Government of **Western Australia**
Department of **Water**

Securing water resources for the South West

Securing Western Australia's water future

The State Government recognises the need to continue long-term water planning to secure water supplies for the region for all water users and for the environment.

The Department of Water regulates water use, conducts scientific assessments, identifies future water demand for all sectors across the State and provides advice to Government on water services. The department has partnered with the three South West water service providers (the Water Corporation, Aqwest and Busselton Water) to plan for the scheme water needs of their customers that align with the State's growth projections and efficiency targets.

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Securing water resources for the South West

Water is a valued natural resource in the south-west of Australia. It supports our regional lifestyles, environments, and economies – including world renowned viticulture and tourism industries.

While some winters are wetter than others, over the last four decades the south-west has been getting less rain. This trend is set to continue with all global climate models predicting we will see less rainfall in this part of the state over the coming decades.

Surface water from rivers and groundwater from aquifers comes from rain. This water is critical to the region's mining, industry, and agriculture, horticulture, forestry, dairy and viticulture production. It is also the source of drinking water supplied to the region's cities and towns.

There is a lot we can do to manage the risks to water resources associated with climate change – so we have enough water now and for the future in the South West region.

The Department of Water regulates water use through water licences and sets sustainable limits on water resource allocations through scientific assessment. The department also identifies and advises on future water demand and supply pressures through strategic water planning, and partners with water service providers and industry to find water solutions. An extensive program of scientific assessment of the region's water resources as well as planning to assess future water needs for our regional towns is currently underway.

The region's three public scheme water service providers – Water Corporation, Aqwest and Busselton Water – are partnering with the department in planning for future drinking water supplies.

To map out future needs the water service providers have each developed 50 year plans that project scheme water demand, set water use efficiency targets and identify supply options to continue to ensure high quality water supplies to the region's towns and cities. The department has analysed these plans to confirm water efficiency targets and growth projections, and identify the timeframe and options to meet future water supply needs.

New information about the region's aquifers from the department's Royalties for Regions funded South West groundwater investigation will be used to refine how we manage water licences and the impacts of groundwater pumping on all water users. It will also be used to set more precise water allocation limits and adapt how we mange the groundwater interface with seawater, and the rivers and wetlands that depend on groundwater.

This program confronts the climate challenges we face with science based planning. This will reduce the risk that changing climate patterns bring to the region's economy, environment and community wellbeing.

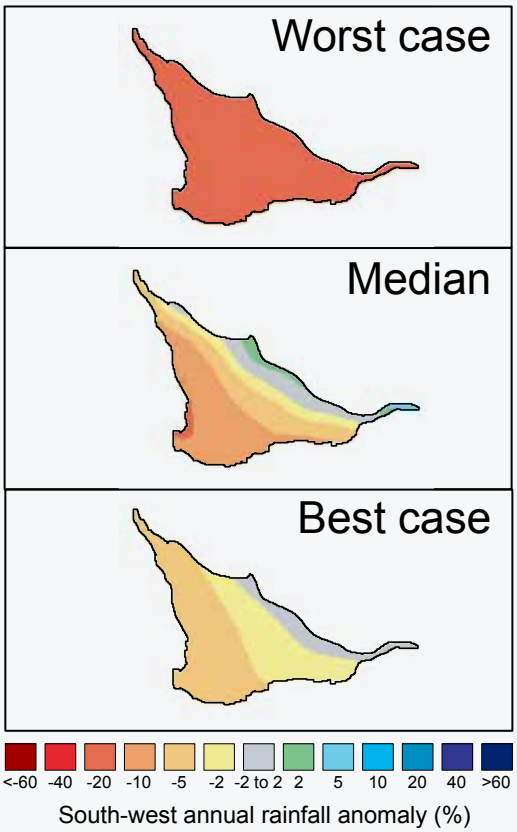
Drying climate

Image courtesy Oxyimages.com

The Department of Water, the CSIRO and the Bureau of Meteorology have been tracking a change in rainfall patterns over the past decades. Rainfall in the south-west of Western Australia is now around 16 per cent below the long term average.

Less rainfall results in less water in rivers and aquifers. To date there has been up to a 50 per cent reduction in average run off into rivers and streams, and up to a 30 per cent reduction in recharge of aquifers – depending on the location.

Research shows this drying trend is set to continue, but whether it will be only slightly drier or much drier can't be certain. So we are planning for the full range of possibilities.



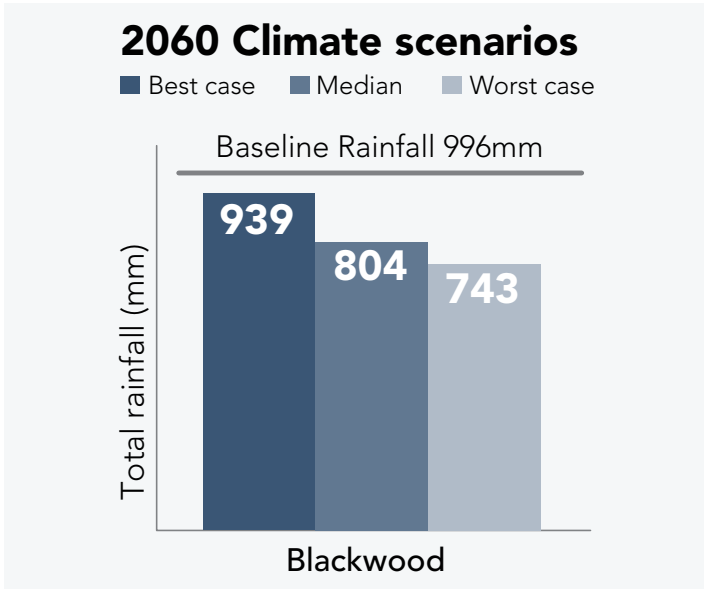
Percentage change in average rainfall in 2060 relative to the 1961-1990 baseline period for the worst case, median and best case scenarios

Responding to change – local data and global models

The department has analysed climate projections from all global climate models and used those that have proved most accurate to date. This work builds on CSIRO's 2010 South-West Western Australia Sustainable Yields assessment. We have selected the most probable wet, median and dry future rainfall scenarios for locations in the south-west of the state. These scenarios provide the best case rainfall and worst case rainfall we might see in the future and are used to inform our modelling, planning and impact assessment.

For example, in the Blackwood groundwater area under a median scenario, rainfall is likely to have decreased by 19 per cent by 2060, and as a best case we expect a six per cent decrease. The worst case scenario would be the most challenging, with a possible 25 per cent decrease in rainfall by 2060.

The department has set water allocation limits using the best available data to ensure water allocations are sustainable for the current climate. Using local water resource data from our new groundwater investigations, and selected climate scenarios from our analysis, we can make more precise water management decisions that optimise water use now and minimise risks for the future.



1961–1990 baseline and 2060 projected rainfall for a representative site in the Blackwood groundwater area

Water use and demand in the South West region

Much of the available water in the South West region is already licensed, with 470 GL/year currently licensed for use.

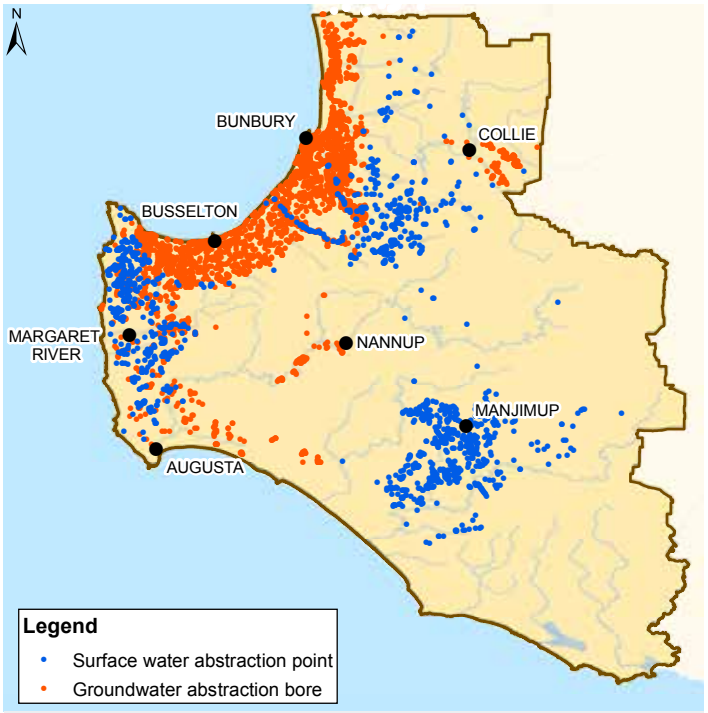
Around 200 GL/year of groundwater is licensed for use, concentrated along the Swan Coastal Plain from north of Bunbury to Dunsborough.

65 GL/year of groundwater is currently available for additional licensing to meet future growth across all sectors, although the quality and volume available varies across the region. Of this, approximately 19 GL/year is presently set aside for future public water supply for towns in the South West.

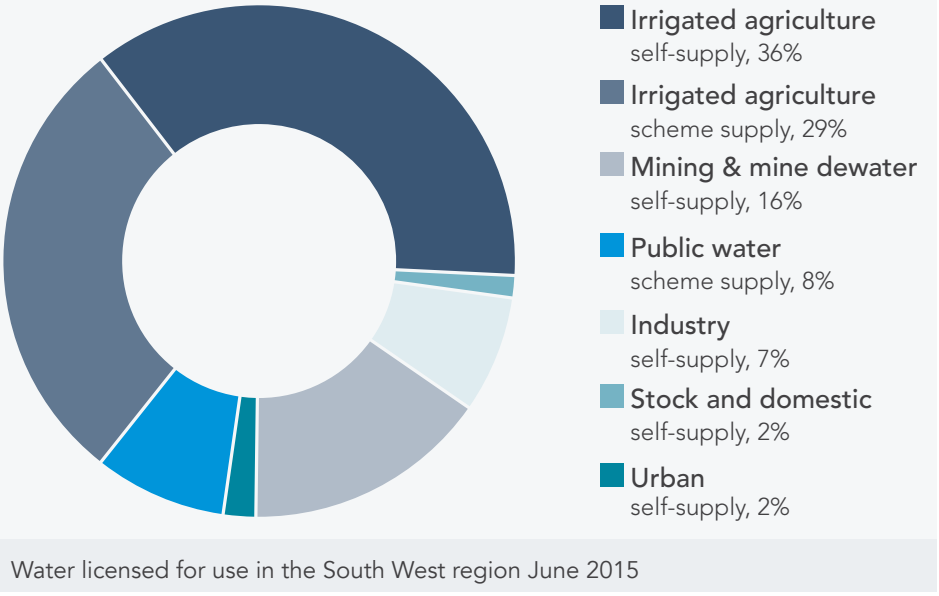
Around 270 GL/year of water is licensed from large and small surface water dams in the South West region. Actual use of surface water in the region is a little less than groundwater, as reliability of water from the large dams varies with annual rainfall.

More than 50 GL/year is licensed for reliable supplies from self-supply dams on streams near Manjimup and Pemberton, and more than 50 GL/year from similar systems between Capel and Augusta. Water from small dams also provides some of the supply for the region's towns.

Water from the Wellington and Harvey dams is licensed for the Collie and Harvey irrigation districts. Water from the Harris Dam goes to the Great Southern Towns Water Supply Scheme.



Surface water and groundwater abstraction points in the South West region



Water licensed for use in the South West region June 2015

How water is used

A water licence from the Department of Water is needed to take groundwater or surface water, except for very small scale domestic and stock purposes.

Public water supply schemes within the South West region comprise eight per cent of volume licensed, mostly sourced from groundwater.

Irrigated agriculture accesses 65 per cent of the water licensed in the region. Water is used for horticulture, viticulture, dairy farming and a range of crops. Water for irrigated agriculture is supplied from irrigation schemes, small on-stream self-supply dams and self-supplied groundwater.

Around 65 GL/year is licensed for use in mining and 30 GL/year for industry. Most of the water licensed for the mining sector is for dewatering to allow coal mining below the watertable near Collie. The mine dewater is used in mining operations and in the local power industry, with some surplus dewater discharged to the Collie River East Branch.

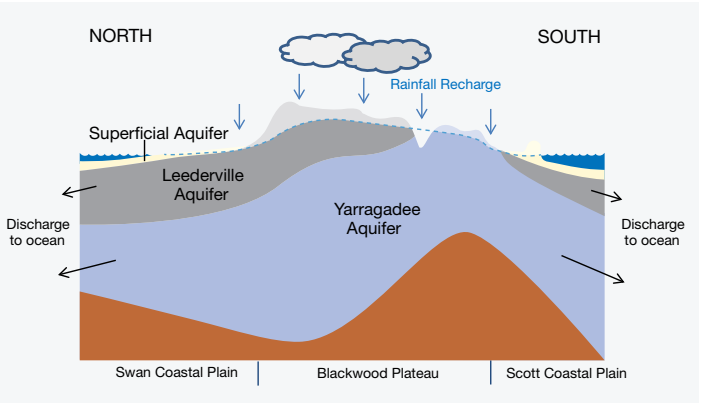
South West region's groundwater

Groundwater is used for town water supplies, agriculture, mining, power and other local industries as well as parks and gardens. Groundwater also maintains wetlands and supports the flow of the region's Capel, Margaret, Brunswick, Donnelly and Blackwood rivers. Groundwater movement towards the coasts reduces the risk of seawater intrusion to groundwater bores along the coast.

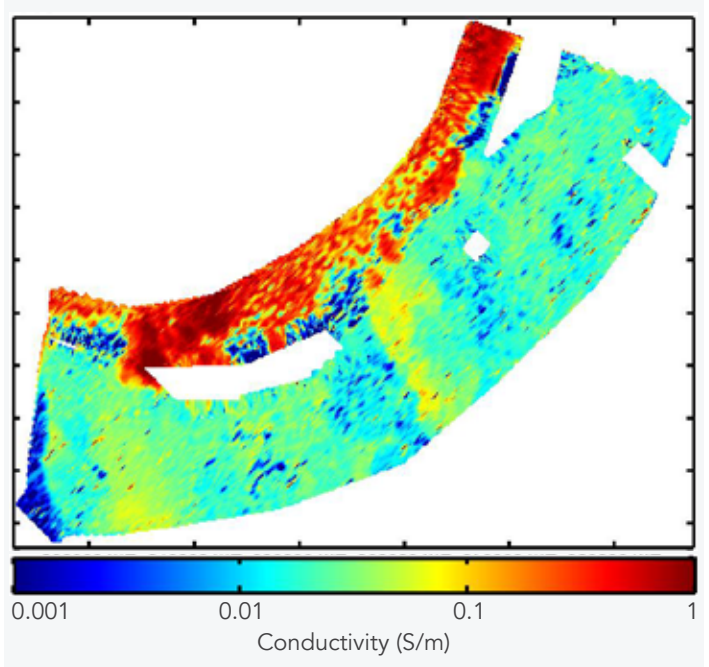
The Yarragadee and Leederville aquifers provide the bulk of supply to the region's three public scheme water service providers, supporting the many growing cities and towns, including the major regional centres of Bunbury and Busselton.

The amount of water that can be taken from the South West Yarragadee Aquifer, as well as the Leederville, Superficial and other smaller aquifers is set by the South West groundwater areas allocation plan (2009). In response to the effects of the drying climate, the South West Yarragadee allocation limit was lowered in 2009 from 120 GL/yr to 87.5 GL/yr and the aquifer was confirmed as a water resource for sole use in the South West region.

To support this policy, water from the South West Yarragadee Aquifer that was not already licensed was reserved for future public water supplies. To equitably manage competition, the water service providers need to meet efficiency targets and demonstrate their future water needs before being licensed to access the reserved water. The 50 year plans from Water Corporation, Aqwest and Busselton Water are an essential step to achieve this.



Conceptual geological cross-section of aquifers in the South West region



Example output from the AEM survey of the Swan Coastal Plain

Science to understand our groundwater future

The Department of Water's $1.5 million, four year Royalties for Regions funded South West groundwater investigation, started in 2012. The study is to determine local groundwater characteristics and aquifer recharge under projected local climate.

Airborne electromagnetic (AEM) surveys flown as part of the investigation, are showing us where freshwater aquifers are being intruded by seawater.

This work will be used to develop a new groundwater model for the South West region to incorporate the latest investigation, monitoring and climate change projection information, including new data for the Scott and Swan Coastal plains.

The modelling will provide the most precise picture to date of the structure and behaviour of the aquifers, and how they respond to changes in climate and water use. This picture will be used to establish the right balance in taking water from the aquifers. The results will inform sustainable allocations for proven sources and guide decisions on where water can be abstracted, including for use by the region's water service providers.

This detailed climate and water resource modelling work will provide greater certainty for future groundwater availability. It will be used to reassess groundwater allocation limits, including water reserved for future public supply, to revise and update groundwater allocation plans, and to target licence compliance activities. The new modelling will also be used for water supply planning, to identify groundwater availability to meet long-term water demand for all water users in this fast growing area, and to target alternative supply solutions where needed.

Town water supply for the future

The South West region's public water supply schemes are essential to the liveability and prosperity of its cities and towns.

Each of the three water service providers have undertaken long-term planning to estimate future drinking water demands based on expected growth and efficiency targets, and to identify water supply options to support this growth. More information on the planning can be found in Water Forever: South West (Water Corporation), AQWEST long-term urban water supply strategy (Aqwest) and from Busselton Water.

The Department of Water worked with the water service providers to assess their projected water demands for all schemes in the region against current water resource availability. Improved water efficiency is a crucial part of the future, with a residential water use target of 100 kilolitres per person per year by 2030[1]. Efficiency gains have already been made in many areas. Current residential water use ranges from 50 to 170 kilolitres per person per year, with around half of the schemes already achieving the target.

Water Service Provider		Department of Water
Long-term public water supply planning (e.g. Water Forever)	Long-term	Assess and advise on long-term planning
Scheme supply plans	Medium-term	Assess and advise on supply planning
Scheme water licences	Short-term	Assess, approve and survey compliance of licences

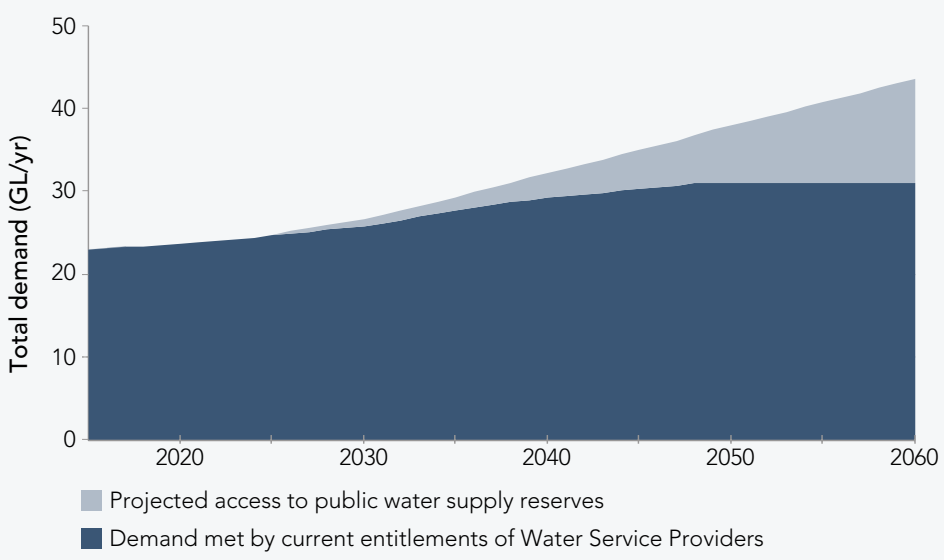
[1] *A residential water use target of 100 kilolitres/year/person equates to approximately 140 kilolitres/year/person for total scheme water use (includes residential, commercial and industrial users and irrigating public open spaces).*

The department's assessment shows that there is enough water to meet projected water demands to 2030 and beyond for most towns, if water use efficiency targets are met. Drinking water demand can be met with the current volumes of water licensed to the water service providers combined with new supplies from water reserved for future public water supply.

To plan for the longer-term in areas where scheme water demands could exceed current groundwater availability, the department will continue to work with water service providers to identify future supply options and ways to increase water conservation, efficiency and recycling.

Public water supply schemes (WSS) in the South West region

The drying climate could result in reduced groundwater and surface water availability, increased seawater intrusion and increased risk of impacts of abstraction on groundwater dependent ecosystems. We will continually monitor for these changes and the volume reserved for future public water supply will be reassessed through future groundwater allocation planning to ensure these risks are minimised.



Projected water demand and supply for all public water supply schemes in the South West region

Non-potable urban water supplies for the future

Non-potable (non-drinking quality) water supplies can be used for public open spaces including sports ovals, parks and other recreational areas. Where groundwater resources are limited or fully allocated, stormwater harvesting and wastewater recycling can be better options than using scheme water for public parks and recreation areas.

The Department of Water and the Department of Sport and Recreation have developed guidelines to assist the planning, design and use of public open spaces and parklands to be water efficient and water sensitive.

The Department of Water is working with local governments to assess non-potable urban water demand for the coastal area between Binningup and Dunsborough. This work will forecast water demand at the local-scale and identify water supply options, including non-potable options, which could be developed to meet the current and future needs.

Water for future agriculture and industry

Industry, mining, agriculture, horticulture, viticulture, forestry and dairy farming all require water to continue and grow.

There are already many examples of improved water use efficiency through using up-to-date technology and infrastructure and more effective on-farm water management. Also important is planning ahead to identify and select new water supply options well before they are needed.

This focus on the future is evident in two new projects in the Royalties for Regions funded $40 million Water for Food program.

The $5.7 million Myalup Wellington project will assess ways to make more effective use of groundwater at Myalup, and the potential to increase effective use of fit-for-purpose or treated water from the Wellington Reservoir.

The $3.6 million Southern Forests water futures project is targeting an additional 12 GL/year of sustainable irrigation water from the Warren and Donnelly catchments. It will assess potential sites for new strategic community dams with a capacity up to 2 GL/year each, to harvest and store water in higher rainfall years and provide a reticulated system to multiple properties.

Data collected in a three year trial will be used to identify locations, associated infrastructure and additional water allocations to assist expansion of the existing $127 million horticultural industry.

This work complements the Southern Forests Food Council's best-practice regime for produce from the region.

The potential for water as an enabler for the South West region to expand its valued horticulture is significant and will be achieved through innovation, optimising existing water supplies, maximising fit-for-purpose water and maturing the water market.

Water for tourism, recreation and the environment

Image courtesy MargaretRiver.com

Tourism and lifestyle are defining characteristics for the South West region's community and economy. While the region's produce – including boutique food and wines – forms a significant part of the tourism attractions, the economy also relies on the natural assets of the region including the rivers and water dependent ecosystems. Small businesses in the tourism and recreation sectors use these natural resources to generate jobs and income. They are also important components of the region's property market.

The Department of Water is also working to support the health of the region's water resources for tourism, recreation, and the environment.

Our water measurement network, along with the new groundwater investigation, builds understanding of the impact of water use on our rivers, wetlands and aquifers.

This information is used to continually adjust and improve how we manage water resources in priority areas to support the resilience of water dependent ecosystems in the region.

Water quality monitoring guides evidence based water and land use decisions. Our whole of water cycle advice to developers, and state and local government is designed to support the management of water quality issues.

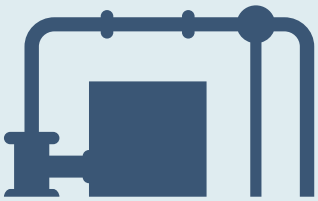
Water quality improvement plans, developed in partnership with local stakeholders set actions for tackling nutrient loading for the Hardy, Vasse and Leschenault estuaries.

This focus on water quality and development ensures people have a healthy and attractive environment to live in.

Image courtesy MargaretRiver.com

Fast facts:

The State Government's position is that the South West Yarragadee Aquifer is for local use only.



The Department of Water monitors water resources in the South West region using a network of 900 groundwater bores and 80 surface water gauging stations to measure changing water levels. We are also carrying out scientific investigations and studies in priority areas such as the Swan and Scott coastal plains.

An update to the South West Aquifer Modelling System (SWAMS) is underway, using the information obtained from the regional monitoring network and new drilling and investigation work, including an Airborne Electromagnetic survey, through the $1.5 million Royalties for Regions funded South West groundwater investigation.

The department has six water allocation plans to support water licensing in the South West region. The department also has 21 drinking water source protection plans and assessments, and three water quality improvement plans to guide land use activities to reduce impacts on water quality.

Combined, these plans provide a sensible and detailed framework to manage the South West region's water resources.

WATER FOR FOOD

The $5.7 million Royalties for Regions funded Myalup Wellington Water for Food project is assessing ways to make more effective use of groundwater at Myalup and fit-for-purpose and treated water from the Wellington Reservoir.

The $3.6 million Royalties for Regions funded Water for Food Southern Forests water futures project is assessing potential sites for new strategic community dams in the Warren and Donnelly catchments.

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