

June 2014

Future Water Strategy

Water security for
our future

Foreword



Our region must plan today to secure our future. This is especially true for our water supply. While our region has enough water to comfortably meet our needs over the short to medium term, we need to plan now to ensure water security for the next 50 years.

As we look ahead, we know that our growing regional population will require and use more water and a changing climate will mean less reliable rainfall. Insufficient or uncertain water supply in the future will threaten our region's lifestyle, economic development and prosperity. This is why Rous Water has developed the Future Water Strategy—to secure our region's long-term future.

The Future Water Strategy is the culmination of several years of study involving our local councils and water industry professionals, supported by a Project Reference Group, largely comprised of members of our community.

This is a practical strategy designed to minimise social, environmental and financial costs to the community, while fulfilling Rous Water's mission of providing a safe, secure and reliable water supply to the region.

Underpinning our strategy is a commitment to make best use of our existing water sources, before developing new ones. However, responsible water use alone will not meet our future regional water needs. Our strategy involves a progressive series of actions to further promote efficient use of water and to investigate new water supply sources, to be developed as required.

Following community feedback on the draft strategy, Rous Water finalised and adopted the Future Water Strategy in May 2014 as its blueprint for maintaining long-term regional water security.

Rous Water will commence implementation and update the strategy as required. Rous Water will also maintain an ongoing dialogue with the community to explain how our investigations into new water sources are progressing and to involve the community in future decisions.

Practical investigations will determine whether increased use of groundwater is viable and how much of future demand can be met using groundwater supplies. At the same time, we will look at whether water re-use should also be integrated into our supply system and talk to the community further about water recycling.

On behalf of Rous Water, I thank everyone who has participated in the development of this strategy, including the many people who provided constructive responses during recent community consultation. Rous Water is confident that we have a sound, practical plan for managing water security for our future.

Councillor Susan Meehan

Chair, Rous Water
June 2014

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The Future Water Strategy embodies Rous Water's vision to provide a healthy, reliable and an ecologically sustainable supply of water to present and future generations.

Purpose of the Future Water Strategy

Rous Water's existing water sources can comfortably meet expected demand in the short to medium term however, it is essential and responsible to plan for our longer term needs. To maintain a reliable and sustainable water supply for the longer term, we have prepared this Future Water Strategy. The strategy has a 50-year planning horizon.

Over the next 50 years, changes to climate and rainfall patterns are expected to mean that the region will receive less reliable rainfall. At the same time, water use is forecast to increase as the population grows.

Based on these predictions, by around 2024, demand for water will match what our current sources can reliably supply. By 2060, expected water demand would exceed reliable supply by 6,500 megalitres per year, or approximately half of our current supplies. Meeting this challenge will require a combination of improved water conservation and new water sources to be developed over the next 10 years.

Key considerations in the development of the Future Water Strategy included:

1. A 50-year demand and supply forecast—how much water the region will need, compared to how much water its current sources can reliably supply.
2. Responsible and efficient water use—how to get the most out of existing water sources.
3. New water sources—identification and assessment of potential new water sources.
4. Dunoon Dam—whether the proposed Dunoon Dam should be included in the Future Water Strategy.

The Future Water Strategy at a glance

- Water use is expected to increase from 11,000 megalitres per year in 2013 to nearly 16,000 megalitres per year around 2060, as our regional population grows.
- The regional water supply is predicted to decline by around 34 per cent over the next 50 years due to changes in climate and rainfall.
- Rous Water's existing supplies will meet predicted demand until around 2024, after which demand for water will exceed reliable supply.
- Based on these projections, Rous Water has about 10 years to act to ensure regional water security is maintained.
- Initiatives across our region to promote the more efficient use of water will prolong our existing water sources and reduce the amount of water required, however on their own will not be enough to ensure water security.
- Rous Water has selected groundwater and water re-use as new water sources for investigation. The Dunoon Dam proposal will not be further progressed unless these new sources prove to be unsuitable.
- To allow time for development, investigations into future new water sources need to be completed by around 2018.

About Rous Water

Rous Water provides safe and secure, drinking-quality water for approximately 100,000 people over a 3,000 km² area, extending to Ocean Shores in the north, Lismore and Coraki in the west and Evans Head in the south (Figure 1).

Rous Water owns, operates and maintains a range of water sources, treatment plants and distribution systems to provide water to Ballina Shire, Byron Shire, Lismore City and Richmond Valley councils. Each council, in turn, manages its own urban water distribution, customer service and water billing activities. Rous Water also retails water directly to approximately 2,000 properties not serviced in the local council urban distribution areas. Regional water use is shown in 'supporting information', on page 18.

Rous Water's existing water sources are:

- Rocky Creek Dam
- Emigrant Creek Dam
- Wilsons River Source
- Groundwater bores on the Alstonville Plateau and at Woodburn.

These water supplies can provide around 13,800 megalitres per year of 'reliable supply', with current use around 11,000 megalitres per year.

In addition to the production, treatment and distribution of water, Rous Water promotes sustainable land management practices in

its water supply catchments and responsible and efficient water use among consumers. The Future Water Strategy reflects Rous Water's strategic planning function, to ensure long-term water supply security within the region.

Rous Water is a County Council governed by eight councillors, comprised of two councillors from Ballina Shire, Byron Shire, Lismore City and Richmond Valley councils.

Figure 1. Rous Water supply area, water sources and distribution system



Our regional water supply challenge

A forecast prepared for the Future Water Strategy estimates regional water requirements over the next 50 years. The forecast is based on each council's long-term housing plans, which have been developed to accommodate anticipated regional population growth.

The forecast predicts that the number of properties serviced by Rous Water will increase from 41,780, to more than 72,000 by 2060, which will increase demand for water by around 50 per cent over the next 50 years (Figure 2).

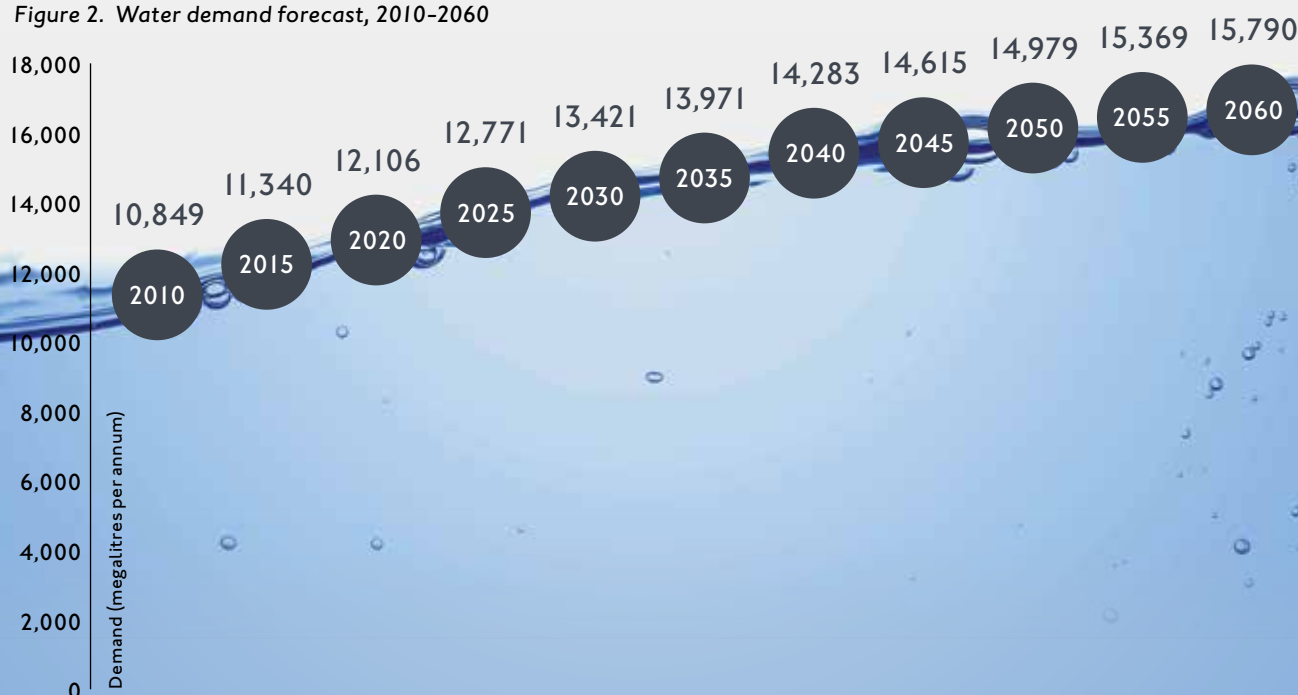
This increase in demand will occur even with existing measures to reduce water use including Rous Waters' existing water efficiency programs, NSW BASIX sustainable building requirements and Ballina Shire's dual-reticulation water re-use scheme.

While demand is expected to increase, scientific modelling indicates that changes to climate and rainfall patterns will likely lead to less reliable rainfall. In the future we are likely to experience fewer, but more intense rainfall events, with longer dry periods. This will impact on the reliability of Rous Water's existing water supply.

How reliable is our water supply?

Secure yield is a formal measure of a water supply's reliability. Secure yield is the amount of water that can be supplied by Rous Water's sources without 'undue' use of water restrictions. In NSW, this is based on the '5/10/10' rule. Based on 100 years of stream flow data, restrictions should not exceed five per cent of the total time and, on average, not occur more frequently than one year in every 10. During restrictions the supply must be able to meet 90 per cent of usual demand. Using this rule, Rous Water can currently provide around 13,800 megalitres of reliable supply per year.

Figure 2. Water demand forecast, 2010-2060



Water demand and supply relationship

The forecasts indicate that Rous Water's existing supplies will be sufficient to meet forecast demand until around 2024, after which time demand for water will exceed the reliable supply. By 2060, demand for water would exceed reliable supplies by 6,500 megalitres per year (Figure 3).

Based on these projections, Rous Water has a period of about 10 years to implement strategies to extend our water supply through increased water efficiency and plan for new water supply sources.

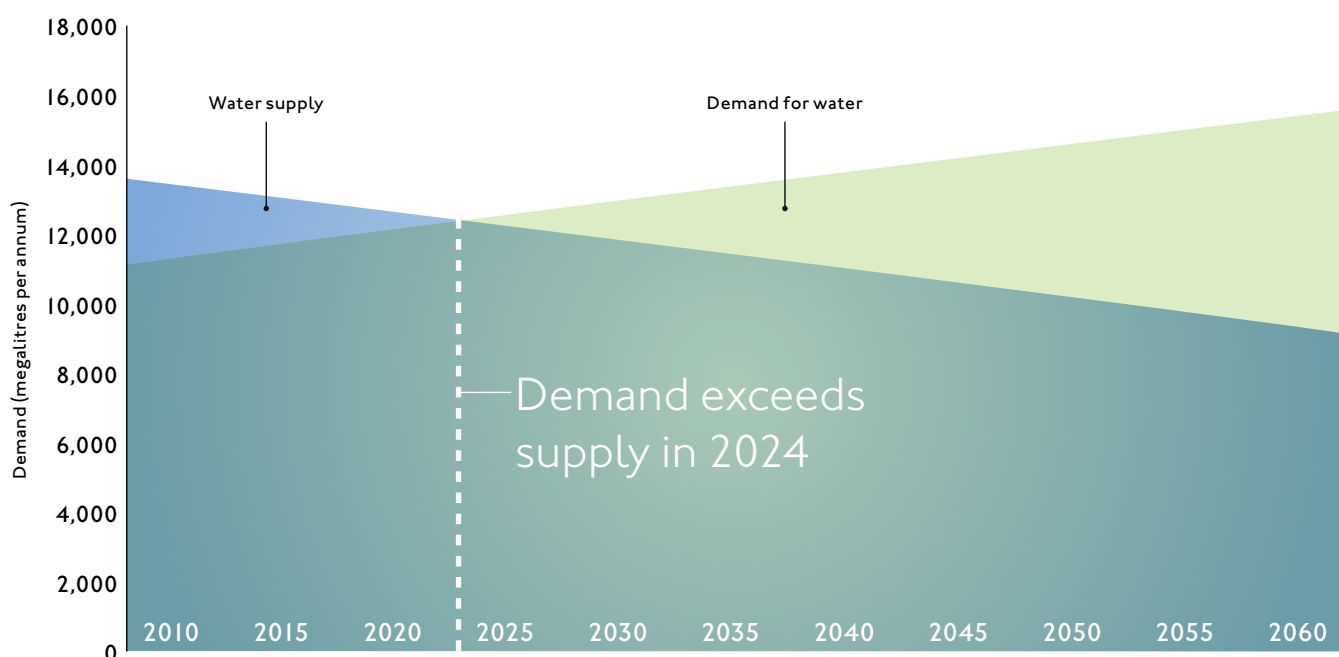
Climate change projections

The future effects of climate change are complex and difficult to predict, however, they are likely to alter local temperature, rainfall, evaporation, rainfall runoff, and stream flows. In response to the potential effects of climate change, the NSW Office of Water has developed guidance to assist local water utilities assess and adapt to the impacts of climate variability on water supply security.

Using this guidance, Rous Water undertook modelling based on an increase in average global maximum daily temperatures of 0.9 degrees Celsius over 1990 conditions by 2030 and an increase of 2 degrees Celsius by 2060. Under this scenario, rainfall for the Rous Water supply decreases, while there is an increase in evaporation and evapotranspiration (water evaporated via uptake through plants during transpiration). As a result, stream flows are reduced and the reliability of existing water sources decreases.

These combined changes are predicted to have a significant impact on the region's water security, reducing Rous Water's current reliable supply (13,800 megalitres per year) by approximately one third, to 9,100 megalitres per year, by 2060.

Figure 3. Future Water Strategy supply and demand forecast



How we developed the Future Water Strategy

Stakeholder engagement and the Project Reference Group

Rous Water worked collaboratively with a wide range of interested groups and individuals across our region to prepare the Future Water Strategy. Members of our community, specialist water professionals and scientific consultants have helped develop the strategy.

We established a Project Reference Group (PRG) to provide community input and guidance. The PRG met 20 times over a four-year period, to review reports, receive briefings and workshop water supply options, with each meeting independently facilitated.

In addition to the PRG, we consulted with a range of other interested parties across our region, such as Traditional Custodians, local councils and government departments, to ensure that the Future Water Strategy reflects community input and expectations.

Once developed, the draft Future Water Strategy was released for broad public consultation in early 2014.

Outcomes of consultation

In February 2014, Rous Water released the draft Future Water Strategy to stimulate community discussion about regional water supply and to provide and promote the opportunity for public feedback.

Rous Water received a combination of 63 group and individual responses during the consultation phase, via a structured survey tool, emails and written submissions.

Overall, the majority of respondents supported the key actions nominated in the draft Future Water Strategy. Virtually all respondents agreed that water security was very important for the future of the region and supported Rous Water's strategic planning and leadership.

Feedback showed that stakeholders and the community support the efficient and responsible consumption of water and support ongoing demand management and water efficiency measures.

Additional use of groundwater was supported, however, with some caution because this resource is yet unproven. Respondents requested that further investigations be undertaken to assess the quality and sustainability of new groundwater resources.

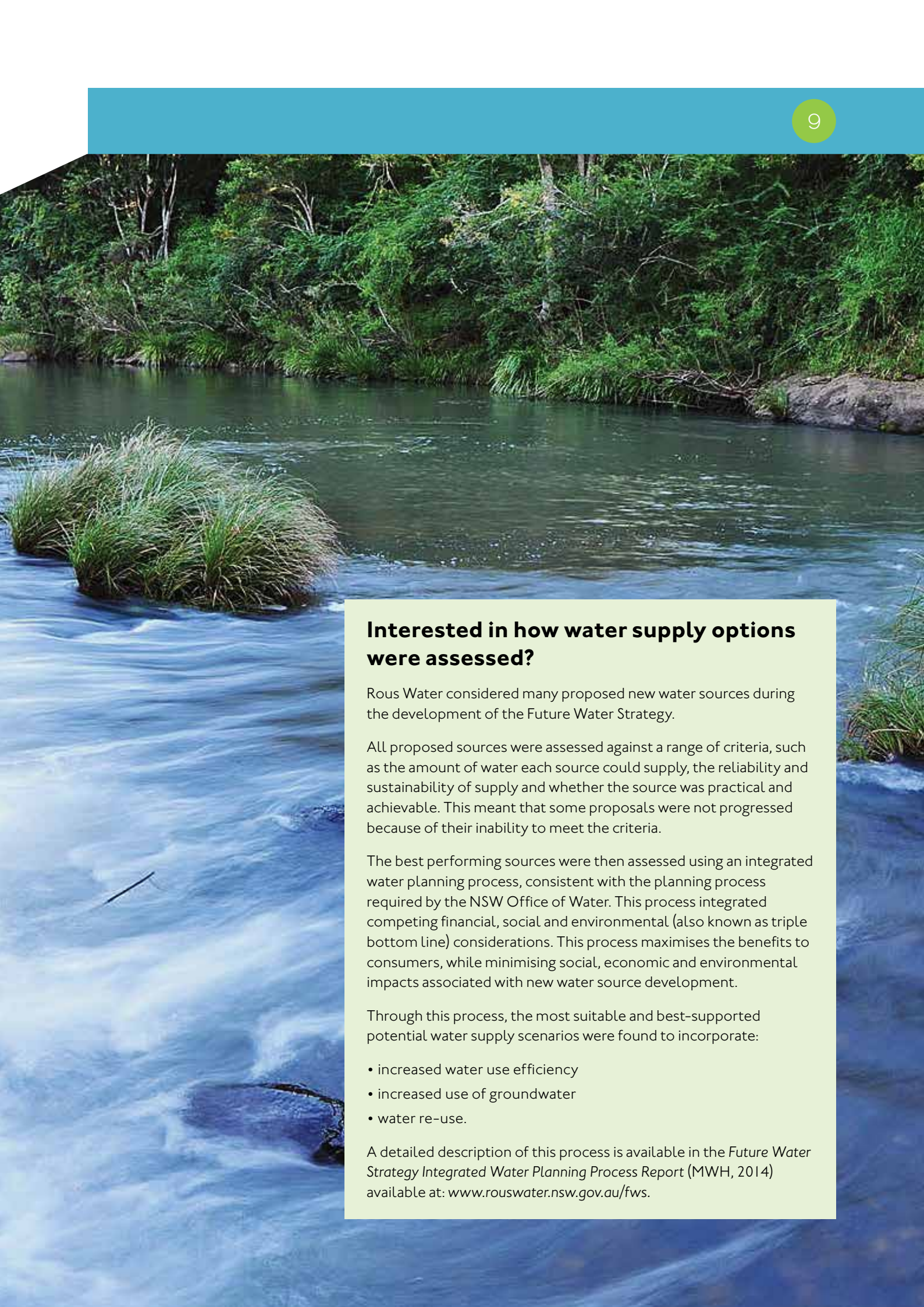
There was strong support for investigation of water re-use and the need for further information and dialogue around potential usage and methods.

The feedback included support for the development of Dunoon Dam, however there was stronger support for its deferral until other options are more fully investigated. This is consistent with Rous Water's position, with Dunoon Dam being deferred but retained until further investigations and completed.

In general, feedback strongly supported the direction of the strategy. This feedback was considered by Rous Water in finalising and endorsing the strategy and has provided useful insights into community priorities and future communication needs during the implementation.

Interested in the consultation processes to develop the Future Water Strategy?

Further information including the stakeholder engagement report is available on the Rous Water website.



Interested in how water supply options were assessed?

Rous Water considered many proposed new water sources during the development of the Future Water Strategy.

All proposed sources were assessed against a range of criteria, such as the amount of water each source could supply, the reliability and sustainability of supply and whether the source was practical and achievable. This meant that some proposals were not progressed because of their inability to meet the criteria.

The best performing sources were then assessed using an integrated water planning process, consistent with the planning process required by the NSW Office of Water. This process integrated competing financial, social and environmental (also known as triple bottom line) considerations. This process maximises the benefits to consumers, while minimising social, economic and environmental impacts associated with new water source development.

Through this process, the most suitable and best-supported potential water supply scenarios were found to incorporate:

- increased water use efficiency
- increased use of groundwater
- water re-use.

A detailed description of this process is available in the *Future Water Strategy Integrated Water Planning Process Report* (MWH, 2014) available at: www.rouswater.nsw.gov.au/fws.

Our strategy

Meeting our water security challenge

Rous Water will undertake the following key actions to ensure responsible and efficient water consumption and the timely development of new water sources to ensure future water security.

The key actions of the Future Water Strategy are:

Key action 1

Water efficiency

Implement water efficiency programs to ensure existing water sources are used responsibly and efficiently.

Key action 2

Groundwater

Undertake detailed investigation to assess the suitability of increased use of groundwater as a new water source.

Key action 3

Water re-use

Undertake detailed investigation and consultation to assess the suitability of water re-use as an additional new water source.

A flexible and adaptive strategy

The Future Water Strategy provides strong direction, but is deliberately not a fixed set of actions. The strategy has been designed to be sufficiently flexible so that Rous Water can adapt and adopt actions to meet future needs and challenges, as they arise. This strategy builds on our existing water supplies and Rous Water will continue to maintain and operate existing infrastructure and water supplies, such as Rocky Creek Dam, to ensure they continue to contribute to our water security.

To meet the long-term regional water supply forecast, the Future Water Strategy nominates enhanced water efficiency measures and the adoption of the following two new water sources:

- groundwater
- water re-use.

In 2014, Rous Water will begin to comprehensively assess these new water sources, with this work concluding around 2018. This will allow the new water sources to be approved, developed and introduced as needed to ensure ongoing water security. These new water sources will be researched and investigated concurrently to ensure Council receives timely advice about their practicality and suitability.

Decision-making and implementation

Through the implementation of the Future Water Strategy, Rous Water will adopt a proactive approach, with investigations commencing immediately into the viability of the selected options to enable structured and timely delivery as new supplies are needed. Investigations into selected new water sources will be undertaken concurrently to ensure Rous Water is in the best position to maintain regional water supply security.

In implementing the Future Water Strategy, Rous Water will adhere to the following principles:

- New water sources will be progressively developed to build water capacity and security over time.
- Decisions will balance environmental, social and economic considerations.

- The future cost of water for consumers will be a key factor in decision-making.
- Decisions will be taken in the interests of the region, within sufficient lead-time to implement and maintain water supply security.
- Ongoing communication and stakeholder engagement will be undertaken.

Ongoing monitoring

Rous Water will undertake ongoing monitoring of both water supply security and water demand to ensure that our strategy remains on-track.

Furthermore, assumptions underpinning our water supply security understanding, such as expected climate change impacts and population growth, will be reviewed periodically to ensure these assumptions remain as accurate as possible.



Emigrant Creek Dam

Key action 1

Water efficiency

Rous Water has long supported responsible and efficient water use to ensure regional water supply security, having commenced 'demand management' programs during the 1990s.

What is demand management?

Demand management describes actions to encourage responsible and sustainable use of water.

Effective demand management can reduce costs to consumers by avoiding or deferring the construction and operational costs of new water sources, storages and pipelines.

These initiatives have been successful in reducing water demand. Since these initiatives were implemented, average water use, per connection within the Rous Water region, has decreased by approximately 45 per cent (Figure 4).

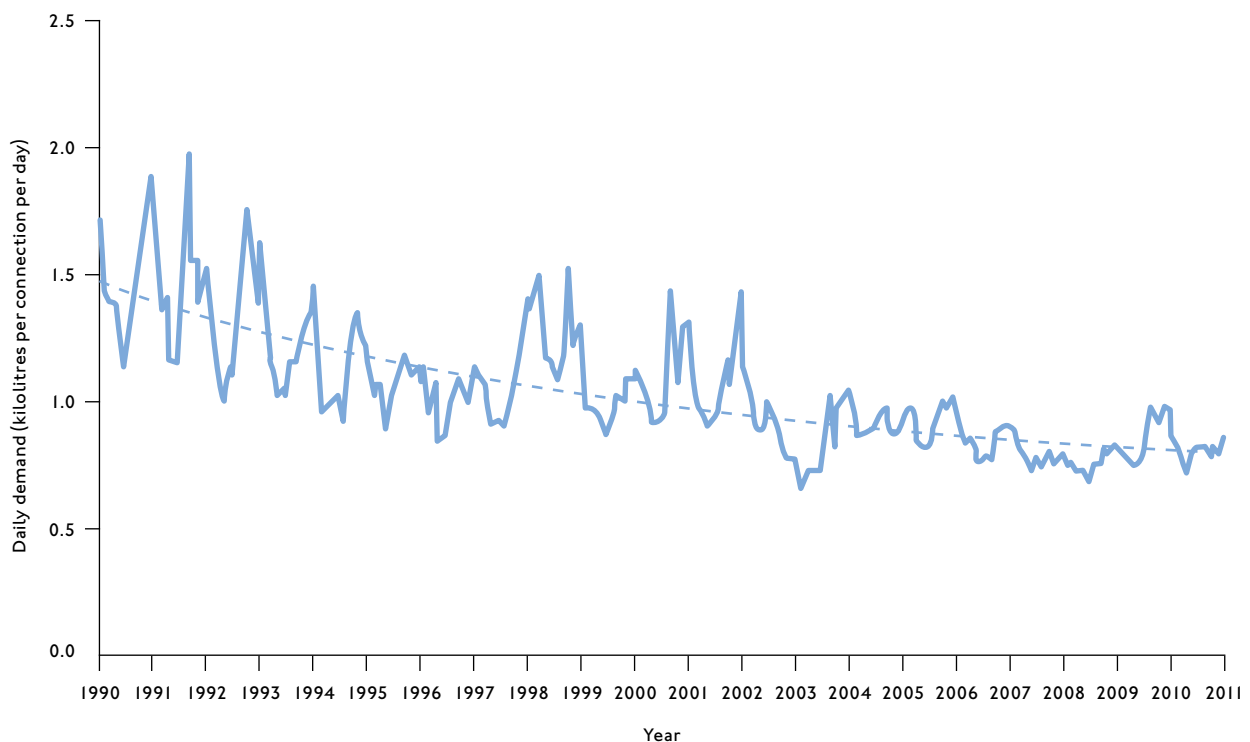
Over the past decade, regional water savings have begun to flatten out. This is similar to the experience of other regions, whereby a level is reached beyond which further reduction in demand becomes more difficult to achieve, largely because of lifestyle reasons. However, Rous Water is committed to responsible water use and believes that further efficiency is achievable. The Future Water Strategy therefore includes

initiatives to both maintain existing savings and to gain further savings through improved water efficiency.

Enhanced demand management programs will consider cost-effective measures to achieve greater water efficiency, including:

- **Community engagement and education**—providing information to assist water consumers to use water more efficiently.
- **Open space water efficiency programs**—saving water in public open spaces, such as parks and sporting grounds.
- **Non-residential water efficiency programs**—working more closely with businesses to improve water efficiency.

Figure 4. Daily water use 1990-2011



- **Residential rebate programs**—improving residential rebate programs for water efficient appliances and fittings (for example showerheads, water tanks and dual flush toilets) to save more water in homes and gardens.
- **Water loss management**—implementing programs to prevent avoidable and excessive leakage and losses through the following distribution networks:
 - bulk water distribution mains owned and operated by Rous Water
 - urban water networks supplying water to urban areas owned and operated by each of the local councils.

Water restrictions

The adoption of this strategy does not eliminate the possibility of water restrictions in the future. Water restrictions may still be needed during periods of very low rainfall or low water supply. Responsible use of water during such times allows Rous Water to maintain water supply security, while not overinvesting in new water sources.

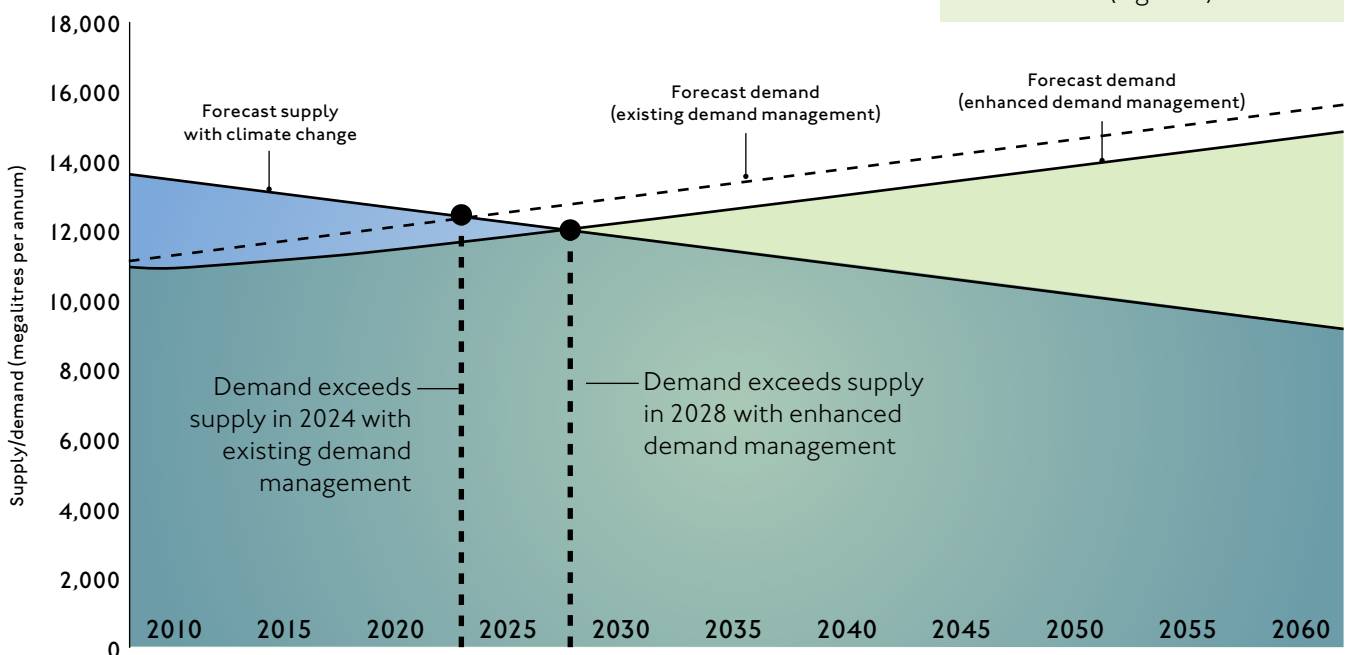
What is the role of water efficiency programs?

Water efficiency programs to reduce water use have been effective and can further defer the need to increase water supplies.

On their own, water efficiency programs alone are not sufficient to provide a secure water supply until 2060.

New demand management initiatives will help delay and downsize future water sources. Supply and demand modelling suggests that increased demand management can further extend the life of our existing water supplies from 2024 to 2028, and reduce the amount of water needed from new sources (Figure 5).

Figure 5. The role of water efficiency programs



Water efficiency measures delay the need for new water sources by four years.

Key action 2

Groundwater

Increased use of groundwater will be investigated as the primary new water source for the region. Whilst Rous Water currently uses groundwater during periods of drought, technical studies indicate that groundwater can potentially provide reliable and high-quality water supplies throughout the year, with relatively low construction and operational costs.

Groundwater sources within the coastal sands aquifer underlying the coastal plain, and fractured basalt aquifers in the coastal range and hinterland areas are identified as best meeting Rous Water's needs (Figure 6).

Rous Water will assess its existing bores at Woodburn and on the Alstonville Plateau to see whether they should be maintained, upgraded or replaced with better located and more productive new bore sites. Potential new bore sites will be assessed based on their suitability for incorporation into the Rous Water bulk water system and consider the needs and rights of other groundwater users.

Investigations into new bore sites will include exploratory drilling and testing for suitable locations. Extensive environmental assessment will be undertaken, including assessing sustainability of supply, possible effects on local groundwater levels and whether there are any implications for groundwater-dependant ecosystems.

The assessment would also include potential impacts associated with the location and operation of surface infrastructure, such as pumps and pipelines.

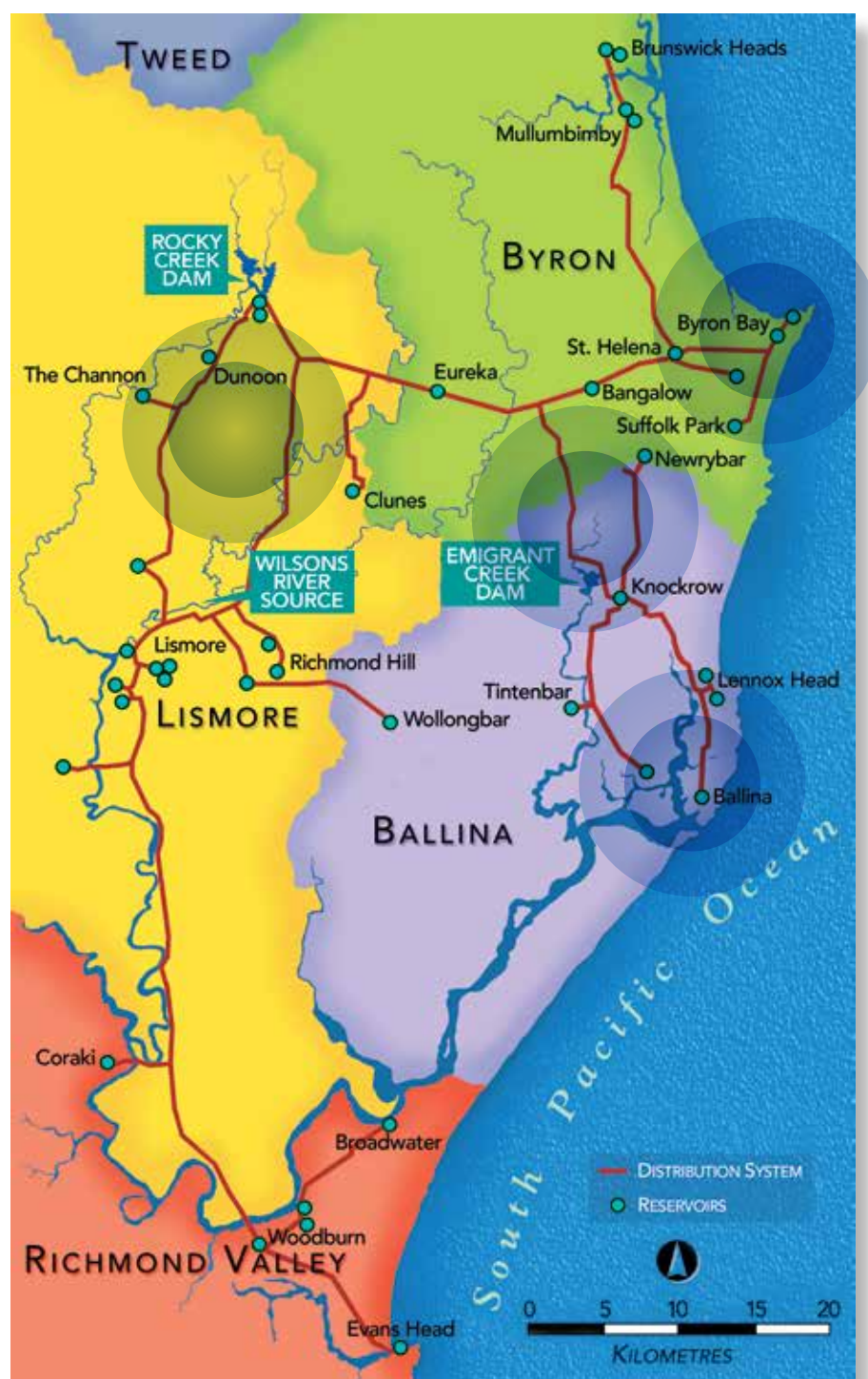
If the outcomes are positive, approval and licencing will be sought to enable a range of new groundwater sources to be brought online to meet increasing demand for water. It is intended that future groundwater sources would be developed progressively to incrementally boost water supply.

There will be ongoing communication about the progress of these investigations, including stakeholder liaison and community consultation.

What is groundwater?

Groundwater is found beneath the earth's surface. It is water that has drained through the soil to a saturated zone where all the pores and fractures are filled with water. Groundwater can be used to provide urban water supplies and support agricultural activity. It is also an important environmental asset that supports wetlands and other groundwater-dependent ecosystems.

Figure 6. Key new groundwater investigation areas



Key action 3

Water re-use

Water re-use is proposed as a potential additional new water source in the Future Water Strategy. The specific water re-use proposed is described as ‘indirect potable re-use of wastewater’.

Indirect potable re-use of wastewater refers to a process where water from wastewater treatment plants is further treated in an advanced water treatment plant to provide very high quality water that meets or exceeds standards for drinking water quality. This water is then released back into the environment upstream of an existing water supply, such as a dam, or groundwater aquifer.

This provides additional water that can be accessed through an existing dam or groundwater bore. The extracted water is then treated through the existing water treatment plant prior to being distributed to consumers through the water supply network.

This form of water recycling will not be used as a standalone solution in the Future Water Strategy. Instead, it is proposed as a complementary approach that can be used in conjunction with new groundwater sources, to ensure long-term water supply security. For example, if new groundwater sources prove viable, but provide less water than required, additional water could be provided through water re-use. If groundwater supply meets future supply needs,

this option would not need to be implemented within the timelines of this strategy.

Multiple treatments, combined with strict operating procedures, including water quality testing are designed to ensure that the water is safe and suitable for human consumption. Although new to the Rous Water region, the technology and processes to safely re-use water in this way currently exist and are in operation elsewhere in Australia and abroad.

The key benefits of this method include more sustainable use of water, more efficient use of existing water supply infrastructure, and reduced wastewater discharge impacts to rivers and streams. This method also provides a very reliable

source of water even in dry times, as it is not dependent upon rainfall.

Extensive research and investigations, including environmental assessment will be undertaken to determine whether indirect potable re-use of wastewater can be implemented without unacceptable risks to human health and local ecology. If the outcomes are positive, approval and licencing will be sought to enable recycled water to complement our other water sources.

Rous Water acknowledges that this option requires consumer confidence and broad community support. There will be ongoing communication about the progress of these investigations including community consultation.

How is recycled water treated and managed to ensure it is safe for human consumption?

In Australia the production, treatment and distribution of drinking water is managed in accordance with the Australian Drinking Water Guidelines. These guidelines provide a framework for good management of drinking water supplies which assures that the water is safe for human consumption.

The Guidelines recognise the ‘multiple barrier’ approach to ensuring water quality. These barriers include environmental, water treatment, operational and managerial actions which, when combined, provides a robust system that is resilient to a wide range of challenges without compromising water quality.

Recycled water production adopts the same multiple barrier approach, including multiple levels of water treatment and ongoing water quality monitoring to ensure suitable quality and safety for human consumption.

The role of the proposed Dunoon Dam

In 1995 Rous Water identified a new dam site at Dunoon, to be developed if required in the future, to maintain the region's water supply security.

The Dunoon Dam proposal has been extensively investigated, including:

- terrestrial ecology impact assessment
- aquatic ecology impact assessment
- hydrological and environmental flow assessment
- preliminary cultural heritage assessment
- geological assessment
- concept design and cost estimation.

These investigations have shown the proposed Dunoon Dam to be technically viable, however cultural heritage and ecological constraints were identified.

These constraints, combined with the high capital costs associated with constructing a large dam, have made Dunoon Dam less preferable to the groundwater and water re-use options. Therefore, the Future Water Strategy has identified and prioritised other water sources ahead of the Dunoon Dam proposal.

At this time, Rous Water is not planning to further progress the Dunoon Dam proposal. However, Rous Water will maintain the Dunoon Dam proposal as a

potential future water supply option until groundwater and water re-use supply options have been fully investigated and are better understood.

Until the other options have been thoroughly assessed, Rous Water will retain land in its ownership at the proposed dam site and maintain its existing commitments to voluntary land acquisition processes.

Once the groundwater and water reuse studies are completed, likely to be around 2018, Rous Water will be in an improved position to determine whether to continue to maintain the Dunoon Dam proposal.

Next steps

The Future Water Strategy describes actions to ensure a safe, sustainable and secure water supply into the future.

The period of existing water supply security, from 2014 until approximately 2024, provides time and opportunity to implement enhanced water efficiency measures aimed at further extending our existing water supplies until approximately 2028.

During this time we will also investigate groundwater supplies and water re-use. These investigations will commence

in 2014 and are expected to conclude by 2018.

Rous Water will continue to work collaboratively with local councils to monitor water supply security and use. This will enable Rous Water to review and update water supply and demand forecasts. Updated forecasts will allow Rous Water to assess the effectiveness of water efficiency programs and to guide when new water sources should be introduced.

There will be ongoing communication about the progress of the Future Water

Strategy and any pending decisions, with further community consultation undertaken on significant matters.

New water sources will be progressively implemented, to ensure ongoing water supply security. Decisions on preferred sources will seek to minimise social, environmental and financial costs, while fulfilling Rous Water's commitment to providing a safe, secure and reliable regional water supply.

Acknowledgements

Rous Water acknowledges the valued contributions of members of the Project Reference Group; Traditional Custodian representatives; constituent councils and NSW Government agency staff.

Additional information

If you would like further information on the studies undertaken as part of the development of the Future Water Strategy, Dunoon Dam investigations or the Project Reference Group, please contact Rous Water or visit the Rous Water website to view project reports.

Future Water Strategy reports and documents

- Future Water Strategy consultation report (The Comms Team, 2014)
- Stakeholder engagement report (The Comms Team, 2013)
- Integrated Water Planning Process (MWH, 2014)
- Demand forecast (Hydrosphere Consulting, 2013)
- Desalination study (GeoLINK, 2011)
- Groundwater investigations (Parsons Brinckerhoff, 2011)

Dunoon Dam reports and documents

- Geotechnical investigations (NSW Public Works, 2013)
- Cultural heritage (Ainsworth Heritage, 2013)
- Aquatic ecology (Eco Logical Australia, 2012)
- Environmental flow assessment (Eco Logical Australia, 2012)
- Terrestrial ecology (SMEC, 2011)

Listed reports are available at www.rouswater.nsw.gov.au.



