

River Murray Act 2003
Annual Report 2007-2008
Incorporating the Triennial Review

Prepared for the South Australian Parliament by the Minister for the River Murray



**Government
of South Australia**

Department of Water, Land and Biodiversity Conservation - September 2008

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FOREWORD

The past three years have seen the ever worsening state of the River Murray, in part the result of the worst drought in 116 years. This has caused severe hardship for irrigators: over the past three years opening water allocations have reduced from 70% at the start of the irrigation 2005-06 season to just 2% in 2008-09. The environment has also suffered, particularly the Lower Lakes and Coorong. Low water levels have seen the risk of acid sulphate soils in wetlands and the Lakes, posing an additional threat to the environment and water quality.

Despite the huge challenges we are facing, progress is being made. The *Intergovernmental Agreement on Murray-Darling Basin Reform* was signed at the COAG meeting of 3 July 2008, leading the way to the establishment of a single Murray-Darling Basin Authority and providing for a comprehensive Basin Plan that will require full compatibility of all basin state water allocation plans. The agreement also aims to secure water for critical human needs for South Australia.

As a condition of signing the Intergovernmental Agreement, the Premier succeeded in gaining \$610 million in Commonwealth funding under the Murray Futures Project to fund programs to restore flows to the River Murray. This funding includes \$330 million for infrastructure efficiency improvements, \$200 million for projects to help save the Ramsar listed Lower Lakes and Coorong, and \$80 million to boost the existing purchase of water entitlements from willing sellers.

It is important to understand that the *River Murray Act 2003* in itself does not have the power to achieve increased flows of water into South Australia from further upstream. It is not a catchment Act and only provides for the regulation of activities to protect the River within South Australia. The great strength of the Act lies with the referral policy. The referral of development, licence and permit applications that relate to the River Murray Protection Areas in South Australia ensure that human activities do not negatively impact on water quantity and quality, native species and their habitats, and on the Riverland communities that are dependent on the River. In addition, the referral policy has been an outstanding success in reducing red tape and ensuring a more robust approach to development assessment.

It is with pleasure that I present the *River Murray Act 2003* Annual Report for 2007-08, which highlights some of the excellent work that has been undertaken this past year. In addition this report includes the second triennial review of the Act, as required by section 11 of the Act.

Hon Karlene Maywald

MINISTER FOR THE RIVER MURRAY

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PART 1

ANNUAL REPORT

1. ANNUAL REPORT - INTRODUCTION

This report describes the progress the *River Murray Act 2003* has made in providing special protection for the River Murray and incorporates the Annual Report and the Triennial Review. This is the fifth Annual Report reporting on the operation of the Act for 2007-08 and the second Triennial Review that identifies the progress the Act has made in providing for greater consideration of River Murray issues for the period 2004-05 – 2007-08. The report is in two parts: the Annual Report is detailed in Part 1 and the Triennial Report in Part 2.

Section 10 of the River Murray Act requires the Minister responsible for the administration of the Act, on or before 30 September of each year, to prepare a report on the operation of the Act for the preceding financial year. The Minister must cause a copy of the report to be laid before both Houses of Parliament within six sitting days of the report being prepared.

The report must include:

- i) information on the implementation of the Act (taking into account the provisions of the Implementation Strategy);
- ii) information on the extent to which the objects of the Act and the Objectives for a Healthy River Murray are being achieved; and
- iii) report on the following matters for the financial year –
 - a. the referral of matters to the Minister under any related operational Act;
 - b. the enforcement of the general duty of care; and
 - c. action taken by the Minister for an authorised officer under Part 8 of the Act (protection and other orders).

The Annual Report provides information on the implementation of the Act, including referrals to the Minister under the related operational Acts, enforcement of the general duty of care to protect the River, and initiatives undertaken to improve the health of the River.

This Annual Report relates to the period from 1 July 2007 to 30 June 2008 and has been compiled from information provided from within Department of Water Land and Biodiversity Conservation and other relevant agencies. Agencies contributing to the report are listed in Appendix 7.

2. MEETING THE OBJECTS OF THE ACT AND OBJECTIVES FOR A HEALTHY RIVER MURRAY

The River Murray Act sets out a list of objects of the Act and the *Objectives for a Healthy River Murray*. The objects and objectives seek to protect the River Murray by ensuring that all reasonable measures are taken to safeguard, restore and enhance the River. A complete list of the objects can be viewed in Appendix 1 and Appendix 5 respectively. The objectives for a Healthy River Murray are reported on in the State of the River Murray, Section 10 of this report.

The Act itself provides both the measures and mechanisms to facilitate protection of the River. Any existing or proposed activities should be undertaken in a way that benefits the River while providing for the economic, social and physical well being of communities, and promoting ecologically sustainable development. Through regulations, referrals, authorised officers, compliance tools and policies implemented pursuant to the Act, the River and its environs can be protected from inappropriate or damaging activities and developments.

There were a large number of programs and projects undertaken in the Murray-Darling Basin during the 2007-08 financial year that acted to further progress the objects and objectives. Various government agencies (state, local and the Australian Government), industry groups and community groups have been involved in a broad range of initiatives designed to improve the health of the River. The work being undertaken in the region is significant and a complete list of Programs and Projects are provided in Appendix 3 of this report.

3. IMPLEMENTATION OF THE ACT

The aim of the River Murray Act is to enhance and restore the River Murray in South Australia, ensuring that the River and natural resources are sustainably managed. To achieve this, the Act aims to ensure that both existing and new activities that may adversely affect the health of the River are undertaken in a way that protects, maintains and improves river health.

The purpose of the Act is to provide coordination of, and fill gaps between the many Acts applicable to the management of the River Murray and its resources. The establishment of the referral policy has been central to the integration of the River's interest into the existing legislative base.

Implementation of the Act in 2007-08 has concentrated on publishing and marketing the River Murray Act Implementation Strategy, responding to referrals, assessing state government policy documents against the objects of the Act, developing policies in relation to various aspects of the referral system (in cooperation with other agencies), compliance matters and relationship building with various stakeholders.

3.1 IMPLEMENTATION STRATEGY

Following the release of the *River Murray Act Implementation Strategy* in 2006, the Minister approved the release of the *River Murray Act Referral Assessment Policy - Overview and General Provisions* for distribution in early 2008. This document is designed to assist officers of Department of Water, Land and Biodiversity Conservation in decision-making on matters that have been referred for comment or direction under the Act. Copies have been distributed to Councils within the River Murray Protection Areas (see Appendix 2) to provide guidance on assessment of referrals.

Special provisions foreshadowed in the *Overview and General Provisions* are in the process of being drafted. These Special Provisions relate to Heritage, Coast, Aquaculture and Wetlands and Floodplains.

3.2 SWITCHING ON PROVISIONS

Section 9 of the Act gives the Minister the ability to impose conditions on activity authorisations, through the operation of the referral mechanism. The mechanism ensures that applications for certain prescribed activities under related operational Acts are referred to the Minister for the River Murray as part of the approval process. The referral mechanism for most of the related operational Acts is only activated when regulations are made (with the exception of the *Fisheries Management Act 2007*, *Mining Act 1971* and the *Petroleum Act 2000* – see section 4 for further information).

An exemption for the requirement to refer certain dredging activities under the *River Murray Act 2003* was gazetted in December 2006 in response to the drought and continued for the

2007-08 period. Further information on this is provided in section 4.1. No other new regulations were made in the 2007-08 financial year.

3.3 DELEGATIONS

Section 12 of the Act allows the Minister to delegate functions or powers under the Act or under any related operational Act to a body or person, for the time being, holding or acting in a specified office or position.

Some of the Minister's functions and powers are delegated to positions within state government departments and statutory bodies, rather than to specific persons. This provides maximum flexibility for officers acting in positions to which functions or powers have been delegated, as they are able to undertake the functions and powers without further authorisation.

Most delegations were put in place shortly after the Act came into operation and have been amended over time as required.

Delegation to the Department of Water Land and Biodiversity Conservation for clearance of vegetation under relevant regulations of the Native Vegetation Regulations 2003 for applications referred pursuant to the Development Act 1993, has been approved by the Native Vegetation Council and endorsed by the Minister for Environment and Conservation and the Minister for River Murray.

3.4 APPOINTMENT OF AUTHORISED OFFICERS

The Act provides various tools to promote and enforce compliance with the duty of care, including conditions imposed through the statutory referral process and through the Regulations. The Act is administered by the Minister for the River Murray and by Authorised Officers. Staff of the Department of Water Land and Biodiversity Conservation, the Environment Protection Agency, the Department of Primary Industries and Resources SA and the Natural Resource Management Boards have been appointed as Authorised Officers.

No new training sessions were provided specific to the River Murray Act during 2007-08. Courses were held for officers authorised pursuant to the *Natural Resources Management Act 2004* facilitated by the University of South Australia in conjunction with the Department of Water, Land and Biodiversity Conservation (DWLBC). Refresher courses are also run for the Natural Resources Management Boards. Currently there are 29 officers authorised within the SA Murray-Darling Basin; 17 regional officers employed by SA Murray-Darling Basin Natural Resource Management Board and 12 state officers from the Investigations Unit of DWLBC. One DWLBC compliance officer is in the field full time to follow up complaints, check compliance with conditions of statutory approvals and enforce the general duty of care.

The *River Murray Act Compliance and Enforcement Guidelines 2004-05* and information sheet (as required under section 14 (11) of the Act), remain in force without amendment.

3.5 RAISING AWARENESS

Publications are produced to assist users of the Act and the general public to understand the Act and its requirements, namely:

- Fact sheets:
 - Overview of the Act
 - General Duty of Care
 - Referrals
- River Murray Act User's First Guide, and
- Exemption of certain outbuildings and farm buildings.

These publications remain in effect and continue to be available on the Department of Water, Land and Biodiversity Conservation web site, www.dwlbc.sa.gov.au, and in the offices of relevant government agencies and local councils.

No additional fact sheets have since been prepared. However, following on from the *Overview and General Provisions* (see section 3.1), the *River Murray Act Referral Assessment Policy: Neutral or Beneficial Effect Guidelines* was developed and is currently undergoing a six-month trial. Its purpose is to assist with the preparation of development proposals before submitting them for approval, by providing a comprehensive step-by-step guide for self-assessing the likely impacts of a proposal against each of the Objectives for a Health River Murray.

3.6 MANAGEMENT AGREEMENTS

Section 18 of the Act allows the Minister to enter into management agreements with owners of land within the South Australian Murray-Darling Basin. The potential scope for management agreements is very wide. They may relate to:

- the conservation or management of water;
- the preservation, conservation, management, enhancement or re-establishment of any aspect of the natural resources of the River Murray; and
- any other matter associated with furthering the objects or objectives of the Act.

No management agreements have been drafted to date.

4. REFERRALS, ENFORCEMENT OF THE GENERAL DUTY OF CARE AND ACTIONS TAKEN

The provisions within the River Murray Act for establishing referrals and the general duty of care are important tools in ensuring the protection of the River Murray.

The referral provisions of the Act require bodies administering related operational Acts to take the River Murray into account in the preparation of plans and undertaking of functions. The bodies must also seek input from the Minister for the River Murray before granting approval for certain types of activities in particular locations. Most of the referral provisions require regulations to be made, which in turn set out the types of activities that need to be referred. As outlined in section 3.2, a limited number of regulations have been made to date. Details of the regulations that have been made can be found in Section 4.1.

The Act also established a duty of care for the River, enforceable by a River Murray Protection Order or Reparation Order. All persons have a general duty of care to take reasonable measures to prevent or minimise harm to the River Murray through actions or activities. A breach of this duty does not constitute an offence but the issuing of a Protection Order or Reparation Order can enforce compliance.

Information on the enforcement of the general duty of care and actions taken during 2007-08 is provided in sections 4.2 and 4.3.

4.1 REFERRAL OF MATTERS UNDER RELATED OPERATIONAL ACTS

The Acts currently requiring referrals are the *Development Act 1993*, *Mining Act 1971*, *Petroleum Act 2000*, *Harbours and Navigation Act 1994* and the *Fisheries Management Act 2007*. The majority of referrals are being generated pursuant to the Development Act. In December 2006, an exemption for the requirement to refer certain dredging activities under the *River Murray Act 2003* was gazetted in response to the drought. The drought also resulted in a decrease in formal referrals to the Minister for the River Murray under the Development Act during 2007-08 compared to the previous reporting periods.

4.1.1 DEVELOPMENT ACT 1993

Development applications for prescribed activities within the River Murray Protection Areas are referred to the Minister for the River Murray pursuant to schedule 8 of the Development Regulations. The Minister may direct the relevant authority to refuse the application or may impose conditions of approval if the application is to be approved by the relevant authority.

Development Applications

During 2007-08, 687 mandatory referrals under schedule 8 of the Development regulations were assessed against the objects and objectives of the River Murray Act. This figure includes 112 emergency dredging applications, which although formally exempt under the Notice of Exemption, were still referred informally to the Minister for the River Murray to ensure compliance with the Objects of the River Murray Act and the Objectives for a Healthy River Murray. Referral fees were not charged for these applications.

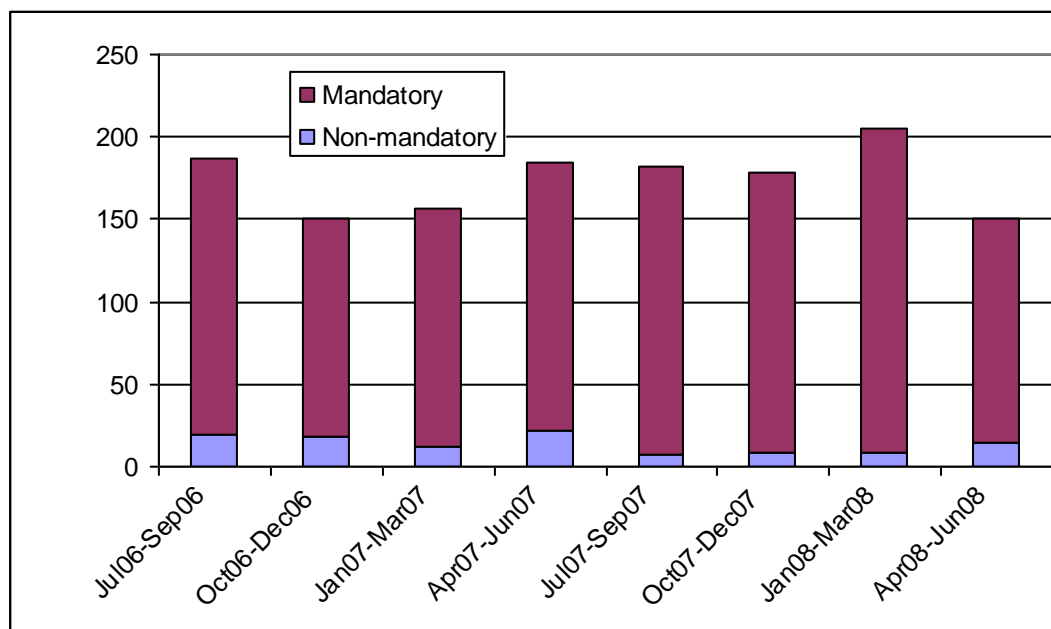
Of the 687 applications approximately 300 (44%) were for dwellings, sheds, garages and outbuildings and 120, (18%) were land divisions. The remaining referrals related to land use, river use, water use, alteration to the landscape and/or impacts upon riparian zones, vegetation or biodiversity. Almost all mandatory referrals had conditions imposed on them by the Minister.

When an application has been referred for assessment against the objects and objectives of the River Murray Act, additional information from an applicant can be requested by the referral agency. A request for further information effectively 'stops the clock' on the period prescribed for a response from the referral agency.

The Minister's delegate negotiated formally with 44 applicants, stopping the clock for further information. For 20% - 30% of applicants, additional information was sought informally via telephone discussions, site visits or email, negating the need to stop the clock. 653 (95%) of the mandatory referrals were responded to within required statutory timeframes (8 weeks).

In addition to the mandatory and exempted mandatory referrals, 46 non-mandatory referrals were made to the Minister for the River Murray, for additional activities within the River Murray Protection Area or the broader SA Murray-Darling Basin. In these cases, recommendations were provided to the referring body for consideration in their decision making process.

Figure 1. Number of Mandatory / Non Mandatory Referrals 2006-07 and 2007-08.



Development Plan Amendments

Under section 24(3) of the *Development Act 1993*, if a proposed amendment to a Development Plan by a Council or the Minister relates to any part of the Murray-Darling Basin, the Minister for Urban Development and Planning must, in relation to the preparation of the amendment, consult with and have regard to the views of the Minister for the River Murray. The Minister for the River Murray is referred Development Plan Amendments (DPAs) at several stages of the planning process, including the Statement of Intent phase.

During 2007-08, 17 Statements of Intent and Development Plan Amendments were in, or adjacent to, one of the two River Murray Protection Areas. The Minister responded to each of these referrals with comments and recommendations.

4.1.2 MINING ACT 1971

Under the *Mining Act 1971*, applications, including renewals, within a River Murray Protection Area must be referred to the Minister for the River Murray for:

- exploration licences,
- mining leases;
- miscellaneous purpose licences;

- retention leases; and
- authorisation to use declared equipment;

There were 30 referrals made for a variety of exploration licenses, declared equipment use and mining leases during 2007-08.

4.1.3 PETROLEUM ACT 2000

Under the *Petroleum Act 2000*, Statements of Environmental Objectives, including a revised statement that applies to any part of the Murray-Darling Basin, must be referred to the Minister for the River Murray.

Six items were referred to the Minister during 2007-08.

4.1.4 HARBORS AND NAVIGATION ACT 1994

River events that require a licence under the *Harbours and Navigation Act 1993* and involve a number of motorised vessels as specified in the Regulations, must be referred to the Minister for the River Murray.

Two aquatic activity licenses were referred during 2007-08.

4.1.5 FISHERIES MANAGEMENT ACT 2007

Activities that require a licence or a permit or an exemption from a license or a permit under the Fisheries Management Act 2007 must consult with the Minister for the River Murray. This provision commenced with the revised Fisheries Management Act coming into effect only recently.

One exemption from the requirement of needing a permit was referred during 2007-08.

4.2 ENFORCEMENT OF THE GENERAL DUTY OF CARE

The general duty of care states, “a person must take all reasonable measures to prevent or minimise any harm to the River Murray through his or her actions or activities”. Harm includes risk of harm, future harm and anything declared by regulation to be harm. Harm need not be permanent but must be more than transient or tenuous in nature, for example, the deposition of material on the floodplain whether from excavated channels or to create an artificial beach. A written or verbal warning may be appropriate if the problem can be quickly corrected in a short time and the detrimental effect on the River will be minor. A breach of duty of care may be enforced by issuing a compliance order (see section 4.3).

A Compliance Officer for the River Murray, was employed full time during the 2007-08 reporting year. In addition to enforcing the general duty of care principle, the Compliance Officer was assisted in educating and raising awareness amongst stakeholders, councils, and Government agencies who have a vested interest in the welfare of the health of the River Murray.

4.3 ACTIONS TAKEN UNDER THE ACT – PROTECTION AND OTHER ORDERS

Protection Orders may be issued to secure compliance with the general duty of care, a condition of a statutory authorisation or any other requirement. An order may require a person to stop or not initiate a particular activity, to only carry on an activity at a particular time, to take specified action within a certain timeframe, to undertake tests or monitoring or prepare a plan or report. If urgent action is required, an authorised officer may issue an Emergency Protection Order. It is an offence not to comply with a Protection Order.

A Reparation Order can be issued if the Minister is satisfied a person has caused harm to the River Murray by contravening the general duty of care, a condition of a statutory authorisation or any other requirement. A Reparation Order may require a person to take particular action to make good any damage or make payments to enable action to be so taken. The Order may include other requirements to prevent or mitigate further harm to the River. An authorised officer may also issue an Emergency Reparation Order.

During 2007-08, the number of matters reported were significantly greater than the previous year. Sixty-one matters were reported relating to activities that were likely to cause harm to the river, resulting in six River Murray Protection Orders being issued. The River Murray Compliance Officer attended a number of community meetings and responded to questions relating to concerns of river residents, largely related to drought conditions and lower water levels. Matters investigated during 2007-08 are described under the following headings:

Sand dumping

Low water levels have resulted in some landholders depositing sand to shore up riverbanks or create artificial beaches. This activity breaches the water quality guidelines under the Environment Protection Act and can also be a breach of the Development Act. The activity has the potential to cause significant harm when river levels rise. Rehabilitation is difficult or impossible to achieve. A program has been initiated by the Environment Protection Authority to educate river residents about the negative impacts of the practice and warn them of potential penalties.

Emergency dredging

Due to the low water levels, emergency dredging was removed from the requirement of a development approval. However this activity has caused concern in some cases where

material extracted from the river was deposited and left on the flood plain. Subsequent compliance action required deposited material to be removed.

Development / planning issues

Unprecedented low river levels have contributed to some residents extending boat ramps, jetties and moorings without submitting development applications. These activities fail to comply with approved specifications and can pose a significant risk of harm to the river. Liaison has occurred with relevant agencies to ensure that residents are aware of their obligations.

Houseboat relocation

Despite the inherent risks to water quality, a program was initiated to allow houseboats to be moored on the main course of the river where access to a marina is limited by low water levels. Complaints were received that this has resulted in the destruction of native vegetation and riverbank erosion. The problem continues to be closely monitored.

Illegal taking of water

Due to the extreme conditions relating to the taking of water from the River Murray the River Murray Compliance Officer has been involved in the investigation of a number of matters where water theft has occurred. This has resulted in prosecution action being taken under the Natural Resources Management Act. The situation continues to be closely monitored.

5. ANNUAL REPORT - SUMMARY

Through the implementation of the River Murray Act and its regulations, referrals, authorised officers, compliance tools the River and its environs experienced increased protection from inappropriate or damaging activities and developments during 2007-08.

In addition, federal, state and local government bodies worked with the community to instigate a great many number of projects and programs in the SA Murray-Darling Basin region that acted to further protect, enhance and restore the natural resources of the area. In general, these initiatives were based around the key areas of improving water quality, restoring environmental flows and key habitat features, as well as protecting native species, and increasing community involvement in the management of the River.

There have been significant achievements made to protecting, restoring and enhancing the River Murray in 2007-08 despite continuing challenges related to the drought. Levels of investment and activity within the region are indicative of the extreme importance the River Murray and Murray-Darling Basin have to South Australia. Refer to Appendix 3 for a complete list of projects.

In response to historically low water levels in the River Murray a number of emergency projects have been undertaken. These include emergency rescue of threatened fish and turtle species, abandonment of some key fishway projects, sand pumping at the Murray Mouth and pumping of water from Lake Alexandrina to Lake Albert to forestall the exposure of acid-sulphate soils below Lock 1 and the Lower Lakes.

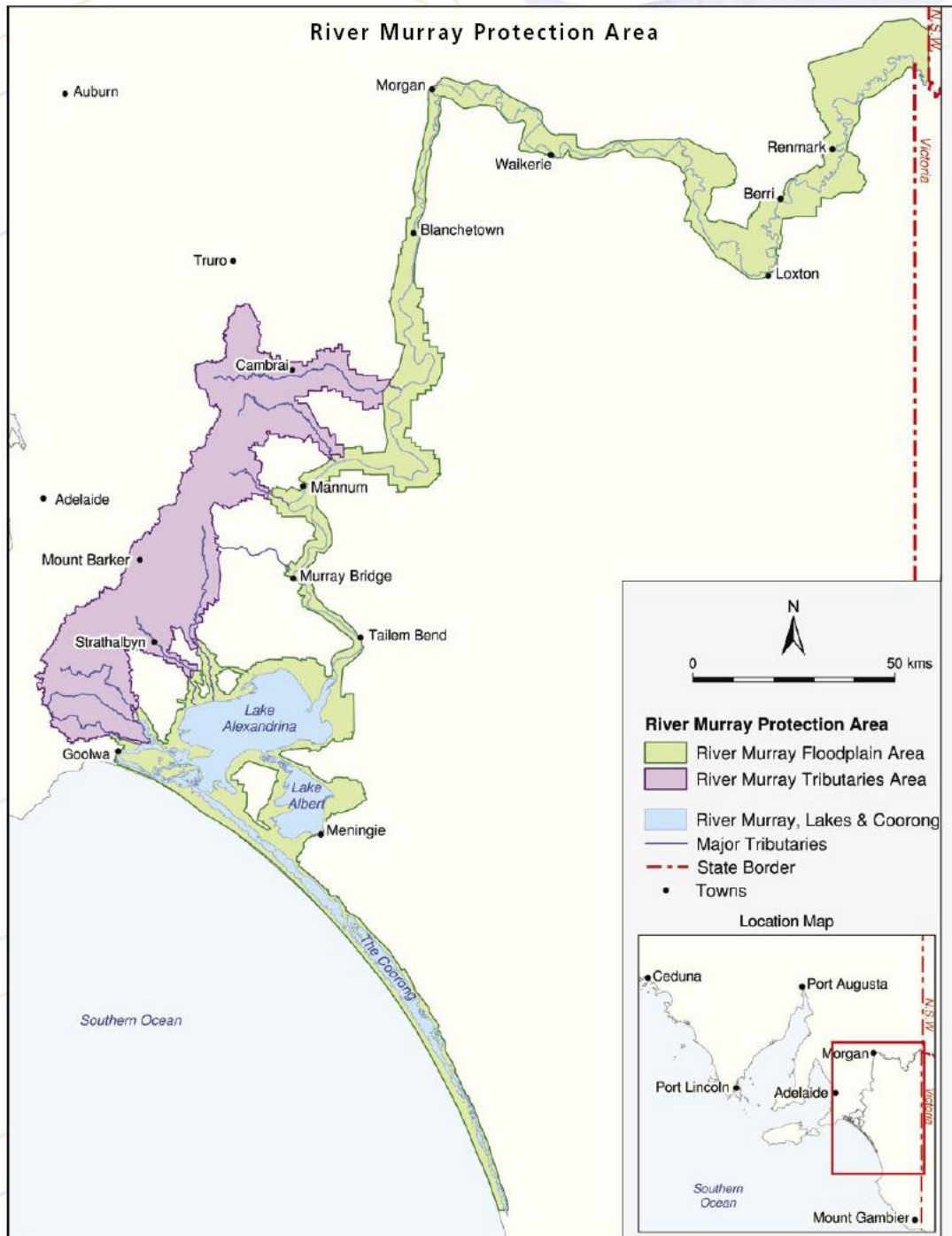
The recently announced Intergovernmental Agreement on Murray-Darling Basin Reform has made available considerable funding to improve infrastructure to allow more efficient management of wetlands and to provide water supply to Lower Lakes irrigators. It is hoped that under the Agreement the dire state of the Murray-Darling System can be reversed through a basin-wide approach to keeping diversion within sustainable limits. In the longer term this should mean that more water is available for downstream users including the environment.

APPENDIX 1 – OBJECTS OF THE RIVER MURRAY ACT

The objects of the Act are:

- i. to ensure that all reasonable and practicable measures are taken to protect, restore and enhance the River Murray in recognition of its critical importance to the South Australian community and its unique value from environmental, economic and social perspectives and to give special acknowledgement to the need to ensure that the use and management of the River Murray sustains the physical, economic and social well being of the people of the state and facilitates the economic development of the state; and
- ii. to provide mechanisms to ensure that any development or activities that may affect the River Murray are undertaken in a way that provides the greatest benefit to, or protection of, the River Murray while at the same time providing for the economic, social and physical well being of the community; and
- iii. to provide a mechanism so that development and activities that are unacceptable in view of their adverse effects on the River Murray are prevented from proceeding, regulated or brought to an end; and
- iv. to promote the principles of ecologically sustainable development in relation to the use and management of the River Murray; and
- v. to ensure that proper weight is given to the significance and well being of the River Murray when legislative plans and strategies are being developed and implemented; and
- vi. to respect the interests and aspirations of Indigenous peoples with an association with the River Murray and to give due recognition to the ability of those Indigenous people to make a significant contribution to the promotion of the principles of ecologically sustainable development in relation to the use and management of the River Murray; and
- vii. to respect the interests and views of other people within the community with an association with the River Murray and to give due recognition to the ability of those people to make a significant contribution to the promotion of the principles of ecologically sustainable development in relation to the use and management of the River Murray, and
- viii. otherwise to ensure the future health, and to recognise the importance, of the River Murray.

APPENDIX 2 – RIVER MURRAY PROTECTION AREAS



APPENDIX 3 – PROGRAMS AND PROJECTS

The South Australian Government supports a wide range of programs that directly contribute to or complement the objects of the Act and the Objectives for a Healthy River Murray. These programs are listed below against the relevant objective. Many programs contribute to a number of objectives, but for simplicity have only been listed under the objective to which they most clearly relate. Programs have not been listed against the Objects of the *River Murray Act 2003*, as the objectives provide a more detailed breakdown and encompass programs that relate to the objects.

1.1 The key habitat features in the River Murray system are to be maintained, protected and restored in order to enhance ecological processes

- **Chowilla Fish Ecology Investigations**

The Chowilla Fish Ecology Project is a collaborative research project of SA Research and Development Institute and SA Murray-Darling Basin Natural Resources Management Board that is funded through the Murray-Darling Basin Commission's Living Murray Environmental Works and Measures Program. The knowledge generated through these projects will be used to provide advice on the flow management and habitat requirements of native fish, particularly Murray cod and golden perch.

- **Lock 1 Carp Disposal Project**

In November 2007, the Lock 1 fishway was completed as a part of the Sea-to-Hume Dam fishway program incorporating a carp separation cage. Field assessment trials from November 2007 to April 2008 demonstrated that the cage successfully removed 869 kilograms of carp per day from Lock 1, while benefiting native fish through improved fish passage.

- **Further Development of an Implementation Plan for the Katarapko Demonstration Reach Project**

Demonstration reaches are a new form of integrated action designed to improve river health and therefore native fish populations over a significant reach of river in South Australia. The Katarapko Reach project includes the Katarapko and Eckert Creek floodplains, associated flowing anabranches and wetlands.

Various baseline studies have been completed since the inception of the project in 2006. These include: assessment of flow data for Eckert Creek, development of a digital terrain model, groundwater mapping, baseline fish surveys, in-stream habitat assessment, an updated vegetation health map and identification of barriers to flow and fish passage. This information along with community monitoring, was used to further the development of an implementation plan for the site. The implementation plan encapsulates a summary of assets, threats, actions and activities to be undertaken, including a communications plan and estimated budget.

- **Main Channel Habitat Identification and Fish Species Association Project**

The Main Channel Habitat Identification and Fish Species Association Project aims to assess the various types of habitats available for fish along the Lower Murray in South Australia from Wellington to the New South Wales border, and to identify any species assemblages that are specific to these habitat types. The project was initiated during 2006-07 and has produced a GIS database that shows the distribution and extent of different habitat types. Representative habitats were fished in autumn this year and fish habitat associations will be determined. This information will allow natural resource managers to better target the restoration and protection of habitats necessary for the maintenance of native fish populations in South Australia, and to ensure that native fish populations are sustainable.

- **River Murray Environmental Watering Plan and Prioritisation Framework**

A draft environmental watering plan has been developed and is being prepared for broader consultation. It outlines the overarching strategy for environmental water allocation for the River Murray in South Australia. The River Murray Floodplain Prioritisation Project and the Wetland Prioritisation projects have been completed and will guide the allocation of resources for floodplain and wetland management for the next five years.

Water was made available for Living Murray projects through the Murray-Darling Basin Commission's *Living Murray Initiative* to re-water sites that were watered two years previously, including 2.6 GL at Chowilla and 617 ML at Banrock Station (combined with 215 ML donated by Hardy Company). Little Duck Lagoon (near Berri) was filled by water (10.8 ML) donated to the SAMDB NRM Board by Waterfind Environment Fund, Nature Foundation, and Margaret Gambling a private irrigator in the Lower Lakes.

- **State Biosecurity Strategy**

Biosecurity is a cross-sectoral issue, with environmental, economic and social impacts caused by a wide range of invasive species, including weeds, vertebrate pests, insects and pathogens. The SA Murray-Darling Basin Natural Resources Management Board has participated in the development of a biosecurity strategy for South Australia to address invasive species management issues across state government agencies. The strategy includes consideration of the national AusBIOSEC intergovernmental arrangements. The Board is addressing the strategy's objectives that relate to: interagency arrangements, risk management, capabilities, communication and awareness, monitoring and surveillance, management of data, planning processes, science-based decision making, social and community pest impacts, funding and resources.

- **Interstate Exchange on Pest Risks**

The lower River Murray is an extensive system crossing state borders and includes many swamps and backwaters. The extent of the system poses a risk of an outbreak of the many aquatic weeds that occur in the New South Wales and Victorian sections of the river. Regular surveys are conducted along the river for early detection and control of any new outbreaks.

The SA MDB NRM Board communicates with the adjoining border roadside quarantine check stations to report any movement of interstate machinery or equipment that has the potential of transporting pests or diseases, to allow for follow up inspections.

1.2 The environments constituted by the River Murray system, with particular reference to high-value floodplains and wetlands of national and international importance, are to be protected and restored

- **Collaborative Research Program for the Coorong, Lower Lakes and Murray Mouth (CLLAMM) Ecology**

This \$2.2 million project is funded by the Commonwealth Science and Industrial Research Organisation (CSIRO) National Flagship Program: *Water for a Healthy Country*. Other partner organisations include University of Adelaide, Flinders University, Australian Water Quality Centre, Department for Environment and Heritage (DEH), DWLBC and SAMDB NRM Board. The project aims to develop system understanding, models and tools for assessing the effectiveness of interventions to improve ecological function of the Coorong, Lower Lakes and Murray Mouth ecosystems. In addition, the SA Research and Development Institute (SARDI) has also successfully attracted research funding from the Fisheries Research and Development Corporation (FRDC) to study flow related fish and fisheries ecology in the Coorong.

Fish sampling has shown that there is a significant difference in fish community structure in the estuary, northern lagoon and southern lagoon of the Coorong, and a general decline in species diversity from the north to south (only small-mouthed hardyhead is present in the southern lagoon). It has also shown that while some species (e.g. congolli) are reasonably tolerant of high salinity, others are not (in particular mullet and the Tamar goby). Rising water temperature is also a significant contributing factor to fish deaths.

Comparisons between commercial catch data since 1984-85 and flow volumes across the barrages indicate reasonable correlations environmental flows and the breeding of greenback flounder and yellow-eye mullet.

SARDI Aquatic Sciences has also engaged Rural Solutions SA to develop a survey for Ngarrindjeri elders to capture information on native fishes and significant drought and flood events in the Coorong pre-European flows.

- **Coorong and Lakes Alexandrina and Albert Ramsar Site**

Department for Environment and Heritage developed a pre-consultation draft of the revised Ramsar Management Plan during 2007-08. This document will be subject to further development and internal government consultation during 2008-2009 prior to its release as a public consultation draft.

- **Katarapko Eckert Creeks Demonstration Reach for Native Fish**

The Demonstration Reach project is a partnership between DEH, SAMDB NRM Board, DWLBC, Rural Solutions SA, Friends of Parks Inc and Banrock Station Wines guided by a project management Memorandum Of Understanding. A Project Steering Group comprising community and government representatives continued to support the project during 2007-08. Background investigations for management options have been developed and a draft implementation plan completed.

- **Riverland Ramsar Site Management Plan**

Department for Environment and Heritage is drafting a management plan for the Riverland Ramsar site in cooperation with landholders and the community. As part of this process the proposal to realign the Ramsar site boundary to reflect the ecological boundary of the wetland using the 1956 flood level was approved. This also addressed community concerns. The draft ecological character description has been completed and released for public comment.

- **Perpetual Lease Accelerated Freeholding Project**

The Perpetual Lease Accelerated Freeholding Project seeks to return (where possible) high conservation value wetland areas to the Crown to facilitate future improved management regimes. One hundred and three new fixed waterfront boundaries 50m or greater in width have now been established under this project. Seventy-five more are yet to be finalised. A smaller residual project has been established to finalise this project by 30 June 2009.

- **Wetland Management Plans for National Parks and Wildlife Act Reserves and Crown Land**

Department for Environment and Heritage implemented wetland management plans for 14 wetlands located within National Parks and Wildlife Reserves and Crown Land along the River Murray from Chowilla to Morgan during 2006-07. Only one wetland (Little Duck) received water during 2007-08.

- **Chowilla Icon Site Understorey Vegetation Monitoring at Red Gum Watering Sites**

The Living Murray has funded the SARDI to undertake a series of understorey vegetation surveys before and after wetlands were flooded to improve overstorey condition. The aim of the project was to determine the change in vegetation communities brought about by flooding and to assess the relevant Living Murray targets.

- **Chowilla Floodplain Icon Site**

Although the current drought is causing significant stress to the floodplain environment, significant progress has been made at The Living Murray Chowilla Floodplain Icon Site over 2007-08. Approval has been granted to undertake a detailed design for the Chowilla environmental regulator that will enable watering of 40% of the floodplain with minimal volumes of water. Concept designs for Pipeclay Creek Weir and Slaney Creek Weir have been completed. Under The Living Murray initiative 2.6

gigalitres of water was made available for environmental watering at five high value, critically stressed sites at Chowilla. Ecological responses to date are very positive.

- **2007 River Murray Wetlands Baseline Survey**

The SA Research and Development Institute was contracted by the Mid-Murray Local Action Planning Committee to undertake baseline vegetation surveys at Markaranka Flat, Lyrup Forest, Wongulla Lagoon and Curnamont wetlands. The aim of the project was to gather baseline information on the vegetation communities of the wetlands to assist community groups to manage these wetlands and determine if there were any species of conservation significance that require protection.

- **Community Wetland Management**

27 managed (regulated) wetlands have remained closed since January 2007 as a drought measure, leading to water savings of approximately 34 gigalitres. An additional six permanent (unregulated) wetlands have been temporarily disconnected to achieve annual evaporative water savings of around 36 gigalitres. Basic monitoring is underway at the managed sites and a comprehensive ecological and water quality-monitoring program is being implemented at the six temporarily disconnected sites.

- **Lower Lakes, Coorong and Murray Mouth (LLC&MM) Icon Site**

The ecological health and condition of the Coorong and Lower Lakes continue to decline, and change to the ecological character of the region is underway. The Coorong is converting to a marine like environment, while salinity levels in the Lakes continue to escalate. The presence of acid sulfate soils has been identified throughout exposed areas of both Lakes as water levels in the lakes have fallen. The Murray-Darling Basin Commission is funding a temporary six-month project to pump water from Lake Alexandrina to Lake Albert to prevent further exposure of acid sulfate soils. Other projects are being developed to trial a range of options for the medium and long-term management of the Lower Lakes including bioremediation of acid sulfate soils and controlled seawater penetration into the barrage region. Up to 60 wetlands below Lock 1 have become disconnected due to falling pool levels. Extensive monitoring is underway at selected sites and the environmental impacts are considerable. It will take a number of years to recover once water returns to these sites.

1.3 The extinction of native species of animal and vegetation associated with the River Murray system is to be prevented

- **Drought Action Plan**

Extended low rainfall conditions across the Murray-Darling Basin have led to significant reductions in the availability and quality of aquatic habitat. The drought conditions are severely impacting on native fish populations, especially those that are already restricted and threatened with either local or statewide extinction. To address this threat a workshop was held and a Drought Action Plan developed. The Drought Action Plan outlines emergency measures aimed at protecting key threatened native

fish populations from existing and worsening drought conditions, and ensuring no species is lost. This has resulted in coordinated action between various state agencies and Non-Government Organisations to support populations of threatened and protected native fish including nationally endangered species. Species include Murray hardyhead, Yarra pygmy perch along with River blackfish, southern purple-spotted gudgeons and southern pygmy perch.

Actions to date have included: detailed surveys of at risk populations, the rescue and captive maintenance or breeding of some species, habitat restoration and environmental watering and the identification of high security sites in the Mount Lofty Ranges to act as natural refuges for captive bred fish. The actions contained within the Drought Action Plan form the cornerstone of broader species recovery plans, to reduce future emergency rescues.

- **Changes to Murray cod Size and Bag Limits**

New restrictions on catching Murray cod apply from the January 2007 in South Australia. The daily bag and boat limits for recreational fishing were decreased from two fish to one and the minimum size increased to 60 centimetres. This was in response to a reduction in the species because of the drought. Additionally, the closed season designed to protect Murray cod during their breeding season was extended to run from 1 August (previously September 1) and continue until December 31 each year.

- **Introduction of Quota Management System for pipi**

A quota management system was introduced for commercial pipi fishing in the Lakes and Coorong Fishery on 13 December 2007. The introduction of the quota management system followed an extensive two-year review process that was underpinned by significant industry involvement. The process to develop new management arrangements in the fishery commenced in November 2005 in order to address to Primary Industries and Resources SA Fisheries' concerns over the future sustainability of the resource. These concerns were in response to high levels of catch, effort and latent effort in the fishery and a trend of declining catch per unit effort (catch rate) over the previous 10 years.

Individual transferable quota units have been allocated to eligible licence holders along with a and a total allowable commercial catch of 1,150 tonnes for the 2007-08 fishing season. The catch limit was agreed with industry based on historical catch levels in the fishery. The new system is aimed primarily at protecting and improving the biological sustainability of the resource, as well as the economic productivity of the fishery.

- **Recreational Fishing Survey and Logbook**

SA Fisheries is committed to maintaining the high quality of our recreational fisheries now and well into the future. To achieve this, up-to-date research information is vital. Consequently 2007-08 was chosen to commence a state-wide survey of recreational fishing in South Australia. The survey is currently underway and encompasses:

- all South Australian waters, both marine and freshwater;

- all non-commercial fishing activity by South Australian residents, aged five years or more;
- all shore and boat-based fishing and the various fishing methods, including line-fishing, diving, pots and nets;
- all species are to be included, with special emphasis on species such as golden perch and Murray cod;
- data on the numbers of fishers and the levels of fishing effort, harvest and release will be collected on a regional basis.

The information will assist in the sustainable management of native fish populations in the River Murray and marine waters of the state.

- **Monitoring of Native Fish Populations in the SA Murray-Darling Basin**

Primary Industries and Resources SA funds a fishery independent sampling program for Murray cod and callop in order to assess the numbers and health of fish. The 2006-07 sampling continued in 2007-08 during the spring/summer seasons in the gorge and floodplain sections of the River Murray and key anabranches (Pike River and Katarapko Creek). This information will assist sustainable management of the fishery and further assist other projects seeking to improve native fish stocks in the SA part of the River Murray. Additional resources will be required to collect additional information for Murray cod in order for a comprehensive stock assessment of this species to be conducted.

- **Integrated Carp Management Demonstration Project at Banrock Station**

This project, funded by the Murray-Darling Basin Commission's Native Fish Strategy, is envisaged to be the first to model, quantitatively measure and demonstrate the effects of carp on the aquatic environment, and the benefits of their removal.

The project is a collaboration between SA Research and Development Institute, the Murray-Darling Fish Research Centre, the Environment Protection Authority, Primary Industries and Resources SA Fisheries, the SA Murray-Darling Basin Natural Resources Management Board, Banrock Station and regional Local Action Planning groups. Due to the closure of the wetland since January 2007 the project has had to be postponed. Although the wetland is currently receiving an environmental water allocation, it will likely be dry again by early 2009 and it is envisaged that the project will remain on-hold for the time being.

- **Projects Investigating the Ecology of *Ruppia megacarpa* in the Coorong**

Two complementary projects have been funded to investigate the ecology of *Ruppia megacarpa* in the Coorong:

- *Monitoring Ruppia megacarpa in the Murray Estuary and North Lagoon of the Coorong* – The Living Murray initiative has provided funding to SA Research and Development Institute Aquatic Sciences to undertake a project that will investigate the impact of barrage releases on the population dynamics of *Ruppia megacarpa* in the Murray Estuary and North lagoon of the Coorong.

- *Impact of Barrage Releases on the Population Dynamics of Ruppia megacarpa in the Murray Estuary and North Lagoon of the Coorong* – the eWater CRC has funded SA Research and Development Institute Aquatic Sciences to undertake a project to investigate the impacts of sub-lethal salinities on the germination, growth and reproductive output of Ruppia megacarpa.

Information from these two projects will be used to formulate a model that predicts Ruppia megacarpa biomass, reproductive output and survival under different salinity regimes and will be used to help determine environmental flow provisions for estuaries, specifically the Coorong.

- **Spawning Migrations and Attractant Flows: Achilles Heel Exploitation of Innate Carp Behaviours**

In mid-2006, SA Research and Development Institute Aquatic Sciences secured a 3-year Invasive Animals Cooperative Research Centre funded project to develop and evaluate wetland carp separation cages. This project has now developed, trialled and successfully demonstrated the utility of a push trap for common carp, exploiting the innate pushing abilities of the fish.

The recent filling of Banrock Station wetland has enabled monitoring of lateral fish migrations during winter and the first real evaluations of wetland carp separation cages incorporating ‘pushing’ and ‘jumping’ traps for common carp. Acoustic attractants/repellents for carp have also been developed.

- **Carp Exclusion Screens**

This project, funded by the Murray-Darling Basin Commission, addresses several high priority knowledge gaps and actions identified at the 2005 workshop ‘Native Fish and Wetlands in the Murray-Darling Basin’. The ultimate goal is to develop an optimised mesh design that excludes carp of a nominated size-range to maximise the ecological benefits of carp exclusion from riverine wetlands, whilst minimising the ecological impacts to native aquatic fauna (especially fish).

The optimised design will be incorporated into carp exclusion screens within the Murray-Darling Basin. Screen designs that successfully exclude carp but do not restrict small bodied / juvenile fish will be trialled in the field to validate Primary Industries and Resources SA laboratory findings. Field trials will take place during spring/summer 2008, ideally at flow control structures adjacent to the River Murray. However, given that all managed wetlands are now forcibly closed under ministerial order, contingency plans including trialling screens in a fish-way or in an ad-hoc manner at unregulated wetland inlets are likely to be needed.

- **Small Bodied Native Fish Rescue Projects**

The River Murray below Lock 1 and the Eastern Mount Lofty Ranges contain the highest diversity of river/wetland fish in the Murray-Darling Basin. Included in the region are five species that are found nowhere else in the basin and four species protected under state (*Fisheries Management Act 2007*) or federal (*Environment Protection and Biodiversity Conservation Act 1999*) legislation.

Ongoing drought conditions and lowered lake levels threaten these fish, with a possibility of local extinction without intervention. Hence, Department for Environment and Heritage and Primary Industries and Resources SA have undertaken a project in conjunction with the SA Murray-Darling Basin Natural Resources Management Board and Native Fish Australia (SA) to collect specimens of Yarra Pygmy Perch (*Nannoperca obscura*) and Purple Spotted gudgeon (*Mongurnda adspersa*) from the Lower Murray and hold them in aquaria and holding tanks to ensure their safety until water levels return to normal in the lower Murray.

- **Threatened River Murray Fauna Recovery Program**

The Threatened River Murray Fauna Recovery Program is currently in place. This is a partnership program between the SA Murray-Darling Basin Natural Resources Management Board, Local Action Planning Groups and Department for Environment and Heritage. To date the program has commenced implementation of four recovery plans for priority species. These are the nationally listed Regent Parrot and Golden Bell Frog and the regionally significant Carpet Python and Bush Stone-curlew. Current projects include habitat restoration planning for Regent Parrots, habitat and distribution studies for Golden Bell Frog and Bush Stone-curlews and community surveys of current Carpet Python distribution. In addition, plans are underway to establish a Native Fish Recovery Group to implement the State Native Fish Action Plan.

1.4 Barriers to the migration of native species of animal within the River Murray system are to be avoided or overcome

- **Coorong Fish Movement and Recruitment Project**

The Lower Murray Barrages separate the freshwater Lower Lakes from the estuarine waters of the Coorong. As a part of the Sea-to-Hume Dam fishway program, fishways have been and continue to be constructed at the Murray barrages. These fishways partially restore connectivity between these environments for freshwater and estuarine fish.

In 2007-08, SA Research and Development Institute completed the second year of a three-year project investigating the movement and recruitment of a range of freshwater, diadromous and estuarine fish in the Coorong and Lower Lakes. No fresh water has been released from the lower lakes into the Coorong since March 2007 and the Goolwa and Tauwichee fishways have remained closed since lake levels dropped consistently below 0.3 AHD. This scenario has seen almost constant reverse flow conditions at the Coorong Barrages through winter and into the sampling season (September–January) in 2007-08.

In comparison to the 2006-07 season, freshwater species have declined, marine opportunists have increased and estuarine species have remained relatively unchanged. In the continued absence of freshwater inflows the estuary now resembles a marine dominated tidal system.

- **Fishways**

Fishways have been integrated into construction plans for capital works at Chowilla, Locks 1 to 6, and at the Barrages. Works at Lock 1, Blanchetown, were completed in 2007-08. The fishway was operational and successful trials of the carp separation were conducted. This fishway is currently not operational due to a very low downstream pool level and low flows in the system.

A construction contract was let for Lock 3, Overland Corner, and Expression of Interest for a tender shortlist for construction contract for the remaining four locks. The 'standard' fishway design for the lock sites has been modified to a dual fishway with an automated fish lock to cater for the smaller fish, and a vertical slot fishway for the large fish. All sites will incorporate carp separation facilities.

- **Sea-to-Hume Dam Fishway Program and Assessment Dams and Weirs**

Dams, weirs and locks prevent successful migration of native fish species by blocking pathways to spawning habitats and feeding areas. This has contributed to substantial declines of native fish species, especially in the Murray-Darling Basin. In order to rehabilitate the native fish communities of the Murray-Darling Basin, the Murray-Darling Basin Commission has committed to a multi-million dollar program to construct 11 fishways and restore access to over 2,000 km in the River Murray from the Hume Dam to the sea.

To determine the success of the construction program, an assessment team was assembled from New South Wales, South Australia and Victoria to ensure the construction program is successful. Assessment of the fishway has been hampered by extremely low downstream water levels. Despite this a total of eight species of fish were collected from the top of the Lock 1 fishway over a four-week period. Common carp was the most abundant species and reasonable numbers of flatheaded gudgeon, bony herring and Australian smelt also ascended despite high headloss at some stages. Over 800kg of carp were removed from the fishway during normal trapping activities. In general, more fish reached the top of the fishway when headloss was low and very few fish were reaching the top of the fishway once headloss exceeded 400mm.

- **Improvements to Fish Passages at Chowilla and Lock 6**

The existing stone and earth wall at Bank E is in poor condition, limiting the ability for weir pool raising to allow fish passage. The bank will be replaced by a rock ramp fishway that will provide access for fish to over 100 kilometres of anabranch creek system and enable future weir pool level manipulations at Lock 6 to create favourable conditions for a range of fish in the downstream creek and wetlands.

2.1 Ecologically significant elements of the natural flow regime of the River Murray system are to be reinstated and maintained

- **Weir Pool Manipulations**

Weir pool manipulations can be used to enhance natural peaks in River Murray flow. Raising the level of weir pools enables the temporary flooding of wetlands increasing their water levels and flushing salt from the wetlands. A weir pool management strategy is under development to allow this action to occur more frequently. Wetland management through the installation of regulators allows wetlands to experience a more natural wetting and drying cycle that mimics the rise and fall of river levels.

- **Water Proofing Adelaide**

The *Water Proofing Adelaide, A Thirst for Change 2005-2025* strategy released in July 2005 included 63 strategies for the management, conservation and development of Adelaide's water resources to 2025. Implementation of the strategies will provide savings of 37GL/year from water conservation initiatives and 33GL/year from stormwater, roof runoff and recycled water by 2025.

Strategies being implemented include a mandatory requirement for rainwater tanks plumbed into new houses and extensions larger than 50m² (ongoing since 2006) and enactment of the *Water Efficiency Standards and Labelling Act 2006*.

The *Local Government (Stormwater Management) Amendment Act 2007* establishes the Stormwater Management Authority, stormwater funding arrangements, and encourages better stormwater planning. It provides for incorporating multiple objectives of stormwater management into decision-making.

Driven by the Water Proofing Adelaide Strategy and the *Adelaide Coastal Waters Study* (EPA), Planning SA and the Federal Government have joined a broad range of government and non-government organisations to complete the *Institutionalisation of Water Sensitive Urban Design (WSUD) in Greater Adelaide* project. Both the Adelaide and Mount Lofty Ranges and SA Murray-Darling Basin Natural Resources Management Boards have played key roles in the steering committee and funding of this pivotal project.

- **Aquifer Storage and Recovery (ASR) Barker Inlet**

A trial of ASR using recycled stormwater from the Barker Inlet Wetlands commenced in 2005 and was completed in October 2007. Overall, the two trial periods indicated that ASR at this location is technically feasible. A permanent scheme is currently being scoped which will enable potential substitution with stormwater of potable mains water currently used for irrigation and by industry.

Planning is underway for a number of ASR projects across metropolitan Adelaide and the state.

- **Water Allocation Plan for the River Murray Prescribed Watercourse**

The SA Murray-Darling Basin Natural Resources Management Board is reviewing the Water Allocation Plan for the River Murray Prescribed Watercourse. It has established three Advisory Committees to assist the Board. Development of the draft plan will continue over the next two years and expected to be released early 2011. Consultation on the development of the draft plan is occurring throughout its development.

- **Temporary Water Authorisations for the Eastern Mount Lofty Ranges**

Temporary water authorisations are issued to current water users in the Eastern Mount Lofty Ranges. Authorisations enable current users to continue to operate during the Notice of Prohibition that will remain in place until the Minister for Environment and Conservation adopts a water allocation plan for the region, after which water licences will be issued.

Implementation of a water allocation plan for the area is expected to commence by June 2009. Current users are authorised on the basis of their irrigation activities in the three years prior to the Notice of Prohibition. The Water Allocation Plan will outline the policies that will govern the take and use, transfer and other management activities of the prescribed water resources.

- **Water Allocation Plans for the Eastern Mount Lofty Ranges**

The SA Murray-Darling Basin Natural Resources Management Board is developing a Water Allocation Plan for the prescribed water resources of the Eastern Mount Lofty Ranges and expects implementation of the plan to commence by June 2009. Prescription of water resources in the Eastern Mount Lofty Ranges followed extensive consultation with the community and industry groups including public meetings, open house forums, industry meetings and information packages. A draft water allocation plan will undergo similar consultation.

2.2 The Murray Mouth should be kept open in order to maintain navigation and the passage of fish in the area, and to enhance the health of the River Murray system and estuarine conditions in the Coorong

- **Murray Mouth Sand Pumping Program**

The drought conditions experienced in the Murray-Darling Basin continued throughout 2007-08 resulting in South Australia receiving significantly reduced flows throughout the year. Dredging is vital for maintaining an open channel for tidal flows to help maintain the health of the Coorong. SA Water continues to be involved with the planning and delivery (in particular contract management) the Murray Mouth Sand Pumping Program. This includes the management of a 24hrs a day, seven days a week dredge operation at the mouth. The Murray Mouth has remained open, with observed tidal ratios well within the projects goals. Stability of the dredged channels is fairly good, enabling the project to currently operate with a single dredge. The program continues to have strong working relationships amongst all stakeholders, in

particular the Ngarrindgeri, Department of Transport Energy and Infrastructure, Department of Water, Land Biodiversity Conservation, Department for Environment and Heritage and Murray-Darling Basin Commission. To date, after five years of operation, the program has not had any major or significant Occupational Health and Safety or Environmental incidents.

2.3 Significant improvements are to be made in the connectivity between and within the environments constituted by the River Murray system

- **Regent Parrot Habitat Corridors**

Work has been done to identify current Regent Parrot habitat corridors and address gaps to augment and improve on the vegetation in those corridor areas. Habitat connectivity is also addressed through the SA Murray-Darling Basin Natural Resources Management Board's involvement in the River Murray Forests project and work funded through the Local Action Planning and other community groups.

The Board works with the Department for Environment and Heritage on the Naturelinks Project, which addresses connectivity for wildlife between the South East and the river corridor. Similarly, another project, Habitat 141, is a major partnership in the Mallee that addresses links between the large Mallee parks and the river system.

- **Tagged trading of interstate water entitlements**

A pilot tagged trade program, commenced in 2006 following an agreement by relevant Ministers from New South Wales, Victoria and South Australia has continued in 2007-08. This program allows holders of water licences to 'permanently' trade water entitlements through ongoing temporary trade approvals. Different legislation in each of the jurisdictions has meant that this could only be achieved through a series of bilateral agreements between the states.

The necessary legislative changes to permit expanded permanent interstate trade in water entitlements as required under the National Water Initiative have been passed in South Australia and ongoing administrative arrangements to facilitate this trade will be implemented as soon as practicable.

3.1 Water quality within the River Murray system should be improved to a level that sustains the ecological processes, environmental values and productive capacity of the system

- **Code of Practice – Vessel and Facility Management: Marine and Inland Waters**

The Environment Protection Authority in partnership with relevant industry groups has released a new code of practice titled *Vessel and Facility Management: Marine and Inland Waters*. The code contains new requirements for management of vessels and facilities on the river to minimise impacts on water quality. The new treatment requirements for grey water are world's best practise, and a trial is currently underway on eight houseboats using a revolutionary greywater treatment system developed by a local manufacturer. Indications are that pollutant loads are substantially reduced when

this system is operated effectively. Facilitated by the Environment Protection Authority, a new Australian Standard for Greywater Treatment is being developed by Standards Australia with support and financial backing of other agencies (SA Water, Department of Water, Land and Biodiversity Conservation and SA Murray-Darling Basin Natural Resources Management Board).

Three vessel audits of vessel blackwater systems were also conducted in the Renmark, Waikerie and Mannum areas. Mostly minor technical breaches were found and are being followed up with vessel owners.

- **Implementation of the National Water Quality Management Strategy (NWQMS)**

The primary objective of the NWQMS is 'to achieve sustainable use of the nation's water resources by protecting and enhancing their quality while maintaining economic and social development'. The implementation of the Strategy will support the future planning and management of water bodies in the SA Murray-Darling Basin by:

- providing a blueprint for future management;
- protecting ecosystem values whilst maintaining their social and economic values (e.g. tourism, industry, fishing and agriculture);
- enabling better regulation of pollutant discharges to water bodies;
- providing information for government, industry and community planning and development activities;
- informing where best to undertake management actions and make investment to improve water quality; and
- supporting targeted and cost-effective water quality monitoring programs.

Draft environmental values (uses and attributes to be protected) and activities to implement the NWQMS are being incorporated into the draft SA Murray-Darling Basin Natural Resources Management Plan for consultation in late 2008.

- **Development of a Catchment Water Quality Model for Sub-catchments to the River Murray**

The Environment Protection Authority has developed a catchment water quality model for the South Australian region of the River Murray. The model will enable the Environment Protection Authority and other stakeholders to predict pollutant generation from different catchments discharging to the River Murray and Lower Lakes, based on scenarios related to changes in land use, point source pollution inputs, catchment management and climate. The outcomes will greatly assist in prioritising future management of risks to water quality. Development of the model will also enable the Environment Protection Authority to make a major contribution to an in-stream water quality model for the River Murray that is currently being implemented by SA Water.

Acid sulfate soil exposure is occurring as water levels fall in the river below Lock 1 and in the Lower Lakes due to continued extreme low flows across the SA border. These soils form naturally but generate acid, and can release heavy metals when exposed to oxygen. There is potential for impacts on water quality from this unprecedented situation. Several urgent projects (risk assessment, acid and metal mobilisation, and

geochemical modelling) have been implemented and managed by the Environment Protection Authority on behalf of South Australia's Water Security Technical Working Group. The outcomes of these projects will inform activities to manage risks to the environment and communities.

3.2 The impact of salinity on the ecological processes and productive capacity of the River Murray system is to be minimised

- **Loxton Salt Interception Scheme**

Work on the Loxton Salt Interception Scheme continued in 2007-08 with the completion of the interception bores on the Thiele's, Rilli's, and the Caravan Park floodplains. The collection and delivery pipework was completed in 2006-07. During 2007-08, work concentrated on an innovative approach to intercept saline groundwater visibly seeping out of the cliff face and riverbank at Loxton. This work has been successfully completed and the Loxton Cliff Toe Drain has provided 100% interception of highly saline groundwater over a short section of the Loxton foreshore preventing two to three tonnes of salt from entering the river. It has also aided the Loxton-Waikerie Council in the progression of their Foreshore Development Plan.

Investigation work in the highland area behind the Loxton Irrigation Pumping Station commenced in 2007-08 to identify the best options for expanding the interception scheme in the highland areas.

- **Murtho Salt Interception Scheme**

The Murtho Salt Interception Scheme received Ministerial Council approval to proceed to construction in March 2008. This \$30.2 million project involves the drilling and equipping of approximately 50 production bores between Paringa and Chowilla and the installation of approx 54km of pipeline connecting the bores to the disposed point at Disher Creek, south of Renmark. Investigation and design work commenced in 2007-08 with construction to commence in early 2008-09. The project is scheduled to be completed in June 2011, and is designed to intercept up to 100 tons of salt per day.

- **Waikerie Lock 2 Salt Interception Scheme**

The Murray-Darling Basin Commission approved the proposed extension to the Qualco Sunlands Salt Interception Scheme, called the Waikerie Lock 2 Salt Interception Scheme, in December 2007. This \$4.9 million scheme commenced investigation and design work in January 2008 with pipeline construction commencing in June 2008. The scheme will be commissioned in 2008-09 and is designed to prevent approximately 39 tons of salt per day from entering the River.

- **Land and Water Management Plan**

Land and Water Management Plan (LWMP) Case Studies have continued to progress in the Riverland during 2007-08. On-going work plans are currently being implemented in the Pike and Murtho regions by the Renmark-to-the-Border Local Action Planning group, the SA Murray-Darling Basin Natural Resources Management Board, Department Water Land and Biodiversity Conservation, the Land and Water

Management Plan Committee's and other stakeholders. The implementation plans are scheduled to cover a period of approximately six years and will develop further resources aimed at increasing knowledge of optimum crop water requirements and natural resource management techniques.

The consultant Australian Water Environments completed the upgrade of the Taylorville North Land and Water Management Plan to guideline standards in March 2008. Work is now being undertaken to progress towards implementing the key outcomes of the upgraded plan. Australian Water Environments is also upgrading the Bookpurnong – Lock 4 LWMP. The upgrade to guideline standard of the Pyap-Kingston LWMP commenced in October 2007 and the final round of community consultation is currently being completed.

- **Irrigation Management Training & Support**

The SA Murray-Darling Basin Natural Resources Management Board has continued to provide irrigation extension services to River Murray irrigators in 2007-08 through its Improving Irrigation Efficiency Project. A new high-level soil water data interpretation workshop, Soil Water Dynamics, aimed at optimising irrigation management across the SA Murray-Darling Basin region, was developed in partnership with a South Australian company Sentek Sensor Technologies. A total of 18 irrigation management workshops were conducted in the 2007-08 water use year. In excess of 250 irrigators attended the training.

- **Automatic Weather Monitoring Network**

The SA Murray-Darling Basin Natural Resources Management Board's Automatic Weather Monitoring Network was officially launched in 2007 at the Loxton Research Centre. The network consists of 26 automatic weather stations and 7 logging rain gauges stretching from Murtho in the north of the SA Murray-Darling Basin region to Currency Creek in the south. The network was established to provide irrigators with up to the minute evapotranspiration data to assist with irrigation scheduling and facilitate improved irrigation water use efficiency. A series of interpretation workshops were conducted in the 2007-08 irrigation season to ensure irrigators gain maximum benefit from the network resources.

- **Irrigation Management Rebate Scheme**

An irrigation management rebate scheme for River Murray irrigators was implemented in January 2008. The scheme provided rebates for the purchase of water meters, soil moisture monitoring equipment and soil surveying works. The scheme was well utilised by irrigators with the soil moisture monitoring rebate proving particularly successful. As a condition of accessing funding, irrigators were provided with one-on-one support to assist with site selection, installation and data interpretation.

- **Determining the Impact of Salinity and Hydrology on Larval Fish Recruitment in the Chowilla Anabranch**

This project entails research into the community composition and spatial and temporal variation of larval fish in lotic and lentic waters of the Chowilla Anabranch system. The project is funded by the National Action Plan for Salinity and Water Quality through the

Department of Water, Land and Biodiversity Conservation Centre for Natural Resources Management.

- **Influences of Salinity and Water Quality on the Recruitment Dynamics of Fishes in the Lower River Murray – Larval Distribution in Relation to Habitats**

This two-year project is funded by the National Action Plan for Salinity and Water Quality through the Centre for Natural Resources Management (SA). Larval sampling was conducted during the spring/summer season during 2005/06 and 2006/07 at selected sites downstream of Locks 1, 5 and 6, within the main channel of the Lower River Murray. Sampling was conducted fortnightly from September to February targeting key native species (Australian smelt, carp gudgeons, flathead gudgeons, bony herring, Murray cod, freshwater catfish, golden perch and silver perch) in an effort to determine if inter-annual and spatial patterns of change could be detected.

Laboratory trials have been conducted to determine the salinity tolerance of critical life stages for key species. Additional trials were run to determine the tolerances of fish eggs and hatching success for dwarf flatheaded gudgeon, carp gudgeon, and galaxias maculatus. A pilot study was run to trial an experimental methodology for assessing the chronic long-term impacts of sub-lethal salinities on Murray catfish, Murray rainbowfish, carp gudgeon and flatheaded gudgeon. A final report to the Centre for Natural Resources Management (SA) is currently in preparation.

3.3 Nutrient levels within the River Murray System are to be managed so as to prevent or reduce the occurrence of algal blooms and to minimize other impacts from nutrients on the ecological processes, environmental values and productive capacity of the system.

- **Drought Response Monitoring**

SA Water has initiated an enhanced amoeba, salinity and algal monitoring program to ensure the continuous supply of potable water during the unprecedented circumstances of the current drought. The monitoring will act as an early warning to impending water quality issues and assist in the management of those water supply systems likely to be affected.

Together with water sampling, the enhanced algal monitoring program also utilises high-resolution digital aerial imagery to help in the early detection of algal blooms in the Murray River as well as other related floodplain management issues. The program has been undergoing successful trials that include ground-truthing water sampling since February 2007. In addition to the algal monitoring benefits of this aerial photography, the footage is particularly useful in identifying illegal discharges and isolated algal blooms outside SA Water's jurisdiction, illegal water harvesting and the connectivity of wetlands to the river. There has been interest from other government agencies to use this aerial footage to conduct compliance monitoring.

An investigation to determine the rate of nutrient release from river sediments to contribute to a risk assessment of cyanobacterial growth in the lower River Murray was continued during 2007-08 by the Australian Water Quality Centre and University

of Adelaide. This cyanobacterial modelling is continuously being updated based on the latest flow and nutrient data.

- **Environmental Improvements**

Environmental improvements implemented by Department of Transport, Energy and Infrastructure include:

- under-deck fuel tank (self banded via the hull itself) and banded drive module to minimise fuel leak potential; and
- introduction of first flush capture of water runoff from the vehicle loading area via under-deck storage tanks. The collected water can be pumped out, filtered and returned to the river.

- **Water Quality Improvement Projects**

Additional water quality improvement projects for which the SA Murray-Darling Basin Natural Resources Management Board has provided support include:

- working trials of greywater treatment systems that satisfy the EPA's new code of practice for greywater management on inland vessels (project underway);
- creation of an Australian Standard for greywater management on inland waters (project about to commence);
- various effluent reuse projects to minimise effluent released to receiving waters; and
- various improvements to stormwater management throughout the region for reuse and water quality benefits.

The SA Murray-Darling Basin reuses over 50% of domestic and industrial effluent generated in the region.

3.4 The impact of potential pollutants, such as sediment and pesticides, on the environments constituted by the River Murray system is to be minimised

- **Off-take Exclusion Zones**

This project entails the demarcation of aquatic exclusion zones around SA Water off-takes. Buoys to be installed will deter river craft from mooring adjacent to off-takes and hence minimise the water quality risks associated with greywater and wastewater management. Signage will also be installed at each off-take to ensure that river users are aware of these off-takes and the need to actively prevent pollution in the vicinity.

- **Re-use of Effluent and Drainage Water Management**

During 2007-08 the SA Murray-Darling Basin Natural Resources Management Board invested in nine wastewater reuse projects.

- **Stormwater Reuse and Management**

During 2007-08, 10 projects were implemented to improve water quality by addressing diffuse and source pollution in priority areas. The SA Murray-Darling NRM Board's actions in aligning local government development plans with the regional NRM plan and in improving urban/industrial water use efficiency also strongly influence improved water quality in the region.

4.1 A responsive and adaptable approach to the management of the River Murray system is to be implemented taking into account ecological outcomes, community interests and new information that may become available from time to time

- **Drought Response Planning**

In 2007-08, the temporary closure of several targeted wetlands was successfully concluded as part of the River Murray Drought Response. These included Lake Bonney (Barmera), Yatco Lagoon (Moorook), Nelwart Swamp, Murbko Lagoon Inlet and Murbko Lagoon Causeway (near Blanchetown). Work also included the provision of an alternative water supply at Lake Bonney and an alternative venting system for irrigators at Yatco Lagoon.

- **River Murray Environmental Manager**

During 2007-08, the South Australian River Murray Environmental Manager continued to expand to cover all aspects of environmental water management. Additional staff were appointed to four teams; Chowilla; Coorong, Lower Lakes and Murray Mouth; Operations and Policy. The Board assumed the function of River Murray Environmental Manager to provide clear accountability for delivering environmental flow outcomes for the River Murray in South Australia. The River Murray Environmental Manager has a key strategic planning and decision-making role for environmental water delivery and management. The River Murray Environmental Manager has an important role in the facilitation of on-ground projects. The River Murray Environmental Manager also serves as South Australia's Living Murray Icon Site Manager.

- **Murraylands Integrated Strategic Tourism Strategy**

In May 2008 a Murraylands Integrated Strategic Tourism Strategy was initiated. This Strategy has similar aims to the Riverland Strategy, namely to achieve realistic growth in tourism in the region. It is a collaborative initiative between key regional stakeholders and the SA Tourism Commission. The Murraylands Integrated Strategic Tourism Strategy will address one of the key goals of the South Australian Tourism Plan 2003-08, which is to 'enhance the River Murray experience' and will recognise the importance of aligning key strategic recreational and water management initiatives within the Murraylands.

- **Scum Booms**

'Scum booms' are a new water quality protection measure that was implemented over the summer of 2006-07 along the river to prevent blue-green algae entering water supply off-takes. The booms act as curtains that prevent the accumulation of very high surface concentrations of blue-green algae adjacent to where point water is withdrawn to supply.

- **Ongoing Monitoring of the Lower Lakes and Coorong**

Extensive monitoring including water levels, water quality, salinity, and ecology has been enacted on an on-going basis. Selected sites were upgraded with telemetered capability, with data managed and delivered through conventional and web-based

systems. A program to complete the update of the monitoring stations in the Lower Lakes and extend the monitoring into the Coorong is currently underway, with funding from the Murray-Darling Basin Commission. Detailed monitoring of water quality, mudflats, birds, native fish and grazing within the Coorong and Lakes Ramsar Site has also been undertaken during 2007-08.

4.2 The community's knowledge and understanding of the River Murray system is to be gathered, considered and disseminated in order to promote the health and proper management of the system

- **Regional Natural Resources Management Plan**

During 2007-08 the development of the Regional NRM Plan established a number of methods through which the community's knowledge and understanding of the River Murray system was gathered, considered and disseminated to identify the outcomes and targets for the region. These methods included targeted planning groups, regional forums, public consultation, interviews and multi-criteria analysis. The information comprises a fundamental part of the regional plan that will be further disseminated once completed.

- **Native Fish Strategy Presentations**

The Native Fish Strategy Coordinator provided a range of talks to the community and professional organisations throughout the year regarding the status of native fish, implementation of the Native Fish Strategy and various projects including the Sea-to-Hume Dam and other projects.

- **National Parks and Wildlife Consultative Committees**

Consultative Committees for the Murraylands and South East continued to provide avenues for community input into the management of parks and reserves during 2007-08.

4.3 The interests of the community are to be taken into account by recognising Indigenous and other cultural, and historical, relationships with the River Murray and its surrounding areas, and by ensuring appropriate participation in processes associated with the management of the River Murray system

- **Building Community Capacity and Support for NRM in the South Australian Murray-Darling Basin**

This project continued during 2007-08 to provide resources that enable community groups and individuals to further develop their understanding and capacity to play a meaningful role in natural resource management in the South Australian Murray-Darling Basin. The project employs a team of officers with a complementary skills base to build the capacity of and provide effective linkages between the community, government and industry.

- **Culturally Significant Species Project**

A project is currently being undertaken to identify and describe management requirements for species of flora and fauna in the SA Murray-Darling Basin with

Aboriginal cultural significance. Such species include food, fiber, tool-making and medicinal species as well as those with other cultural or spiritual significance.

- **Catchment Care**

Catchment Care is an ongoing project that involves working with 70 schools (approx 12,000 students) and 12 community groups throughout the region. It involves:

- building teachers capacity for environmental education through quarterly professional development sessions on whole-school approaches towards sustainability;
- assisting schools to develop School Environmental Management Plans and embed environmental literacy into the curriculum through the development of whole-school curriculum plans;
- delivering education sessions on a number of environmental issues to approximately 2400 students;
- quarterly water quality monitoring with 24 schools and 12 community groups at 48 sites;
- quality control and data systems for community water quality monitoring;
- organising youth leadership programs such as the River Murray Youth Council and the Junior Youth Environment Forums
- developing close working partnerships with the Australian Sustainable Schools Initiative, Department for Education and Community Services, Department for Environment and Heritage, OzGreen, Rotary and Local Action Planning Associations; and
- promotion of events and programs through an Environmental Education for Sustainability Calendar, media releases and radio interviews.

- **River Murray Icon Sites**

Each of the icon sites have Community Coordinating Committees that meet regularly to oversee actions and provide input to decisions regarding the icon sites. The icon sites also each have an Indigenous facilitator to assist with consultation and management of the sites.

- **Friends of Riverland Parks**

Supported by Department for Environment and Heritage, this community group has undertaken a range of on-ground monitoring and rehabilitation programs, including surveys of Regent Parrots, Bush-stone Curlews, pythons, possums and rabbits, and revegetating areas of the Murray River National Park.

- **Indigenous Engagement**

The First Peoples of the River Murray and Mallee are negotiating Indigenous Land Use Agreements with the state government. This may include Crown Land and National Parks and Wildlife Act Reserves

- **River Murray Licensing Project**

The Department for Environment and Heritage River Murray Licensing Project aims to identify and license all structures in the River Murray Protection Area previously built without formal approval. Licensing commenced in 2005-06 and has continued during

the 2007-08 year. It is anticipated the project will be completed within the next six months. This project has been extended until 30 June 2009. Legislative provisions in the Crown Lands Act 1929 relating to the mandatory consultation prior to the issue of licences have been carried forward in the Crown Land Management Bill 2008, introduced into Parliament on 17 June 2008.

- **Mid-Murray Heritage Review / Development Plan Ammendment**

Under its *Heritage Directions* funding for local government program, the Department for Environment and Heritage has provided funding support to the Mid- Murray Council in 2007-08 to undertake a heritage review of its Council area. This funding will also prepare an amendment to its Development Plan to include a list of places of local heritage value and policies to manage those places.

- **Upgrade of River Boat Trail**

In 2007-08 the Department for Environment and Heritage commenced an upgrade of the River Boat Trail along the River Murray from the Murray Mouth to the SA Border. This interpretation project includes 18 new signs at various points along the river as well as a new web-based product and is due for completion in 2008-09.

- **Development Assessment**

Sixty development applications (under the provisions of the Heritage Places and Historic Shipwrecks Acts) referred to Department for Environment and Heritage for advice, under delegation from the Minister for Environment and Conservation, in the period 1 July 2005 to 16 April 2008.

4.4 The importance of a healthy River to the economic, social and cultural prosperity of communities along the length of the River, and the community more generally, is to be recognised

- **Drought Response**

During 2007-08 the SA Murray-Darling Basin Natural Resources Management Board undertook a number of projects to assist the community in addressing difficulties faced because of drought. These included: provision of funding assistance to undertake various types of works on properties to ameliorate the impacts of the drought; and educative and social projects to enable the community to cope with the current conditions.

- **River Murray Drought Communications and Community Engagement Program**

The continued low flows to the River Murray during 2007-08 led to strong demand for regular information from all sectors of River Murray users and other affected stakeholders. The SA Murray-Darling Basin Natural Resources Management Board worked with the Department of Water, Land and Biodiversity Conservation River Murray Drought Team to develop and execute an extensive communication program to meet this demand for information. This communication program included:

- briefings and meetings with stakeholder and community groups;
- production and distribution via email networks and public meetings of frequently asked questions and answer documents on key issues (including

- water restrictions, a proposed temporary weir near Wellington and temporary closures of wetlands);
 - print and radio advertising; regular articles posted on the Drought Link website and SA Drought E-Newsletter;
 - information about the River Murray available via the SA Government Drought Hotline 180 20 20; and
 - contributions to a series of public meetings hosted by the SA Murray-Darling Basin Natural Resources Management Board in River Murray towns.
- **Riverland Futures Project**
The Riverland Futures Project has been established to ensure that land use planning and economic and industry assistance policies are coordinated in facilitating a sustainable future. The current drought has put further stress on the Riverland region making apparent the need for reform of the region’s planning policies. Led by Primary Industries and Resources SA, this is a multi-disciplinary, cross-agency project in conjunction with local governments to articulate a 20-year vision for the growth and spatial distribution of activity for the Riverland region. The project aims to support the Riverland community in facilitating change, allowing for diversification of its economy and the development of employment initiatives.
 - **Water Conservation Community Education**
SA Water continues to support and promote water conservation in South Australia through:
 - education – including water literacy campaigns highlighting the state’s reliance on the River Murray as a major source of drinking water supplies; and
 - encouragement – through our partnerships with organisations and their stakeholders and our dedicated team of Water Conservation Officers.

Prolonged drought and the required water restrictions across the State in the past two years have been the catalyst for SA Water advertising and education campaigns. SA Water’s website was updated in 2008 to report on Adelaide’s reservoir holdings and demonstrate how water supply to Adelaide also depends on reservoirs in the upper reaches of the River Murray.

The SA Water Mediterranean Garden at the Adelaide Botanic Gardens continues to promote waterwise and climate compatible gardening. SA Water is also a key partner in the Sustainable Landscapes Program that demonstrates and promotes sustainable urban park and garden design, plant species selection and horticultural practices.

In 2007 the State Government announced a \$24 million rebates package and SA Water has been charged with administering and promoting this scheme.

In 2008 a Memorandum of Understanding was established between the Minister for Water Security, SA Water and the Local Government Association to promote water efficiency in the community. SA Water has also promoted water efficiency to the industrial and business sector. It receives Water Efficiency Plans from all of its top

industrial water users and continues to deliver a Business Water Savers program. The latter offers a comprehensive audit service, water efficiency report and education services for businesses, large and small.

- **Regional Development Infrastructure Fund**

Through the Regional Development Infrastructure Fund, Department for Trade and Economic Development has supported a number of wastewater re-use projects which demonstrate good practice, innovation and collaborative partnerships between industry, community and government, in regional areas. Some of these projects have a direct benefit for the River Murray through better use of water and wastewater resources, specifically:

- \$800,000 towards wastewater infrastructure to enable the Berri-Barmera Wastewater Re-use Scheme to treat and re-use industrial and residential wastewater, removing a constraint to further development in the Riverland;
- \$400,000 towards water treatment infrastructure to enable Tarac Technologies to continue to process liquid waste from the wine industry;
- \$500,000 towards pipe, pump and storage infrastructure to enable commercial wastewater re-use from the Mt Barker (Laratinga) treatment plant;
- \$268,000 towards infrastructure to allow the commercial use of treated wastewater from the Murray Bridge Septic Tanks Effluent Disposal Scheme (STEDS) and a nearby piggery, as an experimental pilot; and
- \$98,750 towards infrastructure to allow the commercial use of treated wastewater from Wasleys Piggery, as an experimental pilot.

- **Regional Project Fund**

Administered by the Office of Regional Affairs (Department for Trade and Economic Development), the Regional Project Fund supports long-term sustainability and growth of regional economies. The fund facilitates a strategic approach to investment of state government funds and to achieving the South Australian Strategic Plan targets. The fund is available exclusively to Regional Development Boards on a competitive basis for strategic projects identified as a regional priority. Two projects addressing water use and mitigating supply and quality impacts on the River Murray include:

- Waterproofing Barossa & Light Region Master Plan 2008 (managed by Barossa & Light Regional Development Board); and
- Securing Quality Water to the Lower Murray (managed by Fleurieu Regional Development Board)

- **South Australian Murray-Darling Basin Resource Information Centre**

The South Australian Murray-Darling Basin Resource Information Centre (SAMRIC) provides spatial information services and promotes the sustainable development of the region. It undertakes projects that have a benefit to one or more of the partners or the region as a whole.

SAMRIC_has played an integral role in the strategic planning and operational effectiveness in drought planning initiatives across the Murray Basin. Projects have included aerial mapping of the entire SA river corridor providing information on crop patterns, properties that have ceased irrigation, salinity and environmental impacts.

In 2007-08, the Department for Trade and Economic Development funded SAMRIC in the order of \$284,000 as part of a \$1.257 million four-year agreement. SAMRIC also leverages funding through federal, state and local government as well as fee for services.

- **Riverland Development Corporation**

The Riverland Development Corporation, like other Regional Development Boards, is funded by Department for Trade and Economic Development under a 5-year resource agreement (\$287,000 per year). The Board leverages federal, state and local government funding as well as private sector funding to provide a number of programs in the region including: business development, employment and training, migration, IT support, Aboriginal support programs, economic development, and investment facilitation.

- **Business Drought Impacts**

The Department for Trade and Economic Development is working with the Riverland Development Corporation to support local businesses impacted by the current low water allocations. A Business Drought Impacts Officer has been appointed for two years to deliver a direct response to businesses affected by the drought, including linking business to available funding programs. It is a 2-year \$220,000 initiative with the Department for Trade and Economic Development committing \$100,000 in the first year (RDC \$10,000) and Riverland Development Corporation providing \$110,000 in the second year.

- **Regional Communities Drought Fund**

The Regional Communities Drought Fund was established to assist rural communities experiencing significant structural change as a consequence of drought. The purpose of the fund is to assist regional communities to develop their economic and social infrastructure, strengthen community capacity through education and training, and protect or improve local environmental assets. The Department for Trade and Economic Development has provided \$400,000 to the Fund, which is administered by Primary Industries and Resources SA.

- **Water Efficiency Planning for Industry**

The Department for Trade and Economic Development worked with Department of Water, Land and Biodiversity Conservation, SA Water, and Primary Industries and Resources SA in the development of a water efficiency planning scheme for industries using River Murray water (either directly or via SA Water infrastructure). Following the introduction of regulations, prescribed industrial users were required to develop water efficiency plans. The Department for Trade and Economic Development developed a series of non-process and process water templates to assist business prepare their water efficiency plans.

- **Cross Government Participation**

The Department for Trade and Economic Development has been actively involved in the following high level groups and technical working groups to develop strategies and implement actions relating to the drought (including areas supplied by River Murray) and River Murray water security:

- Premier's High Level Drought Taskforce and Interagency Drought Response Team;
- River Murray Task Force, Water Security Council, and Water Security Technical Group; and
- Riverland Futures Project (see above).

Key contributions to these projects included evaluation of the relative economic benefits (\$ and jobs) of competing water uses for risk/consequence matrices, and evaluation of strategic options for the Lower Lakes.

- **Development Policy**

The Department for Trade and Economic Development is regularly involved in the development of various policies and strategies relating to the River Murray in order to ensure an economic perspective is built into these instruments. In 2007-08 DTED provided input to the development of the River Murray Marina Strategy and the River Murray Act Referral Assessment.

- **Policy Maritime Heritage Program**

This program protects and enhances community awareness of maritime heritage, including heritage along the River Murray. In 2006-07 updated information on maritime heritage sites was collected and entered into the Shipwrecks Database maintained by the Department for Environment and Heritage. This updated information was delivered by web mapping applications to other state government Agencies through EnvMaps and public users through Nature Maps. In addition, an audit was undertaken of the maritime heritage interpretive signs along the 'River Boat Trail'.

- **River Murray Canoe Trails**

Canoe Trails are being developed within the River Murray National Park to increase public awareness of the significance of wetland areas and to sustainably manage canoe access to the environment. The Department for Environment and Heritage continues to contribute to the planning and management of canoe access in a sustainable manner on and off reserves within the River Murray National Park. The signage program continues to be implemented.

PART 2

TRIENNIAL REVIEW

6. TRIENNIAL REVIEW - INTRODUCTION

The *River Murray Act 2003* came into operation on 24 November 2003 as part of the South Australian Government's commitment to improve the state of the River Murray. The objects are to ensure that all reasonable and practicable measures are taken to protect, restore and enhance the River Murray, to provide mechanisms to ensure that any development or activities do not have an adverse effect on the River and are undertaken in a way that best protects and benefits the River while providing for the economic, social and physical well being of the community, and to promote principles of ecologically sustainable development in relation to the use and management of the River.

Supplementing the objects are four sets of objectives, collectively named the Objectives for a Healthy River Murray relating to river health, environmental flow, water quality and the human dimension of a working river. The Act introduces a general duty of care requiring all persons to take reasonable measures to prevent or minimise harm to the River through their actions. Harm includes future harm. Numerous other provisions relating to referrals under a wide range of other Acts, protection orders, land management agreements and significant penalties, all work together with the objects and objectives of the Act to provide increased protection to the River.

The assessment of a causal link between the activities of the Act, after five years operation, is a challenge, as long time lags exist between actions and seeing a difference in the condition of the River Murray. The main challenge facing South Australia and the nation as a whole at the present time is the magnitude of the effect of historic low flows on the decline of the whole of the Murray-Darling Basin. It is beyond the scope of the River Murray Act to address this challenge. Nevertheless, the assessment of activity applications through the referral policy and the interaction of the related operational Acts is important in ensuring that no further harm is caused to the River in South Australia due to ill-considered activities.

Section 11 of the *River Murray Act 2003* requires the Minister on a three-yearly basis to undertake a review of the Act. Section 11 (2) states that "the review must include –

- (a) an assessment of the interaction between this Act, the related operational Acts, and any other Act considered relevant by the Minister; and
- (b) an assessment of the state of the River Murray, especially taking into account the Objectives for a Healthy River Murray,

and may include other matters determined by the Minister to be relevant to a review of this Act."

The review must be undertaken so as to coincide with the end of a financial year and the outcome of the review must be reported on as part of the annual report to Parliament for that financial year. The Triennial Review covers the period 2005-08 and has been compiled from information provided by the Department of Water, Land and Biodiversity Conservation and agencies responsible for the related operational Acts. Agencies contributing to the report are listed in Appendix 7.

In the five years since the commencement of the River Murray Act, there has been a significant increase in the numbers of referrals made to the Minister for the River Murray. Although over the past year this increase has started to steady possibly due to the growing impact of the drought and historically low water allocations. The adverse impact of the drought on the Riverland and Lower Lakes communities has been well documented in the media. There has also been a corresponding decline in the region's tourism, partly due to a perception that low water levels have reduced opportunities for recreational river activities. However, rising fuel costs and the general downturn in the Australian economy may also be to blame.

7. INTERACTION BETWEEN ACTS

The *River Murray Act 2003* gives the Minister responsible for it a number of powers designed to ensure the protection of the River. These include the obligation to promote the integration of the River Murray Act with other legislation and to have input into statutory instruments (for example, plans) and in some cases provide direction on statutory authorisations (for example, licences). A number of Acts are identified in the River Murray Act as related operational Acts. Activities authorised pursuant to these Acts have the capacity to significantly impact the health of the River, for both positive and negative outcomes.

The first part of the Triennial Review is an assessment of the interaction between the River Murray Act, the related operational Acts, and any other Act considered relevant by the Minister.

The related operational Acts are:

Aquaculture Act 2001

Coast Protection Act 1972

Crown Lands Act 1929

Development Act 1993

Environment Protection Act 1993

Fisheries Management Act 2007

Harbors and Navigation Act 1993

Heritage Places Act 1993

Historic Shipwrecks Act 1981

Irrigation Act 1994

Murray-Darling Basin Act 1993

National Parks and Wildlife Act 1972

Native Vegetation Act 1991

Natural Resource Management Act 2004

South Eastern Water Conservation and Drainage Act 1992

any Mining Act¹

The *Aboriginal Heritage Act 1998* and the Commonwealth's new *Water Act 2007* were also included within the scope of the review.

The interaction between the River Murray Act and the related operational Acts varies. Some provisions were activated immediately when the River Murray Act became operational. The Act provides a regulation making power, which is made under the relevant

¹ any Mining Act means the *Mining Act 1971*, the *Opal Mining Act 1995* or the *Petroleum Act 2000*

Act and enables the future regulation or prohibition of any identified activity deemed to harm the River as need arises. Further opportunities to streamline and improve efficiency and effectiveness are sought on an ongoing basis.

The interaction between Acts and associated achievements, including how well the interaction is working are detailed below.

7.1 ABORIGINAL HERITAGE ACT 1998

The *Aboriginal Heritage Act 1998* was not amended by the River Murray Act, nor is it a directly linked operational Act. There are however, inevitable interactions between the two Acts, as the Aboriginal Heritage Act does apply statewide.

The River Murray is very important both culturally and historically to Aboriginal people. The River traverses a number of different traditional tribal and language groups. There are large numbers of heritage sites all along the River, such as scar trees, burials, middens, camping sites, and mythological sites (ie dreaming stories).

Sites of Aboriginal heritage significance in South Australia are recorded on the *Register of Aboriginal Sites and Objects* in accordance with section 11 of the Aboriginal Heritage Act. Section 12 of the Act provides for an applicant to seek a determination as to whether the area of a proposed development is an Aboriginal site or whether there are Aboriginal objects in the area.

Development applications referred to the Minister for the River Murray for assessment within 200 metres of the riverbank (approximately 50% to 75% of all applications) are passed on to Aboriginal Affairs and Reconciliation Division of the Department of Premier and Cabinet for advice. The Division checks the Register to see whether a particular site will be impacted by a proposed development and in some situations contacts the relevant Native Title Claimant group or heritage committee for clarification². Once a section 12 determination has been completed the applicant may amend the development proposal in order to proceed without damaging sites or objects, or alternatively be authorised to proceed with the development unchanged, pursuant to section 23 of the Aboriginal Heritage Act.

There are a number of heritage committees along the River Murray operated by local Aboriginal communities to manage and conserve heritage in their areas. These committees work with State and local governments to identify sites and to consider long-term

² In the case of the upper and lower reaches of the River Murray in South Australia, the Aboriginal Affairs and Heritage Division consults with the relevant Native Title claimant organisation. In the case of mid Murray locations (between the two claim areas), a local heritage committee is consulted.

management and conservation options. The committees also assist in the development of tourist projects such as heritage trails, cultural experiences and heritage centres, which also contributes to the achievement of the human dimension objectives.

7.2 AQUACULTURE ACT 2001

The *Aquaculture Act 2001* was amended by the River Murray Act to require any aquaculture policies applying in the Murray-Darling Basin to seek to further the objects and objectives of the River Murray Act. The amendments also prevent the Minister responsible for the Aquaculture Act from approving a policy applying in a River Murray Protection Area without the concurrence of the Minister responsible for the River Murray Act.

These provisions do not require any regulations to be made, therefore they became operational on the same day the River Murray Act came into operation. Since that time, there have been no new policies (or policy reviews) made pursuant to the Aquaculture Act relating to either the Murray-Darling Basin or a River Murray Protection Area, therefore the provisions have not been tested and no matters have been referred to the Minister responsible for the River Murray Act. However, management processes are focused on ecologically sustainable development principles and therefore do operate to the benefit of the River Murray.

Although a process for referrals pursuant to the Aquaculture Act has not been developed, the relevant agency is aware of the requirements and will take appropriate steps when necessary.

7.3 COAST PROTECTION ACT 1972

The *Coast Protection Act 1972* was amended to require the Coast Protection Board to take into account and seek to further the objects and objectives of the *River Murray Act 2003* if or when taking any action under the Coast Protection Act within or in relation to any part of the Murray-Darling Basin. Furthermore, when preparing or reviewing a management plan that could affect the River Murray, the Coast Protection Board must consult with the Minister responsible for the River Murray Act.

These provisions do not require any regulations to be made, therefore they became operational on the same day the River Murray Act came into operation. Since the *Development (River Murray) Variation Regulations 2003* came into effect, the Coast Protection Board is no longer referred applications that are within the River Murray Protection Area. A 'one stop shop' operates whereby those referrals that are relevant to coastal land are passed on to the Coastal Protection Branch of the Department for Environment and Heritage for advice. Referrals number in the order of six per year for the area on the seaward side of Hindmarsh Island and the Coorong.

No management plans affecting the River Murray Protection Area have been prepared since the provisions became operational. There has, however, been a reasonable level of

interaction between agencies responsible for the two Acts. The Coastal Protection Branch of the Department for Environment and Heritage has provided input on the 'River Murray Referral Policy – Coastal Development' (currently under development) and the notice relating to the exemption of certain referrals for sheds. The Branch has also produced maps to enable easier determination of which part of the River Murray Protection Area is 'coastal land'.

7.4 CROWN LANDS ACT 1929

Similar to most of the other operational Acts, the *Crown Lands Act 1929* was amended to require the Minister or authority granting or renewing licenses pursuant to the Crown Lands Act within the Murray-Darling Basin to take into account and seek to further the objects and objectives of the River Murray Act. If a proposed licence is within a prescribed class and relates to a River Murray Protection Area, prior to granting or renewing the licence, the relevant authority must consult with the Minister responsible for the River Murray Act and comply with any of the Minister's directions. A further amendment made by the River Murray Act to the Crown Lands Act, section 146A, prevents the acquisition of land within the Murray-Darling Basin solely or predominantly for the purposes of closer settlement.

No regulations prescribing classes of licence have been made, therefore there has been no obligation on the relevant authority to refer matters to the Minister.

Arrangements have been made to pass on all development application referrals relating to the bed or banks of the River Murray, that are on Crown land or adjoin Crown land to Crown Lands SA for assessment. This has resulted in improvements to auditing and follow up on relevant licensing for existing developments. Some consultation has occurred on potential guidelines and classes of licence to be considered.

7.5 DEVELOPMENT ACT 1993

The consequential amendments made to the *Development Act 1993* by the River Murray Act cascade through the planning hierarchy, starting with the Planning Strategy for South Australia. The strategy is taken to include the objectives of the River Murray Act as of the commencement of the Act.

The amendments intend to ensure the objects and the objectives of the River Murray Act are taken into account in development planning decisions. One of the significant consequential amendments was to confer upon the Minister responsible for the River Murray Act powers to prevent inappropriate development within the Murray-Darling Basin and particularly within River Murray Protection Areas.

Amendments made by the River Murray Act include the following:

- the Planning Strategy to be taken to include the objectives of the River Murray Act;

- development Plan Amendments by a council or the Minister that relates (wholly or in part) to any part of the Murray-Darling Basin must be referred to the Minister responsible for the River Murray Act for consultation;
- developments considered significant by the Minister for the River Murray can be referred by the Minister responsible for the Development Act to the Development Assessment Commission;
- panels considering major developments or projects with significant impacts on any aspect of the River Murray must include a person approved by the Minister for the River Murray;
- applications for developments in prescribed zones that fall within a class of development prescribed under Schedule 8 of the Development Act are referred to the Minister for the River Murray for advice and direction.

The *Development (River Murray) Variation Regulations 2003* (Development Variation Regulations) also came into operation on 24 November 2003. The Development Variation Regulations expand the definition of 'development' to include the placement or construction of infrastructure to take water, or drain water or other substances to, any part of the River. Such use of land has the potential to harm the River (in particular, the cliffs and banks), yet was not previously considered to be development for the purposes of the *Development Act 1993*.

The Development Variation Regulations also reduce the threshold at which development within River Murray Protection Areas is referred to the Environment Protection Authority, and raise the level of the Environment Protection Authority comment to 'direction' for all referrals.

A significant component of the interaction between these two Acts relates to the referral mechanisms. The number of referrals to the Minister for the River Murray has increased significantly since the commencement of the River Murray Act. In 2005-06, the number of mandatory and non-mandatory referrals in the Murray-Darling Basin was 746. The total mandatory and non-mandatory referrals received in 2006-07 was 732 and 733 in 2007-08.

Planning Reforms

In June 2008 the State Government embarked on a wide reaching program to reform the planning and development system. Most of the 50 recommendations of the Planning and Development Review Steering Committee have been endorsed. Key elements of the reform strategy include a 30-year plan to manage growth and development, expansion of the Greater Adelaide Metropolitan Area, identification of a 25 year rolling supply of broad acre land and encouraging higher density development in transport corridors. The review also introduces Regional Plans to guide development with a timeframe of 2009 for the completion of a Greater Metropolitan Plan and 2011 for the introduction of Regional Plans.

The range of developments that will no longer require planning approval has been significantly increased by the application of a Residential Code commencing in January 2009. In addition, a major focus of the review is the reduction in referral of development applications with a 35 per cent cutback by December 2008 and further reductions thereafter.

For the operation of the River Murray Act, the main implications of the Planning Review relate to informal and schedule 8 referrals, reduction of statutory timeframes and the potential relaxation of development controls in zones adjacent to the River.

A broader hierarchy of plans will now inform the planning system. The Review recommends that Regional and Structure plans (part of the Regional plans) provide the opportunity to incorporate information at the strategic level. It is believed that this will reduce or eliminate the need for referrals at the project stage. It is at this time unclear how much and what type of strategic level information could achieve the protection of the River and its environs without further consideration at the development stage. Prior to the completion of strategic Regional Plans, it will be necessary for local councils and agencies to identify what type of application can be exempt from the requirement of an agency referral.

The object of the Residential Code is to purge the system of minor development applications and to speed the process for types of development that fit the criteria of the code. The operation of the code specifically excludes development on land in Watercourse or Flood Zones and on Floodplains. However there remain implications for the health of the River and for the amenity of townships and smaller settlements in the region, particularly where zones within the ambit of the code share boundaries with river zones. Stormwater issues for example are not considered in the Code. Expanding the list of activities that do not constitute development and therefore do not require approval may also prove to be problematic particularly in relation to floodplain settlements.

The recommendations of the Planning Review include a proposal to 'road test' the provisions of the Residential Code and at time of writing, submissions on the code are still invited. Legislative amendments are to be drafted by October 2008. It is expected that local governments and agencies prescribed under the Development Variation Regulations will be actively involved in determining what type and circumstance of referral under Schedule 8 of the Development Act can be revised.

Other initiatives

Several initiatives have been progressed that are aimed at refining and improving the interaction between the Acts:

- Work on a *River Murray (Salinity) Ministerial Plan Amendment Report (PAR)* commenced in 2004 but has been put on hold due to the impact of the drought, which has resulted in unprecedented increases in salinity particularly in the lower reaches of the river. Investment in the construction and maintenance of salt interception schemes has continued and the implementation of the salinity zoning policy aims to encourage irrigation development in low salinity impact areas.

Regional Land Use Frameworks being prepared under the new planning reforms will incorporate policies to reduce the impact of salinity through amendments to Development Plans.

- A *Notice of Exemption* pursuant to section 22(18) of the River Murray Act 2003 was issued in May 2005 in order to streamline processes and reduce unnecessary referrals and is still in place. The Notice outlines criteria that, if met, can exempt certain development applications for outbuildings and farm buildings from referral.
- A *Consolidated Across Government Policy for Marina Development Along the River Murray* was adopted in 2005. This interim policy consolidates all existing provisions and policies related to marinas while a more comprehensive and integrated strategy addressing houseboats, mooring and marinas is being developed.
- A draft *Houseboat, Mooring and Marina Strategy and Guidelines for the River Murray in South Australia* is currently being developed by a inter-agency working group led by Planning SA and Department of Water, Land and Biodiversity Conservation. A number of studies informing the development of the strategy have been completed including an investigation into marina berth supply and demand, and a site suitability analysis for marinas and mooring along the River.
- Interagency cooperation between Planning SA, Mid-Murray Council and Department of Water, Land and Biodiversity Conservation has resulted in a proposed amendment to the *Tourism and Recreation Policy Area of the River Murray Flood Zone* of the Mid-Murray Council Development Plan in order to comply with and better reflect the Objectives for a Healthy River Murray. This document is called the *River Murray Zone - Minor Amendments Statement of Intent*.

Drought conditions and low flows notwithstanding, the *River Murray Act 2003* has continued to provide ongoing protection to the River Murray and its environs. Referrals of Development Plan Amendments and development applications has provided the opportunity for increased protection from inappropriate development.

7.6 ENVIRONMENT PROTECTION ACT 1993

The *Environment Protection Act 1993* was amended to make it the duty of all persons and bodies involved in administration of that Act to take into account and seek to further the objects of the *River Murray Act 2003* and the Objectives for a Healthy River Murray if or when taking any action under the Environment Protection Act within or in relation to any part of the Murray-Darling Basin.

As there are no regulations required, the provisions became active at the commencement of the operation of the River Murray Act.

Following this amendment, the Environment Protection Authority now takes into account the objects and objectives of the River Murray Act when:

- issuing an authorisation under section 47 (“*criteria for grant and conditions of environmental authorisations*”) of the Environment Protection Act;

- making an environment protection policy; and
- providing advice on development applications.

Furthermore, the River Murray Act amended the Environment Protection Act so that the *State of the Environment* report now includes a specific assessment of the State of the River Murray, especially taking into account the Objectives for a Healthy River Murray. The first *State of the Environment* report to include a specific River Murray section was released in November 2003. State of the Environment Reporting occurs on a 5-yearly basis. The next *State of the Environment Report* is due for release in November 2008. As an outcome of this review future consideration needs to be given to alignment of the River Murray Act with the Environment Protection Act to avoid duplication and to streamline the process.

Information from the Environment Protection Authority indicates that the interaction between the River Murray Act and the Environment Protection Act is considered positive, with closer links forged between agencies. The *Environment Protection (Water Quality) Policy 2003* sets the environmental values for the River Murray, the criteria for discharges to the River and, through codes of practice, attempts to manage diffuse sources of pollution to the River, including nutrient inflows. The Environment Protection Authority through this policy is able to oversee the discharge of waste water (storm water from roadsides) and minimise the potential for harmful affects to occur to the River Murray water quality. The Environment Protection Act is also used to better manage flood irrigation in the lower Murray reaches so that over time the impact of this activity is eliminated or reduced significantly.

In order to improve efficiencies the Environment Protection Authority Board has recently endorsed that the River Murray Water Protection Area proclaimed under the Environment Protection Act be consistent with the River Murray Floodplain Area proclaimed under the River Murray Act. These changes have been endorsed by the Minister for Environment and Conservation and the Minister for the River Murray. Implementation is currently underway and will result in one common boundary for councils and the community, including the area of the lower lakes.

The River Murray Act has also facilitated increased Environment Protection Authority input into planning decisions. The Development Variation Regulations reduced the threshold at which development within River Murray Protected Areas is referred to the Environment Protection Authority. The regulations also raised the level of Environment Protection Authority comment to 'direction' for all referrals. An estimated number of approximately fifteen percent of development applications are of relevance to the provisions.

There is on-going cooperation between officers of the Department of Water Land and Biodiversity Conservation and the Environment Protection Authority regarding compliance actions.

7.7 FISHERIES MANAGEMENT ACT 2007

The *Fisheries Act 1982* was repealed in September 2007 and replaced with the *Fisheries Management Act 2007* incorporating all relevant sections of the previous Act.

Actions taken under the Fisheries Management Act must seek to further the objects and objectives of the River Murray Act. The Minister responsible for the River Murray Act can request the Minister responsible for the Fisheries Management Act to make, vary or revoke a declaration in relation to fishing activity in the River Murray. Applications for licences, permits and registration that relate to or apply in respect of the River Murray must be referred to the Minister for the River Murray for consultation. Similarly, applications for exemptions from provisions of the Fisheries Management Act must be referred. There is no power of direction in these cases.

Although only one application (see section 5) was referred in the period 2005-08 since the Fisheries Management Act came into force, there is a significant amount of activity relating to fish management in the Murray-Darling Basin. Relevant agencies have been working together through many non-statutory mechanisms such as the *Murray-Darling Basin Commission's Native Fish Strategy 2003-2013*. Changes to the Lakes and Coorong Fishery Management Plan have been made to enable complementary management factors and performance indicators to be applied to minimise external impacts on fish stocks. Consultation arrangements regarding trout stocking and release of exotic fish will be established in 2008-09. A process for providing a Ministerial exemption for taking of fish for research purposes will also be developed.

A process for consultation by Primary Industries and Resources of South Australia with the Minister for the River Murray is presently being investigated to ensure all relevant actions are undertaken.

7.8 HARBORS AND NAVIGATION ACT 1993

The *Harbors and Navigation Act 1993* is primarily concerned with safe navigation and includes provisions relating to hazards, pollutants and oil spill responses on the River.

Amendments made to the Harbors and Navigation Act require consultation with the Minister responsible for the River Murray Act before any licence is granted in relation to waters that form part of the River Murray. The Minister's directions must be complied with, however, specific categories of licence may be excluded by regulation.

Harbors and Navigation (River Murray) Variation Regulations 2003 were brought into effect in November 2003. In the period 2005-08 eleven applications for aquatic licenses were referred.

The referral provisions appear to be working satisfactorily. Opportunities to improve effectiveness and efficiencies are sought on an ongoing basis.

7.9 HERITAGE PLACES ACT 1993

The amendments to the *Heritage Places Act 1993* require that the State Heritage Authority must, in granting various permits under the Heritage Places Act relating to a River Murray Protection Area, take into account and seek to further the objects of the River Murray Act and the Objectives for a Healthy River Murray. If the permit is of a prescribed class, the Minister administering the River Murray Act must be consulted and any directions of the Minister in relation to the grant of the permit, including that the permit not be granted or must be granted subject to specified conditions, must be complied with.

No regulations prescribing classes of licence have been made, therefore there has been no obligation on the State Heritage Authority to refer matters to the Minister.

Development proposals within the River Murray Floodplain Area that may require Development Act and Heritage Places Act approvals are referred to the Minister for the River Murray to ensure that these approvals are forthcoming at the same time, thus reducing the timeframe required to secure all the approvals necessary. Approximately twenty development applications were referred in the period 2005-08.

Reports from the Department for Environment and Heritage indicate that the interaction between the two Acts is considered positive. It has resulted in increased awareness within Government and the community about protecting State heritage places.

7.10 HISTORIC SHIPWRECKS ACT 1981

The amendments to the *Historic Shipwrecks Act 1981* require that if an application for a permit under the Act relates to a shipwreck located in the River Murray, the Minister must in considering the application, seek to further the objects of the River Murray Act and the Objectives for a Healthy River Murray. If a permit is of a prescribed class and relates to a River Murray Protection Area, the Minister administering the River Murray Act must be consulted and any directions of the Minister in relation to the grant of the permit, including that the permit not be granted or must be granted subject to specified conditions, must be complied with.

No regulations prescribing classes of licence have been made, therefore there has been no obligation on the relevant authority to refer matters to the Minister.

Under the provisions of the Development Act developments within the River Murray Floodplain Area undertaken within 500 metres of a historic shipwreck are referred to the Minister for the River Murray. In addition to development approval, the proposal may require approval under the Historic Shipwrecks Act and is referred by Department of Water,

Land and Biodiversity Conservation to ensure that these approvals are forthcoming at the same time, thus reducing the timeframe required to secure all the approvals necessary. All developments that take place in or over the water are referred to the historic shipwrecks group of Department of Environment and Heritage. Approximately 240 development applications were referred in the period 2005-08.

7.11 IRRIGATION ACT 1994

The amendments to the Irrigation Act 1994 require that an irrigation authority must not breach, a duty or requirement under the River Murray Act, in determining terms and conditions on the supply or drainage of water.

The Irrigation Act was also amended to allow an irrigation authority to reduce water allocations if necessary to meet a reduction of its allocation under the Natural Resources Management Act. In making any reduction in allocations, the irrigation authority may take into account opportunities for more efficient use of water in the district and the types of crops grown and may reduce various allocations by different amounts or proportions.

There is no further interaction between the two Acts.

7.12 MINING ACT 1971

Amendments to the *Mining Act 1971* require that decisions on applications for licences or leases in the Murray-Darling Basin must be made taking into account the objects and objectives of the River Murray Act.

Where applications for licences or leases relate to a River Murray Protection Area, the application must be referred to the Minister responsible for the River Murray Act. However, unlike amendments made to other Acts that require directions to be complied with, amendments to the Mining Act require a dialogue between the two relevant Ministers. Where the Ministers cannot agree on an outcome, the matter is to be referred to the Governor for decision.

These referral provisions became operational on the same day as the River Murray Act. In the period 2005-08 102 referrals were made pursuant to the Mining Act.

Exploratory activities have the potential to be invasive and existing mining activities should not necessarily continue unchecked in all circumstances. There is no evidence to suggest that any amendments are required to the referral provisions at this time. Inter-agency processes and procedures relating to referrals can, however, be reviewed to identify opportunities to simplify and streamline wherever possible.

7.13 MURRAY-DARLING BASIN ACT 1993 (COMMONWEALTH)

The amendment to the *Murray-Darling Basin Act 1993* inserts a new subsection that makes clear that the Minister is the Constructing Authority in relation to any works, or measures authorised by, or associated with, the Murray-Darling-Basin Agreement.

There is no further interaction between the two Acts.

7.14 NATIONAL PARKS AND WILDLIFE ACT 1972

The amendments made by the River Murray Act to the *National Parks and Wildlife Act 1972* require that any lease, licence or agreement that relates to a reserve located within a River Murray Protection Area, must be consistent with the objects of the River Murray Act and the Objectives for a Healthy River Murray. The Minister administering the River Murray Act must be consulted on certain classes of lease, licence or agreement and any directions in relation to the lease, licence, permit or agreement must be complied with.

Regulations have not been made prescribing classes of lease, licence, permit or agreement, therefore no referrals have been made pursuant to these provisions. Negotiation between the relevant agencies since the commencement of the Act agreed that regulations would be made to prescribe permits for duck and quail hunting. However, due to the impact of the drought and consequent reduction in numbers of wildfowl within the Murray-Darling Basin, the duck open season has been cancelled over the past two consecutive years. Consequently the process of drafting regulations to facilitate referrals and determine exemptions has been put on hold for the time being.

The amendments also provide that an objective of managing a reserve located within the Murray-Darling Basin is to promote the objects and objectives of the River Murray Act. The Minister administering the River Murray Act must be consulted when preparing a plan of management for a reserve located within the Murray-Darling Basin, which must have regard to the objects and objectives of the River Murray Act.

A proposal to constitute or alter the boundaries of a reserve that relates to land within the Murray-Darling Basin must be submitted to the Minister administering the River Murray Act, and that Minister's views considered.

To date the interaction between the two Acts has been limited to the Minister administering the River Murray Act being consulted when preparing a plan of management for a reserve located within the Murray-Darling Basin. In the period 2005-08, eight such management plans have been reviewed against the objects and objectives of the River Murray Act.

7.15 NATIVE VEGETATION ACT 1991

The amendments to the *Native Vegetation Act 1991* require the Native Vegetation Council to obtain the approval of the Minister administering the River Murray Act before delegating any of its powers in relation to a matter within the Murray-Darling Basin.

Guidelines in relation to the management of native vegetation prepared by the Council that relate to the Murray-Darling Basin must seek to further the objects of the River Murray Act and the Objectives for a Healthy River Murray and a draft must be submitted to the Minister administering the River Murray Act for comment during consultation.

The amendments also require prescribed classes of applications to clear native vegetation within a River Murray Protection Area to be referred to the Minister administering the River Murray Act. Any directions of the Minister as to the grant of the application or any conditions on the grant must be complied with.

Native Vegetation (River Murray) Variation Regulations 2003 were made under the *Native Vegetation Act 1991*, and came into operation on 24 November 2003.

The Native Vegetation Variation Regulations remove an exemption that allowed the creation of access paths for pedestrians or vehicles within the River Murray Protection (Floodplain) Area. Given the relationship between riverside vegetation and river health, it is not considered appropriate for such an activity to be undertaken without native vegetation clearance consent.

The Native Vegetation Variation Regulations also modify the exemptions relating to fire management. The amendments require a fire management plan applying within the River Murray Protection (Floodplain) Area to be referred to the Minister for the River Murray before being approved by the Native Vegetation Council.

A new requirement was also included in the Schedule of the Principles of Clearance of Native Vegetation, that vegetation should not be cleared if it would cause significant harm to the River Murray.

The Native Vegetation Council has approved delegation to the Department of Water Land and Biodiversity Conservation for applications referred for comment under the *Development Act 1993* and clearance of vegetation under certain relevant regulations of the *Native Vegetation Variation Regulations 2003*. The delegations have been endorsed by the Minister for Environment and Conservation and the Minister for River Murray. Consultation regarding implementation of delegations is currently underway between the Council and the Department of Water Land and Biodiversity Conservation.

These two Acts align well and have complementary objectives.

7.16 NATURAL RESOURCES MANAGEMENT ACT 2004

The Natural Resources Management Act 2004 became fully operational on 1 July 2005, at which time the *Water Resources Act 1997*, *Soil Conservation and Land Care Act 1989* and the *Animal and Plant Control (Agricultural Protection and Other Purposes) Act 1986* were repealed.

Certain provisions of the Natural Resources Management Act were conferred upon the Minister for the River Murray in early 2005. These provisions relate to the Ministerial functions and powers in relation to the South Australian Murray-Darling Basin Natural Resources Management Board, including its regional natural resources management plans. The Board's plans (regional natural resources management and water allocation plans) that apply to the River Murray and the Murray-Darling Basin are required to further the objects of the River Murray Act and the Objectives for a Healthy River Murray. The Minister for the River Murray adopts the South Australian Murray-Darling Basin Natural Resources Management Board plans, which ensures strong integration between the two Acts occurring at a Ministerial level.

The Natural Resources Management Act made a consequential amendment to the River Murray Act, namely that the River Murray Implementation Strategy must take into account the State Natural Resources Management Plan and the Planning Strategy.

The boards constituted under the three repealed Acts³, now replaced by the South Australian Murray-Darling Basin Natural Resources Management Board, were responsible for a significant number of programs and projects operating in the region. These projects and programs continue and are expected to provide improved outcomes now that the administrative structures can facilitate integration across natural resource disciplines.

Management and protection of water resources

Bodies acting pursuant to the Natural Resources Management Act must act consistently with, and seek to further the objects of the River Murray Act and the Objectives for a Healthy River Murray.

Penalties for breaches relating to water affecting activities include an expiation fee if the offence relates to prescribed conditions of licence within a River Murray Protection Area. A provision was also added to the section relating to water affecting activities to allow the

³ River Murray Catchment Water Management Board, several soil conservation boards, several animal and plant control boards and the Murray-Darling Basin Integrated Natural Resources Management Group (non-statutory group established to develop plans and investment strategies through which National Action Plan for Salinity and Water Quality (NAP) and Natural Heritage Trust (NHT) funding are delivered)

relevant authority to determine not to grant any more permits for the construction or enlargement of dams or other structures without a corresponding reduction in the capacity of other storages.

Certain classes of permit or licence as prescribed by regulation must be referred to, and can be directed by, the Minister responsible for the River Murray Act where the application relates to a River Murray Protection Area. The Minister's decision in relation to any permits or licences must take into account the terms and requirements of the Agreement approved under the *Murray-Darling Basin Act 1993* and any relevant resolutions of the Ministerial Council under that Agreement. No regulations prescribing classes of permit or licence have been made.

The Act provides conditions can be added to the water licence that includes allowing that the licensee enter into a bond (in such a sum and subject to such terms as specified by the Minister) to ensure money is available to address the costs of any damage to the River. Licensees can also be required to participate in schemes to protect, restore or otherwise benefit the River.

The Minister has the power to amend water licences at any time within the Murray-Darling Basin if it is appropriate or desirable to prevent, reduce or address damage to the River. Head powers were also provided to allow regulations to cancel appeal rights in the Murray-Darling Basin.

Under the provisions of the *Development Act 1993*, development within the River Murray Floodplain Area, including an activity for which a permit would be required under the Natural Resources Management Act, is referred to the Minister for the River Murray. The interaction between the Natural Resource Management Act and the River Murray Act is working well because both Acts are administered by the Department of Water, Land and Biodiversity Conservation.

Drought conditions have continued to impact severely on River Murray water allocations for three successive seasons resulting in the implementation of the Drought Response Strategy. Section 132(1) of the Natural Resources Management Act provides that the Minister may restrict the taking of water from the River Murray Prescribed Watercourse if considered that the rate at which water is being taken is such that the quantity of water available can no longer meet the demand, will not be sufficient to meet future demand, or is affecting or likely to affect the quality of water in the watercourse.

Management and protection of land

A notice can be issued requiring an owner of land to prepare an action plan for that land to address land management issues. The notice cannot be issued to address land management practices if those practices are required or authorised by a protection order, a reparation order or a reparation authorisation under the River Murray Act.

Control of Animals and Plants

Issuing permits for activities in the Murray-Darling Basin requires to take into account and seek to further the objects and objectives of the *River Murray Act*. Before issuing permits of a prescribed class for activities in the River Murray Protection Areas, to consult with the Minister and comply with the Minister's directions (if any).

No regulations prescribing classes of activities have been made, therefore there has been no obligation to refer matters to the Minister. However through the referral of development applications all applications that fall within the Branched Broomrape Containment Area are referred to Animal and Plant Control officers with notes or conditions placed on the response. In the 2005-08 period, approximately 200 such applications have referred to Animal and Plant Control officers resulting in the applicant being advised as to the serious threat to South Australian agriculture posed by Branched Broomrape.

The objectives of the River Murray Act and the Natural Resources Management Act are closely aligned, and seek to achieve similar outcomes.

7.17 OPAL MINING ACT 1995

The Minister responsible for the River Murray Act must be consulted regarding any declaration made pursuant to the *Opal Mining Act 1995* in a River Murray Protection Area. This amendment does not, however, indicate that any direction can be given by the Minister responsible for the River Murray Act.

To date, there has been no interaction between the two Acts.

7.18 PETROLEUM ACT 2000

Similar to the amendments made to the *Mining Act 1971*, the *Petroleum Act 2000* was amended to require that any statement of environmental objectives applying to any part of the Murray-Darling Basin must have the concurrence of the Minister responsible for the River Murray Act. Where the two relevant Ministers cannot agree, the matter is referred to the Governor for decision.

Fourteen statements of environmental objectives have been referred in the period 2005-08. Opportunities to improve effectiveness and efficiencies are sought on an ongoing basis.

7.19 SOUTH EASTERN WATER CONSERVATION AND DRAINAGE ACT 1992

The amendments made to the *South Eastern Water Conservation and Drainage Act 1992* (SEWCD Act) require that in administering that Act or taking any action under the Act that

relates to any part of the Murray-Darling Basin, the Minister, the South Eastern Water Conservation and Drainage Board, the Council or any other relevant persons must act consistently with and seek to further the objects of the River Murray Act and the Objectives for a Healthy River Murray, insofar as they are relevant.

The South Eastern Water Conservation and Drainage Board, in reviewing its management plan is also required to consult with the Minister administering the River Murray Act insofar as the plan affects the River Murray. Any water management works undertaken by the Board that may affect the River Murray must comply with the approved management plan or otherwise have the approval of the Minister administering the River Murray Act.

In granting a licence of a prescribed class to carry out work in relation to a River Murray Protection Area, the Minister administering the River Murray Act must be consulted and any directions of the Minister in relation to the grant of the licence, including that the licence not be granted or must be granted subject to specified conditions, must be complied with. No regulations prescribing classes of licence have been made.

7.20 WATER ACT 2007 (COMMONWEALTH)

The Commonwealth *Water Act 2007* came into operation on 3 March 2008. While parts of the legislation apply nationally, most of it focuses on the water resources of the Murray-Darling Basin. The Water Act spells out a number of formal objects, the first of which is to enable the Commonwealth, in conjunction with the States of the Murray-Darling Basin, to manage the basin water resources in the national interest. The Act's objects also include:

- giving effect to relevant international agreements about the environment and in so doing, promoting the use and management of the basin water resources in a way that optimises economic, social and environmental outcomes; and
- ensuring the return to environmentally sustainable levels of extraction.

The key feature of the Water Act is the requirement for a new, five-member Murray-Darling Basin Authority to prepare a basin-wide water management plan. The Basin Plan will set long-term sustainable diversion limits for all basin water resources – surface water and groundwater – limiting the quantity of water that may be taken from those resources.

The Basin Plan will also include –

- an environmental watering plan (intended to safeguard existing environmental water, plan for recovering additional water, and coordinate the management of existing and new environmental water);
- a water quality and salinity management plan; and
- rules for trading water rights within the Basin.

The Plan as adopted by the Commonwealth Minister will be an enforceable legal instrument. All Basin States must give effect to the main elements of the Plan that includes the sustainable diversion limits, environmental watering and water quality provisions and trading rules, through their own water management plans. State water management plans will be accredited by the Commonwealth Minister provided they are consistent with the Basin Plan.

Relationship with the River Murray Act and other state legislation

The Water Act is not a 'related operational Act' for the purposes of the River Murray Act. However, its implementation can be expected to give significant support to achieving the objects and objectives of the River Murray Act.

South Australia's existing water allocation plans relating to the River Murray⁴, under the *Natural Resources Management Act 2004*, have been granted status as 'transitional' water resource plans under the Water Act. This means that they are deemed to be accredited for the purposes of the Water Act until the date they cease to have effect under that Act (varying from December 2012 to July 2014, depending on the date each plan was made under South Australian law).

After the existing plans expire, the South Australian Government will need to make new plans that are consistent with the Basin Plan. To gain accreditation under the Water Act, the plans will also need to include all things required by the Basin Plan, including provisions about meeting sustainable diversion limits, regulating interception activities (activities that prevent water from entering rivers or groundwater systems, such as dams and forestry), planning for environmental watering and meeting water quality objectives.

The Basin Plan will have a direct impact on the way in which state government agencies and Ministers administer state legislation. For the River Murray Act, this means that the Minister for the River Murray, delegates of the Minister, and officers administering the related operational Acts (including local government officers administering the Development Act and Regulations) will need to ensure that they do not act in relation to basin water resources if the act is inconsistent with the Basin Plan, or fail to act in relation to those water resources if the failure to do so is inconsistent with the Basin Plan. This may require a review of the River Murray Act in the future.

⁴ Water allocation plans are made under the *Natural Resources Management Act 2004* for the Angas Bremer Prescribed Wells Area, Mallee Prescribed Wells Area, Noora Prescribed Wells Area and River Murray Prescribed Watercourse.

8. NATIONAL WATER INITIATIVE

The Intergovernmental Agreement on the National Water Initiative to which South Australia is a signatory influences the manner in which the Minister for the River Murray comments on statutory instruments applicable to the River Murray Protection Areas. These statutory instruments include: Development Plan Amendments, Aquaculture Plans, Coastal Management Plans, National Parks and Wildlife Reserve Management Plans, Native Vegetation Guidelines, Statements of Environmental Objectives under the Petroleum Act, District Soil Conservation Plans, South East Drainage Management Plans, and most importantly, Water Allocation Plans.

Clause 5 of the National Water Initiative requires that signatories establish “clear pathways to return all (river and groundwater) systems to environmentally sustainable levels of extraction”. This clause lies at the heart of the Commonwealth Water Act and its overriding purpose which is to ensure that all extractions are managed within the sustainable diversion limits of the Murray-Darling system as a whole, through the integrating Basin Plan.

The objects of the River Murray Act concur with the National Water Initiative, in that they seek to ‘promote the principles of ecologically sustainable development in relation to the use and management of the River’ (Object iv). The Objectives for a Healthy River Murray are also in concord with the National Water Initiative in this regard, particularly those relating to Environmental Flow.

The National Water Initiative requires that a fully transparent and accountable method of allocating and transferring water access entitlements be established across all the states and territories subject to the Agreement.

This will be achieved by separating water licences into their component parts. The components are the *water access entitlement*, which is the property right, the *water allocation* which will be based on an equitable share of the sustainable diversion limit for that water use year and is therefore subject to fluctuations from year to year, the *water resource works approval*, the *site use approval* and *delivery capacity entitlement*. Water Allocation Plans are progressively being reviewed to make them National Water Initiative compliant. The Natural Resources Management Act has been amended to facilitate the separation of water rights. Operational mechanisms are currently being developed.

9. COMPLIANCE AND ENFORCEMENT

The River Murray Act established a duty of care, a duty not to harm the River. This duty of care is enforceable by River Murray Protection Order or Reparation Order. It is the responsibility of all persons conducting activities within the River Murray Protection Areas to take reasonable steps to avoid or minimise the risk of harm including future harm to the River. Protection orders may be issued to secure compliance with the general duty of care, a condition of a statutory authorisation or any other requirement. If the Minister is satisfied that a person caused harm to the River, a Reparation Order can be issued requiring particular action or payment to make good any damage.

A dedicated Compliance Officer continued to work specifically in relation to the River Murray Act during the period 2005-08 and to issue orders to provide protection to the River Murray. As with the Natural Resources Management Act. The Protection Order and Reparation Order are useful tools. Education, awareness raising and ongoing liaison are also an important part of the compliance toolbox and serve to instate and improve a culture of care for the River.

However, in the context of repeat offences and cumulative impacts, the inherently reactive nature of the Protection and Reparation Orders means they cannot act as a deterrent. In addition, the results of some activities cannot be fully restored or rehabilitated and sometimes restoration is itself an act that could cause harm to the River.

The River Murray Compliance Officer has reported an increase in particular types of activities, many associated with the drought and low water levels. Some drought-associated activities could not have been foreseen during the drafting of the River Murray Act, for example, material excavated from channel dredging and dumped on the floodplain or sand dumped adjacent to recently exposed banks. Activities such as the placement of fill in the river to compensate for the lowering of water at the end of boat ramps can fall within the definition of 'maintenance', meaning the requirement for development approval is extinguished. Retrospective development approval of existing (illegal) structures can effectively remove the opportunity to protect the River. While individual activities as described above may be considered minor in themselves, the cumulative impacts are likely to be substantial and will contribute to future harm to the River.

The Compliance Officer has identified other issues for which remedial action is difficult. For example, the lower river levels have exposed snags, which on the one hand present a navigational hazard but on the other provide habitat for aquatic life. A large number of derelict houseboats disintegrating insitu also present a risk to the River. Removal is problematic if the owner cannot be located or undertake the logistical difficulties. Algal blooms outside of SA Water offtake areas are not currently monitored. Furthermore, increasing numbers of jetties may contribute to algal blooms particularly in shack areas, by decreasing the amount of light reaching the water and by interference with currents. Monitoring of water quality outside of SA Water offtake zones and particularly in the vicinity of shack areas could help to determine cumulative impacts of river structures.

There is considerable disparity in the way SA Murray-Darling Basin Councils deal with compliance related to the Development Act. Some local governments due to resourcing or other issues do not have the capacity to enforce compliance with conditions attached to development approvals, including those directed by the Minister for the River Murray. Where possible the River Murray Compliance Officer collaborates with local government Compliance Officers on matters relating to both the Development Act and the River Murray Act. Where councils cannot enforce compliance related to development applications, the River Murray Compliance Officer can issue a Protection Order.

The issue of compliance is particularly pertinent due to the increased range of activities attributed to low water levels, significant amounts of illegal development in some areas, impediments to enforcement due largely to resource constraints of local authorities and the inherently re-active nature of acting on complaints. The recent review of the planning system will oversee a reduction in agency referrals and potentially a reduction in statutory conditions imposed by the Minister for the River Murray. The impact of the recommended changes is unknown at this time but the sheer volume of activities and urgent need for increased resources particularly at local government level will mean that the River Murray Compliance Officer will be fully occupied during the next reporting period.

10. STATE OF THE RIVER MURRAY

The River Murray is one of our most important water resources. It provides water for important regional irrigation and manufacturing industries, local communities that rely on those industries for their prosperity, water for the city of Adelaide, growing industries in the Barossa and Clare Valleys, northern regional centres of Whyalla, Port Augusta, Port Pirie and numerous small townships in between.

The River Murray is more than a source of water for consumptive use. It is a living body whose ecological integrity must be maintained. Apart from the obvious value of a healthy river to the economy and the importance of maintaining a prosperous future, it also has significant cultural heritage value to both Aboriginal and non-Aboriginal people.

The most significant issues facing the River are the magnitude of the effect of historic low flows associated with the current drought and the overallocation of water resources. Beneficial outcomes of the River Murray Act will take some time to be fully realised. The assessment of a causal link between the activities of the Act, after five years operation, is a challenge, as long time lags exist between actions and seeing a difference in the condition of the River Murray. It is also difficult to isolate the extent to which the River Murray Act specifically has contributed to restoring health compared to a range of other efforts, as there are multiple interacting factors that affect the health of the River Murray.

The *River Murray Act 2003* is one of the key policy and strategic document together with the SA Strategic Plan and the State Natural Resources Management Plan that contributes to efforts to protect, restore and enhance the River Murray and its natural resources as well as ensuring that the River and natural resources are used and managed in as sustainable way. The health of the River Murray is a priority of the SA Strategic Plan and State Natural Resources Management Plan. The River Murray Act objectives are aligned with and contribute to key targets for the SA Strategic Plan and State Natural Resources Management Plan.

The South Australia's Strategic Plan Targets are:

- increase environmental flows by 500 gigalitres in the River Murray by 2009 as a first step towards improving sustainability in the Murray-Darling Basin, with a longer-term target of 1500 gigalitres by 2018.
- South Australia maintains a positive balance on the Murray-Darling Basin Commission salinity register.
- South Australia's water resources are managed within sustainable limits by 2018.
- by 2014, achieve a 20% increase in South Australia's agricultural cropping land that is adequately protected from erosion.

The *Natural Resources Management Act 2004* promotes the sustainable use of land and water resources within South Australia. Under that Act the *State Natural Resources Management Plan 2006* provides directions for natural resource management and resource condition targets including: improved ecological health, maintenance of wetland and estuaries, increase in water quality and the River Murray managed within ecologically sustainable limits.

The State Natural Resources Management Plan targets are:

- by 2018 the River Murray will be managed within ecologically sustainable limits.
- by 2011, all ecosystems dependent on prescribed water resources have improved ecological health compared with 2006.
- by 2020, all aquatic ecosystems have improved ecological health compared with 2006.
- by 2015, no further net loss of wetland or estuary, extent or condition, compared to 2006.
- by 2011, an increase in net water quality compared to 2006.

The Department of Water, Land and Biodiversity Conservation monitors River Murray outcomes by regular progress reporting on these targets.

10.1 STATE OF THE ENVIRONMENT

Under legislative amendments made to the *Environment Protection Act 1993* in 2003, the Environment Protection Authority is required to report on the state of the River Murray through the State of the Environment Report. The five-yearly report provides a comprehensive assessment of the condition of South Australia's natural resources and is prepared by the Board of the Environment Protection Authority.

A specific assessment of the state of the River Murray is prepared taking into account the *Objectives for a Healthy River Murray* under the *River Murray Act 2003*. The first of these dedicated assessments was included in the *State of the Environment Report 2003* under section two titled 'Inland Waters'. The information contained in that section informed the River Murray Act Triennial Review in 2005. A report on the state of the River Murray for the period 2003-2008 will be included in the *State of the Environment Report 2008* due for completion around November 2008.

While the content of the upcoming State of the Environment Report cannot be pre-empted, the Minister for the River Murray is required under the River Murray Act to provide an assessment of the state of the River Murray, taking into account the *Objectives for a Healthy River Murray*, every three years in the Triennial Review. Consequently a general overview of the state of the River Murray environs, taking into account the *Objectives for a Healthy River Murray*, is provided below based on current available information.

STATE OF THE RIVER – TRENDS FOR 2005 – 2008

The River Murray system is under stress due to a ten-year drought reducing water inflow throughout the Murray-Darling Basin. Adding to the drought is the increased acknowledgement that climate change is negatively impacting on rainfall and that low inflow rates throughout the Murray-Darling Basin may continue into the future. This reduction in catchment inflows has magnified the adverse impacts on the river ecosystem associated with unsustainable land use and water extraction practices. It has also placed significant pressure on securing water for critical human needs. Responding to these changes and pressures, and their ecological, economic and social consequences, has been a major focus for the South Australian Government.

River Health Objectives

Scientific assessments have shown that the River Murray system needs more water than is currently allocated for the maintenance, protection and restoration of key habitats and ecological processes. The Living Murray Initiative intends to return 500 gigalitres of water to the river as environmental flow by June 2009. Living Murray Icon Sites including the Chowilla floodplain, the Coorong, Lower Lakes, Murray Mouth and River Murray Channel in South Australia, will be the initial recipients of this water.

The current Water Allocation Plan for the River Murray Prescribed Watercourse reserves 200 gigalitres of river flow for use by 27 wetlands that have wetland management plans. Other water available for environmental use, including water donations, has been directed to river red gum watering projects and barrage fishway operations. The delivery of small volumes of water at crucial times during the year to red gum watering projects has provided excellent outcomes.

Native fish populations have become increasingly vulnerable throughout the drought period as their habitats have shrunk and become disconnected. These conditions triggered native fish rescues during February 2007 in the Lower Murray and Lake Alexandrina involving Yarra pygmy perch and Southern purple-spotted gudgeons. Rescued fish have been maintained in specially constructed holding facilities and continue to remain in good health.

The *Hume-to-the-Sea* fish project being implemented by the Murray-Darling Basin Commission is continuing to improve fish movement along the River Murray. Monitoring has shown that a large number of different fish species use three fishways that have been built into the barrages. Operational flexibility has been improved with the building of twenty-four remotely controlled gates, however due to very low water levels some are currently inoperable.

Environmental Flow Objectives

A strategy to guide the use of weir pool management operations on a more frequent basis is being developed. Weir pool manipulation involves raising the level of weir pools to enable the temporary flooding of wetlands and to enhance natural peaks in River Murray flows. This action also provides a mechanism for flushing salt from wetlands. A more natural wetting and drying cycle that mimics the rise and fall of river levels is being introduced to wetlands by installing regulators.

Over the last five years dredging of the River Murray mouth has been very important in keeping the connection open to the sea. The dredging effort to date has resulted in about five million cubic metres of sand being moved at a cost of \$27 million. Maintaining this passage allows cooling seawater flows into the Coorong and estuarine fish to move between the sea and the estuary below the barrages. Fish movement has also been improved following the construction of three fishways that form part of the barrages and allow migrating fish to complete their life cycles. Unfortunately however one of the fishways is currently inoperable due to low water levels.

Barrier points for fish movement within anabranch and off-channel habitats along the River Murray system have been identified through recent studies. An outcome from this work has been the construction of fish friendly regulators and channels under roads to improve fish passage between habitats.

Water Quality Objectives

The Environment Protection Authority in collaboration with the South Australian Murray-Darling Basin Natural Resource Management Board is implementing the National Water Quality Management Strategy in the Murraylands region. The primary objective of the Strategy is 'to achieve sustainable use of the nation's water resources by protecting and enhancing their quality while maintaining economic and social development'. Implementation of the Strategy will establish specific environmental values and water quality objectives and support the future planning and management of water bodies in the South Australian Murray-Darling Basin.

A significant contribution to ongoing water quality management is the assessment of risks associated with potential hazards to water quality identified by the River Murray and Lower Lakes Risk Catchment Assessment for Water Quality project. The project is a partnership between the Environment Protection Authority, South Australian Murray-Darling Basin Natural Resources Management Board and SA Water, and has assessed the entire 640 km length of the River in South Australia, the Lower Lakes and Coorong. Data entered into a spatial GIS database permits the mapping, coding and prioritisation of hazard locations. Management options have been proposed, including capital works, capacity building, monitoring, policy planning and research and development. An implementation phase began in 2006 and two strategic and three operational projects have subsequently commenced in response to priorities identified.

The Murray-Darling Basin Commission has developed the Basin Salinity Management Strategy for all Basin states to collectively manage the inflow of salt into the river from irrigation return flows and groundwater. The management process in South Australia includes the commissioning of salt interception schemes and reducing salinity impacts of irrigation through the salinity zoning policy.

The South Australian and Commonwealth Governments are jointly funding a rehabilitation program for the Lower River Murray Irrigation Area in conjunction with irrigators. The program aims to reduce irrigation water use and pollutant loads returning to the river through water efficiency measures and the reuse/recycling of runoff from farms. With reduced flows the risk of algal blooms has increased, even though nutrient levels have declined.

Human Dimension Objectives

The Intergovernmental Agreement on Murray-Darling Basin Reform focuses on a system wide approach to the management of the River Murray. The Agreement was signed on 3 July 2008 between the Commonwealth, New South Wales, Victoria, Queensland, South Australia and the Australian Capital Territory. The Agreement sets in place the Murray-Darling Basin Authority as provided under the Commonwealth Water Act. The Authority will prepare a Basin Plan, which will establish sustainable diversion limits, an environmental watering plan, water quality and salinity plan, and conveyance water to enable the provision of water for critical human needs.

To ensure effective community based management of the River Murray and natural resource issues in South Australia, the SA Murray-Darling Basin Natural Resources Management Board was established as one of the eight Natural Resources Management Boards in 2005 to coordinate and facilitate the management of natural resources regionally. The SA Murray-Darling Basin Natural Resources Management Board is responsible for preparing a Natural Resources Management Plan for the region and for updating the Water Allocation Plan for the River Murray Prescribed Watercourse. The development of the plans requires extensive community consultation and engagement of industry group representatives, environmental organisations, councils and organisations representing Native Title claimants and/or traditional owners.

The Murray-Darling Basin Commission has undertaken widespread consultation on the development of environmental management plans funded under The Living Murray initiative. A Community Reference Group has been established to provide advice to the Murray-Darling Basin Community Advisory Committee on all aspects of The Living Murray's implementation.

In 2003 a Memorandum of Understanding was signed between the traditional owner groups that make up the Murray-Darling Rivers Indigenous Nations and the Murray-Darling Basin Commission for joint agreement regarding management of the natural resources of the

Basin. Traditional Owner participation in the management of the icon sites identified through The Living Murray initiative is enabled and encouraged through the appointment of Aboriginal facilitators at these sites. Work is underway to develop initiatives to improve opportunities for traditional owners through programs such as the employment of Aboriginal people as guides and interpreters at certain icon sites. The Cultural Access to Water Project, through the National Water Initiative, seeks to improve understanding of Aboriginal access issues.

As part of its Drought Response the Department of Water, Land and Biodiversity Conservation prepares monthly resources reports on River Murray storages, allocations, salinity and water levels and regular press releases are issued to enable reporting of river conditions in local newspapers and other media. The Department maintains a River Murray Drought page on its website that provides a range of up to date information relevant to local communities and landholders. The website page also provides information to assist water licence holders such as waivers of licence application fees, use of rollover allocations and a drought information hotline.

11. TRIENNIAL REVIEW - SUMMARY

The River Murray Act has been in place for five years. This is the second Triennial Review. The Review identifies the progress the Act has made in providing for greater consideration of River Murray issues for the period 2004-05 to 2007-08.

There are two key reforms that are currently being progressed that are intended to significantly impact on and improve outcomes for the health of the River.

At the time of the Triennial Review the State Government has embarked on a wide reaching program to reform the planning and development system. Most of the 50 recommendations of the Planning and Development Review Steering Committee have been endorsed.

The recommendations from the review of the planning system will have some implications for the referral system in the future. Although at this stage it is unclear about the impact of the reforms on the operation of the River Murray Act, opportunities are supported to improve efficiency and effectiveness and streamline the interaction between the River Murray Act and the Development Act.

Significant changes to the administration of the Murray-Darling Basin will be brought about through the introduction of the Commonwealth Water Act and the signing of the Intergovernmental Agreement on Murray-Darling Basin Reform. While at the time of this Triennial Review the reform was in its early stages the process is likely to require a review of the River Murray Act in the future. The Triennial Review discusses the Water Act and how the Basin Plan provided under that Act will work to ensure that the system as a whole is managed within the sustainable extraction limits of the system.

One of the main features of the River Murray Act in the protection of the River is the ability of the Minister to refuse or impose conditions on activity authorisations, through the operation of the referral policy. Upon commencement in 2003, the River Murray Act activated a referral process for four of the related operational acts: the *Development Act 1993*, *Harbours and Navigation Act 1993*, *Petroleum Act 2000* and *Mining Act 1971*. In 2007 the *Fisheries Management Act 2007* was added to these when it replaced the former *Fisheries Act 1982*. The Act provides a regulation making power with the intention to enable future regulation or prohibition of any identified activity deemed to harm the River as need arises.

During the review period no further referral provisions requiring regulations have been activated. However, opportunities to refine and streamline existing referral mechanisms are considered on an ongoing basis. Information provided by the agencies administering the related operational Acts indicates that the interaction between Acts is generally proceeding well.

Significant effort has been focussed on improving efficiency and streamlining administration of referrals in the protection of the River under the one-stop-shop process. The River Murray Act uses the existing referral policy established under Schedule 8 of the Development Regulations. The one-stop-shop administrative arrangement ensures that any development application referred to the Minister for the River Murray will not have to be referred to any other environment agency except the Environment Protection Authority, which is an independent authority.

The agencies that were formerly referral bodies provide information regarding applications directly to the Minister of the River Murray so avoiding multiple referrals and reducing timeframes for applications to be considered. Consistency is improved due to the Minister of the River Murray providing a single, non-contradictory response that effectively enhanced the one-stop-shop with the River Murray Protection Areas.

Liaison on compliance continues with relevant Government agencies, Local Government and the River communities in relation to responsibilities under the River Murray Act. Opportunities to review the enforcement tools beyond the Protection and Reparation Orders and to investigate the potential for harm from cumulative impacts have been identified.

Overall the system works well and continues to add value to the development approval process by ensuring potential harm to the River Murray through inappropriate development is minimised, and applicants do not have to seek multiple approvals from separate agencies. Coordination is critical for timeliness and quality responses, highlighting the need for the balance between the dual requirements of harm minimisation and timeliness to be reviewed on an ongoing basis.

The number of referrals has progressively increased over the past three years. However, due possibly to the declining health of the River Murray and the downturn in the economy, this increase has tended to remain static over the past year.

The River Murray Act has the power to consider a range of matters. An important initiative enacted in response to the impact of the drought on river conditions has been an exemption from the requirement to refer applications for emergency dredging of the Murray Mouth. Similarly, a temporary exemption from the requirement to refer the relocation of pumping infrastructure, or dredging channels was initiated to continue to make water available in response to drought-induced falling river levels and retreating shorelines.

The Act provides a 'duty of care' not to harm the River through one's actions. Activities and the extent to which they contribute to harming the River continue to be identified. An increasing range of potentially harming activities has been attributed to responses to low water levels. The cumulative impact of these actions has been identified as having potential to cause harm to the River in the future. Liaison on compliance continues with relevant government agencies, local government and the River communities in relation to responsibilities under the River Murray Act. Opportunities to review the enforcement tools

beyond the Protection and Reparation Orders and to investigate the potential for harm from cumulative impacts have been identified.

The River Murray Act objectives of river health, environmental flow, water quality and human dimensions are aligned with and contribute to key targets for the SA Strategic Plan and State Natural Resources Management Plan. The Environment Protection Authority is preparing the State of the Environment Report, which will be presented to Cabinet later this year. A general overview of the state of the River Murray, taking account of the Objectives for a Healthy River Murray, is provided as part of this Triennial Review, based on current available information.

The River Murray system is experiencing extremely difficult times due to an extended ten-year drought reducing water inflows throughout the Murray Darling Basin. Adding to the drought is the increased acknowledgement that climate change is negatively impacting on rainfall and that low inflow rates throughout the Murray Darling Basin may continue into the future.

Despite the difficult challenges as a result of the continued drought a range of creative and innovative projects and programs (see Section 2 and Appendix 3) have been undertaken that progress the Objectives for a Healthy River Murray. These projects and programs include measures to improve the migration of fish and to inhibit pest species, emergency rescue of rare and endangered fish and other fauna impacted by the drought, environmental water programs for endangered redgums and wetlands, habitat monitoring, emergency pumping of water from Lake Alexandrina to Lake Albert to forestall the development of acid-sulphate soils, and continuation of the sand pumping program to keep the Murray Mouth open.

A number of important plans and policies have also been completed in 2007-08, or are nearing completion. These include the water allocation plans for the Eastern Mount Lofty Ranges, Mallee Prescribed Wells Area, Peake, Roby and Sherlock Prescribed Wells Area, the Environment Protection Authority's Code of Practice for Vessel and Facility Management and National Water Quality Management Strategy.

The River Murray Act provides a comprehensive response to ensuring that any development or activities do not have an adverse effect on the River and environs. This is reflected in the definition of the 'River Murray', the objects and ORMs, in the range of applications that may be referred under the related operational Acts, and in the conditions that may be attached to referred applications. The Minister for the River Murray is able to take into account broader environmental matters, including amenity, heritage, cliff protection and native vegetation. There is greater potential in the River Murray Act for taking action for biodiversity conservation while at the same time ensure that use and management of the River Murray provides for the economic and social wellbeing of the people of South Australia.

REFERENCES

Agreement on Murray-Darling Basin Reform, 3 July 2008. The Commonwealth of Australia, New South Wales, Victoria, Queensland, South Australia and Australian Capital Territory.

Department of Water, Land and Biodiversity Conservation website:
<http://www.dwlbc.sa.gov.au/>

Environment Protection Authority website: <http://www.epa.sa.gov.au/>

River Murray Act 2003 Implementation Strategy, 5 June 2006. ISBN 1 921218 22 3
http://www.dwlbc.sa.gov.au/assets/files/RMA_Implementation_Strategy.pdf

River Murray Act, 2003 Overview and General Provisions, ISBN: 978-1-92128-59-0
http://www.dwlbc.sa.gov.au/assets/files/RMA_ReferralAssessPolicyOverview.pdf

River Murray Catchment Water Management Board website:
<http://www.rivermurray.sa.gov.au/>

The Living Murray Initiative website: <http://www.thelivingmurray.mdbc.gov.au/>

APPENDIX 4 – REGULATIONS

RIVER MURRAY REGULATIONS

The *River Murray Regulations 2003* came into operation on 24 November 2003. The RM Regulations establish the River Murray Protection Areas. There are two RMPAs – one for the main stem, floodplain and cliffs, the other for the tributaries. The RMPAs are the areas in which applications for activities prescribed under the related operational Acts must be referred to the Minister for the River Murray.

The River Murray Regulations also prescribe a number of minor mechanistic matters, including the prescribed rate of interest for outstanding debts and the manner of notification for certain processes.

The River Murray Regulations provide that the Minister will consult certain prescribed bodies in relation to:

- Development of the Implementation Strategy under the Act; and
- Changes to a River Murray Protection Area.

The RM Regulations require the Minister to consult the Local Government Association and regional local government associations when proposing changes to referrals of development applications under the *Development Regulations*.

NATIVE VEGETATION (RIVER MURRAY) VARIATION REGULATIONS

The *Native Vegetation (River Murray) Variation Regulations 2003* were made under the *Native Vegetation Act 1991*, and came into operation on 24 November 2003.

The Native Vegetation Variation Regulations remove an exemption that allowed the creation of access paths for pedestrians or vehicles within the River Murray Protection (Floodplain) Area. Given the relationship between riverside vegetation and river health, it is not considered appropriate for such an activity to be undertaken without native vegetation clearance consent.

The Native Vegetation Variation Regulations also modify the exemptions relating to fire management. The amendments require a fire management plan applying within the River Murray Protection (Floodplain) Area to be referred to the Minister for the River Murray before being approved by the Native Vegetation Council.

DEVELOPMENT (RIVER MURRAY) VARIATION REGULATIONS

The *Development (River Murray) Variation Regulations 2003* also came into operation on 24 November 2003.

The Development Variation Regulations expand the definition of ‘development’ to include the placement or construction of infrastructure to take water, or drain water or other substances to, any part of the River. Such use of land has the potential to harm the River (in particular, the cliffs and banks), yet was not previously considered to be development for the purposes of the *Development Act 1997*.

The Development Variation Regulations also reduce the threshold at which development within RMPAs is referred to the Environment Protection Authority and raise the level of the Environment Protection Authority comment to ‘direction’ for all referrals.

APPENDIX 5 – OBJECTIVES FOR A HEALTHY RIVER MURRAY

OBJECTIVES FOR A HEALTHY RIVER MURRAY

River Health Objectives

There are four river health objectives collectively covering the issues of:

- maintenance, protection and restoration of key habitats and ecological processes;
- protection and restoration of River Murray environments, particularly high-value floodplains and wetlands of national and international importance;
- prevention of native plant and animal extinctions; and
- avoiding and overcoming barriers to the migration of native animal species.

Environmental Flow Objectives

Three environmental flow objectives address the matters of:

- reinstatement and maintenance of ecologically significant elements of the River Murray system natural flow regime;
- keeping open the Murray mouth in order to maintain navigation and fish passage and to enhance the health of the River Murray system and Coorong; and
- significantly improving connectivity between and within the environments constituted by the River Murray system.

Water Quality Objectives

The four water quality objectives seek to:

- improve water quality within the River Murray system to a level that sustains the ecological processes, environmental values and productive capacity of the system;
- minimise the impact of salinity on the ecological processes and productive capacity of the River Murray system;
- manage nutrient levels within the River Murray system so as to prevent or reduce the occurrence of algal blooms, and to minimise other nutrient related impacts;
- minimise the impact of potential pollutants, such as sediment and pesticides, on the environments within the River Murray system.

Human Dimension Objectives

The human dimension objectives aim to:

- implement a responsive and adaptable approach to the management of the River Murray System, taking into account ecological outcomes, community interests and new information as it comes to hand;

- promote the health and proper management of the River Murray system by gathering, considering and disseminating the community's knowledge and understanding of the system;
- take into account the interests of the community by recognising indigenous and other cultural and historical relationships with the River Murray environs, and by ensuring appropriate participation in processes associated with the management of the system;

recognise the importance of a healthy river to the economic, social and cultural prosperity of communities along the length of the river, and the community more generally.

APPENDIX 6 – SUMMARY OF ACTIONS

1. Development Act

Monitor the implementation of the recommendations from the review of the planning system for possible implications the interaction between the *River Murray Act 2003* and the *Development Act 1993*, in particular for referrals.

Monitor work on a *River Murray (Salinity) Ministerial Plan Amendment Report* commenced in 2004 put on hold due to the impact of the drought.

Monitor the development of the draft *Houseboat, Mooring and Marina Strategy and Guidelines for the River Murray in South Australia* via the inter-agency working group led by Planning SA and Department of Water, Land and Biodiversity Conservation.

Follow up on the proposed amendment to the Tourism and Recreation Policy Area of the River Murray Flood Zone of the Mid-Murray Council Development Plan in order to comply with and better reflect the Objectives for a Healthy River Murray.

2. Environment Protection Act

The River Murray Act amended the Environment Protection Act so that the State of the Environment report includes a specific assessment of the state of the River Murray, especially taking into account the Objectives for a Healthy River Murray. The River Murray Act also requires an assessment of the state of the River Murray duplicating the requirements of the Environment Protection Act. Follow up needs to occur to align the River Murray Act with the Environment Protection Act to avoid duplication and streamline reporting requirements.

3. National Parks & Wildlife Act

Monitor the drafting of regulations to prescribe permits for duck and quail hunting put on hold due to the drought.

4. Native Vegetation Act

Follow up on the implementation of delegations currently underway between the Council and the Department of Water Land and Biodiversity Conservation to ensure streamlining of referrals.

5. Water Act

Monitor the requirements of the Water, which is likely to incorporate the review of all legislation under the Murray-Darling Basin Act, including the River Murray Act in the future.

6. Compliance

Monitor the increase in particular types of activities, many associated with the drought and low water levels and the cumulative impacts, which are likely to contribute to future harm to the River particularly when water levels rise.

APPENDIX 7 – CONTRIBUTORS

Contributors to the Annual Report – projects and programs

Department for Environment and Heritage
Department of Trade and Economic Development
Department of Transport, Energy and Infrastructure
Environment Protection Authority
Primary Industries and Resources South Australia
SA Murray-Darling Basin Natural Resource Management Board
SA Water
South Australian Tourism Commission

Contributors to the Triennial Review– interaction between relevant Acts

Department for Environment and Heritage
Environment Protection Authority
Primary Industries and Resources South Australia

