NSW Southern Basin dissolved oxygen

Water Quality Update No. 2 I 28 September 2020

NSW Southern Basin dissolved oxygen update No. 2

Multiple agencies are undertaking water quality monitoring to assess dissolved oxygen conditions across NSW and identify potential risks to ecological communities. This update provides an assessment of dissolved oxygen data from the southern valleys collected up to 28 September.

Stages of criticality for dissolved oxygen

Continuous dissolved oxygen sensors located in the Murray, Murrumbidgee, Lachlan and lower Darling river catchments show levels at all sites are above critical ecological thresholds and pose minimal risk to aquatic ecosystems.

Dissolved oxygen at all sites is remaining above 6 mg/L. The critical threshold for fish health is 2 mg/L. Continuous dissolved oxygen data is available here on the WaterNSW real time data web site. Figures 1 and 2 highlight the Stages of Criticality at monitoring sites in the Southern Basin. Definitions of the Stages of Criticality are below Figure 1.

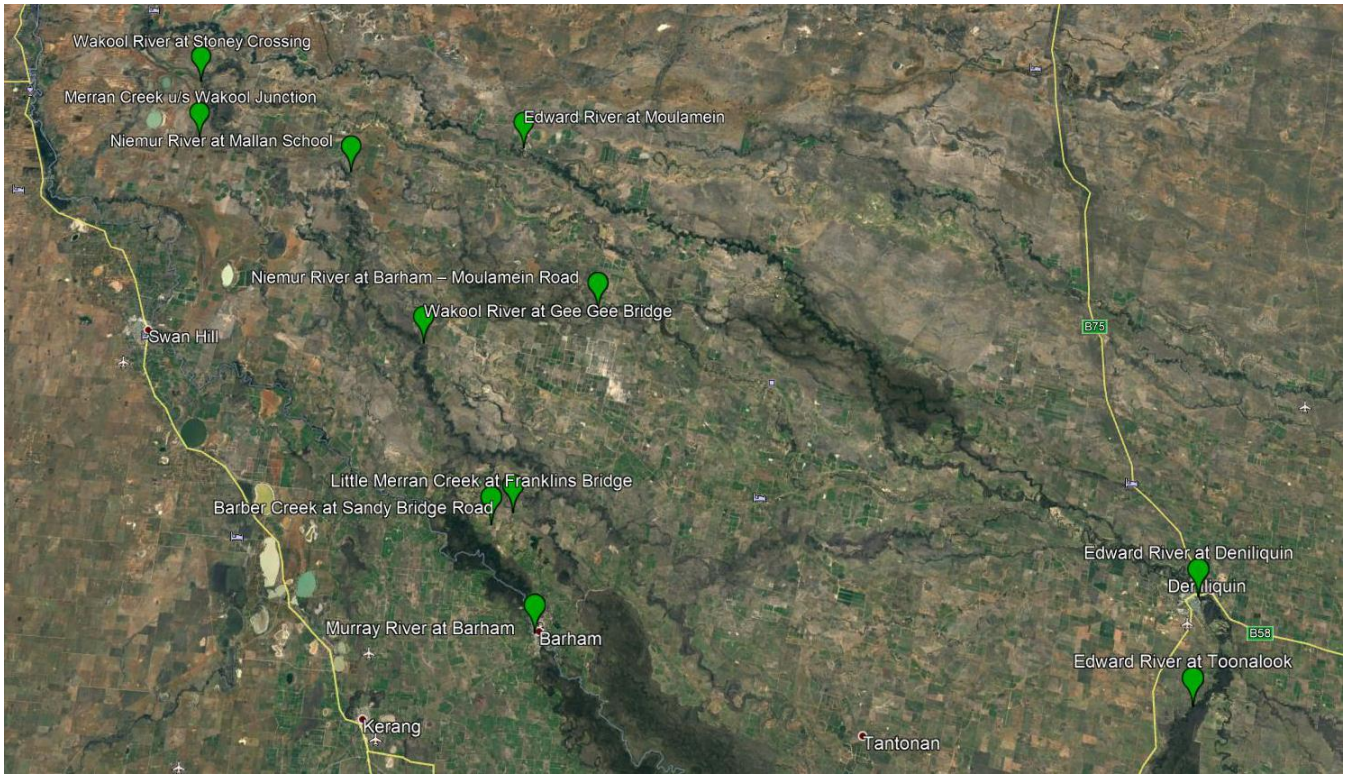

Figure 1: Stages of criticality at continuous dissolved oxygen monitoring sites in the Murray catchment

Key to dissolved oxygen Stages of Criticality

Stage	Definition
Stage 1	Dissolved oxygen level above 4 mg/L at all times. Low risk to aquatic ecosystems
Stage 2	Daily dissolved oxygen level dropping below 4 mg/L at night/early morning, then increasing to above 4 mg/L during the day. Will impact on fish health, but may not result in deaths
Stage 3	Dissolved oxygen level dropping below 2 mg/L at night/early morning. High risk to aquatic ecosystems. Fish deaths may occur
Stage 4	Dissolved oxygen level remaining below 2 mg/L. Very high risk to aquatic ecosystems. Fish deaths will, or have already occurred

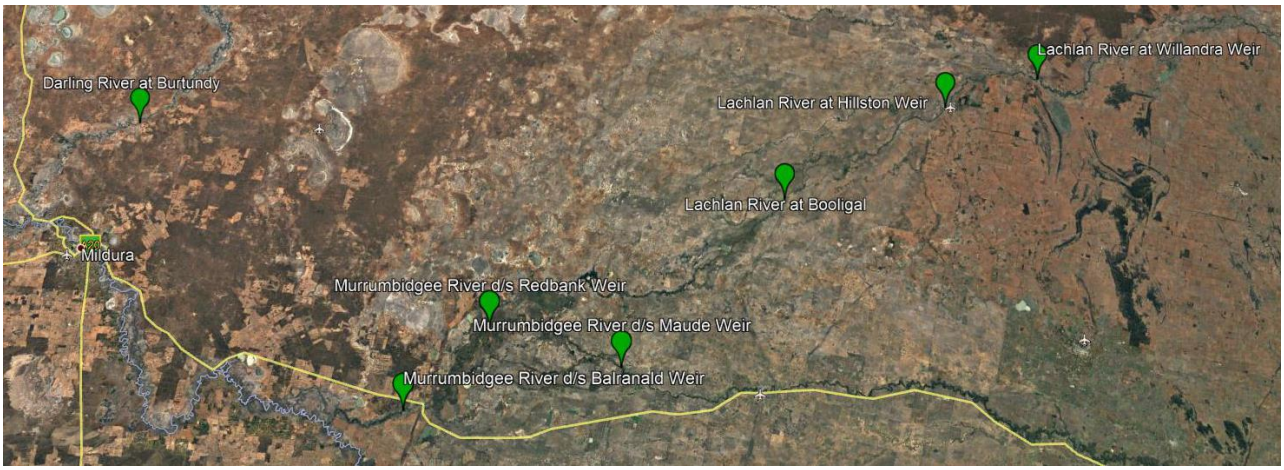

Figure 2: Stages of criticality at continuous dissolved oxygen monitoring sites in the Murrumbidgee and lower Lachlan and Darling rivers

Continuous dissolved oxygen monitoring

Dissolved oxygen in the Lachlan River at Booligal had been steadily declining throughout September until eventually dropping below the 2 mg/L critical threshold for fish health on 19 September. The drop in dissolved oxygen at Booligal coincided with a steady increase in flow and rising water temperature (Figure 3). As flow increased, sticks, leaves, bark and grass would have been flushed into the river. The breakdown of this organic matter resulted in the decreased dissolved oxygen at Booligal.

As flows were already high, releasing more water to dilute the poorer quality water at Booligal would not have provided additional benefits. The Bureau of Meteorology had forecast the arrival of a cool change. As this cool change crossed NSW, water temperatures decreased rapidly (Figure 3). The cooler water temperature slowed the biological activity which was using up the oxygen to break down organic matter in the river. This allowed the dissolved oxygen to recover back up to safe levels. There have been no reports of dead fish or sightings of fish gasping at the water surface in the Lachlan River.

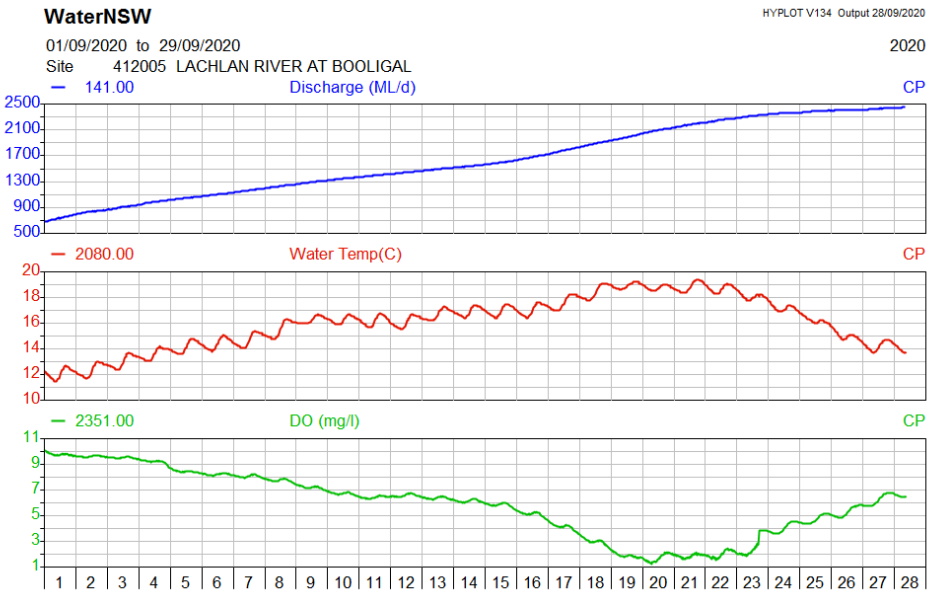

Figure 3: Discharge (ML/day), water temperature (°C) and dissolved oxygen (mg/L) in the Lachlan River at Booligal

Figure 4 illustrates the dissolved oxygen levels at selected monitoring locations in the Murray River catchment for the past three weeks. Levels were showing a steady decline in dissolved oxygen as water temperatures increase, yet minimums were remaining above critical levels. The arrival of the cool change resulted in improved dissolved oxygen levels. All sites in the Murray, Murrumbidgee and Lachlan valleys are above ecological thresholds (Criticality Stage 1).

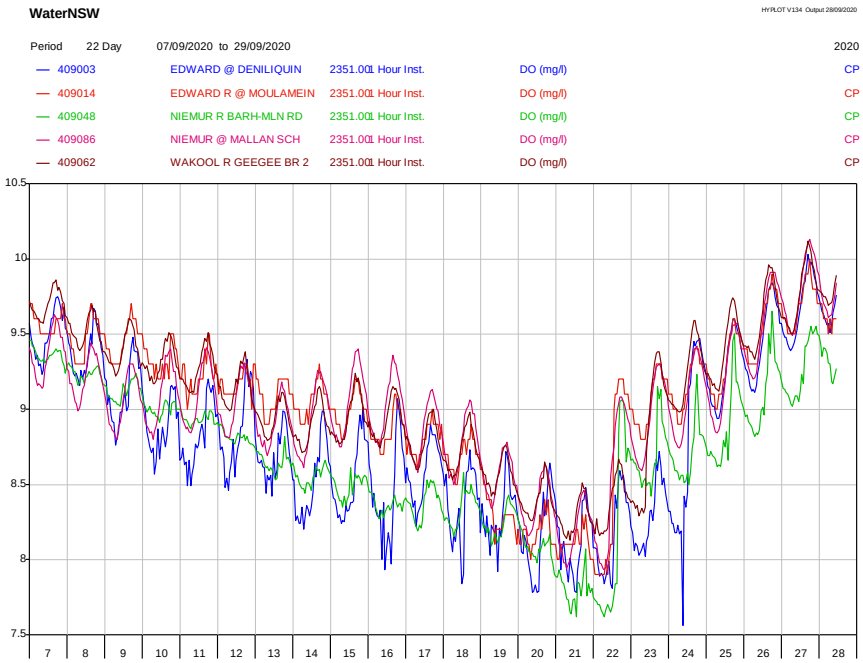

Figure 4: Continuous dissolved oxygen (mg/L) for selected sites in the Murray River valley

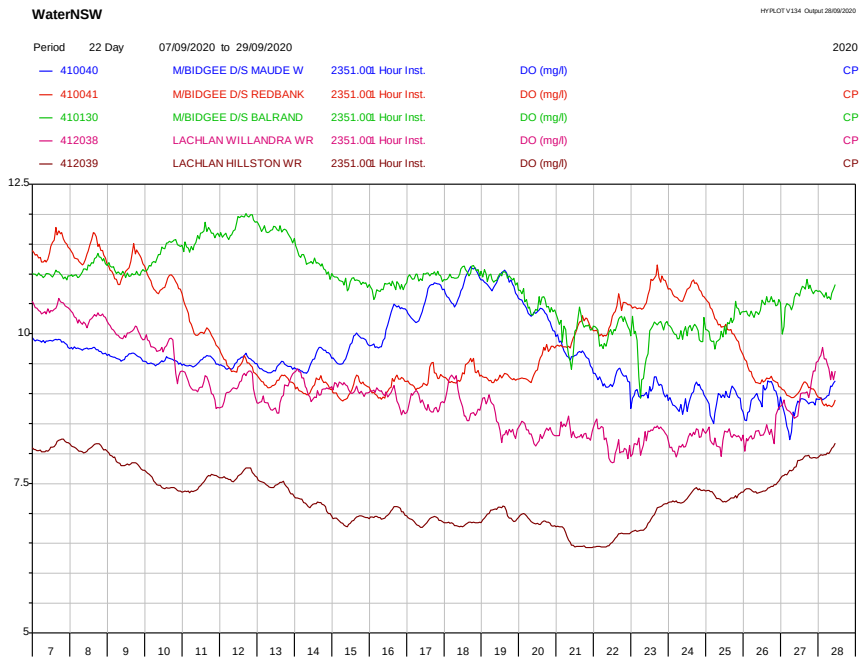

Figure 5: Continuous dissolved oxygen (mg/L) for Murrumbidgee and lower Lachlan rivers

Weather forecast

The Bureau of Meteorology eight-day total rainfall forecast (Figure 6) indicates light rainfall across NSW with the highest falls confined to the Southern Alps. The Bureau of Meteorology longer term outlook indicates a high chance of wetter than average conditions for most of eastern Australia (Figure 7). A La Niña alert is active. La Niña development and warmer eastern Indian Ocean temperatures increases the likelihood of above average rainfall during spring for eastern Australia. Above average rainfall increases the risk of flooding and the potential for hypoxic, or low oxygen, blackwater events in the southern valleys. Bureau of Meteorology rainfall maps are available here.

The four-day synoptic forecast (Figure 8) shows a high pressure system which will bring stable, dry conditions as it crosses NSW. A following trough and cold front should generate gusty winds, showers and possible storms on Wednesday, and coastal showers on Thursday. At this stage, there is a low risk of major flooding triggering a hypoxic blackwater event in the coming week. Synoptic charts are available from the Bureau of Meteorology web site here.

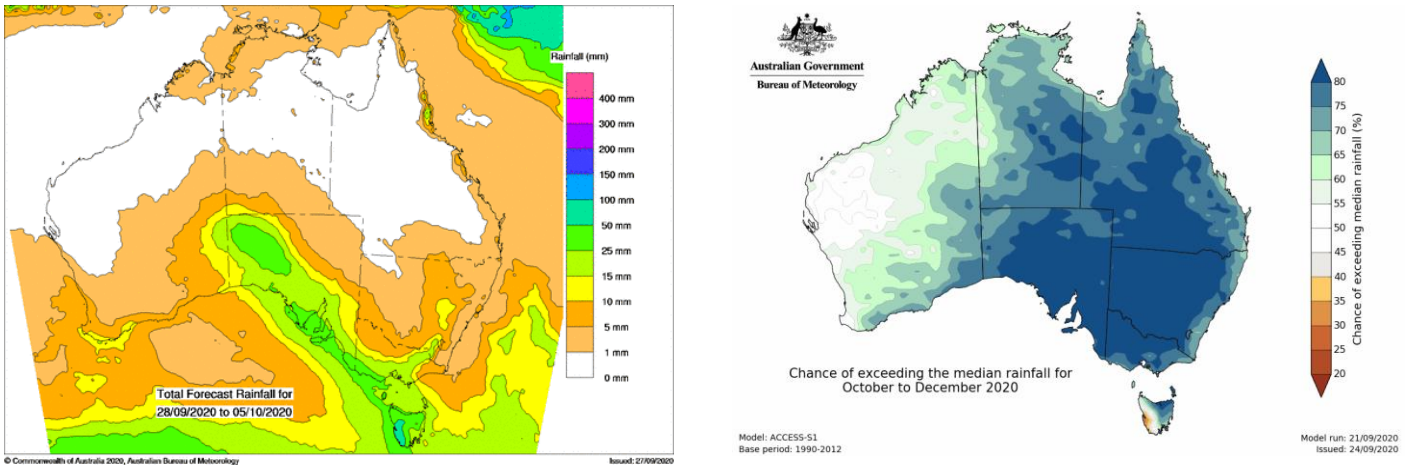

Figure 6: Eight-day rain forecast (left) and chance of exceeding median rainfall for October to December (right)

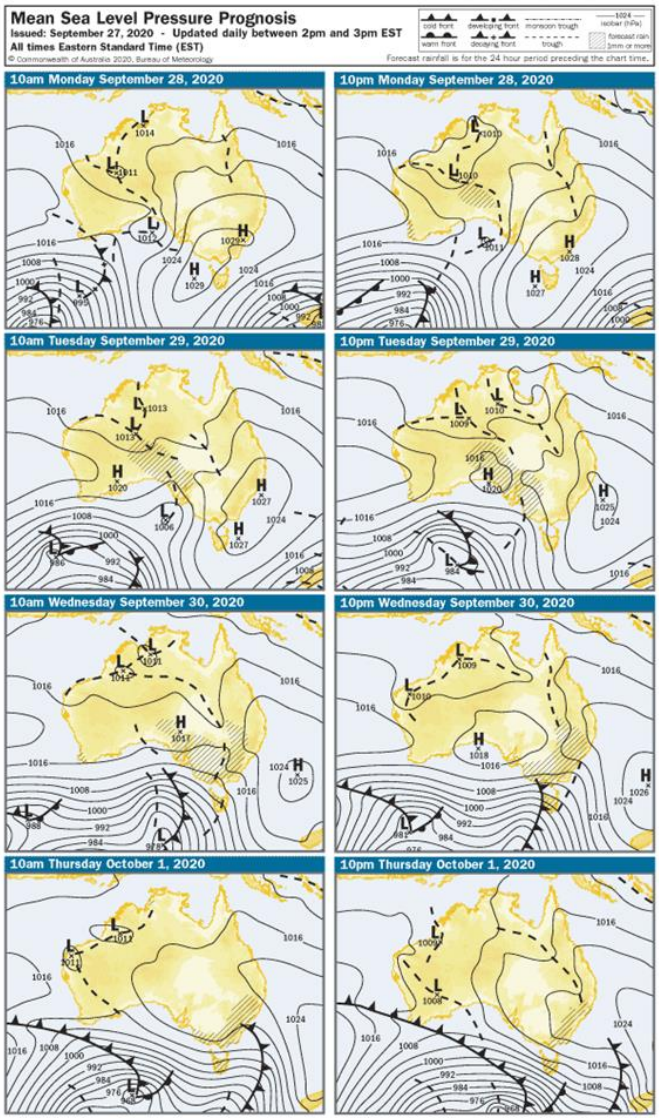

Figure 7: Bureau of Meteorology four-day forecast

Additional information

NSW and Commonwealth agencies will continue to monitor weather and river conditions over the coming summer. To notify the department of potential blackwater events email waterqualitydata@industry.nsw.gov.au or to report a fish kill call the NSW Fisheries Hotline on 1800 043 536.

Further information on hypoxic blackwater can be found at https://www.industry.nsw.gov.au/water/allocations-availability/droughts-floods/drought-update/managing-drought-recovery .