

MDBA ANALYSIS:

MURRAY AND MURRUMBIDGEE NATIONAL PARKS BUSINESS CASE

PROPONENT: NSW

The Murray-Darling Basin Authority's (MDBA) advice addresses criteria from the Basin Officials Committee agreed *Phase 2 Assessment Guidelines for Supply and Constraint Measure Proposals*. The Guideline section reference is shown in brackets.

Key issues/summary

- The outcomes of the proposal will depend on the combined modelling of all Murrumbidgee proposals (CARM, Effluent Creeks, Murrumbidgee-Murray-River National Parks and Yanco Creek) with subsequent integrated modelling of measures across the southern Basin.
- Given the interdependency of the CARM–Effluent creeks proposals and their potential to create general security entitlements., it is preferable to complete Murrumbidgee assessments in two stages:
 1. Assess CARM and Effluent creeks against the Benchmark to evaluate the size of general security entitlements available. Modelling should specify requirements for the Murray to address any third party impacts as an inter-valley account.
 2. Add the Murrumbidgee-Murray-River National Parks and Yanco Creek proposals as a package to assess additional cumulative benefits and risks from their inclusion, including any unresolved downstream impacts.
- This approach may underestimate the Murrumbidgee-Murray-River National Parks and Yanco Creek proposals were they assessed individually, but at least ensures the interdependency features in the overall assessment.
- The model includes estimated additional diversions via Nimmie–Caira to achieve targeted inundation extents, however the estimated volume requirement and physical constraints for flow delivery are yet to be examined.
- The proposal does not provide enough information on hydraulic interactions for Millewa to allow the MDBA to undertake an adequate quantitative analysis. The inclusion of Millewa is required for the proposal to be integrated into the modelling framework. The basis for assumptions made for savings associated with the Yanga regulator upgrade has not been provided.
- Any changes to this proposal's infrastructure/operation will result in changes to anticipated benefits or adverse ecological impacts, hence these will need to be clarified. Currently, there is limited information on how the adverse ecological impacts will be managed moving forward.
- The proponent has referenced superseded MDBA ecological targets and has not set quantitative ecological targets (supported by evidence). Given the information available from extensive ecological surveys, benchmark targets should be defined to allow future progress reporting.

- There is further clarification required on the ability to produce quantified environmental outcomes of Millewa (the second of two national parks in this proposal).
- The proposed works and measures are expected to deliver additional flows into the Murray and Murrumbidgee National Parks (NPs). There is a likelihood of salt mobilisation and increased risk of salinity impacts, however water quality and salinity risks have not been addressed.
- Outstanding requests for information have prevented a thorough assessment in some areas for the proposal.

1. Eligibility (3.1)

1.1. Supply measure requirements (3.1.1)

The proposal meets the definition of a supply measure under the Basin Plan (cl.7.03 and cl.7.15) to:

- operate to increase the quantity of water available to be taken in a set of surface water SDL resource units compared with the quantity available under the benchmark conditions of development
- achieve equivalent environmental outcomes with a lower volume of held environmental water than would otherwise be required
- have no detrimental impacts on reliability of supply of water to holders of water access rights that are not offset or negated.

Note that a final determination will require MDBA modelling, and that effects on reliability are determined by the proponent.

1.2. Measures not included in the benchmark conditions of development (3.1.2)

The MDBA confirms that the measure was not in the benchmark conditions of development (cl.7.02 of the Basin Plan).

2. Ecological values of the site (4.2)

The description of the site's ecological values in the business case is generally consistent with the assessment criteria in the Guidelines. A detailed description of the ecological values and features of Murrumbidgee (Yanga) and Murray (Millewa Forest) Valley National Parks is provided. Both areas have undergone substantial ecological surveying and their values are well known. It is noted that both National Parks support:

- significant areas of red gum forest and other floodplain woodlands and shrub lands represented by a broad range of plant community types
- internationally, nationally and state listed threatened species and communities including Australasian Bittern, Southern Bell Frog, Murray Cod and Silver Perch
- high waterbird values including colonial nesting waterbird rookeries and foraging sites and migratory bird species. Within Yanga, over 60 species of waterbirds have been observed roosting, feeding and breeding. Within Barmah-Millewa Forest, some 54 species of waterbird have been recorded breeding.

There has been a substantial adverse impact on riverine environment condition due to 2000's drought combined with river regulation and consumptive water use. For example, Yanga is considered highly stressed as a result of reduced flooding.

Both areas have a long history of timber production and grazing which has affected the ecological values of the site.

3. Ecological objectives and targets (4.3)

The business case cites Basin Plan and Lower Murrumbidgee environmental objectives and targets from the Guide to the Proposed Basin Plan (MDBA 2010). For example, Tables 4-1 and 4-2 (pages 55, 56) use old quantitative ecological targets from the Guide. This work has been superseded by the set of objectives and targets described in the 'Assessment of environmental water requirements for the proposed Basin Plan: Lower Murrumbidgee River Floodplain' (MDBA 2012, page 11). The revised targets are not quantitative and the proponent is requested to give further consideration to the development of quantitative targets supported by evidence. Given the information available from extensive ecological surveys, it should be possible to describe a baseline or benchmark to help define targets and inform reporting of progress.

The objectives in Tables 4-1 and 4-2 state only the MDBA's criteria for determining a key environmental asset. The MDBA site-specific objectives for the Lower Murrumbidgee and Barmah-Millewa Forest can be found on pages 209 and 213 of the MDBA's ESLT method report (see 'MDBA 2011' in the business case reference list) and should be referenced and used.

The business case articulates the potential interaction with other supply measures in the Murrumbidgee River system, particularly the Nimmie-Caira proposed measure. The importance of completing the integrated modelling of all measures in the Murrumbidgee River to understand the cumulative benefits and risks is further discussed below.

4. Anticipated ecological outcomes (4.4)

4.1. Anticipated ecological benefits (4.4.1)

Inundation resulting from the proposal and additional to that experienced pre-development, is limited to small areas.

The benefit of the Murrumbidgee element of the proposal seems to hinge on Nimmie-Caira being adequately operated. The Murray element provides a small additional inundation at specified flow rates, with low overall additional adjustment potential.

Anticipated ecological benefits are described quantitatively (Yanga) and qualitatively (Millewa Forest) in the business case for a range of water dependent flora and fauna. Benefits from works highlight the potential increase in area, frequency, and duration of inundation of river red gum forest, sedges and lignum. Benefits are also expected for fish, waterbirds, and frogs.

This proposal is identified as interlinked with the Nimmie-Caira supply measure and the business case states that the two should be assessed as an integrated package. The proposals together provide an opportunity for landscape-scale environmental watering. Given modelling of the package of Murrumbidgee proposals is being revised by NSW to address major issues with a number of proposals, including Nimmie-Caira, the proponent is requested to clarify the implications of any required changes

on this business case i.e. any changes to the proposed infrastructure and its operation, and any resulting change to anticipated benefits or potential adverse ecological impacts from this proposal.

Inundation spatial extent maps are provided as part of the business case in Chapter 5 for the Yanga element of the proposal. Additional spatial extent maps were requested to allow comparison with Figures 5-3 to 5-7, however these have not yet been provided.

The business case notes that the ability to quantify environmental outcomes for the Millewa Forest proposal is limited (page 8) because the benchmark model doesn't reflect practical limitations of existing structures, leakage or overwatering, with modelling results showing only a minor increase in area inundated due to operation of the works. Accordingly, only qualitative benefits are described. Given these stated limitations clarification has been sought on the following:

- How does the proponent see the measure being included in the ecological elements scoring method (noting that overwatering is not part of the EE method and environmental benefits from this aspect of the proposal will not contribute to the environmental equivalence test)?
- Does NSW intend to provide proposed changes to the benchmark model including supporting justification / rationale for the changes?

The business case indicates issues with mapping ecological elements at both Yanga and Millewa Forest. With regards to Yanga, it is stated that further analysis is required to map ecological elements and it is expected the work will commence shortly. The proponent was requested to clarify when the work is likely to start and finish, and if there is an expectation the work will be included in the ecological elements scoring method, however this work does not appear to be part of NSW's Nov 2016 modelling workplan. With respect to Millewa Forest, it is stated that mapping oversimplifies natural variation in red gum communities. Evidence is needed to support any proposed refinements to spatial data layers.

The business case indicates significant discrepancies between different modelling outputs for the Yanga proposal (MDBA's SFI inundation mapping, MDBA hydrological modelling, and NSW 2-D hydraulic modelling (pages 60, 89)). Further information, including potential solutions, was sought from the proponent to resolve these inconsistencies so the proposal can be progressed.

The business case notes that a monitoring program will be required if the proposed works proceed e.g. monitoring of fish ways to assess their performance. Given that monitoring is integral to the successful implementation of the proposed measure, there should be a clear indication and confirmation of how this will be funded.

4.2. Potential adverse ecological impacts (4.4.2)

Potential adverse ecological impacts are provided at both site level (associated with constructing the works) and operational level (associated with operating the works). Those impacts are assessed with mitigation measures developed for the identified priority ecological risks resulting from works construction and operation. However, there appears limited information on how the adverse impacts will be managed on an ongoing basis.

Regarding potential adverse impacts (page 108), ponding is considered to have the potential to reduce the availability of suitable habitat for some threatened species. The proponent should clarify if there are particular species identified to be at risk. It is suggested that monitoring should include

consideration of the potential for reduced ecological benefits associated with ponded water during manipulations with respect to threatened species and black water events.

Potential adverse effects of ponding on carp numbers is not discussed despite the possible need for carp traps / cages mentioned in the business case. As highlighted in other business cases by the proponent and in the MDBA's previous advice, the potential for increased carp populations is of concern for all environmental works. Carp population modelling undertaken by ARI highlights the significant risk of works sites providing conditions favourable to carp. Mitigation measures and monitoring are essential to manage the risk of enhanced carp recruitment and should be included in the risk assessment table in Chapter 7. It is noted that for other environmental works business cases that mitigation strategies are generally only marginally effective (e.g. reduced risk from very high to high or very high to medium).

The proposal seeks to address overwatering of various vegetation communities (eg page 73, 83) due to leakage and/or infrastructure constraints in delivering environmental water. It is possible that these vegetation communities have adapted to the new watering regime and will be negatively impacted when what is termed overwatering is removed. The proponent has been asked to provide evidence that the overwatering is causing a problem and that changes to the watering regime won't have adverse ecological impacts.

5. Hydrology of the area and environmental water requirements (4.5)

5.1. Current hydrology and proposed changes to the hydrology (4.5.1)

For Millewa Forest works, not enough hydrology information has been supplied for assessment. For Yanga National Park, the Murrumbidgee model has been delivered and includes two parts – reconstruction of Yanga 1AS regulator to prevent water leaking and additional inundation extent in conjunction with the Nimmie Caira project.

To represent the Yanga 1AS regulator upgrade, the model has assumed reduction of river loss by 5.4 GL/yr. Not enough evidence has been provided to support this assumption.

For additional inundation through the Nimmie Caira system, the model includes estimated additional diversions to achieve targeted inundation extents when there is surplus flow near Balranald. The estimated volume requirement and physical constraints to deliver the requirement still need to be examined.

As there will be less flow as a result of additional diversions, lower flow to the Murray is expected. This impact will be assessed when the package is modelled.

5.2. Environmental water requirements (4.5.2)

The watering requirements of the site are presented in detail, and originate in MDBA publications. The inundation and flow frequencies sought are mainly those as used in the original Basin Plan modelling. Knowledge gaps are included in the risk assessment.

Environmental water requirements are described within the business case in Table 3-4 and draw on the MDBA EWR reports and other information. Further information has been requested as follows:

- Link the published material cited to the EWRs more explicitly i.e. which EWRs are based on literature and which have been derived from discussions with local OEH staff?

- Frequency, duration, and timing are provided but will information on the flow magnitudes required (e.g. ML/day) be provided?
- The minimum and maximum frequencies appear too wide to be meaningful for some environmental assets (eg 20–80% for lignum shrub lands). Additionally, some EWRs are outside the range suggested by Roberts and Martson (2011) such as minimum 10% frequency and one month inundation duration for black box woodlands and three months minimum inundation duration for river red gum forest. The rationale for these differences should be further explained.
- The business case (page 8, paragraph 6) describes additional watering in Yanga resulting from higher flows through Nimmie-Caira and is accompanied by the statement “The scale of inundation is required in at least 40% of years.” The proponent is asked to further explain this statement and how the percentage was determined.

More explanation is required regarding the relationship between the recommended environmental water requirements (Table 3-4) and the proposed operating regime (Table 5-3). In a number of instances it is not apparent how these align, particularly with respect to the duration of watering. The proposed watering regime is interim, with the enduring watering regime to be defined as part of the long-term watering plan. Further information has been sought on the timeframes for development of this plan.

6. Operating regime (4.6)

The proposal anticipates a modest impact on IVT accounting and proposes a rules-based approach to mitigate potential third party impacts. There is insufficient information to determine what these rules will contain and the potential implications for River Murray Operations use of IVT. Rules to mitigate potential third party impacts due to IVT changes will need to be negotiated.

Water savings are to be made secure through a new water entitlement issued to the Commonwealth Environmental Water Holder. Consistent with the requirements of pre-requisite policy measures, associated environmental releases will need to be protected from extraction, re-regulation, and substitution when it reaches the River Murray.

The proposal indicates that a conservative approach has been used to estimate the potential savings. Despite this, the limited modelling, and the need to test the operational efficiencies, raises concerns that the benefits could be overestimated and a reconciliation adjustment may be required in 2024.

7. Assessment of risks and impacts of the operation of the measure (4.7)

The proposed works and measures are expected to deliver additional flows into the Murray and Murrumbidgee National Parks. There is the potential for extra salt mobilisation and increased risk of salinity impact. Water quality and salinity risks have not been addressed in this proposal.

8. Complementary actions and interdependencies (4.9)

Measures in Yanga National Park and Nimmie-Caira interact because additional environmental water flows to Nimmie-Caira can subsequently lead to higher off-target inundation in Yanga National Park.

This project also interacts with the other Murrumbidgee measures. Interdependencies will be only known when it is modelled as part of package of measures, however the operating strategies should be coordinated on the basis of expected interactions.

9. Project governance and project management arrangements (4.11)

10.1. Legal and regulatory requirements (4.11.2)

This supply measure proposal does not appear to impact any transitional or interim plans. If any actions in the project result in an amendment to a transitional or interim water resource plan the MDBA would expect the proponent to seek accreditation of any such amendment in the normal way.