



## **Draft Lake Eyre Basin State of the Basin Condition Assessment 2016 report**

(Draft for public consultation. Comments provided on this draft will be considered in finalising the report.)



*Cooper Creek Cullyamurra Waterhole and Floodplain; Innamincka, South Australia, 2009. Photo: G Scholz*

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# Executive Summary

The Lake Eyre Basin represents around one sixth of the Australian continent and covers significant portions of the Northern Territory, Queensland and South Australia. Amongst the world's largest internally draining river basins, the Basin supports ecological, socio-economic and cultural values of very high national and international significance. In 2000, Ministers of the Australian, Queensland and South Australian governments signed the Lake Eyre Basin Intergovernmental Agreement to protect the Basin's water resources and river systems and to promote their sustainable management, especially with regard to minimising cross-border downstream impacts. The Northern Territory government also signed this Agreement in 2004. This report addresses the requirements of the *Lake Eyre Basin Intergovernmental Agreement Act 2001* to review and report on the condition of watercourses and catchments within the Lake Eyre Basin Agreement Area every 10 years. The first condition assessment was the State of the Basin 2008: Rivers Assessment. This report is the second condition assessment. Available knowledge concerning hydrology, water quality, riverine fish and waterbirds of the Basin is synthesised and current and emerging threats to these features are identified.

Riverine ecosystems and biodiversity of the Lake Eyre Basin are in good condition overall, especially when compared with neighbouring systems such as the Murray-Darling Basin where high levels of modification and resource use have resulted in widespread environmental degradation over the last century. Comparatively little human alteration of water regimes or landscapes has occurred in the Lake Eyre Basin and this is reflected by rich and diverse riverine communities (e.g. fish and waterbirds).

Riverine ecosystems and biodiversity of the Basin are driven primarily by climatic and hydrological patterns which are characterised by high levels of spatial and temporal variability. Throughout the Basin, riverine habitat characteristics, including water quantity and quality, largely reflect preceding hydrological conditions and, to a lesser extent, geological and geomorphological features. No long-term trends in hydrology or water quality have been detected from existing records in the Basin although it is difficult to determine whether this is mainly due to the high variability and relatively short duration of available datasets rather than the definite absence of trends. For example, contemporary water quality is characterised by high nutrient and turbidity compared to other Australian river systems, but it is not known if this reflects natural processes or is influenced by human activities such as grazing.

Assessment of data collected under the Lake Eyre Basin Rivers Assessment programme indicates that riverine fish communities across the Basin are generally in good condition with at least 19 native species present including numerous well-known (yellowbelly) and endemic species (Welch's grunter, desert goby, and the Finke goby). Exotic and translocated fish species are more abundant and widespread in the Basin than previously known, and present a threat to native fish species in both riverine and spring habitats. The rapid expansion of the translocated sleepy cod in the Cooper Creek catchment is of particular concern because of its potential to affect the condition of native fish communities, including those of the Coongie Lakes Ramsar wetlands.

Waterbird communities across the Basin also demonstrate long-term stability in abundance and diversity over the monitoring period (1983-2015), despite being highly variable at basin and local scales in response to streamflow and water levels. Declines of shorebirds have occurred during this period at three wetlands (Goyders Lagoon, Lower Cooper and Lake Yamma Yamma), reflecting a continental decline in this migratory group

probably due to habitat changes in their flyways beyond the Basin. Herbivorous waterbirds and broilgas also exhibited declines in Lake Katherine and the Georgina-Diamantina catchments respectively, although the reasons for this remain unclear.

The Coongie Lakes in the South Australian portion of the Cooper Creek comprise a wetland of global and national significance listed under the international Ramsar Convention on Wetlands. Limits of acceptable change have previously been defined under the Convention for the Coongie Lakes for hydrology, fish and waterbirds. Limits of acceptable change are threshold values designed to alert managers to potential changes in ecological character of the site. None of these limits of acceptable change were breached for hydrology between 2011 and 2016, although one was approached during a recent period of low flows in the lower Cooper. The limit of acceptable change associated with fish could be interpreted as exceeded on four occasions in the recent sampling period. As the sampling was only conducted in one or two sites at these times, the lack of fish species observed may reflect sampling effort rather than a depleted fish community. The recent appearance of sleepy cod represents a risk to the ecology of the Coongie Lakes Ramsar site because this translocated predator may have adverse effects on native fish populations and aquatic food webs. Waterbird surveys in the Coongie Lakes region in November 2008 observed very high numbers of waterbirds (almost 60 000) and waterbird species (~45) present, including around 2% of the total populations of both red-necked avocet and pink-eared duck, providing further evidence to support the continued recognition of this site as internationally significant according to Ramsar criteria 5 and 6.

Risks associated with current threats and pressures to water resources and riverine ecosystems in the Basin are considered to be relatively low and are mostly localised in their effects, typically concentrated in the vicinity of waterholes. There is a risk, of cumulative impacts should the intensity and distribution of these pressures increase in the future. Invasive species, including aquatic pests and terrestrial animals and plants, represent the greatest current risk to riverine ecosystems and biodiversity. Climate change also presents a significant emerging threat with the potential for direct and indirect effects on water resources and riverine ecosystems and biodiversity. Along with warming, a drying trend revision of the fish can be expected over the coming century, especially in the southern parts of the Basin, as well as a potential for more frequent bushfire weather. Predicting climate change impacts entails high levels of uncertainty due to the inherent variability of the system and the complexities and feedbacks involved. Nevertheless, changes in the abundance and distribution of many native species across the Basin can be expected.

Management priorities to conserve riverine ecosystems and biodiversity in the Basin include on-ground actions to contain source populations of invasive species, including capping artesian bores to prevent the sustenance of the exotic fish gambusia, fencing of water storages infested by cane toads, and eradication of source populations of invasive plants; education and enforcement to limit overfishing and illegal fish stocking in waterholes; minimisation of current pressures and stressors, such as 4WD driving and stock access, in the vicinity of persistent waterholes; and education to limit firewood harvest and spread of invasive plants in high-use tourism and recreational areas in the vicinity of persistent waterholes. Maintaining current low levels of water resources development also remains a priority, along with careful planning of floodplain development to maintain natural spatial patterns of inundation, especially during smaller floods.