EYRE PENINSULA DEMAND AND SUPPLY STATEMENT

APRIL 2011

DEPARTMENT FOR WATER

Government of South Australia
Department for Water

FOREWORD

I am pleased to present the first Regional Demand and Supply Statement, a key commitment in *Water for Good* – the State Government's plan to ensure our water future to 2050.

The Eyre Peninsula Demand and Supply Statement is the first of eight regional demand and supply statements. These statements will ensure that long-term water security solutions for each region are based on a thorough understanding of the state of all local water resources, the demand for these resources, and likely future pressures.

This Statement uses an adaptive management process that will ensure it will recognise annual changes in water availability and demand pressures.

The recent drought experienced throughout South Australia has magnified the need for long-term water security planning, with the Eyre Peninsula Region feeling this pressure more than others.

This is highlighted by the projections in this statement that suggest demand may exceed supply for drinking quality water as early as 2017-18 under a worst-case scenario or 2022-23 under a best-case scenario.

These projections will be reviewed annually and the State Government will initiate an Independent Planning Process five years from when the projections indicate demand will exceed supply, at this stage in 2012-13. The Independent Planning Process will include an analysis of options to address the projected shortfall in supply and make recommendations to the Government.

The Eyre Peninsula Demand and Supply Statement will provide guidance to decision makers to ensure the Eyre Peninsula Region's water supply continues to support its economy, lifestyle and environment.

The Hon Paul Caica MP

Minister for Water
Minister for the River Murray

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PART 1:
EYRE PENINSULA DEMAND AND SUPPLY STATEMENT IN SUMMARY

Water is fundamental for the preservation of both the quality of life and the environment for all South Australians. It also underpins sustainable population growth and an expanding economy, which are critical to the State's future prosperity.

South Australia has a vast land area with diverse landscapes and climatic conditions that influence the quantity and source of available water. Beyond the city of Adelaide, the population is scattered widely, with some regional centres, towns and communities without a local and reliable natural water source. In order to determine the best ways to secure the State's water resources, it is important to first take stock of the resources available, the current and projected future demands on them, and the likely timing of any potential demand-supply imbalance.

It is also important to recognise that the water industry in South Australia is changing. To achieve a more dynamic water sector, the State Government's water security plan, *Water for Good,* commits to new legislation that will better reflect the changing environment. The purpose of this new legislation is to provide a framework to support a contemporary and developing water industry by:

- Providing for an integrated approach to water demand and supply planning.
- Providing for the regulation of the water industry.

A changing climate, drought, economic development initiatives, and expected population growth have driven this change in what has typically been a relatively stable service sector. South Australia is also a signatory to the National Water Initiative (NWI), Australia's blueprint for water reform. The NWI promotes a more cohesive national approach to the way Australia manages, measures, plans for, prices and trades water.

Within this context, the Eyre Peninsula Demand and Supply Statement is a *Water for Good* initiative which aims to provide a long-term (40 years) overview of water supply and demand in the Eyre Peninsula region of South Australia. It applies an adaptive management process to outline the state and condition of all water resources in the region for drinking water and non-drinking water, lists major demands on these water resources, and identifies likely timeframes for any possible future demand-supply imbalance.

Water for Good states that the Minister for Water will establish an independent planning process if demand-supply projections indicate a gap is likely to exist in the foreseeable future. Therefore, this statement will be used to provide guidance to decision-makers planning for the timing and nature of future demand management or supply options, ensuring that long-term solutions are based on a thorough understanding of the state of local resources, the demand for them, and likely future pressures, including the impacts of climate change.

The Eyre Peninsula Demand and Supply Statement will be reviewed annually, checking the status of resources and the assumptions on which the statement is based. The statement will also be comprehensively reviewed and updated every five years, unless such a review is triggered earlier based on the findings of the annual review process.

PART 1: EYRE PENINSULA DEMAND AND SUPPLY STATEMENT IN SUMMARY

The Eyre Peninsula Demand and Supply Statement builds on, and does not duplicate, other water planning processes. Other key plans that link to the Eyre Peninsula Demand and Supply Statement include:

- South Australia's Strategic Plan
- Water for Good
- Strategic Infrastructure Plan for South Australia
- State Natural Resources Management Plan
- SA Water's Long Term Plan for Eyre Region
- Water Allocation Plan for the Southern Basins Prescribed Wells Area
- Water Allocation Plan for the Musgrave Prescribed Wells Area
- Water Allocation Plan for the River Murray Prescribed Watercourse
- Eyre Peninsula Natural Resources Management Plan
- Draft Eyre and Western Regional Plan

In particular, the Eyre Peninsula Demand and Supply Statement builds on *SA Water's Long Term Plan for Eyre Region*, and covers all water resources, drinking water and non-drinking water quality, and all water demands, including requirements for the mining sector.

The Eyre Peninsula Demand and Supply Statement is based on the Eyre Peninsula Natural Resources Management (NRM) Board region, which includes Whyalla, as shown in Figure 1. However, the *SA Water Long Term Plan for Eyre Region* does not include Whyalla because it is supplied from a separate mains distribution network to the remainder of the region.

The Eyre Peninsula NRM region incorporates 13 major towns, including Whyalla, Port Lincoln and Ceduna. The major SA Water mains distribution systems include the Morgan-Whyalla System, Iron Knob-Lock System, Tod-Ceduna System and the East Coast System (see Table 1). Additional trunk mains owned by SA Water supply water from independent bore fields or from the Southern Basins Prescribed Wells Area (PWA). The Morgan-Whyalla and Iron Knob-Lock systems supply River Murray water. Groundwater is supplied by the Tod-Ceduna and East Coast pipelines, as well as the additional trunk mains. Since late 2009, the Tod-Ceduna pipeline has also been providing a small volume of River Murray water to Ceduna, Streaky Bay and Wudinna.

Figure 1: Map of the Eyre Peninsula Region

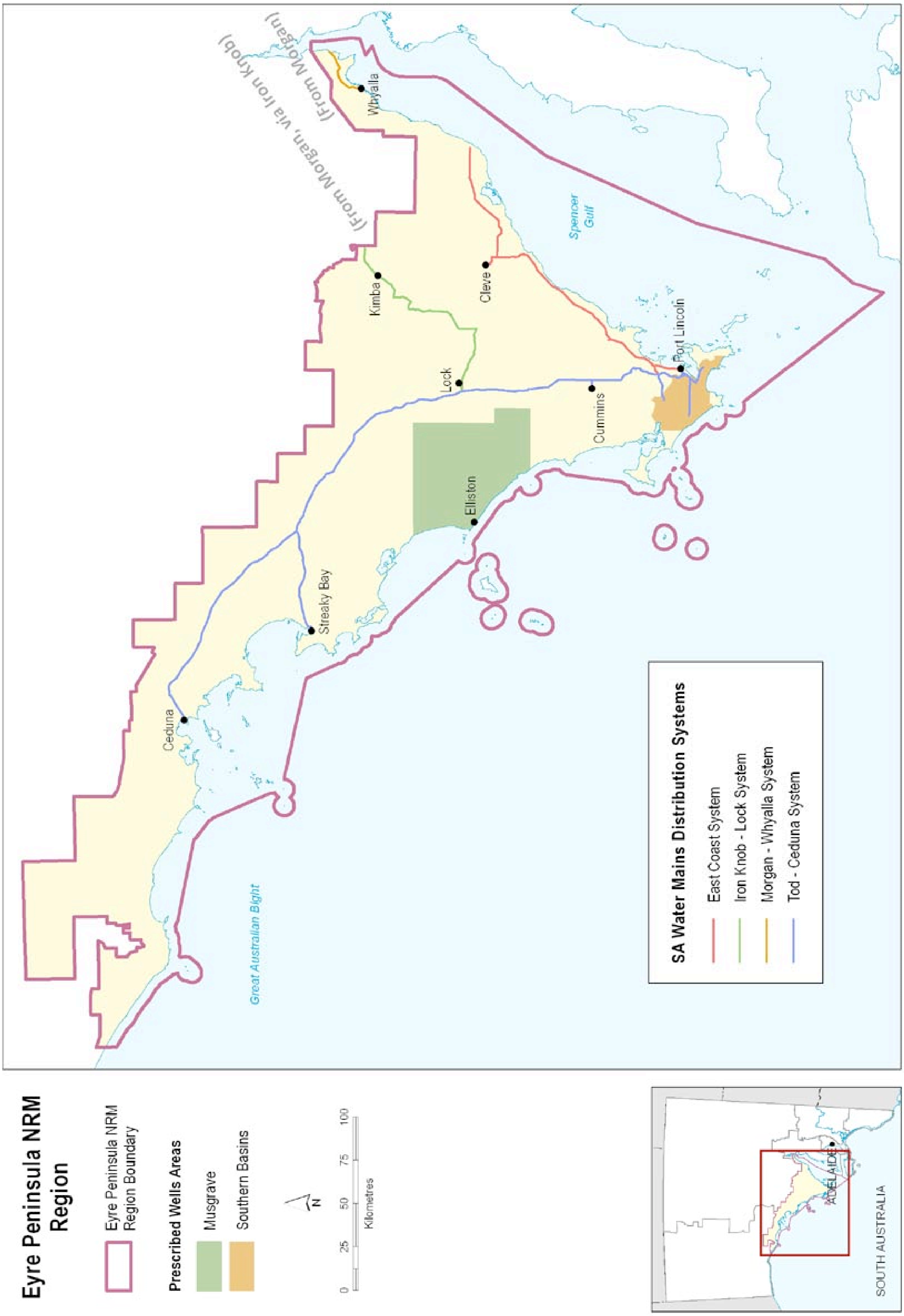


Table 1: The SA Water mains distribution systems and independent systems that supply Eyre Peninsula townships

		River Murray Water		Groundwater		
		Whyalla-Morgan System	Iron Knob-Lock System	Tod-Ceduna System	East Coast System	Independent systems
Township	Ceduna					
	Cleve					
	Coffin Bay					
	Cowell					
	Cummins					
	Elliston					
	Kimba					
	Port Lincoln					
	Port Neill					
	Streaky Bay					
	Tumby Bay					
	Whyalla					
	Wudinna					

Table 2 shows the capacities of the water distribution pipelines. The water distribution capacities are based on delivering peak month demands which means, subject to the availability of the water resource, there is spare distribution capacity in cooler months. It is important to note that spare distribution capacity in the cooler months does not mean excess water is automatically available for distribution. The Iron Knob-Kimba pipeline differs from the other water distribution pipelines in that it is designed to provide a base load, with demand variability being catered for by the Southern Basins PWA via the Tod-Ceduna system.

It should also be noted that the capacity figures relate to the beginning of the system, as capacities reduce along the pipeline route. For example, the capacity of the Morgan-Whyalla pipeline is 200ML/d but the peak capacity that can be delivered to Whyalla (at the end of the pipeline) is 67 ML/d.

Table 2: Capacity of the water distribution pipelines to supply water

Pipeline	Capacity (ML/d)	2008/2009 Annual use (ML)	Historical peak monthly demand (ML/d)	2008/2009 Peak monthly demand (ML/d)
Morgan-Whyalla	200	37,000 (annual use in Whyalla was 3,100)	120	117
Iron Knob-Kimba	4.5	844	4.5	4.5
Tod-Ceduna	26	3,847	22	13
East Coast	8	1,295	8	4.5

Water for the environment is essential for ecosystem and waterway health, and ultimately the resources' productivity. The environmental water provisions of the Eyre Peninsula region are set out in water allocation plans for Southern Basins and Musgrave Prescribed Wells Areas, and the Eyre Peninsula NRM Plan. As such they are not explicitly included in this statement.

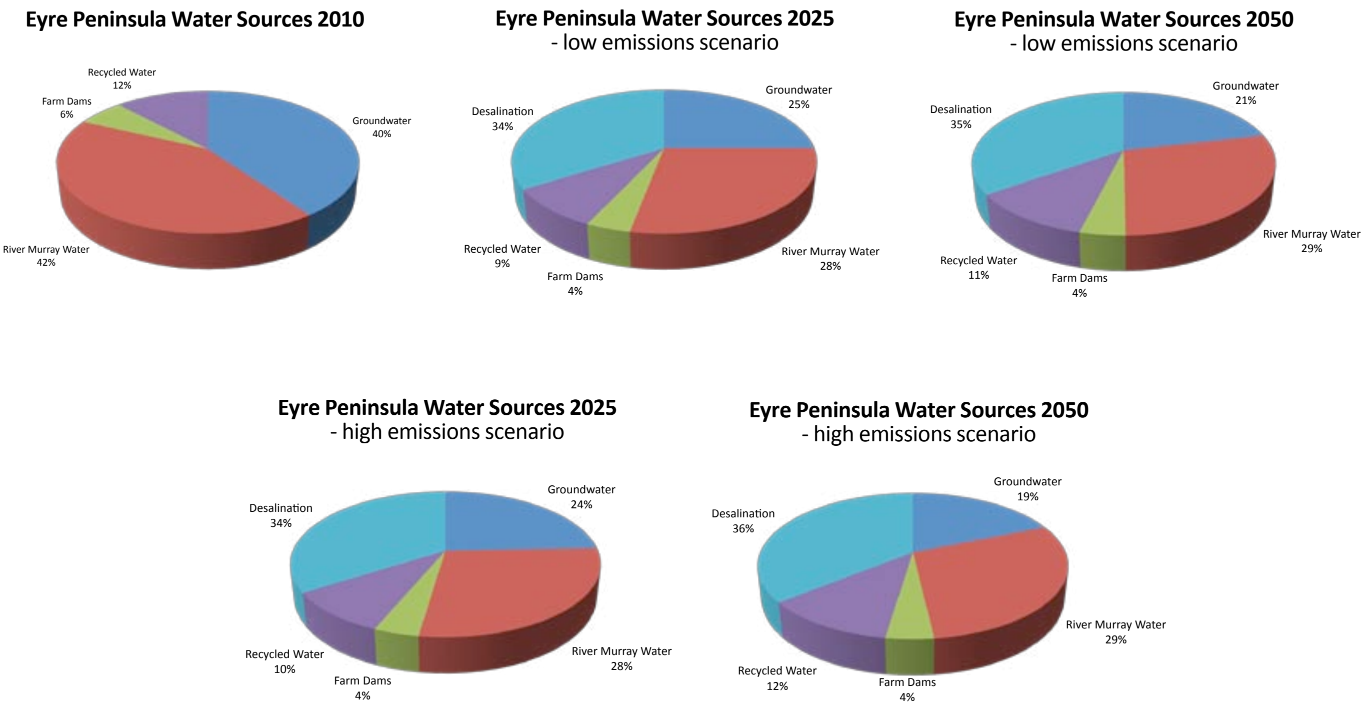
When preparing water allocations plans one of the issues considered is the quantity and quality of water needed for dependent ecosystems, and the time periods during which those ecosystems need water. The appropriate proportions are then set aside to meet these demands and the remaining proportion is available for allocation. The Eyre Peninsula Demand and Supply Statement only includes supply from the prescribed wells areas available for allocation, meaning the remainder is available to the environment. Further, the Eyre Peninsula NRM Management Plan contains a land and water strategic priority that aims to protect the environments and ecosystems that depend on these water resources.

Source mix

Figure 2 (below) outlines the current and projected future mix of water sources in the Eyre Peninsula region under possible scenarios for both low and high greenhouse gas emissions. The current (2010) combined total drinking water and non-drinking water sources of the region are 26.7GL. Based on the assumptions outlined in Table 10, the supply projections suggest this will increase to approximately 40.5GL by 2025 under the low emissions scenario, and 40.0GL by 2025 under the high emissions scenario, largely due to the addition of private desalinated seawater for mining use.

By 2050, the demand-supply projections suggest that the total water supply sources will decrease slightly to approximately 39.3GL under the low emissions scenario, and 38.1GL under the high emissions scenario due to a projected decrease in the amount of groundwater available as a result of the impacts of climate change.

Figure 2: Eyre Peninsula's water sources for drinking and non-drinking purposes



The assumed addition of desalinated seawater would make it the dominant water source by 2025. This injection of desalinated seawater would likely come from private desalination plants built for use in mining activities (13.7 GL/a). SA Water have been investigating the possibility of a desalination plant for drinking-quality water supplies however this has not been included in the projections as no decision has yet been made on supplementing supplies from such a source.

Projections indicate water from the River Murray and groundwater aquifers will continue to make a significant contribution to the total water source mix, and will continue to be the dominant sources of drinking water. It is important to note the majority of River Murray water supplied to Eyre Peninsula is for Whyalla (9.8 GL out of a total of 11.2 GL in 2010) and further distribution of this water to the remainder of Eyre Peninsula is limited due to infrastructure constraints.

Recycled water, including treated wastewater and stormwater (road and roof run-off), is also projected to make an important contribution towards water for non-drinking purposes.

Demand and supply projections

Two different demand-supply projections are considered in this statement under scenarios for both high and low population growth and greenhouse gas emissions:

- Projection 1: Drinking-quality water demand and supply only.
- Projection 2: All water sources and all human demands.

The first projection refers to water supply from and demand of high-quality, treated water from the SA Water mains distribution network. The second projection refers to drinking water and non-drinking quality water supplies; and demand for water for all human purposes such as domestic use, stock use, irrigation, industrial, commercial, mining etc. Demand from water dependent ecosystems is incorporated as previously described on page 5.

Table 3 outlines the impact on demand-supply for both projections under scenarios for both high and low population growth and emissions, if all of the assumptions outlined in Table 10 were to occur.

Table 3: Impact on demand-supply

Scenario	Projection 1: Drinking-quality water demand and supply only	Projection 2: All water sources and all human demands
High population growth/high emissions	Demand is projected to exceed supply in 2017/18.	Demand is projected to exceed supply in 2030/31.
High population growth/low emissions	Demand is projected to exceed supply in 2018/19.	Demand is projected to exceed supply in 2034/35.
Low population growth/high emissions	Demand is projected to exceed supply during 2020/21.	Demand is projected to exceed supply in 2036/37.
Low population growth/low emissions	Demand is projected to exceed supply during 2022/23.	Demand is projected to exceed supply in 2043/44.

Key findings

Supply

- Desalinated seawater, for mining sector use, is projected to become the major 'new water' source in the region from 2019 (up to 13.7GL). As outlined in *Water for Good*, the State Government requires that mining ventures provide their own water supplies, and therefore it is anticipated the additional desalinated seawater will come from private desalination plants. *Water for Good* also outlines that additional water sources, including desalinated seawater, will supplement existing Eyre Peninsula resources, subject to site and environmental investigations. SA Water have been investigating the possibility of a desalination plant for drinking-quality water supplies however this has not been included in the projections as no decision has yet been made on supplementing supplies from such a source. If the projected mining activities in the region are not realised, then water from the River Murray will continue to be the major source.

- The River Murray continues to be the major source of drinking-quality water for the region (currently 11.2 GL), but any increase in supply is likely to be limited to River Murray water purchases as the SA Water country towns licence for South Australia is fully allocated and constrained by allocation restrictions imposed on River Murray licences. The influence of any potential additional River Murray water purchases has not been included in the analysis.

- A modelling framework for assessing recharge processes and climate change, commissioned by the Eyre Peninsula NRM Board (2009), suggests climate change will reduce recharge to the Southern Basins and Musgrave prescribed wells areas. Based on this modelling, under the low and high emissions scenarios, it is projected groundwater supply from the Southern Basins Prescribed Wells Area (PWA) will decrease within a range of approximately 2.3-3.3GL, from a peak of 8.6GL in 2012 to 5.3-6.3 GL in 2050; and the Musgrave PWA will decrease within a range of approximately 400-700ML, from 1.8GL in 2010 to 1.1-1.4 GL in 2050.

- Over the next five years the Department for Water (DFW) will undertake its *Groundwater Program*, which will improve understanding of the capacity of the State's groundwater resources; enhance groundwater monitoring, assessment and reporting processes; and minimise the risk of water supply failure.

- The second biggest source of 'new water' is treated wastewater (currently 2.5 GL). This option is being proactively pursued in virtually every local government area in the region for non-drinking purposes, such as irrigating public open spaces and sports fields. This water is sourced from the Whyalla and Port Lincoln wastewater treatment plants owned by SA Water, and community wastewater management schemes owned by local government.

- The third largest source of 'new water' is stormwater harvesting and reuse (currently 700ML). Local government in the region has implemented many stormwater harvesting and reuse projects, which contribute towards irrigating public open spaces and sports fields. Local government will continue to explore new opportunities of this nature, which may be limited by the low amounts of stormwater generated from relatively small urban areas, limited surface and aquifer storages, and the high cost of infrastructure.

Demand

- Given all of the assumptions outlined in Table 10, it is projected that the major increase in demand on Eyre Peninsula will come from mining. There is considerable evidence there will be significant growth in the mining industry over the next 40 years. This analysis is based on the 2009 Resources and Energy Sector Infrastructure Council's (RESIC) Infrastructure Demand Study and updated advice from Primary Industries and Resources South Australia (PIRSA) in June 2010, which outlines eight known mines that are either operational or in advanced stages of exploration in the Eyre Peninsula region. The projections suggest mining will increase demand in 2050 by approximately 14.7GL, a level currently not available without significant private augmentation. As mentioned previously, the State Government requires mining ventures to provide their own water supplies. The mining industry anticipates providing the majority of this water through private seawater desalination.

- The second major increase in demand is projected to come from population growth. The scenario for high population growth assumes the population will increase by 1%, boosting water demand by as much as 2.2GL by 2050. This increase is very sensitive to the growth rate assumed. The 1% increase is based on the State Government's population growth target for the Eyre and Western region, however it is well above the average for the past 10 years of only 0.2% (South Australian Government 2010), which was used in the low population growth scenario (450ML increase by 2050). Actual population growth will need to be closely monitored and is likely to be driven by mining sector expansion.

- Changes in land use, increases in stock numbers and higher tourist visitation numbers are not projected to have a major impact on future demand. PIRSA suggests stock numbers are likely to increase for the next 10 years and then stabilise, which is only expected to increase demand by approximately 1GL to 2050. *SA Water's Long Term Plan for Eyre Region* suggests visitor numbers in the region will increase by 4% per annum, which will increase demand by 640ML to 2050.

- *Water for Good* states that Water Sensitive Urban Design (WSUD) will be mandated across South Australia, which may reduce demand and provide alternative sources of water in all new developments. Local government advice suggests there will be a small number of new developments in the short-term. Eyre Peninsula householders are already high users of rainwater and favour gardens suited to arid conditions. The shower exchange program has been an effective demand management measure in the major centres, while other water efficient rebates have been used to a lesser extent.

- As the two highest areas of water use in the Eyre Peninsula region, there is potential to explore options to save water from non-residential water use (35%) and stock water use (33%).

PART 2:
CURRENT RESOURCES

This section describes Eyre Peninsula's demographics, predominant industries, climatic characteristics and main water sources.

Regional overview

The region encompassed by the Eyre Peninsula NRM Board covers more than 80,000 km^2 (including marine areas) and supports approximately 55,000 people. The majority of the population lives in one of two local government areas –Port Lincoln City Council and Whyalla Council, with the balance spread across another nine councils and some falling outside any council area, principally west of Ceduna.

Table 4: Local government areas and populations of the Eyre Peninsula region

Council area	Total area (ha)	Population (2006 Census)
Ceduna	543,120	3,572
Cleve	480,343	1,896
Elliston	669,300	1,132
Franklin Harbour	328,300	1,277
Kimba	350,000	1,116
Lower Eyre Peninsula	477,100	4,402
Port Lincoln	3,800	13,603
Streaky Bay	623,200	2,024
Tumby Bay	261,590	2,541
Whyalla	4,150	21,416
Wudinna	539,380	1,314

The predominant industries in the region are agriculture (traditionally cereal and wool production), seafood (fishing and aquaculture) and tourism. Eyre Peninsula produces 33% of the State's grain and 65% of its seafood. In addition, it is South Australia's most visited regional destination, attracting more than 350,000 visitors every year (EP NRM Board, 2009b).

The climatic characteristics of the region are warm, dry summers and cool winters. The southern areas experience a milder, moister coastal climate as opposed to the north and north-west, which experiences a warmer drier climate. Mean annual rainfall ranges from 250 mm in the north and north-west to more than 500 mm in the south. Mean annual maximum temperatures range from 21 degrees Celsius in the south to 26 degrees Celsius in the north.

Research by the CSIRO and DFW has shown that over the past 20 years there has been a decline in rainfall across south eastern Australia, including the Murray-Darling Basin, the Mount Lofty Ranges and in south-west Western Australia. Figure 3 shows there has also been a declining trend in rainfall over the past 20 years in the Eyre Peninsula region, with the decline being more prominent in the drier areas. Figure 4 shows that over the same 20-year period there has been an increase in the average annual maximum temperature.

Figure 3: Bureau of Meteorology annual rainfall data for the townships of Port Lincoln, Lock and Ceduna for the period 1990-2009

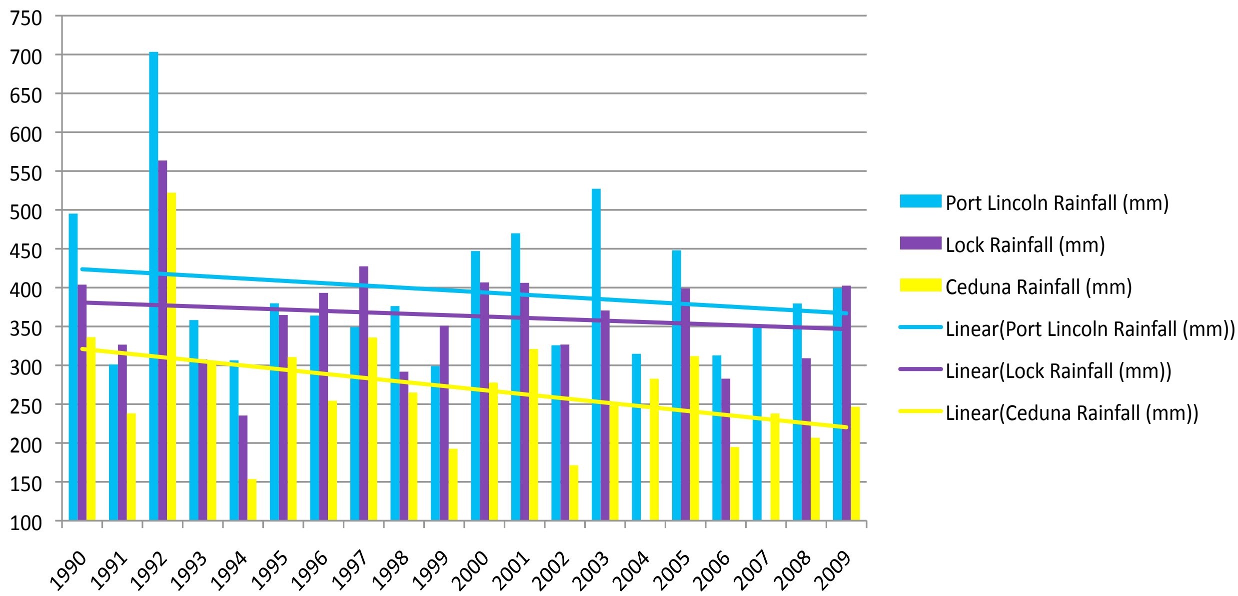
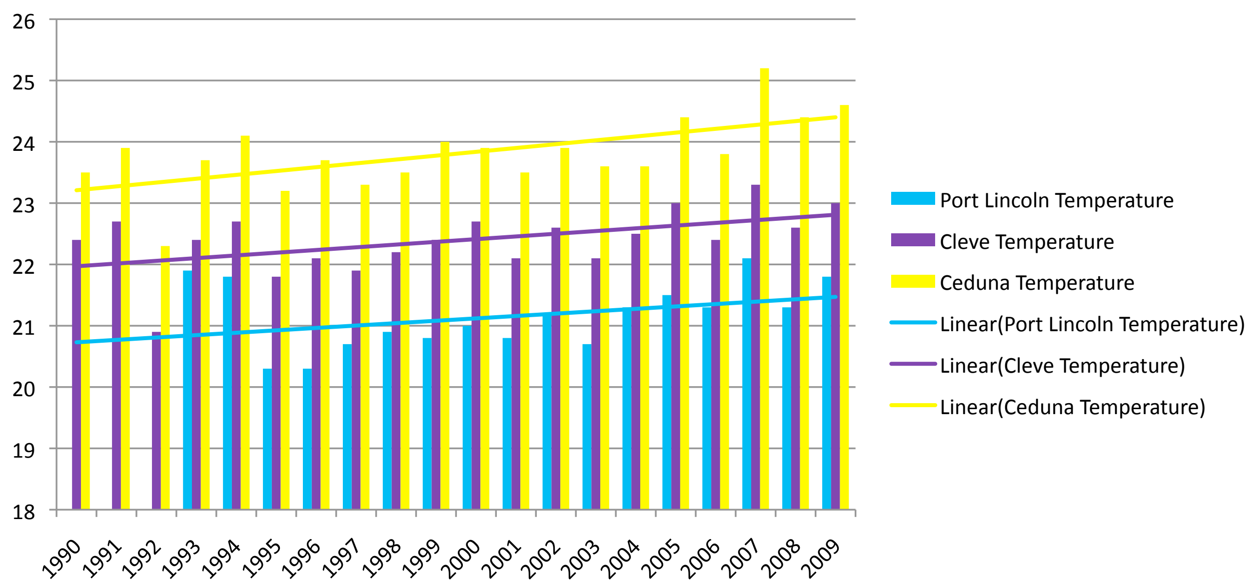


Figure 4: Bureau of Meteorology average annual maximum temperature data for the townships of Port Lincoln, Cleve and Ceduna for the period 1990-2009



Water resources

Eyre Peninsula's climatic characteristics, combined with the generally low altitudes and relatively flat landscape, result in minimal surface water and limited watercourses. As a result, the region primarily relies on water from two key sources:

- Groundwater from two prescribed wells areas.
- Water imported from the River Murray.

Figure 5 shows the majority of the region's water is currently supplied from the River Murray, closely followed by water from groundwater aquifers. The third largest water source in the region is recycled water (including treated wastewater, stormwater, and roof run-off), followed by water captured in farm dams.

It is important to note most River Murray water supplied to the Eyre Peninsula is used in Whyalla and the possibility of further distribution of this water to the remainder of Eyre Peninsula is limited due to infrastructure constraints.

Figure 5: Eyre Peninsula water supplies

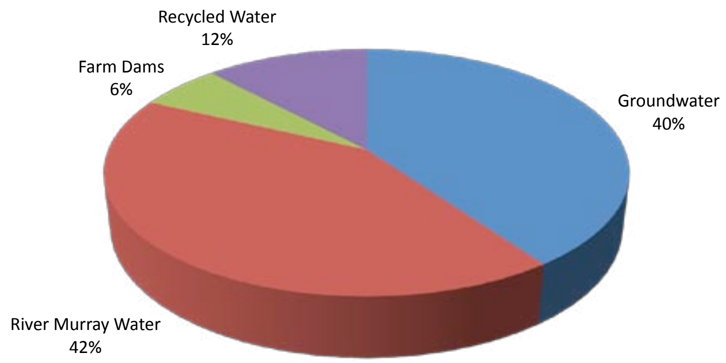
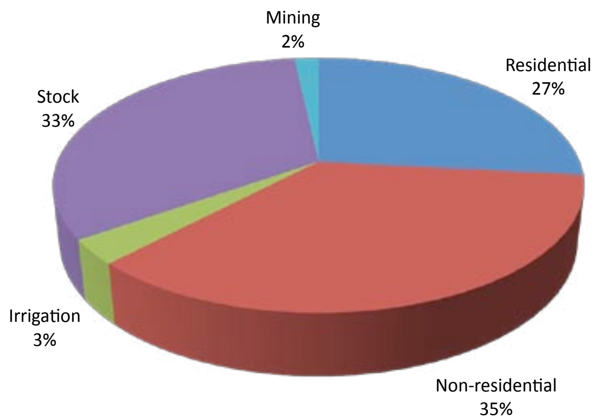


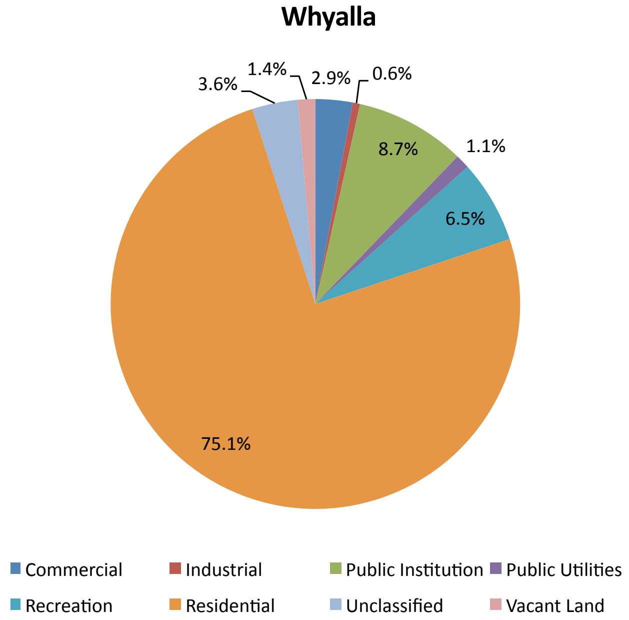
Figure 6 shows that the majority of Eyre Peninsula's current water (drinking and non-drinking quality water) is used for non-residential purposes (e.g. industrial, commercial and institutional), followed by stock water use and residential water use. Irrigation and mining use are currently low. Figure 7 shows that the majority of drinking-quality water used in the Whyalla, Port Lincoln and Ceduna townships is for residential purposes.

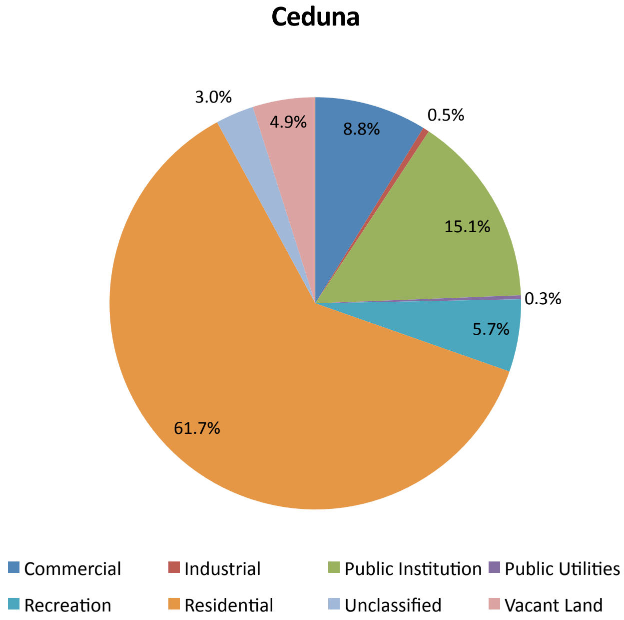
Figure 6: Eyre Peninsula's current water use from drinking and non-drinking quality supplies

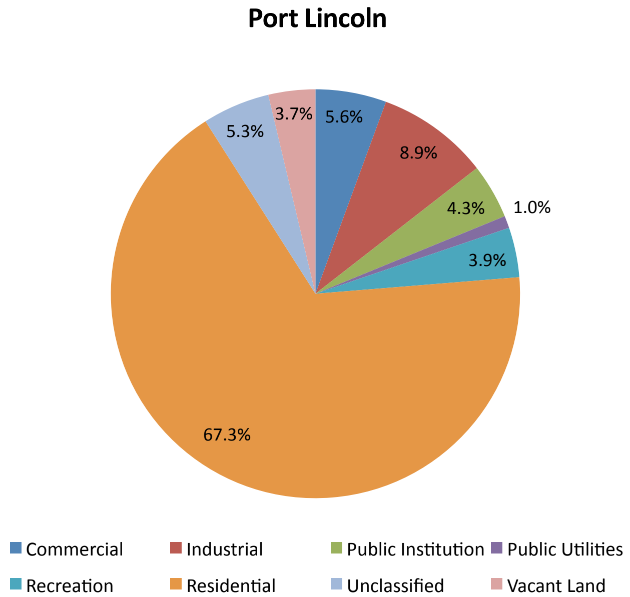


Note: Irrigation water use includes rural irrigation, irrigation of public open spaces, dust suppression and road construction.

Figure 7: 2008-2009 drinking-quality water use for the Whyalla, Port Lincoln and Ceduna townships (2008-2009 SA Water Asset Management Support Unit data)







Prescribed water resources

The two prescribed wells areas in the Eyre Peninsula region are the Southern Basins Prescribed Wells Area (Southern Basins PWA) and the Musgrave Prescribed Wells Area (Musgrave PWA). The Southern Basins PWA contains the majority of aquifers with drinking-quality water and suitable yields in the southern part of Eyre Peninsula. The Musgrave PWA contains the majority of aquifers with drinking-quality water and suitable yields in the central-western part of Eyre Peninsula.

The Eyre Peninsula NRM Board reviewed the water allocation plans for both areas in 2006 and is currently in the process of amending them. The amended plans will be incorporated into a single water allocation plan, due to be completed in 2012. The annual review process for this Demand and Supply Statement (discussed in Part 5), will ensure any changes to licensed allocations in the amended water allocation plan will be included and its impact on the projected demand-supply balance assessed.

Of the allowable allocation in 2009-10 from these prescribed wells areas, SA Water has a licence for 97% of the total water available in the Southern Basins PWA and 92% of the total water available in the Musgrave PWA for public water supply.

Table 5: Groundwater available for allocation

Aquifer	Stock and domestic requirements (ML)	Groundwater available for allocation (ML)			2009-10 Total allowable allocations (ML)	2008-09 Actual usage (ML)
		Other existing licences	SA Water public water supply	Unallocated water		
Southern Basins PWA total	530	340	10,545	2900	8,245	7,287
Musgrave PWA total	1490	160	2990	5060	1,786	81
COMBINED TOTAL	**2020**	**500**	**13,535**	**7960**		

Note: A Notice of Prohibition was placed on the taking of water from the Polda Lens in the Musgrave Prescribed Wells Area because water levels had fallen to such an extent that a few licensees were unable to access water. (Source: Southern Basins PWA Water Allocation Plan (2000), Musgrave PWA Water Allocation Plan (2001), and 2009-10 allowable allocations and 2008-09 actual usage data from the Department for Water)

As highlighted in Table 5, annual allocations may be different to those outlined in the current water allocation plans for the Southern Basins and Musgrave PWAs as they are issued on an annual basis by the Minister for Environment and Conservation, following an assessment of the average annual recharge of the resource over the past 10 years. The annual allocations also depend on the recharge area and location within the basin (e.g. the Notice of Prohibition in the Polda Basin will affect allocations there). In addition, new licences were issued following adoption of the original water allocation plans.

While the water allocation plans for the Southern Basins and Musgrave PWAs indicate unallocated water is available (see Table 5), it is important to note accessibility to this water may be limited. For example:

- Groundwater production from the tertiary sand aquifer in the area is problematic because it is made up of unconsolidated fine sand (Harrington et. al., 2006). While water has been found, there may be problems with yields, which could limit the use of this resource for irrigation and town water supply.
- The basement aquifer is fractured where it comes into contact with overlying tertiary sediments. Groundwater within the fractured rock aquifer is generally available only in small amounts (Schwarz, 2003). Consequently, while the current water allocation plan identifies that there is water available, in reality there is no guarantee if someone drilled a well they would be able to access sufficient water.
- The quaternary aquifer is believed to extend underneath the Coffin Bay National Park, so while water is available, access to the resource may be difficult.

Non-prescribed groundwater, surface water and watercourse water resources

Other non-prescribed groundwater resources in the Eyre Peninsula region are summarised in Table 6.

Table 6: Non-prescribed groundwater resources in the Eyre Peninsula region

Groundwater source	Available capacity (ML/a)	Quality of resource
Robinson Lens	The latest sustainable yield calculations from the Department for Water and SA Water suggest 30ML/annum is the appropriate sustainable yield to be applied to this lens.	The salinity of the Quaternary aquifer has increased considerably such that SA Water no longer uses the water for public water supply. Salinity levels in the Tertiary Sands aquifer generally range from high to very high. Although this water is available, its use is currently limited due to high salinity levels.
Port Kenny Lens	Capacity of this lens is not known.	Salinity of the Quaternary aquifer is generally low.
Penong Lenses	Capacity of these lenses is not known.	Recorded salinities in the Penong area range from very low to high. Good quality groundwater for use in the township of Penong has been tapped, however increasing salinity levels suggest the aquifer may be over used.
Cowell Basin	Capacity of this basin is not known, however limited groundwater is used in the eastern area of Eyre Peninsula due to high levels of salinity and low yields.	Groundwater in the Tertiary aquifers generally has high salinity levels. Groundwater in the basement rock aquifer generally ranges from saline to hyper-saline.
North-west Eyre Peninsula	Capacity of the groundwater in the dunes along this coastal margin is not known.	It is thought there is potential for minor sources of fresh groundwater in this area, however generally the dune groundwater quality is marginal.

(Source: EP NRM Board, 2009b and G Ashman 2009, pers. comm., 27 January)

Surface water on Eyre Peninsula is scarce. The low rainfall, high evaporation rate, permeable soils and relatively flat landscape that typify much of the region results in little surface run-off and few surface water resources. The majority of stream systems are ephemeral, or seasonal, with minimal connection to the ocean.

The Tod River is the only permanent flowing river system in the region. Its catchment yield is estimated to be 11 GL/a (EP NRM Board, 2009b). The Tod Reservoir has a capacity of 11.3 GL and, prior to 2002, was a major water source for the region.

High salinity in the Tod catchment is the major factor limiting the use of water from the Tod Reservoir. The high salinity levels are due to the naturally saline geology and mobilisation of salt with the clearance of native vegetation. Under current operating rules saline run-off is diverted past the Tod Reservoir, estimated to be 90% of the available water (SA Water, 2008).

Due to increasing salinity levels and declining yield, since 2002 the Tod Reservoir has been retained only as an emergency back-up supply of drinking-quality water.

Figure 8: Tod Reservoir

The Eyre Peninsula Farm Dams Audit (EPNRMB, 2009c) reports there is a total of 7,699 farm dams across the Eyre Peninsula region. In the southern Eyre Peninsula priority catchment, as categorised in the Eyre Peninsula Farm Dams Audit, there are 4,667 dams. These dams vary in size, with 52% capable of storing 0.5-2 ML of water and 17.5% with a capacity of 2-5 ML. It is estimated the total existing farm dam capacity across southern Eyre Peninsula (including some non-priority catchments) is around 7.2 GL.

Alternative water resources

River Murray water

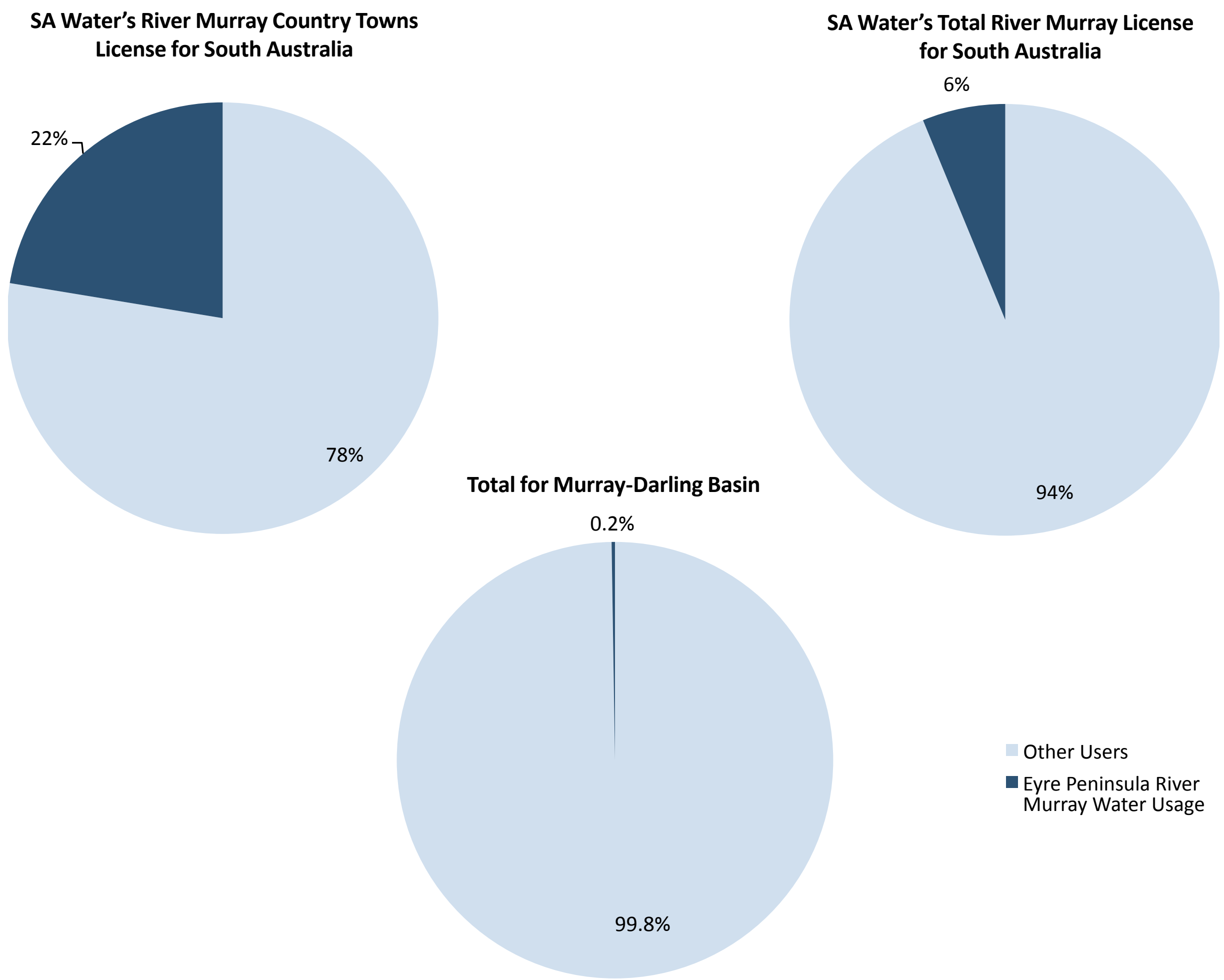
Water from the River Murray is used throughout South Australia for irrigation, industrial, commercial, recreational, stock and domestic, and urban water supplies, as well as for the environment. The *Commonwealth Water Amendment Act 2008* outlines that South Australian entitlement holders have the right to divert 724.1GL of water from the River Murray for consumptive purposes. This includes SA Water's 50GL per year for country town water supply purposes.

At present, the Murray Darling Basin Authority is developing the Basin Plan, which, among other matters, will set sustainable diversion limits on resource extraction from the Murray-Darling Basin. The South Australian Government will need to consider any changes to the volume of water South Australia is permitted to divert from the River Murray following the release of the final Basin Plan, and determine how much of that water should be used for any given purpose.

Currently 42% (11.2GL) of the region's water supply is River Murray water imported via the Morgan-Whyalla system, the majority of which is used in the City of Whyalla. A small volume passes through the Iron Knob-Lock system to supplement other areas on Eyre Peninsula, including Ceduna, Streaky Bay and Wudinna. It is important to emphasise the majority of River Murray water supplied to Eyre Peninsula is used in Whyalla and further distribution of this water to the remainder of Eyre Peninsula is limited due to infrastructure constraints.

Figure 9 shows this currently equates to 22% of SA Water's 50GL country towns licence for South Australia, 6% of SA Water's total River Murray licence for South Australia, and 0.2% of total water use in the Murray-Darling Basin.

Figure 9: Eyre Peninsula River Murray water usage relative to total usage



Stormwater reuse

Approximately 2.5% of the region's water supply is stormwater, including road run-off and roof run-off. Local councils throughout the Eyre Peninsula region have well developed capacities for capturing and reusing stormwater for non-drinking purposes. It is estimated 100ML/annum of road run-off in the region is currently being reused, predominantly to irrigate public open spaces, golf courses and sports ovals. A range of factors may restrict any significant increase in stormwater harvesting and reuse in the region, including:

- A lack of suitable surface and aquifer storage.
- Low yields due to the low rainfall in much of the region, which is expected to be further compounded by climate change.
- The high cost of infrastructure.

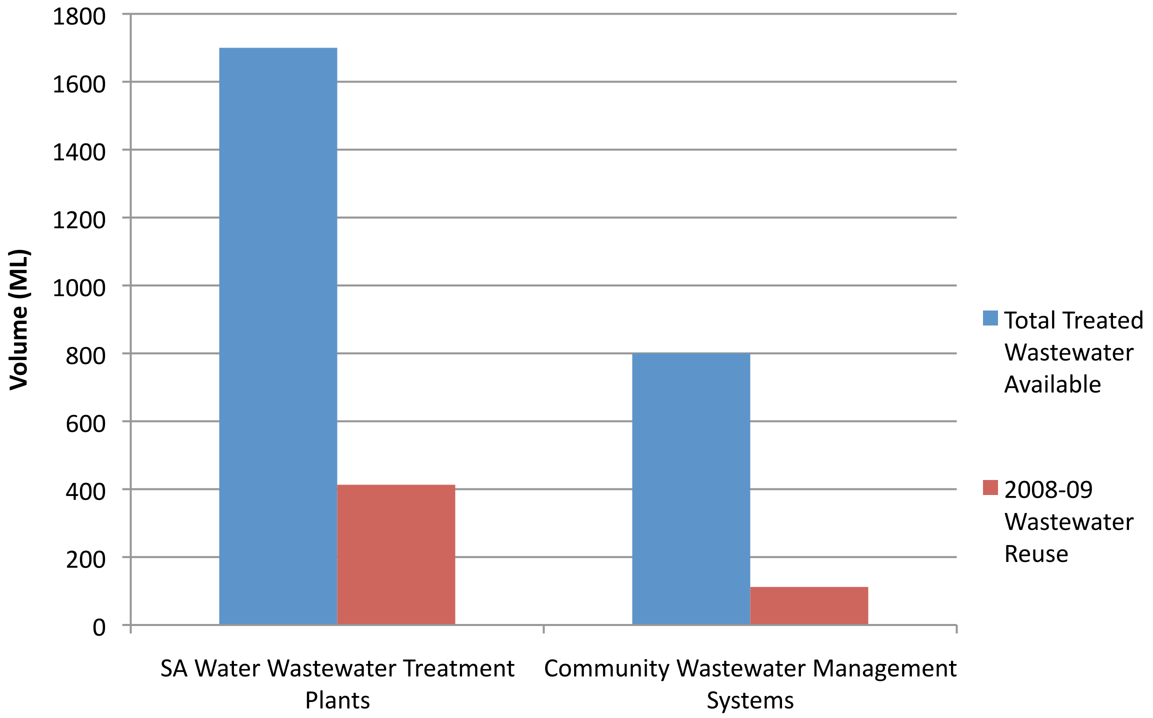
The Eyre Peninsula community is actively engaged in demand management measures, highlighted by the large proportion of households with rainwater tanks. It is estimated 600ML/annum of roof run-off is being used in the region for domestic purposes.

Wastewater reuse

Treated wastewater reuse could contribute up to approximately 9.5% of the water supplies in the Eyre Peninsula region. There is approximately 1.7GL/annum of treated wastewater potentially available from SA Water Wastewater Treatment Plants (WWTP) in Whyalla and Port Lincoln for non-drinking purposes. In 2008/09 357ML was reused from the Whyalla WWTP and 56ML from the Port Lincoln WWTP (SA Water, 2009).

Many local councils across the Eyre Peninsula Region manage Community Wastewater Management Schemes (CWMS). Approximately 800ML/annum of treated wastewater is available from these schemes for non-drinking purposes. It is estimated that in 2008/09, only 112ML was reused.

Figure 10: 2008-09 Wastewater reuse from SA Water Wastewater Treatment Plants and Community Wastewater Management Systems

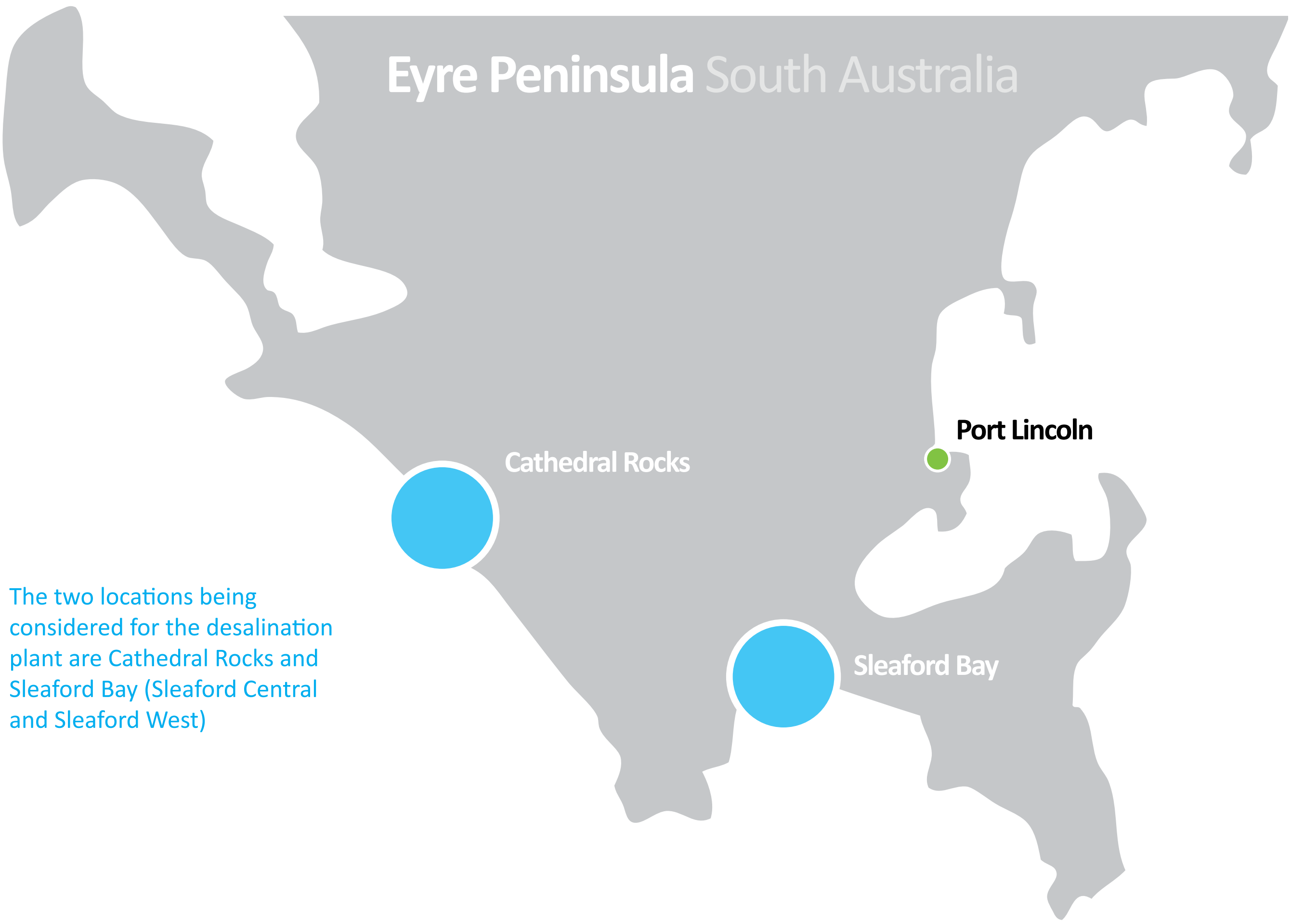


Desalinated water

Two private desalination plants in the region generate and reuse approximately 30 ML/annum from non-prescribed groundwater resources.

SA Water's Long Term Plan for Eyre Region identified that a seawater desalination plant on Lower Eyre Peninsula was the preferred option to supply additional water to the region. This view was reinforced by *Water for Good*, which states that additional water sources including desalinated seawater will supplement Eyre Peninsula water resources, subject to site and environmental investigation. In early 2010, SA Water announced it is investigating two potential sites for a desalination plant in Lower Eyre Peninsula to supplement drinking-quality water from the Southern Basins PWA. No decision has yet been made to supplement water resources in the region through desalination.

Figure 11: The two locations being investigated by SA Water for the desalination plant



PART 3:
FUTURE DEMAND AND SUPPLY

This section of the statement describes future potential demands on the Eyre Peninsula region's water supplies and shows the projected implications of these demands on supply.

Demands

Key issues with the potential to influence future demand in the Eyre Peninsula region include:

- Mining expansion
- Urban development and associated population growth
- Climate change
- Land use change
- Demand management
- Unaccounted for Water

Mining expansion

South Australia's Strategic Plan contains targets for exploration, production and processing in the mining sector that will drive significant growth over the next 40 years. Much of the State's projected growth in the mining industry is likely to occur in the Eyre Peninsula region, which is expected to place significant demands on the region's water resources.

The 2009 Resources and Energy Sector Infrastructure Council (RESIC) Infrastructure Demand Study shows there are currently eight mines either in operation or advanced stages of exploration within the region. A description of each of the mining projects and their projected water consumption is listed in Table 7.

Table 7: Current and potential future mines in the Eyre Peninsula region

Company Name	Project Name	Nearest Township	Resource Type	Expected Mine Life	Water Consumption (ML/a)	Water Source
Centrex Metals Ltd	Bungalow Magnetite	Cowell	Magnetite	>10 years	4000 (2015+)	Desalinated water
Centrex Metals Ltd	Charleton Gully Magnetite Deposit	Wanilla	Magnetite	>10 years	4000 (2015+)	Desalinated water
Centrex Metals Ltd	Carrow Magnetite Deposit	Cowell	Magnetite	>10 years	4000 (2015+)	Desalinated water
**Centrex Metals Ltd	Wilgerup	Lock	Iron Ore	6-10 years	600 (2011-2012)	Non-prescribed groundwater
**OneSteel	Hematite Extension Project	Whyalla	Iron Ore	10 years	1100 (2011-2020)	Desalinated water
Ironclad Mining Ltd	Wilcherry Hill	Kimba	Iron	>10 years	365 (2010-2011), 730 (2012-2014), unknown (2015+)	Non-prescribed groundwater (2010-2014), desalinated water 2015+
Lincoln Minerals Ltd	Gum Flat	Port Lincoln	Iron	>10 years	1000 (2010-2014), 2000 (2015-2019), 2500 (2020+)	Prescribed groundwater
Minotaur Exploration Ltd	Poochera Kaolin Project	Poochera	Kaolin	>10 years	25 (2010-2011), 150 (2012-2020+)	Mains water (2010-2011), desalinated water (2012-2020+)

Note: In June 2010, PIRSA provided updated figures for two of the mining projects that differ from the original data provided in the RESIC study. These mining projects are highlighted in Table 7 by the following symbol (**).

Demand from the mining industry has been factored in to the demand-supply projection outlined in Figure 14 by including demand from mines in operation or advanced stages of exploration. It is important to note information provided in the 2009 RESIC study, including figures for two projects recently updated by PIRSA, is the best available data at the present time, but is subject to change as mining companies update their investment plans. The annual review process discussed in Part 5 will assess the assumptions underlying projected mining demand, which can be adjusted as necessary.

As outlined in *Water for Good*, it is State Government policy that securing water for mining activities is the responsibility of the company. Water will not be provided from the current SA Water reticulated supply, except perhaps for small amounts during establishment where the capacity exists, subject to negotiation with SA Water. SA Water may be prepared to consider joint proposals with mining companies for new water resource opportunities.

Urban development and associated population growth

Demand for drinking-quality water in the Eyre Peninsula region decreased between 2000/01 and 2006/07 (excluding Whyalla). There are likely to be various reasons for this decline, including:

- Water restrictions.
- Increased use of rainwater tanks.
- Increased stormwater and wastewater reuse.

However, the State Government has a target population growth rate of 1% per annum for the Eyre Peninsula region to 2036 (South Australian Government 2010). This target population growth rate is significantly higher than the observed growth rate of 0.2% per annum over the past 10 years (South Australian Government 2010). Due to the difference between the current growth rate and the State Government's target growth rate, the demand-supply balance is projected under both scenarios.

Mining expansion offers the most likely impetus for any increase in population to achieve the State Government's target.

Climate change

CSIRO studies (2006) have indicated that rainfall is expected to decrease and temperatures increase across the Eyre Peninsula Region in future years due to the impact of climate change (see Table 8). These changes are already occurring (see Figure 3 & Figure 4), and are likely to have a significant impact on groundwater availability and farm dam capture.

Table 8: CSIRO (2006) projected average range of temperature and rainfall change in the Eyre Peninsula Region for 2030 and 2070

Climatic characteristic	2030					2070				
	Annual	Summer	Autumn	Winter	Spring	Annual	Summer	Autumn	Winter	Spring
Temperature (°C)	0.4 to 1.2	0.4 to 1.3	0.4 to 1.1	0.4 to 1.2	0.4 to 1.3	0.9 to 3.5	0.8 to 4.0	0.8 to 3.5	0.8 to 3.6	0.9 to 3.8
Rainfall (%)	-10 to -1	-9 to +4	-10 to +3	-12 to -2	-20 to -2	-30 to -2	-25 to +13	-30 to +8	-35 to -4	-60 to -4

Monitoring data has shown a strong correlation between groundwater levels and rainfall events. Consecutive seasons of poor rainfall leads to reduced recharge, which in turn causes water levels to decline. Research commissioned by the Eyre Peninsula NRM Board (2009a) presents a spatial assessment of recharge under historical conditions and under possible climate change scenarios across three key water resources in the region. Given the assumptions used in this research, the modelling has projected large decreases in recharge to the Southern Basins, Musgrave and Robinson groundwater aquifers (see Table 9).

The low and high emissions scenarios used in this modelling correspond to the B1 and A1FI emissions scenarios from the IPCC Special Report on Emissions Scenarios (IPCC, 2000). This report describes the B1 scenario as a convergent world with global population peaking mid-century and declining thereafter, with rapid changes in economic structures toward a service and information economy, reductions in material intensity, and the introduction of cleaner and more resource-efficient technologies. The emphasis is on global solutions to economic, social and environmental sustainability, including improved equity, but without additional initiatives to mitigate climate change.

The A1FI scenario is a fossil-intensive world of very rapid economic growth, a global population that peaks mid-century and declines thereafter, and the rapid introduction of new and more efficient technologies. Major underlying themes are convergence among regions, capacity building, and increased cultural and social interactions with a substantial reduction in regional differences in per capita income.

Table 9: Example of potential changes to recharge under climate change scenarios for a grassland area (Eyre Peninsula NRM Board 2009a)

Groundwater aquifer	2030 low emissions	2030 high emissions	2070 low emissions	2070 high emissions	Increased rainfall intensity
Southern basins	-28%	-34%	-43%	-59%	+9%
Musgrave (coastal)	-45%	-50%	-61%	-78%	+14%
Musgrave (inland)	-20%	-27%	-37%	-58%	+24%
Robinson	-20%	-27%	-36%	-56%	+33%

It is important to note that research commissioned by the Eyre Peninsula NRM Board (2009a) acknowledges some data gaps and limitations to the modelling framework, and suggests future work for refinement. However, this is the best available climate change science on Eyre Peninsula groundwater resources to date. When new climate change science becomes available it will be incorporated into the demand-supply projections for Eyre Peninsula through the annual review process.

Land use change

Reduced rainfall may place further pressure on the Eyre Peninsula region through changes to land use. Primary producers may diversify their practices, reducing grain production and reintroducing stock in order to minimise risk. However, stock also require water. Increasing water prices may lead to increased productivity or to changes in agricultural practices, which could influence stocking rates or contribute to the increasing trend of on-farm desalination for stock water. PIRSA anticipates that stock numbers will continue to grow in the short-term and then stabilise. An increase in rural irrigation is not considered likely.

Demand management

Mains water use per residential property in the Eyre Peninsula region is already around the State average, despite the hot and dry climate of much of the area. This is due in part to a strong level of community awareness, highlighted by the proportion of properties with rainwater tanks (97%).

Mains water substitution is the largest demand management measure for drinking-quality water in the Eyre Peninsula region. It is projected that the use of stormwater or treated wastewater will continue to increase until 2015 and then stabilise once the most viable schemes have been implemented. This will contribute towards the achievement of the *Water for Good* target for South Australia's regional areas to provide up to 15GL/annum of stormwater harvesting potential and the expansion of recycling from CWMS to 12GL/annum by 2050. However, total water use is unlikely to change and may in fact rise slightly as previously unwatered areas are irrigated with recycled water.

The influence of other demand management measures such as rebates for water efficient appliances are more difficult to ascertain. A review of the uptake of rebates in the Eyre Peninsula region shows there has been a high level of interest in rebates for water efficient washing machines (10-11% of households in each town), moderate interest in rainwater tanks (5-7% of households in each town), and lower interest in other measures on offer. The water efficient showerhead exchange program has been very effective with more than 1000 exchanged in 2010, mainly in Whyalla and Port Lincoln.

Water for Good states that WSUD will be mandated across South Australia by 2013. This may drive further savings through the adoption of WSUD measures in new developments, particularly as knowledge and experience among councils and local developers increases as a result of the State Government's WSUD Technical Manual for Greater Adelaide becoming available.

Unaccounted for water

Unaccounted for water is the volume of water resulting from burst mains, fire water and mains flushing; unauthorised consumption; and leakage. Unaccounted for water attributed to the SA Water reticulated supply system and on-farm losses has been incorporated into the projections in this statement. As outlined in *Water for Good*, SA Water will continue its program of leak detection and repair in major country town networks. Recent investment in improved pressure management has increased infrastructure efficiency, particularly in Ceduna.

Supplies

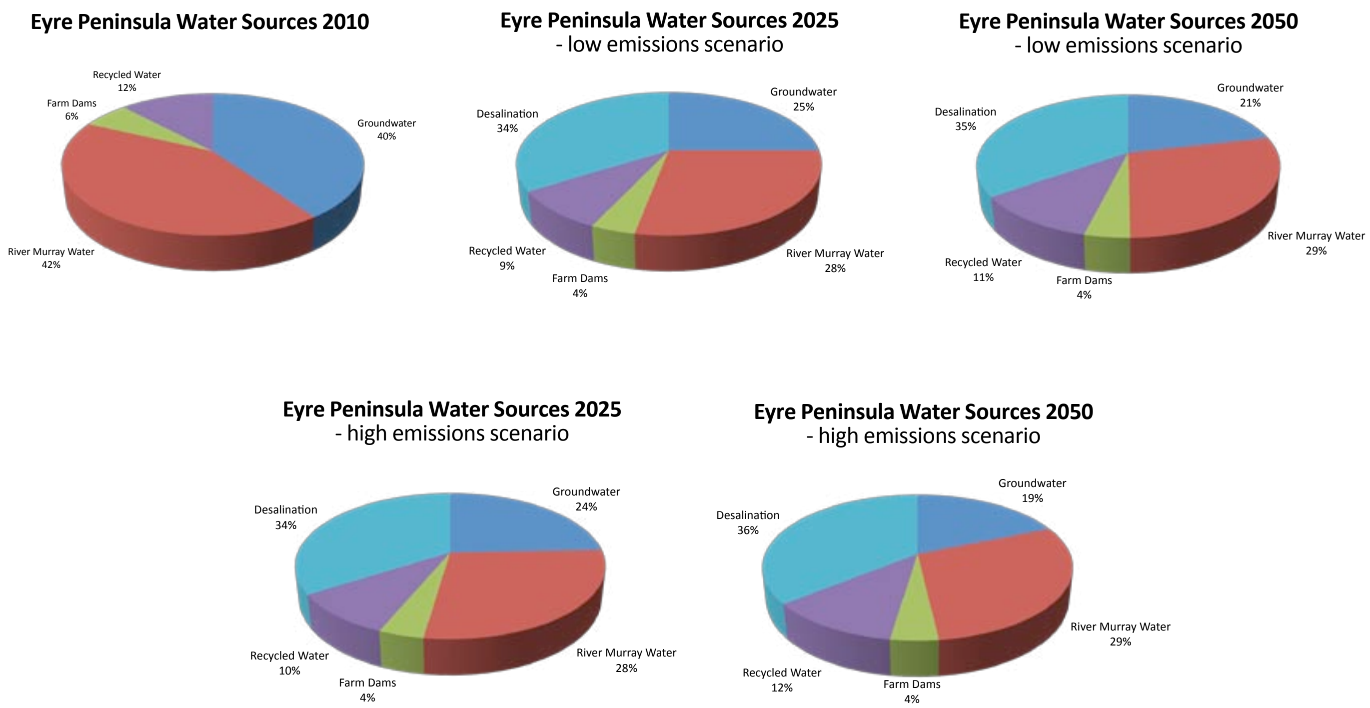
Figure 12 (below) provides a projection of the drinking and non-drinking quality water source mix in the Eyre Peninsula region under possible low and high emission scenarios. Currently, the combined total drinking and non-drinking quality water sources in the region are 26.7GL. Based on assumptions outlined in Table 10, the demand-supply projections suggest this will increase to approximately 40.5GL by 2025 under the low emissions scenario and 40.0GL by 2025 under the high emissions scenario.

This increase is most likely due to the addition of desalinated seawater, which is projected to be supplied from private desalination plants for use in mining activities. *Water for Good* states that additional water sources including desalinated seawater will supplement existing Eyre Peninsula water resources, subject to site and environmental investigations. SA Water has been investigating sites for a 2.2GL/a desalination plant. However, a final decision to construct a new desalination plant has not been made and therefore water supplied from a 2.2GL/a desalination plant has not been included in these projections.

By 2050, the demand-supply projections suggest total water supply sources will decrease slightly to approximately 39.3GL under the low emissions scenario, and 38.1GL under the high emissions scenario because of an assumed decrease in the amount of groundwater available due to climate change.

As mentioned previously, it is important to note most River Murray water supplied to Eyre Peninsula is used in Whyalla, and further distribution of this water to the remainder of the region is limited due to infrastructure constraints.

Figure 12: Eyre Peninsula's current and projected water sources for drinking and non-drinking purposes



The overview of supply provided in Figure 12 does not include water from the Tod Reservoir or the current small volume of private desalination water. As mentioned previously, the catchment yield of the Tod River is estimated to be 11 GL/annum (EP NRM Board, 2009b), however in dry years the catchment yield is significantly reduced. For the purposes of this statement, it is considered that only 1.9 GL/annum is available from the Tod Reservoir. This water resource is not currently used and future use is in doubt due to water quality concerns, so it has not been included as an available water source for the region other than as an emergency back-up supply.

Demand and supply assumptions

In order to produce the 40-year demand-supply projections to 2050, a range of assumptions were required. Table 10 outlines the assumptions used to develop the projections. A confidence rating has been provided as a guide to the quality of the start value, where 1 represents metered data, 2 represents derived data and 3 represents best guess.

Table 10: Demand and supply assumptions

Demand assumption						
Demand	**Start value (ML)**	**Confidence rating**	**Trend**		**Notes**	**Data source**
Residential	5800	2	+1%/a of start level for high population projection	+0.2%/a of start level for low population projection	Start value is derived from estimated use per property (mains and rainwater) post water restrictions.	Start value – population from ABS; average mains water use from SA Water 2008/09 data; rainwater use from Rainwater Tank Policy Discussion Paper. Trend – Eyre and Western Region Plan.
Non-residential	8000	2	+0.3%/a of start level		Start value is derived from actual usage data for 2008/09 in Whyalla and 33% of township use in the remainder of Eyre Peninsula. Trend is based on historic growth.	Start value and trend – SA Water's Long Term Plan for Eyre Region.
Visitors	400	2	+4%/a of start level		Start value is derived from 5% of township use. Trend is based on estimated growth in visitors.	Start value and trend – SA Water's Long Term Plan for Eyre Region.
Irrigation – groundwater	100	1	Constant		Start value is derived from licensed extractions in 2008/09. Trend is based on current usage, with no expansion.	Start value – DFW data.
Irrigation – wastewater	500	2	+140ML/a for 5 years, then constant		Start value is derived from the SA Water treated wastewater summary for 2008/09 and council data from Community Wastewater Management Systems. Trend is based on projected council demand for open space watering.	Start value - SA Water Treatment Group and local government supplied data. Trend – local government supplied data.

Demand assumption					
Demand	Start value (ML)	Confidence rating	Trend	Notes	Data source
Irrigation – stormwater	100	3	+10%/a of start level	Start value is derived from council data. Trend is based on council information on proposed new stormwater projects and suggestions of an increase greater than population increase due to current unsatisfied demand and increasing mains water costs.	Start value – local government data. Trend – local government forecasts, including Round 2 stormwater funding bids.
Stock	7400	3	+1.5% on start level for 10 years, then constant	Start value is derived from 2 million sheep requiring 10l per day. Trend is based on PIRSA forecast.	Start value – PIRSA estimates of stock numbers and daily water use includes an allowance for on-farm losses. Trend – PIRSA forecast (same as used in SA Water's Long Term Plan for Eyre Region).
Mining – Bungalow	800	3	Constant increase of 800ML/a (2015-2019), then Constant 4000ML/a (2020-2050)	Due to uncertainty regarding water demand during the development period, a standard assumption has been applied, such that a constant increase in demand is assumed until the total volume required is reached in the final year of the development period.	Start value and trend - Resources and Energy Sector Infrastructure Council (RESIC) Infrastructure Demand Study.
Mining – Charleton Gully	800	3	Constant increase of 800ML/a (2015-2019), then Constant 4000ML/a (2020-2050)	Due to uncertainty regarding water demand during the development period, a standard assumption has been applied, such that a constant increase in demand is assumed until the total volume required is reached in the final year of the development period.	Start value and trend - RESIC Infrastructure Demand Study.

Demand assumption					
Demand	**Start value (ML)**	**Confidence rating**	**Trend**	**Notes**	**Data source**
Mining – Carrow	800	3	Constant increase of 800ML/a (2015-2019), then Constant 4000ML/a (2020-2050)	Due to uncertainty regarding water demand during the development period, a standard assumption has been applied such that a constant increase in demand is assumed until the total volume required is reached in the final year of the development period.	Start value and trend - RESIC Infrastructure Demand Study.
**Mining – OneSteel	1100	3	Constant (2011-2020)	The mine will require a constant volume with water supply projected to come from a private desalination plant.	Start value and trend – PIRSA advice.
**Mining – Wilgerup	600	3	Constant (2011-2012)	The water supply is projected to come from a non-prescribed groundwater source.	Start value and trend – PIRSA advice.
Mining – Wilcherry Hill	182.5	3	Constant increase 182.5ML/a (2010-2011), then constant increase 121.7/a (2012-2014)	The water supply is projected to come from a non-prescribed groundwater source. Due to uncertainty regarding water demand during the development period, a standard assumption has been applied such that a constant increase in demand is assumed until the total volume required is reached in the final year of the development period.	Start value and trend - RESIC Infrastructure Demand Study

Demand assumption					
Demand	**Start value (ML)**	**Confidence rating**	**Trend**	**Notes**	**Data source**
Mining – Gum Flat	200	3	Constant increase 200ML/a (2010-2014), then constant increase 200ML/a (2015-2019), then constant 2500ML/a (2020-2050)	The water supply is projected to come from licensed extraction from the Southern Basins Prescribed Wells Area. Due to uncertainty regarding water demand during the development period, a standard assumption has been applied such that a constant increase in demand is assumed until the total volume required is reached in the final year of the development period.	Start value and trend - RESIC Infrastructure Demand Study.
Mining – Poochera Kaolin Project	12.5	3	Constant increase 12.5ML/a (2010-2011), then constant 150ML/a (2012-2050)	The water supply is projected to come from mains water from 2010-2011, and then from a private desalination plant from 2012. Due to uncertainty regarding water demand during the development period, a standard assumption has been applied such that a constant increase in demand is assumed until the total volume required is reached in the final year of the development period.	Start value and trend - RESIC Infrastructure Demand Study.
Demand management	0	2	-85ML/a of current year level for 5 years, then constant.	Trend is based on current uptake of rebates and exchange programs and mains water substitution with recycled water.	Start value - set at zero as only future measures considered. Trend – SA Water Rebate and Exchange Program data.
Unaccounted for water	1400	3	Constant	Start value is derived from SA Water average of 10% difference between water supplied and billed. No increase forecast due to improved leakage management and improved metering.	Start value – SA Water average for unmetered water.

Supply assumptions						
Supply	**Start value (ML)**	**Confidence rating**	**Trend**		**Notes**	**Data Source**
River Murray – Morgan-Whyalla pipeline	9800	2	Constant		Start value is derived from current use. Trend is based on no changes to the River Murray licence.	Start value – water supplied by SA water during 2008/09, full water licence used.
River Murray – Iron Knob-Kimba pipeline	1400	1	Constant		Start value is derived from the capacity of the current share of licence. Trend is based on no changes to the River Murray licence or water purchases.	Start value – SA Water's Long Term Plan for Eyre Region.
Southern Basins Prescribed Wells Area	8200	1	8200ML in 2010, 8100ML in 2011, 8600ML in 2012 with a 0.7%/a decrease of 2012 level for low emissions scenario	8200ML in 2010, 8100ML in 2011, 8600ML in 2012 with a 1%/a decrease of 2012 level for high emissions scenario	Start value is derived from licensed allocations for 2009/10. Trend is based on EP NRM Board 2009a.	Start value – DFW data. Trend – EP NRM Board 2009a.
Musgrave Basin Prescribed Wells Area	1800	1	0.6%/a decrease of start level for low emissions scenario	1%/a decrease of start level for high emissions scenario	Start value is derived from licenced allocations for 2009/10. Trend is based on EP NRM Board 2009a.	Start value – DFW data. Trend – EP NRM Board 2009a.
Non-prescribed groundwater resources	730	3	Constant 730ML/a (2010), then constant 1330ML/a (2011-2012), then constant 730ML/a (2013+)		Trend is based on water anticipated to be drawn from non-prescribed groundwater resources for mining purposes.	Start value - RESIC Infrastructure Demand Study.
Tod Reservoir	1900	2	Constant		Start value is derived from water available in a dry year, noting that this water is unsuitable for use without prior treatment. Trend is based on a dry year yield.	Start value – SA Water data, based on sustainable yield determined during desalination study in 2003.
Farm dams	1600	3	Constant		Trend is based on a dry year yield.	Start value – Eyre Peninsula Farm Dams Audit (EPNRMB, 2009c).

Supply assumptions					
Supply	**Start value (ML)**	**Confidence rating**	**Trend**	**Notes**	**Data Source**
Desalination – mining supplies 1	2400	3	Constant increase 2400ML/a (2015-2019), then constant 12,000ML/a (2020-2050)	Due to uncertainty regarding water demand during the development period, a standard assumption has been applied such that a constant increase in supply is assumed until the total volume required is reached in the final year of the development period.	Start value and trend - RESIC Infrastructure Demand Study.
Desalination – mining supplies 2	1500	3	Constant 1500ML/a (2011+)		Start value and trend - RESIC Infrastructure Demand Study.
Desalination – mining supplies 3	150	3	Constant 150ML/a (2012-2050)		Start value and trend - RESIC Infrastructure Demand Study.
Wastewater – WWTP	1700	1	+1%/a of start level	Trend is based on increase due to population growth.	Start value – SA Water data. Trend – Eyre and Western Region Plan.
Wastewater – CWMS	800	2	+1%/a of start level	Trend is based on increase due to population growth.	Start value – local government data Trend – Eyre and Western Region Plan.
Stormwater – road run-off	100	2	+70ML/a for 5 years, then constant	Trend is based on expansion to schemes, and rainfall reductions offset by increased impervious area.	Start value and trend – local government data
Stormwater - Roof run-off	600	2	Constant	Start value is derived from all houses having 100 square meters of roof area collecting 200mm of rain. Trend is based on an average year.	Start –BOM rainfall data and SA Water's Long Term Plan for Eyre Region.

Note: In June 2010, PIRSA provided updated figures for two of the mining projects that differ from the original data provided in the 2009 RESIC study. These mining projects are highlighted in Table 10 by the following symbol (**).

Demand and supply projections

The demand and supply projections outlined below have been simulated using the SimulAlt Demand-Supply Water Simulation Model (Intelligent Software Development, 2010), which was commissioned by DFW.

This model comprises basic features of the multi-award winning SimulAlt (socio-economic and predictive analytics) behavioural simulation platform. The model enables simulation of the demand-supply balance of water in various systems, over yearly time-steps, to assist with strategic planning and water policy. It allows the creation of customised water systems comprising many demand and supply components with unique water demand-supply trends over time; and the simulation of many water systems and their demand-supply components over many years (yearly time-step).

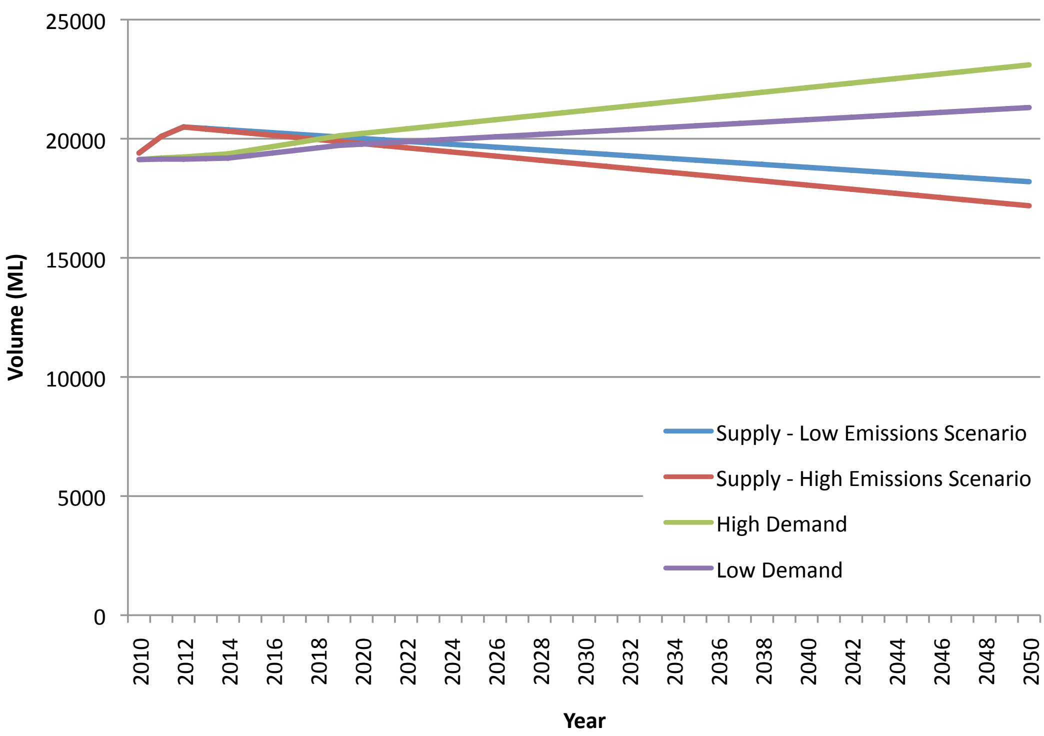
Projection 1: Drinking water sources and demands

Projection 1 provides the demand-supply balance when only drinking-quality water demands and sources are considered, under high and low population growth and emissions scenarios. Drinking quality demands that have been included in Projection 1 are residential, non-residential, visitors, stock, demand management and unaccounted for water. Drinking quality sources that have been considered for Projection 1 include River Murray water from the Morgan-Whyalla and Iron Knob-Lock systems, the public water supply from the Southern Basins PWA and Musgrave Basin PWA and roof run-off. The projection is based on the suite of assumptions outlined in Table 10.

The B1 and A1FI emissions scenarios from the Special Report on Emissions Scenarios (IPCC, 2000) were applied to the research commissioned by the Eyre Peninsula NRM Board (2009a) to determine the impact of climate change on recharge to the Southern Basins PWA and Musgrave Basin PWA. The B1 emissions scenario represents a low emissions scenario and A1FI represents a high emissions scenario.

As mentioned previously, the research commissioned by the Eyre Peninsula NRM Board (2009a) acknowledges some data gaps and limitations to the modelling framework, and suggests future work for refinement. However, this is the best available climate change science on Eyre Peninsula groundwater resources to date. When new climate change science is available, it will be incorporated into the demand-supply projections through the annual review process.

Figure 13: Projection 1: Drinking water sources and demands



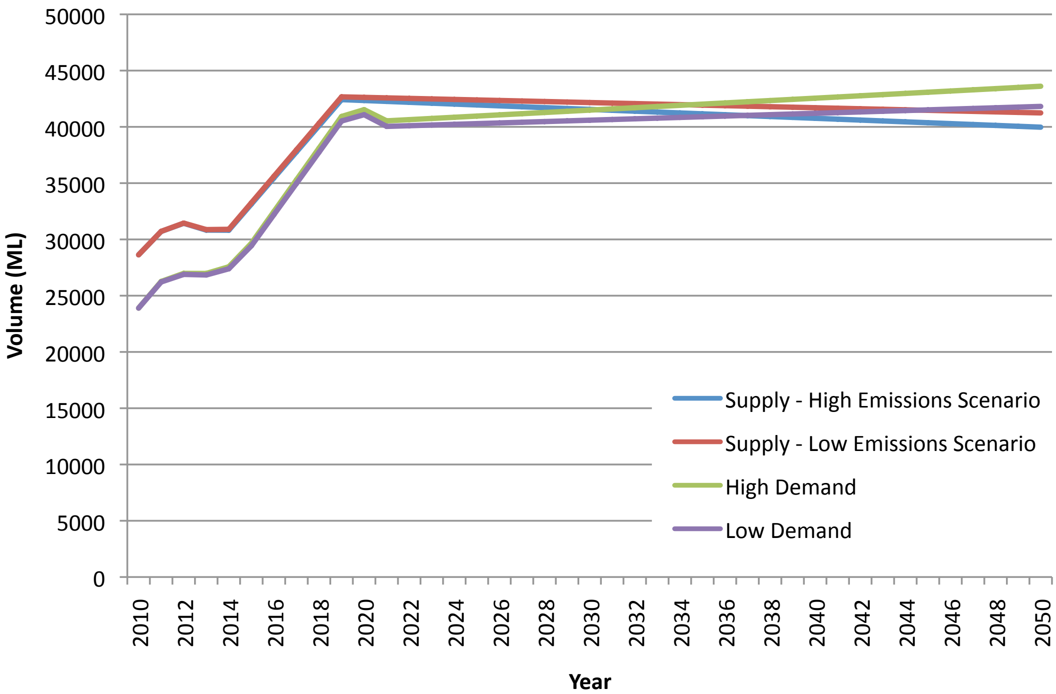
Projection 1 shows that demand for drinking-quality water under the high emissions and high population growth scenario is projected to exceed supply during 2017/18. Under the low emissions and high population growth scenario demand is projected to exceed supply during 2018/19.

Under the high emissions and low population growth scenario, demand is projected to exceed supply during 2020/21. Under the low emissions and low population growth scenario, demand is projected to exceed supply during 2022/23.

Projection 2: All water sources and demands

Projection 2 provides the demand-supply balance, when all demands and water sources listed in Table 10 are considered, showing high and low population growth scenarios. As with Projection 1, the B1 and A1FI emissions scenarios from the Special Report on Emissions Scenarios (IPCC, 2000) were applied to the research commissioned by the Eyre Peninsula NRM Board (2009a) to determine the impact of climate change on recharge to the Southern Basins PWA and Musgrave Basin PWA. The B1 emissions scenario represents a low emissions scenario and A1FI represents a high emissions scenario.

Figure 14: Projection 2: All water sources and demands



Projection 2 shows that under the high emissions and high population growth scenario, demand is projected to exceed supply during 2030/31. Under the low emissions and high population growth scenario, demand is projected to exceed supply during 2034/35.

Under the high emissions and low population growth scenario, demand is projected to exceed supply during 2036/37. Under the low emissions and low population growth scenario, demand is projected to exceed supply during 2043/44.

The projected increase in supply of approximately 14GL and demand of approximately 13GL from 2014 to 2019 is based on the assumption that private desalinated seawater from the mining sector will be provided, with the associated mining sector demand.

PART 4:
FINDINGS

This section of the statement describes the key findings identified.

Some of the findings identified in this statement warrant further discussion, which may lead to specific recommendations. It is not within the scope of this statement to provide recommendations. However, if deemed necessary, the South Australian Minister for Water will determine how to address the findings of the statement by establishing an independent planning process to consider and recommend options.

The types of options an independent planning process may consider include seawater or groundwater desalination, expansion of any existing desalination plants, River Murray water purchases, expansion of the mains water distribution network and/or capacity, stormwater harvesting and reuse, treated wastewater recycling, increased rainwater reuse and demand management measures, including increased production efficiency due to market influences.

The key findings identified in this statement relate to:

- Demand and supply projections
- Mining
- The Tod Reservoir
- Urban development and associated population growth
- Climate change
- Land use change
- Recycled water
- Efficient water use
- Data availability

Demand and supply projections

Two different demand-supply projections are considered in this statement, each under high and low population growth and emissions scenarios - Projection 1: Drinking water demand and supply only; and Projection 2: All sources and demands. The outcomes of these projections presume that all the assumptions outlined in Table 10 occur.

Table 11 outlines the impact on demand-supply for both projections under the high and low population growth and emissions scenarios, if all of the assumptions outlined in Table 10 were to be realised.

Table 11: Impact on demand-supply

Scenario	Projection 1: Drinking-quality water demand and supply only	Projection 2: All water sources and all human demands
High population growth/high emissions	Demand is projected to exceed supply in 2017/18.	Demand is projected to exceed supply in 2030/31.
High population growth/low emissions	Demand is projected to exceed supply in 2018/19.	Demand is projected to exceed supply in 2034/35.
Low population growth/high emissions	Demand is projected to exceed supply during 2020/21.	Demand is projected to exceed supply in 2036/37.
Low population growth/low emissions	Demand is projected to exceed supply during 2022/23.	Demand is projected to exceed supply in 2043/44.

Mining

The projected increase in demand from mining activities over the planning period is approximately 14.3GL. It is assumed that the majority of this water will be supplied by private seawater desalination plants, with less than 20% to be provided from groundwater resources within the terms and regulations of the Natural Resources Management Act 2004 and water allocation plans.

State Government policy states that it is the responsibility of a mining company to secure water for mining acitivites. Water will not be provided from the current SA Water reticulated supply other than possibly small amounts for establishment where capacity exists, subject to negotiation with SA Water.

Tod Reservoir

The Tod Reservoir is the only major surface water storage on Eyre Peninsula, however, due to deteriorating water quality, this resource has not been used since early 2002 and is held as an emergency supply of water only.

SA Water's Long Term Plan for Eyre Region lists a range of possible options to utilise this water resource, including:

- Catchment rehabilitation to improve the health of the Tod Reservoir and improve the quality of its inflows.
- The potential to use the Tod Reservoir for recreational use.
- Decommissioning and removing the dam wall.

Urban development and associated population growth

Under the high population growth scenario, increased demand from urban growth over the planning period is projected to be 2.2GL. Under the low population growth scenario, increased demand from urban growth over the planning period is projected to be approximately 450ML.

Climate change

Research commissioned by the Eyre Peninsula NRM Board (2009a) presents a spatial assessment of recharge under historical conditions and possible future climate change across three key water resources in the region. Given the assumptions used in this research, the modelling has projected large decreases in recharge to the Southern Basins, Musgrave and Robinson groundwater aquifers.

Based on this modelling, under the low and high emissions scenarios, it is projected groundwater supply from the Southern Basins PWA will decrease within a range of approximately 2.3-3.3GL from a peak of 8.6GL in 2012 to 5.3-6.3 GL in 2050, and the Musgrave PWA will decrease within a range of approximately 400-700ML from 1.8GL in 2010 to 1.1-1.4 GL in 2050.

It is important to note that the research commissioned by the Eyre Peninsula NRM Board (2009a) acknowledges some data gaps and limitations to the modelling framework, and suggests future work for refinement. However, this is the best available climate change science on Eyre Peninsula groundwater resources to date. At such a time as new climate change science is available, it will be incorporated into the demand-supply projections for Eyre Peninsula through the annual review process.

Land use change

The projected increase in demand from stock over the planning period is 1GL. An increase in rural irrigation practices is not considered likely.

Recycled water

Recycled water use is projected to make a moderate contribution to water supply in the Eyre Peninsula region, accounting for 12% in 2010, 9% in 2025 and 11% in 2050. It is important to note the overall volume of recycled water is projected to increase from 2010 to 2050, however its contribution to the total water supply decreases from 2010 to 2025 and increases again from 2025 to 2050 due to larger increases in other available water sources.

Local government is actively pursuing opportunities to increase stormwater and treated wastewater reuse, however most councils suggest reuse of treated wastewater is more viable than stormwater reuse. The volume of treated wastewater available is largely independent of climate change and will continue to increase as the population increases.

Efficient water use

As the two highest areas of water use in the Eyre Peninsula region, there is potential to explore options to save water from non-residential water use (35%) and stock water use (33%).

Data availability

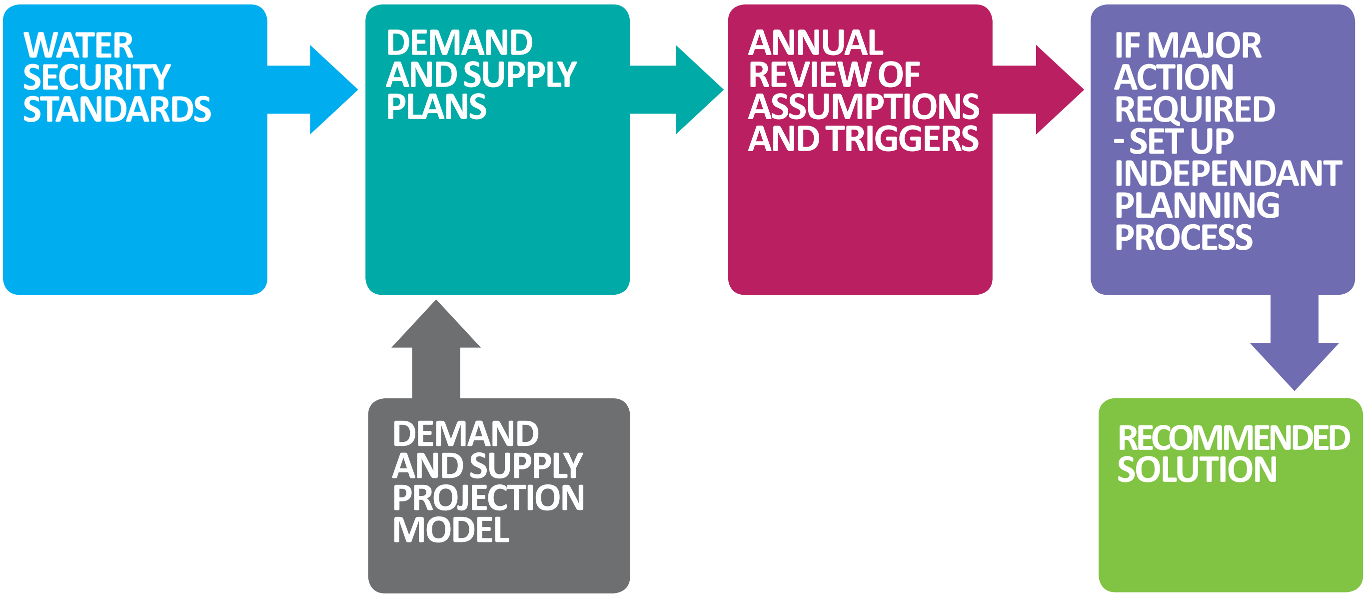
It is essential that existing water availability and potential changes in water availability are identified as soon as possible in order to understand the full potential of the water supply system and the impact of any changes to it. Over the next five years, DFW will undertake a *Groundwater Program*, which will improve understanding of the capacity of the groundwater resources; enhance groundwater monitoring, assessment and reporting processes; and minimise the risk of water supply failure.

PART 5:
STAYING ON TRACK – IMPLEMENTATION AND MONITORING

This section describes how Regional Demand and Supply Statements contribute to a broad Adaptive Management Framework to ensure the State's water supplies continue to support our economy, lifestyle and environment.

Water for Good indicates that Regional Demand and Supply Statements will be analysed and monitored as an integral part of an Adaptive Management Framework, shown below in Figure 15.

Figure 15: Adaptive Management Framework



Water security standards

South Australia will establish water security standards, which will be pre-agreed levels of service that can be assigned to a defined jurisdiction, area or water source. The standards can be based on national guidelines, state legislation or policy or agency standards. Each standard needs to be measurable with a clear level of exceedence that would trigger a decision on corrective long-term action.

Water for Good indicates the State Government will set water security standards for South Australia's water supplies. These standards will define the risk point that would threaten water supply and require decisions on options to increase supply, reduce demand, or both. They will be developed based on the following parameters:

- System water quality
- Capacity of the supply system
- Water source – including diversity, reliability and security
- Consumer efficiency
- Demand factors – population and economic growth
- Climate change
- Environmental requirements
- Cost effectiveness
- Standard of service
- Restrictions – including timing, frequency, severity and duration

Demand and supply statement projections

For each individual water demand and source of water, assumptions are made on their respective future trend based on the best available information. Start points and assumed trends are loaded, by the DFW, for each demand and supply element into the SimulAlt DSWSM, which calculates the value of each demand and supply in yearly increments. These can then be plotted in any desired combination.

Review of regional demand and supply statements

Water for Good stipulates that all regional demand and supply statements will be reviewed annually. The review process will assess the state of all water resources against the water security standards and update the demand and supply assumptions, based on latest data provided by state agencies. Areas of particular interest are likely to be actual water use, population growth, changes in water allocation and major new ventures.

When triggers are reached decisions must be made on whether or not to take corrective action. Trigger points help to ensure that decisions are cost-effective and timely. In particular, they:

- Reduce risk and identify opportunities.
- Encourage a large range of innovative solutions.
- Reduce the risk of making high-cost investments that prove to be redundant, or are delivered earlier than needed.
- Ensure demand and supply is continually monitored.

It should not be assumed that all identified demand and supply gaps will necessarily be filled by government. Should the Minister decide corrective action is needed, an independent planning process will be established to review options and recommend a solution.

Details of the annual assessment will appear in the Minister's Annual Statement, expected to be released late each calendar year.

Water for Good also proposes a more thorough review of the regional demand and supply statements is conducted every five years, which may involve field visits, stakeholder consultation and investigative studies.

Glossary

Aquifer — Underground sediments or fractured rock that hold water and allow water to flow through them. Aquifers include confined, unconfined and artesian types.

Catchment — An area of land that collects rainfall and contributes to surface water (streams, rivers, wetlands) or to groundwater.

Climate change —Variations in historic weather patterns due to increases in the Earth's average temperature resulting from increased greenhouse gases in the atmosphere.

Commercial use — Commercial uses can include, but are not limited to, automotive/equipment showrooms, food outlets, restaurants, hotels, garden centres, motels, offices, supermarkets and shops.

Demand management — An approach that is used to intentionally reduce the consumption of water through specific initiatives, normally either to conserve supplies or defer augmentations.

Desalination — The process of removing dissolved salts from seawater (or brackish water) so that it becomes suitable for drinking or other productive uses.

Drinking quality water — Water that is fit for human consumption.

Environmental water provisions – Those parts of the environmental water requirement that can be met at any given time, with consideration of existing users' rights, as well as the need for water to be taken for social and economic purposes. The environmental water provisions for Prescribed Areas do not aim to return water-dependent ecosystems to a pristine condition, but rather to ensure they are sustained (and restored, where achievable) as close as possible to the natural condition.

Groundwater — Sub-surface water, particularly that which is held in aquifers.

Irrigation — The application of water to cultivated land or open space to promote the growth of vegetation or crops.

Institutional water use – Water used for governmental, educational, social welfare, armed services, cultural activities and nature exhibitions, places of assembly, amusements and entertainments, medical and health, and other public service purposes.

Natural recharge — The infiltration of water into an aquifer from the surface (rainfall, stream flow, irrigation etc).

Prescribed Water Resource — A prescribed water resource may be surface water, groundwater, watercourse water, or a combination of these.

Prescription – Prescription establishes a framework for the sustainable management of water resources, provides more secure access to water for all water users, establishes a potentially tradable statutory water right, and recognises the environment as a legitimate user of water.

Recycled water — Water derived from wastewater systems or stormwater drainage systems that has been treated to a standard that is appropriate for its intended use.

Run-off — Precipitation that flows from a catchment area into rivers, lakes, watercourses, reservoirs or dams.

Security of supply — Reliability or surety of meeting water supply demand. Storages provide the capability to ensure a certain level of supply is available despite seasonal variations in stream flow.

Stormwater — Water that flows off properties and roads during rain events.

Surface water — water flowing over land or collected in a dam or reservoir.

Unaccounted for water – the volume of water resulting from burst mains, fire water, mains flushing, unauthorised consumption and leakage.

Wastewater — Contaminated water before it undergoes any form of treatment. The water may be contaminated with solids, chemicals, or changes in temperature.

Water allocation plan — A legal document detailing the rules for the allocation, use and transfer of water from prescribed water resources, as well as the water-affecting activities that require permits.

Water licence — Authorisation granted to a water licensee that has endorsed on it an allocation as a volume of water that the licensee is authorised to take or to hold, representing a share of water from a prescribed water resource as defined in the relevant water allocation plan.

Water sensitive urban design – An approach to urban planning that integrates the management of the total water cycle into the design of new developments to improve water use efficiency without adversely affecting lifestyle.

Abbreviations

ABS	Australian Bureau of Statistics
CWMS	Community Wastewater Management Scheme
DSWSM	Demand-Supply Water Simulation Model
DFW	Department for Water (Government of South Australia)
GL	gigalitre
GL/a	gigalitres per annum
kL	kilolitre
kL/a	kilolitres per annum
kL/day	kilolitres per day
ML	megalitre
ML/a	megalitres per annum
ML/d	megalitres per day
NRM	Natural Resources Management
NWI	National Water Initiative
PIRSA	Primary Industries and Resources South Australia (Government of South Australia)
PWA	Prescribed Wells Area
PWCMs	Permanent Water Conservation Measures
RESIC	Resource and Energy Sector Infrastructure Council
SA Water	South Australian Water Corporation (Government of South Australia)
WAP	Water Allocation Plan
WSUD	Water Sensitive Urban Design
WWTP	Wastewater Treatment Plant

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