THE WARREGO

Quarter 4 | April - June 2023

Water for the environment

Water for the environment is used to improve environmental values of river and wetland systems and its use can provide social and cultural benefits, too. It can be either water entitlements that are left in the river, or a specified amount of water that has been set aside in storages that is released into natural waterways when needed.

Either way, the aim is to improve river and wetland health. Learn more here.

This quarter in a nutshell

Low flows continued in the Warriku-Baaka (Warrego-Darling) Selected Area for the duration of the quarter. Autumn surveys of food webs, vegetation and biodiversity were completed.

We've been quite productive in the communication and engagement space. Most importantly, the Culture to Science Day was held at Toorale on June 17.

Here's a key story we produced this quarter: Sharing Cultural and Science Knowledge – Toorale. More details on the story are listed below.

We would like to acknowledge the Kurnu-Baakandji People, the Traditional Owners of the Warriku (Warrego) and Baaka (Darling) Rivers and surrounds. Thank you for sharing your Country and knowledge of its land, water and life with us.

We pay respects to Elders past and present.

Bourke received a total of 53 mm this quarter, 22.8 mm less than the long-term average. During this quarter, maximum temperatures at Bourke ranged from 33.1 °C on April 12 as the highest and 13.6 °C on June 28 as the lowest.

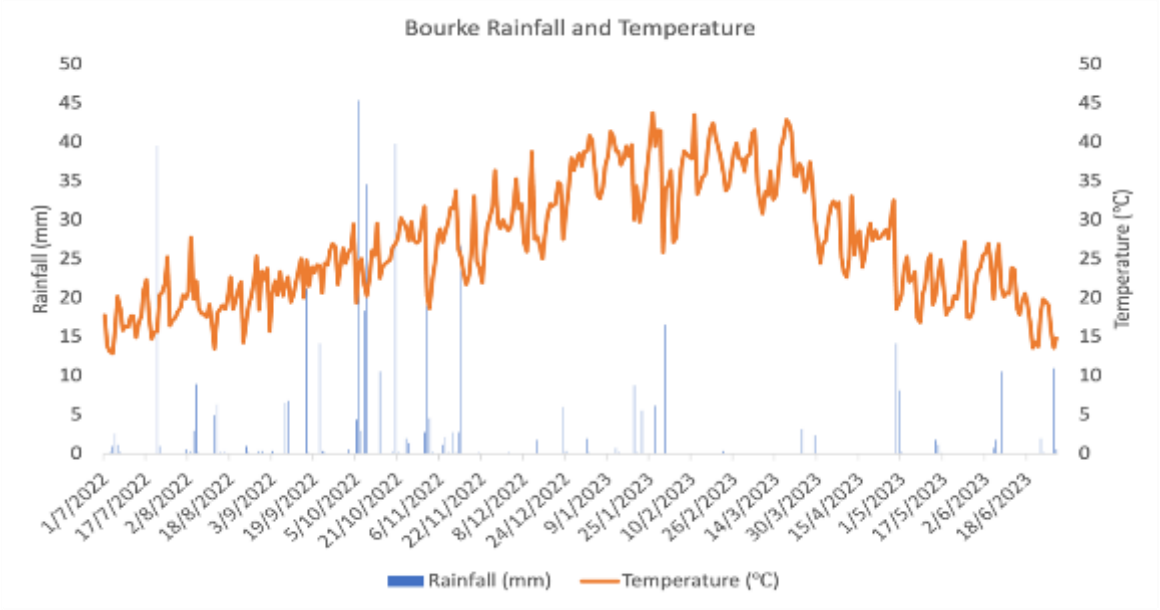

Figure 1 Bourke rainfall and temperature from July 2022 - June 2023.

Hydrology

16.8 GL of water for the environment was delivered down the Barwon-Darling system in between late March and early June from the Gwydir and Namoi systems, a part of this contributed to the Northern Refresh Flow. The flow was aimed at maintaining water quality, replenishing river habitats to support native fish movement and condition. This produced a small flow pulse through the system which peaked at Brewarrina at 2,185 ML/d on April 27, Werraweena at 2,229 ML/d on April 30, 2,197 ML/d on May 1 at Bourke and at 2,372 ML/d on May 2 at Louth. Following these peaks, flows remained below 1,700 ML/d across the gauges through to June 20 (Figure 2).

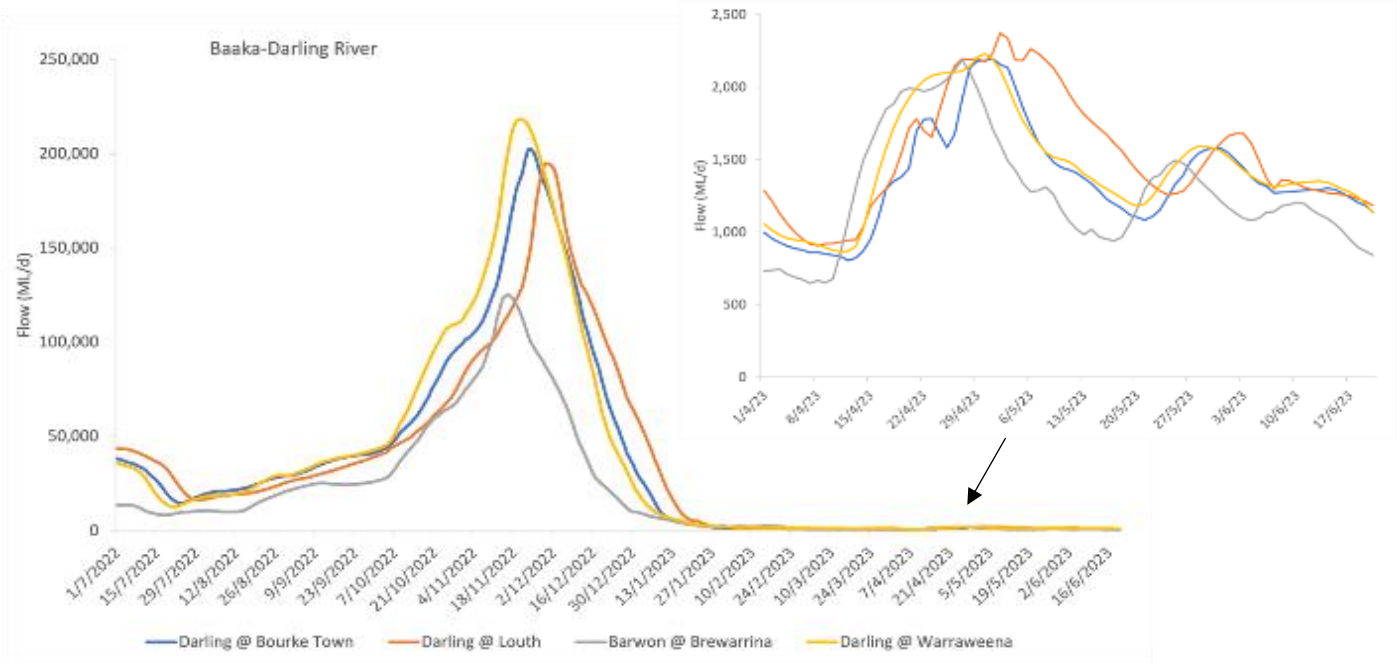

Figure 2 Discharge (ML/d) in Barwon and Baaka-Darling Rivers from July 2022 - June

The Warriku (Warrego) River experienced low flows for the duration of the quarter. Flows did not exceed 100 ML/d across all gauges. The Warriku (Warrego) at Wyandra ceased to flow from April 4 to June 7. The Warrego at Wallen ceased to flow from April 15 and at Cunamulla Weir from April 22 and flows had not resumed by June 20.

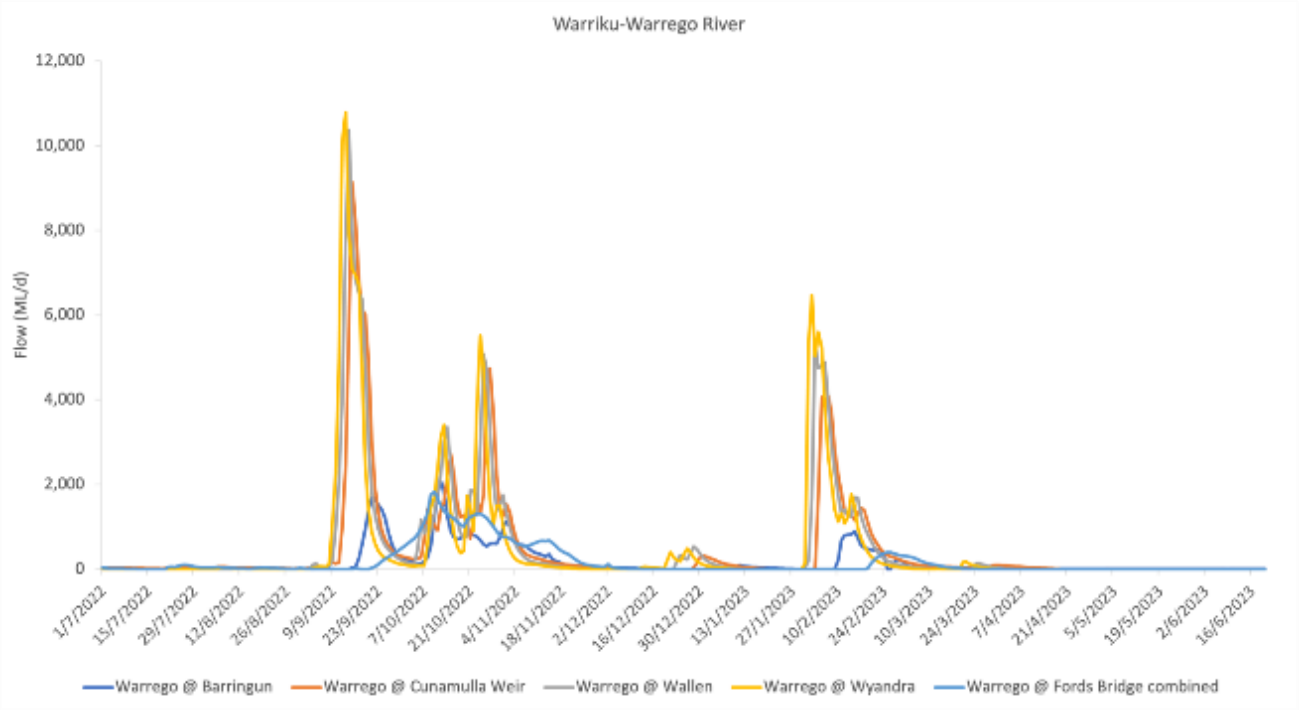

Figure 3 Discharge (ML/d) in Warriku (Warrego) River from July 2022 - June 2023.

The water level in Boera Dam remained above the Western Floodplain connection level from the beginning of the quarter to April 17. Following this the water level at Boera Dam remained below the connection level for the duration of the quarter. Water levels in Dicks Dam declined from 0.8m at the beginning of the quarter to 0.5 m at the end.

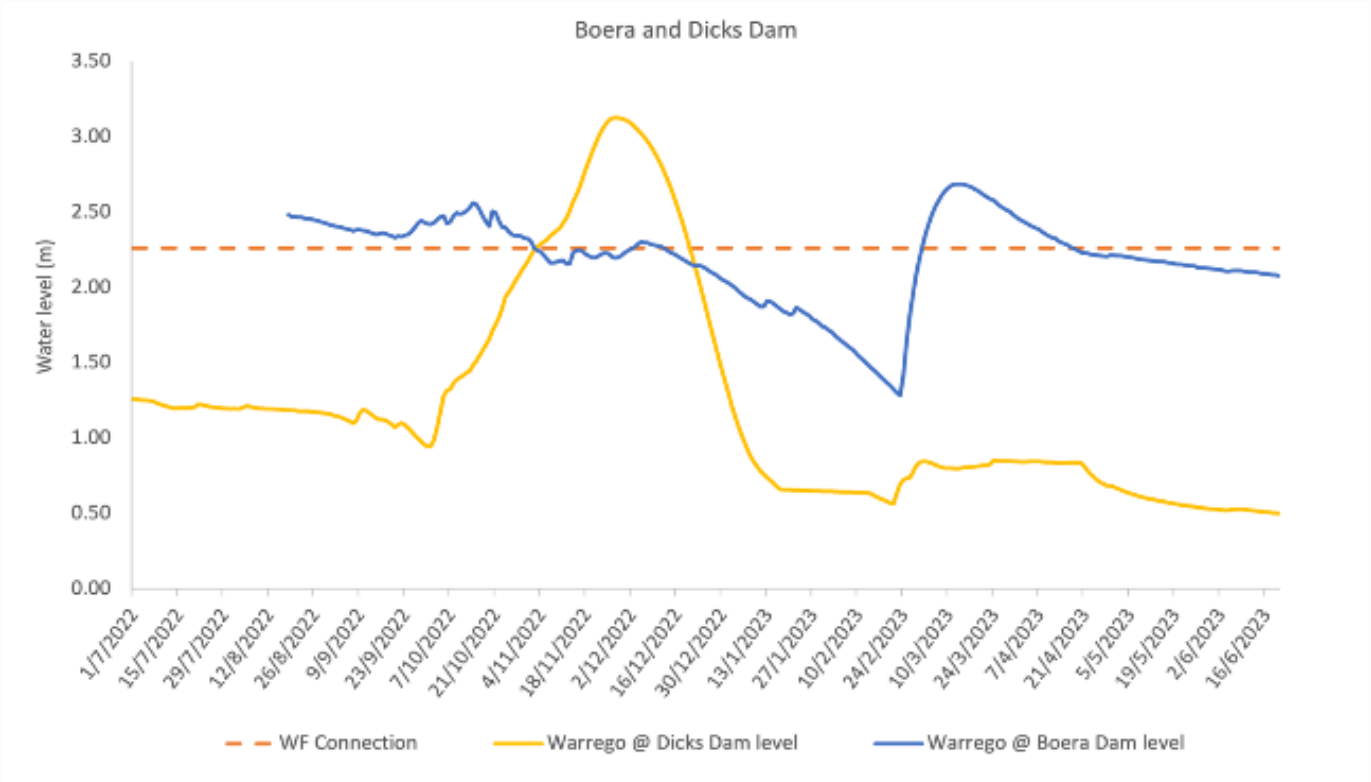

Figure 4 Water level (m) in Boera and Dicks Dam from July 2022 -

Floodplain inundation

Inflows to Boera Dam in early April resulted in spill to the Western Floodplain. By mid-April, there was connectivity through the major flow paths in the top 6km of the floodplain.

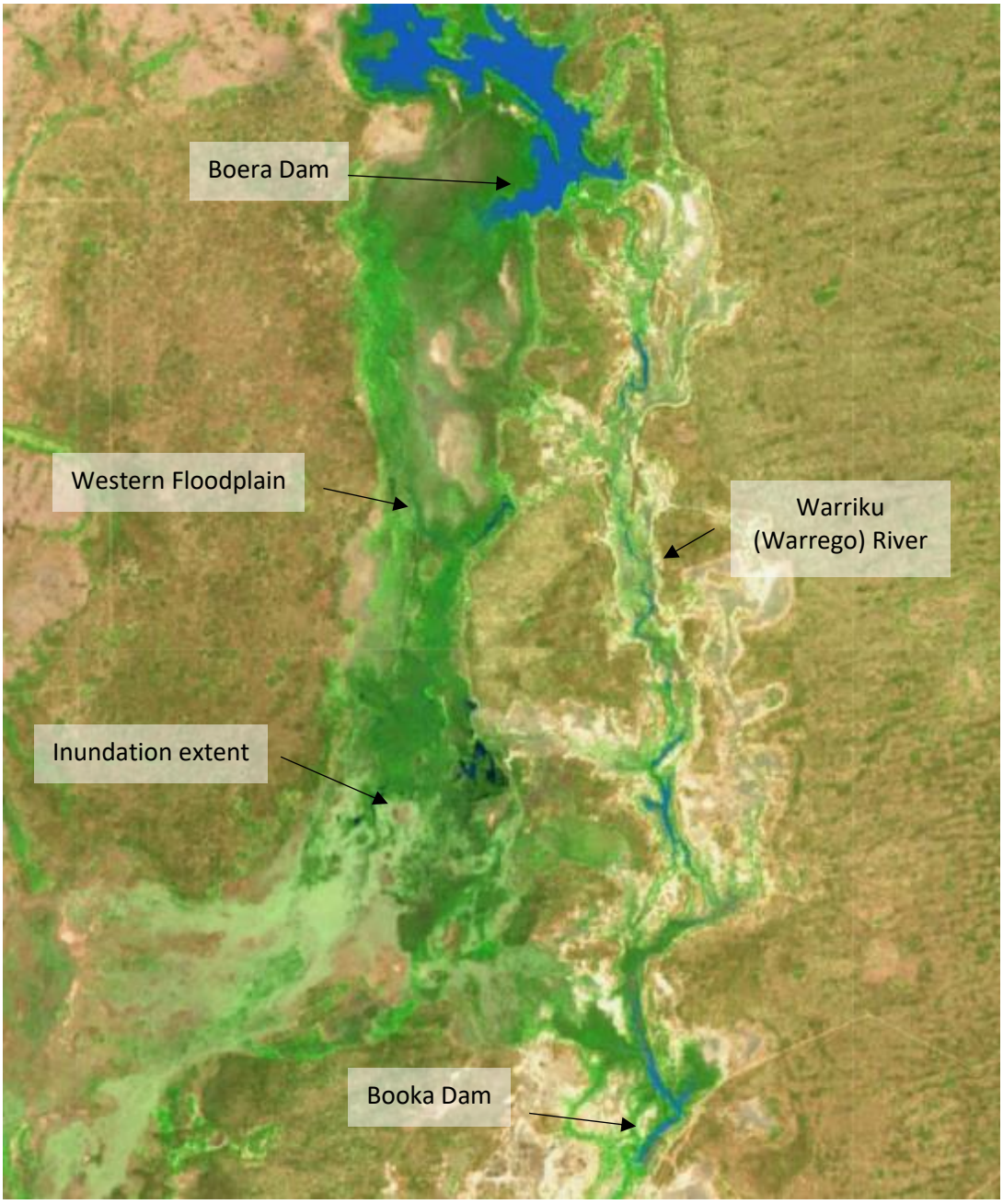

Figure 5 False colour Sentinel-2 image of the Western Floodplain and Warriku (Warrego) River taken on the 10/4/23 (https://apps.sentinel-hub.com/sentinel-playground).

Water quality

This quarter, dissolved oxygen levels in the Baaka (Darling) dipped below 2 mg/L at Walgett, Collarenebri and Brewarrina as measured at WaterNSW gauges. These low levels were not detected during field visits at these locations pre- and post-delivery of the Northern Refresh Flow. Therefore, there may be issues with the telemeted loggers at these locations. Oxygen levels were higher at Bourke and Louth, remaining above 4 mg/L for the duration of the quarter at Bourke, and above 7 mg/L at Louth.

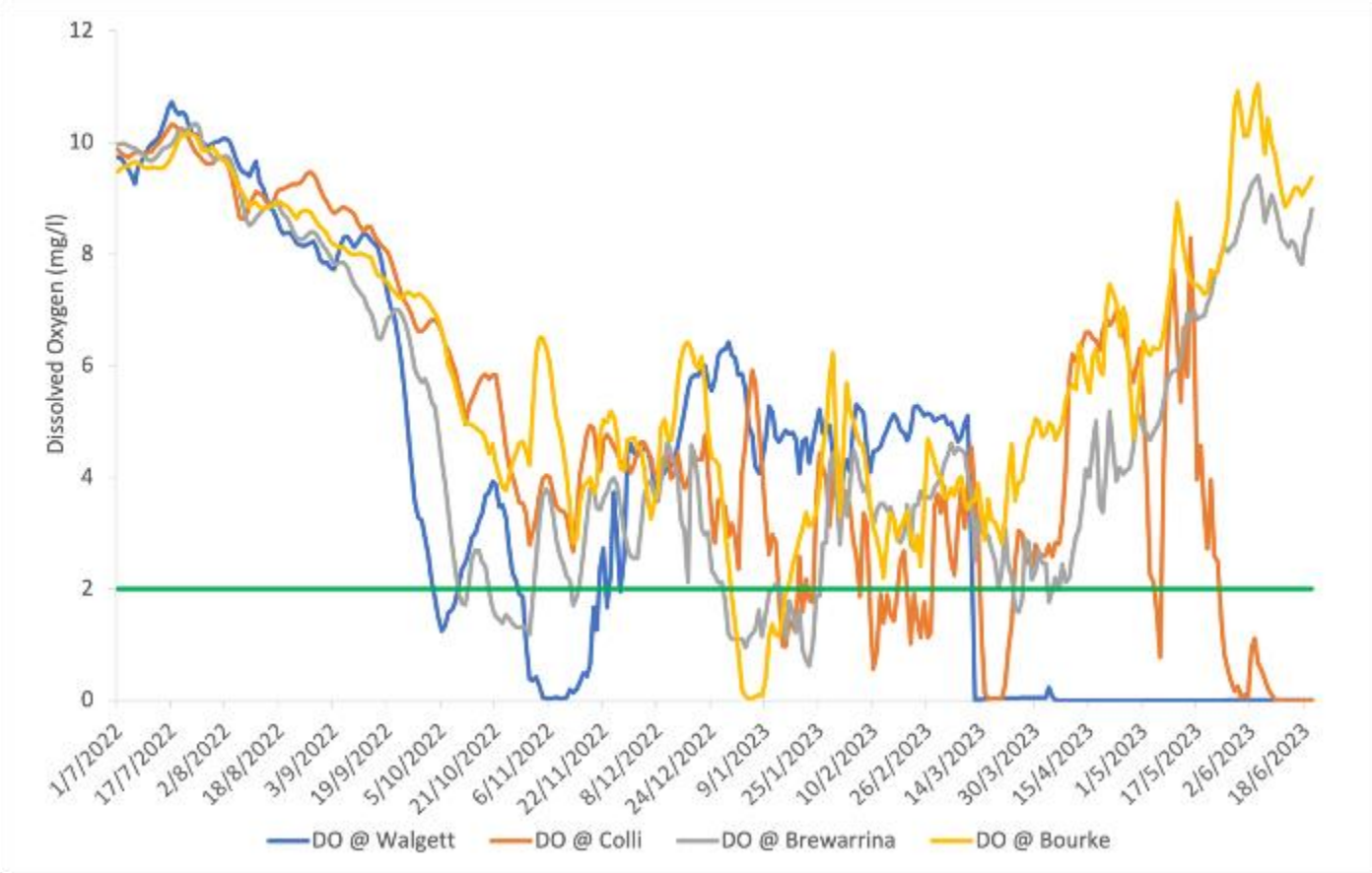

Figure 6 Concentration of dissolved oxygen in the Barwon and Baaka (Darling) Rivers from July 2022 – June 2023. Oxygen concentrations below the green line can be dangerous for aquatic animals.

Monitoring

Autumn surveys of food webs, vegetation and biodiversity were completed.

Food webs

The final food webs sampling trip for the 2022-2023 water year occurred in March 2023. Water quality was assessed pre- and post-delivery of the Northern Refresh Flow, which occurred between April 22 and May 16. Following delivery of the Northern Refresh Flow, dissolved oxygen was markedly high across all sites with a maximum measurement of 104.4% at 1 m in the Baaka (Darling) near Bourke. Salinity was reduced at every site post-flow compared to pre-flow, showing the positive influences of the delivery of the event.

Vegetation diversity

Between December 2022 and April 2023, species richness declined in all communities studied on the Western Floodplain – reflective of the drier overall conditions within study plots. Vegetation cover also declined but to a lesser extent. Vegetation cover mostly comprised of a few species, notably grasses such as common blown- grass and spike rushes such as pale and flat spike-sedge.

Figure 7 Coolibah woodland in December 2022 (top) and in April 2023 (bottom) (Photo Credit: UNE).

Biodiversity monitoring

Monitoring undertaken in April was aimed at better understanding the ecology of the Western Floodplain. One eastern long-necked turtle (*Chelodina longicollis*) was observed. Various frog species were also observed, including the broad palmed frog (*Litoria latopalmata*), long thumbed frog (*Limnodynastes fletcheri*), desert tree frog *(Litoria rubella*), spotted grass frog *(Limnodynastes tasmaniensis*), Crinia species and Peron's tree frog (*Litoria peroni*). A mulga snake was also seen during monitoring.

Culture to Science Day

A Culture to Science Day was held at Toorale on June 17. In attendance were Toorale JMC members and members of the local community, as well as UNE, 2rog, DPI Fisheries and NPWS staff. During the day, attendees shared their experiences of the Warriku and Baaka, and talked about culture, use of the landscape and the scientific methods used in monitoring. The attendees also discussed ways to move forward and priorities at Toorale. During the day, the Kurlaku (Brolga) visited. This was an important step in the journey to better understanding the traditional values of the Warriku (Warrego) and Baaka (Darling) and how we can better incorporate these values into our monitoring of water for the environment.

Figure 8 Smoking ceremony (top) and Elder Kevin Knight and Elder Phil Sullivan (bottom) (Photo Credit: Tamara Kermode).

Communications

We produce a range of communication products each quarter to help tell the story of the wetlands we study, the people that study them and the cultures that depend on and care for them. All our stories can be found on the 2rog Consulting website News page linked here.

This quarter's story Sharing Cultural and Science Knowledge – Toorale spoke briefly about the experience of seeing Kularku (Brolga) fly over the Toorale Shearers Quarters during discussions about incorporating traditional and science knowledge into the Flow-MER program.

The Toorale Culture to Science Day, held on June 17, was the most significant communication event during quarter four.

Below is a snapshot of some of the communications and engagement activities we achieved this quarter:

- Toorale Culture to Science event on June 17
- Paul and Mark on 2WEB talking about the Toorale Culture to Science event
- Article to be published in the Western Herald about the Culture to Science event
- You can listen to Paul and Mark on 2WEB and read the Western Herald article here. Both are regarding the recent Sharing Culture and Science Knowledge at Toorale on the 17th of June 2023.
- Paul presented at the MDBA River Reflections conference in Narrabri (June 14 to 15)
- Continuing to incorporate traditional language into all communications

Flow-MER website: https://flow-mer.org.au/

Figure 9 Kurlaku (Brolga) at Booka Dam in June 2023 (Photo Credit: Tamara Kermode).

What's next?

Our on-ground activities are limited over the winter months when we turn our focus to analysing and reporting on the data we've collected during the year. We will report this in our annual Flow-MER summary report. Summary reports from previous years can be found here.

We will also continue generating MER stories and preparing for MER 1.5.

Figure 10 Kurlaku (Brolga) soaring over the Toorale Shearers Quarters (Photo Credit: Tamara Kermode).