Community update on response to fish deaths in Menindee and Lower Darling-Baaka

Current situation

The risk of further large-scale fish deaths is still a possibility, with the chances increasing as the weather starts to warm up. This is particularly the case for Bony Herring and Carp in the river reach between Lake Pamamaroo and Weir 32, which boomed during the recent floods and many may now be in poor condition and more susceptible to environmental stresses.

Our water quality monitoring is showing dissolved oxygen levels in the Darling-Baaka River at Menindee are remaining above the critical thresholds for fish health. The release of oxygenated water from lakes Pamamaroo and Menindee, combined with the cooler water temperatures over winter, provided an opportunity for dissolved oxygen levels to recover. These circumstances are all helpful to the survival of fish. However, as the weather continues to warm, we are seeing signs of deteriorating water quality.

Blue-green algae, remain a cause for concern. The most recent results indicate a red alert warning for recreational use in the Darling-Baaka River at Burtundy and Ellerslie. Algal numbers at most sites in the Menindee Lakes area remaining in the amber alert range for recreational use.

Key challenges

We face challenges from the reduction of dissolved oxygen levels caused by:

- temperature increases (which will start to rise more quickly over the next few weeks as summer approaches)
- the enormous population of Carp and Bony Herring that boomed during the last three years
- further algal blooms
- increased demand for water downstream during the hotter months
- several weirs which affect fish migration (fish are trapped between main weir and Weir 32).

Actions being taken

Water releases

- Water releases from the lakes are being adjusted, where required, to mix water layers before the differences in temperature and dissolved oxygen becomes too pronounced.
- Flows from Lake Pamamaroo were increased from 200ML/day to 500Ml/day on 12 October to address stratification.
- From 16 October we reverted to 200ML/day from Pamamaroo and 350ML/day from Menindee given destratification was less than expected and with dissolved oxygen not going below critical levels.
- From 20 October, flows were reduced at Lake Pamamaroo from 200ML/day to 100ML/day to conserve drought reserve in the top lakes based on expert advice that the risk of

stratification is low at the moment, but we have increased monitoring to adjust flows if necessary. At the same time, flows were increased from Lake Menindee to 450ML/day.

- The situation is being closely monitored, as water quality is dynamic and may change for the worse if stratification persists. **(See explanation of stratification and destratification below**).
- As at 3 November, the flows remain at 100ML/day form Lake Pamamaroo and 450ML/day from Lake Menindee.
- Pamamaroo inlet will be opened on 3 Nov and ramped up for a few days. Water levels in lakes Wetherell and Pamamaroo should be level by around 12 November. Opening the inlet will assist moving water off the floodplain in Lake Wetherell. With hot weather approaching, keeping the water on the floodplain can make water quality conditions worse.
- The environmental flows have been specifically timed to support Murray Cod breeding in the Lower Darling-Baaka. Releases from Lake Pamamaroo will also assist with disrupting thermal stratification and limiting algal growth in the Weir 32 weir pool.
- Commonwealth environmental water has been released from Lake Cawndilla to maintain connectivity through the Great Darling Anabranch to provide a pathway for juvenile Golden Perch to migrate from the Basin's north to the south.
- The flow is also of benefit to vegetation, waterbirds, bush birds, aquatic bugs, frogs, yabbies and other animals that live on the floodplain.

Water quality monitoring

- The latest water quality monitoring from in the Darling-Baaka River at Menindee shows dissolved oxygen levels remain above the critical thresholds for fish health, however, the situation can change quickly.
- Commencing Monday 23 October, WaterNSW crews are on the ground twice a week (Monday and Friday) to monitor dissolved oxygen throughout the water profile to assess conditions.
- All water agencies will continue to regularly assess the situation and adjust flows to balance the need to maintain water quality and manage drought reserves in the top Menindee lakes.
- A series of in-river buoys is also be installed between Lake Pamamaroo and Weir 32 to provide 'real-time' enhanced water quality data. This increased sampling will greatly assist all water agencies to assess the situation and adjust flows to balance the need to maintain water quality and manage drought reserves in the top lakes.

Fish monitoring

- Specialist contractors were on the water last week to undertake fish survey work in the Menindee town weir pool. The information collected will help identify the number and location of fish that can then be translated to biomass (or similar metric) estimates.
- DPI Fisheries staff will also be out in Menindee this week targeting Golden Perch in the lakes to fit with tracking devices. The fish will be released, and their journey tracked as they move through the Darling-Baaka and Barwon rivers in a project funded by the Commonwealth Environmental Water Office.

Local Emergency Management Committee

- Last week the Local Emergency Management Committee met to ensure the processes are in place for swift action to be taken to clean up any mass fish death event, should this happen, with a stocktake of contractor information and equipment completed, and roles and responsibilities understood.

Fish deaths

DPI Fisheries has received a low number of reports of dead large Murray Cod in the Lower Darling-Baaka near Menindee over separate incidents in a number of locations. The cause of death is unknown.

To report any incidents of dead fish, fish struggling or starting to gasp at the water surface, please call the Fishers Watch Phoneline on 1800 043 536 or complete a fish kill protocol and report form at: www.dpi.nsw.gov.au/fishing/habitat/threats/fish-kills

How will the Lakes and water quality be managed during the coming summer?

We need to balance the requirement to deliver water to all Basin States as per the Murray Darling Basin Agreement with the need to maintain fish health, as well as conserving water in the top lakes at Menindee as we move into summer and dryer conditions as a result of the El Nino event. It is a balancing act.

We know there is still a large number of fish, predominantly Bony Herring and Carp, between Pamamaroo outlet and Weir 32, so releases will continue from lakes Pamamaroo and Menindee to disrupt stratification and minimise algal growth in the weir pool between Main Weir and Menindee Creek.

These releases will be closely monitored in order to make any necessary changes to flow rates as a result of water quality, changes in weather conditions that affect the MDBA's call for water, or the need to conserve water in the top lakes.

The Murray-Darling Basin Authority (MDBA) have paused their call on water following substantial rainfall over the southern catchment in early October which meant adequate water was available further south. The anticipated cessation of these flows over the next several weeks and the potential on-set of warmer weather, may see a call from the MDBA for increased releases sometime in December.

Will water take from the northern basin be restricted?

Section 324 of the *Water Management Act 2000* (the Act) allows the Minister or a delegate to direct, by order, that temporary water restrictions within a water source(s) have effect for a specified period, if these restrictions are determined to be in the public interest.

Applying this order would require there to be enough water upstream of Menindee, and other towns on the Darling-Baaka, to ensure those towns critical water supply is not impacted.

What other actions are being considered?

We have welcomed the findings of the Independent Review by the Office of the NSW Chief Scientist & Engineer. We are getting on with actioning those recommendations, including investigating immediate and long-term solutions like:

- Change infrastructure and remediate fish barriers so fish are not trapped and can move away from poor quality water in extreme events.
- Embed water restrictions in water sharing plans to provide certainty around when licence holders upstream will be restricted for downstream critical needs.
- Invest in land management and rehabilitate riverbanks and floodplains that can help reduce the risk of pollutants and sediments entering water ways.
- Fill data gaps to make sure the best decisions are made with the best available information in future events.
- Establish accountability and responsibility for water quality in NSW so there is a sustained focus on improving water quality with clear accountabilities (currently running as incident response).
- Viability of recirculating pumps being investigated.
- Pulsed releases (already used as a tool).
- Exploring funding options with the Commonwealth for fish passage projects.
- Improving river connectivity through actions identified in the Western Regional Water Strategy.
- Established an Expert Panel on connectivity in the Barwon-Darling River, commenced 4 September 2023, report draft due November 2023 and final March 2024.

APPLY NOW!

Want to play a more active role in Menindee and lower Darling water monitoring and management?

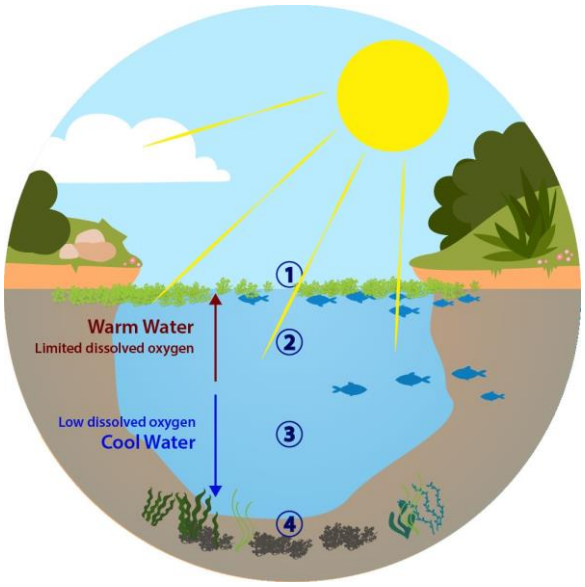
The Department of Planning and Environment's Water Group is seeking a Senior Water Implementation Officer to provide high quality management, analysis, and problem solving on water management issues, including water quality, with a focus on Menindee and the lower Darling, to enable the development and evaluation of effective water management operational responses and policy. Applications close 15 November 2023.

https://iworkfor.nsw.gov.au/viewjob/437713

- 2 Year Fixed Term full-time opportunity until 15 January 2026
- Kinchega or Broken Hill locations available
- Salary relative to experience, and ranges from $120,859 to $133,183 + super

What is stratification?

Stratification is when the surface water heats up more than the deeper water. That warmer layer tends to be warm and well-oxygenated compared to the deeper water that is colder and has less oxygen. The longer stratification goes on, the more chance there is that the oxygen in the bottom level is depleted. When the two layers mix (destratification), there is not enough oxygen overall in the water column.



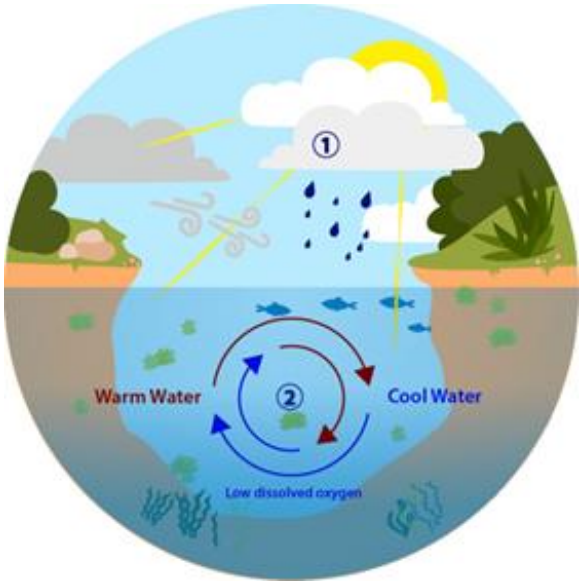
Thermal stratification key

1. **Blue Green Algal Bloom**
   Algal flourish in warm and still conditions, particularly in the absence of high flow
2. **Surface Water Layer**
   Warm, high nutrient load from run off.
   Dissolved oxygen by day, depletion overnight
   Limited fish habitat
3. **Deep Water Layer**
   Cooler, low light penetration, low dissolved oxygen (hypoxia), Poor fish habitat
4. **Decomposition of organic matter**
   Depletes dissolved oxygen

What is destratification?

Destratification is when the water mixes and is more consistent throughout the water column. Even though this could be more ideal for fish health in some situations, fish kills can still occur eg if the overall oxygen level is too low when the top layer mixes with the bottom layer.

(**Note** the fish deaths in 2023 were not caused by destratification but by low dissolved oxygen caused by a number of other factors outlined in the OCSE report).



Destratification key

1. Sudden weather events or small increases in flow can mix the warmer surface water and cooler deep water – essentially breaking down the temperature stratification.
2. These changes can mix the warmer surface water with cooler deep water
   Algal blooms may also be disrupted, potentially increasing decomposition (and further depleting oxygen). This means even at the surface dissolved oxygen levels can become critical, killing fish.

Where else can I find information?

Information about the monitoring, management and maintenance of water quality, including detailed community updates from the Department of Planning and Environment, is available online: www.industry.nsw.gov.au/water/allocations-availability/droughts-floods/droughtupdate/managing-drought-recovery/blackwater

www.water.dpie.nsw.gov.au/menindee/community-updates-and-frequently-asked-questions

Observations of changes to water, including struggling fish or deaths can be reported directly to DPI Fisheries on 1800 043 536. For more information about fish kills, as well as recent reports of observations and causes, visit: www.dpi.nsw.gov.au/fishing/habitat/threats/fish-kills

These types of events can be distressing to members of the community, and anyone who requires health, welfare or other support can contact local community support services. A comprehensive list of services can be located online: www.service.nsw.gov.au/transaction/customer-support-serviceinfoxchange-service-seeker