

Department of Climate Change, Energy, the Environment and Water

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2022–23 Active Management Annual Evaluation and Review

Full report on active management in the unregulated water sources of the Barwon–Darling,
Gwydir and Macquarie–Bogan

June 2024



Acknowledgement of Country

The Department Climate Change, Energy, the Environment and Water acknowledges that it stands on Aboriginal land. We acknowledge the Traditional Custodians of the land and we show our respect for Elders past, present and emerging through thoughtful and collaborative approaches to our work, seeking to demonstrate our ongoing commitment to providing places in which Aboriginal people are included socially, culturally and economically.

Published by NSW Department of Climate Change, Energy,
the Environment and Water

dcceew.nsw.gov.au

2022–23 Active Management Annual Evaluation and Review

First published: June 2024

Department reference number: PUB24/464

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Executive Summary

Between 1 July 2022 and 30 June 2023, the active management procedures provided regulatory protection to 67.2 gigalitres (GL) of active environmental water (AEW) in the unregulated Barwon-Darling and Macquarie-Bogan water sources. Protection was applied across:

- 1 event in the Barwon-Darling, which protected 32.4 GL
- 2 events in the Macquarie-Bogan, which protected 34.8 GL.

As a result of the protection, 10.2 GL of AEW flowed into the Menindee Lakes in 2022-23.

The active management procedures were not applied in the unregulated Gwydir because there were no held environmental water (HEW) deliveries which the active management procedures needed to protect. In the Gwydir, the active management procedures only apply to HEW deliveries and only in three management zones; Upper Gingham, Lower Gingham and Mallowa creeks. HEW was delivered to the Mallowa, however they were low flows which were already protected by access thresholds on unregulated river access licences.

WaterNSW followed procedures in 2022-23

WaterNSW followed the active management procedures for each event in 2022-23, with the exception of a deviation in the Barwon-Darling where WaterNSW have been adjusting access thresholds for a schedule 2 licence (WAL 33722) to account for AEW. This same deviation was reported in 2020-21, with recommendation 18 created to resolve the inconsistencies between the mandatory and discretionary conditions, the procedure, and the water sharing plan.

Recommendation 18 is still in progress.

WaterNSW have not yet published information on flow and loss forecasting methods, as required by procedure manuals (also tracked through the [Claydon Review](#) as recommendation 9). WaterNSW have drafted this information and when finalised it will be published on their WaterInsights portal. This matter is not reported as a deviation from procedures.

Managing flow forecasting uncertainty remains a key challenge for active management

Active management implementation relies on flow forecasting for announcements and AEW protection. Due to the inherent variability in natural river systems, forecasting is inexact and actual

flows may fall short or exceed forecast flows. Forecasting, therefore, remains the primary operational risk in implementing active management. Specific issues contributing to flow forecasting uncertainty raised in this review include reduced capacity for upstream operators to forecast end-of-system flows during flood periods, and challenges forecasting local rainfall and the impact of expressions of interest (EOIs) in the Barwon–Darling which exceed intentions to take.

A review of ‘mismatch’ totals found WaterNSW’s measures to manage the risk to be appropriately conservative in the Macquarie–Bogan, as the total proportion of ‘under-announced’ volumes were less than 5%. The mismatch was similar across zones except for larger impacts in the Macquarie downstream sub zone 2.

There were relatively large mismatches in the Barwon–Darling, however, for available water announcements for both AEW and consumptive licences. These were under-estimated by 23% and 13% respectively. Barwon–Darling mismatches were due to forecasting issues and impacts when licence holders’ EOIs are not updated to reflect their intention to take. WaterNSW are working on improved forecasting methods, while the issue with EOIs can be most easily resolved by customers regularly entering realistic EOIs into the WaterNSW Water Accounting System (via iWAS). Other planned improvements such as sub-daily announcements and temporary trading of IDECs may also help address these issues.

Compliance monitoring has been hampered by a lack of access to quality-assured telemetry data

The Natural Resources Access Regulator (NRAR) has a broad capability and experience in monitoring environmental flow events for compliance with licence obligations. NRAR can, and regularly does, use real time and historic spatial data as well as field personnel to undertake compliance monitoring activities. However, NRAR did not monitor any of the specific active management events that occurred in 2022–23. This means that there is uncertainty around the level of water user compliance with active management procedures. There are existing recommendations for enabling efficient compliance assessments in the future (R.25 and R.26) but progress on those recommendations has been limited by delays in access to telemetered extraction data.

There have been delays in quality assuring and linking telemetered usage data to the WaterNSW Water Accounting System (WAS) database. WaterNSW and the Water Group in the NSW Department of Climate Change, Energy, the Environment and Water, via the [non-urban metering review](#), are working to identify and resolve issues with metering.

Procedures were largely effective at protecting active environmental water, but improvements are still required

Previous reviews identified improvements required for procedures or implementation of procedures. In some cases, the recommendations relate to water sharing plans or the Active Management in Unregulated Rivers Policy, and therefore require longer timeframes to be addressed – that is, at the time of water sharing plan remake, or as part of the policy review due February 2026.

There were 39 recommendations made in the first active management annual review (2020–21) and 5 in the second review (2021–22), a total of 44 recommendations. Ten of the recommendations from 2020–21 were reported as complete in the 2021–22 review. Of the remaining 34 recommendations across previous reviews:

- 7 recommendations have been addressed
- 19 recommendations have been progressed
- 8 recommendations have not had any progress

Several of the recommendations are delayed due to inadequate access to telemetered usage data.

Further changes to the overarching Active Management in Unregulated Rivers Policy, the three procedures manuals and water sharing plans are required to address existing recommendations. In 2024–25, the Water Group will undertake consultation with water users and key stakeholders on substantial procedural changes, as specified in part C of the procedures manuals.

Summary of new recommendations

There are 5 additional recommendations this year.

R.45 The Water Group and WaterNSW to discuss management of expressions of interest (EOIs) with licence holders in 2024.

R.46 WaterNSW to investigate the possibility of upgrading the current model to enable attenuation of AEW.

R.47 The Water Group to consult with affected Macquarie–Bogan stakeholders in 2024 to seek suggestions for improvement and consult on proposed procedure changes.

R.48 The Water Group to clarify, during the Active Management in Unregulated Rivers Policy review, whether non-HEW licences can submit EOIs to protect water.

R.49 The Water Group to update the Macquarie–Bogan procedures manual to clarify that both AEW and flow below CTP is to be protected.

1 Introduction

1.1 Background

In 2020, active management rules were implemented in the water sharing plans for the unregulated Barwon–Darling, Gwydir and Macquarie–Bogan water sources (see Appendix A – Where active management rules apply). The rules protect environmental flows that were previously available for extraction, replacing the need for temporary water restrictions.

The rules gave effect to the three procedures manuals for each water source which describe the operational procedures to protect active environmental water and reflect the principles and objectives outlined in the Active Management in Unregulated Rivers Policy (the policy). More information is available on the department’s [Active management website](#).

To clarify, the ‘active management rules’ are not directly related to the practice of ‘actively/adaptively managing’ environmental water for environmental outcomes. In NSW, this practice is the role of the NSW Environmental Water Manager, a delegated responsibility of the department’s Biodiversity, Conservation and Science Group (BCS Group), and the Commonwealth Environmental Water Holder (CEWH). From here on, ‘active management’, active environmental water (AEW) and ‘actively managed flow events’ refer only to the implementation of the active management rules/procedures.

1.2 Purpose

The purpose of the evaluation and review is to support learning and provide for improvements to active management procedures, in line with the adaptive management/continuous improvement approach. The evaluation and review did not include monitoring of environmental outcomes arising from the use of environmental water, since this is a responsibility of the BCS Group and CEWH. Reviews on outcomes arising from the use of environmental water can be found on the following BCS Group and CEWH websites:

- [NSW Water for environment outcomes 2022–23](#)
- [Flow-MER – Environmental Water Monitoring, Evaluation and Research](#)

The purpose of this document is to present the detailed, technical findings and recommendations of the third annual evaluation and review into the implementation of active management between 1 July 2022 and 30 June 2023 – equivalent to the third ‘water year’ of implementation. Previous annual reviews can be found on the department’s [Active management website](#).

1.3 Stakeholder consultation and contributors

The evaluation and review was conducted by the Water Group, with input from partner agencies WaterNSW, the BCS Group, and the Natural Resources Access Regulator (NRAR). The evaluation and review compiled information from partner agencies' annual active management reports, and from feedback gathered from licence holders and peak stakeholder groups (as per Table 1 in the procedure manuals found on the [department's website](#)).

The Water Group consulted with licence holders and peak stakeholder groups through the following avenues:

- WaterNSW Barwon–Darling Customer Advisory Group (CAG), 9 November 2023 (Water Group representatives attended in person in Bourke)
- Barwon–Darling Water Inc., submission 15 December 2023
- Macquarie–Bogan individual consultations, 1 hour meetings with 4 unregulated licence holders in the Lower Macquarie, 19 and 29 November 2023
- An online submission form was created 8 November 2023 for the purpose of gathering water user feedback on active management implementation (the form remains open for future reviews)
- Water user feedback gathered by partner agencies and detailed in their annual active management reports.

The Water Group will continue to work with stakeholders on relevant outstanding issues.

2 Annual evaluation and review requirements

Procedures 31, 25 and 32 of the Barwon–Darling, Gwydir and Macquarie–Bogan procedures manuals, respectively, outline the matters for consideration (or requirements) for the annual evaluation and review. The requirements are listed in Table 1 alongside the section in the report where they are addressed. Additional requirements, relating to stakeholder consultation and mismatch procedures, are listed elsewhere in the manuals and are discussed below Table 1.

Although issues raised by agencies are not a review requirement, they are still included in the review.

Reporting on the ‘resumption of flows’ rule is also included in this review, although not required in the procedures manual for the Barwon–Darling where the rule is implemented.

Table 1. Matters for consideration and the sections of this report where they are addressed

Matters for consideration (review requirements)	Section of this report
a) Reporting on the implementation of improvements from previous reviews	Section 4.3
b) Issues relating to active management raised through consultation with stakeholders	Section 4.1 (stakeholders) Section 4.2 (agencies)
c) A summary of results and recommendations contained in reports provided by WaterNSW, NRAR and the BCS Group	Section 3 (results) Section 4.2 (agency recommendations)
d) Proposals for variations or new procedures brought forward by agencies or stakeholders	Section 4
e) An assessment of whether: <ul style="list-style-type: none">procedures were followed for active managementany deviations from the procedures occurred and any modifications to the procedures that may be required to avoid future deviations, where possible	Section 5

Matters for consideration (review requirements)	Section of this report
<ul style="list-style-type: none"> the current active management procedures and the associated operation provide for AEW to remain in the water source for environmental purposes the risk management measures in place are effective in protecting AEW and ensuring that access by water users to water above the access thresholds arising from other sources has not been impacted, and the active management procedures should be expanded, modified or remain unchanged. 	
f) Recommendations to change the manuals, the active management policy or [relevant] WSP rules relating to active management	Section 5.4 and 5.5

2.1 Mismatch

Note 5 of Procedure 18 in the Barwon–Darling Procedures Manual states that “The NSW Department of Planning, Industry and Environment – Water will consider during the annual review if criteria are required to define when a response to a mismatch between forecast and observed AEW should be taken.” Note 2 in the Gwydir Procedures Manual is similar, but no such note is included in the Macquarie–Bogan Procedures Manual. Criteria to define when mismatch responses are made, as per these notes, has not been considered in this review as the mismatch procedure may be paused once sub-daily announcements are implemented. See recommendation 1 in section 4.3 for further information about sub daily announcements.

3 Actively managed events in 2022–23

Between 1 July 2022 and 30 June 2023, the active management procedures provided regulatory protection to 67.2 gigalitres (GL) of active environmental water (AEW) in the unregulated Barwon–Darling and Macquarie–Bogan water sources. Protection was applied across:

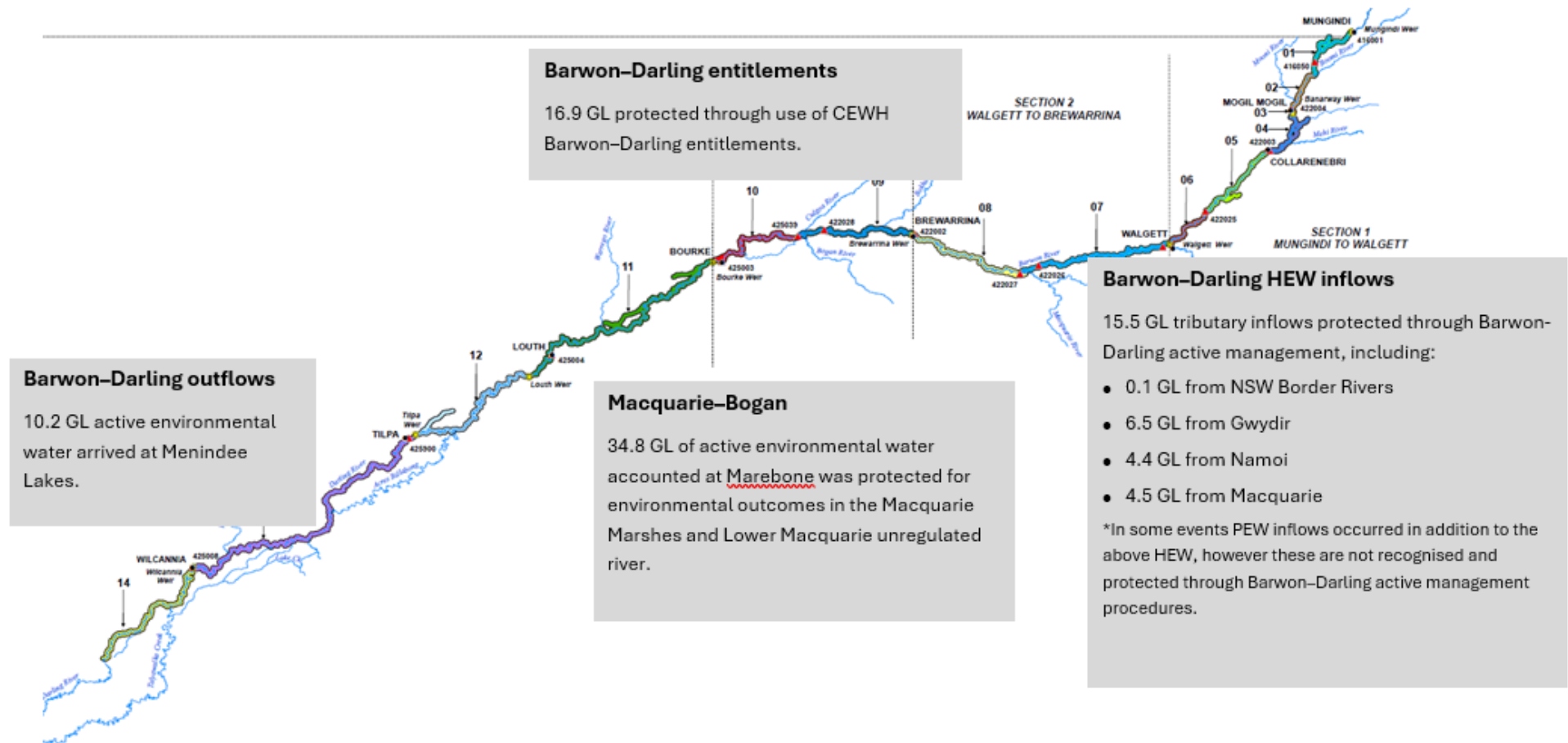
- 1 event in the Barwon–Darling which protected 32.4 GL
- 2 events in the Macquarie–Bogan which protected 34.8 GL.

As a result of the protection, 10.2 GL of AEW flowed into the Menindee Lakes in 2022–23.

A summary of the events and the total volumes protected is shown in Figure 1.

The active management procedures were not applied in the unregulated Gwydir because there were no relevant HEW deliveries which required protection.

Figure 1. Summary of volumes protected under active management procedures in 2022–23



3.1 Barwon–Darling

There was one event in the Barwon–Darling Unregulated River Water Source in the 2022–23 water year which extended from 12 March to 30 June (Table 2). Key features of the event were:

- AEW tributary inflows first arrived from the Macquarie on 12 March 2023 and continued until 30 March 2023
- AEW tributary inflows then arrived from the Macquarie on 4 May and continued until to 23 May 2023
- In between the two AEW inflows above, AEW arrived from the Border, Namoi and Gwydir
- All water combined and created a single ‘event’ in the Barwon–Darling that continued after 30 June 2023
- Around 15,521 ML arrived from upstream regulated valleys (see Figure 1 for more detail)
- A further 16,871 ML was protected through Barwon–Darling held environmental water (HEW) entitlements.

AEW was sometimes a significant portion of total flow in the Barwon–Darling during the March to June period (Figure 2, Figure 3, Figure 4).

The environmental objective was connectivity and improved water quality. The BCS Group have stated that they are unable to assess the degree to which active management procedures enable environmental water holders to achieve their objectives as they do not know how much additional water could have been taken if the procedures were not in place. It is possible the impact is large, depending on irrigation demand.

In late 2023 a procedure was agreed to protect QLD HEW from the Border Rivers regulated system into the Barwon–Darling. QLD HEW reaching the Barwon–Darling from the Intersecting Streams will not be recognised until the Water Group’s accounting method is implemented. The accounting method is in development. Key stakeholders will be consulted on the method before they are approved by the Water Group. Once approved, the method can be implemented and HEW inflows can be recognised and protected as AEW in the Barwon–Darling. No updates to the Barwon–Darling procedures manual are required to implement the method.

Table 2. Description of active management undertaken in the Barwon–Darling in 2022–23

Date commenced & finished	Total AEW protected (ML)	AEW from upstream tributaries (ML)	Total AEW from Barwon–Darling licences (ML)	AEW @ Wilcannia (ML)	AEW @ Lake Wetherell (ML)
12 Mar - 30 Jun	32,392	15,521	16,871	15,936	10,217

Figure 2. Barwon–Darling total flow (blue line) and active environmental flows (orange line) in Walgett, March – June 2023

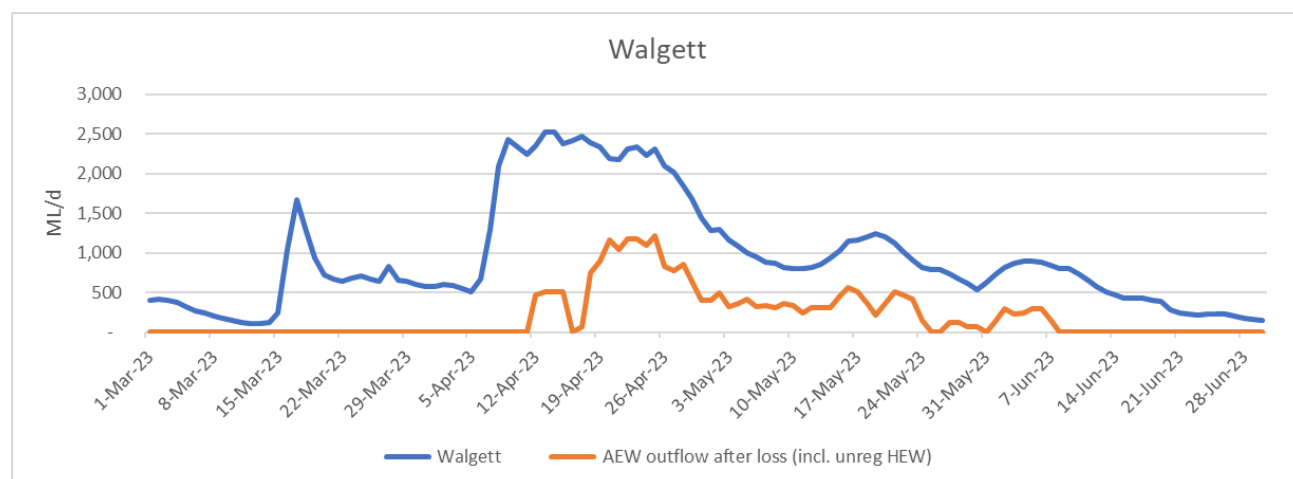


Figure 3. Barwon–Darling total flow (blue line) and active environmental flows (orange line) in Bourke, March – June 2023

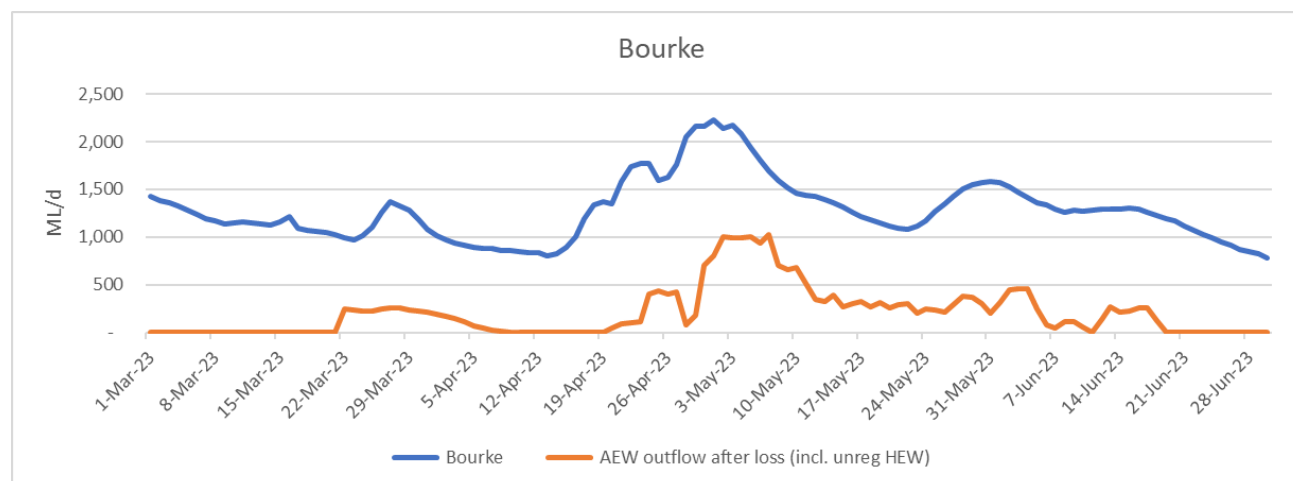
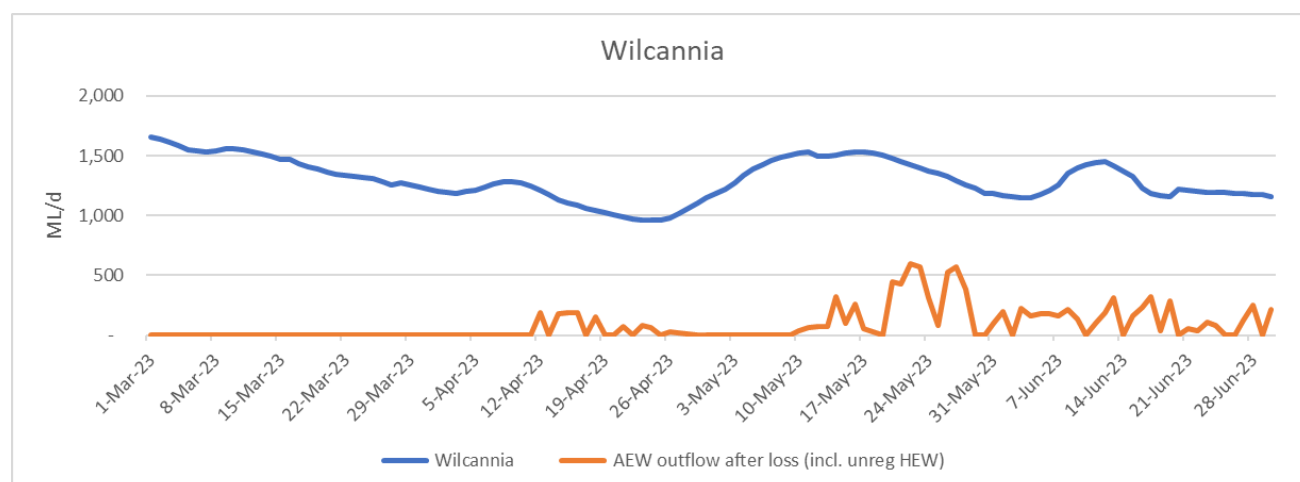


Figure 4. Barwon–Darling total flow (blue line) and active environmental flows (orange line) in Wilcannia, March – June 2023



The resumption of flows (RoF) rule was not triggered in 2022–23 year (Table 3).

Table 3. History of all resumption of flows events

Event #	Start date (any triggers activated)	End date (all triggers relaxed)	Total volume protected (ML)	Total volume that may have been extracted without RoF (ML)
#1	12 January 2021	29 January 2021	8,000 ¹	6,000 ²

3.2 Gwydir

In 2022–23 WaterNSW did not issue access announcements in the relevant sections where active management can be applied in the Gwydir (Upper and Lower Gingham and Mallowa). The active management procedures do not apply to PEW in the Gwydir. HEW deliveries were made to the Mallowa, however they were low flows which were already protected by access thresholds on unregulated river access licences.

Any AEW originating from the Gwydir continues to be protected in the Barwon–Darling. In 2022–23 High Security HEW was used to improve water quality and connect to the Barwon–Darling.

Note that on 1 December 2023 clause 52 of the Gwydir regulated river water sharing plan commenced and this provides for active management protection conditions on floodplain harvesting (regulated river) licences in the Mallowa Creek Management Zone. There are currently no floodplain harvesting access licences in this management zone. If this changes, the Water Group will develop procedures to enable active management announcements for the zone.

¹ WaterNSW 2021. [Resumption to Flows event report February 2021](#). Accessed online 8 August 2023

² WaterNSW 2021. [Resumption to Flows event report February 2021](#). Accessed online 8 August 2023, sum of expressions of interest

3.3 Macquarie–Bogan

There were 2 AEW events in the Macquarie–Bogan Unregulated River Water Source in the 2022–23 water year (Table 4 and Figure 5). Key features of the events were:

- There was a combination of planned environmental water from the EWA2 account (PEW -Active) and general security HEW use
- The environmental objective for event 1 was to maintain the water level in key waterbird rookeries to support the successful completion of breeding in the Macquarie Marshes
- The environmental objective for event 2 was to provide a small fresh through the Marshes and lower Macquarie, to support the movement and dispersal of native fish. and a secondary benefit of Barwon River connectivity.

The BCS Group have stated that they are unable to assess the degree to which active management procedures enable environmental water holders to achieve their objectives, as they do not know how much additional water could have been taken if the procedures were not in place. For event 1, they indicated that there was likely no unregulated take during flooding hence the procedures may not have had an impact. For event 2, it is possible the impact of the procedures is large, depending on irrigation demand.

Figure 5. Macquarie–Bogan total flow (blue line) and active environmental flows (orange line) Feb – May 2023

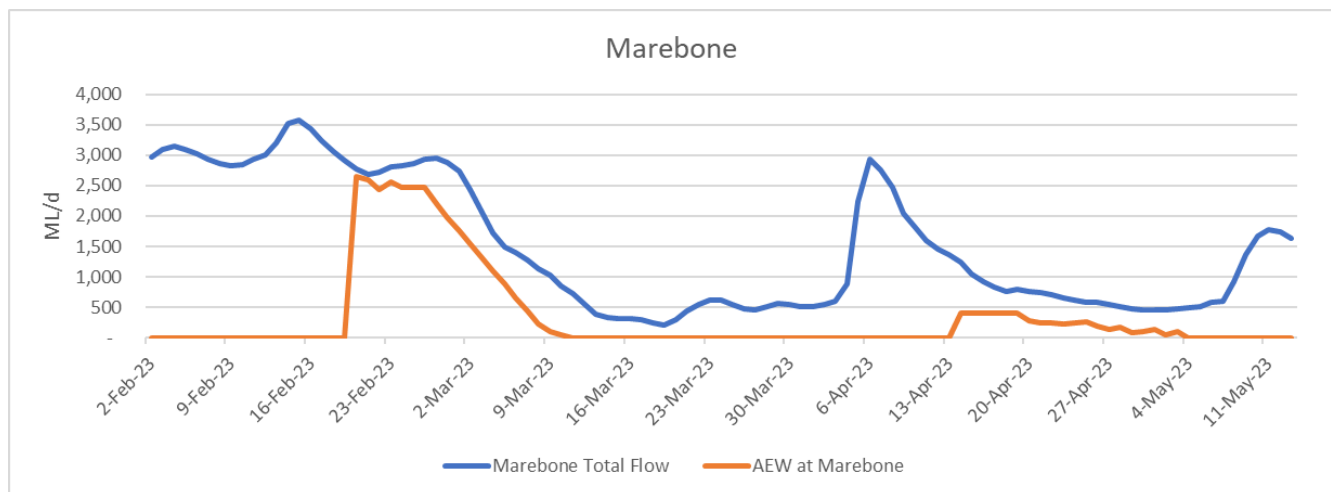


Table 4. Description of active management undertaken in the Macquarie–Bogan in 2022–23

Event name	Date commenced & finished	Event type [HEW / PEW]	Target asset/location	AEW Macquarie River @ Marebone Weir (ML)	AEW Macquarie River D/S Marebone Weir (ML)	AEW Marebone Bk @ D/S Marebone Regulator (ML)	AEW outflow ³ (ML)
Event #1	20 Feb – 10 Mar	HEW (GS) PEW (EWA2)	Macquarie Marshes	29,897	25,591	4,306	7,410 (HEW – 3,857 EWA2 – 3,553)
Event #2	14 Apr – 3 May	HEW (GS) PEW (EWA2)	Macquarie Marshes	4,947	3,553	1,394	1,306 (HEW – 676, EWA2 – 630)

³ Note that EWA2 is not recognised as AEW in the Barwon Darling and therefore does not have further protection under the Barwon-Darling active management procedures

4 Review

4.1 New issues and recommendations raised by stakeholders

The issues raised by stakeholders came from partner agencies' annual statements, direct consultation, or submissions from stakeholders. 'Stakeholders' are licensed water users or their representatives. The Water Group responses are provided alongside the issues in Table 5

If an issue is a duplicate from any issue or recommendation in prior reviews, it is not included in Table 4. See Section 4.3 for an update on previous recommendations.

Table 5. Issues raised by stakeholders and the Water Group's response

ID	Water source	Issue	Description	Water Group response
I.01	Macquarie–Bogan	Clarity of notices	<p>Issue raised by irrigator in informal discussions with partner agency:</p> <p>The irrigator indicated that WaterNSW notices are difficult to interpret – too technical/too much jargon. This was partly mitigated by the availability of WaterNSW River ops staff for phone queries.</p>	WaterNSW can further explain the announcements to stakeholders at relevant CAG meetings and other forums and any specific issues with announcements can be identified.
I.02	Barwon–Darling	Expressions of interest – equity of volume distribution and impacts	<p>In March 2023, Barwon–Darling CAG members were concerned about the impacts on customers downstream of Walgett Weir during the April–May 2023 period, who had an EOI in place but were being disadvantaged due to WaterNSW preventing access for those users when usage above the weir is getting close to the threshold, even though upstream users are not always using their full EOI volumes.</p>	<p>WaterNSW are following the active management procedures by announcing access to water users based on expressions of interest (EOIs). EOIs can be entered for a maximum of 400 days, however, WaterNSW and the Water Group encourage licence holders to regularly update EOIs to reflect their intention to take.</p> <p>WaterNSW has reviewed and discussed this issue with CAG members (<i>Action BD2303.01</i>). WaterNSW's review found that when licence holders do not update their EOIs to reflect their intention to take, it impacts other licence holder access.</p> <p>To mitigate some of the impacts of unrealistic EOIs, WaterNSW restrict EOIs by the remaining account balance. The implementation of sub-daily announcements (R.1) and temporary trade of IDECs (R.2) will further mitigate impacts from unrealistic</p>

ID	Water source	Issue	Description	Water Group response
				<p>EOIs. Sub-daily announcement may recognise untaken water flowing into the downstream management zone, while temporary trade of IDECs (R.2) will enable access to higher IDECs to better match a water user's demand.</p> <p>R.45 The Water Group and WaterNSW to discuss management of expressions of interest (EOIs) with licence holders in 2024.</p> <p>The department may review IDECs and share components once new information becomes available. In the interim, the most effective way to manage this issue is for water users to regularly update EOIs to reflect their intention to take.</p>
I.03	Barwon-Darling Macquarie-Bogan	Confidence and review input	<p>In March 2023, CAG members raised a concern regarding confidence of the active management system as a whole.</p> <p>Licence holders in the Macquarie-Bogan also raised concerns about WaterNSW having insufficient resourcing which has eroded confidence in how the procedures are implemented and reduced the level of support. They would like support 7 days a week particularly when conditions are changing and users are pumping.</p>	<p>The Water Group engaged with stakeholders in late 2023 to gather feedback on the implementation of active management for consideration in this annual evaluation and review.</p> <p>Feedback from the Barwon-Darling Water Inc (BDW) submission has been incorporated into this review and specific issues raised in the submission are considered below (I.04, I.05 & I.06) where there is not already an existing recommendation.</p> <p>Specific issues raised by licence holders in the Lower Macquarie have also been included (I.07 to I.12).</p> <p>Note also that WaterNSW have recently recruited additional staff to the river operations team which will improve the level of support for active management implementation.</p>

ID	Water source	Issue	Description	Water Group response
I.04	Barwon-Darling	Feedback on existing recommendations	Barwon-Darling Water Inc commented on existing recommendations and asked for consultation on some of these.	Any update to procedures or the policy will include consultation with key stakeholders as required by procedure manuals. The Water Group will attend the Barwon-Darling CAGs in 2024 and can provide further updates on existing recommendations as required.
I.05	Barwon-Darling	Automatic EOI reminder	Barwon-Darling Water Inc conveyed and supported licence holders' request for an automatic reminder notification when their EOI is about to expire.	iWAS clearly shows when the current EOI is about to end. WaterNSW has noted the request for automatic reminders and are reviewing feasibility and costs.
I.06	Barwon-Darling	Equity of volume distribution and impacts	Barwon-Darling Water Inc - concerned about the inability of individual licensees to get a transparent picture of how much water they miss out on due to the imprecise nature of model forecasting and the potential misallocation of pumping opportunities.	The annual evaluation and review reports include a summary of mismatches between actual and announced volumes across events (see 2020-21 report) or across water sources (see 2021-22 report and section 5.3.2 of this report). The summaries are included to understand whether procedures are having unintended impacts on access, noting that a balance must be struck between over-estimating and underestimating available water and AEW, while remaining operationally feasible. The Water Group and WaterNSW will investigate mismatches between actual and forecast announcements for each zone, to the extent required to understand whether the procedures or

ID	Water source	Issue	Description	Water Group response
				<p>forecasting models are causing any unintended impacts on access. See section 5.3.2 for further information.</p> <p>R.45 The Water Group and WaterNSW to discuss management of expressions of interest (EOIs) with licence holders in 2024.</p> <p>Regarding "Misallocation of pumping opportunities", see the response for I.02 above regarding the impacts of unrealistic EOIs on access/pumping opportunities.</p>
I.07	Macquarie–Bogan	Model accuracy	Licence holders in the Lower Macquarie provided evidence of missed local rainfall events and questioned the model's ability to capture local rainfall-runoff.	WaterNSW are developing rainfall-runoff models that will automatically incorporate local rainfall runoff into available water assessments. In the interim, WaterNSW will manually assess and incorporate rainfall runoff.
I.08	Macquarie–Bogan	Model accuracy	Insufficient attenuation of AEW means overs and unders in the announcements - making access variable and difficult for licence holders to plan and operate	<p>It is not feasible to add an attenuation model to WaterNSW's current operational model, CARM-Lite. WaterNSW would need to upgrade the operational model to either CARM or Source Ops.</p> <p>R.46 - WaterNSW to investigate the possibility of upgrading the current model to enable attenuation of AEW.</p>

ID	Water source	Issue	Description	Water Group response
I.09	Macquarie–Bogan	Event notification	Better communication of when AEW is coming so they can start to plan / watch more closely.	<p>WaterNSW’s announcements already state what AEW is in the system (see Section 4.1.1 for an example).</p> <p>WaterNSW are currently updating WaterInsights to include a plot that shows what AEW is in the system (see R.20) like the plot for the Barwon–Darling.</p> <p>R.47 The Water Group to consult with affected Macquarie stakeholders in 2024 to seek suggestions for improvement and consult on proposed procedure changes.</p>
I.10	Macquarie–Bogan	Volume distribution and rostering	Licence holders in the Lower Macquarie can receive several small volumetric announcements below volumes that justify starting and operating their pumps. Previously, licence holders could roster access across days so that they have one day of good access rather than multiple days of low access. Licence holders believe a longer announcement period would enable rostering.	<p>This issue will be explored with stakeholders later in the year.</p> <p>R.47 The Water Group to consult with affected Macquarie stakeholders in 2024 to seek suggestions for improvement and consult on proposed procedure changes.</p>

ID	Water source	Issue	Description	Water Group response
I.11	Macquarie–Bogan	Equity of volume distribution and impacts	EOI process - lack of realistic EOIs causing impacts.	<p>As mentioned in I.02 (the same issue but for the Barwon–Darling) WaterNSW restrict EOIs by the remaining account balance.</p> <p>Management of EOIs will be discussed with licence holders at CAGs and other forums in 2024, however, the most effective way to manage this issue is for water users to regularly update EOIs to reflect their intention to take.</p>
I.12	Macquarie–Bogan	AEW definition	Licence holders claimed non-HEW licence should not be able to protect water in stream	This will be reviewed during the active management policy review. See R.16 and R.48

4.1.1 Example of AEW advice provided in existing announcements

Figure 6 is an example of the advice provided to customers alerting them to AEW and when it is likely to pass downstream locations. This advice enables customers to plan ahead. The announcement can be found on WaterInsights, in iWAS and also through SMS alerts.

Figure 6. Example of flow advice provided in an announcement for the Macquarie–Bogan

General flow advice and additional Information

Release for environmental water delivery in regulated Macquarie has started from 12 August 2023, consequently, the environmental flows have arrived at Marebone on 19 August 2023. AEW delivered at Marebone on 19 August 2023 will likely to pass through Oxley on 21 August 2023, Pillicawarina 25 August 2023, Miltara 1 Sept 2023, Carinda 3 Sept 2023 and Barwon Confluence 9 Sept 2023. All above dates are estimates and may vary with the travel time. Untill AEW enters each management zone access to flows will be as per the NORMAL licence conditions.

4.2 New issues and recommendations raised by partner agencies

Issues and recommendations raised by partner agencies (WaterNSW, NRAR, the BCS Group and NRC) are presented in Table 6 along with the Water Group response.

Duplicate issues or recommendations from prior reviews are not included in the following table. See Section 4.3 for an update on previous recommendations.

Table 6. Issues and recommendations raised by partner agencies and the Water Group's response

ID	Agency	Issue	Description	Agency recommendation	Water Group response
I.13	BCS Group and CEWH	Transparency	<p>No public transparency of Active Management events.</p> <p>The Macquarie announcements don't provide any information on flow rates and volumes being protected. This information would be useful for environmental water managers but also for transparency into active management in the Barwon.</p>	<p>Put something on WaterInsights to show what water is in the river and what protection is provided to it.</p> <p>It would be helpful to show water being actively managed across the Northern Basin. Ideally sources (catchments), where water is being protected and flow rates/volumes if possible. This transparency will become increasingly important as water is protected from QLD, NSW tributaries and all the way to and potentially through Menindee.</p>	<p>See existing recommendation R.20.</p> <p>The source of AEW will also be reported in monthly event reporting to agencies (see R.10 and R.26)</p>
I.14	BCS Group	Compliance checks	No evidence of compliance	NRAR need to be checking for compliance and demonstrate that the system is working.	See existing R.25 & R.26
I.15	BCS Group and CEWH	Hydrological Impact Assessment	Difficulty in assessing impact.	<p>WaterNSW and NRAR reports should be provided to the BCS Group prior to assessing impacts.</p> <p>Unreg volume not taken needs to be estimated to enable an assessment of impacts.</p>	<p>See existing recommendation, R.26: <i>WaterNSW will provide event report summaries to the BCS Group during the year</i></p> <p>It is not feasible at this stage to calculate the unregulated volume that would have been taken if active management procedures were not in</p>

ID	Agency	Issue	Description	Agency recommendation	Water Group response
					place. However, the Water Group will work with the BCS Group to prepare better data and products to enable assessment of outcomes (See R.41)
I.16	BCS Group	Water balance	Water balance broken in Lower Macquarie. The gauges in the Lower Macquarie do not allow a firm water balance so it is very difficult to know if there is any effect. (The Water Group note that the BCS Group are trying to reconcile Macquarie end of system flows with changes in Barwon–Darling flow and additional information is required to do this.)	Use new telemetry and gauging to create a water balance that works for this area, embed that in WaterInsights alongside active management annual reporting.	See R.31 for progress on an additional gauge in the Marthaguy Creek. The active management model will be updated when new data such as the gauge and telemetered usage data becomes available. WaterInsights will also be updated when the new gauge is complete. WaterInsights shows gauged flow diagrams (e.g. see Barwon–Darling > System View) and a data request has been made for this to be updated to enable the user to select custom periods to show total flows.
I.17	BCS Group	Barwon–Darling AEW definition	‘3T’ water diverted away from Gingham Lower Gwydir after an extreme wet period and reached the Barwon–Darling where it was no longer protected. This PEW does not normally reach the	The BCS Group recommends that PEW which would not normally enter a system should have protection for its duration of existence in that system (e.g. until its volume is diminished with instream losses).	The Water Sharing Plan for the Gwydir Regulated River Water Source allows for 3T water to be diverted from the wetlands during extreme wet periods and this was <u>supported by the EWAG</u> . This water is not protected as the Barwon–Darling water sharing plan

ID	Agency	Issue	Description	Agency recommendation	Water Group response
			Barwon Darling except in very wet times.		and active management procedures only recognise HEW as AEW. AEW definitions will be reviewed as part of the Active Management Policy review which is due February 2026.
I.18	WaterNSW	Missed announcements	<p>There were two days where the announcement was not published in the Barwon–Darling. Only one of these days had AEW present. There was one day in the Macquarie–Bogan.</p> <p>Two of these missed announcements were due to an incomplete approvals process. One was due to patching on the Water Distribution Module (WDM).</p> <p>The Barwon–Darling procedures manual allows for protection of AEW during missed announcements as the previous day’s announcement applies and this is communicated to licence holders. The same approach applies in the Macquarie however</p>	<p>To avoid any such issues in future WaterNSW had trained multiple operators and provided them with approval access. They have also clarified the approvals process. They are investigating whether a further process improvement can be added to send a reminder to the relevant operator and supervisors if approval is pending for an announcement.</p>	<p>Noted. Not considered a deviation as the WaterNSW prior announcement states “If an announcement is not made for a period of time that applies after this Announcement, then this Announcement still applies.”</p>

ID	Agency	Issue	Description	Agency recommendation	Water Group response
			the procedures manual has not yet been updated to state this.		
I.19	NRAR	Event notification	Uncertainty when events occur.	The department to advise and make as simple as possible advice to NRAR when an active management event is forecast to occur. Suggest that The Water Group advise both the NRAR executive and leadership group of active management events using the existing email group.	See existing R.33
I.21	NRAR	Compliance checks - method	NRAR are waiting on WaterNSW to automate a live database table to enable compliance monitoring of all active management events. A specification was provided to WaterNSW in February 2021 but WaterNSW have not provided any update.	NRAR to reactivate this issue and contact WaterNSW.	Noted. See existing R.25

ID	Agency	Issue	Description	Agency recommendation	Water Group response
I.22	NRAR	Compliance checks - telemetry	ISI Branch has built active management (IDEC) monitoring dashboards, however, there is lack of quality assured and controlled (QA/QC) water take data coming in for the Barwon-Darling from DAS into WAS. This has slowed progress with compliance monitoring.	NRAR requires quality telemetry data from local intelligence devices is entered into WAS in a timely manner for active management compliance monitoring with its dashboards.	WaterNSW are working to remove the backlog of meters which have not yet passed QA/QC and been linked to WAS. WaterNSW are also working to provide a daily view of the data in WAS. See Section 5.2.2 for further information.
I.23	CEWH	Protection of Commonwealth Environmental Water through active management	CEWH staff requested in writing to ensure the CEWH water was protected. Ideally this protection would occur automatically, precluding the need for CEWH staff to specify which active environmental water is to be protected (it will be every delivery).	Commonwealth environmental water to be protected automatically.	All customers need to place orders and EOIs with WaterNSW. Ideally this is via iWAS, however, there are some gaps in that system which WaterNSW are still reviewing (R.30).

4.3 Update on previous recommendations.

There were 39 recommendations made in the first active management annual review (2020–21). The second review (2021–22) noted that 10 of these were complete and identified 5 new recommendations. Progress is noted in Table 7, excluding the 10 recommendations which were noted as complete in the last review.

Table 7. Status of previous review recommendations

REF	2020–21 review recommendation	Agency	Status	Comments
R.1	The Water Group to enable sub-daily (corrective) announcements in the unregulated Barwon–Darling water source, through water sharing plan, procedures manual and operational changes, and consider the implications for compliance monitoring.	Water Group & WaterNSW	underway	The Barwon–Darling water sharing plan has been amended to allow for sub-daily announcements, however the procedures manual has not been updated and WaterNSW have not yet completed the necessary information and communication technology (ICT) system updates to enable implementation of sub daily announcements. The Water Group are in the process of placing a system update request.
R.2	The Water Group and WaterNSW to make the required changes to the Barwon–Darling Water Sharing Plan and procedures manual and develop systems to enable temporary trade of IDECs.	Water Group	underway	The Barwon–Darling water sharing plan has been amended but the procedures manual and ICT systems have not. The Water Group is in the process of placing a system update request.
R.3	The Water Group to consider revising wording for access thresholds in the Barwon–Darling Water Sharing Plan (49A, Table B) from "more than" to "equal to or more than".	Water Group	not started	The revised wording will be considered in 2024 as part of the next Barwon–Darling water sharing plan remake.

REF	2020–21 review recommendation	Agency	Status	Comments
R.4	The Water Group and WaterNSW to revise trading rules between management zones in the Macquarie–Bogan to manage the impact of trading in/out entitlements with different access thresholds.	Water Group & WaterNSW	not started	All trading rules will be reviewed during the Macquarie–Bogan water sharing plan remake.
R.6	The Water Group to change the ‘no flow share’ procedure (Procedure 19 in the Barwon–Darling procedures manual) to prevent licence holders who did not submit an EOI from extracting water.	Water Group & WaterNSW	underway	This recommendation was required to prevent implementation issues and will be discussed with stakeholders later in the year.
R.7	The Water Group and WaterNSW to complete investigations into travel times greater than one day within a management zone and their impact on licence holders in the Macquarie–Bogan.	Water Group & WaterNSW	underway	The Macquarie–Bogan water sharing plan remake will consider how a change of reference gauge will work with active management.
R.8	The Water Group to advise licence holders in the unregulated Barwon–Darling, Gwydir and Macquarie–Bogan water sources on the maximum period that can be entered for an EOI.	Water Group	not started	This will be discussed with stakeholders later in the year.
R.9	The Water Group to include wording (based on any relevant WSP clauses) in the three procedures manuals relating to the period an announcement applies in the case of a system outage and should clarify that the announcement covers both the flow class and flow share.	Water Group	underway	WaterNSW already provide the required clarity in announcements. Water Group to update the procedures to improve clarity.

REF	2020–21 review recommendation	Agency	Status	Comments
R.10	The Water Group to amend the three procedures manuals to require WaterNSW to provide a basic summary of active management events in the previous 12 months to 30 June to agencies by 31 August each year.	Water Group	underway	WaterNSW commenced event reporting to agencies in March 2024. See R.26. We will confirm with agencies prior to the 2023–24 review if this covers their needs.
R.12	The Water Group to revise the Barwon–Darling procedures manual to clarify that multiple flow share announcements and flow class announcements (each of 24-hour duration) during times of "high flow" may be announced on one day ("high flow" to be defined) so long as WaterNSW's operational practice of daily accounting is followed.	Water Group	underway	During wet periods WaterNSW sometimes provide announcements ahead of time (e.g., to cover weekends). The Water Group have made changes to the draft (unpublished) versions of the manuals to clarify this approach.
R.15	The Water Group to further investigate measures to protect AEW in Barwon–Darling backflows from extraction in the Macquarie, and then implement these measures.	Water Group	underway	Further investigation is required. As an interim solution to best protect AEW in Barwon–Darling backflows, WaterNSW has been issuing 'no access' or 'limited access' notifications to these licence holders when they could potentially access the AEW. However, this only occurs when there is also an AEW event in the Macquarie. This issue is being considered as part of the Macquarie unregulated water sharing plan remake.

REF	2020–21 review recommendation	Agency	Status	Comments
R.16	The Water Group to resolve the issue with sleeper/irrigator licences in the unregulated Macquarie–Bogan being able to protect water instream.	Water Group	complete	<p>This issue was addressed in the first annual review. However, there is a related issue which will now be tracked through a new clearer recommendation.</p> <p>1. Whether purchase of inactive entitlement for HEW can be included in AEW and protected.</p> <p>The department does not distinguish between active and inactive licences. In the Macquarie Bogan, WaterNSW grant a licence holder access to extraction or protection of flows if the licence holder's access threshold is met, they have submitted an EOI, and all licence conditions are met. Licence holders have equal rights to access water. This was already communicated in the first annual review.</p> <p>2. Whether an entitlement which is not considered HEW can protect water through an EOI</p> <p>There are some inconsistencies across active management procedures on this matter. This provision is not currently being used.</p> <p>R.48 The Water Group to clarify during the active management policy review whether non-HEW licences can submit EOIs to protect water.</p>

REF	2020–21 review recommendation	Agency	Status	Comments
R.18	The Water Group and WaterNSW to first explore the rationale behind the inclusion of Procedure 15.3 and Note 5 and then revise the procedure, the Barwon–Darling WSP, and the mandatory and discretionary conditions for Schedule 2 and 2A licences in the WSP to ensure consistency between all three instruments.	Water Group & WaterNSW	underway	<p>Following advice from the Water Group, WaterNSW adjusted WAL 33722's access thresholds to account for AEW.</p> <p>The Barwon–Darling procedure is to be updated to remove WAL 33667 and WAL 33722 from the exclusion list as their licence conditions have CTPs applied. Inconsistencies between the plan and licence conditions will be addressed during the remake of the Water Sharing Plan for the Barwon–Darling Unregulated and Alluvial Water Sources 2012, which is due to be finalised 1 July 2025.</p>
R.20	WaterNSW to consider including a graphical representation of AEW on the WaterInsights portal and implement where practical.	WaterNSW	underway	Complete for the <u>Barwon–Darling</u> . In progress for the Macquarie.
R.21	WaterNSW to pursue opportunities to improve flow forecasting in the Barwon–Darling (in line with Claydon Review Recommendation 2 and 3).	WaterNSW	underway	<p>WaterNSW continue to revise the forecast procedure, however no significant improvements have been possible. Key issues which make forecasting difficult include limited staff resources for forecasting end of system flows during flood periods and variability in event behaviour in the Barwon–Darling. WaterNSW are in the process of developing more accurate and timely flow forecasting models.</p> <p>The non-urban metering rollout will improve flow forecasting because it will generate more data on extraction locations and volumes.</p>

REF	2020–21 review recommendation	Agency	Status	Comments
R.22	The Water Group and WaterNSW to make changes to the Gwydir procedures manual to reflect the practices of not announcing access when normal conditions apply in the Gwydir and only announcing on days when active management rules apply.	Water Group & WaterNSW	not started	No announcements were made in 2022–23. Gwydir AEW is protected as it flows into the Barwon–Darling.
R.23	The Water Group to conduct an analysis on the likelihood of an issue (issue 12 in Table 5 of the full report - equitable sharing) between two licence holders in the Macquarie–Bogan.	Water Group	underway	This needs to be resolved through an update to active management procedures and does not require an update to the water sharing plan. This issue will be discussed with stakeholders later in the year.
R.25	WaterNSW and NRAR to explore options for dynamic (near real-time) comparison of extraction data and daily access announcements.	WaterNSW & NRAR	underway	NRAR have developed specifications for the required system and will follow up with WaterNSW on progress (see I.21). Lack of quality assured telemetry data is still causing delays in compliance implementation.
R.26	The Water Group to investigate development and implementation of an active management event reporting portal so agencies can report events, track compliance, report issues and put forward recommendations throughout the year	Water Group	complete	WaterNSW commenced event reporting to agencies in March 2024. They will provide a report after each event and monthly during long events. A shared directory has been developed to store these reports and for agencies to share other relevant material. The Water Group maintains the permissions on the directory.
R.27	WaterNSW to change operational systems to prevent full IDEC announcement for licences that did not submit an EOI when the rules allow this.	WaterNSW	not started	Not started as procedure change is not finalised (see R.6). This will be discussed with stakeholders later in the year.

REF	2020–21 review recommendation	Agency	Status	Comments
R.28	The Water Group to review interim measures used by WaterNSW to address issues with Tara gauge and either endorse the measures or propose new measures.	Water Group	underway	WaterNSW forecast based on the new Caloola gauge as Tara is now only a level gauge. Stakeholders will be consulted on the inclusion of the new Caloola gauge in the water sharing plan (see R.34)
R.29	WaterNSW to identify extraction points along management zones in the Barwon–Darling and incorporate into the forecasting model to improve flow forecasts in the downstream zone.	WaterNSW	not started	Waiting on telemetry data.
R.30	The Water Group to change procedures to require environmental water licence holders to (a) nominate the end of the upstream regulated system as the delivery location when the water is then to be actively managed in the Barwon–Darling, and to (b) place such orders via iWAS.	Water Group & WaterNSW	not started	Not all end of system locations are currently listed in iWAS. Also, the BCS Group are not placing orders via iWAS. WaterNSW plan to review whether an update of iWAS is required.
R.31	The Water Group to progress installation of a new gauge at Marthaguy Creek near upstream of the confluence with Terrigal Creek (prioritised in the Hydrometric Improvement Plan).	Water Group	complete	A new gauging station has been established at Marthaguy Ck at u/s Terrigal Ck (Quambone) (421062). The gauge has been installed and is collecting height data. When sufficient data is available a rating for the new site will be developed.
R.32	WaterNSW to make access announcements from all prior water years publicly available through their WaterInsights portal.	WaterNSW	underway	WaterNSW have scoped archiving announcements on WaterInsights but have not yet implemented.

REF	2020–21 review recommendation	Agency	Status	Comments
R.33	WaterNSW and NRAR to establish an advanced notification protocol to facilitate timely active management compliance monitoring.	WaterNSW & NRAR	complete	The Water Group has established an agency email list and WaterNSW commenced sending out notifications in March 2024. Where possible, this will allow for early warning. In stream protections and use of supplementary HEW may make it difficult to give early warning.
R.34	WaterNSW to replace/relocate Tara gauge and Water Group to update references to the gauge in the Barwon–Darling WSP and procedures manual.	WaterNSW	underway	<p>A new gauge upstream of Tara has been installed – Barwon River at Caloola gauge (422035) has data since April 2022. Tara is now just a level gauge.</p> <p>Before the new gauge at Caloola completely replaces the Tara gauge, the following issues and changes need to be considered:</p> <ul style="list-style-type: none"> • Changes to the WSP – the reference to the gauge and the impacted Management Zone • Changes to licences – need to determine how many licences are “between” Tara and Caloola and notify them of the changes required to their licence. Need to also look at special licences that may reference Tara • Changes to the licencing systems, data bases, operational models.

REF	2020–21 review recommendation	Agency	Status	Comments
R.38	The Water Group and WaterNSW to address stakeholder concerns around the resumption of flows rule through external communications.	Water Group & WaterNSW	complete	<p>The Water Group and WaterNSW are communicating with stakeholders through the Barwon-Darling CAG and plan to conduct further engagements to address Claydon Review recommendations.</p> <p>Considerable community engagement has occurred in preparing the Western Regional Water Strategy and further consultation is planned associated with current work on Connectivity by the Water Group and the Connectivity Expert Panel and with the remake of the Barwon–Darling Water Sharing Plan.</p> <p>Reporting against this issue will be addressed through these other processes in future rather than through this review.</p>
R.39	The Water Group to notify licence holders of current trading rules between zones with different access thresholds.	Water Group	not started	To be discussed as part of Macquarie–Bogan water sharing plan remake
R.40	The Water Group to clarify with stakeholders how we will be consulting with them for the next annual review.	Water Group	complete	Water Group consulted through the Barwon–Darling CAG and individual consultations in the Lower Macquarie. An online submission form was also created and remains open for future stakeholder feedback: Online submission form

REF	2020–21 review recommendation	Agency	Status	Comments
R.41	The Water Group to develop better information products to communicate how active management rules protect HEW through the system and impact hydrology	Water Group	underway	We have included additional plots in Section 3 of this report and requested some improvements to WaterInsights. In addition, the Barwon–Darling <u>general purpose water account</u> includes a diagram that summarises the water balance each year, including volumes of protected water. We will continue to work with partner agencies to improve on reporting where feasible.
R.42	The Water Group to update the active management policy to further describe how proposals to expand the areas where active management rules apply will be considered.	Water Group	underway	An evaluation and review of the policy is required by February 2026. We have not formally commenced that work however we have discussed this issue with partner agencies and have started to scope what updates to the policy may be required and how the assessment process could be streamlined.
R.43	WaterNSW to review how to better track and report on causes for mismatch.	WaterNSW	complete	WaterNSW place notes in the operator sheet when large mismatch occurs to explain the causes.
R.44	The Water Group to update procedure manuals to reflect new WSP provisions for active management of floodplain harvesting licences.	Water Group	underway	Procedure changes will be scoped in 2024. These provisions enable cease to pump conditions on floodplain harvesting licences to protect AEW. Note that FPH licences are not required and are not able to submit an EOI to either protect or extract.

5 Evaluation

Item 3 (e) of Procedures 31, 25 and 32 of the Gwydir, Barwon–Darling and Macquarie–Bogan manuals, respectively, require the report to include an assessment of whether:

- procedures were followed for active management
- any deviations from the procedures occurred and any modifications to the procedures that may be required to avoid future deviations, where possible
- the current active management procedures and the associated operation provide for AEW to remain in the water source for environmental purposes
- the risk management measures in place are effective in protecting AEW and ensuring that access by water users to water above the access thresholds arising from other sources has not been impacted
- the active management procedures should be expanded, modified or remain unchanged.

5.1 Were procedures followed and any deviations?

Procedures were followed except for one deviation in the Barwon–Darling. This deviation protected AEW from one access licence when not required by the procedure (see Section 5.1.1 for further detail).

An assessment of deviations (that is, which procedures were not followed) is provided in Table 8. The findings in Table 8 are based on information provided in the annual statements and consultation with WaterNSW.

No announcements were required in the Gwydir (see Section 3.2).

While procedures were followed for each event, WaterNSW have not yet published some information on methods as required by procedures. This includes flow and loss forecasting methods. This information has been prepared and when finalised will be published on the WaterInsights portal.

Table 8. Assessment of deviations from procedures (value in brackets corresponds to deviation no.)

Procedure category	Deviations?	
	Barwon–Darling	Macquarie–Bogan
Forecasting flows and river transmission losses	N	N
Identifying, determining and monitoring active environmental water	N	N
Monitoring and managing the intended sharing of river flows	N	N
Issuing flow advice	N	N
Expressions of interest	N	N
Adjusting access thresholds	Y (1)	N/A
Determining the water available and maximum volume permitted to be taken	N	N/A
Determining the flow class	N	N
Daily management approach	N/A	N/A
Access announcements	N	N
Debiting water allocations accounts	N	N
Monitoring, evaluation, reporting and improvement	N	N

5.1.1 Deviation 1 – Adjusting schedule 2 licences to account for AEW

WaterNSW have been adjusting access thresholds for a Schedule 2 licence (WAL 33722) to account for AEW. This action represents a deviation from Procedure 15 (3) and Note 5 of the Barwon–Darling procedures manual. This deviation was first reported in the 2020–21 annual review and further detail can be found in that report. The deviation was reported again the 2021–22 report. There are conflicting conditions on this licence and WaterNSW sought advice from the Water Group as to whether WAL 33722’s access thresholds should be adjusted or not. Following the advice from the Water Group, WaterNSW adjusted WAL 33722’s access thresholds to account for AEW.

Recommendation 18 is to resolve the inconsistencies between the mandatory and discretionary conditions, the procedure and the water sharing plan.

The Barwon–Darling procedure is to be updated to remove WAL 33667 and WAL 33722 from the exclusion list as their licence conditions have CTPs applied. Inconsistencies between the plan and licence conditions will be addressed during the remake of the Water Sharing Plan for the Barwon–Darling Unregulated and Alluvial Water Sources 2012, which is due to be finalised 1 July 2025.

5.2 Were the procedures and their associated operations effective?

This section seeks to determine whether the current active management procedures and the associated operation provide for AEW to remain in the water source for environmental purposes. This section does not describe environmental benefits or outcomes from the implementation of the active management rules. The active management policy specifies that reporting of outcomes is outside the scope of the annual review and is the responsibility of environmental water holders.

5.2.1 Procedures and associated operation

There were no unprotected events in 2022–23. However, we note that active management does not protect AEW from extraction under basic landholder rights, domestic and stock or utility licences as specified in the policy and further explained in the 2021–22 annual review.

In their current form, the procedures manuals largely provide for AEW to remain in the water source for environmental purposes. However, there are three gaps with procedures and overarching water sharing plans that need to be addressed to better protect AEW.

Two of these gaps have previously been reported on (see in Section 5.2 of the 2020–21 report), *Protection of AEW in Barwon–Darling backflows into the lower Macquarie*.

WaterNSW has implemented an interim solution as described in last year's report. WaterNSW has been issuing 'no access' or 'limited access' notifications to these licence holders when they could potentially access the AEW from the Barwon–Darling. However, they only issue this when there is also an AEW event in the Macquarie. R.15 is for a longer-term solution. This issue is also noted in the Macquarie Issues List (Issue 7), *Protection of AEW from specific Schedule 2 and 2A licences*.

WaterNSW have applied an interim solution (see section 5.1.1) from the procedures, to also adjust access thresholds for these licences. R.18 is for the Water Group to clarify and if necessary, update procedures, the water sharing plan and licence conditions.

A new, third gap, has recently been identified in the Macquarie which means that flow below the cease-to-pump (CTP) thresholds is not properly protected. This is because in some zones, the

procedure does not ensure protection for both AEW and flow below the CTP. This is inconsistent with the policy intent.

R.49 Macquarie–Bogan procedures manual to be updated to clarify that both AEW and flow below CTP is to be protected.

5.2.2 Compliance monitoring

NRAR has a broad capability and experience in monitoring environmental flow events for compliance with license obligations, using spatial data both in real time and historically as well as field personnel, and regularly undertake these activities. However, NRAR did not monitor any of the specific active management events that occurred in 2022–23.

NRAR are progressing development of a system to provide timely identification of possible breaches of active management procedures (R.25). However, the lack of daily telemetered data in WAS has hampered progress.

WaterNSW complete quality assurance (QA) of the telemetry data prior to allowing this data to automatically flow to WAS. WaterNSW currently have a backlog of meters which are waiting on this QA process or resolution of issues identified during the process. A number of the contributing causes for issues have been identified for addressing as part of the [non-urban metering review](#).

WaterNSW don't post daily meter read information in WAS and are currently working on a method to give the department visibility of daily information.

5.3 Were the risk management measures effective?

The procedures manuals require an assessment of whether the risk management measures in place for active management are effective in:

- protecting AEW
- ensuring that access by water users to water above the access thresholds arising from other sources (that is, available water) has not been impacted.

The procedures manuals identify 'uncertainty in forecasting flows' as the principal residual risk to both protection of AEW and access to available water. The uncertainty is a result of the inherent variability in natural river systems and the limitations in measuring and estimating flow parameters. This uncertainty leads to differences between announced (based on the forecast) flows and actual (measured or post-calculated) flows.

5.3.1 Risk management measures

There are 8 risk management measures listed in the procedures manuals, employed mostly by WaterNSW, with the aim of striking a balance between over-estimating and underestimating available water and AEW, while remaining operationally feasible. The 8 risk management measures for WaterNSW are:

1. consider the best information available on daily extraction
2. make the forecast/prohibition to access/volumetric limit announcements as close to the period of access as possible
3. share river transmission losses proportionally
4. base initial and ongoing loss estimates on historic loss
5. adjust the ongoing loss forecast to prevent mismatches compounding
6. adjust access to address cumulative mismatches
7. increasing the frequency of announcements
8. continuous improvement (better information and metering, conduct reviews and evaluations).

5.3.2 Assessment

As part of risk management measure 8, WaterNSW provide information on flow events in their annual reports, summarising the difference (mismatch) between the forecast volume and actual volume of available water, losses and AEW. The mismatch totals across all events in the Barwon–Darling and Macquarie–Bogan, are shown in Table 9.

Note that for the Barwon–Darling AEW mismatch totals only include mismatch in available water for HEW accounts, not in tracking of AEW. The Macquarie totals include mismatch in AEW tracking in each zone.

Table 9. Forecast minus post-calculated totals

Unregulated Water Source	AEW mismatch forecast minus post-calculated AEW (ML)	Consumptive mismatch announced available water minus post-calculated available water (ML)	Unaccounted flow difference Forecast minus actual river AUD* (ML)
Barwon–Darling	-3,830	-10,240	23,658**
Macquarie–Bogan	-865	-1,039	-1,101
TOTAL	-4,695	-11,279	22,557

*Positive means that the forecast under-estimated losses or over-estimated ungauged inflows

**Most zones had a negative value which means that losses were over-estimated or ungauged inflows were under-estimated. The overall positive value is due to a large mismatch in zone 14 where there is a lack of gauging.

Table 10. Total volumes of AEW and available water announced and mismatch %

Unregulated Water Source	AEW	Consumptive
Barwon–Darling (ML)	16,871*	81,714
Macquarie–Bogan (ML)	73,805**	24,930
Total (ML)	90,676	106,644
Mismatch %	-5%	-11%

*Data only for Barwon–Darling HEW, not for AEW inflows.

**Data represents the mismatch of AEW within each zone

Effectiveness in protecting AEW

Table 9 and Table 10 show:

- In the Barwon–Darling, 3,830 ML of AEW was not protected under the active management procedures that would have been protected based on the post-calculated flows. This represents 23% of the AEW in the Barwon–Darling. Note that this data only includes estimates for Barwon–Darling HEW, not for protection of HEW inflows from upstream tributaries.
- In the Macquarie–Bogan, 865 ML was not protected under the active management rules that would have been protected based on post-calculated flows. This represents 1% of the AEW in the Macquarie.

Therefore, across the two water sources, forecasting uncertainty led to 4,695 ML of AEW not being protected under the active management procedures, that would have been protected if forecasting was 100% accurate. This underestimate represents 5% of the total volume of AEW.

The mismatch for each zone and event is reported in Appendix B.

Effectiveness in not impacting consumptive available water

Table 9 and Table 10 show:

- In the Barwon–Darling, 10,240 ML was not made available to licence holders that would have been made available based on post-calculated flows. This represents 13% of the consumptive available water in the Barwon–Darling over the event period.
- In the Macquarie–Bogan, 1,039 ML was not announced that would have been announced based on post-calculated flows. This represents 4% of the consumptive available water in the Macquarie over the event period.

Therefore, across the two water sources, 11,279 ML was not made available to licence holders because of forecasting uncertainty. This underestimate represents 11% of the total consumptive

available volume during the active management events. This does not necessarily mean that there would have been 11% more diversion if the mismatch had not occurred. It is likely that the impacts on diversions are less than the sum of the mismatch volumes across reaches. This is because an under-estimate in an upstream zone may result in higher gauged flows and forecasts in downstream zones, that is, less opportunity to take in an upstream zone, but greater opportunities to take in the downstream zone.

The mismatch for each zone and event is reported in Appendix B. Note that while the Macquarie had a small mismatch in overall announced available water, there was a high mismatch for Macquarie DS Sub zone 2. In the Barwon–Darling there is significant variation in mismatch by zone. WaterNSW will continue to monitor causes for higher mismatch however this is likely due to a combination of forecasting issues and unrealistic EOIs in upstream zones. Underlying causes will be further examined and discussed at Barwon–Darling CAGs.

Discussion and recommendations

The announcements in the Macquarie have resulted in appropriate protection of AEW while avoiding impacts in most zones. There were much larger impacts on both AEW and consumptive water users in the Barwon–Darling, however. WaterNSW have indicated that the main causes for the mismatch in the Barwon–Darling are flow forecasting and expressions of interest which exceed intentions to take.

Overall, there was a greater percentage under-estimate of available water for Barwon–Darling HEW accounts than for consumptive accounts. This is due to higher mismatch for the zones where the Barwon–Darling HEW is held. WaterNSW will continue to monitor causes for higher mismatches in those zones. There are much larger impacts on consumptive licence holders, however, in terms of volume of under-estimates. This means that overall, the mismatches are likely to have resulted in more water arriving at Lake Wetherell.

WaterNSW are working on improved forecasting methods. However, the issue with expressions of interest is most easily resolved by customers more regularly entering realistic EOIs into iWAS. Other planned improvements such as sub-daily announcements and temporary trading of IDECs may also partially help address these issues.

5.4 Are changes to the procedures required?

Some changes to procedures have been identified through existing recommendations. A new issue has been identified which requires a procedure change:

R.49 Macquarie–Bogan procedures manual to be updated to clarify that both AEW and flow below CTP is to be protected.

See Section 5.2.1 for further information.

5.5 Policy recommendations

There are no new recommendations relating to either policy or legislation. Note that a review of the policy is due by February 2026.

6 Next steps

The Water Group are progressing the accounting arrangements to track HEW from the QLD border to the Barwon–Darling. When these arrangements are complete the water will be protected through the Barwon–Darling active management procedures. We are aiming to have this procedure commence in the 2024–25 water year. The Barwon–Darling procedures manual does not need to be updated to commence implementation; however, the Water Group will discuss the accounting arrangements with the Barwon–Darling CAG prior to implementation.

The Water Group are also working towards a trial to protect AEW inflows into and through Menindee Lakes. These inflows have previously not been protected and, under current arrangements, the inflows contribute to the allocation pool for the Lower Darling (including for HEW entitlements), as well as to the shared Murray resource (when Menindee Lakes are under MDBA control). The trial aims to recognise and protect the AEW so that it can be used for connectivity to the southern Basin and for other environmental purposes.

The Water Group, with partner agencies, will determine priorities for progressing recommendations.

Licence holders and peak stakeholder groups will be consulted on the changes to vary water sharing plans, the Active Management in Unregulated Rivers Policy or any of the three active management procedures manuals and their associated operations. This will include meetings with affected stakeholders during 2024–25 water year to share knowledge, explore issues and identify solutions.

The Water Group will continue to report on progress in each annual review. In carrying out the workplan, the Water Group will collaborate with partner agencies, and managers of relevant projects and programs.

7 References

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WaterNSW 2021. How to guide – Lodge an expression of interest (EOI) for active management. Accessed online 12 June 2022

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Appendix A – Where active management rules apply

Table 11. Where active management rules apply in NSW

Unregulated Water Source	Unregulated water sharing plan management zone	Figure
Barwon–Darling	All management zones	Figure 7
Gwydir	Upper Gingham Watercourse Management Zone Lower Gingham Watercourse Management Zones Mallow Creek Water Source	Figure 8
Macquarie–Bogan	Lower Macquarie River Upstream Management Zone Lower Macquarie Downstream Management Zones Gum Cowal Management Zone Lower Marthaguy Creek Management Zone	Figure 9

Figure 7. Active management rules apply across all fourteen-management zone in the Barwon–Darling Unregulated River Water Source

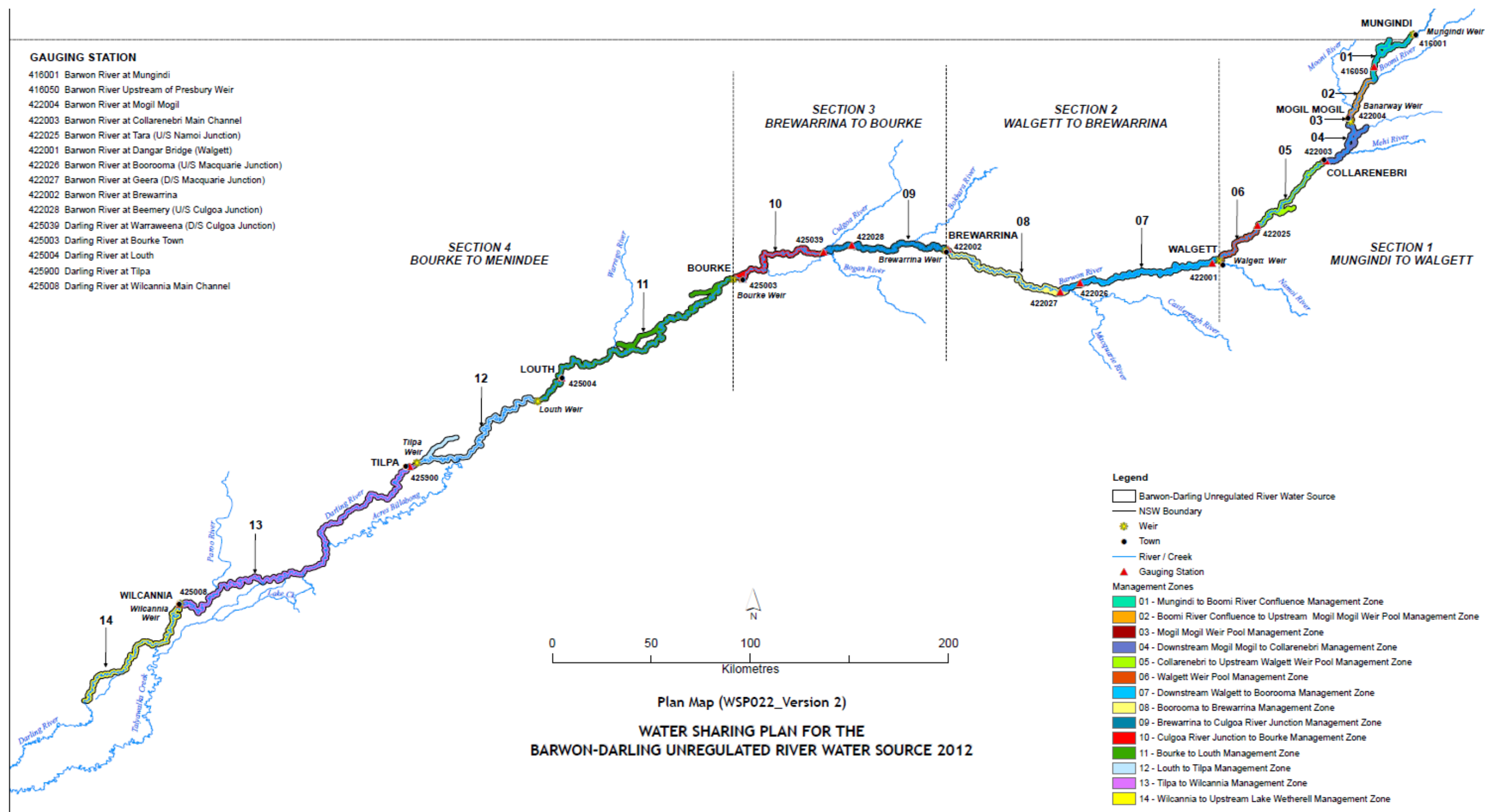


Figure 8. The three management zones where active management rules apply in the Gwydir Unregulated River Water Sources

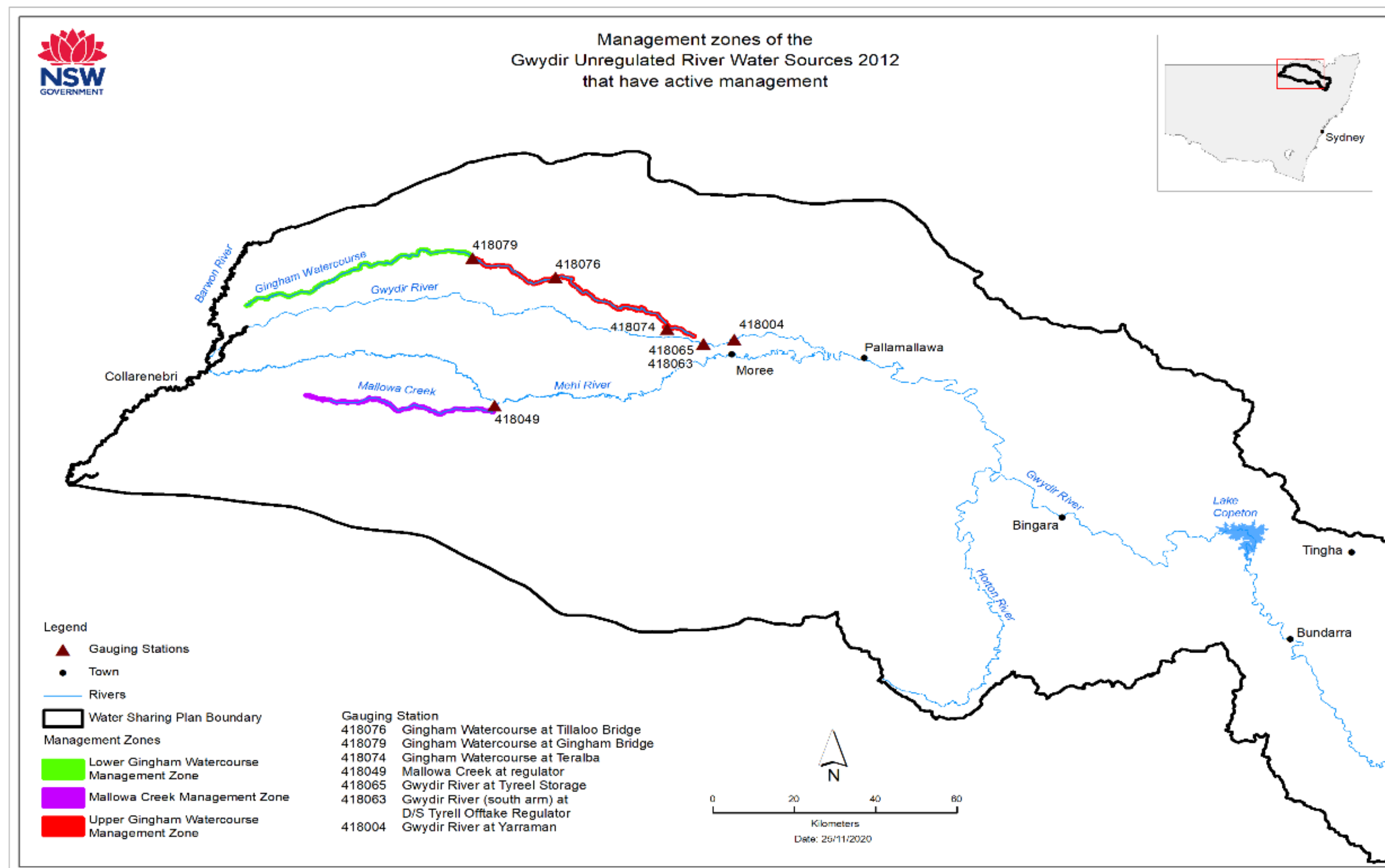
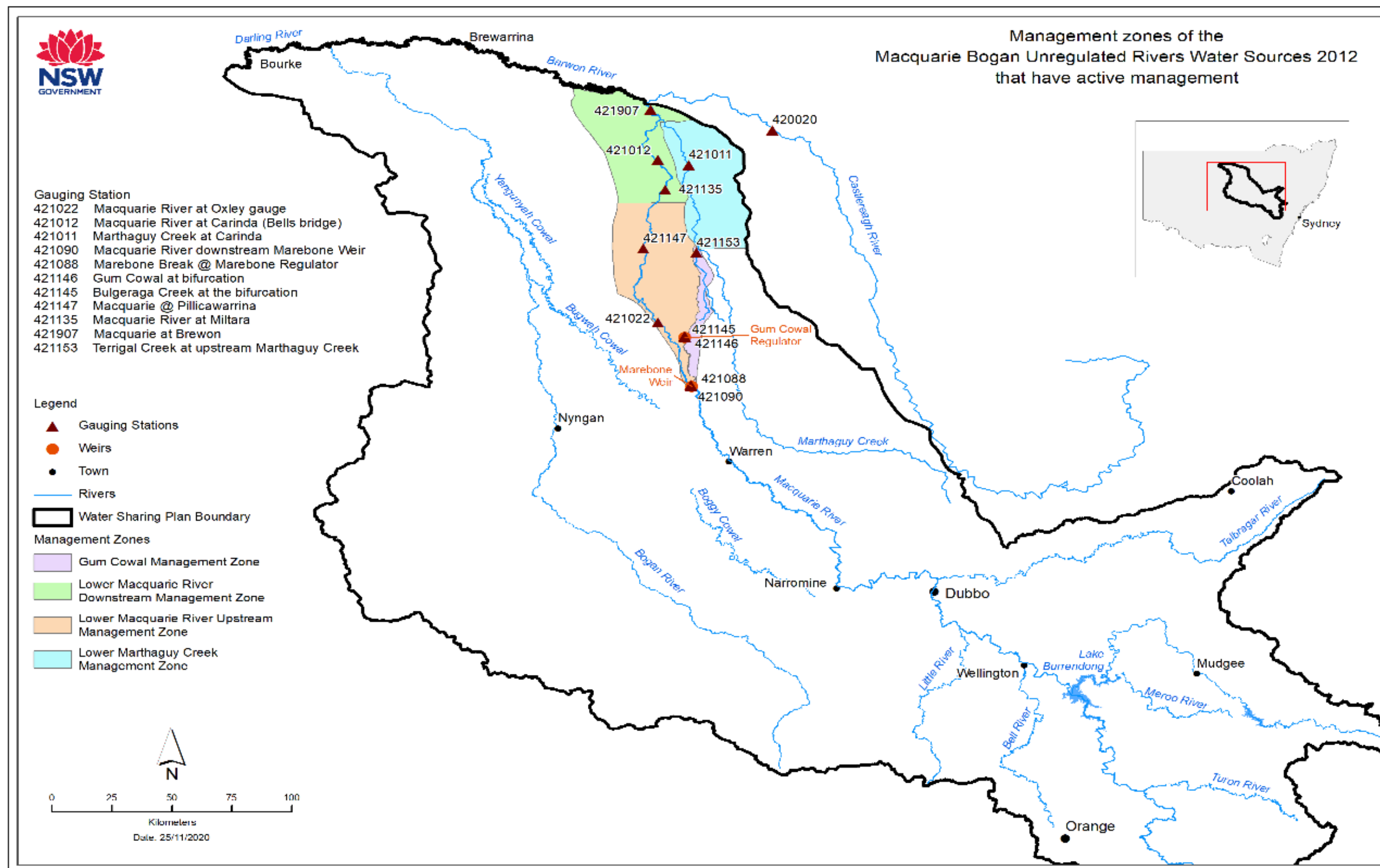


Figure 9. The four management zones where active management rules apply in the Macquarie–Bogan Unregulated River Water Source



Appendix B – Mismatch analysis by event and zone

Table 12. Consumptive available water mismatch by zone and event – Macquarie

	Event 1		Event 2	
Section	Announced	Mismatch as % announced	Announced	Mismatch as % announced
Gum Cowal – Marthaguy*	475	-	0	-
Macquarie US	0	-	0	-
Macquarie DS Sub zone 1	6,911	-3%	9,338	-1%
Sub zone 2	939	-29%	2,145	-23%
Sub zone 3**	0	-	0	-
Sub zone 4	1,983	0%	3,614	0%
Total	9,833	-5%	15,097	-4%

*This management zone has only 1 licence and it get full access or no access so no mismatch is calculated.

**No active licences in this management zone

Table 13. AEW mismatch at the start of each zone – Macquarie*

	Event 1		Event 2	
Section	Announced	Mismatch as % announced	Announced	Mismatch as % announced
Gum Cowal – Marthaguy*	0	-	0	-
Macquarie US	28,046	3%	4,742	-1%
Macquarie DS Sub zone 1	9,101	2%	1,514	4%
Sub zone 2	9,259	0%	1,581	0%

	Event 1		Event 2	
Sub zone 3**	9,266	-1%	1,581	0%
Sub zone 4	7,410	0%	1,305	0%
Total	63,082	1%	10,723	0%

*Announced is the estimated AEW flow at the start of the zone. The mismatch reflects mismatch in calculated losses in the upstream zone only, not cumulative across all zones.

**No active licences in this management zone

Table 14. Consumptive available water mismatch by zone and event – Barwon–Darling

	Event 1	
Section	Announced	Mismatch as % announced
Zone 1	15,979	-9%
Zone 2	-	-
Zone 3	-	-
Zone 4	-	-
Zone 5	15,939	-25%
Zone 6	3,344	-16%
Zone 7	1,659	-3%
Zone 8	15,385	-5%
Zone 9	8,058	0%
Zone 10	6,564	-9%
Zone 11	8,842	-31%
Zone 12	5,945	-4%
Zone 13	-	-
Zone 14	-	-9%

Table 15. HEW available water mismatch by zone and event – Barwon–Darling

	Event 1	
Section	Announced	Mismatch as % announced
Zone 1	-	-
Zone 2	7,092	-27%
Zone 3	-	-
Zone 4	7,147	-17%
Zone 5	-	-
Zone 6	-	-
Zone 7	-	-
Zone 8	825	-5%
Zone 9	-	-
Zone 10	-	-
Zone 11	1,807	-36%
Zone 12	-	-
Zone 13	-	-
Zone 14	-	-