



Lower Lakes, Coorong and Murray Mouth

The Lower Lakes, Coorong and Murray Mouth is one of six icon sites in the Murray-Darling Basin. The Department of Environment, Water and Natural Resources is responsible for implementing The Living Murray program in South Australia.

The Living Murray

The First Step Decision of *The Living Murray* program was announced in November 2003, at which a historic decision was made to address the declining health of the River Murray. Since this time, The Living Murray has recovered almost 500 gigalitres (GL) of environmental water to be shared between six 'icon sites' in the River Murray. The term 'icon site' refers to certain Ramsar-listed wetlands, rivers and floodplains that have been selected for their high ecological value and cultural significance. The Living Murray program is coordinated by the *Murray-Darling Basin Authority (MDBA)*.

Icon Site Environmental Water Management Plan

Each icon site has recently upgraded its Environmental Water Management Plan. The Lower Lakes, Coorong and Murray Mouth (LLCMM) Icon Site Environmental Water Management Plan outlines the environmental water needs of the icon site, so that ecological objectives and targets can be achieved. It also describes current management arrangements, infrastructure needs, monitoring and engagement requirements.

Ecological Objectives

The LLCMM Icon Site has the following high-level objectives as set by Ministerial Council:

- **an open Murray Mouth**
- **enhanced migratory water bird habitat in the Lower Lakes and Coorong**
- **more frequent estuarine fish spawning and recruitment.**





Engagement

In April 2012, a *Community Advisory Panel* replaced the LLCMM Icon Site Community Reference Committee as the community-based reference group for the icon site. The Community Advisory Panel consists of members representing local government, boating, farming and irrigation, environment and tourism industries.

A *Scientific Advisory Group* has provided direction on the LLCMM Icon Site program since 2007. Members of the group consist of researchers with knowledge of water birds, aquatic vegetation, macroinvertebrates, fish, water quality, groundwater, acid sulfate soils and wetland ecology – all specific to the Lower Lakes and Coorong environment. Local universities and State Government research organisations have representatives on the Scientific Advisory Group.



Community support and involvement is vital to the success of The Living Murray



Ngarrindjeri Indigenous Partnerships

The Ngarrindjeri work in partnership with The Living Murray and the *Coorong, Lower Lakes and Murray Mouth (CLLMM)* Murray Futures programs and provide input into management actions for the icon site.

Activities aim to achieve a healthy ecosystem through increasing freshwater flows and connectivity with the Coorong, Lower Lakes and Murray Mouth; and maintaining a diversity of wetland habitats.

The *Ngarrindjeri Regional Authority* was established in 2008 and consists of Ngarrindjeri Nation communities, Ngarrindjeri native title claimants and the Ngarrindjeri Heritage Committee. Through its *Yarluwar-Ruwe (Sea Country)* program, the Ngarrindjeri Regional Authority is working with government and local communities to develop programs that recognise Ngarrindjeri values and incorporate Ngarrindjeri expertise and capacity.

In 2009, the South Australian Government and the Ngarrindjeri people entered into the *Kungun Ngarrindjeri Yunnan Agreement* whereby the relevant Ministers, on behalf of the Crown, formed a new relationship between South Australia and Ngarrindjeri. The agreement is based on mutual respect and trust, and acknowledges that protection and maintenance of Ngarrindjeri culture and cultural sites are central to Ngarrindjeri community wellbeing and existence.

Environmental Water and Adaptive Management

Environmental water is obtained by The Living Murray through a 'bidding' process, and is sourced from both the MDBA and the *Commonwealth Environmental Water Holder*. This is a competitive process, which requires strong scientific justification. Each year the data collected through our ecological monitoring programs improves our understanding of the LLCMM Icon Site and informs what our environmental water needs should be. Modelling also determines the water level and salinity consequences of delivering environmental water at certain times of the year.

Ecological Targets for the Icon Site

The Living Murray aims to achieve a series of ecological objectives, which include but are not limited to:

- enhancing bird populations (including migratory waders)
- diadromous fish recruitment (congolli, galaxias and lampreys)
- endangered fish recruitment (Murray hardyhead and pygmy perch)
- maintaining connectivity between the Lower Lakes, Coorong and the sea



Indigenous lands (Ngarrindjeri) National parks and reserves Watercourses Townships Barrages



- enhancing invertebrate populations
- Ruppia colonisation and reproduction
- water level fluctuation for exposure and submergence of mudflats
- enhancing aquatic and littoral vegetation in the Lower Lakes
- maintaining salinity variations in the estuary and North Lagoon.

Environmental Water Received in the Icon Site

During the drought (2006–2010), environmental water was obtained for the LLCMM Icon Site for the purpose of maintaining water levels in the Lower Lakes, to prevent acidification and to sustain refuge habitats to protect populations of threatened fish; such as the Murray hardyhead.

Following higher flow conditions (2010–present), environmental water has been prioritised to maintain barrage releases and to achieve a healthy Coorong ecosystem. The adjacent table identifies the environmental water received from 2008–2012.

Environmental Water Requirements

As outlined in the LLCMM Icon Site Environmental Water Management Plan, appropriate *water and salinity levels* need to be maintained for a healthy system. These include:

- Lake Alexandrina less than 1000 EC (Electrical Conductivity) 95% of the time (less than 1500 EC 100% of the time)
- Lake Alexandrina and Albert water levels fluctuate between a minimum and maximum level of 0.35m AHD to 0.75m AHD (Australian Height Datum) annually, and then one in three years a higher operating range of 0.50m AHD to 0.83m AHD
- Murray Mouth remains open 100% of the time
- Coorong South Lagoon salinity less than 100 ppt (parts per thousand)
- Coorong South Lagoon water levels between 0.0-0.2m AHD during summer.

Environmental Water Targets for the Lower Lakes, Coorong and Murray Mouth Icon Site (2008/09 – 2011/12)				
Water Year	Volume received	Providers	Sites	Objective
2008/09	8 ML	The Living Murray / Healthy Rivers Australia	Boggy Creek and Turveys Drain	Protect threatened fish habitat
2009/10	~300 ML	The Living Murray	Narrung, Boggy Creek, Turveys Drain	Protect threatened fish and wetlands
	486,300 ML	The Living Murray / Commonwealth Environmental Water Holder / SA Drought Framework	Lakes Alexandrina and Albert	Maintain lake levels above acidification triggers
2010/11	397,000 ML	The Living Murray / Commonwealth Environmental Water Holder / SA Drought Allocation Framework	Barrage releases	Maintain connectivity and provide salinity benefits in the Coorong South Lagoon
2011/12c	416,000 ML	The Living Murray / Commonwealth Environmental Water Holder	Barrage releases	Maintain connectivity and provide salinity benefits in the Coorong South Lagoon

To maintain salinity and water levels within these ranges, *Environmental Water Requirements* have been developed by the CLLMM Murray Futures program to guide environmental water use in the region. These requirements target barrage releases and form the basis of environmental water bids for the Lower Lakes and Coorong:

- a minimum barrage release of 650 GL in any one year (if in conjunction with a 3-year rolling average of 2,000 GL per year) to maintain Lake Alexandrina salinity levels less than 1,000 EC 95% of the time
- barrage releases of 730 – 1090 GL per year to maintain an open Murray Mouth
- barrage releases of 6,000 and 10,000 GL per year every three and seven years respectively to achieve a healthy Coorong ‘ecosystem state’.



Delivery of environmental flows greatly enhances the ecological health of the Lower Lakes, Coorong and Murray Mouth Icon Site

Monitoring results, modelling data, water forecasting and expert opinion form the basis of environmental water bids



Ecological Monitoring

There are two core monitoring programs of The Living Murray; Condition and Intervention Monitoring. Condition Monitoring focuses on fish, vegetation and bird communities and aims to detect change in condition and measure long-term trends. Intervention Monitoring is often short-term in nature and aims to assess the ecological responses to various environmental water management actions, at a site. Monitoring is essential to inform the success of The Living Murray program's environmental water delivery.

Each icon site has developed a specific Condition Monitoring Plan which outlines the required monitoring program, and how it relates to each objective and ecological target (refer to Ecological Targets for the Icon Site). The Living Murray – LLCMM Icon Site Condition Monitoring Plan describes the required method, timing, location, data analysis and interpretation required to collect and analyse monitoring data.

Currently, both monitoring programs are undertaken on behalf of the South Australian Department of Environment, Water and Natural Resources by a range of service providers including; The University of Adelaide, SARDI Aquatic Sciences, Flinders University and Coorong Nature Tours.

The CLLMM Murray Futures program also undertakes monitoring which focuses on water quality and ecological responses to management, and recovery of the icon site. While there are different objectives for monitoring, both The Living Murray and CLLMM programs are complementary, and data sharing helps achieve the objectives of both programs.

Community Wetland Monitoring

The South Australian Murray–Darling Basin Natural Resources Management Board's wetland program engages landholders and wetland community groups to monitor a number of wetlands fringing Lake Albert and Lake Alexandrina. This program works closely with The Living Murray to build upon existing monitoring and environmental watering initiatives.

Further Information

The Living Murray is a joint initiative funded by the New South Wales, Victorian, South Australian, Australian Capital Territory and the Commonwealth Government. It is coordinated by the Murray–Darling Basin Authority.

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