



Site options profile #L12

Loch Luna Complex - Draft

Lock 3 Master Plan



Location: Weir Pool 3, River Chainage Markers 435 to 432

Land Tenure: National Parks and Wildlife Service SA

Wetland Size: 220 hectares (Ha)

Normal Pool Level: +9.8 mAHD

PROPOSED OPTIONS	
Option #1:	Improve floodplain condition by promoting variable water levels created through weir pool manipulation (lowering and raising), whilst managing for salt influx from Lake Bonney following high-flow events and weir pool manipulation.
Description	The wetland is positioned to exploit the benefits associated with weir pool manipulation and associated variable water levels. Weir pool manipulation (WPM) presents an opportunity to increase the extent of managed floodplain area and have greater control of watering frequency through weir pool raising. Weir pool lowering (WPL) presents an opportunity to expose otherwise permanently inundated substrate and promote the active transport of floodplain matter and nutrients, including salt, back to river. WPL also promotes the creation of temporary lotic conditions within the Nockburra and Chambers Creek anabranches. Hydrodynamic modelling and monitoring demonstrates that during the recession of high-flow events and weir pool manipulation, the wetland receives an influx of salt from Lake Bonney, which persists in the wetland, before receding back into Lake Bonney. This option includes an investigation on how best to protect Loch Luna from any salt influx from Lake Bonney and it will support weir pool manipulation events in the Lock 3 Reach.
Outcomes	• Conservation and improvement of wetland vegetation. • Improved soil moisture conditions. • Improved lateral connectivity. • Temporary lotic conditions within the Nockburra and Chambers Creek anabranches. • Provision of fresh water recharge to salt-affected floodplains. • Restoration of variable water levels supporting an interconnected mosaic of diverse littoral, riparian and floodplain habitats and mixed cohorts of native woody-perennial plants across the lateral extent of the WPM Zone of Influence.

Option #2:	Explore infrastructure options and remediate obstructed flow paths to minimise impacts of salt from Lake Bonney during weir pool manipulation by promoting alternative pathways for flow back to river.
Description	This option includes an investigation on protecting Loch Luna from any salt influx in order to maintain the existing aquatic flora and fauna communities that are valued by recreational users. It will investigate the potential to use new structures to utilise alternative flow paths during a weir pool manipulation event to manage the risk of salt transport into Loch Luna. This option will also address any barriers to flow. There are several pipes under the access tracks that might obstruct flow or are set artificially high. This option will review the need to upgrade these structures and address barriers that restrict flows.
Outcomes	• Conservation and improvement of wetland vegetation. • Improved soil moisture conditions. • Improved lateral connectivity. • Provision of fresh water recharge to salt-affected floodplains. • Restoration of variable water levels supporting an interconnected mosaic of diverse littoral, riparian and floodplain habitats and mixed cohorts of native woody-perennial plants across the lateral extent of the WPM Zone of Influence.

SITE BACKGROUND

Description

The Loch Luna wetland complex is approximately 6km west of Barmera and is a part of the floodplain between Lake Bonney and Lock 3. The area is protected in the Loch Luna Game Reserve, which is comprised of permanent wetlands, narrow creeks, shallow swamps, as well as floodplains and seasonally inundated lowlands. The Loch Luna lakes are comprised of two large wetlands that are permanently connected to the River Murray at Lock 3 pool level. These lakes are linked to the river through a series of creeks and channels that make up the Nockburra and Chambers Creek sections to the south. Irrigation offtakes occur at several locations within the wetland complex.

Cultural Significance

The River Murray and Mallee Aboriginal Corporation (RMMAC) holds native title over the River Murray within the Lock 3 Reach. The First Peoples intimate knowledge and understanding of Country and active participation across all levels is vital to the effective management of this landscape.

Post-colonial Use

Prior to the regulation of flows in the River Murray and the construction of locks and weirs, Loch Luna would have had a more variable water regime. The stabilisation of water levels has led to permanent inundation of low-lying areas and reduced frequency and duration of inundation of the surrounding floodplains.

WETLAND ECOLOGY

Ecological role: Loch Luna wetland complex comprises mostly permanent wetlands. It is part of the Loch Luna Game Reserve and is a wetland of importance and high conservation value due to its diverse vegetation^{1,2}. It is also important habitat for water birds and other aquatic life²⁻⁴.

Flora: Vegetation composition at Loch Luna wetland complex includes river red gum and black box woodland and forest, lignum, saltbush and shrublands, reedbeds and sedgelands. See^{2,5} for detailed description of flora at site. The tree and vegetation survey concluded that the trees in this wetland complex were mainly in good to excellent health and the complex had generally a low diversity of emergent aquatic vegetation which was restricted to narrow fringes around the wetland basins⁵.

Fauna: The complex is an important nesting habitat for numerous waterbird species, particularly during flood periods. Loch Luna also provides habitat for tortoise breeding^{2,3}. See reference⁵ for further details about species composition at site.

WETLAND MANAGEMENT

Current Management:

The wetland complex is currently managed by National Parks and Wildlife SA, and is primarily used for recreational activities. The wetland complex has numerous narrow creeks and shallow swamps, making it a popular kayaking and canoeing destination. Waterfowl hunting is permitted within designated areas of the reserve on declared open days³.

Infrastructure:

No structures have been installed within the Loch Luna wetland complex.

ISSUES AND DRIVERS

As part of the Master Planning Project engagement process, an ongoing register of issues and drivers relating to sites and options was maintained. These highlighted key considerations and investigations that would need to be factored in and undertaken as part of any next steps towards realising the outcomes described within the option profiles. For Loch Luna, these included:

Environmental

- Hydrodynamic modelling and monitoring demonstrates that during the recession of high-flow events the wetland receives an influx of salt from Lake Bonney, which persists in the wetland, before receding back into Lake Bonney. Impacts to both ecology and irrigators would need to be considered for any future management decisions.
- There is a medium to high risk of acid sulfate soils across this site, see reference for further details⁶.
- Loch Luna is currently in good condition; investigations could assess whether condition could be maintained with intermittent fluxes in salinity.

Cultural

- Construction works need to be mindful not to disturb areas of cultural importance.

Community/Social

- Consider potential impacts to Canoe Trails and camping sites in National Park.
- Short-term salinity spikes for long term freshening may have short-term impacts but long-term benefits for irrigators drawing water from Loch Luna.
- To negate potential issue posed by salinity affecting irrigators with pumps on Chambers Creek, they could be assisted to hook into the Central Irrigation Trust (CIT) network.

Operational/logistics

- Need to investigate feasibility of water exchange with Lake Bonney using this approach and compare to alternatives such as McIntosh Canal and pipeline from Bonney to main channel.
- Potentially investigate the necessity of additional infrastructure to split flow through Cobdogla Basin and Nockburra Creek.

KEY STAKEHOLDER INVOLVEMENT

- Berri Barmera Council
- Berri Barmera Council - Environment and Sustainability Committee
- Berri Barmera Council - Lake Bonney Caring for Country Advisory Committee
- Berri Barmera Landcare
- Central Irrigation Trust (CIT)
- Commonwealth Environmental Water Office (CEWO)
- Loxton Waikerie Council
- Loxton Waikerie Landcare
- Murraylands and Riverland Landscape Board
- National Parks and Wildlife Service SA

- Overland Corner Group
- River Murray and Mallee Aboriginal Corporation (RMMAC)
- South Australian Murray Irrigators (SAMI)
- SA Water

REFERENCES

1. Jensen A, South Australia, Department of Environment and Natural Resources, South Australian River Murray Wetlands Management Committee. Wetlands atlas of the South Australian Murray Valley: a summary of current knowledge of Murray Valley wetlands as a basis for integrated catchment management. Adelaide: Dept. of Environment and Natural Resources; 1996.
2. Thompson MB. River Murray Wetlands - Their Characteristics, Significance and Management. Adelaide: University of Adelaide for the Department of Environment and Planning and the Nature Conservation Society of South Australia; 1986.
3. DEW. Loch Luna and Moorook Game Reserves [Internet]. 2020 [cited 2020 Aug 24]. Available from: https://www.parks.sa.gov.au/find-a-park/Browse_by_region/Murray_River/loch-luna-moorook-game-reserves
4. Australian Government. Directory of Important Wetlands in Australia - Loch Luna Wetland Complex - SA042 [Internet]. 2019 [cited 2020 Jan 4]. Available from: <https://www.environment.gov.au/cgi-bin/wetlands/report.pl>
5. SKM. River Murray Wetlands Baseline Survey – Final Report. Sinclair Knight Merz, Armadale. Prepared for the River Murray Catchment Water Management Board.; 2004.
6. Grealish G, Shand P, Grocke S, Baker A, Fitzpatrick R, Hicks W. Assessment of Acid Sulfate Soil Materials in the Lock 1 to Lock 5 Region of the Murray-Darling Basin. CSIRO: Water for a Healthy Country National Research Flagship.; 2010.



Pictures: top left, former bridge/jetty close to Cobdogla basin in Chambers Creek; top right, Short-necked turtle; bottom left, Loch Luna-Cobdogla basin on the left and Chambers Creek on the right; bottom right, Cobdogla basin structure at Chambers Creek, looking out towards Chambers Creek.

