SOUTH AUSTRALIA'S RIVER MURRAY ENVIRONMENTAL WATERING PROGRAM REPORT 2010-2011

Spectacle Lakes. Photo: Lisa Stribley

Government of South Australia
Department for Water

Australian Government

MURRAY–DARLING BASIN AUTHORITY

Contents

Acknowledgements

The Commonwealth Environmental Water Holder (CEWH)

The Murray-Darling Basin Authority (MDBA)

South Australian Murray-Darling Basin Natural Resources Management Board (SA MDB NRM Board)

South Australian Research and Development Institute (SARDI)

Local Action Planning Committees

SA Water

SA Department for Water (DFW)

SA Department of Environment and Natural Resources (DENR)

The Wetlands Habitat Trust

Australian Landscape Trust

Department of Sustainability, Environment, Water, Population and Communities

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

INTRODUCTION

This is the third environmental watering program report to be produced in South Australia. It meets a South Australian Government commitment to the Council of Australian Governments (COAG) to publish an annual report to provide transparency and accountability for River Murray environmental water use in South Australia. The report summarises the sources and volumes of environmental water used along the River Murray in South Australia during 2010-2011 and some of the ecological outcomes achieved with this water.

When the 2010-2011 water year began, the Murray-Darling Basin was still in drought. Water levels within Lakes Alexandrina and Albert were continuing to decline and the threat of acidification at the Lakes was being managed through liming and revegetation. The South Australian Government had implemented the South Australian Drought Allocation Framework to manage water use within the state and a temporary South Australian Environmental Water Reserve had been established specifically to provide water to the Lower Lakes during the drought. All managed wetlands remained closed to achieve evaporative water savings and South Australia was facing the loss of species and irreversible change to the wetlands and floodplains.

The Lower Lakes, Coorong and Murray Mouth icon site was South Australia's highest priority site for receiving environmental water to enable:

- Mitigation of harm to the existing environment by preventing acidification
- Reduction in salinity and possible restoration of connectivity
- Prevention of the loss of species and the environments upon which they depend

Many other wetland and floodplain sites in South Australia also required environmental water and these were prioritised using the following criteria:

- Avoiding critical loss of threatened species particularly the Murray Hardyhead and Southern Purple Spotted Gudgeon fish
- Avoiding irretrievable loss or catastrophic events including salinisation of dry wetlands
- Maintaining key refuges to allow re-colonisation by threatened species when conditions began to improve

The remaining volume of the South Australian Drought Allocation Framework Environmental Water Reserve was delivered to Lakes Alexandrina and Albert in July 2010. Pumping to priority wetland refuge sites on the floodplains also began in July.

Beldora Wetland. Photo: Lisa Stribley

Higher river flows began to cross the South Australian border in August and this water was used to fill managed wetlands connected at pool level. As the higher flows continued, 16 banks constructed to enable pumping into wetlands during the drought on the Chowilla floodplain were breached to enable water to again flow naturally into these refuge sites.

Banks at other floodplain sites were also removed. Lakes Alexandrina and Albert began to fill and the Goolwa boat lock was used to assist the movement of Congolli fish through the barrages in August 2010. The Chowilla Regulator construction site flooded and construction ceased in October 2010. The regulators in the Lakes (Narrung, Clayton and Currency Creek) were breached, as were banks installed to retain environmental water in wetlands fringing the Lakes.

As rainfall and inflows into River Murray water storages increased during spring and summer and significant flows lead to widespread floodplain inundation, management priorities were focussed on further enhancing the prospects of improvement and recovery especially in the Lakes, Coorong and Murray Mouth. Once it began raining in the upper catchments, river flows continued to increase during 2010-2011 and peaked at 93,000 ML/day at the SA border in February 2011.

This flow inundated all previously watered refuges on the Chowilla floodplain, filled the previously dried pool level managed wetlands, inundated more than 60% of the floodplain, filled the Lower Lakes, widened and deepened the Murray Mouth and freshened the Coorong. As a result, dredging at the Murray Mouth ceased in December 2010 for the first time in 8 years. The Lower Lakes and Coorong salinities reduced and the prospects for recovery have improved.

A blackwater event did occur in the River Murray as a result of the natural floods following the drought. The accumulation of organic matter such as leaves decaying in waterways and wetlands darkened the water, turning it black. There were some fish deaths during the blackwater event but there are longer term benefits for native fish due to the large amount of carbon entering the river.

Schillers Lagoon. Photo: Callie Nickolai

WATERING SUMMARY

During 2010-2011, management of environmental water was undertaken by the Environmental Water Management team within the Department for Water (DFW). Environmental water bids, trades, delivery, accounting and monitoring were undertaken in partnership with other DFW teams, government agencies, research organisations and community groups.

South Australia received 306,410.55 megalitres (ML) of environmental water for River Murray wetlands, floodplains and the Lower Lakes, Coorong and Murray Mouth (LLCMM). This included water from the following sources:

- The Murray-Darling Basin Authority The Living Murray program (TLM) (157,347 ML)
- Commonwealth environmental water holder (CEW) (139,528 ML)
- Private donations (100 ML)
- Return flows from Victorian environmental watering actions (8,873 ML)

South Australia also received 92,000 ML of water saved under the Drought Allocation Framework for Lakes Alexandrina and Albert.

ENVIRONMENTAL WATER DELIVERED IN 2010-2011

Site	Volume ML	Source
LLCMM	92,000	SA Drought Allocation Framework
LLCMM	139,374	CEW
Carpark Lagoons, Katarapko floodplain	154	CEW
LLCMM	8,873	Victorian ewater return flows
LLCMM*	157,210	TLM
Monoman Creek Depression, Chowilla floodplain	57.3	TLM
Monoman Depression, Chowilla floodplain	45	TLM
Punkah Creek Floodrunner, Chowilla floodplain	34.4	TLM
Inner Mundic Floodrunner, Pike floodplain	8	Private donation
Mundic Billabong, Pike floodplain	92	Private donation
Coombool Swamp, Chowilla floodplain	506	CEW carried over from 09-10
Kulkurna wetland, NSW	56.85	CEW carried over from 09-10
Total	**398,410.55**	

* as part of a multi site watering

LOWER LAKES, COORONG AND MURRAY MOUTH

The re-filling of Lakes Alexandrina and Albert during spring 2010 and the significant flow into the Coorong and out through the Murray Mouth have been a highlight of the year. The Lakes returned to their Full Supply Level (FSL) of 0.75 m AHD during October 2010. Lake Albert was reconnected to Lake Alexandrina with the partial removal of the Narrung Bund in mid-September 2010. The Goolwa channel was then reconnected to the rest of Lake Alexandrina with the partial removal of the Clayton embankment in late September 2010. Water releases through the barrages from the Lakes to the Coorong and the sea commenced in September 2010. This was the first time since March 2007 that water has been released through the barrages.

An estimated volume in excess of 11,000 GL flowed out the Murray Mouth during 2010-2011. From January to June 2011, the release through the barrages was managed to vary the level of the Lower Lakes between 0.65 and 0.85 m AHD. This action aimed to facilitate mixing and hence improve the salinity levels in Lake Albert and the Coorong. At times it was difficult to implement large variations in water level in the Lakes due to releases from the barrages being constrained by a 'saturated Coorong', high tides and accumulated sand inside the Murray Mouth.

BENEFITS OF IMPROVED FLOW

Congolli project

Congolli are a diadromous fish species that migrates between fresh and salt water for breeding. The lack of barrage outflows due to drought had prevented this breeding event and there was a high risk of this local Congolli population becoming extinct. The Department of Environment and Natural Resources led a state government intervention aiming to facilitate breeding by creating passage for the fish from the Lakes to the Coorong. This was achieved by utilising the Goolwa barrage boat lock. Thousands of adult female Congolli were successfully transferred into the estuary via the boat lock in August 2010. Monitoring undertaken by South Australian Research and Development Aquatic Sciences (through The Living Murray program) in late 2010 detected hundreds of baby Congolli moving back into Lake Alexandrina, indicating that breeding occurred and the intervention was a success. While environmental water was requested at the start of the water year to use at the Goolwa barrage to also facilitate Congolli movement, this was not required once flow conditions improved and the fishways were opened in September 2010.

Fish survey at Lower Lakes. Photo: Pip Holmes

Inspecting fish trap. Photo: Adrienne Frears

Threatened fish refuge sites

During the period of low Lake levels, populations of threatened fish (Murray hardyhead and Southern pygmy perch) had been kept alive by the application of environmental water via pumping to small refuge sites fringing the Lakes. When the Lakes refilled in spring 2010, these fringing wetlands re-connected to the Lakes and the populations of threatened fish exited the refuge habitats to recolonise other wetland habitat in the Lakes. While environmental water was requested for these refuge sites at the start of 2010-2011 (including Boggy Creek, Turvey's Drain and Dog Lake Channel), unregulated flows filled the Lakes and wetlands, and environmental water was not needed.

Managing the fringing wetlands

During the drought, a fringing Lakes wetland (Narrung) received environmental water to protect aquatic vegetation and to create feeding habitat for birds. During 2010-2011, high water levels in both the Lakes and Coorong resulted in a loss of suitable feeding habitat for migratory waders. Traditional mudflat habitat was in some cases more than a metre under water, rendering it unusable. In order to create suitable habitat, Lakes wetlands with a flow regulator such as at Narrung and Waltowa were managed to lower water levels during summer and autumn. This not only exposed mudflats and created excellent wader habitat, but also promoted aquatic vegetation and invertebrate growth, attracting thousands of birds. While environmental water was requested for Lakes fringing wetlands in 2010-2011 at the start of the water year, unregulated flows filled these sites and the environmental water was not needed.

Multi site environmental watering trial 2010-2011

To trial the use of environmental water at multiple sites, a proposal was developed to use return flows from watering the Barmah Millewa Forest for the Lower Lakes, Coorong and Murray Mouth icon site. In total 428 GL of environmental water was released from Hume Reservoir and this consisted of a combination of The Living Murray, Barmah-Millewa Environmental Watering Account and NSW Adaptive Environmental Water. A large portion of this water eventually flowed to the Lakes and through the barrages, providing salinity benefits to the Coorong and transport of salt out of the system. The SA River Murray also received return flows from other watering events upstream in the Murrumbidgee and Goulburn rivers.

Pelicans below Lock 1. Photo: Jan Whittle

Congolli gill parasite. Photo: Scotte Wedderburn

MONITORING RESULTS FROM 2010-2011 WATERING AT THE LOWER LAKES, COORONG AND MURRAY MOUTH ICON SITE

Department for Water icon site staff worked cooperatively with Department of Environment and Natural Resources staff to deliver a comprehensive monitoring program at Lakes Alexandrina and Albert, Coorong and Murray Mouth and documented the ecological response as the system re-filled.

Key findings:

Vegetation

- A slow return of submerged aquatic plants to Lakes wetlands and the Lake edge, however many species recorded prior to drought have not yet been detected, and many wetlands that were once highly diverse have not yet fully recovered.
- A reduction in terrestrial weed species.

Waterbirds

- High water levels in both the Lakes and Coorong during summer and autumn reduced the availability of mudflat feeding habitat, and thus vastly reduced the numbers of migratory waders at the site.
- A gradual return of Chironomid larvae to the Coorong South Lagoon (food for waders).
- High numbers of piscivorous (fish eating) birds were observed taking advantage of the large abundance of fish in the Lakes and Coorong.

Fish

- Inflows and connectivity have facilitated fish migration, spawning and recruitment in diadromous species such as Congolli and Common Galaxias.
- An overall increase in fish abundance throughout the site including a large proportion of European Carp and Redfin.
- Very few threatened fish (Murray Hardyhead and Southern Pygmy Perch) detected as they have dispersed throughout the Lakes.

Egret at Narrung. Photo: Adrienne Frears

Rock ramp. Photo: Adrienne Frears

CHOWILLA

Several wetlands were prioritised for environmental watering in 2010-2011. Some pumping did occur but the high river flow eventually filled all of the sites that had been previously watered as part of the environmental watering program.

BREACHING OF BANKS

During the drought, environmental water was pumped to 28 sites on the Chowilla floodplain. To hold this water in the wetlands for extended periods of time, temporary earthen banks were built. When high river flows occurred in 2011, these banks were breached to allow the river water to flow into the sites.

CHOWILLA CONSTRUCTION SITE

In response to the floodplain degradation occurring as a result of reduced river flows and the loss of regular floodplain inundation, an environmental regulator is being built on Chowilla Creek. The Regulator will enable periodic inundation of more than 5,000 hectares of the Chowilla floodplain at relatively low flows. Construction began in early 2010 but had to stop once the river flows increased and flooded the site. Construction will begin again in 2012 and will take up to 18 months for completion. The environmental regulator is designed so that continuous flow down Chowilla Creek will be maintained even when the structure is in operation and will enable fish passage for small to large bodied fish species.

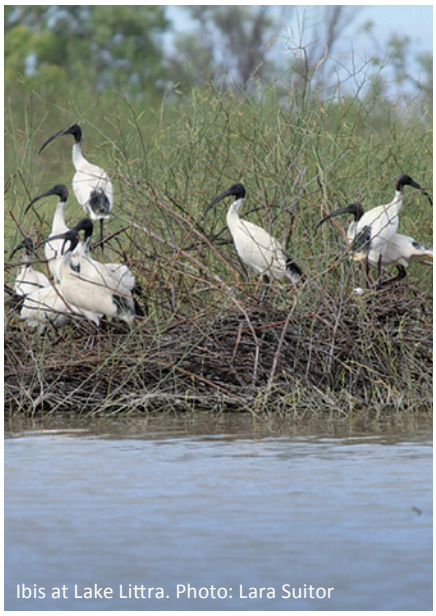
MONITORING RESULTS FROM 2010-2011 WATERING AT CHOWILLA

Delays to The Living Murray condition monitoring program were experienced in 2010-11 due to the high flow event which inundated all major wetlands and approximately 60% of the Chowilla floodplain.

Key findings:

Tree Condition Assessment

- Positive responses have been observed in tree condition near permanent water and in trees at sites that have been previously watered. Areas that received water for the first time in more than ten years have shown limited improvement and will require follow up water to recover.
- Large areas of Black Box woodland were not inundated in the recent event and remain in poor condition.



Ibis at Lake Littra. Photo: Lara Suitor

Coppermine Complex, Chowilla. Photo: Erin Lenon

Understorey Plant Assemblage

- 63 species of understorey plants were recorded with over 60% of these being species from flood dependent or amphibious functional groups. Of the 67 species recorded the vast majority were natives. However, 13 exotic species were recorded. In previous years the floodplain was dominated by terrestrial understorey species.

Fish

- Surveys identified 15 species of fish: 4 exotic species and 11 native species. Many juvenile fish were using temporary flooded habitats. The native species caught include Golden Perch and Freshwater Catfish. The Freshwater Catfish is a protected species being considered for re-classification as an endangered species.
- Another notable native fish species caught was the Spangled Perch. This species has only been recorded in South Australia on two previous occasions. Four pest fish species were recorded including the Oriental Weatherloach which has not previously been recorded in South Australia.

Birds

- Large numbers of birds were recorded at both environmentally watered sites and at sites that were naturally inundated. At sites that remain inundated there were large numbers of Spoonbills, Ibis and Cormorants.

Amphibians

- Seven of the eight previously identified frog species were recorded. This included the Southern Bell Frog which was recorded in large numbers during the high flow event.
- The incidence of Southern Bell Frogs has increased across Chowilla in response to the environmental watering program which commenced in 2004.

Murray Cod. Photo: Mark Schultz

Chowilla. Photo: Erin Lenon

OTHER WETLANDS AND FLOODPLAINS

The high flow inundated many temporary wetlands on the floodplain. Tree condition monitoring at Markaranka wetland showed that 70% of trees had epicormic growth and 90% had flower buds. 35 species of waterbirds were recorded. At Paiwalla, multiple pairs of Black Swan with young were observed.

KEY FINDINGS:

- Extensive bird breeding particularly of Australian Darter, Cormorants, Nankeen Night Herons and Ibis.
- Observed species that have not been seen prior to flooding for a number of years, e.g. White Necked Herons and Nankeen Night Herons.
- Good frog breeding with hundreds of Southern Bell Frogs at Overland Corner.
- Good breeding of Golden Perch with many more caught than previous years.
- Black water event near Renmark with yabbies observed leaving the water, and dead Murray Cod floating downstream.
- River Red Gums and Black Box showing some signs of recovery, with more dense canopy cover and epicormic growth.
- River Red Gum recruitment was evident on the floodplain as water levels receded.

CONCLUSION

It is not possible to differentiate the ecological outcomes from the environmental water delivery and the subsequent high flows in the River Murray. It is recognised that the environmental water only represented a small proportion of the total flow into South Australia and out through the barrages.

The 2010-2011 flood event along the River Murray has provided a wonderful "kick-start" to the recovery of the ailing floodplain. As water connects the river and the floodplain and wetlands it enables the transfer of nutrients between the river channel and the floodplain and this drives the riverine food webs. The sediments deposited during high flows provide for the future fertility of the floodplain, and greatly enhance plant growth. River and floodplain species are well adapted to make use of these productive times. Many native species that live in the main river channel can use floodplains to source food, for shelter from predators and as spawning and breeding grounds. The increased flows not only provide enhanced habitat in the floodplains and wetlands, but also provide downstream transport opportunities, especially for invertebrates, seeds and eggs. This enables species dispersal and colonisation of new areas.

The River Murray in South Australia is on the mend with a much needed boom period following the long dry. However the river and its spectacular wetlands and floodplains need more frequent flooding flows if they are to return to full health and build the resilience that will sustain them through the next dry period for the long-term enjoyment and use of future generations. The gradually increasing volumes of environmental water will help to contribute to the maintenance and recovery of species into the future.

Department for Water
Head Office
Level 1
25 Grenfell Street
Adelaide 5000
www.waterforgood.sa.gov.au
www.sa.gov.au

WATER FOR GOOD