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

### Mulcra

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#### Forward

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.

#### Mulcra Summary:

In 2003 The Living Murray Program began developing the project Mulcra Island Environmental Flows Project that developed works on the Potterwalkagee Creek in tandem with Lock 8 weir pool raising on the River Murray. The Mulcra 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 Mulcra package of works as meeting the Phase 2 criteria.

Mulcra Island is part of the larger Chowilla Floodplain and Lindsay–Wallpolla Icon Site, and is located between Lindsay and Wallpolla Islands, approximately 70 km west of Mildura. The island occupies 3000ha of floodplain between the River Murray and Potterwalkagee Creek and consists of watercourses, wetland basins and freely-draining floodplain areas which are inundated at a variety of flows. The Islands are situated within a semi-arid Mallee landscape and feature extensive wetland and floodplain areas supporting a mosaic of Red Gum, Black Box and Lignum communities. They are recognised nationally and internationally for their role as refuge and breeding habitat for waterbirds and for their sites of Indigenous cultural significance. As part of the First Step for the Living Murray Initiative, the following ecological objectives were established for the Icon Site:

- Maintain a diverse community of viable populations of native fish, including species dependent on fast-flowing habitat;
- Provide alternative fish passage between Lock 7 and Lock 8;
- Provide wetland habitat for frogs and turtles;
- Provide frequent breeding events for waterbirds dependent on flooded marshland and shrub land vegetation; and
- Maintain the health of 530 ha of Lignum, Red Gum Forest, Red Gum Woodland and Black Box vegetation (270ha being in NSW).

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

- *The Living Murray – The Chowilla Floodplain (Including Lindsay-Wallpolla and Mulcra) Icon Site Environmental Management Plan 2006-2007.*
- *The Living Murray Environmental Works and Measures Mulcra Island Environmental Flows Project – Construction Proposal.*
- *The MDBA delegate (RM Executive Director) approved SA Water to proceed to Tender in Sept 2009 and construction in March 2010. Note that Ministerial Council 46 endorsed the TLM works special account budget in November 2008 (refinement of the original budget approved in November 2003).*
- *Mulcra Island (part of the Chowilla Floodplain and Lindsay –Wallpolla Island Icon Site) - Interim Operating Plan 2013.*
- *Mulcra Island Management Plan – SA Water Commissioning Plan (July 2013). This is the First operation to deliver water to test the structures and achieve an environmental outcome.*

The project has developed packages of on-ground engineering structures designed to flexibly manage the delivery of environmental water to the creeks, wetlands and/or floodplains of the islands. The project has been designed to provide the flexibility to operate under a range of river conditions and has been designed to achieve inundation up to 800ha and meet a number of ecological objectives whilst using minimal environmental water. Risks and possible ecological impacts were identified in these various plans, modelled and adaptably managed during the first commissioning.

The commissioning of the structures has been staged over the first couple of watering events. To date the major regulator, LPCR (Lower Potterwalkagee Creek Regulator) has been commissioned to 25.37m AHD, 230mm below full capacity. There is currently no agreement date when the commissioning must be finalised. The structures will be commissioned over time based on; operating within the design capabilities (to minimise failure of the structures i.e. rates of rise and fall against the structures) and prevent erosion downstream, ecological requirements of the site, and water availability.

The first of the structures at Mulcra have been successfully built and commissioned by the state constructing authorities (SA Water) on behalf of MDBA in 2013. In the same year TLM commenced the commissioning and first environmental watering event (3.7GL), with the target to inundate Horseshoe Lagoon to 24.5m AHD. This inundated 50% River redgums, 8% Black box and 20% lignum and significant environmental outcomes were achieved being: improvement of wetland aquatic vegetation, native fish recruitment, with substantial increase in floodplain biotic processes. A second commissioning of the Mulcra Island structures was undertaken in 2014, raising Horseshoe Lagoon to 24.8 m AHD and operating the system in flow-through mode. This 6.3GL watering event built on the benefits for river red gums provided in the 2013 watering, inundated a greater area of lignum shrublands and also improved connectivity between the river and floodplain.

During the commissioning, several important lessons were learnt that should be noted for the SDL calculation process and future proposals.

- **Lock raising:** Currently lock raising is suspended until SA Water direct users otherwise. This is due to a failure at Lock 1, even though no issues occurred at Lock 8.

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

Although there are no direct links between this Mulcra works and recently submitted projects by Victoria, consideration will need to be considered in Phase 2 of recent projects, particularly with regards to the operation of multiple new sites between Lock 6 to lock 10.

Ongoing costs will be part of the MDBA River Management annual budget. No additional resources are required to operate and maintain the Mulcra structures: the minimal costs (additional petrol and time to travel daily to the sites) are considered 'sunk' and the activities during operation is business as usual for the Lock 8 staff. Environmental use of water remains cost effective.

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
<b>Mulcra</b>	Lower Potterwalkagee regulator	This major structure improves fish passage between the Lock 7 weir pool and Potterwalkagee Creek and increase floodplain inundation when Lock 8 is raised.	Yes, Commissioning not completed (2013 and 2014 so far).	Note: Combination of commissioning and inundation from 2010-12 floods exacerbated a failure. The key outcomes was increased robustness of the spillway design. The structure required repairs.	Several new proposals currently rely on inundation between nearby locks and wider flow relationships between locks. Repairs to Lock 1 will influence lock 8 operations.
	Upper Potterwalkagee regulator	In conjunction with lowering of the inlet and approximately 1 km of creek bed, this structure would provide watering and increased flowing habitat along 20 km of creek, improved fish passage between Potterwalkagee Creek and the Lock 8 weir pool and allow watering of Snake Lagoon.	Yes, Commissioning completed 2010	As above	As above
	Stoney Crossing Regulator	This structure allows for periodic drying of Potterwalkagee Creek, increased inflows during periods of elevated levels within the Lock 8 weir pool and improved fish passage between Potterwalkagee Creek and the Lock 8 weir pool.	Yes, Commissioning completed 2010	As above	As above
	Lowering sills near Snake Lagoon	Lowers the sill level to enable increased frequency of wetting of the Lagoon	Yes, 2010	As above	As above
	Horseshoe Lagoon: 4 regulators and pipe/channel	Structures allow the Mulcra Horseshoe wetland to be gravity filled from the Lower Potterwalkagee Creek when the Lower Potterwalkagee regulator is operated and the Lock 8 weir pool water level is elevated.	Yes, Commissioning not completed (2013 and 2014 so far).	As above	As above
<b>Lock 8</b>	Raising of Lock 8 to 25.7mAHD (1.1m above Full supply level).	This enables increased flows into the Potterwalkagee Creek and Stoney Crossing inlets, which pushes flows through the creek system and inundates over 500 ha of floodplain.	Max raising to 25.46mAHD (0.86m above FSL) has been tested to date.	As above	As above

	Lock 8 track raising, and the Cutting block bank	This block bank will prevent water from flowing to the River Murray from Potterwalkagee Creek during elevated creek water levels, for example when Lock 8 is raised above full supply level.	Yes, Commissioning completed 2010	As above	As above
	NSW wetlands	Raise Lock 8 track in NSW and install box culverts to increase inundation extent	Yes, commissioning not completed	As above	As above