
Phase 2 MDBA Analysis - Existing TLM works and measures: Chowilla

Foreword

Under the Basin Plan a measure must meet particular criteria to be considered as a supply measure for the purposes of the SDL adjustment mechanism. Under the Basin Plan (cl.7.03 and (cl.7.15) a supply measure must:

- operate to increase the quantity of water available to be taken in a set of surface water SDL resource units compared with the quantity available under the benchmark conditions of development;
- achieve equivalent environmental outcomes with a lower volume of held environmental water than would otherwise be required; and
- have no detrimental impacts on reliability of supply of water to holders of water access rights that are not offset or negated.

The Living Murray projects have been modelled as part of the MDBA's trial implementation of its ecological elements method, and the results indicate that the projects meet the above criteria.

Chowilla Summary:

In 2003 The Living Murray Program began developing the Chowilla Floodplain Project that described a system of works, with a Chowilla creek regulator and fishway and ancillary structures near Chowilla Island and on Woolshed Creek. The project is part of the Living Murray Initiative and is funded by the Australian Government, New South Wales, Victoria and South Australia through the Murray–Darling Basin Authority.

MDBA supports the Chowilla works as meeting the Phase 2 criteria.

The Chowilla Floodplain and anabranch system is a significant ecological asset that straddles the South Australian and NSW border. Covering 17,781 hectares (ha) the floodplain is part of Chowilla Floodplain and Lindsay–Wallpolla Islands icon site. It is a wetland of international significance and is recognised under the Ramsar convention. As part of the First Step for the Living Murray Initiative, the first objective is to maintain high biodiversity values of Chowilla Floodplain for the high value wetlands, river red gums and black box. These were further refined into seventeen preliminary ecological objectives the Icon Site^{#11} which can be summarised as:

- Maintain viable river red gum, black box, lignum populations and improve the abundance and diversity of grass and herblands.
- Maintain diversity and distribution of native fish species, with small and large bodied fish recruitment.
- Maintain sustainable communities of riparian frog species, with improvement in the Southern Bell frog.
- Create conditions conducive to successful breeding of colonial waterbirds and maintain or improve the diversity and abundance of key bird species.

¹ Chowilla Environmental Water Management Plan 2012 and Chowilla Floodplain Operations Plan...2014. Objectives yet to be endorsed by MDB Ministerial Council.

The development and implementation of the Chowilla works project have proceeded through a number of agreed phases with several plans:

- *The Living Murray - The Chowilla Floodplain (Including Lindsay-Wallpolla) Icon Site Environmental Management Plan 2006-2007.*
- *Chowilla Floodplain Icon Site - Chowilla Creek Environmental Regulator – Investment Proposal 2008*
- *Chowilla Floodplain – Environmental Water Management Plan February 2012.*
- *Chowilla Floodplain – Operations Plan for Chowilla Creek Regulator and ancillary structures 2014, endorsed by the The Living Murray Committee (TLMC) on 30 July 2014.*
- *Chowilla Floodplain – Event Plans and Hazard Mitigation strategy for operation of the Chowilla Creek Regulator and ancillary structures 2014.*
- *Chowilla Floodplain – Monitoring Strategy for Operation of the Chowilla Creek Regulator and ancillary structures 2014.*

TLM works are operated in the context of strong co-operative governance arrangements, and control and ownership of the works is clear.

In order to assist evaluation of icon site structures **Table 1** describes each work, with key SDL information, variations and status.

Risks have been collectively assessed and addressed through the TLM governance possesses and robust treatments and mitigations put in place. Residual risks are acceptable.

The Chowilla project was designed to meet the hydrologic requirements of the floodplain in a manner that involves being flexible and responsive to emerging River Murray conditions between 4,000ML/day and >50,000ML/day (flood operations). Within Chowilla maintaining water velocity and exchange are key priorities so that hazards impacting native fish and water quality are addressed.

The TLM structures at Chowilla have been built and partially commissioned by SA Minister, DEWNR and SA Water in 2014. Beginning in September 2014, a partial commissioning achieved a low level inundation of the Chowilla floodplain (Chowilla regulator at 19.1m AHD and raising of lock 6 and other ancillary structures). 104.1GL of TLM water was delivered from early September to early December and 17.2 GL was consumed (evaporation and seepage losses). Significant environmental outcomes were achieved being:

- The additional inundation of ~ 2302ha.
- Improved health of floodplain vegetation – particularly watering of saplings. Strong breeding response from all six species of frogs.
- Maintenance of water quality was largely kept within acceptable levels. Exceptions to this were short lived and localised.

During the first small commissioning, several important lessons were learnt that should be noted for the SDL modelling/offset and future works proposals.

- The flow rating of Slaney and Pipeclay structures was found to be incorrect and is being revised in accordance with the commissioning and operational plan, directed with the Chowilla Operational Group.
- There is a current court case yet to be resolved in South Australia, which could affect the future waterings/future watering levels at Chowilla.
- It was found that Lock 6 influence on flows into the anabranch was stronger than estimated. It is expected that future waterings (and associated learnings) at Chowilla will continue to inform

changes to the operations and outcomes at Chowilla, such as velocities of flows and ecological responses. These learnings will continue to be incorporated in the Chowilla operational plans and models. Please note that these in turn may influence future SDL adjustment calculation if significant changes arise.

It has been recognised that SDL Adjustment modelling had not initially reflected revised Chowilla modelling undertaken within TLM. This has now been addressed, with the TLM Chowilla modelling now being incorporated to MSM BIGMOD and the hydrodynamic modelling for the SDL adjustment.

In accordance with clause 64 of the Murray-Darling Basin Agreement, the works will be declared effective once construction and all testing has been completed.

There are clear links between this package of works and recently submitted projects by Victoria: Mulcra, Lindsay, Pike and Katarapko, Lindsay stage II, Walpolla, Carrs-Cappits-Bunberoo, Lock 5, 6, 7, 8, 9 weirs and weir pool manipulations.

Operation of the works is supported by appropriate operational planning, monitoring and reporting. Stable arrangements are in place for on-going resourcing and administration of operation and maintenance costs, with ongoing costs funded through the Joint venture program, as part of the overall River Murray assets program. Environmental use of water remains cost effective, although MDBA notes that should South Australia pursue pumping/ bank works to the outer lakes that will have considerable charges.

Table 1: List of TLM structures for SDL adjustment

Package	Works	Key purpose	Built under TLM program, commissioned	Variations or key comments for modelling	Key Links
Chowilla Creek	Chowilla Creek Regulator	The Chowilla Creek environmental regulator will be the primary structure used for producing a managed inundation of the Chowilla floodplain. A wide range of operation types are possible.	Yes, partially commissioned.	The TLM Chowilla modelling now being incorporated to MSM BIGMOD and the hydrodynamic modelling for the SDL adjustment	There are clear links between this package of works and recently submitted projects by Victoria: Mulcra, Lindsay, Pike and Katarapko, Lindsay stage II, Walpolla, Carrs-Cappits-Bunberoo, Lock 7, 8, 9 weir pool manipulation.
	Denil and vertical slot fishway	Maintenance of optimum fish passage through the vertical slot fish way on the Chowilla Regulator requires a minimum water depth within the fish way of 1.5m. At the downstream entrance this can be achieved by a tail water elevation of 16.55m AHD and requires flows of 15,000 MLday ⁻¹ into South Australia	Yes, partially commissioned.	See above	See above
Ancillary Structures	Woolshed Creek South regulator	A small structure (four bay culvert) will serve as a component of the blocking bank.	Yes, partially commissioned.	See above	See above
	Woolshed Creek East regulator	This structure functions as a component of the blocking bank that allows controlled flow into Chowilla Creek downstream of the regulator.	Yes, partially commissioned.	See above	See above
	Chowilla Island Loop channel and channel regulator	The Chowilla Island Loop channel provides a means to deliver flow from Chowilla Creek into the wetland located on Chowilla Island to the eastern side of the Chowilla Regulator,	Yes, partially commissioned.	See above	See above

	Chowilla Island Loop ancillary regulator	The Chowilla Island Loop ancillary regulator is a small structure located at the bottom of the Chowilla Island Loop wetland with an outlet with a short connection along the natural flow path to the Murray River. This structure will primarily act as a component of the blocking bank that allows water to be backed up behind the Chowilla environmental regulator	Yes, partially commissioned.	See above	See above
	Upgrading of weirs, at Slaney and Pipeclay	Upgrades have been made to the existing structures to allow for operational flexibility of these structures and fishways. In addition to being used independently to reintroduce flow variability within Pipeclay and Slaney Creeks and upper Chowilla Creek on an annual basis, these structures will be operated with all regulator operations to increase flows through the anabranch system.	Yes, partially commissioned.	See above. Slaney and Pipeclay flow ratings have underestimated the passing flows down those creeks (confirmed by spot gauging). Ratings will be updated in the operational plans.	See above
Lock and Weir 6	Weir 6	Lock 6 and Chowilla Regulator are the primary water level/flow control structures. Normal pool level for Lock 6 is 19.25m. Maximum surchargeable height is 19.87 mAHD. Raising Lock 6 above its normal operation height has the capacity to increase flow volumes and flow velocity into the Chowilla anabranch system.	N/A	See above. There was stronger influence of Lock 6 on the Chowilla anabranch system.	See above
Lock and Weir 5	Weir 5	For operations with a low QSA (i.e. < 15,000ML/day) a small scale raising of lock 5 may be required in order to achieve the optimum minimum water depth in the vertical slot fishway on the Chowilla regulator.	N/A	See above	See above