelt and Goldfields regions and demand is expected to double in the next 40 years. Scheme supplies have been secured in response to a drying climate through a combination of groundwater, surface water, desalination, groundwater replenishment and recovery, and effective demand management.

Treating wastewater to drinking water standards and recharging it into groundwater aquifers will become an increasing part of the scheme water supply mix with potential for treatment of more than 100 Gl of wastewater.

The Perth region’s climate with its long dry summers, means there is high demand for water to irrigate public open space. Parks and gardens in Perth use about 120 Gl/yr and more parks will be needed in new residential areas, particularly north of Perth. The North West metropolitan corridor water supply strategy – developed by the Department of Water and the City of Wanneroo – ensures water for well-designed playing fields and public open spaces for community sport and recreation. Through water-sensitive urban design, water use is minimised on non-active open spaces such as verges and streetscapes. This approach balances competing demand for water while ensuring good public open space.
Industry demand

The Western Trade Coast (Kwinana Industrial Strip) is the only heavy industrial zoned area within the Perth metropolitan area. Existing industry produces around $15.5 billion annually and the Government’s aim is to increase this output to $28.3 billion.

Current water use is estimated to be around 21 Gl/yr, which is sourced from a combination of scheme water, groundwater, stormwater recovery and recycled wastewater. Wastewater recycling provides the best opportunity for future water supply and is currently being investigated.

Horticulture

High-value horticulture located mostly on the Gnangara Mound accounts for more than 20 per cent of the State’s vegetable production. Horticulture in the Carabooda and Wanneroo areas north of Perth provides lettuce, broccoli, beans, sweet corn, tomatoes and strawberries for local sales and export. Horticulture and viticulture are significant industries in the Swan Valley. The local horticulture industry is serviced primarily by self-supply groundwater from the Gnangara system, and uses about 28 per cent of groundwater licensed from that system. Because there is strong competition for this climate-affected water source, the Department of Water is working with growers to improve water use and efficiencies.

Planning ahead

New studies of Perth’s deep aquifers may support the potential expansion of the groundwater replenishment scheme. The Department of Water’s Perth Regional Confined Aquifer Capacity study is investigating the way the aquifers are recharged, including where they are connected to overlying aquifers, the location of the seawater interface and how groundwater moves. This information will help to determine the best locations to draw additional water and the best locations for groundwater moves. This study is central to the strategy of moving public water abstraction away from sensitive surface wetland areas and lakes that have been affected by the drying climate, and towards optimising the deep aquifers that currently supply almost 100 Gl/yr for scheme supply.
GEOGRAPHY AND POPULATION
/ Located immediately south of Perth
/ WA’s smallest region covering 5,648 km², including 137 km² of inland waterways and 50 kms of coastline
/ Population of 112,677 with the majority concentrated in the city of Mandurah

LANDSCAPE
/ Geographically diverse with urban, agricultural and horticultural land, a forested escarpment and plateau, a major flood plain
/ The Peel Inlet and Harvey Estuary are a major system forming the western boundary of the Murray groundwater area

CLIMATE
/ Mediterranean climate with hot, dry summers and cool wet winters
/ During summer hot, dry easterly winds prevail

MAIN INDUSTRIES
/ Mining (bauxite, gold and copper)
/ Building and construction
/ Manufacturing (metal products, machinery, equipment and food processing)
/ Agriculture, forestry and fishing
/ Retail
/ Tourism

Water availability

<table>
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<tr>
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<td>49</td>
<td>30</td>
<td>Fresh to brackish</td>
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<tr>
<td>Middle aquifers</td>
<td>20</td>
<td>11</td>
<td>Marginal to brackish</td>
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<tr>
<td>Deep aquifers</td>
<td>3</td>
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<td>Fresh to saline</td>
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<tr>
<td>Groundwater total</td>
<td>72</td>
<td>42</td>
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</tr>
<tr>
<td>Surface water</td>
<td>36</td>
<td>-</td>
<td>Fresh to saline</td>
</tr>
</tbody>
</table>

Harnessing the potential
Peel is one of the fastest growing regional areas in Western Australia. It also has some of the greatest water challenges with undeveloped parts of the landscape flooded in winter and dry in summer. Mining, construction, agriculture and residential development already utilise both surface and groundwater. The internationally important Peel Inlet - Harvey Estuary system and associated wetlands are also groundwater dependent.

Accommodating economic growth
Surface water collected in reservoirs in the Darling escarpment provides fresh water for Perth and Peel’s integrated public water supply, for the bauxite and gold mining industries and for the Harvey and Waroona irrigation districts. These reservoirs are fully utilised and stream flows into them have significantly reduced with diminishing rainfall.

This challenge is being met by water efficiency, recycling and sharing, which are essential for future regional development growth.

Significant groundwater volumes are stored in the sedimentary aquifers of the southern Perth Basin. However, quality and reliability of yield are common challenges to beneficial use. To address this, the Department of Water is using its scientific investigations to recommend distribution of abstraction amongst numerous lower yielding draw-points to ensure greater reliability. The Department of Water is working to ensure adequate supplies are available for projected industry and development expansion and for public open space.

Additional groundwater for industry and fit-for-purpose use is currently being investigated to allow for further development in the Peel region.
A state groundwater investigation has been completed in the Murray area and another is underway in the Serpentine area to address the issues of winter flooding and give greater certainty to potential urban development and the need for additional water to support domestic and industrial growth. One concept being explored is to harness the flood waters that inundate the land in winter and employ managed aquifer recharge techniques to store the water in the deeper aquifers to be accessed on a fit for purpose basis by industry or local government in the region.

The Department of Water is using its expertise and working across Government and with the urban development industry to identify flood risk, reduce the need for sand fill and design drainage in Peel to allow for cost-effective and safe urban development in the low-lying land that dominates the Murray region.

The Department of Water’s expertise contributes to the Strategic Assessment of the Perth-Peel Region, led by the Department of the Premier and Cabinet. The Department is working to enable the region’s future urban and industrial growth and the ongoing management of water as a significant component of the Peel-Yalgorup Ramsar listed wetland system.

Self-supply groundwater users in the Peel area can access their water from the superficial and Leederville aquifers, however availability and quality varies between subareas.

The Department of Water is exploring water planning and supply options to support the region’s rapid population growth.

Options include recycling and water treatment by developers which is allowing major greenfield urban development to continue in the area while new developments are adapting to the unique Peel conditions.
South West

GEOGRAPHY AND POPULATION

/ 23,998 km²
/ 163,000 residents, and growing rapidly
/ Offers an enviable lifestyle including diverse economy

LANDSCAPE

/ Rugged coastline, with some of the best surfing beaches in Australia
/ Caves and wineries
/ Towering forests

CLIMATE

/ Mediterranean climate with pleasant summer months and winter rainfall

MAIN INDUSTRIES

/ Tourism
/ Agriculture, dairy and horticulture
/ Timber and forest products
/ Mineral extraction
/ Processing and manufacturing
/ Service industries
/ Fishing and aquaculture

Water availability

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<tbody>
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<td>67</td>
<td>30</td>
<td>Fresh to saline</td>
</tr>
<tr>
<td>Middle aquifers</td>
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<td>Mostly fresh</td>
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<tr>
<td>Deep aquifers</td>
<td>104</td>
<td>12</td>
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<tr>
<td>Groundwater total</td>
<td>218</td>
<td>50</td>
<td></td>
</tr>
<tr>
<td>Mine dewater surplus</td>
<td>-</td>
<td>16</td>
<td>Fresh to variable</td>
</tr>
<tr>
<td>Surface water total</td>
<td>359</td>
<td>139</td>
<td>Fresh to brackish</td>
</tr>
</tbody>
</table>

South West agriculture

Of the estimated 240 Gl/yr of irrigation water used in the South West, almost 50 per cent is surface water supplied by irrigation cooperatives to the Waroona, Harvey, Collie and Preston Valley irrigation districts. Another 25 per cent is surface water supplied from in-stream dams and by direct pumping from watercourses in areas such as Capel, Donnybrook, Busselton, Augusta-Margaret River, Manjimup and Pemberton. The remainder is supplied from groundwater bores on the Swan Coastal Plain at Myalup, between Harvey and Dunsborough and on the Scott Coastal Plain.

The Department of Water is working with users to improve water efficiencies and to support the ability of users to trade water between themselves.

The focus is on identifying innovative ways to improve salinity levels in the Wellington Reservoir for local agriculture, in particular the dairy industry.

A new groundwater investigation shows there may be additional Yarragadee groundwater available on Scott Coastal Plain.

Harnessing the potential

A drying climate is affecting both surface water runoff and groundwater recharge across the South West with an average rainfall reduction of 16 per cent below the average long term annual rainfall. This has resulted in a reduction of 50 per cent in average runoff (CSIRO 2013), which in some areas has reduced the reliability of surface water entitlements by about 30 per cent.

A major focus of the Department of Water’s investigations is to identify water resources and supply options to support existing and potential growth of the South West region’s industry, including mining, agriculture, horticulture, viticulture, forestry and dairy farming, as well as population growth associated with the economic and lifestyle advantages of the region.

For example, the department is assessing potential sites for storage of runoff along with associated infrastructure and water allocations in the productive horticultural Warren-Donnelly area of the State, to assist expansion of the existing $127 million horticultural industry.

The Department of Water has recently completed a supply/demand study for the Collie-Kemerton area that considers growth scenarios and water availability for industry. While sufficient water was identified for immediate and moderate growth scenarios, poor water quality represents a major cost for most industries and is prohibitive for existing agricultural practices. The Department of Water is also identifying supply/demand strategies for urban development in the cities of Bunbury and Busselton and for the Warren-Donnelly area.

The potential for the South West region is significant and can be satisfied through innovation, optimising existing water supplies and maximising fit-for-purpose water.
Industrial demand

Industrial water demand in the South West is concentrated in the Upper Collie Basin, Kemerton Industrial Park and scattered sand mining locations. The Upper Collie Basin currently supports coal mining, power generation and a range of other industrial uses.

Water for industry in the Upper Collie Basin is currently sourced from groundwater, surface water from the Wellington reservoir and mine dewatering surplus, some of which is available for use in the short term. Major water users in the Kemerton Industrial Park rely on local groundwater.

Additional sources of water for industry in the region are being investigated, including mine dewatering, additional supply from the Wellington reservoir and water recycling.

Public water supply

14 Gl/yr has been reserved from the south west Yarragadee aquifer for future regional town supplies.

The south west Yarragadee and Leederville aquifers are the key water resources for the region’s three public water service providers supplying the many growing cities and towns. Along with the localised superficial aquifers and rivers, they also provide water for horticulture, pasture and mining and support the flow of the Capel, Margaret, Brunswick, Donnelly and Blackwood rivers.

A Royalties for Regions funded aerial electromagnetic survey is being used to determine groundwater availability, quality and rate of recharge required to balance taking water from the aquifer resources of the Scott and Swan coastal plains.

Water for South West

The Department of water has substantially expanded the coverage of its groundwater assessment network monitoring since allocation limits for the South West’s key groundwater aquifers were re-set in 2009 to adjust to the drying climate trend.

Evaluation of the key regional aquifers using this network has shown the impact of the drying climate is being managed within the set allocation limits. Therefore it is unlikely the climate will negatively impact on current water availability for supporting industry, agriculture and town supplies. An update to the South West Aquifer Modelling System is underway using the information obtained from the network and new drilling and investigation work through Royalties for Regions funding.
Great Southern

GEOGRAPHY AND POPULATION
/ Approximately 250 kms of coast
/ Total land area of 39,007 km²
/ Region includes two ancient ranges of hills, the Stirling Range and the Porongurup Range. Bluff Knoll, at 1095m, is the highest peak in the southern half of WA
/ Population of 60,000 including 35,000 in the historic port city of Albany, which is the State's oldest European settlement

LANDSCAPE
/ Land types range from Mallee scrub in the north east to karri forests in the south west
/ Features forests, national parks and beaches
/ The coast is abundant with fish and can provide tourists with encounters with whales
/ Two world-class trails including the Bibbulmun Track and Munda Biddi Trail offer off-road tourism
/ Albany is one of the southern hemisphere's best natural anchorages

CLIMATE
/ Milder climate than much of the rest of Western Australia
/ Reliable growing seasons most of the time
/ Annual rainfall decreases along the coast from west to east, and inland away from the coast

MAIN INDUSTRIES
/ Primary production, including wool, cropping, livestock, timber, viticulture and fishing
/ Tourism
/ Retail and manufacturing
/ Key growth areas include engineering, commercial and financial services

Water availability

<table>
<thead>
<tr>
<th>Water resource</th>
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</tr>
</thead>
<tbody>
<tr>
<td>Shallow aquifers</td>
<td>4</td>
<td>New sources under investigation</td>
<td>Mostly fresh</td>
</tr>
<tr>
<td>Middle aquifers</td>
<td>2</td>
<td>New sources under investigation</td>
<td>Mostly fresh</td>
</tr>
<tr>
<td>Groundwater total</td>
<td>7</td>
<td>New sources under investigation</td>
<td></td>
</tr>
</tbody>
</table>

Harnessing the potential

Surface water use in the Great Southern region is relatively low, except in the wetter south west area where local surface water supplies towns such as Denmark and Walpole. A decade of work by the Department of Water has resulted in the Denmark River recovering from being salinity-affected to regaining drinking water quality.

The Great Southern Town Water Supply Scheme to Katanning and Narrogin is supplied from outside the region from the Harris Dam, north of Collie.

Farmers and small townsites not connected to scheme water use surface dams and granite rock catchments for watering stock and local drinking water supplies.

Fresh groundwater sources in the region are limited to a narrow sedimentary basin - the Bremer Basin near Albany. Royalties for Regions funding has been used to direct hydrogeological drilling for groundwater to supplement the lower Great Southern Towns scheme water supply that meets the needs of Albany and Mt Barker. The results of this four-year assessment program commissioned by the Department of Water have confirmed that an additional 0.5 Gl/yr is available on a sustainable basis from existing production fields, and there is potential for a further 1 Gl/yr which would meet scheme requirements on current planning beyond 2030.

Aerial electro-magnetic surveys have identified potential sources of fresh groundwater in the Albany hinterland that can provide diversification options for industry and agriculture in the long term. Studies indicate that both potable and fit for purposed supplies may be available in the order of 10 Gl. The area represents the most significant ‘hot spot’ for competing water demand in the Great Southern Region. These sources will be further investigated through a $1.6 million Royalties for Regions funded program of exploratory drilling and analysis in the next two years to determine volumes and quality.
A growing region

The Great Southern extends from Walpole in the west to the eastern border of the Shire of Jerramungup, and north to the shires of Woodanilling and Kent.

The region’s growing economy is built on the major contributions from agriculture, manufacturing, tourism and construction. It also has valuable forestry, fishing, aquaculture and mining sectors.

An increasingly popular choice of location for lifestyle change, it has a high population growth and attracts around 500,000 visitors a year who enjoy the region’s renowned natural attractions and world class wineries. While it may look like the Great Southern’s major towns such as Albany get a lot of rain, the fact is that water supplies in this beautiful region are not abundant. Water demand in the Great Southern region is expected to increase by more than 20 GL/year by 2040. This will be driven by population growth, new mining developments and expansion of industry and irrigated agriculture. At the same time, water availability will decline as the region’s climate becomes drier.

The Great Southern region has the highest level of wastewater recycling in the state, and a combination of new groundwater sources, stormwater harvesting and recycling and managed aquifer recharge will meet projected demand.

Water for Great Southern

The Department of Water’s regional water supply planning has forecast the Great Southern’s water demand over the next 30 years and provides water supply options and actions to meet this demand.

The plan builds on the excellent work to date in securing the town scheme water supplies for Albany, Mt Barker and Denmark, including Royalties for Region’s funded groundwater investigations which are promising more water for supplies to the Great Southern towns, as well as future agriculture and industry development in the region.

The State Government is committed to provide opportunities for the growth of regional Western Australia. The planning and investment in securing the water supplies of the Great Southern region is further evidence of the social and economic importance placed on regional towns and industry.
GEOGRAPHY AND POPULATION

- The largest of the State’s nine regions
- Located in the south eastern part of Western Australia
- Covers 770,448 km²
- Bounded by the Little Sandy Desert and Gibson Desert to the north; the Wheatbelt region to the west; the Great Australian Bight to the South; and the South Australian and Northern Territory borders to the east
- Population of just under 60,000
- Many mining enterprises operating on a fly-in-fly-out basis

LANDSCAPE

- Four distinct sub-regions:
  - Goldfields subregion: flat, arid, desert landscapes
  - Esperance subregion: coastal landscape with bordering wheat-growing farmland including Esperance port
  - Flat Nullarbor plain out to the South Australian border

CLIMATE

- Varies from cool southern coastal climates to dry, arid conditions moving towards the Great Victorian and Gibson Deserts
- Experiences little and intermittent rainfall

MAIN INDUSTRIES

- Mining (gold, nickel, cobalt, zinc, copper, silver)
- Pastoral agriculture
- Retail and manufacturing
- Aquaculture
- Tourism

Water availability

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<td>57</td>
<td>54</td>
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<tr>
<td>Middle aquifers</td>
<td>11</td>
<td>10</td>
<td>Marginal</td>
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<tr>
<td>Groundwater total</td>
<td>68</td>
<td>64</td>
<td></td>
</tr>
</tbody>
</table>

Harnessing the potential

While the region is best known for the extraction and processing of minerals (in particular gold and nickel) there are also well-established agricultural industries, and tourism is a key growth sector.

Quality and demand

In the Goldfields, large quantities of variable quality, local groundwater is pumped for fit-for-purpose use in gold and nickel mining and ore-processing. Goldfields-Esperance experiences little and intermittent rainfall. While south-flowing rivers along the Esperance coast are mostly quite short and infrequently reach estuaries that open to the ocean, rivers tend to be ephemeral and hyper-saline.

Groundwater in palaechannels tends to be hyper-saline and other aquifers can range in quality from fresh to brackish to saline.

Across the region there is further groundwater available for general fit for purpose use from the sedimentary aquifer resources. While the coastal Bremer Basin is largely allocated, additional water is available from other areas and from fractured rock aquifers. Water quality and yield are quite variable.

The Department of Water has technical information for most sedimentary resources across the region and detailed information for those resources abstracted for public water supply. Detailed water information associated with mining projects is used for site-specific water management.
Town water supplies

Town water supplies for most of the region and Kalgoorlie are piped from Perth through the famous Goldfields and Agricultural Water Supply Scheme, also known as the CY O’Connor pipeline.

Local groundwater supplies drinking water to the inland towns of Sandstone, Laverton and Leonora.

Groundwater also supplies drinking water for the coastal towns of Hopetoun and Esperance on the coast. Groundwater is reserved for future town supply in the area and new long term options for the town water supplies are being modelled as well.

Aerial electromagnetic surveys were conducted in 2013 and the data gathered is being used by the Department of Water in a scientific process to assess the quantity, quality, availability and recharge of the region’s groundwater resources.

This information will be used to set sustainable allocations for proved sources and provide confidence in the future water security for all.

Groundwater from the Esperance groundwater area provides support to the region’s dry-land farming communities and is often carted outside the area for use in drought relief to livestock farmers.

The Department of Water works with the farming community and local governments to develop and maintain emergency livestock water supplies throughout the region, as well as build on farm water capacity.
More information

The Water Resources Inventory 2014 which details all known water resources in Western Australia, including water availability, quality and trends is available at www.water.wa.gov.au

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Department of Water Surface and Groundwater Allocation Plans (as at 9 May 2014)

Kimberley Region:
/ Ord surface water allocation plan
/ La Grange groundwater allocation plan

Pilbara Region:
/ Pilbara groundwater allocation plan
/ Pilbara regional water supply strategy
/ Western Australian water in mining guideline

Mid West Gascoyne Region:
/ Arrowsmith groundwater allocation plan
/ Carnarvon Artesian Basin water management plan
/ Jurien groundwater allocation plan
/ Lower Gascoyne allocation plan

Swan-Avon Region:
/ Gingin surface water allocation plan
/ Gnangara groundwater areas allocation plan
/ Middle Canning River surface water allocation plan

Kwinana-Peel Region:
/ Cockburn groundwater area management plan
/ Murray groundwater allocation plan
/ Rockingham-Stakehill groundwater management plan
/ Murray drainage and water management plan

South West Region:
/ Kemerton groundwater subareas water management plan
/ Lower Collie surface water allocation plan
/ South West groundwater areas allocation plan
/ Upper Collie water allocation plan
/ Warren-Donnelly surface water allocation plan
/ Whicher surface water allocation plan

Kalgoorlie-Esperance Region:
/ Esperance groundwater subareas management plan

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