

## **Water for Nature Environmental Watering Site Monitoring Report** by Dr Anne Jensen

### **Lyrup Lagoon, Gurra Gurra wetlands complex, South Australian Riverland** July 2013 to June 2016


Nature Foundation SA is a not-for-profit nature charity that works to Save, Protect and Restore South Australia's natural biodiversity. Since 2008 one of our flagship programs, Water for Nature, has been delivering environmental water along the Murray River to help reduce the loss and stress to ecosystems and habitats caused by river regulation and drought.

Over the last three years, our Water for Nature program has worked with 200 volunteers to deliver 4.56 gigalitres of environmental water to more than 35 wetland and floodplain sites along the Murray River.

Healthy wetland and floodplain environments are important for environmental, economic, cultural and social reasons, providing an optimal environment for flora and fauna, improved water quality for human consumption and agricultural use, and opportunities for recreation and tourism.

We work with private landholders, irrigators, community groups & local government on smaller sites to deliver environmental water, complementing larger government watering projects. Nature Foundation SA also works closely with the Commonwealth Environmental Water Holder to deliver environmental water.

## Water For Nature Environmental Watering Site Monitoring Report

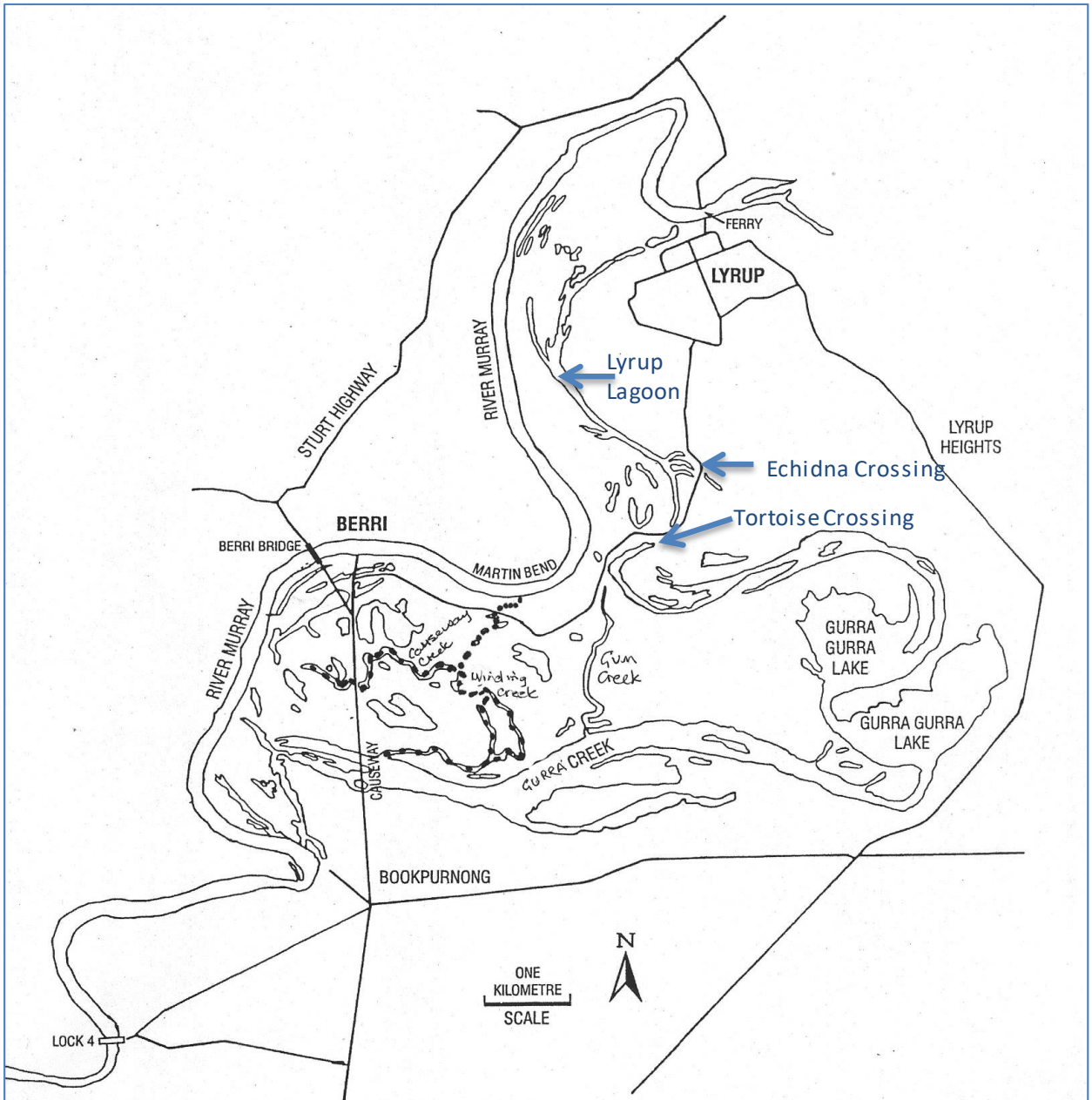
<b>Site name</b>	Lyrup Lagoon, Gurra Gurra wetlands complex, South Australian Riverland
<b>Reporting period</b>	July 2013 to June 2016
<b>Date prepared</b>	July 2016
<b>Location</b>	 <p>Lyrup Lagoon, which is part of Lyrup Forest Reserve, lies at the upstream end of the Gurra Gurra wetlands complex, which covers 3000 ha of floodplain between Lyrup and Bookpurnong, at 521-537 km from the Murray mouth. It includes a former river channel which flows through Lyrup Lagoon to the constricted channel at Tortoise Crossing on Gurra Road, before broadening out into the Gurra Lakes and flowing through Gurra Gurra Creek to flow back into the mainstream at Goldmine Cliffs.</p>
<b>Contact Name</b>	NFSA Water For Nature Program Manager Natalie Stalenberg
<b>Water Provider</b>	Commonwealth Environmental Water Holder allocation to NFSA
<b>Partners</b>	Central Irrigation Trust; Dave Reilly, irrigator
<b>Aim of watering project</b>	The proposed watering at Lyrup Forest would use CIT water input at the upstream end of the Lyrup Lagoon to provide a pulse of freshwater into the highly saline lagoon in order to promote a pulse of <i>Artemia salina</i> (brine shrimp or sea monkeys) to provide a food source for waterbirds. This process has been previously observed at the wetland, and brine shrimp cysts have been collected at the site.
<b>Planning Context</b>	Jensen, A, Marsh, F & Nichols, S (1999). <i>Gurra Gurra Wetland Complex Management Plan</i> . For the Loxton-Bookpurnong Local Action Planning Association and the Gurra Wetland Care Group. Wetland Care Australia: Berri Renmark To Border LAP, Loxton to Bookpurnong LAP and Gurra Wet Pty Ltd (2006). <i>Lyrup Forest Reserve Environmental Management Project</i> . Project Brief.

<b>Key objectives</b>	Environmental watering at this site has the following objective: 1. freshen saline lagoon to stimulate generation of aquatic food sources for waterbirds, including brine shrimp
<b>Site Description</b>	Lyrup Lagoon is highly saline permanent pool, with a combination of irrigation drainage water and groundwater accumulating and evaporating at this site. Salinities as high as 250,000 EC were reported in 2006 (see LAP study) and concerns have been raised recently by backflows into Lyrup Lagoon generated by raising of the weir pool level in conjunction with managing water regimes for Katfish Reach on the opposite side of the river.  The water level in the Gurra Lakes held at a raised level by Weir No 4 at Bookpurnong, keeping the lakes permanently inundated and this water backs up to the pool immediately below Tortoise Crossing. Salinities up to 12,750 EC have been recorded at this point during low flow conditions in 2006.
<b>Watering History 2013-16</b>	Watering occurred from 9 September to 16 October 2015, with 200 ML on the initial fill, and a further 90 ML added 7-24 December to top up levels, for a total of 284 ML delivered in 2015-16. This raised water levels in the lagoon significantly but was still below river pool level, and the water did not flow through Tortoise Crossing.
<b>Habitat</b>	Lyrup Lagoon provides a permanent pool of mostly saline to hyper-saline water, fed by regional groundwater as a result of local irrigation, occasionally freshened when river flows exceed 35,000 ML/d. It is used regularly by waterbird species associated with saline aquatic ecosystems, including Avocets and Black-winged Stilts. The muddy shores provide food sources for waders and shorebirds, and the adjacent floodplain has dense regeneration of black box seedlings following inundation by the 2011 flood peak. The lagoon was formerly bordered by river red gums but these are long dead due to lack of freshwater flows. A line of healthy black box and dryland tea-tree border the lagoon adjacent to irrigation blocks, supported by irrigation drainage water.
<b>Water Source</b>	NFSA allocation from Commonwealth environmental water 2013-2016; delivered via Central Irrigation Trust infrastructure
<b>Event details</b>	2013-14 Project not commenced 2014-15 Project not commenced 2015-16 284 ML delivered ; note lagoon capacity is 351 ML at pool level of 13.22 m AHD, maximum capacity of 741 ML if Lock 4 raised to 14.33 m AHD <i>Maximum area inundated (ha)</i> Estimated area 40 ha <i>Duration of the environmental watering project (2013-16)</i> one seasonal filling late spring through summer

<b>Annual Observations</b> <i>(including species of conservation significance (state or Commonwealth listed threatened species, or listed migratory species) observed at the site, any breeding of frogs, birds or other prominent species observed at the site and details of any observable responses in vegetation, such as improved vigour or significant new growth)</i>	<b>2013-14</b> N/A
	<b>2014-15</b> N/A
	<b>2015-16</b> (observations by consultant Elizabeth Lescheid) Limited conclusions can be drawn from three surveys, due to the mobility of birds, changing daily conditions and availability of alternative habitats in the vicinity. Watering increased food sources and increased numbers of waterfowl were noted. This response was possibly due to reduced salinities, but also may have been use of the location as a refuge from hunting. Vulnerable species Freckled Duck, Black-winged Stilt and Straw-necked Ibis were observed during monitoring. Rare species observed included Red-kneed Dotterel, Australasian Shoveler, Black-fronted Dotterel and Caspian Tern. Breeding was noted in vulnerable Black-winged stilt, Rare Black-fronted Dotterel and Near-Threatened Black-faced Cuckoo-Shrike and Pied Butcherbird. Avocets, Stilts and Pink-eared Ducks were recorded, which can indicate more saline conditions and salt-tolerant food sources. No brine shrimp were observed, but these could have been missed due to the timing of monitoring surveys. It is also possible that higher water levels (above pool level) are required to trigger brine shrimp emergence. Some recommendations have been made to investigate this aspect further, to try to determine the water regime required to trigger a bloom of brine shrimp.
<b>Future Watering</b>	Repeat seasonal fillings in late spring, taking into account natural flood events, with particular monitoring to detect presence of live brine shrimp or cysts; maximise filling of Lyrup Lagoon to at least pool level, subject to monitoring of salinity of any water discharging through Tortoise Crossing into the top end of Gurra Lakes



**Figure 2** Lyrup Lagoon. showing waterbirds and regeneration on the floodplain (below) in October 2014 (Photos: Anne Jensen)



**Figure 3** Location of Lyrup Lagoon in the Gurra Gurra wetlands complex near Berri