

Lower Darling release – Water quality monitoring update

Update No. 1 - This update provides an assessment of water quality data collected up to 26 March 2020

Key information

- Initial flows into Lake Wetherell were of poor quality, with low dissolved oxygen and high turbidity and salt load resulting in a fish kill of Bony Bream around 12 March 2020.
- Subsequent flows behind the initial front were of better quality and assisted with dilution and mixing in Lake Wetherell.
- Profile water quality monitoring from 23 March 2020 confirms water in Lake Wetherell is well mixed. Water temperature and dissolved oxygen is consistent with depth and electrical conductivity is low.
- Turbidity in Lake Wetherell is high, but is expected to decrease with time. In the short-term high turbidity is likely to reduce light availability helping minimise harmful algal blooms.
- Upstream of Weir 32, electrical conductivity is higher than Lake Wetherell. Profile monitoring shows only a slight decrease in dissolved oxygen. Currently there is a low risk of fish deaths caused by hypoxic conditions.
- The Darling River at Burtundy shows high electrical conductivity as salts are concentrated by evaporation. This site remains on red alert warning level for harmful algal blooms for recreational use.

Monitoring Lower Darling River releases

The first flows from widespread rainfall over north-west NSW and southern Queensland during January/February 2020 started arriving at Menindee Lakes (Lake Wetherell) on 10 March. Flows are expected to continue into Lake Wetherell over coming months.

Releases to the Lower Darling River will begin the 26 March 2020. Enough water is stored in Lake Wetherell to allow the higher flow rates of the pulse to be achieved and the first two block banks across the Lower Darling River have been removed.

The aim of the initial release is to provide a dilution and flushing action to move contaminated water through the system. This 'first flush', required to restore water quality in the Lower Darling, will be followed by lower flows to maintain connectivity with the Murray River for as long as possible.

The release of water from Menindee Lakes into the Darling River could result in water quality impacts downstream as the river is 'restarted'. Resuming flow may flush high salt loads down the Lower Darling River and into the Lock 10 weir pool at Wentworth. It can also mobilise large amounts of organic material as the head of the flow progresses downstream. This can result in short term hypoxia (low dissolved oxygen). There is also a risk restarting the river will de-stratify isolated pools, increasing the risk of low dissolved oxygen water from the bottom of pools mixing through the water column causing fish kills.

Water quality monitoring is being undertaken by NSW state and local agencies in Menindee Lakes and the Lower Darling River. Scientists are collecting water quality field readings, including profiles in deeper pools, to provide timely water quality data. This information informs water management

decision making and identifies potential environmental impacts as flows progress down the Lower Darling River.

Pre-release water quality monitoring

The first flows to enter Lake Wetherell were of poor quality, with low dissolved oxygen and high turbidity and salt load. The inflow of a large volume of poor quality water into the isolated pools in Lake Wetherell had some impacts on fish, with the death of a large number of Bony Bream around 12 March. Some of the poorer quality water from the first flush flowed into Lake Tandure, reducing the impact on the pools closer to the Lake Wetherell main weir. Subsequent flows behind the initial front were of better quality and assisted with dilution and mixing in Lake Wetherell.

WaterNSW have undertaken water quality profile monitoring in Lake Wetherell and upstream of Weir 32 during the week of 23 March to confirm if the poor quality water at the head of the flow had been diluted in Lake Wetherell by the better quality water following behind. The data will also indicate the quality of the water to be released from Lake Wetherell into the Weir 32 pool (Menindee town pool). The water quality data is shown in Table 1.

The profile data from Lake Wetherell Sites 2, 3 and 4 show the water is well mixed from the surface to the bottom. Water temperature and dissolved oxygen is consistent with depth and electrical conductivity is low. Dissolved oxygen levels are above the critical threshold for aquatic ecosystems (2 mg/L) at all sites. Lake Wetherell Site 4 had one result less than 4 mg/L. These results indicate that the first flush of poor quality water from the upper catchment has been diluted by the better quality water following and that the water in Lake Wetherell is well mixed.

The turbidity in Lake Wetherell exceeded the upper limit of the water quality meters (greater than 1,000 NTU). It is expected that the high turbidity will decrease with time as sediment drops out of suspension. In the short term the high turbidity is likely to reduce light availability, restricting algal growth in Lake Wetherell.

Profiles collected upstream of Weir 32 show the electrical conductivity is much higher than in Lake Wetherell (up to 1,600 $\mu\text{S}/\text{cm}$). There is a slight decrease in dissolved oxygen with depth, but as the bottom waters are not hypoxic there is a low risk of fish deaths when the pool is mixed by the release. The water upstream of Weir 32 is quite alkaline with a pH of 9.0.

The electrical conductivity in the Darling River at Burtundy has increased to 3,811 $\mu\text{S}/\text{cm}$ as salts are concentrated by evaporation. The water in the Darling River arm of the Lock 10 weir pool remains fresh with an electrical conductivity of 129 $\mu\text{S}/\text{cm}$. The very high dissolved oxygen at Burtundy during mid-March suggest increased algal growth. This site remains on red alert warning level for recreational use. The water quality data is shown in Table 2.

Latest water quality data

The water quality data in Table 1 comes from profile monitoring in Menindee Lakes. At each site, a water quality probe was used to record readings of various water quality parameters at different depths. By taking readings at a range of depths from 0.25 m up to 8 m (where possible) scientists can determine if water quality is consistent through the water column and the lakes are well mixed. The water quality parameters monitored are Electrical conductivity (salinity), dissolved oxygen (DO), pH (acid/alkali) and temperature.

More information on water quality parameters can be found [here](#).

Menindee Lakes & Lower Darling



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Table 1: Water quality profile readings from Menindee Lakes for 23-24 March 2020

Site Number	Site Name	Sample Date/Time	Sample Depth (m)	Conductivity (µS/cm)	DO (%sat)	DO (mg/L)	pH	Temp (°C)
N1087	Lake Wetherell Site 1	23/3/2020 9:04	0.25	147	77	6.52	8.0	23.66
N1088	Lake Wetherell Site 2	23/03/2020 9:44	0.25	154	75	6.27	8.2	23.60
			0.5	155	72	6.11	8.0	23.62
			1	155	72	6.10	7.9	23.62
			2	155	72	6.08	7.9	23.61
			3	155	72	6.07	7.8	23.61
			4	155	71	6.05	7.8	23.61
			5	155	71	6.05	7.8	23.61
			6	155	71	6.03	7.7	23.61
N1089	Lake Wetherell Site 3	23/03/2020 12:37	0.5	151	67	5.70	8.0	23.55
			1	151	67	5.68	8.0	23.53
			2	151	67	5.66	7.9	23.51
			3	151.	66	5.64	7.9	23.48
			4	151	69	5.82	7.8	23.52
			5	151	67	5.70	7.8	23.51
			6	151	67	5.66	7.8	23.51
			7	151	66	5.63	7.7	23.52
N1090	Lake Wetherell Site 4	24/03/2020 13:40	0.25	194	51	4.31	8.0	22.70
			0.5	187	49	4.25	7.9	22.71
			1	182	48	4.10	7.9	22.58
			2	182	45	3.90	7.8	22.30
			3	185	49	4.24	7.8	22.31
			4	188	50	4.38	7.7	22.16
			5	189	53	4.59	7.7	21.97
N1095	Darling River at Rhwb Pumping Station at Menindee	24/03/2020 10:00	0.25	1110	72	6.13	8.8	22.92
			0.5	1111	72	6.15	8.9	22.95
			1	1110	72	6.16	8.9	22.97
			2	1111	69	5.94	8.9	22.86
			3	1111	60	5.15	8.8	22.68
			4	1111	58	5.02	8.8	22.67
N1085	Darling River at Menindee Town	24/03/2020 8:42	0.25	1179	55	4.68	8.7	22.40
			0.5	1181	54	4.70	8.8	22.43
			1	1180	53	4.59	8.8	22.41
			2	1178	53	4.60	8.8	22.39
			3	1175	55	4.75	8.8	22.39
			4	1178	52	4.52	8.8	22.38
N1086	Darling River at Menindee Weir 32	24/03/2020 9:05	0.25	1604	63	5.49	9.0	21.40
			0.5	1606	62	5.43	9.0	21.41
			1	1606	61	5.36	9.0	21.36
			2	1606	59	5.18	9.0	21.31
			3	1606	58	5.09	9.0	21.30
			4	1604	56	4.94	9.0	21.30

The water quality data in Table 2 comes from monitoring in the Lower Darling River. At each site, a water quality probe was used to record readings of various water quality parameters at a depths of 0.25 m. This table gives us a snapshot of water quality conditions at key locations in the Lower Darling River over the past three weeks.

Table 2: Recent water quality readings from Darling River for March

Site Number	Site Name	Sample Date/Time	Conductivity (µS/cm)	DO (%sat)	DO (mg/L)	pH	Temp (°C)
N1041	Darling River at Burtundy	3/03/2020 13:10	3422	53	4.68	9.1	20.693
		10/03/2020 10:59	3440	193	16.35	9.2	23.02
		17/03/2020 9:15	3636	122	11.11	9.3	19.325
		24/03/2020 8:23	3811	95	8.78	9.1	18.436
N1074	Darling River at Ellerslie	3/03/2020 10:27	126	82	7.2	8.44	21.594
		9/03/2020 10:48	127	83	7.33	7.56	21.608
		17/03/2020 8:47	129	76	6.81	8.25	20.483
		24/03/2020 9:18	129	82	7.37	8.29	20.387
N1075	Darling River at Tapio	10/03/2020 10:23	112	76	6.62	7.68	21.978

Further information

Additional flow and water quality information from the WaterNSW real time data web site is available [here](#).

The Water Quality Australia website (available [here](#)) is a product of the National Water Quality Management Strategy (NWQMS), an Australian Government initiative in partnership with state and territory governments. It provides information on issues affecting water quality, water quality guidelines and water quality planning.

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The water quality data provided in this report is 'raw data' and no interpretation has been included as to its usability for various agricultural enterprises. Additional information on water suitability can be found on the NSW Department of Primary Industries web site to determine if the water is fit for your purpose.

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