



SAVE THE RIVER MURRAY FUND

ANNUAL REPORT 2007-08



Government of South Australia

Department of Water, Land and
Biodiversity Conservation

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ANNUAL REPORT 2007-08

Prepared for the

South Australian Parliament

by the Minister for the River Murray

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For further information about the Save the River Murray Fund, or the achievements listed in this Annual Report, please contact the Department of Water, Land and Biodiversity Conservation on (08) 8463 6800 or visit the website at www.dwlbc.sa.gov.au

CONTENTS

RETURNING WATER TO THE RIVER

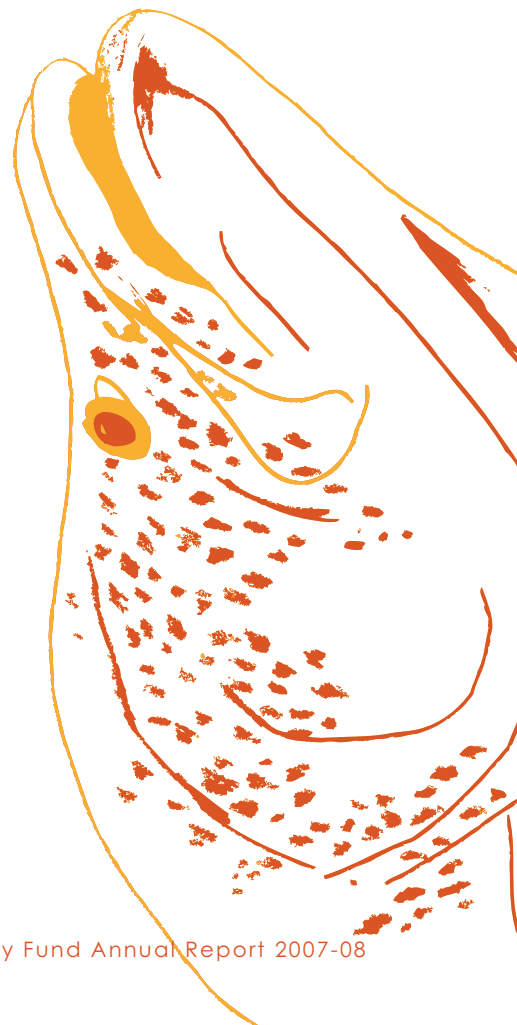
SECURING WATER RIGHTS

PROTECTING THE RIVER

ENHANCING THE ENVIRONMENT

BUILDING CAPACITY

PROGRAM STATEMENT
FOR THE PERIOD ENDED
30 JUNE 2008



INTRODUCTION

The Save the River Murray Fund (the Fund) was established under the *Waterworks Act 1932* on 24 July 2003. The Fund is held by the Minister for the River Murray and administered by the Department of Water, Land and Biodiversity Conservation (DWLBC) on behalf of the Minister.

The Save the River Murray Levy was introduced on 1 October 2003 under the *Waterworks (Save the River Murray Levy) Amendment Bill 2003*. The levy is charged to all SA Water customers across South Australia, both residential and non-residential and is indexed annually.

The Save the River Murray Levy 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 water of acceptable quality for urban and irrigation purposes. The program, known as the River Murray Improvement Program (RMIP), is integrated within a larger Murray-Darling Basin program of works and measures, the South Australian River Murray Salinity Strategy and the South Australian Environmental Flows for the River Murray strategy.

The RMIP contributes to the delivery of three high level outcomes:

- improved environmental health of the River Murray system in South Australia;
- high security of water of acceptable quality for irrigation in South Australia at an appropriate price; and
- high security of water quality for urban water supplies.

It also contributes to a range of targets identified in South Australia's Strategic Plan including:

- Increase environmental flows by 500 gigalitres (GL) in the River Murray by 2009 as the first step towards improving sustainability in the Murray-Darling Basin, with a longer-term

target of 1500 GL by 2018 (T3.10);

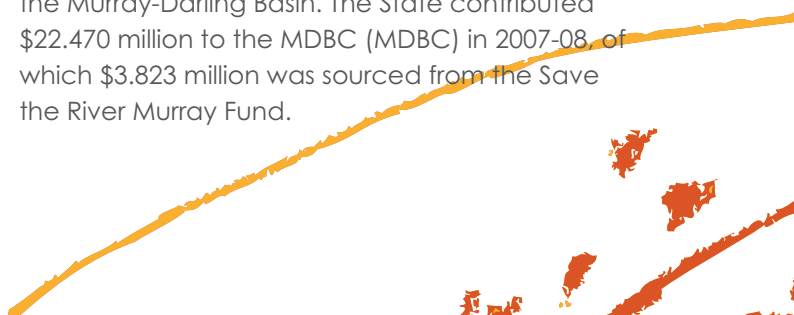
- South Australia maintains a positive balance on the Murray-Darling Basin Commission (MDBC) salinity register (T3.11); and
- South Australia's water resources are managed within sustainable limits by 2018 (T3.9).

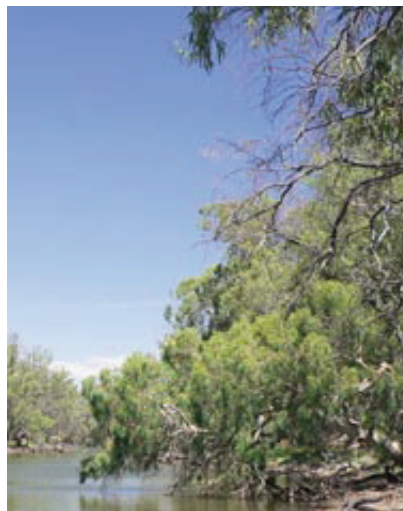
In 2006-07, the River Murray and southern part of the Murray-Darling Basin experienced the worst drought in recorded history. Severe drought conditions have continued throughout 2007-08. Although River Murray system inflows in 2007-08 were higher than 2006-07, opening storage levels in 2007-08 were so low that the total water resources position deteriorated compared with 2006-07.

Extremely low River Murray system inflows, together with low storage volumes, meant that licensed River Murray water allocations were again restricted in 2007-08. Allocations started on 4 per cent on 1 July 2007 and increased to 32 per cent by 14 December 2007, where they remained for the rest of the year. Allocations in 2006-07 were restricted to 60 per cent.

The limited water available to South Australia also meant that there was insufficient water to maintain water levels below Lock 1 at Blanchetown and, as a result, water levels below Lock 1 continued to decline and salinity levels continued to increase. As a consequence, the natural connection between Lake Alexandrina and Lake Albert almost closed causing water levels in Lake Albert to decline more quickly than in Lake Alexandrina, posing a high risk that vast areas of lakebed could acidify. To ensure that this did not occur, pumping of water from Lake Alexandrina into Lake Albert commenced in May 2008.

The Fund contributes to a range of River Murray projects in South Australia and more broadly in the Murray-Darling Basin. The State contributed \$22.470 million to the MDBC (MDBC) in 2007-08, of which \$3.823 million was sourced from the Save the River Murray Fund.





Funding was provided through the MDBC to support drought emergency measures required to reduce the risk of environmental damage to important River Murray lakes and wetlands. An embankment between Lakes Albert and Alexandrina was constructed to allow the pumping of water from Lake Alexandrina and retention of water in Lake Albert, to mitigate acidification over the 2008 winter. Also, the continuation of dredging at the Murray Mouth ensured a hydrological link between the Coorong and the sea.

Further water savings measures were implemented, including the temporary disconnection of six unregulated wetlands from the main channel to reduce evaporative losses and protect water quality in the river. These wetlands have an annual evaporation rate of about 36 GL.

Despite the severe drought conditions, a small volume of River Murray water was available for watering of key environmental sites in South Australia. A total of 2.3 GL of environmental water was made available through the MDBC as part of the Living Murray initiative, and used on five sites across the Chowilla floodplain.

Salinity levels in River Murray water above Lock 1 remained at acceptable levels, as a result of reduced drainage of saline waters from irrigation districts, and the salinity management programs of the MDBC. The MDBC's salt interception initiative continued, with completion of the floodplain component of the Loxton salt interception scheme, while preliminary investigations and project approvals for a new scheme at Murtho were completed. When these two projects are complete, an additional 164 tonnes of salt each day will no longer drain into the River.

At the beginning of the 2007-08 year, there was \$12.483 million in the Fund representing commitments relating to the South Australian contribution towards the 2003 Living Murray Initiative First Step decision to return 500 GL of water for environmental flows to the river system by June 2009.

In 2007-08 a total of \$22 million was received into the Fund and \$20.01 million was expended from the Fund on works and measures under the River Murray Improvement Program.

The annual report framework is presented to highlight achievements in the following five key outcome areas:

- returning water to the river;
- securing water rights;
- protecting the river;
- enhancing the environment; and
- building capacity.

01

RETURNING WATER TO THE RIVER

Throughout 2007-08 a number of initiatives were undertaken to return water to the River Murray.

Living Murray Water Recovery Within South Australia

As part of the Murray-Darling Basin Ministerial Council's Living Murray Initiative, basin jurisdictions that are signatories to the 2004 *Intergovernmental Agreement Addressing Overallocation and Achieving Environmental Objectives in the Murray-Darling Basin*, committed to water recovery and financial targets. South Australia has a financial target of \$65 million to invest in both local and interstate water recovery measures. South Australia has also agreed to recover 35 GL by June 2009, from within South Australia, through a number of measures and has made strong progress towards its obligations in 2007-08 including:

- being the first jurisdiction to list 13 GL of water on the Living Murray Environmental Water Register;
- in May 2008, the Murray-Darling Basin Ministerial Council also agreed to list a South Australian measure for 5 GL of water, purchased from willing sellers, on the Living Murray Eligible Measures Register. This measure will be finalised early in the 2008-09 financial year;
- the development of an application to list a further 15 GL on the Eligible Measures Register; and
- 2 GL to be recovered through improved wetland management is undergoing modelling to confirm the volumes available and determine the policy and legislative arrangements necessary to enable the water to be used elsewhere in the Basin.

South Australia's water recovery objective for the Living Murray is also recognised in the South Australian Strategic Plan with target T3.10 focussing on recovering 1500 GL of water for environmental flows by 2018. The South Australian Strategic Plan Audit Committee rated "Positive Progress" toward this target as part of the 2007-08 Strategic Plan audit.

Living Murray Water Recovery Interstate Investments

In order to meet respective water recovery and financial investment targets, jurisdictions are able to propose water recovery measures in which all partner governments may choose to invest. South Australia has invested in the Goulburn-Murray Water Recovery Project since 2005-06 and this investment will be completed in 2008-09. This project will recover 145 GL of water for the Living Murray with 120 GL recovered to date and placed on the Murray Darling Basin Commission's (MDBC) Environmental Water Register.

In 2007-08, South Australia also committed to invest in a further four water recovery projects proposed by New South Wales, the Australian Government and the MDBC. These projects aim to recover a total of 147 GL.

SA River Murray Environmental Manager

South Australia's *Environmental Flows for the River Murray* strategy released in 2005 established the function of River Murray Environmental Manager (RMEM). The function was assigned to the South Australian Murray-Darling Basin Natural Resources Management Board. The Board, through the RMEM, has the lead role to coordinate the delivery, allocation and management of River Murray environmental water and to develop policy in relation to environmental water. The RMEM is also South Australia's Living Murray Icon Site Manager and has ongoing responsibility for Living Murray Icon Site management and project implementation. This includes the management of environmental water recovered through the Living Murray for icon sites.

In 2007-08 the transition of icon site staff to the Board was finalised. The RMEM was involved in ongoing negotiations with the MDBC with regard to recovered Living Murray water for use at icon sites and a small amount of water was delivered to a number of sites on the Chowilla floodplain, Banrock Station and three sites below Lock 1. A Strategic River Murray Environmental Watering Plan was also developed to guide environmental water decision-making and further development of environmental water donations systems and partnerships with water trusts occurred.

SA Independent Commissioner

South Australia's Independent Commissioner continued to represent the State on the MDBC, pursuant to the *Murray-Darling Basin Act* 1993. The role of the Commissioner is to provide advice to the South Australian Minister for the River Murray, as the State's lead Minister on the Murray-Darling Basin Ministerial Council, on all matters relating to the operations of MDBC.

Key Achievements

- SA was the first Basin state to have 13 GL of water listed on the Living Murray Environmental Water Register.
- Committed to invest in the following interstate Living Murray water recovery projects:
 - Rice Growers A1 (\$152 000);
 - NSW Market Purchase Measure (\$19.165 million);
 - NSW Proposal B (\$5.650 million);
 - Pilot Market Purchase (MDBC) 20 GL (\$2.171 million); and
 - Water Tender for Efficiencies (\$25 000).
- Ongoing development of partnerships with potential environmental water trusts.
- Partnership with a private donor, Waterfind Environment Fund and Nature Foundation to provide environmental water to Little Duck Lagoon near Berri.
- Development of a Strategic River Murray Environmental Watering Plan to guide decision making for environmental water delivery.
- Small volume of Living Murray water delivered to the Chowilla floodplain, Banrock Station Ramsar site and to prevent acid sulphate soils at three sites below Lock 1.

CASE STUDY 01

PARTNERSHIP WITH A PRIVATE DONOR TO PROVIDE ENVIRONMENTAL WATER TO LITTLE DUCK LAGOON NEAR BERRI

Little Duck Lagoon, a small wetland near Berri, has been suffering from prolonged drought and was refilled in June 2008 to establish a refuge for native frogs, fish and birds.

A private South Australian irrigator, Ms Margaret Gambling, donated water to the South Australian Murray-Darling Basin Natural Resources Management Board for the wetland. Water was also provided by not-for-profit organisations, Waterfind Environment Fund and the Nature Foundation.

The donated water, which was 10 megalitres in total, was enough to fill the wetland and make a real difference to the local habitat. The watering resulted in the breeding of three frog species: the Eastern Sign Bearing Froglet, Eastern Banjo Frog and Spotted Grass Frog. In addition, six species of waterbirds used the wetland with up to 150 birds counted at one time. Three of these species bred at the wetland.

The project was a great example of the Government, not-for-profit environmental funds and the general public working together to achieve positive environmental outcomes.

Banrock Station Wetland Refill

This Ramsar listed wetland was disconnected from the river channel in December 2006, as a drought water saving measure. Although the wetland did not completely dry out until March 2007, the surrounding vegetation had not been flooded for more than two years. This resulted in rising saline groundwater and localised acid sulfate soil hotspots that posed a significant risk to the wetland bed and surrounding River Red Gum communities. A volume of 615 megalitres (ML) was allocated under the Living Murray Environmental Watering Plan to the Banrock Station Wetland, which had been disconnected from the river for several months. Constellation Wines contributed an additional 215 ML. The most critical issue supporting the partial refilling of Banrock was the high risk of salinisation at the wetland due to rising groundwater.



The wetland regulator upstream of Lock 3 was opened on 2 June 2008 and the desired height of 8.6 metres was reached on 10 June 2008. Following extensive water quality monitoring, it was agreed that the bottom regulator could be opened on 19 June 2008 to provide a flow-

through wetland system. Ongoing monitoring is being undertaken at Banrock and excellent ecological responses have been observed including signs of new growth in trees and recording of over 22 bird species using the wetland, including the Great Egret (listed

under the China-Australia Migratory Bird Agreement and Japan-Australia Migratory Bird Agreement). To date, a total of 11,609 fish from 12 species have been sampled at Banrock, including Golden Perch and Freshwater Catfish. Three frog species have also been identified.



02

SECURING WATER RIGHTS

Securing the water rights of the River Murray and Murray-Darling Basin is important for licensed water users and the wider South Australian community in economic, social and cultural terms.

This security encompasses the quantity and quality of available water, and considers the needs of all water users; rural and urban, as well as the environment. The security and transfer of these rights are key principles of the National Water Initiative, and of Council of Australian Government commitments. The importance of this security has been further highlighted over the 2007-08 year, as the impacts of the drought on all River Murray water users remain ever present and significant.

Eastern Mount Lofty Ranges Catchment

Water resources in the Eastern Mount Lofty Ranges were prescribed on 8 September 2005 and the area is currently under a Notice of Prohibition until 6 October 2009. The Notice of Prohibition prohibits any new or additional water use during the notice period. Existing users have been issued with a temporary authorisation to take water at existing levels of use.

The South Australian Murray-Darling Basin Natural Resources Management Board is in the process of developing a Water Allocation Plan for the area; extensive scientific investigation into the capacity of the resources; plus community and industry consultation is being undertaken as part of this process. It is anticipated that the Water Allocation Plan will be adopted in mid-2009.

Existing users of water have applied for licences, which will be issued following adoption of the Water Allocation Plan.

River Murray Prescribed Watercourse Water Allocation Planning, Licensing and Compliance

Ongoing implementation of the River Murray Water Allocation Plan and the *Natural Resources*

Management Act 2004 remained a primary focus during 2007-08, in particular the administration of the River Murray salinity zoning policy and support of South Australia's Murray-Darling Basin salinity reporting obligations; ensuring that water allocation transfers met minimum requirements including those associated with efficient water use; and implementation of South Australia's metered water use policy.

Preliminary work commenced in preparation for, and support of, the River Murray Water Allocation Plan amendment process being managed by the South Australian Murray-Darling Basin Natural Resources Management Board and as required under the *Natural Resources Management Act 2004*.

As a consequence of the serious ongoing impacts of the River Murray drought on the River Murray Prescribed Water Resource within South Australia, programs to effectively implement water restrictions and water conservation measures for all water users including for irrigation, domestic and industrial water users were a high priority for 2007-08.

In support of this, enhanced water trading options were developed and implemented during 2007-08 that provided clarity for water allocation buyers/sellers in respect of useability and pricing of water allocations; enhanced aquifer storage and recovery options; expanded compliance programs; and were supported by clear and practical communication with all water users.

Water Trade

In response to the major impact that water restrictions had on South Australian River Murray water users, in particular permanent horticultural plantings and critical human needs, a significant expansion of temporary water allocation trading activity was supported and managed during 2007-08.

Transfer transactions increased from around 1500 in 2006-07 to over 4600 during 2007-08. The increase, in the main, reflected annual water allocation trade transfers into South Australia from interstate, with transfer volumes increasing from 51 GL in 2006-07 to 148 GL in 2007-08. Trade out of South Australia fell while trade within South Australia remained stable. A summary of water allocation transfer activity in 2007-08 and comparison with 2006-07 is detailed in the table below.

2006-07			2007-08	
	No.	Volume (GL)	No.	Volume (GL)
Trade into SA				
NSW	197	33.3	1967	100.0
VIC	361	18.1	1692	47.8
Trade from SA				
NSW	49	5.4	6	0.3
VIC	60	5.8	30	2.0
Trade within SA				
Permanent	155	15.8	180	15.9
Temporary	744	219.7	762	259.8

To facilitate this increased amount of water trading activity, processing procedures were streamlined to improve processing times and cope with the additional workload.

MDB Cap on Diversions

The Murray-Darling Basin Cap on diversions became permanent in New South Wales, Victoria and South Australia from 1 July 1997. The Cap is not a fixed limit on the water the States can divert for use each year, but a limit to the long term average diversions of water from the Murray-Darling Basin each State can make. Under this averaging system, the States can allocate differing amounts of water each year, as long as they do not exceed the average specified amount over a period of years. The specified amount is calculated based on the rainfall received and the amount of water held in storage.

River Murray flows to South Australia for 2007-08 continued to be severely constrained as a result of ongoing drought conditions. Under the Murray-Darling Basin water sharing arrangements, 350 GL of water was made available to South Australia for allocation in 2007-08 and restrictions on River Murray water use were again applied in the 2007-08 water year. This was the fifth consecutive year where allocations were restricted.

South Australia continues to be well placed to manage diversions within the Cap, as the majority of the water diverted from the River Murray is metered. All diversions remained within the annual Cap targets.

The Independent Audit Group of the Murray-Darling Basin Commission reviews compliance with the Cap each year. In June 2008, the Independent Audit Group's review found that water use in all the Cap Valleys in South Australia was within the trade-adjusted annual Cap targets for 2006-07.

Separation of Water Rights

Foundation principles were developed for site-use approvals for salinity under the separation of water rights, which will be incorporated into the next version of the Water Allocation Plan for the River Murray Prescribed Watercourse.

Key Achievements

- Commenced trialling the methodology for volumetric conversion and allocating water to existing users in the Currency Creek catchment.
- Independent Audit Group's review found that water use in all the Cap Valleys in South Australia was within the trade-adjusted annual Cap targets for 2006-07.
- Facilitated expanded water trading particularly interstate allocation trading as a response to drought.
- Implemented Schedule E tagged trading of water entitlements that came into effect 1 July 2007.
- Implemented stage one of the regional meter implementation plan to support implementation of the SA Licensed Water Use Metering Policy.
- Facilitated administration of the Minister for the River Murray Living Murray water licence and associated water purchases for the environment.
- Expanded programs addressing non-complaint water extraction, metering and use and watercourse damage, particularly in response to the impacts of the River Murray drought.
- Assessed, where required, River Murray water licence applications against the principles within the River Murray Water Prescribed Watercourse Water Allocation Plan.
- Implemented metered use for all extractions in the Lower Murray Reclaimed Areas, and administered environmental land management allocations.
- Implemented River Murray water restrictions including development and implementation of expanded water trading options (entitlement and allocation trade) and associated trading rules, and expanded communication to water users on authorised allocations, monthly water use and specific restrictions on water use.



CASE STUDY 02

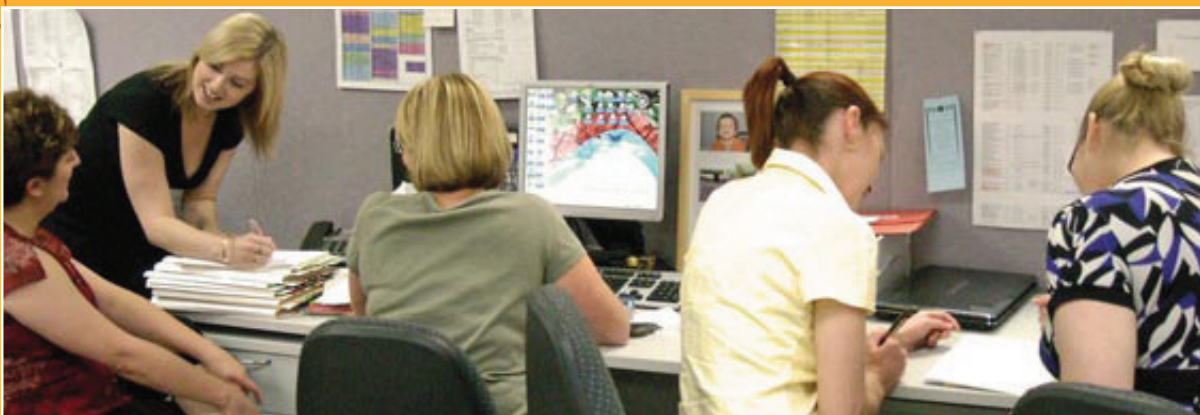
INTERSTATE WATER TRADE TAKES PLACE UNDER SCHEDULE E OF THE MURRAY-DARLING BASIN AGREEMENT

Interstate water trade takes place under Schedule E of the Murray-Darling Basin Agreement. Amendments to this Schedule were made in 2006-07, which greatly expanded the area from which irrigators in South Australia can access water for trade. The provisions of Schedule E for tagged trade were implemented on 1 July 2007, allowing irrigators greater freedom to choose how they trade.

Many irrigators have taken advantage of this increased trading ability, which is reflected in the record numbers of trades processed and record amounts

of water that were traded into South Australia during 2007-08. This is likely a reflection of the ongoing effect of drought on water availability as well as the greater flexibility in the trading market. Nearly 150 gigalitres were traded into South Australia and less than three gigalitres was traded out during the same period. The net amount of water traded into South Australia was more than three times the net amount traded into South Australia in the previous year. The majority of trading activity took place on the allocation (temporary) market.

The number of trades processed in 2007-08 was more than five times the number processed for the previous year. To enhance the efficiency of processing this increased number of applications, streamlined processes were introduced for some classes of trade, such as applications to purchase water to top-up irrigator licences to previously approved levels. This reduced the amount of time taken to process such trades, so irrigators could access their purchased water quickly.



03

PROTECTING THE RIVER

The Save the River Murray Fund contributes to numerous projects designed to protect the River Murray from processes that have a detrimental impact.

Risks to Shared Resources

The Murray-Darling Basin Commission (MDBC) Risks to Shared Water Resources program is aimed at addressing the impacts of climate change, overuse of groundwater, bushfires, expansion of farm dams, reduced return irrigation flows and reforestation on the future water resources of the Murray-Darling Basin.

The Murray-Darling Basin Risks Strategy was developed and agreed by the six partner governments of the Murray-Darling Basin and approved by the Murray-Darling Basin Ministerial Council in December 2007. It provides an objective operating framework and a broad process to ensure a consistent and flexible approach to the management of risks now and into the future. It builds on existing water management arrangements and is consistent with the National Water Initiative (NWI).

One of the major risks to shared water in the Basin is the projected impact of climate change. In July 2008, the latest in a series of reports produced through the CSIRO Murray-Darling Basin Sustainable Yields Project covering the Murray region of southern New South Wales, northern Victoria and south-eastern South Australia was released.

The report showed that in comparison to historical climate conditions, by 2030:

- under the best estimate of climate change, surface water availability in the Murray region would be reduced by 12 per cent and flows to the end of the system by 24 per cent; and
- if the dry conditions experienced between 1997 and 2006 continued, average surface

water availability would fall by 27 per cent and end of system flow by 50 per cent.

Salinity Management

Salinity is a threat to the quality of River Murray water. Increased salinity levels in the River result in costs for urban and industrial users, and adversely affect the environment and the health of irrigated horticultural crops.

In 2007-08, South Australia successfully negotiated with the MDBC and the other Murray-Darling Basin jurisdictions to recognise that the short-term, in-river salinity impacts of environmental and river flow management are also important, particularly for South Australia. This is because some environmental watering actions may result in salinity increases in the River Murray if local saline groundwater is displaced, or local flooding washes salt from floodplain soils, while managing flow to South Australia can provide for dilution of salt in the River.

Reducing the inflow of saline groundwater into the River Murray provides environmental benefits and underpins sustainable irrigation development. The bores of the floodplain component of the Loxton Salt Interception Scheme, as well as the Cliff Toe Drain, were completed and are operational. As a result, about 35 tonnes of salt each day are prevented from reaching the River.

A suite of groundwater models to enable appropriate investment in new and existing salt interception infrastructure (including the construction-approved Murtho Salt Interception Scheme), to ensure long-term water quality was completed.

The 2nd International Salinity Forum was held in Adelaide from 31 March - 3 April 2008. South Australia's involvement at the forum has enabled exchange of knowledge regarding new and innovative salinity management practices and this is being incorporated into South Australian salinity management strategies to ensure the State remains a leader in this area.

Lakes Alexandrina and Albert

Continuing extremely low inflows into Lakes Alexandrina and Albert have led to falling lake levels. This has exposed acid sulphate soils on the lake beds and has resulted in extensive investigations, modelling and monitoring to assess the risk of the lakes acidifying. A temporary bank separating Lake Albert and Lake Alexandrina was built to enable pumping of water from Lake Alexandrina into Lake Albert to reduce the risk of acidification.

The State Government and the MDBC agreed to maintain Lake Albert water levels by installing a temporary blocking bank at the Narrung Narrows, and then pumping water from Lake Alexandrina into Lake Albert. The volume of water pumped into Lake Albert is determined through modelling so as to maintain the water level above -0.5 m Australian Height Datum (AHD), taking account of evaporation losses. Water levels have been maintained above -0.5 m AHD.

Extensive community and indigenous consultation and monitoring has been undertaken in relation to this project.

River Murray Select Committee

The River Murray Parliamentary Select Committee tabled its final report on 25 July 2001. Many of the Committee's 97 recommendations have now been implemented. Key achievements consistent with the recommendations include:

- South Australia's salinity obligations under the Basin Salinity Management Strategy have been met, including a positive salinity credit balance on the MDBC's salinity registers; and in addition effective processes have been put in place to direct future irrigation development to low salinity risk locations;

- wetting and drying cycles have been established on a number of wetlands, although drought conditions have limited the scope of rewetting in many instances;
- rehabilitation of the Lower Murray Reclaimed Irrigation Area is complete;
- the Murray-Darling Basin Authority is to be established, which will function with a large degree of independence;
- water trading across the interconnected lower Murray-Darling has been achieved;
- the South Australian Murray-Darling Basin Natural Resources Management Board has been established with functions and powers that include water resource management, animal and plant control, and soil conservation;
- the Water Allocation Plan for the River Murray Prescribed Watercourse addresses water use efficiency, Lower Murray Reclaimed Irrigation Area metering, and salinity accountability matters, amongst other principles for water management; and
- water management policy and action under the extreme drought conditions currently being experienced has been coordinated at the Basin, State and community levels.

River Murray Act

The *River Murray Act 2003* was introduced to ensure that new and existing activities that may affect the health of the river are undertaken in a way that protects, maintains and improves river health. The *River Murray Act 2003* Referral Assessment Policy – Overview and General Provisions and the Neutral or Beneficial Guidelines were released to assist with the preparation and assessment of referred matters under the *River Murray Act 2003* as a pilot to assess their usefulness.

Compliance matters during the 2007-08 reporting year were significantly higher than in the previous year. A total of 61 matters were reported relating to activities that were likely to cause harm to the river resulting in six River Murray Protection Orders being issued. Matters investigated included sand dumping, emergency dredging and houseboat relocation.

Riverland Drainage Disposal Systems and Waste Disposal Stations

A new River Vessel Waste Disposal System was installed at Walker Flat. This station comprises a floating pontoon where boats can dock, sewage pump equipment for attaching to wastewater holding tanks, land-based facilities for hard rubbish collection and a small wastewater treatment plant providing recycled water for irrigation.

Prior to the installation of the Walker Flat station, there was no public station between Mannum and Swan Reach, a distance of about 100 kilometres. This new station is in addition to the twelve stations already in operation downstream from the South Australian-Victorian border.

Water Quality Improvement

A number of water quality improvement activities were undertaken in 2007-08 including:

- dairy farms on the Lower Murray Reclaimed Irrigation area reducing pollution to the River Murray by increasing irrigation efficiency, storing run-off on paddocks for re-use and upgrading dairy shed effluent systems;
- houseboat blackwater audits, innovative greywater system trials and education and implementation of the Environment Protection Authority's (EPA) Code of Practice for Vessel and Facility Management are reducing the impact of vessels on the River Murray;
- assessment and provision of input to Development Applications to reduce pollution in the River Murray Protection Area; and
- acid sulphate soil management below Lock 1 and in Lakes Alexandrina and Albert.

Lower Murray Levee Banks

Drought conditions have caused soil cracking on certain levee banks in the Lower Murray from Mannum to Wellington. Repairs were undertaken by filling cracks with clay in order to maintain their integrity.

The levees were initially built as flood mitigation and control structures to allow irrigation of the floodplains.

Key Achievements

- Contributed to the Murray-Darling Basin Risks Strategy.
- Murtho Salt Interception Scheme construction approved.
- Loxton Salt Interception Scheme floodplain bores and Cliff Toe Drain completed.
- 2nd International Salinity Forum was held in Adelaide from 31 March - 3 April 2008.
- New river vessel waste disposal station installed at Walker Flat.
- 687 mandatory referrals were assessed against the Objects and Objectives of the *River Murray Act*. Of the applications mandated for referral approximately 44 per cent were for dwellings, sheds, garages and outbuildings and 18 per cent were for land divisions.
- Contributed to the EPA's development of greywater management standards, needed for river vessels to meet the new EPA Code of Compliance.
- Commenced an integrated floodplain salt management investigation into the long-term future of drainage disposal basins.
- Audits of dairy milking shed effluent systems in the Lower Murray were conducted.
- 140 private houseboats upgraded their blackwater treatment systems.



CASE STUDY 03

LOXTON SALT INTERCEPTION SCHEME - FLOODPLAIN BORES AND CLIFF TOE DRAIN

The Loxton Salt Interception Scheme was approved by the Murray-Darling Basin Commission for construction in 2004. The floodplain component of the scheme has been completed. The bore fields on Rillis Floodplain (eight bores), the Thieles Floodplain (11 bores) and the Caravan Park Floodplain (8 bores) are now operational protecting the River Murray by reducing the salinity impacts.

There was an area near the Loxton riverbank where saline water was discharging to the river from the highlands. The hydrogeological setting precluded the installation of conventional bore pumps and therefore the innovation of the "cliff toe" drain was developed for this area. Today there is a 200 m-sheet pile cut-off wall and drain system successfully intercepting salt from getting into the river. Prior to the construction of the drain the area of the riverfront was very boggy, saline and unattractive as a public area. The Loxton Waikerie Council had already

formulated major redevelopment plans for the area and the cliff toe drain was successfully integrated with a houseboat mooring pontoon and paved walkway.

2nd International Salinity Forum, Adelaide, 31 March - 3 April 2008

Salinity specialists and community members from all Australian states, and many overseas countries, attended the Forum. South Australia's involvement and leadership has enabled exchange of knowledge regarding new and innovative salinity management practices and this is being incorporated into South Australian salinity management strategies to ensure the State remains a leader in this area.

The attendees exchanged cutting edge knowledge on policies, science and management practices relating to salinity. Salinity experts with scientific, engineering, policy and community interests discussed how to address salinity issues, particularly its associated water and human dimensions, and learnt from the experience of others to consider how to apply knowledge and learnings in other regions.

South Australia was chosen to host the Forum as the experience gained in managing River Murray and dryland salinity is relevant to other regions and nations. Management actions to manage threats to the quality of water of the River Murray have included engineering solutions to intercept and dispose of saline water, improved irrigation efficiencies, rehabilitation of irrigation infrastructure and limiting irrigated horticulture to low salinity impact areas. Other strategies include consideration of dilution flows which is subject to water availability and clearly difficult to implement under drought conditions when low flows exist.

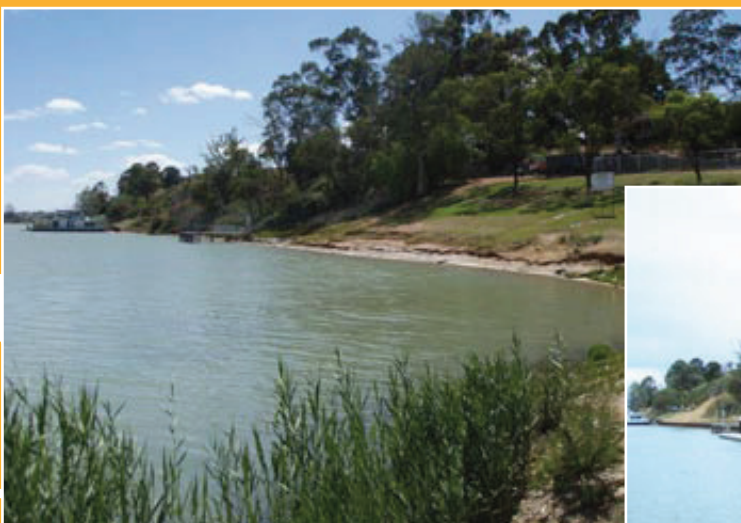
Managing salinity in a river basin that transcends state borders also requires political solutions, which can be very difficult to negotiate. In Australia, there is a new era of River management with the States agreeing to a greater federal

authority over the river, and with this will come greater opportunity for sustainability and coordinated River Murray salinity management.

Special emphasis was also put on climate change and its uncertain impact on salinity.

The forum clearly stressed the importance of improved partnerships between salinity affected communities, research and funding institutions. One highlight was a presentation on the research activities of the International Centre for Biosaline Agriculture, in Dubai, as this Centre was developed using scientific and engineering expertise from South Australia.

Visitors were able to gain first hand experience with South Australian management strategies on tours to the Riverland, the Lower Murray, and dryland areas of the State.



04

ENHANCING THE ENVIRONMENT

The River Murray in South Australia is important to all South Australians for a range of reasons. Economically, the River supports vibrant and productive agriculture. It functions as a significant cultural and recreational resource and it is, in itself, a complex and rich ecosystem.

The maintenance of functioning ecosystems is a critical component of integrated natural resource management in the region. The region features a variety of wetland systems and types that perform various functions for the River and many of these are recognised as being of national and international significance.

While the drought has continued to impact substantially on environmental projects during 2007-08, programs and activities to maintain these environments have been progressed.

River Murray Environmental Manager

Wetland and floodplain prioritisation projects were completed and planning began for expanding this work into a management action database to assist environmental watering decisions. Development of wetland and floodplain management plans continued with floodplain planning work at Pike, Bookpurnong, Yatco and Katarapko.

A River Murray environmental watering plan was also completed.

Chowilla Floodplain

A total of 2.3 GL of Living Murray environmental water was used to water five sites on the Chowilla floodplain. Planning for the proposed Chowilla environmental regulator continued with impact/benefit assessments completed for frogs, water birds and vegetation health.

The Bank E rock ramp fishway was completed. This will provide access for fish to over 100 kilometres of anabranch creek system and will enable future weir pool level manipulations at Lock 6 to create favourable conditions for a range of fish in the downstream creek and wetlands. Concept designs for the Pipeclay and Slaney weirs were completed. Investigations into the viability of groundwater management and deep aquifer injection for groundwater disposal were undertaken.

A deep aquifer injection trial is underway at Chowilla to test the viability of saline disposal to the deep aquifer. To date, hydraulic testing trials have been finalised. If the project proves viable, ongoing funding will be sought from various funding sources including the Groundwater Assessment Initiative. Parallel development of a groundwater management scheme is being progressed.

Floodplain Planning - Pike Integrated Management Plan

A draft Pike River Floodplain Management Plan has been developed, which identifies environmental assets and values, the extent to which processes threaten these values and options for management to improve floodplain health. The plan proposes coordinated management activities at local and regional scales, integrates multi-disciplinary actions and prioritises actions so that the greatest benefits can be achieved.

Lower Lakes, Coorong and Murray Mouth

Dredging of the Murray Mouth has continued and is vital for maintaining an open channel for tidal flows to help maintain the health of the North Lagoon of the Coorong.

The ongoing water quality monitoring for the Coorong is an essential part of the Save the Murray Fund. This data has enabled the Government to understand the implications of drought and reduced flows to the Coorong.

Wetland Management

Extensive wetland monitoring occurred above Lock 1 on targeted wetlands with high conservation values. This information is collected by Department for Environment and Heritage and then provided to the South Australian Murray-Darling Basin Natural Resources Management Board for consideration for water allocation planning and environmental flows.

Native Fish Strategy Implementation

Significant progress has been achieved in 2007-08 including:

- successful implementation of a program to rescue threatened and protected fish species at risk due to drought conditions;
- further development of the Katfish Reach project to restore the Katarapko-Eckerts Creek floodplain and anabranch habitats;
- the successful completion of a project to identify and map aquatic habitats in the River Murray and fish associations to guide future management and restoration efforts in SA;
- carp research and harvesting projects – Banrock integrated carp management research, assessment of carp screens and the implementation of carp cage technology at Lock 1 to harvest over 20 tonnes of carp; and
- research into the fish communities of the Chowilla floodplain icon site to inform the operation and/or construction of new and refurbished regulatory structures in the Chowilla system.

Fishway Program

Locks and weirs installed for the purpose of River regulation have created artificial barriers that

prevent native fish travelling freely throughout the river system to breed and complete their life cycles. As part of the Living Murray Program, the South Australian Government installed three fish passages at Lock 1 (Blanchetown), "Bank E" (Chowilla) and Hunters Creek (Hindmarsh Island).

Additional fish passages were planned for the Barrages at the Lower Lakes, and at the locks and weirs of the River Murray in South Australia. The next four proposed locations are at Lock 3, Pipeclay and Slaney Creek Weirs, and Tauwitchere Barrage.

Key Achievements

- Further development and implementation of South Australian Living Murray Icon Site Environmental Management Plans.
- Initiation of the Pike River Floodplain Project in conjunction with the broader Pike Implementation Project.
- Reached agreement regarding protection measures for sites at Chowilla identified in the 2007 cultural heritage report.
- Construction of Boat Creek Bridge completed.
- Completed detailed designs for Slaney Creek weir and Pipeclay Creek weir modification.
- Commencement of stage 2 trials for the groundwater deep injection project.
- Completed final report on the ecological risk investigation for the Chowilla Creek environmental regulator.
- Undertook hydraulic modelling of a range of management scenarios for the Chowilla Creek regulator to assist in the development and implementation of environmental flow strategies.
- Received construction approval for Boundary Creek and Tauwitchere small vertical slot fishways.
- Installed three fish passage structures at Lock 1 (Blanchetown), "Bank E" (Chowilla) and Hunters Creek (Hindmarsh Island).

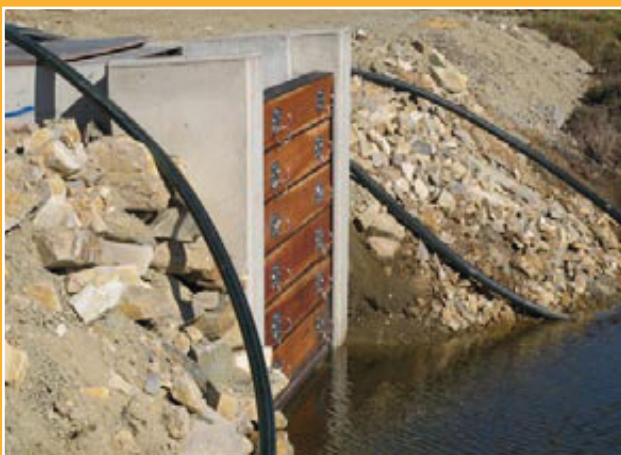
CASE STUDY 04

HUNTERS CREEK

FISH PASSAGE

Hunters Creek is an important freshwater and estuarine fish system located on Hindmarsh Island. It is considered critical in maintaining viable populations of endangered fish such as the Yarra Pygmy Perch, Murray Hardyhead and Southern Pygmy Perch.

Before the construction of the fish friendly regulator, Hunters Creek had an earthen embankment for vehicle access with a single pipe



running through the centre. This pipe was not suitable for the delivery of environmental flows or fish passage, as the velocities through the pipe were too high for fish, and there was a lack of light.

To accommodate fish passage and the effective delivery of environmental flows, the Hunters Creek fish friendly regulator was constructed. The fishway is of a vertical slot design comprising of box culverts and baffles. The vertical slot fishway design is the most effective over the wide variation of water levels found in this tidal system. Fish such as Common Galaxias (*Galaxias maculatus*), Congolli (*Pseudaphritis urvillii*) and Smallmouthed Hardyhead (*Atherinosoma microstoma*) that move between estuarine and freshwater environments will greatly benefit from the fishway.

The fish friendly regulator works by providing attraction and environmental flows through the bypass pipe and fish passage through the box culverts. The baffles in the box culverts cause the water to 'zigzag', which reduces the water velocity for the small-bodied fish to move through. The baffles also provide refuge and resting points within the fishway, where fish can rest before moving through the other baffles. The grid mesh top also provides vehicle access and sufficient light to avoid deterring the fish from using the fishway, as fish are unlikely to move into areas where there is a lack of light.

05

BUILDING CAPACITY

South Australia's Strategic Plan places a strong emphasis on building strong community networks and enhancing information transfer. Capacity building generates knowledge and skills that will better equip South Australians to responsibly manage our natural resources. This knowledge will allow South Australians to actively participate in making decisions for their individual and collective social, economic and environmental futures.

Adopting a strategic knowledge management approach will provide the framework for the long-term management of the River Murray, which will be enhanced by informed decision-making backed up by the most up-to-date and relevant science. Integrating this scientific knowledge increases the ability to achieve positive ecosystem outcomes throughout the South Australia Murray-Darling Basin and in upstream areas of strategic importance to South Australia.

Significant capacity has been built by directly funding research and investigations through improving research networks. This generates new knowledge that is used to improve environmental management outcomes, inform water policy and strengthen the State's position in the Murray-Darling Initiative and the National Water Initiative.

Innovative management systems and technologies in areas such as environmental flows, water trade and water use efficiency continue to be pursued to enable irrigators, water and environmental managers to respond to challenges presented by climate change, salinity and water allocation policy.

eWater CRC

During 2007-08, the *Investing in River Murray Ecology* project was progressed through the eWater Cooperative Research Centre (eWater CRC).

The eWater CRC is developing a suite of decision tools to assist the improved management of freshwater resources and environments.

This included models for forecasting and visualising scenarios, databases and decision support software, management guidelines and training courses for industry professionals and postgraduates.

Irrigation Research, Technology Diffusion and Education

In 2007-08 the program focussed on addressing the irrigation sector's immediate and critical issues of improving their responsiveness and resilience in dealing with the impacts of climate change, reduced water availability and lower water quality. The activities included:

- continuing to undertake workshops and field days for Murray irrigators on using tools to improve management of root zone salinity and increasing the efficiency of leaching irrigation with minimal irrigation;
- developing recommendations for the Riverland Wine Grape Industry on managing extreme temperature events;
- partnership with Industry in developing a toolkit to assist the Riverland Wine Grape Industry to identify its vulnerability to climate change;

- ongoing development of Irrigation Recording and Evaluation System (IRES) computer software to enable district scale reporting of irrigation performance to allow improved irrigation demand forecasting for a step-change in water availability; and
- using landscape-scale techniques to quantify vineyard water use, demonstrating there is scope for further significant improvement in water use efficiency by reducing evaporative losses.

Living Murray Icon Site Indigenous Facilitators

Indigenous facilitators have been employed at both South Australian icon sites. They facilitate Indigenous consultation and discussion on matters regarding the icon site including management plans, wetland closures and development of infrastructure.

Significant flora species for Indigenous nations have been identified at Chowilla.

Key Achievements

- Continued development of Indigenous engagement and consultation strategies.
- Indigenous support for both Icon Site and broader SA River Murray programs.
- Continued to undertake workshops and field days for River Murray irrigators on using tools to improve management of root zone salinity and increasing the efficiency of leaching irrigation with minimal irrigation.
- In partnership with industry, developed a toolkit to assist the Riverland Wine Grape Industry to identify its vulnerability to climate change.
- Continued development of Irrigation Recording and Evaluation System (IRES) computer software.





CASE STUDY 05

TOOLKIT FOR RIVERLAND WINE GRAPE INDUSTRY IRRIGATORS

In recent years fewer participants in the wine grape industry are asking "What is Climate Change?" or "Is climate change real?" and more are asking about the impact of climate change on wine grape growing and what can be done about it.

With support from the Grape and Wine Research and Development Corporation, the South Australian Wine Industry Association (SAWIA) and the South Australian Research and Development Institute (SARDI) have worked with the Riverland viticultural technical group to develop a toolkit to help address climate change and the wine industry in the Riverland. This involved acquiring the latest climate change projections for the region, including the

projected flows in the River Murray. Not long ago, the major challenge was a lack of information on climate change. Now there is an abundance of climate change information and the task is to understand the different levels of scientific confidence and to move past the headlines to the detail of the reports.

The likely impacts of climate change on viticulture can be summarised as follows:

- change in mean temperature, which will lead to faster crop development, higher water use and changed pest and disease risk;
- changes to extreme maximum temperatures;
- changes to frost risk;
- changes to amount and timing of rainfall influencing soil water;
- changes to quality and quantity of water available for irrigation; and
- change to carbon dioxide in the atmosphere.

The main concern in the Riverland is the quality and quantity of water for irrigation. This is because low allocations are a current reality rather than a future threat but also because the main way of dealing with problems such as heatwaves or even untimely frost is to use water.

The purpose of the toolkit is not to provide all the answers, but to prompt the important questions. By considering the climate change projections and the likely impacts on grape growing, grape growers are better positioned to think through adaptation options ranging from changing water use to different varieties.



PROGRAM STATEMENT FOR THE PERIOD ENDED 30 JUNE 2008

	Note	2008 \$'000	2007 \$'000
RECEIPTS			
	1		
Recurrent Appropriation		22,000	21,113
Total Receipts		22,000	21,113
EXPENDITURE			
Implementation of Water Allocation Plan		1,678	1,431
Investment in Salinity Accountability		208	212
River Murray Act		543	522
MDBC State Contribution		3,823	3,741
Environmental Flows & Wetland Management		482	470
Modelling Assessment		181	229
Prescription of Eastern Mount Lofty Ranges		895	885
Investing in River Murray Ecology		156	150
Upgrade of Riverland Drainage Disposal System		23	24
Upgrade of River Murray Waste Disposal Stations		512	550
River Murray Select Committee - Drought Management & Other Recommendations		217	167
Improved Information Management		299	225
Water Acquisition for Environmental Flows	2	9,478	5,522
MDBC Independent Commissioner		61	42
Lower Murray Levee Banks		109	0
International Salinity Conference		48	0
E-Flows and Wetland Management		0	197
Irrigation Research, Technology Diffusion and Education		800	900
Water Quality Improvement		262	256
River Murray Environmental Manager		235	308
TOTAL PAYMENTS		20,010	15,831
Net Increase in Funds		1,990	5,282
Funds held at 30 June		14,473	12,483

1 Fund Purpose and Funding

The "Save the River Murray Fund" (The Fund) is established under Section 100 of the *Waterworks Act 1932*. The major purpose of The Fund is to provide funds for programs and measures to improve and promote the environmental health of the River Murray or ensure the adequacy, security and quality of the State's water supply from the River Murray. The Fund contributes to the excess of the State's contribution to the MDBC and may be used to provide rebates (including administration costs) in particular cases.

Revenue collected from the Save the River Murray levy is paid into the Fund through the provision of appropriation from the Consolidated Account. The fund is not interest bearing.

(a) Proposed Future Developments in Financial Reporting

Establishing the Save the River Murray Fund (STRMF) as a separate general-purpose reporting entity, where separate statements would be prepared and then consolidated with the Department recognising that the latter retains control. This is intended to improve the overall 'understandability', an essential qualitative characteristic of financial reporting. Recent transactions in respect of water license transfers have further emphasised the need for separation of reporting. This reporting relationship is not provided for in existing statutory arrangements.

(b) Goods and Services Tax (GST)

Generally transactions through The Fund are included under the grouping provisions of the GST Legislation. Under grouping provisions, the Department of Water, Land and Biodiversity Conservation (DWLBC) is responsible for the collection of GST on sales and payment of GST on purchases. The DWLBC received and paid these monies to the Australia Tax Office.

2 Water Acquisition

Funds transferred to The Living Murray for water acquisition during the year totalled \$9.478 million. Water entitlements of 3,179,490 KL was purchased from irrigators at a cost of \$7.395 million. The balance of funds were used to invest in interstate water recovery programs.

3 Save the River Murray Contributions Fund

A separate fund, Save the River Murray Contributions Fund, has been established to receive contributions where there is no obligation to pay the Save the River Murray Levy. The separate fund was created because the legislation that established the Save the River Murray Fund only provided for revenue to be received from the Save the River Murray Levy.

The funds received in the Save the River Murray Contributions Fund will be applied for the same purpose as the Save the River Murray Fund. The balance of funds held in the Save the River Murray Contributions Fund at 30 June 2008 was \$4,415.

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