

NSW Southern Basin dissolved oxygen update No. 5

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 9 November.

Key information

- Assessment of the continuous dissolved oxygen monitoring stations shows there is currently a low risk to fish health from declining dissolved oxygen levels in the Southern Basin. There have been no reports of fish deaths.
- Rainfall and isolated thunderstorms in the upper Murrumbidgee and Murray catchments saw increased flows in rivers and creeks in the Southern Basin. Minor flood flows into Lake Hume saw the storage capacity increase to 80%, while good flows into Burrinjuck Dam from the Murrumbidgee River resulted in the capacity increasing to 95%. These high storage capacities and existing flows in many waterways, increases the risk of flooding following runoff from storms.
- The short-term outlook for NSW is for light showers later this week. The highest falls are predicted for the Southern Alps and along the NSW/Victoria border, but rainfall totals are not expected to result in flooding.
- The long-term climatic outlook is for above average rainfall from November 2020 through to January 2021. Above average rainfall increases the risk of flooding and the potential for hypoxic blackwater events in the southern valleys of NSW.

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. Figures 1 and 2 highlight the Stages of Criticality at monitoring sites in the Southern Basin. All sites are on Criticality Stage 1. Definitions of the Stages of Criticality are below Figure 2. Continuous dissolved oxygen data is available the WaterNSW real time data web site:

realtimedata.watnsw.com.au/water.stm

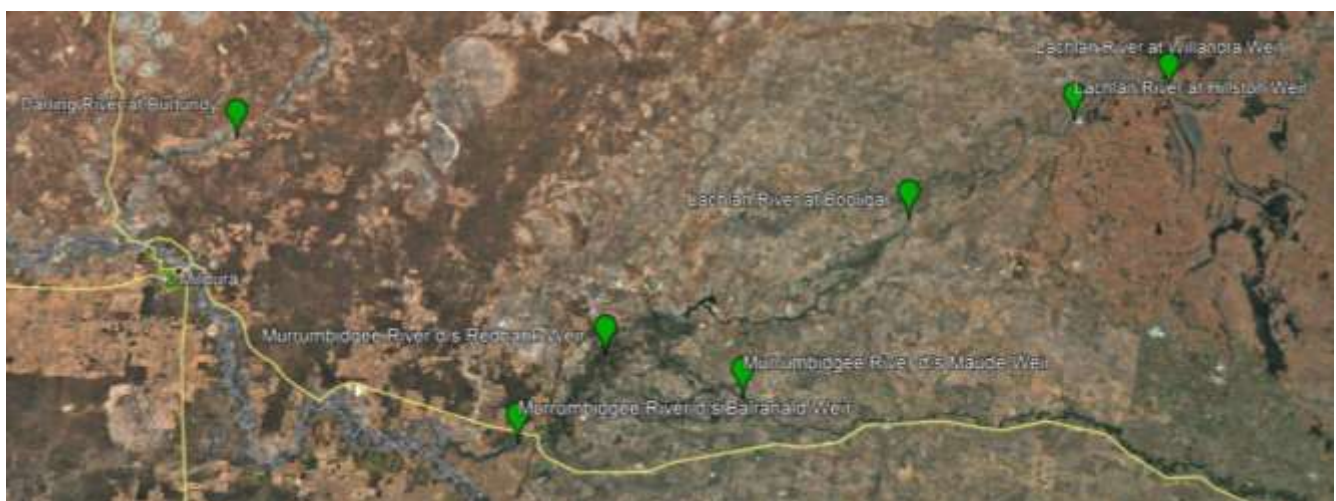


Figure 1: Stages of criticality at continuous dissolved oxygen monitoring sites in the Murrumbidgee and lower Lachlan and Darling rivers.

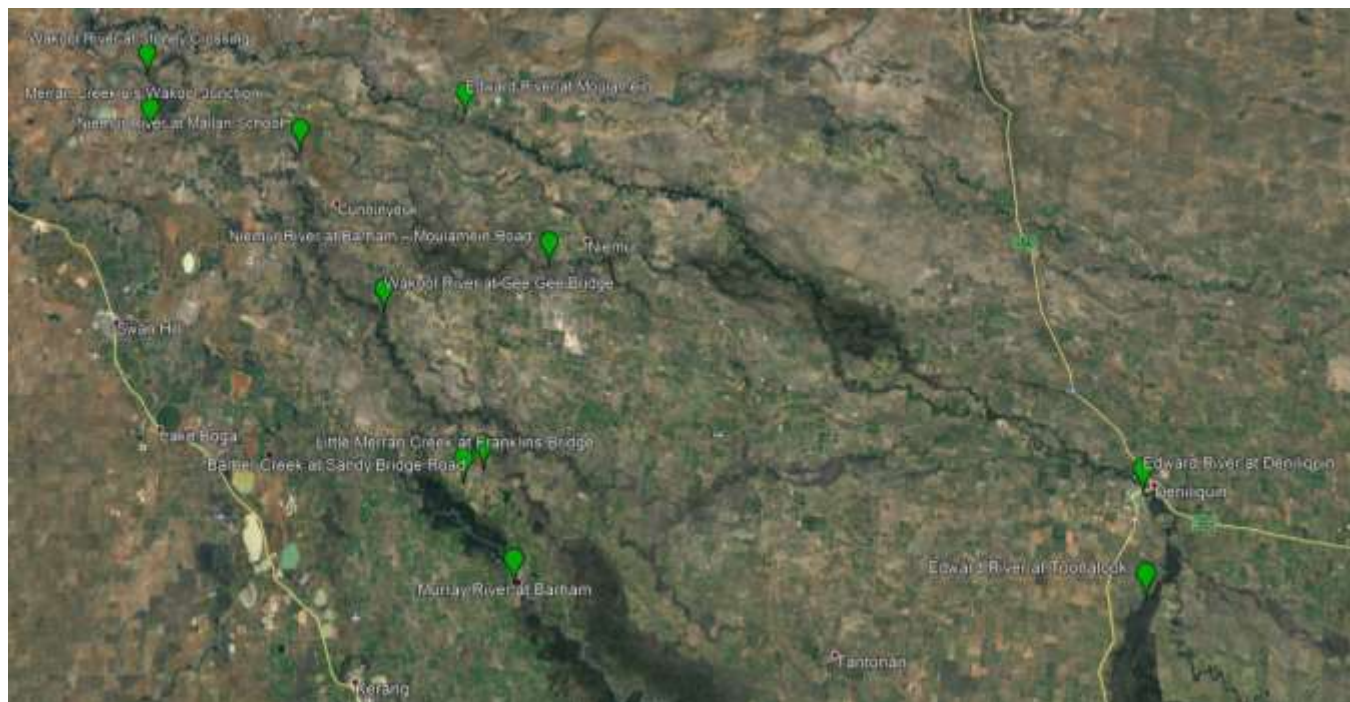


Figure 2: Stages of criticality at continuous dissolved oxygen monitoring sites in the Murray catchment.

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

Continuous dissolved oxygen monitoring

In the Lachlan catchment (Figure 3), dissolved oxygen at Booligal has been dropping below 5 mg/L for the past week, but has not reached 4 mg/L. The current flow rate at Booligal is around 100 ML/day. Increased flows down the Lachlan River reached the Condobolin gauging station on 2 November (Figure 4). The arrival of the higher flows did not result in a drop in dissolved oxygen, rather stabilising the readings above 8 mg/L. The Lachlan River at Willandra Weir is showing very high dissolved oxygen readings, possibly due to aquatic plant or algal growth at the site. All sites in the Lachlan Valley are remaining above the 2 mg/L critical threshold for fish health.

Dissolved oxygen levels at the three monitoring sites in the Murrumbidgee River (downstream of Maude, Redbank and Balranald weirs) are remaining stable above 7.0 mg/L.

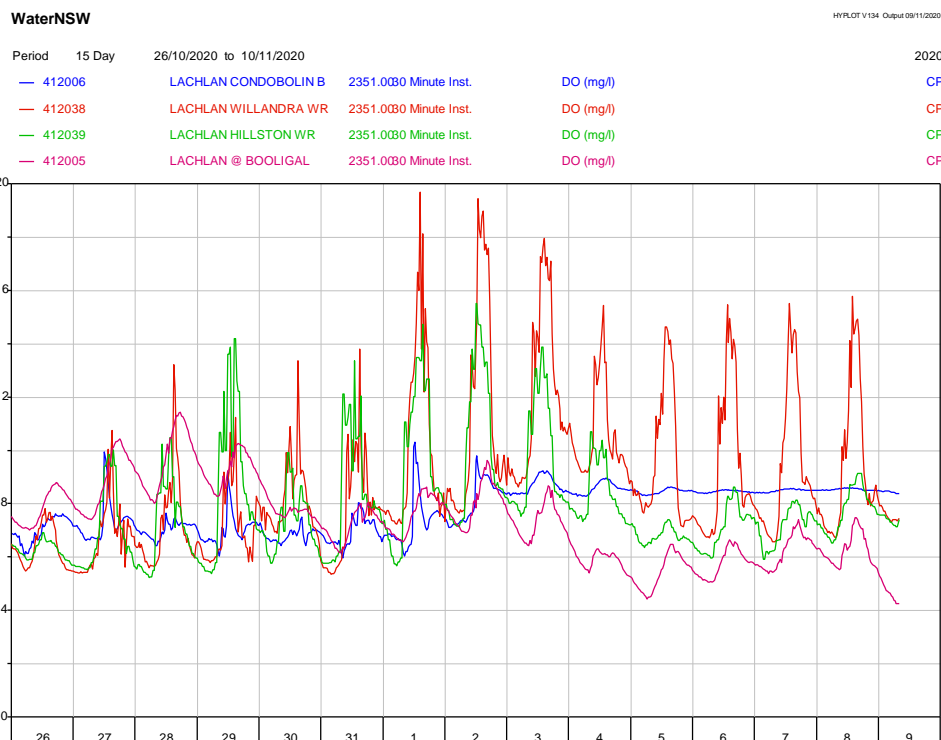


Figure 3: Continuous dissolved oxygen (mg/L) for the Lachlan River.

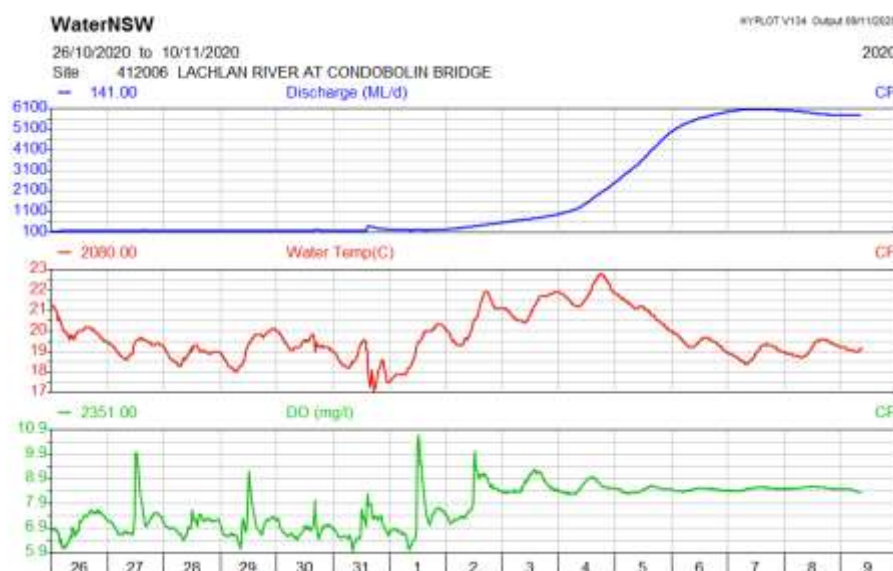


Figure 4: Discharge (ML/day), water temperature (°C) and dissolved oxygen (mg/L) in the Lachlan River at Condobolin.

Figure 5 illustrates the dissolved oxygen levels at monitoring locations in the Murray and Edward rivers for the past two weeks. Dissolved oxygen in the Edward River at both Toonalook and Deniliquin were declining with the arrival of flows around 4,000 ML/day. Oxygen levels at Toonalook decreased to less than 6 mg/L last week, but both sites have started to improve. The lower oxygen levels do not appear to be extending down the Edward River to Moulamein.

Oxygen levels in the Wakool and Niemur rivers and Merran Creek are remaining above 6.5 mg/L (Figure 6). Barber Creek at Sandy Bridge Road dropped to 2.2 mg/L last week but recovered quickly back up to around 5 mg/L. Apart from the Wakool at Stoney Crossing and Barber Creek, sites are showing a stable daily fluctuation in dissolved oxygen. All sites in the Murray valley are above ecological thresholds (Criticality Stage 1).

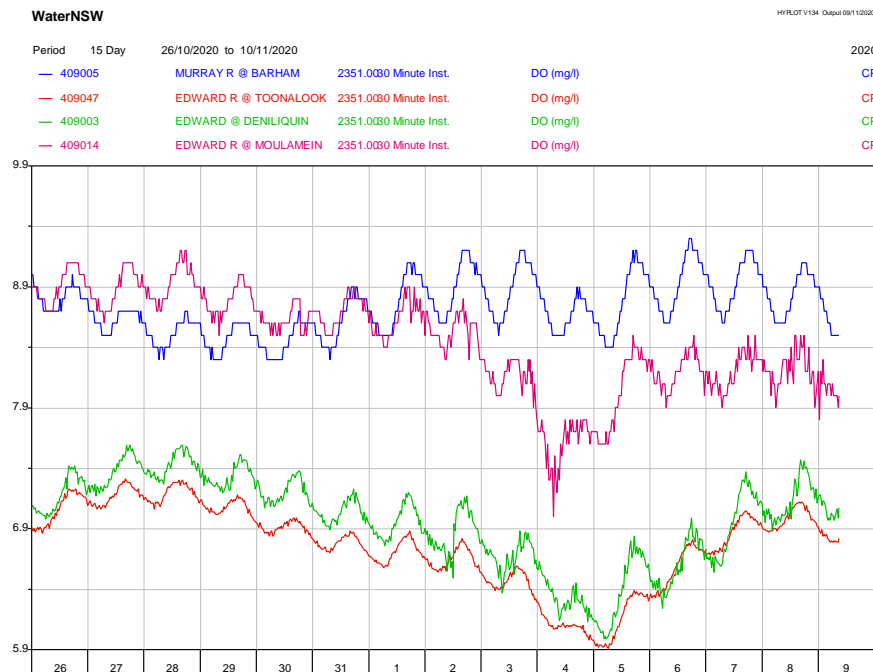


Figure 5: Continuous dissolved oxygen (mg/L) for sites in the Murray and Edward rivers.

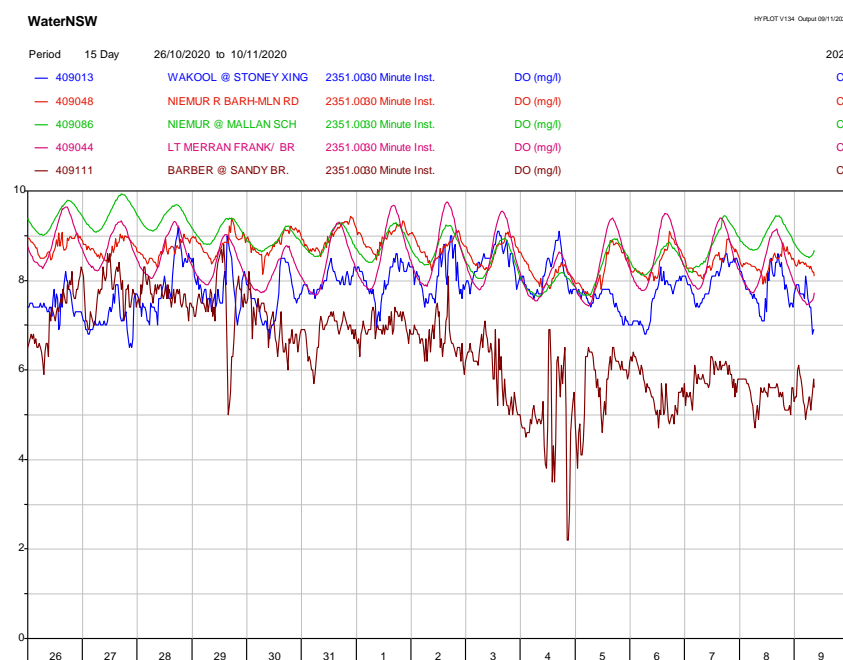


Figure 6: Continuous dissolved oxygen (mg/L) for distributary channels in the Murray catchment.

Storage capacities in the Southern Basin

Widespread rainfall and isolated thunderstorms in the upper Murrumbidgee and Murray catchments saw increased flows in rivers and creeks in the Southern Basin. Minor flood flows into Lake Hume from the upper Murray and Tooma Rivers saw the storage capacity increase to 80%, while good flows into Burrinjuck Dam from the Murrumbidgee River resulted in the capacity increasing to 95%. Blowering Dam on the Tumut River is at almost 86% capacity and Dartmouth Dam is at 60%. The high storage capacities in these dams and existing high flows in many waterways, increases the risk of flooding from runoff following intense storms.

Weather forecast

The Bureau of Meteorology total rainfall forecast (Figure 7) indicates light rainfall across NSW in the next eight days. The highest falls are predicted for the southern Alps and along the NSW/Victoria border with a chance of thunderstorms. The rainfall totals are not expected to result in flooding. The rainfall outlook for December indicates a high chance of wetter than average conditions for most of NSW with the highest chance predicted for the Central West Slopes and Plains and Riverina districts (Figure 7). La Niña is continuing, indicating above average rainfall for November 2020 through to January 2021. Climate models are suggesting La Niña is likely to peak in December. 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 at: www.bom.gov.au/jsp/watl/rainfall/pme.jsp

The four-day synoptic forecast (Figure 8) shows a high pressure system will cross NSW at the start of the week, keeping conditions stable and dry. An approaching low and associated cold front will reach southwestern NSW late on Wednesday, extending to the rest of the state later in the week. The following high pressure system will bring a return to drier, stable conditions over the weekend. At this stage, the predicted rainfall totals for most of NSW are low. However, continuing rainfall on an already wet catchment, particularly on the Southern Tablelands, Snowy Mountains and South Western Slopes, increases the risk of major flooding triggering a hypoxic blackwater event. Synoptic charts are available from the Bureau of Meteorology web site at: www.bom.gov.au/watl/pressure/index.shtml

There are no heatwave conditions predicted for NSW for the next five days. Updates from the Heatwave Service and additional information is available at: www.bom.gov.au/australia/heatwave/

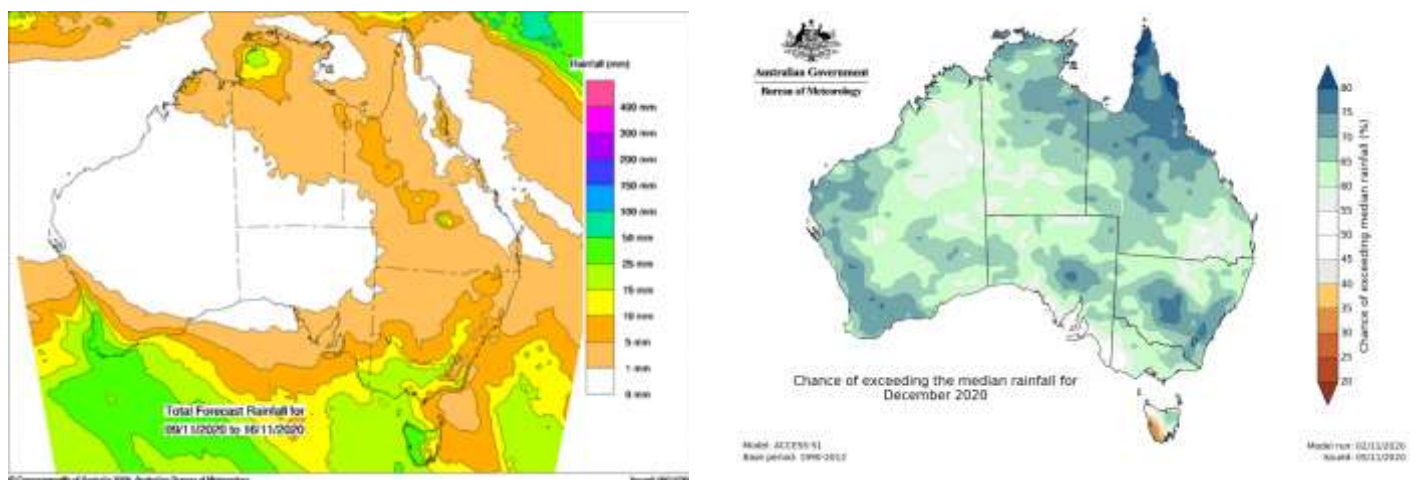


Figure 7: Eight-day rain forecast (left) and chance of exceeding median rainfall for December (right).

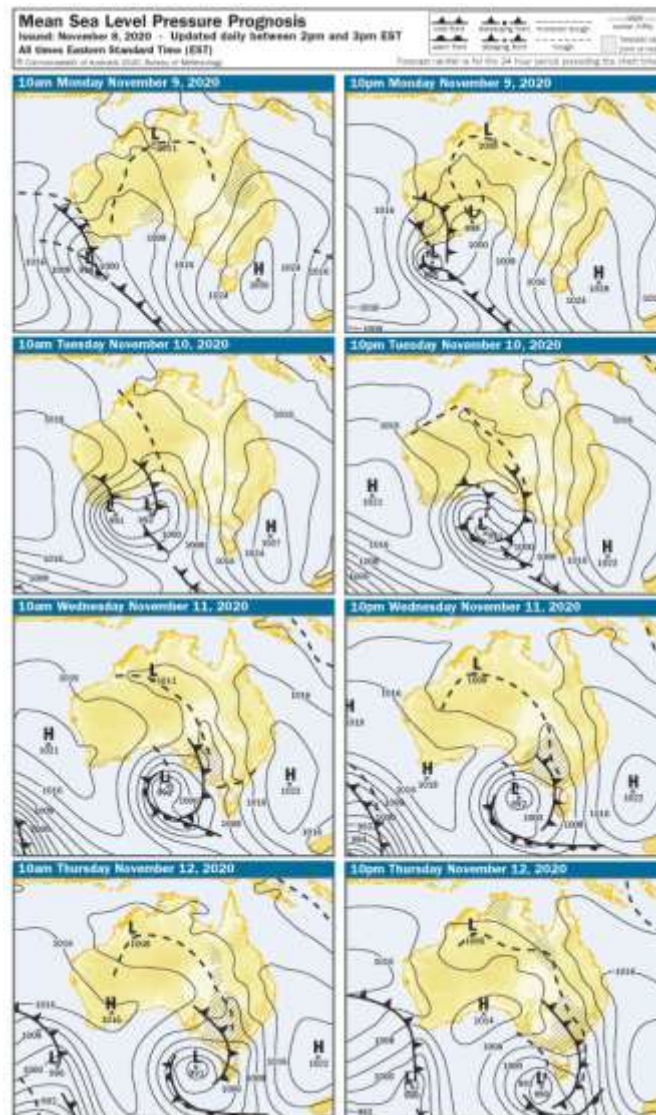


Figure 8: Bureau of Meteorology four-day forecast.

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: www.industry.nsw.gov.au/water/allocations-availability/droughts-floods/drought-update/managing-drought-recovery

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