



Figure 1. Gingham Waterhole of the Gwydir Wetlands following rainfall and environmental flows in 2020. Plenty of water and habitat available to support the diversity of life the wetlands host. Credit - UNE

A TURTLES GO WITH NO FLOW

The Gwydir River valley is home to a diverse range of aquatic species that rely on flows of fresh water to survive and thrive. The 2019 calendar year was the driest on record and the drought saw record low rainfall which led to sustained periods of no flow. Very dry conditions combined with high temperatures and local bushfires had to place a lot of pressure on the plants and animals of the Gwydir. In this little story we'll provide some insight into how the system responded.

As flows ceased, aquatic animals were restricted to small areas of water in the deeper pools of the river channels. These pools are key refuge sites that provide critical habitat for aquatic animals during dry periods.

While fish and other fully aquatic species are confined to these refuge pools, other aquatic species engage various methods of resistance and resilience. The Gingham waterhole of the Gwydir Wetlands State Conservation Area (SCA) is home to a community of turtles- including Eastern long-necked (*Chelodina longicollis*) (Figure 2) and Murray River turtle (*Emydura macquarii*) species. These species

presented contrasting modes of survival during the 2019 drought. University of New England (UNE) Master's student, Annette Deppe, studied the Gwydir's turtle community in 2019, including how they responded to the tough drought conditions. Tracking of these turtles showed that Eastern long-necked turtles (Figure 2) sought refuge in the forests surrounding the floodplains, while Murray River turtles bunkered down in the mud that remained after waterholes had dried.

Some Murray River turtles attempted migrating to other water sources. An impressive journey was recorded by one turtle, who successfully moved over one kilometre to a nearby dam. Fortunately, the majority of the Gwydir turtle community was able to survive the 3-month period while their habitat dried, before water again replenished their waterholes (Figure 3).

The summer-autumn of 2020 brought some relief for the flora and fauna communities of the Gwydir river system, with higher-than-average rainfall and the release of environmental water (e-water). These e-water flows aimed to protect in-stream habitat, increase water quality and



Figure 2. Eastern long-necked turtles (*Chelodina longicollis*) seeking refuge near a dried waterhole. Credit - UNE

support the wetlands by protecting their fundamental ecosystem processes. By winter 2020 the wetlands saw a relatively high abundance of fish, influx of ducks, swans and geese, high vegetation cover and a high rate of turtle survival, showcasing the resilience and adaptability of these wetland species.

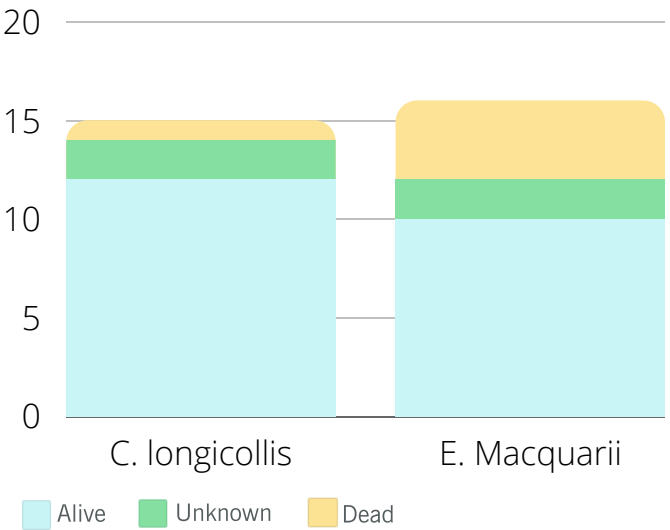


Figure 3. Tracking of turtles in the Gwydir Wetlands State Conservation Area (SCA) during the 2019 drought saw that of 15 Eastern long-necked turtles (*Chelodina longicollis*) studied, 12 survived, 1 died and 2 had an unknown fate; and of 16 Murray River turtles (*Emydura macquarii*) studied, 10 survived, 4 died and 2 had an unknown fate. These numbers show the effectiveness of these species survival tactics.

Long-term strategic management and delivery of environmental water in the river channels, wetlands and water courses of the Lower Gwydir has likely contributed to current resilience of the systems over time.

As the Gwydir faces challenges, so to do the water managers to allocate and deliver very limited water resources in the most beneficial way. Monitoring the system through challenging periods and observing the response to flows (both run-off from rain events and e-water) deepens our understanding of critical periods and how to manage them more effectively in the future.

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Managing water for the environment is a collective and collaborative effort, working in partnership with communities, private landholders, scientists and government agencies - these contributions are gratefully acknowledged.

We acknowledge the Traditional Owners of the land on which we live, work and play. We also pay our respects to Elders past, present and emerging.