

**South Australian Government
Submission to the Senate Rural
and Regional Affairs and
Transport Legislation Committee
Inquiry into Water Policy**



**Government
of South Australia**

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EXECUTIVE SUMMARY

Rainfall in South Australia is seasonal and highly variable over much of the State. Water resources per capita are relatively high, however, they are distributed unevenly throughout the State. Surface water in particular is highly variable in quality and distribution. Groundwater resources are more evenly distributed with fresh to brackish water found under about half of the State.

While South Australia has not over-allocated its available water resources and there has been considerable public investment in water delivery systems to farms that sees most water efficiently delivered, there are challenges facing South Australia. These include, encouraging water to move to the best economic use to maximise the wealth created for rural communities from irrigation, how to manage the threats of salinity and contributing and managing environmental water for best environmental outcomes.

Water Property Rights

Since 1997, common law rights to take water from a natural source in South Australia were replaced by statute law. Water property titles in South Australia are personal property. Licensed rights specify an allocation, limiting the quantity of water that may be taken and may specify other conditions on the manner of taking that water, and the manner of its use. As with the traditional attributes of personal property, water access rights are exclusive, transferable and can be divided, disposed of or amalgamated, are mortgagable and enforceable.

The prescription of a water resource (surface, ground or watercourse) is a means of protecting the water resource to ensure that it is not over used and that there is enough water for all water users, including the environment. Most of this State's significant water resources have been prescribed (see Appendix A).

Where a water resource is prescribed, the *Natural Resources Management Act 2004* requires that a water allocation plan be prepared. Water allocation plans set the principles or rules under which water can be allocated on water licences and principles for the transfer of water allocations are also included. The water needs of the environment must be taken into account when determining the quantity of water available for allocation for consumptive use. Aboriginal heritage and the interests of the traditional owners of any land or other natural resources must also be considered when developing a water allocation plan.

As sustainable limits for extraction are set through the water allocation planning system, licensees can be confident of a secure, perpetual share of the specified consumptive pool. South Australia's approach to reductions in allocations has been to negotiate varied allocations without compensation. The water allocation planning process has been successful in negotiating reductions where necessary.

South Australia led the nation when permanent water trading was first introduced in this State in 1983. This was the first time in Australia that water access entitlements were separated from land title. South Australia has always been and continues to be an active participant in developing interstate trade within the Murray-Darling Basin and continues to be actively involved in expanding water trading, both in a geographical and diversity of product sense as well as issues such as exchange rates and tagging. In addition to the Murray-Darling Basin trading regime, South Australia also has well developed groundwater trading markets operating in the South East, Northern Adelaide Plains and Barossa regions.

Protection of River and Aquifers

Rivers and aquifers in South Australia are protected through a number of Acts and statutory instruments. These include the *Environment Protection Act 1993* and its associated policies, the *Development Act 1993*, the *Natural Resources Management Act 2004* and the *River Murray Act 2003*. Other statutory instruments or policy documents providing protection to river and aquifers include various intergovernmental agreements, the environmental flows strategy and the wetlands strategy. As a downstream state, South Australia considers up-stream over-allocation or over-extraction to be a critical issue.

Farming Innovation

Over the past 25 years there has been an effective partnership between industry, State and Commonwealth Governments in research and development, as well as infrastructure investment for sustainable agricultural development. Significant investments are being made in South Australia to increase food exports, create innovative farming options from current 'waste' resources and improve storage ability of water to better meet user demands and environmental needs.

Monitoring Drought and Predicting Farm Water Demand

South Australia supports the National Drought Policy and the principles of self-preparedness for seasonal adversity. The State has also made a commitment to the development of the National Agricultural Monitoring System.

Implications for Agriculture of Predicted Climate Change

CSIRO climate modeling projections for South Australia are for a warming and drying trend. Agriculture in this State is vulnerable to climate change and the Government is working with communities to identify and take action on ways to reduce greenhouse gas emissions and adapt to projected climate change.

List of Recommendations

Recommendation

1. That the Australian Government support proposals that ensure that the natural variability of resources is maintained (for example, in cases of high flows, appropriate amounts need to be retained for the environment).
2. That the Australian Government use its water fund to develop appropriate mechanisms (for example, water substitutions, purchasing allocations from willing sellers) to reduce overallocation in rivers and aquifers.
3. That the Australian Government consider approaches made by States or Territories for strategic structural adjustment assistance, in those areas that require it, according to a set of pre-agreed principles.
4. That the Australian Government support tax reform to allow permanent or temporary donations of water for the environment to be recognised as "gifts" for taxation purposes.
5. That the Australian Government consider re-establishing funding schemes to help facilitate the provision of adequate water infrastructure to support sustainable regional development.
6. That the Australian Government must consider increasing funding for research into:
 - cost-effective, low-technology solutions for improving the quality of water supplies, with a focus on drinking water supplies; and
 - cost-effective wastewater services to rural and remote communities, with an emphasis on safe reuse for appropriate purposes.
7. That the Australian Government work through the NWI to reinvigorate States' commitment to water trading.
8. That Ramsar Management Plans could be used to trigger the *Environment Protection and Biodiversity Conservation Act 1999* (Cwlth) if upstream development threatens the status of a Ramsar site.
9. That investment programs such as NHT and NAP be continued as they are critical to both the ongoing success of partnership-based natural resource management and the encouragement of innovation in agricultural production and sustainable natural resource use.
10. That the Australian Government provides support to ensure equity between resource users (including the environment).
11. That the Australian Government support the allocation of at least 1500 gigalitres of water to the River Murray as environmental flows by 2018.

12. That the Australian Government assist in the progression of research into the requirements for more effective management of the Coorong, Lower Lakes and Murray Mouth.

13. That the Australian Government provide seed money or incentives for the development of products or schemes that conserve water (for example, dual water supplies).

14. That the Australian Government plays a greater role in educating the community, professionals and trades in the areas of water conservation and efficient use of water, for example by:

- educating the community about ways to conserve water; and
- encouraging industry to develop and implement new technologies that conserve water.

15. That the Australian Government further assist the investigation and coordination of regulatory approaches, which would encourage the uptake of appropriate water conserving devices or practices in rural communities.

16. That the Australian Government, in collaboration with the States and Territories, develop a more integrated and strategic approach to improve access to data. As part of this undertaking the Commonwealth consider improved monitoring in areas of hydrological significance in outback Australia.

17. That the Australian Government continues to work with the States/Territories and industry to promote the ecologically sustainable development of water resources through support of a broad range of research, development and community capacity building initiatives.

18. That the Australian Government resources appropriate Commonwealth agencies, and/or assist the States/Territories, to develop and keep up to date water resource projections/scenarios that account for climate change.

1. INTRODUCTION

In June 2004 the House of Representatives Standing Committee on Agriculture, Fisheries and Forestry presented a report – *Getting Water Right(s)-The Future of Rural Australia* – following an inquiry into future water supplies for Australia's rural industries and communities. The report concluded that "the greatest impact on future rural water supplies would come from: water allocations to the environment; water trading; and additional water 'created' through improvements in water use efficiency." The report also noted that "the most pressing issue highlighted by the majority of submissions and public hearings..... was the need for secure, perpetual water rights" and that the "Inquiry was overtaken by.....the announcement.....of the new National Water Initiative".¹

The South Australian Government submission has taken account of the policy initiatives relating to the National Water Initiative. The policies agreed to by signatories to the National Water Initiative are directly relevant to the key areas listed in the Committee's terms of reference, namely:

"The impact on rural water usage of recent water policy initiatives and the possible role for Commonwealth agencies, with particular reference to:

- a. the development of water property titles;
- b. methods of protection for rivers and aquifers;
- c. farming innovation;
- d. monitoring drought and predicting farm water demand; and
- e. the implications for agriculture of predicted changes in patterns of precipitation and temperature."²

This submission includes information regarding South Australia's water resources, legislative framework and progress in implementing water policy reforms arising out of the National Water Initiative agreement.

¹ Australia, Parliament 2004, *House of Representatives Standing Committee on Agriculture, Fisheries and Forestry, Getting Water Right(s) – the future of rural Australia*, Commonwealth of Australia, Pg vii.

² http://www.apf.gov.au/Senate/committee/rrat_ctte/rural_water/info.htm

2. SOUTH AUSTRALIA'S WATER RESOURCES

Rainfall in South Australia is seasonal and highly variable over much of the State. Figure 1 demonstrates rainfall variability and evaporation rates. Water resources per capita are relatively high, however, they are distributed unevenly throughout the State. Surface water in particular is highly variable in quality and distribution. Groundwater resources are more evenly distributed with fresh to brackish water found under about half of the State. In South Australia, groundwater makes up a greater proportion of the total water used than in other States. Figure 2 provides a summary of the amount of water being used and the use limits for each region and the State. A brief description of the key water resources of the State is provided below.

Figure 1 – Rainfall and Evaporation

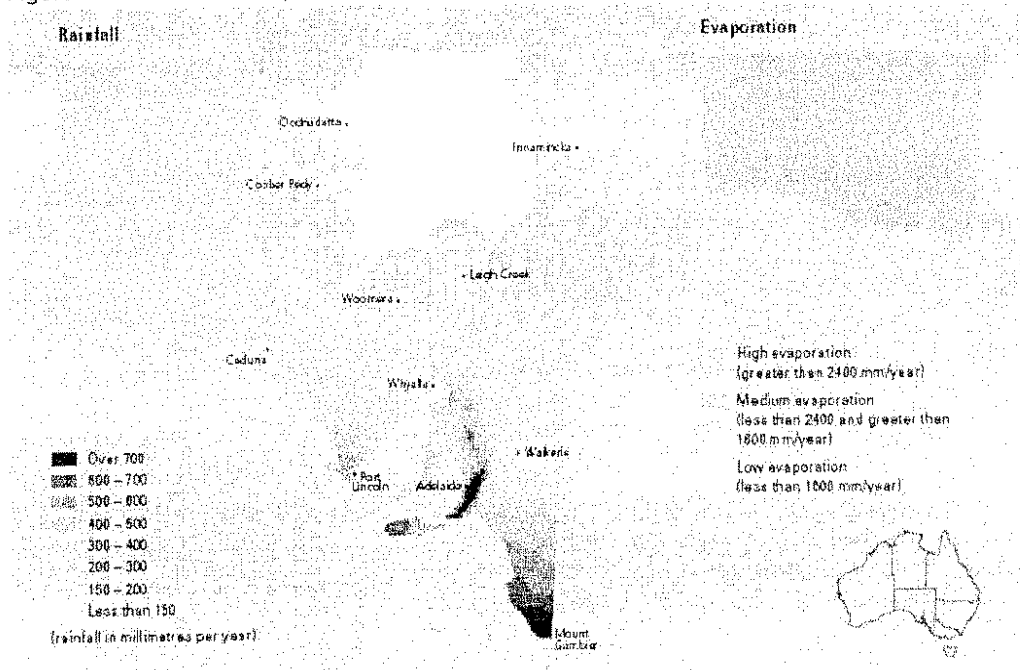
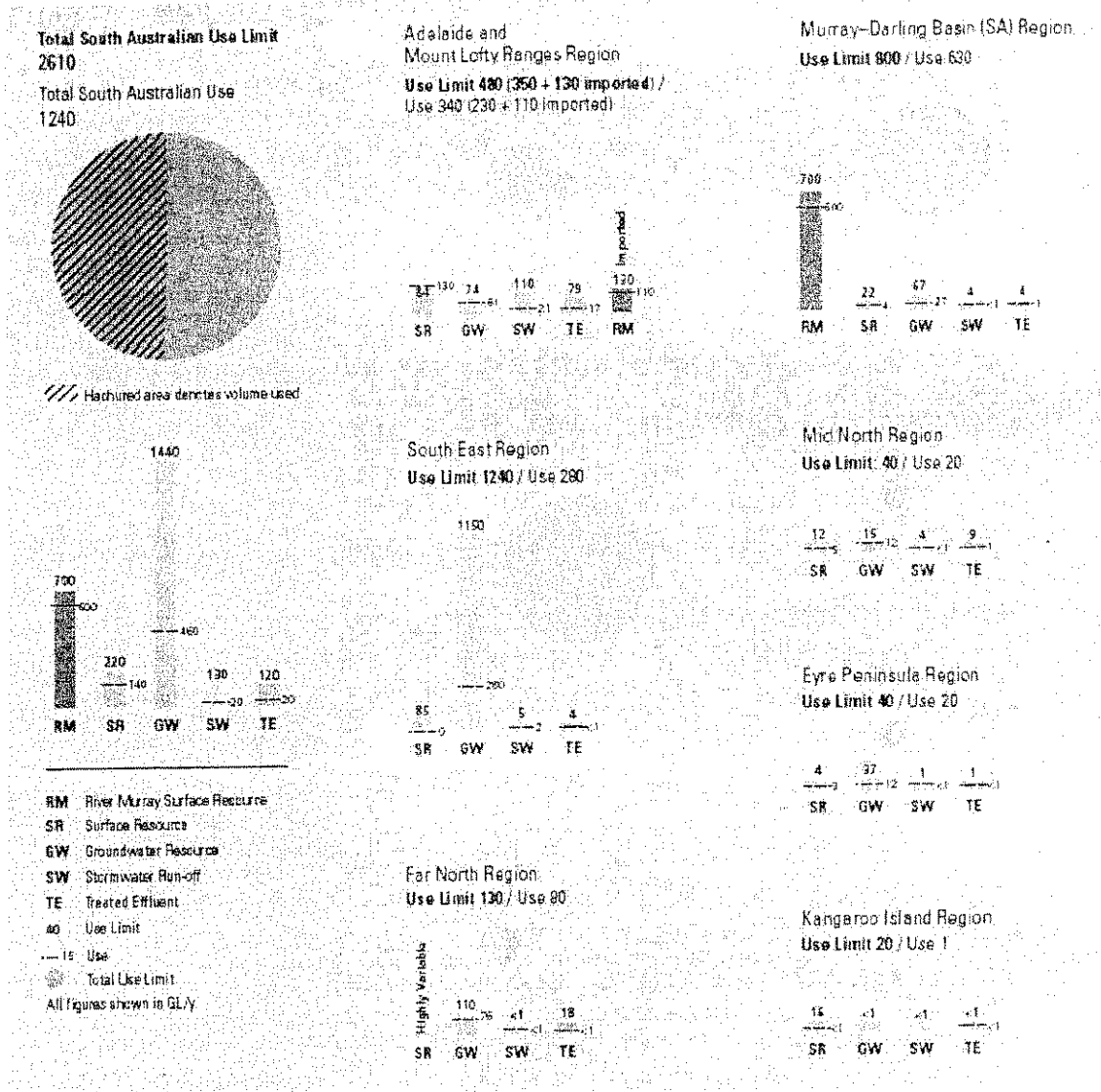


Figure 2 – State Water Quantity Limits and Use Summary



2.1 Adelaide and Mount Lofty Ranges

The high rainfall catchment areas of the Mount Lofty Ranges supply approximately 60 per cent (in an average year) of the water needs of the most intensively settled area of the State – metropolitan Adelaide. Most of the stream flows in the Western Mount Lofty Ranges Watershed catchments is captured in large reservoirs with a total capacity of 200,000 ML. The National Land and Water Audit 2000 indicated that these catchments may be 'over-developed' due to the total amount of water captured in the water supply reservoirs and farm dams.³ The South Australian State of the Environment Report 2003⁴ noted that while the estimated sustainable limit for the watershed is 44 gigalitres per year, the estimated use is 120 gigalitres per year.

³ Department of Water, Land and Biodiversity Conservation, Farm dams and Reservoir Catchments in the Western Mount Lofty Water Resource Management Area, http://www.dwbc.sa.gov.au/files/wmlr_dams.pdf

⁴ Environment Protection Authority, State of the Environment Report for South Australia 2003, Government of South Australia, November 2003, Pg 56

Over the entire region, however, the sustainable use limit is estimated to be 480 gigalitres per year with estimated use being in the order of 340 gigalitres per year.

The Mount Lofty Ranges area also has significant agricultural enterprises supported by farm dams and an unknown number of direct watercourse extractions.

Groundwater is stored within a system of either fractured rock or sedimentary aquifers and groundwater development tends to be concentrated in those areas of good quality and high yield. While groundwater resources appear to meet current levels of demand, a recent steady rising trend in well permit applications suggest a rising demand for irrigation water.

Following extensive community consultation regarding the sustainability of the water resource use throughout the Mount Lofty Ranges, the Minister for Environment and Conservation announced his decision to proceed with the prescription of the water resources in the Eastern and Western Mount Lofty Ranges in late 2005. This means that groundwater, surface water and watercourses in the Mount Lofty Ranges will be better protected and water users will have greater security of supply.

2.2 South Australian Murray-Darling Basin

"No State relies on the River Murray more than South Australia – it has shaped our landscape, our people, our way of life, and our future depends on it.....We now know that this lifeline is under serious threat because the level of water extraction has exceeded sustainable limits."⁵

South Australia is highly vulnerable to upstream use of the River Murray. As well as being essential to Adelaide's water supply (providing up to 90 per cent in a dry year) and sustaining a significant part of the South Australian economy through irrigated agriculture, the River also supports two major wetland complexes of international importance under the Ramsar Convention (the Coorong and Lower Lakes and the Chowilla Wetland complex).

1. That the Australian Government support proposals that ensure that the natural variability of resources is maintained (for example in cases of high flows, appropriate amounts need to be retained for the environment).

Water extractions from the River Murray have been controlled in South Australia since 1919. In 1968, a policy decision was made to prevent any new water allocations in order to protect the resource. In 1979 a review of allocations resulted in a reduction to the internal State allocation limit. This limit has been maintained since that time and is included in the Basin-wide cap now in place.⁶ The Murray-Darling Basin Agreement also ensures that South Australia receives an agreed

⁵ Department of Water, Land and Biodiversity Conservation, *Environmental Flows for the River Murray – South Australia's Framework for Collective Action to Restore River Health 2005-2010*, Government of South Australia, October 2005, Pg. 11

⁶ *ibid*, Pg 70

share of the available water ('entitlement flow'). The entitlement flow to South Australia is 1 850 gigalitres per year. Due to the prolonged dry conditions between 2002 and 2004, South Australia received entitlement flow or less and there was insufficient water to release through the barrages and out through the Murray Mouth. This has resulted in the need for on-going dredging of the mouth of the River and necessitated reductions in irrigation allocations between 2002-03 and 2004-05.

2. That the Australian Government use its water fund to develop appropriate mechanisms (for example, water substitutions, purchasing allocations from willing sellers) to reduce overallocation in rivers and aquifers.

The House of Representatives report – *Getting Water Right(s)-The Future of Rural Australia* – stated that variations in flow are natural and not in themselves an indicator of poor river health. While this statement is not untrue, it belies the urgency of the problems facing the River when the reality is that drought-like flows are now experienced in the lower reaches of the River Murray 60 per cent of the time, compared with 5 per cent before river regulation and development.

3. That the Australian Government consider approaches made by States or Territories for strategic structural adjustment assistance, in those areas that require it, according to a set of pre-agreed principles.

The South Australian Government takes the view that "River flows are not only essential to maintaining and improving the condition of ecological systems, but also influence water quality and the robustness of the river system to withstand extreme events such as drought. The future condition of the River Murray depends on what actions are taken now. Inaction is not an option. Further decline will not only have serious ramifications for the ecology of the river, but also for those industries and communities that depend on it."⁷

4. That the Australian Government support tax reform to allow permanent or temporary donations of water for the environment to be recognised as "gifts" for taxation purposes.

The independent report on environmental flows by the Expert Reference Panel commissioned by the Murray-Darling Basin Commission undertook a risk assessment of various flow options. The following table summarises the options that led the Murray-Darling Basin Ministerial Council to direct the Commission to undertake a comprehensive analysis of the environmental, social and economic costs and benefits associated with returning water to the River Murray system, using three environmental flow reference points for analysis (an additional average 350, 750 and 1,500 gigalitres per year).

⁷ Department of Water, Land and Biodiversity Conservation, op cit, Pg 11

ERP Risk-Based Assessment of Flow Option Packages⁸

Management Options	Probability of having a healthy working River Murray System
Do nothing more (Current operations)	LOW
A. Improved operations	LOW ¹
B. Improved operations plus 340 GL/yr new environmental flows (Murray source)	LOW ¹
C. Improved operations plus 750 GL/yr new environmental flows (Basin-wide source)	LOW-MODERATE
D. Improved operations plus 1630 GL/yr new environmental flows (Basin-wide source)	MODERATE
E. Improved operations plus 3350L new environmental flows (Basin-wide source)	HIGH

¹ Some localised ecological benefits are delivered by these options ie. for specific wetlands, floodplain forests or river reaches, but the overall system level impact was insufficient to improve the probability category

2.3 South East Regional Water Resources

The landscape of the South East region is distinguished by a series of stranded dunes and interdunal flats. From the earliest years of European settlement, the inundation of the large areas of the interdunal flats reduced economic production and in 1864 the Government commenced the construction of a drainage scheme.

The South East has three-quarters of the State's plantation forests and a third of its improved pastures. Recent expansion of forestry has resulted in forest development being included in an accountable and transparent system to manage the impact of interception of the groundwater recharge on the region's water budget. Extensive farming (including viticulture) enterprises use the confined and unconfined aquifers in the region to support a multi-million dollar industry. The region also includes Bool Lagoon and the Coorong – both Ramsar listed wetlands that provide nesting sites for migratory birds.

All of the aquifers currently used in the South East are prescribed water resources and therefore subject to a formal management regime. While there is generally ample water in the region for current enterprises, salinity issues, water quality and localised extractions have put stress on certain areas.

The groundwater resources along the South Australian-Victorian border are subject to the Border Groundwaters Agreement 1985 under which extraction from the shared groundwaters is limited to permissible annual volumes (PAVs).

2.4 Far North

Covering approximately 80 per cent of the State and made up of the SA Arid Lands and the Alinytjara Wilurara Natural Resources Management Regions, the Far North includes a number of important waterways, mound springs, wetlands and

⁸ Jones G., Hillman T., Kingsford R., McMahon T., Walker K., Arthington A., Whittington J and Cartwright S. 2002. *Independent Report of the Expert Reference Panel on Environmental Flows and Water Quality Requirements for the River Murray System*. Cooperative Research Centre for Freshwater Ecology. Report to the Murray-Darling Basin Ministerial Council, February

groundwater resources. Predominantly devoted to pastoralism, the area also supports important and extensive mining ventures, nature-based tourism and Aboriginal lands. The region features the greatest percentage of intact ecosystems and natural biodiversity of any other area of the State but with such a large land area and small population (less than 2 per cent) there are obvious challenges in managing natural resources.

Although the area can, at times, have significant surface water resources, the extreme variability limits useful harvesting. The Lake Eyre Basin and the Ramsar listed Coongie Lakes are of natural, cultural and economic importance to South Australia. In recognition of the need to maintain the important environmental, social and economic values associated with the Lake Eyre Basin, the Australian, Queensland and South Australian Governments signed the Lake Eyre Basin Inter-governmental Agreement on 21 October 2000. The Northern Territory became a party to the Lake Eyre Basin Agreement on 10 June 2004. The Agreement provides for the sustainable management of the water and related natural resources associated with cross-border river systems in the Lake Eyre Basin to avoid downstream impacts on associated environmental, economic and social values and incorporates a number of guiding principles that recognise the significance of the Lake Eyre Basin.

The Great Artesian Basin provides a large portion of the available groundwater in the area. While generally potable, it does vary in quality and has a high bicarbonate content, which makes it unsuitable for irrigation. A well rehabilitation program has been operational in South Australia for some years. While this has improved the long-term sustainability of this important resource, past extraction rates have caused groundwater pressures to decline.

Other smaller groundwater resources within the region (Eucala, Officer, Curdimuka and Muloorina) supply mining operations, Aboriginal communities, townships and stock.

2.5 *Eyre Peninsula*

Annual rainfall in the Eyre Peninsula region ranges from 200 mm to 500 mm and occurs mostly during winter months. There are few useful surface water resources, although there are significant groundwater resources in localised areas. The Southern Basins and Musgrave Prescribed Wells Areas provide 97 per cent of the region's reticulated water supply.

"Farming, particularly cereals and sheep, is the main [agricultural] activity of the region. The Eyre Peninsula Region produces over one-third of all wheat grown in the State, 25 per cent of the barley and 40 per cent of the oats."⁹

⁹ Department for Water Resources, *op cit*, Pg 128

Eyre Peninsula also has more than twenty identified wetlands, covering some 60,000 hectares. Eleven are listed as nationally significant, however the current state of the region's water dependent ecosystems still requires investigation.¹⁰

The scarcity of water resources in this region means that careful management of existing supplies and future expansion is required. Water conservation measures applying to a range of household, rural and commercial water uses have been in place in this region since 2002 due to diminished local supplies.

In May 2005, the South Australian Government announced a new pipeline to the Eyre Peninsula to deliver up to 2.3 gigalitres of water to more than 15,000 residents. The 90km pipeline running from Iron Knob to Kimba, will supplement local water resources on Eyre Peninsula and will complement regional community desires and initiatives to conserve the resource and move towards water recycling programs.

Longer-term options for desalination are being investigated to supply new demands for mining and other regional development purposes. Desalination could also be used to supply water to Whyalla, which is currently reliant on the River Murray.

5. That the Australian Government consider re-establishing funding schemes to help facilitate the provision of adequate water infrastructure to support sustainable regional development.

6. That the Australian Government must consider increasing funding for research into:

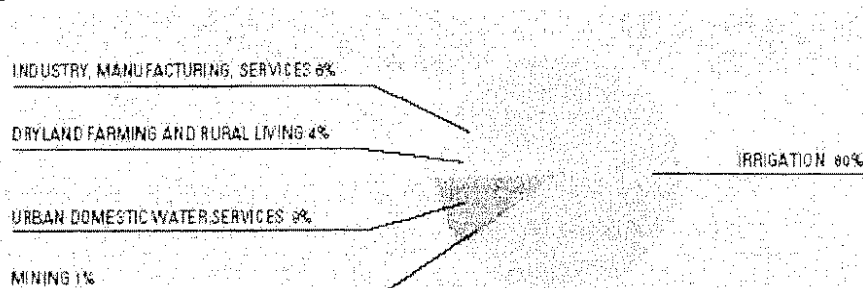
- * cost-effective, low-technology solutions for improving the quality of water supplies, with a focus on drinking water supplies; and
- * cost-effective wastewater services to rural and remote communities, with an emphasis on safe reuse for appropriate purposes.

¹⁰ Eyre Peninsula Natural Resources Management Group, Regional Natural Resources Management Plan 2004-2007, January 2004, Pg 16.

3. THE IMPACT ON RURAL WATER USAGE OF RECENT WATER POLICY INITIATIVES

Historically, South Australia has taken a conservative approach in allocating water resources, particularly from the River Murray. Most water resource extractions in South Australia are used for irrigated agriculture. Figure 3 shows the approximate percentages of water use in South Australia. According to the Australian Bureau of Statistics, within the agriculture grouping 'livestock pasture, grains and other agriculture' and dairy farming together consumed approximately 64 per cent of the volume used for irrigation.¹¹

Figure 3 – Water Use in South Australia



Agriculture, forestry and fishing accounted for 6.2 per cent of Gross State Product in 2003-04¹² but total agriculture related exports amount to \$3.7 billion or around half (49 per cent) of the State's merchandise export value of \$7.6 billion¹³. The irrigation industry in South Australia is significantly more efficient than some upstream. For example, the New South Wales Murray region uses more than 2000 gegalitres to irrigate 321 000 hectares of land to produce irrigated revenue of about \$310 million. The Riverland in South Australia uses 311 gegalitres to irrigate 36 000 hectares of land to produce irrigated revenue of \$555 million. That is, one sixth of the water on one tenth of the land area in the Riverland produced 1.8 times the revenue.¹⁴

As noted by Professor Peter Cullen as part of his 'Thinker in Residence Report', "South Australia has not over-allocated the available water [in the River Murray] in the same way as some upstream States have done.....There has been considerable public investment in water delivery systems to farms that sees most water piped, rather than transported in open channels"¹⁵. Notwithstanding this solid foundation, there are challenges facing South Australia. These include:

- encouraging water to move to the best economic use to maximise the wealth created for rural communities from irrigation;

¹¹ Australian Bureau of Statistics, *Water use - Australian economy consumes 50 Sydney harbour's*, ABS 4610.0. Media Release, 19 May 2004

¹² Australian Bureau of Statistics, Catalogues No 5220.0 and 6291.10.0.001

¹³ Government of South Australia, *The 2004-05 Food South Australia Scorecard*, Primary Industries and Resources SA

¹⁴ Commonwealth of Australia, *Irrigation in Perspective – Irrigation in the Murray and Murrumbidgee Basins*, CSIRO Land and Water, Cooperative Research Centre for Irrigation Futures, 2005

¹⁵ Cullen, Peter, *Water Challenges for South Australia in the 21st Century*, September 2004, Pg 22

- how to manage the threats of salinity; and
- contributing and managing environmental water for best environmental outcomes.

These challenges are being addressed through a number of policies, programs and projects and are fundamental to many of the commitments made as part of the *Intergovernmental Agreement on a National Water Initiative*.

3.1 The development of water property titles (water access entitlements)

South Australia became a signatory to the *Intergovernmental Agreement on a National Water Initiative* (NWI) in June 2004. Key work areas for the implementation of actions of the NWI for 2005-06 for water access entitlements and planning frameworks as outlined in Schedule A of the NWI include:

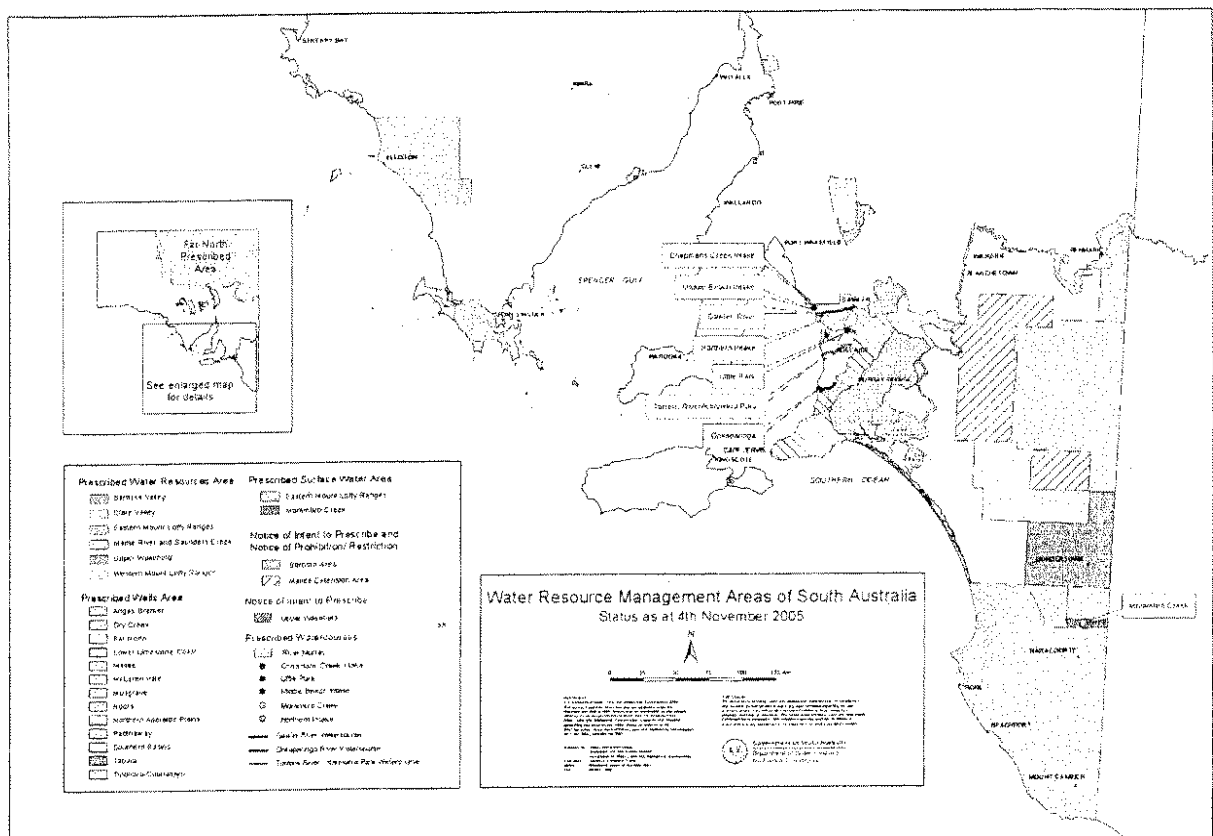
- substantial completion of plans to address any existing over-allocations for all river systems and groundwater resources;
- defining and implementing water access entitlements;
- water plans to include the definition, provision and management of water to meet environmental and other public benefit outcomes;
- substantially addressing over-allocation as per National Competition Council commitments;
- implementation of risk assignment framework for all changes in allocation not provided for in over-allocation pathways in water plans; and
- water plans to address indigenous water issues.

Since 1997, common law rights to take water from a natural source in South Australia were replaced by statute law. The *Water Resources Act 1997* set out the rights to access and take water. Rights exist in a number of degrees, from a basic, unlicensed right of a landowner or occupier to take water for stock and domestic use through to the right of a licence holder to take a particular volume of water from a prescribed resource (water property titles). In July 2005 The *Natural Resources Management Act 2004* (the Act) replaced the *Water Resources Act*, however the provisions relating to water access entitlements have not been altered.

Water property titles in South Australia are personal property. Licensed rights specify an allocation that limits the quantity of water that may be taken and may specify other conditions on the manner of taking that water and the manner of its use. As with the traditional attributes of personal property, water access rights are exclusive, transferable, can be divided, disposed of or amalgamated and are mortgagable and enforceable.

Prescription of a water resource (surface, ground or watercourse) is a means of protecting the water resource to ensure that it is not over-used and that there is enough water for all water users, including the environment. Most of this State's significant water resources have been prescribed (see figure 4).

Figure 4 – Prescribed Water Resources in South Australia



A decision to prescribe a resource is made only after consulting with the community and investigating the economic, social and environmental implications of prescription on the region. Once a water resource is prescribed, most people who take water from that prescribed resource will need a licence to do so. Stock and domestic use is usually exempted from licensing requirements. Further information regarding prescription of water resources can be found in Appendix A.

Where a water resource is prescribed, the Act requires that a water allocation plan be prepared. Water allocation plans¹⁶, amongst other things, set the principles or rules under which water can be allocated on water licences and principles for the transfer of water allocations are also included. The water needs of the environment must be taken into account when determining the quantity of water available for allocation for consumptive use. The Act also requires that consideration be given to Aboriginal heritage and to the interests of the traditional owners of any land or other natural resources when developing a water allocation plan.

As sustainable limits for extraction are set through the water allocation planning system, licensees can be confident of a secure, perpetual share of the specified consumptive pool.

¹⁶ Part of the planning hierarchy established by the Act, which includes the higher order State Natural Resources Management Plan (previously the State Water Plan) and Regional Natural Resources Management Plans (previously catchment water management plans).

South Australia's approach to reductions in allocations has been to negotiate varied allocations without compensation. The water allocation planning process requires significant community input and buy-in. The process has been successful in negotiating reductions where necessary and has resulted in innovative approaches to resource supply issues. For example, in the late 1990's, extraction levels in the McLaren Vale Prescribed Wells Area (McLaren Vale PWA) were identified as being of concern and investigations undertaken during the development of the water allocation plan identified the need to reduce allocations. While there was understandable community concern at the time, an open and consultative process led to an agreed strategy for reductions in allocations. This also encouraged innovation in that local irrigators worked together to construct a pipeline from the nearest wastewater treatment plant (Christies Beach). The use of treated effluent imported from the Christies Beach Wastewater Treatment Plant for irrigation of horticultural crops is now widespread through the McLaren Vale PWA. At present, irrigators use between 2,200 and 4,220 megalitres of treated effluent each year in the Sellicks, Aldinga, Maslin Beach, Willunga and McLaren Vale areas.

A well-developed water trading scheme is also critical for balancing economic development with resource availability. Allowing water access entitlements to move between users in an open market mechanism ensures that the water allocated for consumptive use progressively moves to higher value uses. This not only results in greater production from the same (or less) volume of water, but also accrues environmental benefits where water is traded from degraded areas and/or low value low efficiency production to areas more suited to irrigation using improved management practices on higher value crops.

7. That the Australian Government work through the NWI to reinvigorate States' commitment to water trading.

South Australia led the nation when permanent water trading was first introduced in this State in 1983. This was the first time in Australia that water access entitlements were separated from land title. South Australia has always been and continues to be an active participant in developing interstate trade within the Murray-Darling Basin and continues to be actively involved in expanding water trading, both in a geographical and diversity of product sense as well as issues such as exchange rates and tagging. In addition to the Murray-Darling Basin trading regime, South Australia also has well developed groundwater trading markets operating in the South East, Northern Adelaide Plains and Barossa regions.

Naturally, water can only be traded within identified physical, social and environmental constraints. The water "Transfer Criteria" are clearly explained in the relevant Water Allocation Plans for all prescribed areas detailing the general principles applying to the transfer of surface and/or groundwater within that area.

A water trading website has been developed to provide useful water trading market information. The site details every water trade in the current financial year for every prescribed area in South Australia and the information is updated on a daily basis. In addition, annual summaries of water trading activities in the prescribed areas are

provided for every year from 2000-2001. The website also allows potential buyers and sellers to post advertisements for their respective water requirements. This is a free service and "Wanted to Buy" and "For Sale" advertisements remain on the site for eight weeks. Work is also progressing on making the water licensing system available on the Internet.

South Australia is keen to expand water trading in the Murray-Darling Basin. To this end, South Australia has met the first NWI water reform milestone by implementing the 4 per cent interim trade rule¹⁷ for all of the State's major irrigation trusts. This reform was agreed and operational as at 1 July 2005.

A report has been prepared identifying what needs to be done to introduce a low security water product into South Australia. The necessity for such a product will depend, to some extent, on outcomes of the extended water trading regime within the Murray-Darling Basin. South Australia has also been an active participant in developing exchange rates to facilitate expanded trade throughout the Murray-Darling Basin. This is an important reform that may further enhance the value of production from available water resources and needs to be urgently resolved to facilitate effective implementation of the Living Murray Initiative.

South Australia continues to be an active participant on the Murray-Darling Basin Commission Interstate Water Trading Project Board, working with the Commission and the other jurisdictions to expand the geographical extent of interstate trade, as well as the number of water products being traded.

3.2 *Methods of protection for rivers and aquifers*

Rivers and aquifers in South Australia are protected through a number of Acts and statutory instruments.

8. That Ramsar Management Plans be used to trigger the *Environment Protection and Biodiversity Conservation Act 1999* (Cwlth) if upstream development threatens the status of a Ramsar site.

Environment Protection Act 1993

The *Environment Protection Act 1993* (EP Act) is the primary pollution control legislation in South Australia. Broadly, the EP Act aims to:

- ensure that measures are taken to protect, restore and enhance the quality of the environment according to the principles of ecologically sustainable development (ESD);
- promote these ESD principles.

¹⁷ Paragraph (63ii)(b) of the *Intergovernmental Agreement on a National Water Initiative* (NWI)

The Environment Protection Authority (EPA) is responsible for administering and enforcing the Act and its subordinate legislation, including environment protection policies (EPPs) and associated codes of practice. The EPA has responsibility for protection of air and water quality, control of pollution, waste and noise, and protection and enhancement of the environment.

The *Environment Protection (Water Quality) Policy 2003* (Water Quality EPP), which came into operation on 1 October 2003, aims to achieve the sustainable management of South Australian waters by protecting or enhancing water quality while allowing economic and social development. The Water Quality EPP provides South Australia with a consistent approach to the management of water quality and brings the State in line with the National Water Quality Management Strategy.

The Board of the Environment Protection Authority produces a State of the Environment (SoE) Report every five years. The SoE Report 2003 identified salinity as the most serious water quality issue facing South Australia, particularly its impacts on River Murray ecosystems, irrigation and drinking water supplies. Reduced flows and increasing salinity are stressing ecosystems and irrigation in many of the State's other rivers and streams. Development in the Mount Lofty Ranges has resulted in significant pressures on water quality in the rivers and streams, particularly in the watershed that provides much of Adelaide's water supplies. Other significant pollution pressures on the State's waters include nutrient and bacterial pollution of the lower River Murray, nitrate and pesticide pollution of South East groundwaters and the degradation of Lake Bonney, South East.

Murray-Darling Basin Agreement – Salinity Management

Under the Murray-Darling Basin Agreement and Schedule C to the Agreement, South Australia is required to ensure that any actions taken since 1988 that may increase River Murray salinity (salinity debits) are fully offset by actions that reduce salinity (salinity credits). New irrigation development is the major contributor to increased salinity impacts. To meet the salinity obligations, South Australia has:

- *Implemented salinity impact zoning.* Some potential irrigation development locations will result in much greater salinity impact than others. High salinity impacts generally correspond to locations either (or both) close to the River, and where groundwater salinity is high. Salinity zoning policy aims to direct new irrigation development to low salinity impact locations (or to locations where salinity impacts can be offset) through the allocation of salinity credits. Further information can be found in Appendix B.
- *Established a salinity accounting system to record both salinity credits and debits.* Debits are generated when irrigation increases the rate of saline groundwater drainage to the River. Credits arise from actions that reduce saline groundwater drainage, such as irrigation headworks rehabilitation, improved irrigation management and salt interception. South Australia's salinity account is currently in credit. The account will move to debit as delayed impacts of irrigation development are fully expressed, however further salinity management action is being investigated to offset these prospective impacts.

- *Accelerated construction of salt interception schemes.* Salt interception schemes reduce inflow of saline groundwater into the River Murray. The schemes also control watertable levels on the River floodplain, thereby providing environmental benefits, and underpin sustainable irrigation development by preventing saline irrigation drainage from impacting the River and the floodplain. In addition to local benefits, the schemes allow South Australia, Victoria and New South Wales to discharge salt to the River up to their share of benefits from the schemes. The schemes are critical for the achievement of the 800 EC River Murray water quality target and for economic development targets in the *State Food Plan*¹⁸ and *Wine: A Partnership*¹⁹, which require increased production in the Riverland. The schemes are monitored through a range of river salinity measurement strategies including annual 'run-of-river' surveys that pinpoint salt intrusion at a fine scale and increasingly, the use of remote sensing (and under water) technologies.

Natural Resources Management Act 2004

The *Natural Resources Management Act 2004* (NRM Act), which came fully into operation on 1 July 2005, is the first step in ground-breaking legislative reform that heralds a new era of integrated natural resource management in South Australia. Bringing together the legislative controls relating to land management, pest animal and plant control and water resource management, the legislation sets a hierarchy of plans (State, regional, local) that work together to preserve and enhance environmental values, using a triple-bottom line and community engagement approach. This participation model also provides for partnership between Commonwealth, State and local governments and the community.

9. That investment programs such as NHT and NAP be continued as they are critical to both the ongoing success of partnership-based natural resources management and the encouragement of innovation in agricultural production and sustainable natural resource use.

The State Natural Resources Management (NRM) Plan provides state-wide policy for water for the environment within a framework of integrated policies for the management of all water-dependent ecosystems, including wetlands, riparian zones, floodplains and estuaries.

Regional NRM plans, amongst other things, set out goals for the region's natural resources, providing a basis for government and community investment in the management of the resources.

Where a water resource is prescribed, the NRM Act requires that a water allocation plan be prepared. Water allocation plans set the principles or rules under which water can be allocated on water licences and principles for the transfer of water

¹⁸ Food South Australia, *South Australian State Food Plan 2004 – 2007*, Government of South Australia, September 2004

¹⁹ South Australian Wine Industry Council, *Wine: A Partnership 2005-2010*, Government of South Australia, February 2005

allocations are also included. The water needs of the environment must be taken into account when determining the quantity of water available for allocation for consumptive use.

Another key feature of the NRM Act is the links it has to the *Development Act 1993*. Both Acts work together in recognition of the importance of land-use planning to the management of natural resources.

River Murray Act 2003

The *River Murray Act 2003* came into operation on 24 November 2003. For the first time in Australia's history, the River Murray has special protection under its own legislation, in recognition of the importance of the River to all South Australians.

The object of the Act is to achieve a healthy working River Murray system, sustaining communities and preserving unique values, by ensuring that development and other activities with an effect on the River are ecologically sustainable, and undertaken in a way that does not harm the River.

The purpose of the Act is to provide coordination of and fill the gaps between the many other Acts applicable to the management of the catchment and its resources. One of the cornerstones of the Act is the referral system, which was designed to be well integrated with existing referral and activity approval systems under other legislation, including the *Development Act 1993*.

Save the River Murray Fund

"The Save the River Murray Levy was introduced on 1 October 2003 under the *Waterworks Act 1932* and establishe[d] the *Save the River Murray Fund*, which is held by the Minister for the River Murray..... The levy is charged to all SA Water customers across the State [and raises approximately \$20 million per annum, which is indexed annually].

[The Fund] contributes to a program of works and measures to address the declining health of the River Murray in South Australia and increasing community demands for a high security of good quality water for urban and irrigation purposes. The program, known as the River Murray Improvement Program, is integrated within a larger program of works and measures formulated with the Murray-Darling Initiative program and the South Australian River Murray Salinity Strategy."²⁰

By introducing the levy, the South Australian Government has been able to leverage funding commitments from the Governments of New South Wales, Victoria and the Australian Capital Territory, together with the Australian Government, of \$500 million over five years. Funds raised will also provide South Australia's contribution to the Living Murray Initiative's *First Step* decision to return 500 gigalitres of water over five years to the river system and help to achieve the longer term target of 1500 gigalitres in South Australia's Strategic Plan.

²⁰ Government of South Australia, *Save the River Murray Fund Annual Report 2003-04*, May 2005, Pg 1

Environmental Flows Strategy

There have been a number of significant Government policies specifically designed to protect key resources. For example, one of the sustainability targets in *South Australia's Strategic Plan* is the return of 500 gigalitres of environmental flows to the River Murray.²¹ The recently released strategy *Environmental Flows for the River Murray - South Australia's framework for collective action to restore river health 2005-2010* is principally concerned with the delivery and management of flows to priority ecological assets in South Australia, as one critical input to the overall management of river health. The strategy builds on existing River Murray plans and management initiatives and provides strategic direction to the management of environmental flows in the River Murray in South Australia. The strategy will assist South Australia to meet its commitments to the Murray-Darling Basin Ministerial Council's *The Living Murray First Step* decision, to return around 500 GL of water on average per year of environmental flows to the River Murray by 2009, and beyond. While supporting the *First Step* decision, South Australia will continue to advocate for additional flows of at least 1500 gigalitres by 2018, as this is the only one of the three reference points chosen by the Ministerial Council for discussion that is classed as having a moderate likelihood of success in achieving a working healthy river from an ecological perspective²². The health of the River Murray is essential for community wellbeing, safeguarding future generations and the State's prosperity.

10. That the Australian Government provides support to ensure equity between resource users (including the environment).

11. That the Australian Government support the allocation of at least 1500 gigalitres of water to the River Murray as environmental flows by 2018.

12. That the Australian Government assist in the progression of research into the requirements for more effective management of the Coorong, Lower Lakes and Murray Mouth.

Wetlands Strategy

In 2003, the Government released the *Wetlands Strategy for South Australia*, recognising that wetlands are an essential part of the State's natural assets. The goals and objectives of the Strategy work with existing policy instruments to guide a whole of government approach to the management, protection and creation of wetlands. The strategy particularly recognises the importance of partnerships between governments, industry, land-holders, researchers and communities and a recent example of the success of such cooperative arrangements can be found on the Chowilla Floodplain. One of the six icon sites under the *Living Murray Initiative*, Chowilla has an area of 17 700 hectares and is one of the last remaining parts of the

²¹ Government of South Australia, *South Australia's Strategic Plan*, March 2004, Target 3.1

²² Murray-Darling Basin Ministerial Council, *The Living Murray - A discussion paper on restoring the health of the River Murray, Stage 1: Informing and engaging the community*, July 2002, Pg 29

lower Murray floodplain that has not been used for irrigation, so it retains much of the area's natural character and attributes.

The Chowilla floodplain is part of the South Australian Riverland area designated as a Wetland of International Importance under the Ramsar Convention. It is recognised as being nationally significant because it has a high diversity of vegetation communities and contains wetlands in a semi-arid environment.

The interim objective for this area under the First Step is to maintain the high biodiversity values of the Chowilla Floodplain. The expected outcomes of actions include:

- high value wetlands maintained;
- current area of River Red Gums maintained; and
- at least 20 per cent of the original area of Black Box vegetation maintained.

In 2004-05, an agreement was reached to remove domestic grazing animals from the Chowilla Floodplain to enhance the conservation of this significant ecological asset and assist in vegetation management. This was a critical step in improving management of the floodplain and would not have occurred without a spirit of cooperation and partnership between all parties.

Successful watering projects have also been undertaken on the Chowilla Floodplain using interim prioritisation criteria, with thirteen sites watered during 2004-05. An annual watering plan is currently being developed for 2005-06. Weir pool raising and lowering trials were also held and indications are that the benefits of seasonal weir pool raising and lowering trials include an increase in the zone of aquatic vegetation, increased breeding opportunities for fauna and a more nutritious bottom-of-the food chain biofilm composition for aquatic invertebrates.

Mining and Petroleum

Extractive activities such as mining are governed by separate legislation. Under the *Petroleum Act 2000*, the protection of aquifers is an explicit requirement as part of the Statement of Environmental Objectives whereby aquifers must be isolated to prevent commingling.

Regulations associated with the *Mining Act 1971* require that holders of an Exploration License conduct operations in accordance with a program designed to prevent pollution to or contamination of surface or underground waters and ensure that, in drilling or other underground investigations, no interconnection between groundwater aquifers occurs.

Holders of a tenement that authorises the production of minerals (a Minerals Lease) are required to develop and have approved a Mining and Rehabilitation Program (MARP). When developing a MARP, the environmental impacts of mining activity are extensively assessed and appropriate control and remediation measures introduced to ensure that such impacts cause minimal disturbance to the



environment. In developing the MARP, statutory requirements under other legislation, such as the *Natural Resources Management Act 2004* and the *Environment Protection and Biodiversity Conservation Act 1999* (Cwlth) are included as conditions of the program.

Constant attention is given to innovation in the allocation of scarce resources such as water. For example, research into alternative water sources such as desalination for major projects has a focus on the complementary usage of water. This will lead to infrastructure development that may reduce the State's reliance on existing supplies such as the River Murray or groundwater.

3.3 *Farming Innovation*

Over the past 25 years there has been an effective partnership between industry, State and Commonwealth Governments in research and development, as well as infrastructure investment for sustainable agricultural development. Starting in the early to mid eighties with the River Murray Salinity and Irrigation Program and continuing with support from the Murray-Darling Basin Commission's Natural Resources Management Program and the National Action Plan for Salinity and Water Quality, South Australia has been a leader in improving agricultural water use. The State has achieved this by building up an understanding of soil properties, the performance of irrigation systems and irrigation scheduling. The impact can be seen by the relatively low level of inefficient (flood) irrigation systems in South Australia compared to that in upstream States.²³

Improvements in headworks and the installation of pressurised pipelines that allowed 'water on demand' for irrigation, increased management control have enabled the delivery of major benefits to individual farming enterprises, regional economies and the environment. These benefits have been extended beyond the River Murray in South Australia by active collaboration through local and interstate networks to ensure that the maximum return is received on the research and development effort expended.

13. That the Australian Government provide seed money or incentives for the development of products or schemes that conserve water (for example, dual water supplies).

14. That the Australian Government plays a greater role in educating the community, professionals and trades in the areas of water conservation and efficient use of water. It could also encourage community participation, for example by:

- * educating the community about ways to conserve water; and
- * encouraging industry to develop and implement new technologies that conserve water.

²³ Commonwealth of Australia, *Irrigation in Perspective*, op cit

Active management of South Australia's water resources through the prescription of resources has allowed for better integration of programs and monitoring of outcomes. For the irrigated agriculture sector this has resulted in the confidence and ability to set challenging and objective targets for water use efficiency. The majority of irrigators on the River Murray, for example, have achieved or are actively working to achieve 85 per cent water use efficiency (65 per cent on the flood irrigated Lower Murray Reclaimed Irrigation Areas).

South Australia's Strategic Plan has set specific targets for both sustainability and growing prosperity through export growth in the food and wine sector. One of the targets in the Plan is to "treble the value of South Australia's export income to \$25 billion by 2013....[the achievement of which will be assisted by] industry-agreed sectoral goals...includ[ing] \$7.5 billion by 2013 by the food industry in meeting the Food Plan target, over \$3 billion nationally by the wine industry by 2010.....Minerals will also contribute to the overall target by achieving ambitious exploration and processing targets."²⁴

The irrigated agriculture sector contributes about 45 per cent of South Australia's food and beverage revenue. There is a challenge for the State to maximise the productivity of existing water use and to plan for sustainable development of the sector into the future.

15. That the Australian Government further assist the investigation and coordination of regulatory approaches, which would encourage the uptake of appropriate water conserving devices or practices in rural communities.

Food ScoreCard

In order to assist in this task the Department of Primary Industries and Resources SA (PIRSA) developed the Food ScoreCard in 1999 to evaluate the contribution made by the food and beverage industry to South Australia's economy from production to consumption. It provides baseline data to measure the food industry's achievements and to track its progress towards its \$15 billion target by 2010. It also identifies opportunities for future growth.

The ScoreCard monitors all food and beverages, either produced or consumed in South Australia, with detailed analysis on key points along the food value chain. The industry is tracked under the main producing categories: Field crops, horticulture, livestock, dairy and seafood. A separate wine ScoreCard is also produced. Measures used to value the agri-food industry include local farm production values; value-added processing; overseas and interstate trade exports and imports at both the commodity and processed level, as well as consumption through food retail and food hospitality. The ScoreCard analyses both the volume and value of sales at each stage and also looks at economic performance indicators, such as employment and capital investment.

²⁴ Government of South Australia, *South Australia's Strategic Plan*, op cit, Pg 4-5, Target 1.12

The Food ScoreCard has recently been expanded to include triple bottom line reporting, measuring environmental and social impacts in addition to economic impacts. The aim is to provide a set of generic indicators that track economic growth, including employment, skills development and wage levels and sustainable use of natural resources - energy, land, air quality and water.

Within the context of current water policy initiatives, South Australia will use the Scorecard to assist in examining the opportunities for sustainable growth of the irrigated agriculture sector and monitoring the economic efficiency of the sector over time.

Aquaculture

South Australia is also investigating aquaculture as an innovative means of maximising water use efficiencies through such projects as the South Australian Research and Development Institute's Waikerie Inland Saline Aquaculture Centre (WISAC) and agri-aquaculture.

The WISAC will evaluate the commercial aquaculture potential of selected species and culture systems using groundwater from the Woolpunda/Waikerie/Qualco salinity interception scheme that currently discharges into the Stockyard Plains Disposal Basin. The use of this currently wasted water resource for aquaculture has the potential to offer commercial benefits to the community.

This project forms part of the broader proposal for a project entitled Bio-saline Futures Australia submitted to the Water Smart Australia Programme in June 2005. The proposal aims to demonstrate the effective and economic use of inland saline water resources to deliver triple bottom line benefits to regional Australia and will examine the use of water from the salinity interception scheme for not only aquaculture, but also extensive agriculture production systems that utilise saline water resources.

Agri-aquaculture, or the integration of aquaculture with traditional farming systems to utilise "waste" water resources, also has the potential to enhance farm productivity and water-use efficiency and is being further promoted in South Australia.

Upper South East Dryland Salinity and Flood Management Program

The Upper South East Dryland Salinity and Flood Management Program (USE Program) was developed in the early 1990s to address dryland salinity, waterlogging and ecosystem fragmentation and degradation. Measures adopted to address these concerns include drainage, saltland agronomy, revegetation and wetland management.

The Upper South East region covers over 680,000 hectares, with over 430 farm businesses based mainly on sheep and cattle grazing along with significant cropping enterprises. Large scale clearing of native vegetation was undertaken between 1949 and 1965, with much of this land being successfully sown down to Hunter River lucerne. During the 1970s about 50 per cent of USE pastures were lucerne, important not only for its productive value but also as an effective means of reducing groundwater recharge.

Salinity is not a new issue in the Upper South East, but it became an increasing problem with the demise of the lucerne following aphid infestations in 1978 and with the advent of widespread flooding in 1981 and again in 1988. As a result, dryland salinity currently affects about 250,000 ha of the Upper South East with a further 160,000 ha at risk. To control dryland salinity there must be a balance between the rainfall that enters the ground and that which leaves by run-off, evaporation and transpiration from plants. If these components are not in balance, the excess water will drain down into the groundwater (recharge), dissolving salts from within the soil regolith. If groundwater later finds its way to the surface somewhere else in the landscape (discharge), the salt comes with it. When the water evaporates, the salt remains.

Dryland salinity in the Upper South East, which represents approximately 80 per cent of the salinity in South Australia, is closely associated with flooding. The inter-dunal flats that characterise the region are particularly prone to inundation in years of above average rainfall. Not only does this inundation damage crops, pastures and infrastructure, it also recharges the saline groundwater system that is close to the ground surface in many areas.

The Upper South East also features numerous wetlands, some of which are of high conservation significance. The Coorong National Park, with its Ramsar listed wetland, other important wetlands including Watervalley and those along Bakers Range, Marcollat, Duck Island, West Avenue Range and Tilley Swamp Watercourses provide habitat for at least 79 species of waterbird.²⁵

Prior to European settlement, up to half of the South East would experience winter flooding, with surface water flowing slowly in a north-west direction along inter-dunal watercourses. Water flowed the full length of the watercourses only in very wet years, but generally formed lakes, lagoons and swamps that would often dry out in summer.

Unwanted water – surface water and saline groundwater – is the focus of the Upper South East Dryland Salinity and Flood Management Program, with the drainage scheme playing an essential role in removing this water from a very flat landscape.

²⁵ Government of South Australia, *Wetlands – Managing our Wonderful Wetlands*, Upper South East Dryland Salinity and Flood Management Program Fact Sheet

Native vegetation is very efficient at reducing groundwater recharge (and thereby helping to control flooding and salinity) and this has been a driving force behind the revegetation programs implemented in the Upper South East. The region's large areas of remnant vegetation perform a similar function, while at the same time contributing far more to biodiversity than we can ever expect from revegetation. This resource must therefore be managed sustainably with the aim of enhancing it where it has already degraded.

The clear connection between the drainage scheme and need to protect biodiversity provided the unique opportunity to develop the 'Drainage Levy – Biodiversity Conservation' scheme. This scheme is now being implemented, which provides landholders with the option of off-setting their levy payment by entering into a management agreement to improve the protection and enhancement of biodiversity values on their property.

The Scheme is intended to function as a lever to encourage landholders with biodiversity assets located on their property to place these assets under a Management Agreement and to raise the standard of management of these areas specifically for biodiversity conservation outcomes. Individual levy assessment notices covering 4400 parcels of land were posted to 1340 landholders in September 2004, with a call for expressions of interest in biodiversity offsets. Approximately 260 expressions of interest have been received from landholders.

Part of the trading framework will involve placing a value on the biodiversity to be traded against the levy. The principles for this valuation come from the Biodiversity Plan for the South East of South Australia, which indicates that there should be:

- a comprehensive and representative network of natural areas;
- a focus on threatened species;
- a coordinated approach to management; and
- sub-regions where diverse ecosystems can evolve.

Aquifer Storage and Recovery

Another area of research and development that may have long-term economic and environmental benefits is aquifer storage and recovery. With water availability and demand both being subject to seasonal variation, there is generally a surplus of water availability during peak winter rainfall periods and a shortage during the dry summer months. Throughout the world, various methods of recharge enhancement are employed to meet the growing demand for safe potable water supplies.

The Department of Water, Land and Biodiversity Conservation (DWLBC), in collaboration with the Centre for Groundwater Studies (CGS) and other partner organisations including SA Water, United Water, local councils, Natural Resources Management Boards and industry are involved in developing aquifer storage and recovery technology in South Australia, which is leading the nation in this field. There are currently 22 operating sites in South Australia, mostly in the Adelaide

In urban areas, wetland-treated stormwater is recharged for later use in irrigating parks and recreational areas or for industrial use. In rural areas where water salinity issues are important, imported water or runoff is recharged to improve the quality of native groundwater for irrigation purposes.

Aquifer storage and recovery using treated wastewater presents an opportunity to use the available water resources more efficiently. It can relieve pressure on natural water sources by utilising otherwise wasted and often problematic resources (eg. Stormwater, treated wastewater) and has the added advantage of providing a continual supply regardless of prevailing weather conditions. Trials involving the storage and recovery of treated wastewater for irrigation of horticultural crops are currently being undertaken at Bolivar on the Northern Adelaide Plains and in the McLaren Vale area.

Minerals and Exploration

South Australia's Strategic Plan includes a target to "make South Australia a favoured mineral investment destination.....with exploration expenditure targeted to almost treble to \$100 million by 2007, and minerals production to reach \$3 billion by 2020, with a further \$1 billion worth of minerals processing by that time."²⁶

An innovation in this sector is geothermal energy. South Australia offers opportunities for geothermal energy exploration in Australia due to the comparative advantages of naturally occurring Hot Rock geothermal resources and a supportive investment framework designed by the Government. This has resulted in nine companies applying for 60 Geothermal Licence Applications (GELs) with aggregate licence commitments in excess of \$400 million. Whilst these companies will rely heavily on groundwater for power generation, water use will be sustainable as these waters will be recycled within a closed system.

²⁶ Government of South Australia, *South Australia's Strategic Plan*, op cit, Target 1.15

Figure 5 – ASR Project Locations

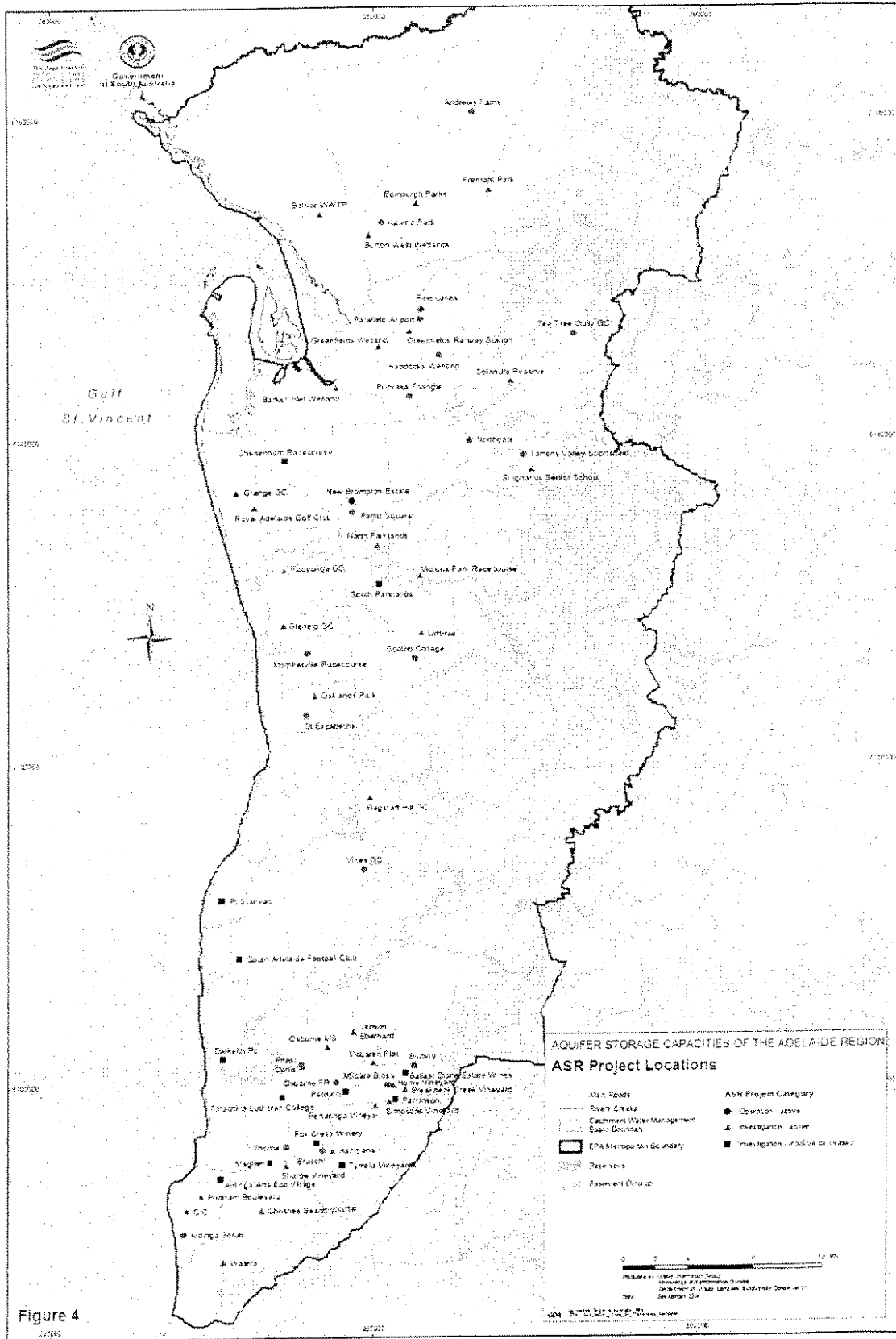


Figure 4

3.4 *Monitoring Drought and Predicting Farm Water Demand*

South Australia supports the National Drought Policy and the principles of self-preparedness for seasonal adversity. The State has also made a commitment to the development of the National Agricultural Monitoring System (the System).

16. That the Australian Government, in collaboration with the States and Territories, develop a more integrated and strategic approach to improve access to data. As part of this undertaking, the Commonwealth consider improved monitoring in areas of hydrological significance in outback Australia.

The System is an internet resource containing current and historic climate and agronomic information. Its key objective is to streamline Exceptional Circumstances application and assessment processes and the web site will contain an agreed set of maps and data on the current and emerging state of the major agricultural systems, as well as the main climatic drivers. Collectively, the information contained in the web site would show the production condition and prospects for the major agricultural production systems and all stakeholders would be able to access this information directly from the website. It will include the following information and reporting components:

- Landuse – landuse, landcover type, growing zones
- Climate Variables – rainfall variability and reliability, temperature
- Resource Condition – greenness from satellite, modelled soil moisture, dam storages, irrigation allocations
- Production information - modelled pasture growth, modelled wheat and sorghum yields, measured crop yields, livestock production
- National State and regional reports - Exceptional Circumstances application, current conditions, background information on regions

It is envisaged that the System would be used to identify the emergence of regions that are under severe climatic stress and showing signs of significant downturn in production. Eventually, it is envisaged that the System would indicate that a region or regions had broadly met Exceptional Circumstances criteria on meteorological rarity and severity of impact on production.

The System that is currently under development will enable farmers and rural communities to monitor developing situations of drought and should raise awareness of impending water supply issues.

17. That the Australian Government continues to work with the State and industry to promote ecologically sustainable development of water resources through support of a broad range of research, development and community capacity building initiatives.

While the System will provide some information on water storages and irrigation allocations that may help irrigators, it is unlikely that it will provide the density of information that will help dryland producers who are accessing underground water, nor will it provide information regarding on-farm surface catchments.

Policy makers will be able to use the System website to monitor seasonal conditions and modelled/predicted production yields, which should allow for increased awareness of pressures on water users.

River Murray Drought Response

Dry conditions have affected the Murray in the past, but rarely has the whole Murray-Darling Basin experienced such a prolonged period of drought and below average rainfall as has been the case over the past four years. As a result, South Australia has received only Entitlement Flow (1850 gigalitres) or marginally above since 2002. The problem for the River is exacerbated by the substantial increase in water diverted for irrigation and other consumptive uses since previous prolonged drought periods (in the 1980s and the 1960s). On average (under normally prevailing weather patterns) South Australia receives flows of about 4800 gigalitres per year, well in excess of the flows received over the past few years.

In June 2003, the South Australian Government introduced water restrictions on licensed allocations in the South Australian Murray-Darling Basin. Although these were eased to nearly full allocations as conditions improved during the year, it was again necessary to introduce restrictions in 2004-05 and 2005-06 due to the poor flows to the State.

The South Australian Government is working to improve the management of River Murray water to ensure that all users, including the environment, have fair and reasonable access to water under drought conditions. Following discussions with representatives from various water user groups, a policy framework for the management of the River Murray and its water resources during drought periods has been developed. The draft policy framework was applied for the 2004-05 water year to confirm the appropriateness of the measures applied.

Under this policy framework the Department of Water, Land and Biodiversity Conservation monitors a pre-determined set of "indicators" that are used to assess the capacity of the resource and the health of the River Murray on a month-by-month basis. If conditions within the River Murray system deteriorate to such an extent that the indicators fall to the trigger level, activation of the Drought Water Allocation Policy Framework is considered. This framework outlines a series of steps ranging from issuing alerts to irrigators through to the introduction of restrictions as a last resort.

3.5 Implications for Agriculture of Predicted Climate Change

CSIRO climate modeling projections for South Australia are for a warming and drying trend. Agriculture in the State is vulnerable to climate change and the Government is working with communities to identify and take action on ways to reduce greenhouse gas emissions and adapt to projected climate change.

Climate projections conducted by CSIRO²⁷ suggest a warming in the agricultural regions of 0.2 to 1.4 degrees Celsius by 2030 and 0.6 to 4.4 degrees Celsius by 2070. Of particular relevance to this inquiry is the projected decline in stream flow within the Murray-Darling Basin. Stream flows within the region are expected to vary by 0 to -20 per cent by 2030 and +5 to -45 per cent by 2070. Jones *et al* 2002 note that stream flow in the Basin is under threat from three sources; climate change, decadal-scale variability and land use change.

The projections for rainfall in the agricultural regions are shown in Table 1. Both the extent of the drying trend and the uncertainty is much greater for 2070 than 2030. All the outlooks have a high range, which reflects the uncertainty, but in general terms the strongest drying indications are for spring.

Projections of annual potential evaporation indicate increases across the State with the largest increases seen in the far-east and north-west of the State and the smallest increases in coastal regions around Adelaide and the Eyre Peninsula.

Table 1 – Rainfall Projections in Agricultural Regions of South Australia

	2030	2070
Annual rainfall	0% to -18%	0% to -40%
Summer	+5% to -18%	+20% to -40%
Autumn		
Eyre Peninsula	+5% to -18%	+20% to -40%
Upper Nth & Murray Mallee	-5% to +5%	-20% to +20%
YP, Adelaide & SE	0% to -18%	0% to -40%
Winter	0% to -18%	0% to -40%
Spring	0% to -20%	0% to -60%

Average annual water balances show deficits throughout the State, with the largest values in the south-east of the State and the smallest in the west of the State. Despite decreases in average rainfall over most of South Australia in most seasons by 0 per cent to 30 per cent, extreme rainfall is found to increase by between 0 per cent to 10 per cent. All climate models show an increase in the frequency of droughts towards the end of the century.

²⁷ McInnes, K.L. R. Suppiah, P.H. Whetton, K.J. Hennessy and R.N. Jones, *Assessment of climate change, impacts and possible adaptation strategies relevant to South Australia*, 2003, Pg61

18. That the Australian Government resources appropriate Commonwealth agencies, and/or assist the States, to develop and keep up to date water resource projections/scenarios, that account for climate change.

Climate change is one of six recognised threats to the Murray-Darling Basin and (along with south-west Western Australia and the Great Barrier Reef) the Basin is one of three focus areas for the Australian Climate Change Science Program. Potential climate change is a significant risk for agriculture, rural communities and water dependent ecosystems. Water dependent ecosystems are highly vulnerable to climate change but are critical in providing ecosystem services that extractive industries depend on to maintain productivity. South Australia's Strategic Plan has a target to "lose no species".²⁸ Maintaining and improving environmental flows and reducing the impact of development on natural resource assets are critical to ensuring that this target is achieved.

South Australia's Strategic Plan has a key commitment to address climate change, namely to "achieve the Kyoto target during the first commitment period (2008-2012)."²⁹ On 31 January 2006, the South Australian Government has released a draft Greenhouse Strategy, "Tackling Climate Change" for public consultation. Once finalised, the Strategy will outline the priority actions for Government, industry and the general community to reduce greenhouse emissions, adapt to inevitable climate change and develop innovative solutions. The Strategy considers the implications for agriculture of predicted changes in rainfall patterns and temperature. South Australia is also developing a Biodiversity Strategy that outlines what is required to secure our ecological assets in regard to climate change.

South Australian Government agencies are incorporating climate change adaptation and greenhouse gas reduction into the triple bottom line approach. The South Australian Research and Development Institute (SARDI)³⁰ has projects with grain growers, wool growers and grape growers on managing climate risks and the Department of Water, Land and Biodiversity Conservation is working with SARDI and regional NRM Boards on managing climate risk.

²⁸ Government of South Australia, *South Australia's Strategic Plan*, op cit, Target 3.8

²⁹ Government of South Australia, *South Australia's Strategic Plan*, op cit, Target T3.3

³⁰ South Australian Research and Development Institute

4. ROLE FOR AUSTRALIAN GOVERNMENT AGENCIES

In 2002, the South Australian Government made a submission to a House of Representatives Standing Committee inquiry into future water supplies for Australia's rural industries and communities. The recommendations from that submission on the possible role for the Commonwealth were as follows:

1. The Commonwealth should consider approaches made by States or Territories for strategic structural adjustment assistance, in those areas that require it, according to a set of pre-agreed principles.
2. The Commonwealth could consider resourcing appropriate Commonwealth agencies, and/or assisting the States, to develop and keep up to date water resource projections/scenarios, that account for climate change.
3. The Commonwealth should in collaboration with the States and Territories develop a more integrated and strategic approach to improve access to data. As part of this the Commonwealth should consider improved monitoring in areas of hydrological significance in outback Australia.
4. The Commonwealth should consider re-establishing funding schemes to help facilitate the provision of adequate water infrastructure to support sustainable regional development.
5. The Commonwealth could consider increasing funding for research into:
 - cost-effective, low-technology solutions for improving the quality of water supplies, with a focus on drinking water supplies; and
 - cost-effective wastewater services to rural and remote communities, with an emphasis on safe reuse for appropriate purposes.
6. The Commonwealth could further assist the investigation and coordination of regulatory approaches, which would encourage the uptake of appropriate water conserving devices or practices in rural communities.
7. The Commonwealth could play a greater role in educating the community, professionals and trades in the areas of water conservation and efficient use of water. It could also encourage community participation, for example by:
 - educating the community about ways to conserve water; and
 - encouraging industry to develop and implement new technologies that conserve water.

These recommendations remain valid and are applicable to this inquiry. South Australia considers it critical that any structural assistance be closely linked to the reform agenda to ensure that investments made support agreed policy outcomes.

As described in Section 2 of this submission, South Australia's water resources are vulnerable to up-stream users. South Australia has sound legislative and policy mechanisms in place that have served to protect its key resources. However, even when resources are protected under South Australian or Commonwealth legislation, the protection of upper catchment flows remains a critical need. Australian Government support to ensure equity between resource users (including the environment) is vital.

In the case of impacts of upstream extractions on wetlands, one approach could be for the Australian and State Governments to pursue the use of Ramsar Management Plans under the *Environment Protection and Biodiversity Conservation Act 1999* (Cwlth) to trigger the Act if upstream development threatens the status of a Ramsar site.

Furthermore, while the Living Murray *First Step* decision is commendable as an initial measure, the South Australian Government vigorously supports the allocation of at least 1500 gigalitres of water to the River as environmental flows by 2018. Australian Government support for policy that moves towards second steps and beyond to ensure that the 1500 gigalitres target is adopted within the Murray-Darling Basin Ministerial Council is essential.

The South Australian Government would welcome assistance from the Australian Government in the progression of research into the requirements for more effective management of the Coorong, Lake Alexandrina, Lower River and Murray Mouth, which is a priority for South Australia.

Past Commonwealth, State, and industry partnerships have delivered impressive results in developing the irrigation sector in South Australia. Such partnerships have helped to drive technical improvements, supported positive industry adjustment and underpinned improved ecological sustainability of the sector.

Australian Government investment in projects and programs in partnership with State and local governments and regional communities is also extremely valuable. The new regional NRM boards in South Australia will simplify administrative arrangements so that joint investments between governments and local communities can be made to address pressing local issues and better manage regional natural resources.

Continued Australian Government support through programs such as the Natural Heritage Trust (NHT) and the National Action Plan for Salinity and Water Quality (NAP) is critical. Projects, programs and works funded through these schemes have, through cooperative arrangements between governments and communities, made improvements in local environments and management of natural resources that may not have been possible without this investment. Communities have been

able to take ownership of their local natural resources management issues and make real and significant changes to their communities. For example, part of a herbivore control project on the Anangu Pitantjatjara Yankunytjatjara Lands funded through the NHT has resulted in the community being able to turn a problem into a profit. Feral camels, which contaminate water sources critical for native threatened species in the Far North, are being mustered for sale. Young people from the Anangu Pitantjatjara Yankunytjatjara lands are gaining valuable experience and work mustering the camels with plans in place for the future teach them to train suitable camels for cameliers. This project achieves positive environmental, social and economic outcomes.

It is hoped that over coming years the Australian Government will continue to work with the State and industry for ecologically sustainable development of our water resources and broader natural resources management through support of a broad range of research, development and community capacity building initiatives. *South Australia's Strategic Plan* includes a target to "have based in South Australia either the headquarters or a major node of at least 40 per cent of all existing CRCs, Major National Research Facilities and Centres of Excellence within 5 years." Any appropriate Australian Government assistance to achieve this target would be welcomed.

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APPENDIX A

Fact Sheet

26

Prescription of Water Res



Prescription of Water Resources

Fact Sheet 26

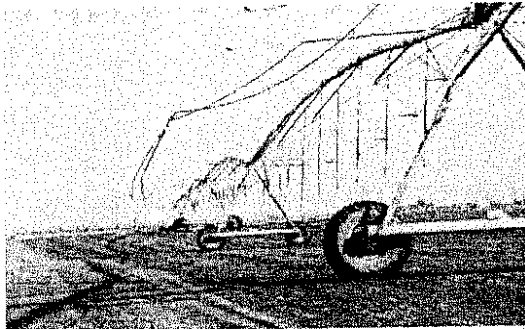
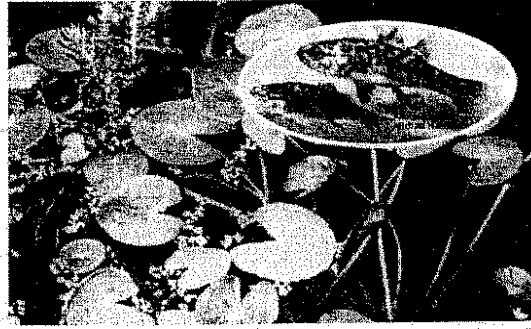


Photo courtesy John Bergner



What is Prescription?

Prescription is a means by which water resources can be sustainably managed to provide security for all water users, now and into the future.

It is set in motion when the level of water use and the declining condition of an area's water resources indicate that sustainable management is needed.

Prescription is recommended by the Minister of Environment and Conservation only after analysis of a region's water resources and extensive consultation with the community.

Prescription is administered by the Department of Water, Land and Biodiversity Conservation (DWLBC).

Once a water resource is prescribed, all people who take water from that prescribed resource will need a licence to do so. The only exception is that stock and domestic use can be exempted from the licensing requirements.

Each licence specifies how much water is allocated and how the allocated water can be taken or used, as well as any other conditions or controls. Licences are issued by DWLBC.

Once a resource is prescribed, a Water Allocation Plan is developed by the Catchment Water Management Board or a Water Resources Planning Committee. The plan contains the criteria by which decisions about the allocation, transfer and use of water are made. Among other things, this plan influences the conditions that the Minister attaches to any water licences that are issued. The Water Allocation Plan is developed in close consultation with the community and is adopted by the Minister for Environment and Conservation.

What does prescription mean for existing users of water?

When a water resource is first prescribed, users of the water resources need to apply to the Minister for a licence and a water allocation within six months to be considered an existing user. Under prescription, water is allocated to existing users before any additional allocations can be made under a Water Allocation Plan. The amount allocated will be based on an estimation of the reasonable requirements of the existing user and consideration of the capacity of the resource.

What about people who may wish to use water in the future?

They will need to apply for a licence and allocations will be determined according to the criteria set out in the Water Allocation Plan for making available unallocated water.

What are the benefits of prescription?

Prescription establishes a system for more sustainable sharing of the nominated resource and protects against the unregulated extraction of additional water. Security of water access is therefore increased and conflicts over water sharing reduced.

Water users are licensed to take a defined allocation of water. The water licence provides water users with a level of clarity and certainty in relation to their access to water. A water licence can also be a valuable asset.

Water resource development is allowed to continue up to sustainable limits through new allocations. Once these limits are reached, further development can still occur through trading of licensed water access rights.

Generally under prescription, all water users will be protected from over use and degradation of the resource. The long-term health of the area's wetlands and rivers is maintained by ensuring that the needs of water dependent ecosystems are protected.

What is the process for prescribing a resource?

The Minister initially announces his intention to prescribe the resource. This triggers a period of consultation when the community has the opportunity to comment on the proposal.

Following this period of consultation, the Minister considers all comments received and makes a decision on whether to recommend that the resource(s) be prescribed or not.

If, on the Minister's recommendation, the designated water resources of an area are prescribed, work commences on developing a Water Allocation Plan. The Catchment Water Management Board works with the community to develop the plan. Once the Water Allocation Plan is adopted, licences are issued with conditions to make them consistent with the new plan.

How long does the process take?

Typically, the process takes about three years from the announcement of the intent to prescribe to the adoption of a Water Allocation Plan and issuing of licences. This is due to the need to gather additional information on the resource's and to consult widely with the community.

Want to know more?

This brochure is one of a series of publications about water resource management. Further details and contact information are included below.

Website

View the Department's website, www.dwlbc.sa.gov.au

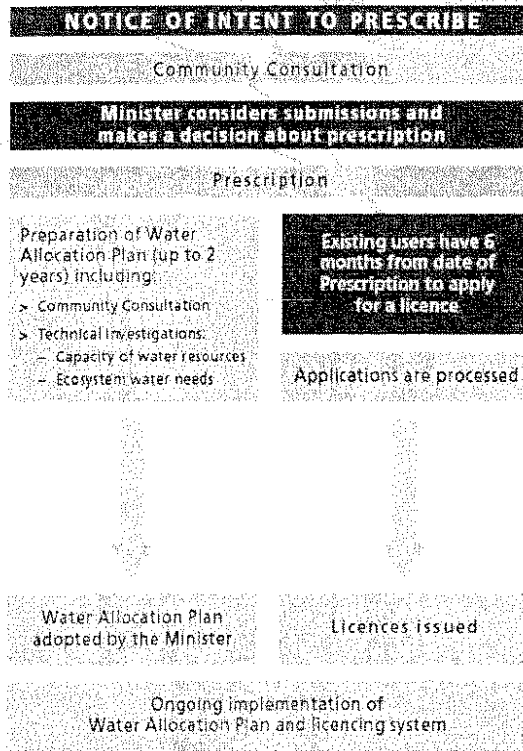
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APPENDIX B

Fact Sheet

72

River Murray Sa



River Murray Salinity Zoning

Fact Sheet 72



A salinity zoning policy has been developed to implement the salinity management provisions in the Water Allocation Plan for the River Murray Prescribed Watercourse (River Murray WAP).

The policy affects water allocation transfers, conversions from water (holding) to water (taking) allocations and variations of licences to change the land on which water can be used (to be referred to as licence transactions in this fact sheet). The salinity zoning policy ensures that South Australia's salinity management is in line with the Murray-Darling Basin Agreement salinity provisions.

This fact sheet explains salinity zoning, what the policy means to you and how the Department of Water, Land and Biodiversity Conservation (DWLBC) will process applications for licence transactions. The text of the actual salinity zoning policy is provided within the fact box, on page 6 of this fact sheet.

For more background information on River Murray salinity and reasons for introducing a salinity zoning policy, please refer to the Consultation Workbook "Managing Salinity in the River Murray in South Australia", which is available from the DWLBC Berri office or on the web at: http://www.dwlbc.sa.gov.au/files/consult_workbook.pdf

Fact Box

The state government, under the *Natural Resources Management Act 2004* (which replaces the *Water Resources Act 1997*), generally prescribes water resources to ensure that water is used in a sustainable manner. Prescription means a water licence is required to take water from a resource. The *Natural Resources Management Act 2004* requires all water resources that have been prescribed to have a Water Allocation Plan (WAP). The role of the WAP is to set the rules regarding the licensed allocation and use of the prescribed water resource.

1. What is the salinity zoning policy?

The River Murray WAP establishes specific principles regarding river salinity management. Licence transactions cannot occur where the use of the water will detrimentally affect, either directly or indirectly, the quality of water in the River Murray Prescribed Watercourse, through increases in salinity. The only exception is where the increase in salinity is offset by an agreement, undertaking or obligation for works, actions or practices to prevent increases in salinity (principles 22 and 54 of the River Murray WAP). Salinity zoning uses a system of salinity credits and debits to offset the salinity impacts from irrigation developments.

Under the Murray-Darling Basin Agreement, New South Wales, Victoria and South Australia maintain a salinity register, which records all actions that reduce or increase salt loads to the River. Actions that increase salt loads, such as new irrigation developments, result in a debit. Actions that decrease salt loads, such as new salt interception schemes, result in a credit. The register needs to be in surplus (credit) at all times.

The salinity zoning policy establishes salinity impact zones along the River Murray. These zones indicate areas of varying impact to the future salinity levels of the River Murray. The policy also introduces the rules for the approval of licence transactions and allocation of salinity credits within the zones.

Fact box

The table below indicates South Australia's current position on the Murray-Darling Basin Commission's (MDBC) salinity register. The table is correct as of 1 July 2004.

Credit or Debit affecting activity	30-year average impact
1988-2004 trades	9.4 EC debit
Quailco-Sunlands groundwater control scheme	4.8 EC credit
Irrigation efficiency improvements	6.8 EC credit
Rehabilitation of Loxton water supply infrastructure	2.9 EC credit
Total	5.1 EC credit

2. What are the salinity impact zones?

There are three salinity impact zones:

1. Low salinity impact zones - licence transactions will be approved provided the salinity impacts of the proposed water use can be offset by salinity credits that are available to South Australia.
2. High salinity impact zones - licence transactions can only occur provided the salinity impacts of the proposed licence transaction can be fully offset by the proponent (see point 11). An exemption applies to transactions for developments with significant commitment prior to 30 June 2003 at the specific location (see point 12), but such licence transactions are also subject to the availability of salinity credits to South Australia.
3. High salinity impact (Salt Interception) zones - licence transactions will be approved provided

the salinity impacts of the proposed water use can be managed within the available capacity of the salt interception scheme servicing that zone. If there is no capacity available in the scheme, this zone will be treated as a high salinity impact zone¹. The area where the *Groundwater (Quailco-Sunlands) Control Act 2000* applies is essentially a special case of a salt interception zone, where the Act specifies its own system of risk management allocations to ensure irrigation development remains within the capacity of the groundwater control scheme.

All of the above approvals are subject to all other River Murray WAP principles (including principles regarding water quality, floodplain impacts, water use efficiency and pumps on backwaters) being met.

The map (on page 7 of this fact sheet) shows the extent of the salinity impact zones. More detailed maps are available at DWLBC offices or on the DWLBC website, at: <http://www.dwlbc.sa.gov.au/murray/salinity/zoning.html>

3. Are all licences and licence transactions affected?

The policy does not apply to existing licences unless a licence transaction is required, either to or from the licence. The salinity zoning policy applies to transfers of water to taking allocations, conversions from holding to taking allocations and variations of licences to change the land on which the water can be used (occurring after 30 June 2003). Any licence transactions that occurred prior to the 30 June 2003 are not affected by the salinity zoning policy.

The following licence transactions are also not affected by the salinity zoning provisions:

- Water transfers to holding allocations.
- A transfer of a water licence (including its entire allocation) to another person, where only a change of ownership name is required (eg no locational change in water use).
- Temporary water transfers that are required (in a year of water restrictions) to top up the authorised level of water use to the same level as the water (taking) allocation.

4. Will the salinity zone boundaries change in the future?

The salinity zoning policy is designed to provide certainty to developers about locations where licence transactions for irrigation can continue without salinity impediments. It is therefore not intended to review the boundary between high and low salinity impact zones in the short-term. The current zones will be the starting point for salinity management provisions in the River Murray WAP as part of its review, due in July 2007.

The boundaries of salt interception areas may be reviewed from time to time, for example as new schemes come on line, or the operation of schemes is reviewed.

5. How do I know what zone my proposed development is in?

The map (at the back of this fact sheet) indicates the extent of the salinity impact zones. More detailed zone maps are available, and are designed to assist in identifying parcels of land in relation to the zone boundaries. The detailed zone maps are available for viewing at DWLBC offices, or on the DWLBC website, at: www.dwlbc.sa.gov.au/murray/salinity/zoning.html

Alternatively, if the developer can provide a property description (ie Certificate of Title, Section and/or Allotment and Hundred and/or Plan) or GPS coordinates to the DWLBC, advice on where the property is situated in relation to the zone boundaries will be provided.

¹ There are also areas protected by salt interception schemes that are in the low salinity impact zone. These areas are referred to as low salinity impact (salt interception) zones and licence transactions are approved and offset with either the salt interception scheme capacity or salinity credits, available to SA.

For additional details phone the DWLBC, Bert office on: (08) 8545 2053, or the DWLBC Murray Bridge office on: (08) 8535 6050.

5. How are the salinity credits assessed and allocated?

Salinity credit allocation is based on a standard assessment of salinity impacts (debts), which would arise from the water use of the proposed licence transaction. A computerised hydrogeological model (which has been accredited by the Murray-Darling Basin Commission) is used to evaluate irrigation, drainage, local geology and groundwater salinity at the location of the proposed licence transaction. The assessment will determine the salinity debts created by the proposed development, which therefore indicates the amount of salinity credits required to offset the salinity debts.

Salinity credits will be made available to developers for the purpose of licence transactions that transfer water into, or within, the low salinity impact zone.

A licence transaction into, or within, a high salinity impact (salt interception) zone will only proceed if the salt interception scheme has sufficient capacity.

Salinity credits will not be made available to licence transactions into or within a high salinity impact zone unless the developer needs the water for a development to which he/she was legally committed

or had committed significant financial or other resources at the specific site prior to 30 June 2003.

- Salinity credits are strictly subject to availability and are issued on a first-come first-served basis, in order of receipt of complete applications. South Australia does not have a limitless supply of salinity credits, and has an obligation under Schedule C of the Murray-Darling Basin Agreement to keep the salinity register in surplus at all times.

There is the option of provisional reservation of salinity credits in certain circumstances, prior to a formal application for a licence transaction:

- When a prior commitment claim has been approved, salinity credits will be reserved for the total volume of the approved claim, subject to credit availability.
- To provide certainty for investment purposes, credits can be reserved for planned developments in the low salinity impact zone and in high salinity impact (salt interception) zones, upon receipt of a detailed proposal outlining location, type of crop, volume of water and timeline for the development. Reservation of credits does not mean an approval of a licence transaction and is not transferable to any other person or entity (with the exception of a transfer through deceased estates).

The duration of the reservation will be determined on a case-by-case basis, depending on the development proposal, the type of zone and the availability and demand for credits in that zone.

7. What happens if my proposed licence transaction is situated across two different zones?

If a proposed licence transaction location (Certificate of Title or Certificate of Lease location) is partially within the high salinity impact zone, the whole application will be assessed as though it were within the high salinity impact zone, regardless of the other zone(s) that it lies within. If this causes issues for progressing a licence transaction, potential options/alternatives should be discussed with the DWLBC. A proposal can be varied to avoid the high salinity impact zone. If a developer were to choose this option, he/she would be legally obliged to only use water on the part of the property that is not within the high salinity impact zone.

8. What if I think the zone boundary is incorrect?

The salinity assessment model uses the best available hydrogeological information. However, it is possible that a detailed and localised hydrogeological investigation may reveal a specific site which is considered to be in the high salinity impact zone,

would in fact have a salinity impact equal to, or less than, what would be expected if the same development occurred in a low salinity impact zone. A developer may initiate detailed hydrogeological investigations at his/her own cost to demonstrate that the impact of irrigation at a specific site is equivalent to a low salinity impact zone location. Zoning will not be adjusted on the basis of claimed irrigation management practices or drainage rates. The salinity zoning evaluation and assessment methodology is not open for variation.

9. Will licence transactions into, or within, low salinity impact zones always get approved?

The South Australian Government is committed to ensuring that there are sufficient salinity credits available to allow licence transactions in low salinity impact zones to proceed, by continuing investment in salt interception and assisting irrigation communities to reduce drainage below existing irrigation areas. However, the availability of credits at all times cannot be guaranteed. In the unlikely event that South Australia fully allocates available salinity credits in a particular year, a licence transaction in the low salinity impact zone may be refused or delayed. All approvals are subject to other River Murray WAP principles being met.



10. Will licence transactions into, or within, high salinity impact zones always be refused?

No. Licence transfers proposed in high salinity impact locations will be approved (subject to other River Murray WAP principles being met) if the salinity impacts of the development can be offset (see point 11) or if there is proof of significant commitment to the development at the proposed site prior to 30 June 2003 (see point 12).

11. How can I offset my salinity impacts if I am in a high salinity impact zone?

The salinity zoning policy outlines that a proposal to offset salinity impacts can involve changes in use or management of other water allocations within the same zone, or any other scheme that will reduce salinity levels in the River Murray. Offset proposals need to generate credits for the Murray-Darling Basin

salinity registers and must be enforceable through licence conditions or other methods.

The proponent may transfer a water (taking) allocation in a high salinity impact zone within SA to another location in the high salinity impact zone. The impacts of the new irrigation development can be offset by the reduction of salinity impacts at the original location through ceasing irrigation or reducing demand through changed practices, therefore providing a salinity credit. This offset option only applies to permanent water trades. The licensee selling the water (taking) allocation will forfeit the opportunity to bring additional water onto the property under a prior commitment claim.

DWLBC encourages commitment to greater irrigation efficiency. Salinity debits are calculated assuming that only 10 percent of the water volume applied plus rainfall combined results in drainage (in accordance with Murray-Darling Basin Commission protocols)

Claims for smaller drainage rates cannot be accepted as an offset for the purposes of approving a licence transaction. It is possible that irrigation efficiency may become a source of salinity credits for existing irrigation developments in the future.

DWLBC encourages any other innovative salinity offset solutions. However it is strongly advised that any potential offset solutions are discussed with the DWLBC at the earliest possible stage, so that the potential salinity benefit can be assessed prior to investment in the proposed solution.

12. How do I prove prior commitment?

The salinity zoning policy water to be transferred for use within a high salinity impact zone up to a quantity determined by the responsible Minister to meet the future requirements of a development, project or other undertaking to which the developer was legally committed or had committed significant financial or other

resources at the proposed site prior to 30 June 2003 (subject to the availability of salinity credits and other River Murray WAP principles being met).

Significant evidence of commitment prior to 30 June 2003 needs to be provided by the developer, and needs to clearly link to the proposed development location for which the licence transaction is sought. Further information regarding the suitability of evidence can be obtained from the DWLBC Berri Office on: (08) 8595 2053.

An independently chaired assessment panel will consider the prior commitment evidence and provide recommendations to the Minister responsible for administering the River Murray WAP, regarding the validity of a submission.

A prior commitment claim may be lodged before the corresponding licence transaction. This provides the added security that should the claim be approved, salinity credits may be reserved to offset the salinity impacts generated by the licence transaction (pending the actual water transfer or other licence transaction).

Further Information

The River Murray WAP is available on the River Murray Catchment Water Management Board's website, at: http://www.rivermurray.sa.gov.au/about/pdfs/rwap_final_lowres.pdf

The detailed zone maps and a description of the salinity zoning policy are available on the DWLBC website, at: <http://www.dwlbc.sa.gov.au/murray/salinity/zoning.html>

If you wish to speak to DWLBC staff administering the salinity zoning policy, please contact DWLBC Berri (phone: 08 8595 2053) or DWLBC Murray Bridge (phone 08 8535 6050).

Fact Base: The Salinity Zoning Policy

Salinity zoning policy for administration of Principles 54 and 22 of the Water Allocation Plan and taking account of Schedule C of the Murray-Darling Basin Agreement.

Applications for grant or variation of water licence, or for transfer of licence or water allocation in River Murray Prescribed Watercourse.

Transfers of licences and water allocations - Principle 54 of the WAP

Principle 54 reads: *Despite principle 53(i) water may be transferred for irrigation notwithstanding that such use may detrimentally affect, by increasing salinity, the quality of water in the River Murray Prescribed Watercourse if the increase in salinity is offset by an agreement, undertaking or obligation for works actions or practices to prevent increases in salinity (including drainage management, infrastructure, salinity mitigation infrastructure or revegetation to control irrigation recharge).*

For the purposes of principle 54:

transfer into or within low salinity impact zone

Water may be transferred for use within a low salinity impact zone if the salinity impacts of the proposed use are determined by the Minister to be offset by salinity credits that are in the opinion of the Minister, after taking into account the advice of the Minister administering the *Murray-Darling Basin Act 1993*, available to the State of South Australia for the purposes of the Murray-Darling Basin Agreement.

transfer into or within high salinity impact (salt interception) zone

- a) Water may be transferred for use within a high salinity impact (salt interception) zone if the salinity impacts of the proposed use are determined by the Minister to be within the available capacity of a salt interception scheme servicing that zone.
- b) Where the salinity impacts of the proposed use are determined by the Minister to be in excess of the available capacity of a salt interception scheme, the policy for the high salinity impact zone applies as if the high salinity impact (salt interception) zone were a high salinity impact zone.

transfer into or within high salinity impact zone

Water may be transferred for use within a high salinity impact zone:

- i) if:
 - (A) the salinity impacts of the proposed use are determined by the Minister to be offset by the impacts of a proposal by the applicant regarding:
 1. changes in use or management of other allocation used within the same zone, or
 2. any other scheme which will reduce salinity levels in the River Murray; and
 - (B) the effects of the applicant's proposal include generating salinity credits that in the opinion of the Minister, after taking into account the advice of the Minister administering the *Murray-Darling Basin Act 1993*, are or will be available to the State of South Australia for the purposes of the Murray-Darling Basin Agreement, and which are sufficient to offset the salinity impact of the use; and
 - (C) fulfilment of and compliance with the proposal is secured by licence conditions or other method as determined by the Minister;
- or
- ii) up to a quantity determined by the Minister to meet the future requirements of the applicant for water for a development, project or other undertaking to which he or she was legally committed or in respect of which he or she had committed significant financial or other resources at the proposed site prior to 30 June 2003, if the salinity impacts of the proposed use are determined by the Minister to be offset by salinity credits that are in the opinion of the Minister, after taking into account the advice of the Minister administering the *Murray-Darling Basin Act 1993*, available to the State of South Australia for the purposes of the Murray-Darling Basin Agreement.

Water allocation (including variation and conversion) - Principle 22(i) of the WAP

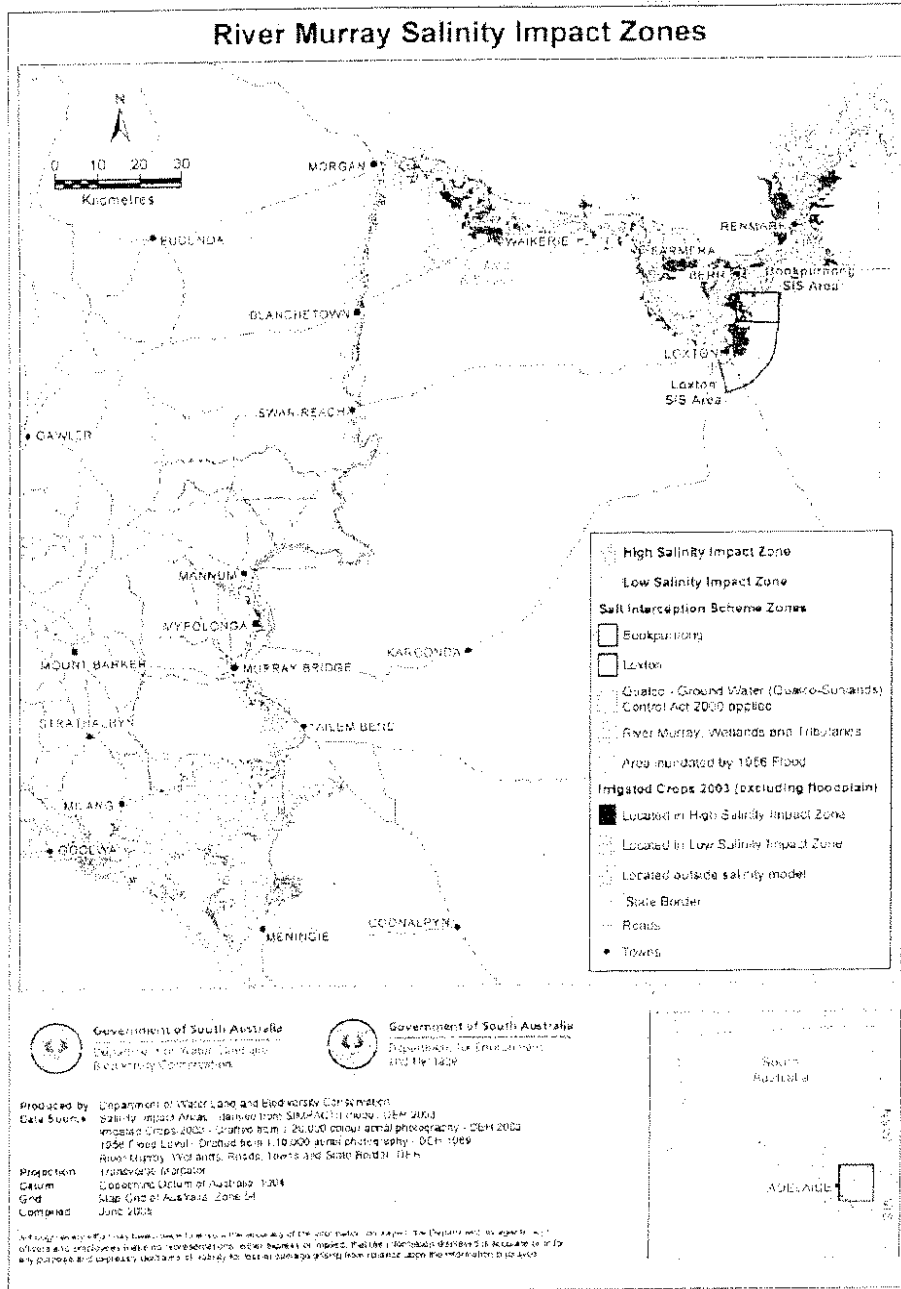
Principle 22(i) states:

Despite principle 21, water allocated after 1 January 1988 may be taken and used for irrigation notwithstanding that such use may detrimentally affect, by increasing salinity, the quality of water in the River Murray Prescribed Watercourse if the increase in salinity is offset by an agreement, undertaking or obligation for works actions or practices to prevent increases in salinity (including drainage management, infrastructure, salinity mitigation infrastructure or revegetation to control irrigation recharge).

For the purposes of principle 22(i), a water allocation made to give effect to:

- a transfer of a water allocation from another State or Australia
- a variation of licence at the request of the licensee to change the location of use of a water allocation
- a conversion of the whole or part of a water (holding) allocation to a water (taking) allocation

will be considered in accordance with the policies for the administration of Principle 54 of the WAP (see above), as if it were a transfer of the whole or part of the water allocation of a water licence.





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