Barwon–Darling valley annual surface water quality report: 2022–2023

Key Points

- Flow during July 2022 to June 2023 was characterised by heavy rain falling across much of the catchment. This rain resulted in flooding across all catchments in the Northern Basin leading to large flows in the Barwon-Darling system.
- Large tributary inflows led to a hypoxic blackwater event that threatened aquatic ecosystems from October 2022 and continued past June 2023. In March 2023, dissolved oxygen levels rapidly dropped below the critical ecological threshold of 2 mg/L and remained below this level in the reaches around Menindee Creek for about a month. Low dissolved oxygen levels combined with large numbers of fish (particularly carp), resulted in an estimated 20-30 million fish deaths reported near Menindee town.
- Flooding was the main driver of water quality in the Barwon-Darling. The water quality index indicated that of the 8 sites in the catchment, 2 were rated as poor, 3 were moderate and 3 were good. Compared to 2021 to 2022 results, the water quality index scores for 7 of the 8 sites were higher in 2022 to 2023.
- Most sites were below the Basin Plan agriculture and irrigation salinity targets of 957 µS/cm (microSiemens per centimetre) upstream of Menindee Lakes and all sites downstream of Menindee Lakes were less than 833 µS/cm. The median and 80th percentile at Wilcannia were both above the End-of Valley targets of 389 µS/cm and 453 µS/cm respectively.
- Blue-green algal blooms were not a major problem over the 2023 summer. Red-alert warnings for blue-green algal blooms were issued in the lower areas of the Darling River and towards the southern end of the Great Darling Anabranch from February 2023.

The water quality data used in this report is collected on a monthly frequency at 8 sites in the Barwon–Darling valley for the State Water Quality Assessment and Monitoring Program. The program is responsible for collecting, analysing and reporting the ambient water quality condition of rivers in NSW. This annual report summarises the surface water quality data collected in the Barwon–Darling Valley from July 2022 to June 2023. The location of monitoring sites is shown in Figure 1.

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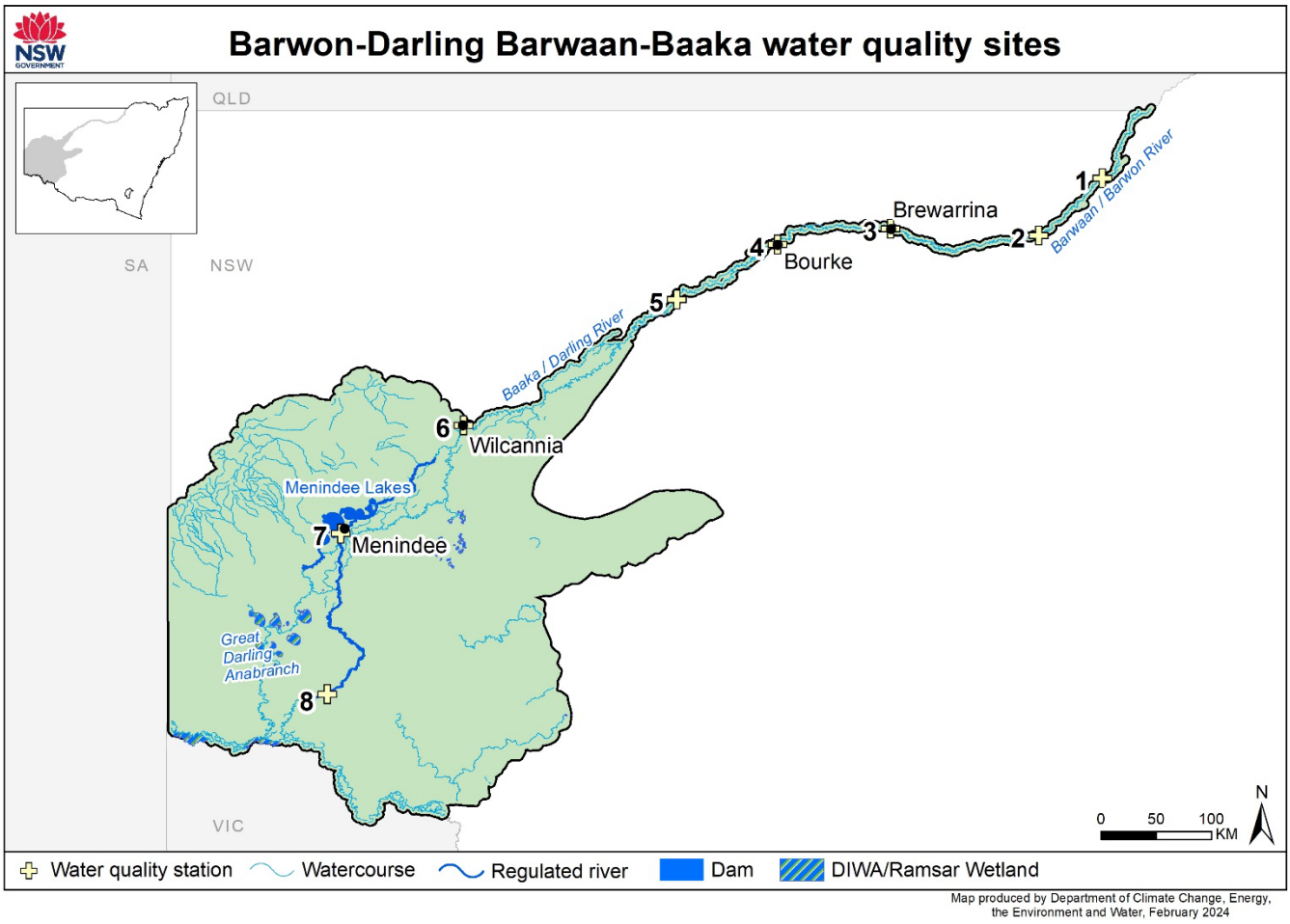

Figure 1: Location of routine water quality monitoring sites in the Barwon–Darling valley

Table 1: Site information for each monitoring site in the Barwon–Darling River catchment. Refer to Figure 1 and site numbers for location of each site.

Site number	Site name	Water Quality Zone	Station number
1	Barwon River at Collarenebri	Barwon	422003
2	Barwon River at Dangar Bridge (Walgett)	Barwon	422001
3	Barwon River at Brewarrina	Barwon	422002
4	Darling River at Bourke	Upper Darling	425003
5	Darling River at Louth	Upper Darling	425004
6	Darling River at Wilcannia	Upper Darling	425008
7	Darling River at Weir 32	Lower Darling	425012
8	Darling River at Burtundy	Lower Darling	425007

Catchment description

The Barwon, Darling and West region covers a large area of western NSW. The region is characterised by extremely low relief, low rainfall and climatic variability.

The Barwon–Darling connects the river systems of the northern Murray–Darling Basin with those of the south. It is considered unregulated from Mungindi on the NSW-Queensland border to Menindee Lakes in south-west NSW, despite there being 15 weirs between Mungindi and Wilcannia (NSW Office of Water 2012) and approximately 100 in-stream structures. The weirs provide important storage pools for local town water supplies and to meet irrigation needs. They also create major barriers to fish movement (NSW DPI 2015) and can be associated with algal blooms (Mitrovic et al. 2003).

Upstream of Bourke, inflows are received from all of the major river valleys in the northern Murray-Darling Basin, including from the Intersecting Streams, Border Rivers, Gwydir, Namoi and Macquarie and Castlereagh rivers. Downstream of Bourke and further west, the Paroo and Warrego are the only major tributaries that contribute intermittent flows but can provide significant volumes during flood events.

Flows in the Lower Darling are regulated by releases from Menindee Lakes. There are two major river systems in the Lower Darling, the Darling River and the Great Darling Anabranch. The Darling Anabranch Lakes are listed in the Directory of Important Wetlands.

Grazing is the dominant land use along the Barwon and Darling Rivers. Cropping (dryland and irrigated) is largely concentrated between Mungindi and Brewarrina, with some areas of irrigated cotton around Bourke and irrigation of horticulture crops near Wentworth.

Catchment conditions during 2022-2023

Flow during 2022–2023 was characterised by heavy rain falling in late 2022 across much of the catchment and relatively dry conditions for 2023 (Figure 2A). High inflows led to flooding with peak discharge at Bourke reaching over 200,000 ML/day and over 140,000 ML/day at Collarenebri in November 2022 (Figure 2C). Whilst the floods helped native fish move along the river system and provided some of the biggest flows into Menindee Lakes in almost 10 years, there was also a high risk of hypoxic blackwater events (refer to Extreme Water Quality Events). The lakes' total storage level was above full capacity from July 2022 until March 2023 after which it reduced to around 80% capacity by June (Figure 2B). Discharge from Lakes Pamamaroo and Menindee has been managed to support water quality following the mass fish deaths in March 2023. Daily releases of 1,900 ML/day

from Lake Cawndilla from July through to November maintained flows down the length of the Great Darling Anabranch. By the end of June 2023 this had reduced to 40 ML/day.

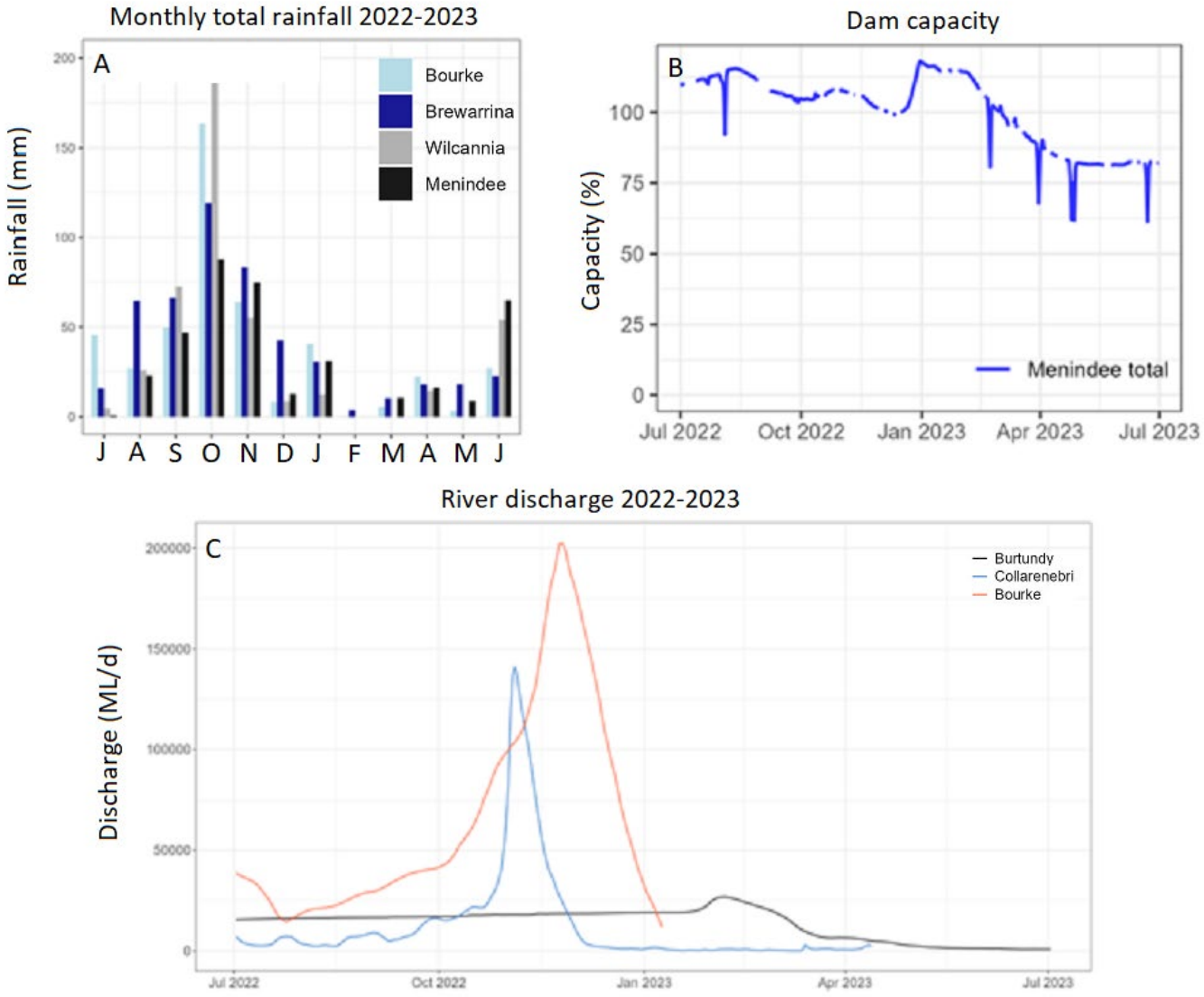

Figure 2: Catchment conditions for selected stations in the Barwon–Darling catchment from July 2022 to June 2023 for A: Monthly total rainfall (mm) B: Dam capacity (%) and C: River discharge (ML/day).

Water quality for water dependent ecosystems

NSW uses a Water Quality Index (WaQI) as a tool to communicate complex and technical water quality data in a simple and consistent way. The WaQI score was calculated for each monitoring site using total nitrogen, total phosphorus, turbidity, pH, dissolved oxygen and electrical conductivity. The index compares the monthly water quality results against a set of predetermined water quality targets to calculate a score between 1 and 100. A score of 100 represents a site in pristine condition,

while a score of one is a very highly degraded site. This value can then be categorised to rate the general water quality at a monitoring site. The results from the WaQI are summarised in Figure 3. Sites where there has been a change of less than 5 points in WaQI score, have been identified with horizontal arrows. Arrows pointing up or down indicate the score has increased/decreased by more than 5 points.

The water quality index category ratings in the Barwon and Darling rivers improved in 2022–2023 for 4 of the 8 sites compared to 2021–2022.

- The Barwon River at Brewarrina and Dangar Bridge (Walgett) remained poor.
- The Barwon River at Collarenebri and the Darling River at Burtundy remained moderate.
- The Darling River at Wilcannia improved from poor to moderate.
- The Darling River at Louth and Menindee improved from moderate to good.
- The Darling River at Bourke improved from poor to good.

This improvement is attributed to lower turbidity caused by blackwater events and lower nutrient concentrations and electrical conductivity diluted by prolonged flooding.

Compared 2021–2022, the water quality index score for 7 sites increased and one site showed minimal change.

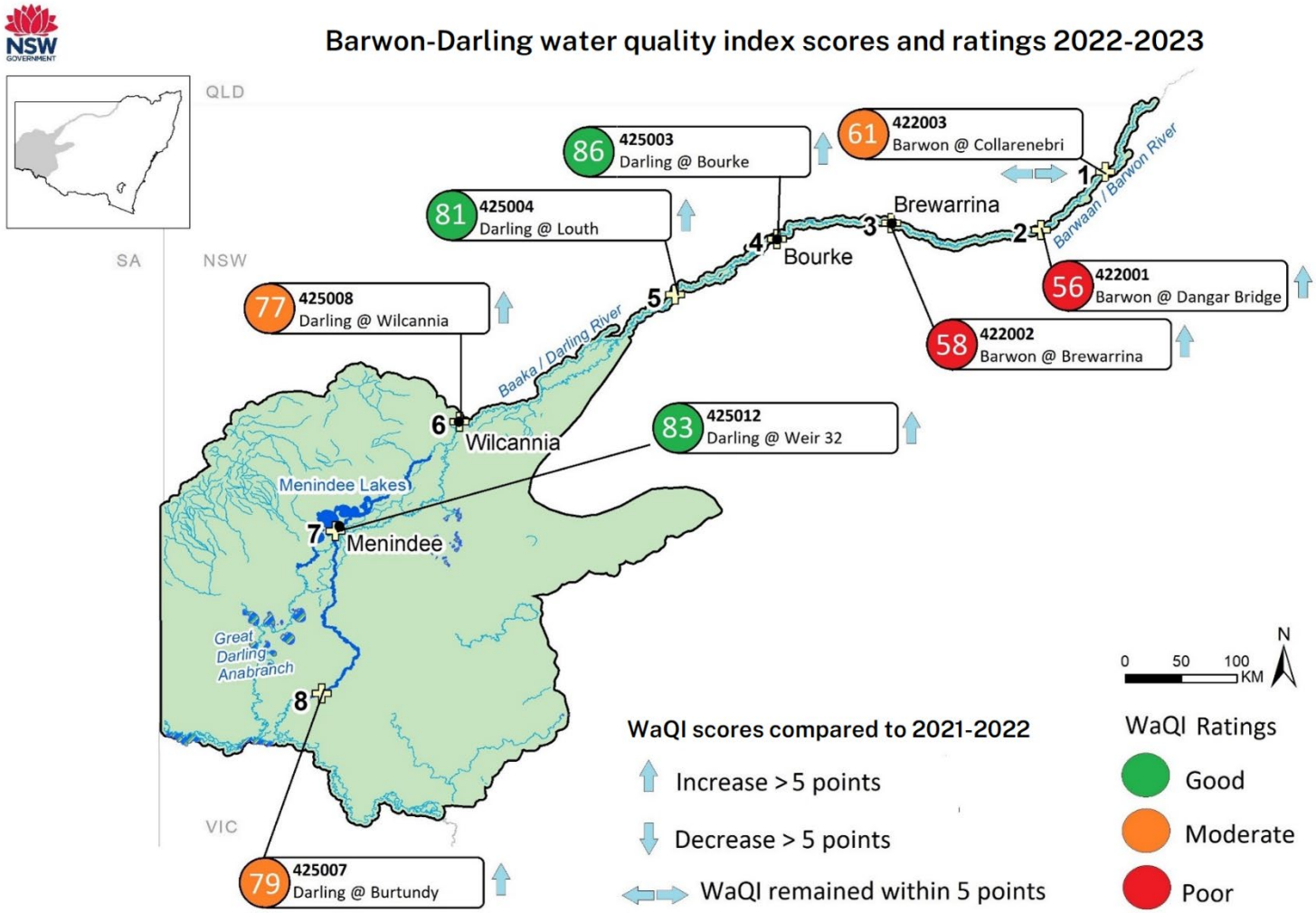

Figure 3: Water quality index scores and ratings for the Barwon–Darling valley

Generally, turbidity, total nitrogen and total phosphorus increased with distance down the Barwon and Darling rivers as floodwaters transported soil and attached nutrients downstream. However, the highest turbidity results were in the Barwon River at Collarenebri and Dangar Bridge at Walgett. The return of low turbidity hypoxic blackwater off the floodplains downstream of Walgett to the Barwon River resulted in lower turbidity results downstream at Brewarrina. Total suspended solids results varied along the Barwon-Darling River and decreased at Menindee as some of this material was deposited within the lakes.

Although the median dissolved oxygen levels largely remained above the critical threshold for fish health, a notable drop in these levels occurred due to the hypoxic blackwater event. Several factors contributed to this event, including high water temperatures leading to reduced oxygen solubility in the water column. Additionally, significant flooding events resulted in the flushing of organic matter from lowland floodplains into the waterways. This organic material was rapidly broken down by bacteria, further exacerbating the decline in dissolved oxygen levels in the major rivers of the Northern Murray Darling Basin. As a result, dissolved oxygen began to decline to critical levels for fish health in the Barwon River in December 2022 and in the lower Darling River in February 2023.

Due to the diluting effects of the consistent high flows through 2022 to 2023, electrical conductivity was low at all sites, though it was starting to increase in 2023. The pH is in the safe range for aquatic ecosystems.

Summary statistics for the key water quality parameters at each monitoring site in the Barwon Darling system have been displayed as box plots (Figure 4). The box plots show the annual 25th, 50th and 75th percentile values, with error bars indicating the 10th and 90th percentile values for each site.

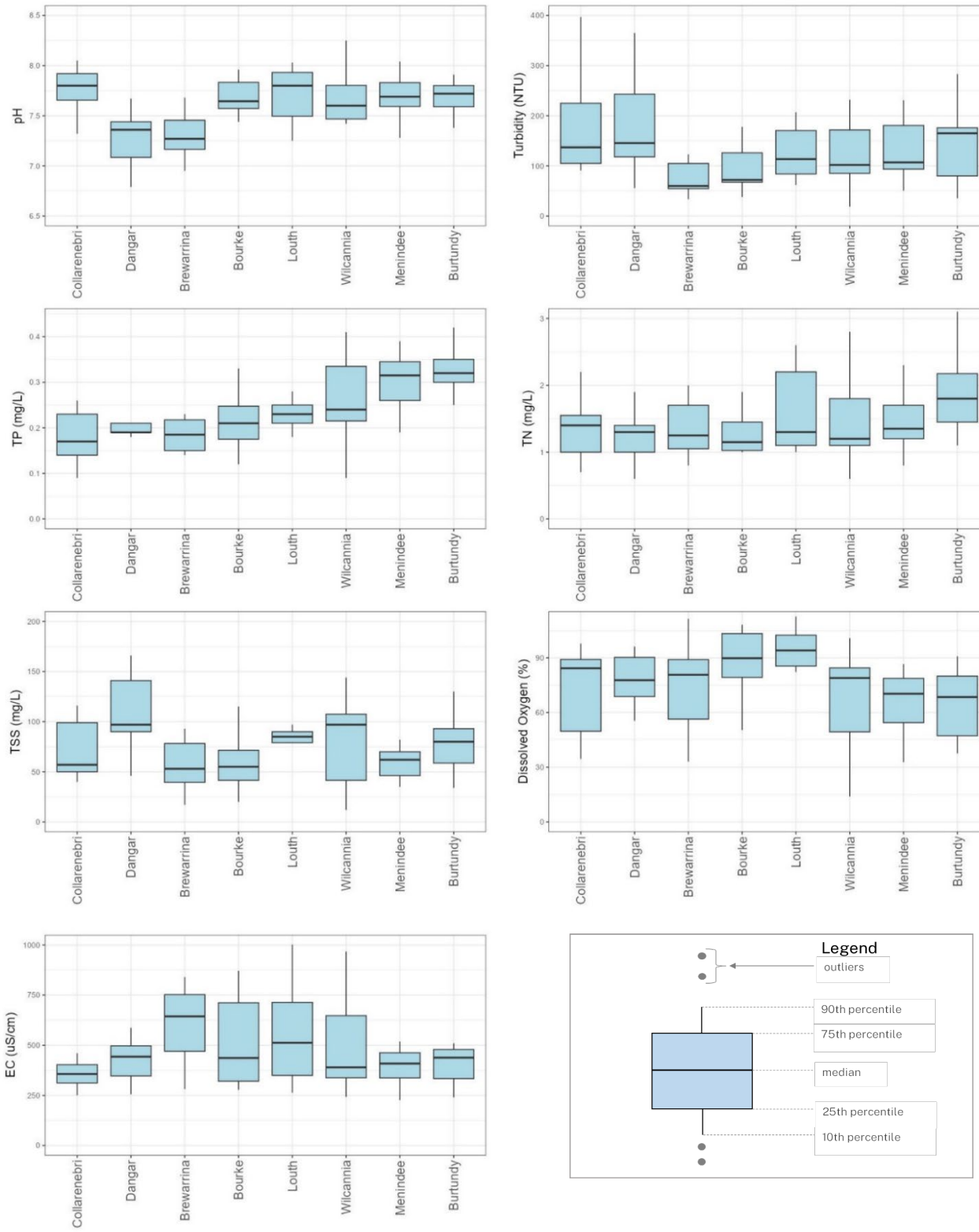

Figure 4: Water quality data by site, moving upstream to downstream from left to right. The water quality parameters shown are pH, Turbidity, Total phosphorus (TP), Total nitrogen (TN), Total suspended solids (TSS), Dissolved oxygen, and electrical conductivity (EC).

Irrigation and salinity

There are 2 Basin Plan agriculture and irrigation salinity targets for the Barwon–Darling valley:

- 957 µS/cm for sites upstream of Menindee Lakes and
- 833 µS/cm downstream of Menindee Lakes.

In addition, there is a Basin Plan target for managing water flows in the Darling River at Burtundy of 830 µS/cm.

There are 17 continuous electrical conductivity monitoring sites in the Barwon–Darling valley extending from Mungindi to Burtundy and down the Great Darling Anabranch. There is also a cluster of electrical conductivity monitoring sites located between Bourke and Louth for the Upper Darling salt interception scheme. There is one irrigation infrastructure operator in the lower Darling River at Pomona (Wentworth).

All sites had low electrical conductivity in late 2022 due to flooding. As flows receded in 2023, and shallow saline groundwater started draining back into the main river channel, electrical conductivity increased. Three sites upstream of Menindee lakes had a 95th percentile electrical conductivity above the Basin Plan agriculture and irrigation salinity target of 957 µS/cm. These sites were:

- Barwon River at Geera (Macquarie River junction)
- Darling River at Louth
- Darling River at Tilpa

All sites downstream of Menindee Lakes, including the Darling River at Wentworth, had a 95th percentile electrical conductivity lower than the Basin Plan irrigation target of 833 µS/cm.

Electrical conductivity in the Darling River at Burtundy did not exceed the Basin Plan target for managing water flows (830 µS/cm) at any stage during 2022 to 2023.

Figure 5 shows electrical conductivity at selected sites in the Barwon–Darling valley. High flows due to substantial rainfall and flooding, resulted in generally low electrical conductivity across these sites in 2022. As conditions became drier in 2023, electrical conductivity increased at these same sites.

The Basin Salinity Management Strategy End-of-Valley salinity targets for the Darling River at Wilcannia are:

- the median electrical conductivity does not exceed 389 µS/cm
- the 80th percentile electrical conductivity does not exceed 453 µS/cm and

- the annual salt load does not exceed 576,400 t/year.

The 2022 to 2023 median (397 µS/cm) and 80th percentile (835 µS/cm) at Wilcannia exceed the End-of-Valley target. The annual salt load of 1,446,976 t/year was higher than the target due to the very high flows.

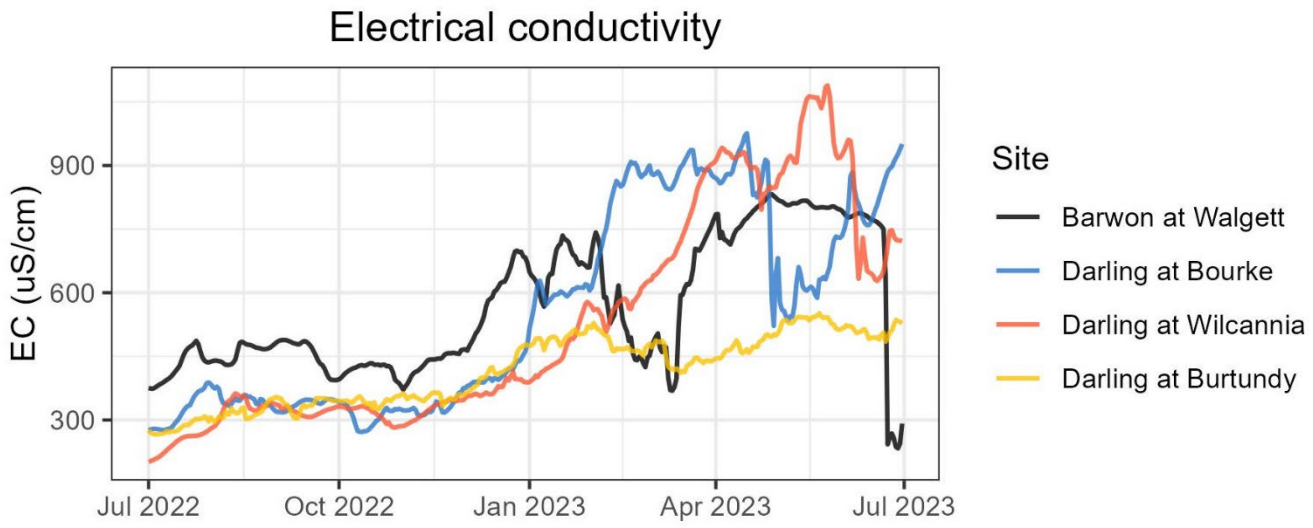

Figure 5: Electrical conductivity (µS/cm) at selected sites in the Barwon–Darling valley

Recreation

Exposure to blue-green algae (cyanobacteria) through ingestion, inhalation or contact during recreational use of water can impact human health. A colour alert scale is used with a green alert warning indicating low numbers of blue-green algae but requiring monitoring, an amber alert warning being a heightened level of alert with increased sampling and surveillance, and a red alert warning being a state of action where waters are unsuitable for recreational use. For more information about blue-green algae and algal alerts see the WaterNSW algae web page (Algae - WaterNSW).

Table 2 shows blue-green algal alerts for selected sites from July 2022 to June 2023. Due to large-scale flooding across the Northern Basin from October 2022, red alerts for blue-green algal blooms occurred in the lower parts of the Darling River and towards the southern end of the Great Darling Anabranch. Water releases were managed in and out of the system after flooding to address water quality issues and disperse algal blooms.

Table 2: Distribution of algal alert levels along the Barwon–Darling valley July 2022 to June 2023

	Jul					Aug					Sep					Oct					Nov					Dec					Jan					Feb					Mar					Apr					May					Jun				
Barwon R at Brewarrina	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*	2	2	2	2	*	*	*	*	*	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	*	*	*	*	*	1	1	1	1
Darling R at North Bourke Bridge	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*	1	1	1	1	1	1	1	1	1	1	1	*	*	*	1	1	1	2	2	2	2	2	2	2	2	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1
Darling R at Louth	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*	2	2	2	2	2	1	1	1	1	1	1	1	1	1	2	2	2	2	2	2	2	2	2	1	1	1	1	1	1	1	1	1	1
Darling R at Wilcannia	1	1	1	*	*	*	*	*	*	*	*	*	*	*	*	*	*	1	1	1	1	1	1	1	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	1	1	1	1	1	*	*	*	1	1	1	1	1	1	1	1	1
Menindee Lakes at Lake Wetherell Site 4	1	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2
Pamamaroo Outlet / Regulator (Site 10)	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*	1	1	1	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2
Menindee Lakes - Cawndilla Outlet	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2
Darling R Pumping Station at Menindee	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*	1	1	1	1	1	1	1	1	1	1	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2
Darling R at Menindee Weir 32	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2
Darling R at Tolarno	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*	1	1	1	1	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	3	3	3	3	3	2	2	2	2	2
Darling R at Pooncarie	1	1	*	*	*	*	*	*	1	1	1	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*	2	2	2	2	2	3	3	3	3	3	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2
Darling R at Burtundy	1	1	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*	1	1	1	1	1	1	1	1	1	3	3	3	3	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2
Darling R at Ellerslie	1	1	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*	1	1	1	1	1	1	1	2	2	3	3	3	3	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2
Darling R at Tapio	1	1	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*	1	1	1	1	1	1	1	2	2	2	2	2	2	2	2	2	2	2	1	1	1	1	2	2	2	2	2	2	2	2	2	2
Popiltah Lake (Great Darling anabranch)	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2
Silver City Hwy (Great Darling anabranch)	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*	3	3	3	3	3	3	3	3	3	3	3	3	3	3	3	3	3	3	3	3	3	3	3	2	2	2	2	2

Key : * = Nil/Low alert 1 = 1 = green alert 2 = 2 = amber alert 3 = 3 = red alert

Extreme water quality events

Spring 2022 was the wettest spring on record (since 1900) for New South Wales. In October, heavy rainfall led to widespread flooding in the Murray–Darling Basin, impacting many towns in inland New South Wales (Figure 3 - BoM, 2023 and Figure 4). By November, the Barwon River reached major flood levels at Mungindi, peaking above 34,000 ML/day. The Darling River also reached major flood levels at Bourke, Tilpa and Wilcannia. By December, floodwaters had moved through the Menindee Lakes.

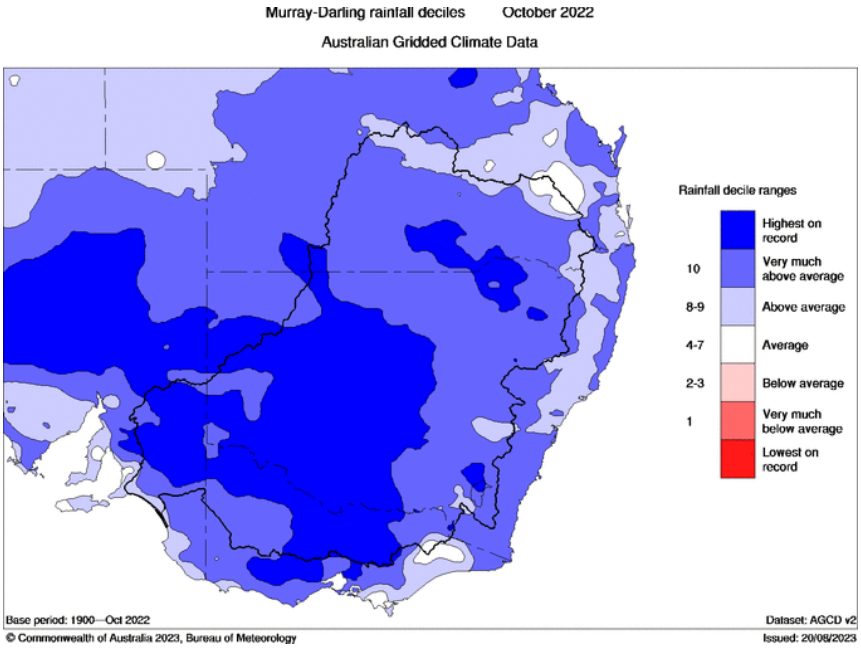

Figure 3: Murray Darling rainfall deciles for October 2022. (Source: BoM)

Figure 4: Flooding is seen in the Menindee area. (Picture: NCA NewsWire/pool/Samara Harris)

Flood flows entered the Barwon and upper Darling rivers from all tributaries and led to a hypoxic blackwater event. Hypoxic, or low oxygen blackwater is a feature of Australian lowland river systems and occurs when organic material, such as sticks, leaves, bark and grass is broken down in the floodwater or washed off the floodplain into the river. The breakdown of this material by bacteria can rapidly use up all the oxygen in the water. The dark appearance of the water is due to the release of tannins as the organic matter decays.

As the floodwaters from the Border Rivers, Gwydir, Namoi, Castlereagh and Wambuul / Macquarie catchments entered the Barwon River, dissolved oxygen levels began to decline. Dissolved oxygen levels rapidly dropped below the critical ecological threshold of 2 mg/L. In the Barwon River at Brewarrina dissolved oxygen levels fluctuated around 2 mg/L for four months (October 2022 – January 2023). In the Darling River at Wilcannia, monitoring showed dissolved oxygen had dropped to 0 mg/L in December and January. As a result of these low oxygen conditions, it was anticipated that fish could start to gasp at the water surface, and that fish deaths could occur.

A peak discharge of over 230,000 ML/day was recorded in the Barwon River at Walgett in early November 2022. This peak decreased to over 73,000 ML/day at Bourke in mid-January 2023. The management of these inflows into the Menindee Lakes, and their release, was a careful balancing act, which was continually monitored and adjusted as needed.

In March, an Emergency Operations Centre (EOC) was activated at Menindee, with NSW Police coordinating the multi-agency response to the fish deaths. Agencies and scientific experts worked together to monitor the dissolved oxygen levels throughout the river system and advise the best operational measures to minimise the risk to aquatic life.

NSW Fisheries investigated numerous fish death reports for 1 July 2022 - 30 June 2023. These reports are listed on the Department of Primary Industries website.

The likely cause for most reports was due to widespread flooding in the northern Murray Darling Basin and associated organic material entering waterways resulting in the deoxygenation of the water and subsequent fish deaths. Significant rainfall events in the catchment in the preceding years also provided favourable conditions for fish breeding, leading to a high biomass of fish in 2022–2023, particularly carp. A high biomass of fish can result in more stress on aquatic animals competing for resources and greater consumption of dissolved oxygen as waters recede. A carp removal program was initiated in the Darling River at Menindee in April 2023 to help relieve competition for dissolved oxygen with native species.

The fish death reports listed for the Barwon – Darling for 2022-2023 were:

- Barwon-Darling River, near Bourke (6 January) - Report of thousands of dead fish. Species affected included Bony Herring (Bony Bream), Murray Cod and Golden Perch. Yabbies were also observed exiting the water.
- Darling River, near Tilpa (17 January) - Report of tens of thousands of dead fish. Species affected included Silver Perch, Bony Herring, Murray Cod, Golden Perch and carp.
- Lake Pamamaroo, near Menindee (23 January)- Report of tens of thousands of dead fish. Species affected included Bony Herring and carp.
- Barwon-Darling River, near Walgett (1 February) - Report of hundreds of dead fish, predominantly Golden Perch.
- Lake Wetherell, on the Lower Darling, near Menindee (4 February; 18-21 February) - Report of tens of thousands of dead fish, predominantly Bony Herring.
- Lake Cawndilla outlet regulator and channel, near Menindee (16 February) - Report of hundreds of dead fish, predominantly Bony Herring.
- 3 Mile Creek, off Lake Wetherell near Menindee (18 February) - Report of thousands of dead fish. Species affected included carp, Bony Herring as well as some Murray Cod and Golden Perch.
- Darling-Baaka River from Bindara Station, near Menindee downstream towards Pooncarie (20 February; 2 March) - Report of tens of thousands of dead fish. Species affected were mainly Bony Herring with some carp, Murray Cod and Golden Perch.

- Darling-Baaka River from Menindee Main Weir to Menindee Town (24-28 February) - Report of tens of thousands of dead fish. Species affected included Bony Herring, Golden Perch, Murray Cod and carp.
- Darling-Baaka River from Menindee Main Weir to Menindee Town (March 17) - It was estimated that millions of fish, predominantly Bony Herring had been affected, as well as smaller numbers of species such as Murray Cod, Golden Perch, Silver Perch and carp.

NSW DPI Fisheries staff worked with local recreational fishing groups to recover at-risk Murray Cod, Golden Perch and Silver Perch from the impacted areas of the river. Fish recovered were relocated to sections of the river where habitat was not impacted, or transported to a DPI hatchery for holding until river conditions improved.

The findings of the Office of the NSW Chief Scientist and Engineer enquiry into the fish deaths in the Darling River at Menindee were that the fish died from hypoxia. The low dissolved oxygen was caused by a high biomass of Carp and algae, poor water quality, reduced inflows and high temperatures (Menindee Fish Deaths | Chief Scientist (nsw.gov.au).

Summary

The quality of the water in a river or stream reflects underlying climate and geology and the multiple activities and land uses occurring in a catchment area. Numerous factors contribute to the observed results.

In 2022 to 2023, flooding was the key driver of water quality. Reduced turbidity due to blackwater events and diluted nutrients in the river channels improved water quality index scores at 7 of 8 monitoring sites in the Barwon – Darling system. Three of these sites were rated as good. The high flows maintained electrical conductivity below the irrigation targets in 2022, but as flows receded in 2023, electrical conductivity increased.

Large tributary inflows in October and November 2022 led to a hypoxic blackwater event. Dissolved oxygen levels dropped below the critical ecological threshold for fish health of 2 mg/L. NSW Fisheries investigated numerous fish death events between January and March 2023. Millions of dead fish, (predominantly Carp and Bony Herring), were reported.

The management of inflows of hypoxic blackwater from the Northern Basin catchments into the Barwon and Darling rivers, and releases from Menindee Lakes, was a careful balancing act, which was continually monitored and adjusted as needed. Agencies and scientific experts worked together to monitor the dissolved oxygen levels throughout the river system and advise the best operational measures to minimise the risk to aquatic life.

Although hypoxic blackwater events may result in the loss of fish and other aquatic life, the impacts of these events on the environment are usually short-term, as the river water re-oxygenates again as the flooding subsides. Naturally occurring events such as these underpin the broad health of rivers. They provide nutrients to drive the overall production of our river and wetland systems. In the longer term, native fish, water birds and other organisms benefit from the increased production in the river, boosting food supplies and supporting breeding cycles.

For more detailed information about water quality issues in the Barwon–Darling – catchment see the Barwon–Darling surface water quality technical report (https://water.dpie.nsw.gov.au/__data/assets/pdf_file/0004/456925/Water-quality-technical-report-for-the-Barwon-Darling-surface-water-resource-plan-area-SW12.pdf).

Long-term water quality trends

Long-term analysis of WaQI scores in the Barwon-Darling River (Figure 5) show all sites except Brewarrina have a long-term median rating of moderate to good. The Darling River at Bourke, Menindee and Burtundy had the highest long-term WaQI scores, the small spread of data for these sites indicates scores are consistently high across the 10-year period.

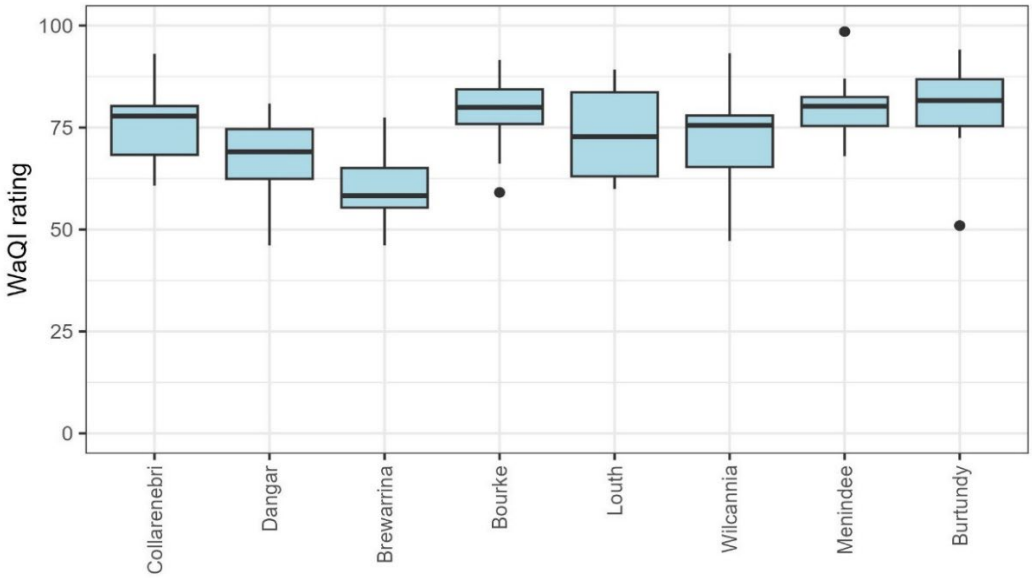

Figure 5: boxplots showing long-term analysis (2012–2013 to 2022–2023) of WaQI ratings at all sites on the Barwon-Darling River

The number of sites with ratings of good, moderate or poor on the Barwon-Darling River have changed considerably from 2012–2013 to 2022–2023 (Figure 6). The number of sites with a “good”

rating was in decline from a peak of 6 sites in 2013–2014 to zero sites with a “good” rating in 2016–2017 and 2021–2022. In 2012–2013 there were 3 sites with a “moderate” rating, this increased to 7 by 2016 and then gradually decreased until returning to 3 sites in 2022–2023. The number of sites with a “poor” rating remained between one and zero from 2012–2013 until 2018–2019 before consistently increasing through to 4 sites in 2021–2022. The increase in sites with a “poor” rating coincides with drought followed by repeated flooding since 2021.

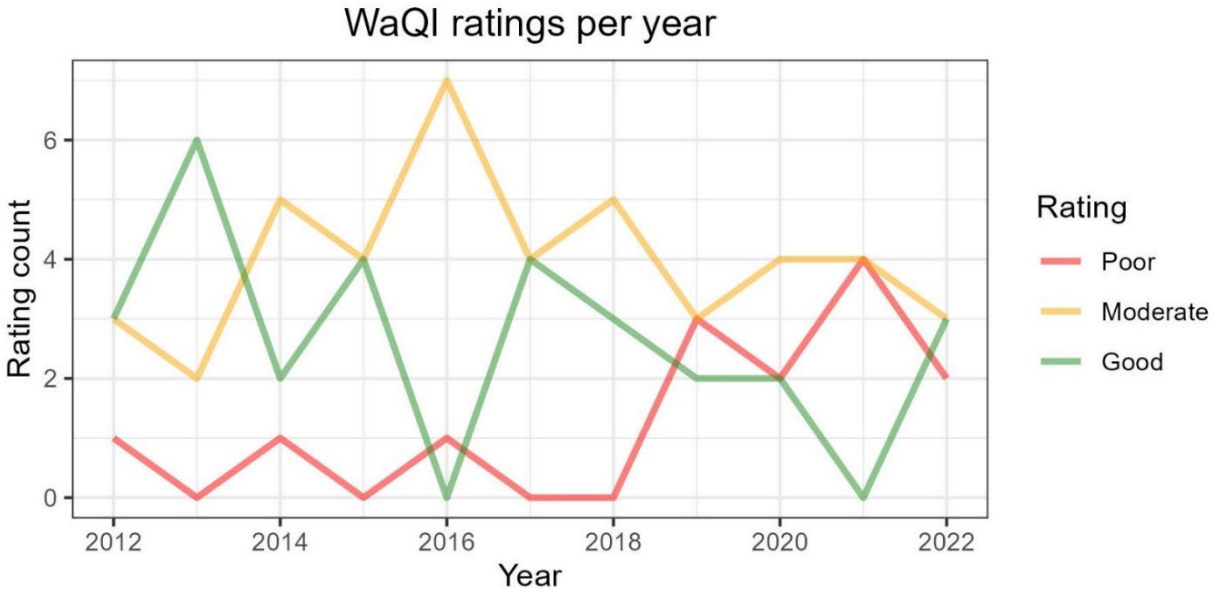

Figure 6: Number of sites with ratings of good, moderate or poor in the Barwon-Darling River from 2012–2013 until 2022–2013

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