

Macquarie-Cudgegong Environmental Flows Reference Group

Meeting Summary, 2 & 3 May 2023, Quality Inn Dubbo

Attendees: Ian Rogan (Chair), Paul Keyte (Exec officer), Jo Ocock, Robert McLellan, , Garry Hall, Mel Gray, Nerida Sloane, Tim Hosking (SWARCO), Debbie Love, Bill Johnson, Stephanie McCaffery, Ajantha Prathab, Jarrod Mesken (notes), Julie Lovell, Tony Lees, Richard Woodlock, Hayley Behnke, Chris Pavich, Douglas Juma, Jane Munro, John McCrae, Julian Geddes, Kyra Roach, Rohan Saunders, Shireen Baguley, Michael Drum (MRFF, observer), Luke Friend (Day 1, Observer), Marita Pearson DPI-F (Day 2 observer)

Apologies: Rob Smith, Peter Thomas, Hugh Kater, David Duncan

1. KEY WATERING OUTCOMES 2022-2023

- Extended dam spill event ended in February 2023.
- Approximately 50GL of environmental water was delivered this water year to date, from various accounts to support:
 - Successful completion of colonial waterbird nesting sites 30GL
 - Movement of native Fish into the mid Macquarie River during Autumn 2023.
 - Note: Triggers for the release of Translucent Environmental Water Allowance occurred in Autumn 2023 (14.5GL). These “rule based” flows largely replaced the need to use water from active environmental accounts to facilitate native fish movement.
- Inundation data indicates extended duration within the 20,000-50,000ha hydrological ‘red zone’. This zone hosts extensive River Red Gum woodlands and semi-permanent wetland areas.
- Peak inundation occurred in late October/early November 2022 with around 230,000 hectares flooded. This inundation included most of the Marshes area including coolabah black-box communities which are mostly outside the reach of managed environmental water.
- Significant End-of-system flows from the Macquarie-Castlereagh. Over 1,809 GL at Miltara and ~1,100GL at the Barwon River confluence including Castlereagh and Marthaguy Creek flows were recorded. It is acknowledged these volumes are underestimates given the overland flow which bypasses some gauging stations.
- Significant colonial and other waterbird nesting, significant frog activity and high health/condition vegetation within the Macquarie Marshes noted during annual monitoring programs and general observations.
- Translucent releases were suspended in the Cudgegong River for much of the water year, with some flows occurring in later in the water year once the Water Sharing Plan was reinstated. Dam spills from Windamere Dam during the rule suspension produced beneficial environmental outcomes to the entire regulated Cudgegong River and its floodplain.

2. WATER AVAILABILITY AS AT 1 JULY 2023

Water availability at 1 July 2023 was estimated based on published *Water Allocation Statements*. This indicates an approximate account balance of the following, including NSW and CEWO sources:

- Macquarie Regulated system:
 - **410GL general security** including Environmental Water Allowance and Held Environmental Water licences (carryover + 40% allocation)

- **9.7GL supplementary licences**
- **5.8GL Pillicawarrina unregulated licence**
- Cudgong Regulated system: **17GL to 25.3GL General security environmental water allowance**
 - **12.5GL - 18.8GL** 'Residual' environmental water allowance balance provided at the start of the new Water Sharing Plan
 - **4.5GL** environmental water allowance 40% allocation

3. ROLLING MEDIUM-TERM OBJECTIVES

REGULATED MACQUARIE AND DOWNSTREAM UNREGULATED AREAS

A rolling set of objectives are proposed that respond to the system conditions and likely minimum water availability. These include:

- **Support maintenance of existing high-condition wetland vegetation** in the Macquarie Marshes when it is possible, noting this capability decreases over time after flood years when water accounts are smaller and landscape drier
- **Assist native fish populations to breed and recruit** in the Mid-Macquarie River, particularly flow generalists' and 'river specialist' species like Murray cod, freshwater catfish and small-bodied native species. It is noted cold-water pollution present downstream of Burrendong is a constraint to achieving this objective
- **Boost system resilience** in the event of drought through
 - **securing future maintenance flows** via carryover. This could target core Marshes areas and specific river flows in future years, noting the risk of river system failure where the 2017-2019 drought of record is omitted from the Available Water Determination (AWD) process.
 - **Supporting fish refugia** in response to deteriorating conditions where feasible.
- **Provide wetland habitat** for waterbirds, flow-dependent frogs and other wetland-dependent species.
- **Support viable colonial waterbird breeding events in the Macquarie Marshes**, should they occur
- **Connect the Macquarie River to the Barwon River**, where possible, for the movement of flow-specialist native fish into our catchment (e.g., golden and silver perch) and contribute to environmental outcomes in the Barwon River.

REGULATED CUDGONG

- This is the first year of active management of the environmental water allowance (EWA) in Windamere Dam.

The release strategy will target higher-level system outcomes this year. In time as our knowledge grows and constraints removed, the use of the Cudgong EWA will become more sophisticated and targeted. An initial set of objectives and opportunities were identified: **Assist native fish populations to breed and recruit** in the regulated Cudgong River, particularly flow generalists' and 'in-stream specialist' species like Murray cod, freshwater catfish and small-bodied natives.

- **Support river productivity and processes through limited reinstatement of flow variability** within constraints.
- **Examine opportunities to enhance the functioning of the Butta Bucca wetlands** using environmental water and complimentary measures
- **Build knowledge, experience, and community awareness**, particularly in:
 - environmental water operations in the Cudgegong
 - infrastructure constraints to water management – Rocky Waterhole bridge, Lawson Park
 - other potential beneficiaries of managed environmental water, like platypus, riparian vegetation, erosion and sedimentation processes, local groundwater systems, macroinvertebrates and birds.

4. A PLAN FOR THE 2022-2023 WATER YEAR

Proposed Macquarie Annual Objectives for the 2023-2024 Water Year

The overarching objective for 2023-24 is to capitalise on recent natural flooding to build resilience in native fish populations and vegetation of the Macquarie Marshes.

The following objectives were set for the 2023-2024 water year:

- The recent widespread inundation in the Macquarie Marshes from 2020-2023 provides a rare opportunity to use water for the environment to inundate the greater river red gum woodland area of the Marshes between 20,000 and 50,000 hectares (Red Zone). To build resilience in these River red gum woodlands, a Spring event to target inundation of between 20,000 and 50,000ha of the Macquarie Marshes is proposed. To achieve the higher (50,000 ha) target would require support from supplementary or flood mitigation flow events which provide overland flow to areas not able to be targeted with actively managed environmental water. All areas of key semi-permanent wetland vegetation (reedbeds, mixed Marsh, water couch) will be inundated in the 20,000 to 50,000 target.
- **Boost eel-tailed catfish breeding and recruitment in the Mid-Macquarie River** using the latest scientific information on their flow requirements.
- **Secure carryover for drought buffering** of the inner 'blue zone' semi-permanent wetlands of the Macquarie Marshes (inner 4,000-9,000ha)
- **Provide habitat for waterbirds**, particularly for young-of-year birds to improve survivability.
- **Support viable colonial waterbird breeding events**, should they occur and need assistance.

Proposed Macquarie Watering Actions for the 2023-2024 Water Year

To meet the above objectives, in 2023-2024 the following actions were recommended, drawn in Figures 1 and 2 below:

1. **Adopt the following setting for the Translucent Environmental Water Allowance (EWA):**
 - a) **default Water Sharing Plan trigger timing window**
 - b) **adjusted maximum flow rates, being:**
 - **1 July to 31 August 2023: default (maximum 4,000ML/d)**
 - **1 September to 30 November 2023: maximum 2,000ML/d**

▪ **15 March to 30 June 2024: maximum 2,000ML/d**

Translucent EWA releases can, and hopefully will, contribute to the environmental outcomes of managed releases. The volume and timing of the managed event will be adjusted around the contribution from Translucent EWA flows.

2. **Use up to 150GL from all environmental water sources for a Spring 2023 flow pulse** (August, September, October) to achieve Marshes inundation of between 20,000 and 50,000 hectares. This will boost River Red Gum woodland vegetation resilience and condition and meet related wetland fauna habitat and connectivity objectives. Other flows occurring during this event may reduce the managed volume needed.
3. **Provide flows to assist freshwater Catfish breeding and recruitment in the Mid-Macquarie between Gin Gin and Dubbo, (up to 50GL) being:**
 - a) A conditioning flow in Spring – provided by (1) or (2) above.
 - b) Flows in warmer months (October to February) to
 - Provide a 'floor' on river flow of 1,000ML/d at Barooka gauge
 - Work with river operators and industry to smooth the rates of rise and fall at Barooka gauge during river operations over summer months (December to February inclusive).
 - c) A 'small fresh' fish dispersal flow at Barooka in March or April 2023. This could be provided by (1) or other flows.
4. **Secure carryover to enable watering of at least the semi-permanent wetland areas (4,000-9,000ha) in years 2 and 3 of a potential drought.** Based on current projections, this would be at least 120GL, probably 200GL depending on rainfall and triggered translucent EWA.

Under this proposal, flow connectivity to the Barwon River via the Macquarie Marshes and Lower Macquarie River is likely in Spring 2023 depending on rainfall and weather conditions.

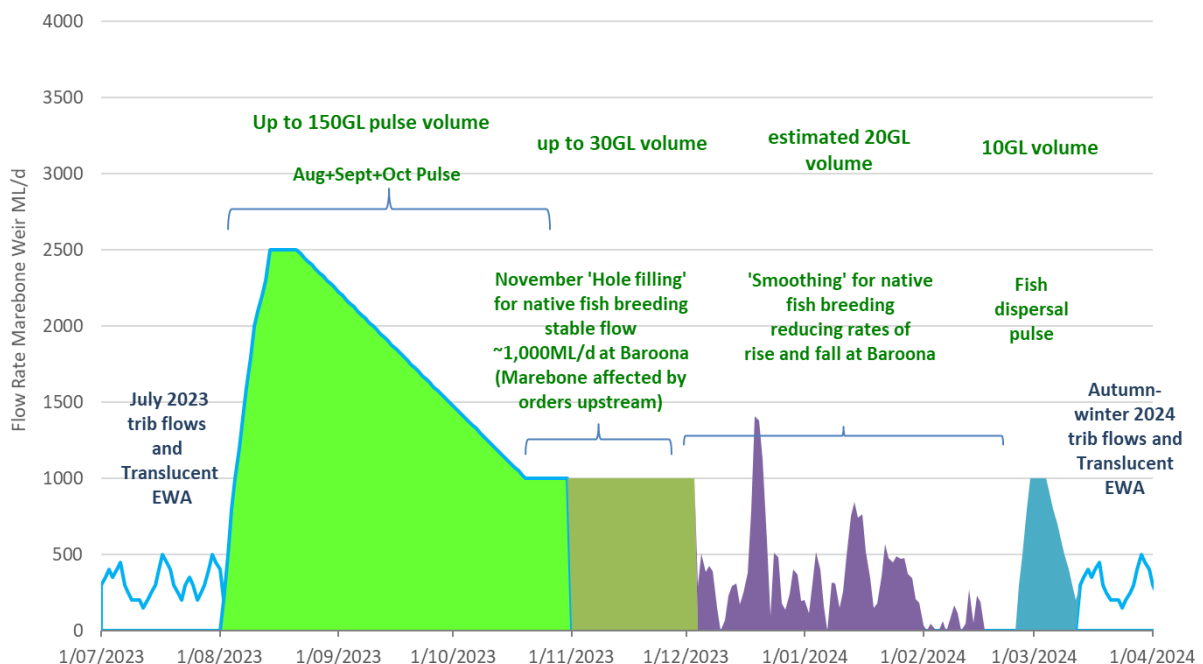


Figure 1: Proposed 2023-2024 environmental watering events at Marebone Weir under dry conditions - plan as at May 2023

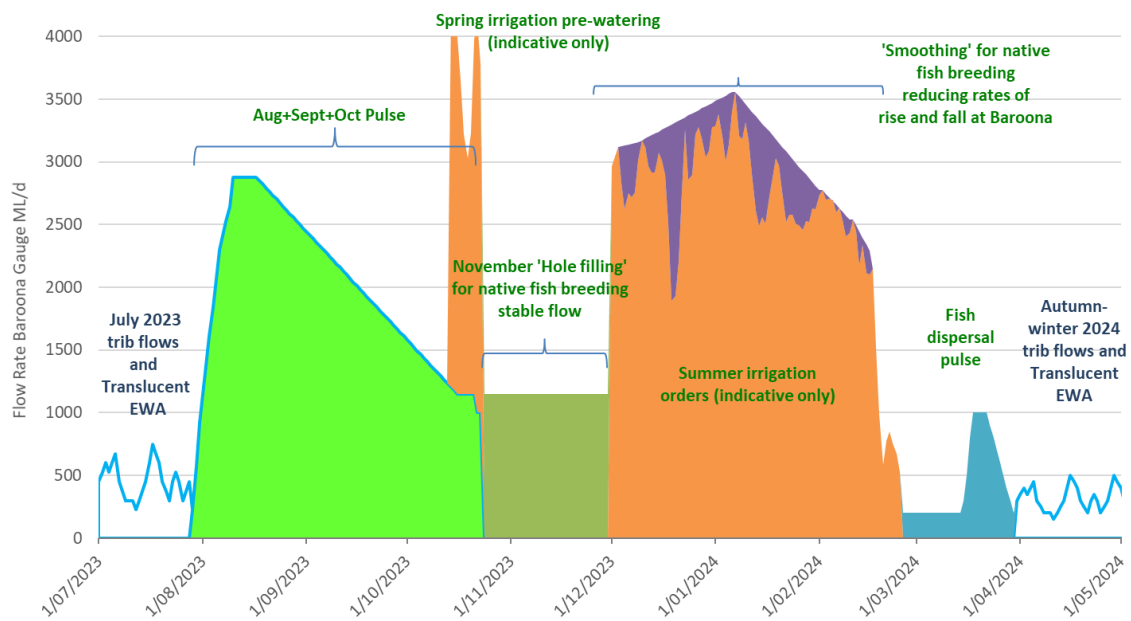


Figure 2: Proposed 2023-2024 environmental watering event at Baroona gauge under dry conditions - plan as at May 2023

Proposed Cudgegong Annual Objectives for the 2023-2024 Water Year

The following objectives were set for the regulated Cudgegong River in 2023-2024 water year:

- **Support native fish breeding and recruitment** – particularly river specialists (Murray cod, freshwater catfish (endangered), northern river blackfish, purple spotted gudgeon (endangered)) and generalists (small-bodied natives such as galaxiids, gudgeons).
- **Support river productivity and processes** by providing small freshes and flow variability.
- **Secure carryover for use in future years**

Proposed Regulated Cudgegong River Watering Actions for the 2023-2024 Water Year

To meet the above objectives, after discussion in the May EWAG meeting it was recommended a sequence of specific flow events should be provided to support native fish outcomes:

1. **If not provided by natural inflow event(s), deliver a fish breeding event flow – a seasonal ‘Small Fresh’ flow event (SF2) - at Yamble Bridge** to support fish nesting during months with warmer water temperature.
2. **Taking advantage of other flows, provide general Small Freshes (SF1) in Spring 2023 and Autumn 2024** for fish conditioning and dispersal respectively.
3. **Boosting lower flows to 50ML/d at Rocky Waterhole** to achieve minimum ‘Base flow’ flow rates for the warmer months during fish breeding season
4. **Secure carryover to provide future a seasonal Small Freshes (SF2) in at least 2024-25** should drought occur. This would be at least 8GL.

The above actions proposed in the meeting were further refined by DPE EHG and DPI-Fisheries staff after further information was obtained. The following information was incorporated:

- 1 July 2023 water availability – clarification of the residual EWA volume.
- further examination of native fish information and flow gauge data
- results of Autumn 2023 Cudgegong fish surveys by DPI-Fisheries.

The revised plan (**Figure 3**) will be presented back to the EWAG for their endorsement, it includes two main components, with a maximum total proposed volume of approximately 10GL:

- 1) **Fish priming pulse** – if not provided by other sources of water, a small fresh commencing mid-October. This is timed with rising water temperatures (above 18 degrees) and will assist in boosting river productivity in readiness for native fish breeding over late Spring/summer.

Target Gauge: Yamble Bridge

Flow requirement: Small Fresh, 200 – 1000 ML/day for 14 days

Volume: approximately 7GL

- 2) **Fish breeding base flows** - Adding a flow rate ‘floor’ on river flows over Spring/Summer. This would raise the flows in the river over nesting times to the level of ‘Base flow’ as specified in the **Long-term watering plan**. It would assist the nesting season of Murray cod, freshwater catfish (endangered), river blackfish, purple spotted gudgeons (endangered) and a range of small-bodied native flow generalist species (galaxiids and gudgeons).

Target Gauge: Yamble Bridge

Flow requirement: 50ML/day minimum flow

Volume: using ‘pothole filling’ operations – 1 to 3GL depending on conditions.

Other benefits from this plan include improving river productivity and function for other species including Platypus, rakali, turtles and waterbirds.

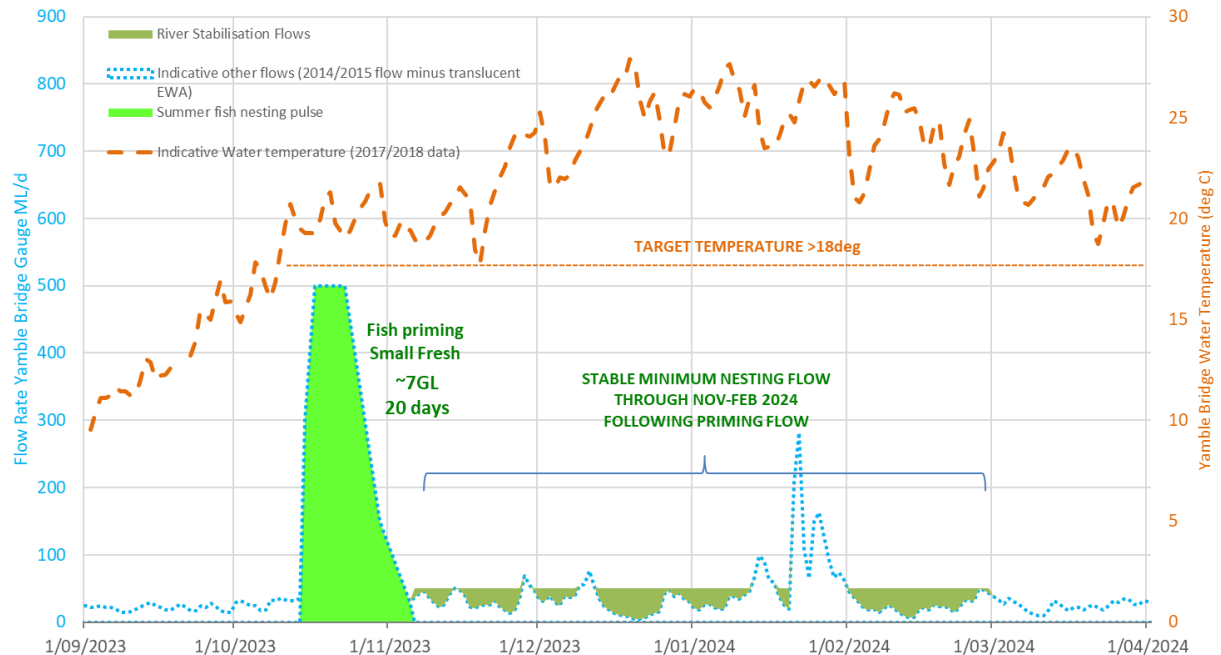


Figure 3: Proposed 2023-2024 environmental watering events at Yamble Bridge under dry conditions - plan as at May 2023

5. MONITORING IN 2023-2024

- A list of proposed monitoring actions was presented by DPE Environment & Heritage Group including waterbirds, vegetation and frog surveys and wetland inundation mapping.
- CEWO is funding DPI-Fisheries to undertake fish movement monitoring focussed on the Lower Macquarie/Macquarie Marshes and the Dubbo-Gin Gin reach.
- Commencement of baseline data collection for the regulated Cudgegong River.

6. COMMUNICATIONS IN 2023-2024

- A range of media and communication activities will be undertaken by DPE EHG and CEWO.
- Specific items will focus on the Cudgegong community, including supporting EWAG members to link to residents.

7. UPDATE ON VARIOUS WATER-RELATED PROJECTS

- **Northern Basin Toolkit project** – Oxley break No3 bed raising structure – survey to commence soon for approvals work by Water Infrastructure NSW ('WIN')
- Southern MMNR '**Breakaway**' structures – National Parks getting closer to this work proceeding

NEXT MEETING: Tues 8 August 2023, location TBC, possibly Mudgee