

MDBA ANALYSIS:
SOUTH AUSTRALIAN RIVERLAND FLOODPLAIN INTEGRATED
INFRASTRUCTURE PROGRAM (SARFIIP) — PIKE AND KATARAPKO
FLOODPLAIN PROJECT ELEMENTS BUSINESS CASE
PROPONENT: SA

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

Key points/summary

- The proposal meets the definition of a supply measure under the Basin Plan and has adjustment potential.
- The proposal describes a proposed operating regime using regulators to raise weir pool levels for the inundation of the Pike/Katarapko floodplains.
- Without baseline ecological monitoring data (currently being collected) it is difficult to assess whether the proposed quantitative targets are adequate or meaningful.
- Given that ecological monitoring and evaluation is integral to the successful implementation of the proposal, there is no clear indication that funding is available nor how it will be obtained.
- Hydraulically-speaking, the vegetation mapping presented may differ to that currently used in SDL adjustment modelling. Additionally, while some operating regime details are supplied, MDBA requires the latest hydrodynamic model to test these operating strategies.
- There appears some inconsistencies in environmental water requirements relating to inundation duration, and more explanation required on how the proposed operating regime relates to the preferred watering regime of floodplain biota.
- It is uncertain how effective the proposal is in reinstating the watering regime to the (pre-development) benchmark — further analysis in the detailed design phase is required.

1. Eligibility (3.1)

1.1. Supply measure requirements (3.1.1)

The proposal would meet the definition of '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; and
- have no detrimental impacts on reliability of supply of water to holders of water access rights that are not offset or negated;

noting that a final determination will require MDBA modelling.

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

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

2. Ecological values of the site (4.2)

An adequate description is provided of the ecological values of the South Australian Riverland Floodplain, particularly Pike and Katarapko floodplains which are the focus of the proposal. Key ecological values include:

- Diverse range of floodplain and aquatic habitats, including permanent fast and slow flowing anabranch creeks, islands, billabongs, permanent and temporary wetlands and oxbow lakes.
- Flood-dependent vegetation including river red gum, black box, and lignum shrub lands.
- Seventeen plant species of conservation significance within SA, recorded at both Pike and Katarapko floodplains.
- Twenty one fauna species of conservation significance within SA or nationally recorded at Pike floodplain—Murray Cod, Golden Bell Frog, Mallee fowl and the Regent Parrot being the species of national significance.
- Twenty nine fauna species of conservation significance within SA or nationally recorded at Katarapko floodplain. This includes 14 fauna species of national conservation significance (threatened) including Murray Cod, Silver Perch, Golden Bell Frog, and Murray Hardy head.
- Habitat for waterbirds under international migratory bird agreements (JAMBA, CAMBA, RoKAMBA).

A number of processes are affecting the condition of the Pike and Katarapko floodplains including altered flow regimes, saline groundwater, obstructions to fish passage, grazing and pest plants and animals. Direct management intervention is identified as being required to retain and support recovery of the ecological character of these floodplains.

3. Ecological objectives and targets (4.3)

Table 1 (page 21) notes that the SARFIIP ecological objectives and targets align with the Basin Plan and Long-term Watering Plan for the South Australian River Murray. However, explicit evidence of the alignment is not presented.

An extensive list of ecological objectives and quantitative ecological targets are provided which are generally consistent with assessment criteria. In the absence of baseline data they have been based

on nearby Chowilla where baseline data is available. In response to a request for further information the proponent has indicated that baseline data is being collected.

The business case states that ecological targets will be revised periodically to assess changes to the underlying assumptions based upon new monitoring information, research findings and understanding of ecological responses.

Without baseline monitoring data it is difficult to assess whether the proposed quantitative targets are adequate or meaningful. The proponent should therefore review the ecological targets during the detailed design phase when baseline data, design specification, and operational details are available.

The proponent clarified that ecological target timeframes for achievement have been revised, with most targets now between 2030 and 2040 i.e. 10 to 20 years after expected construction. However, this timeframe is inconsistent with the additional information provided by the proponent which shows that target timeframes have been changed to 2025 based on the assumption that proposed works could be operational by 2020. This should also be clarified when the ecological targets are reviewed as part of the detailed design (above).

Irrespective of this discrepancy, whilst it is acknowledged that there are likely to be time lags in ecological response to management intervention, consideration should be given to a range of interim targets to complement the long-term targets that can be used to measure progress and inform adaptive management in the shorter term (eg intervention monitoring).

4. Anticipated ecological outcomes (4.4)

4.1. Anticipated ecological benefits (4.4.1)

Anticipated ecological benefits/outcomes are described and are generally consistent with the assessment criteria. Predominantly qualitative descriptions of expected improvements for a range of biota (e.g. frogs, waterbirds, vegetation, fish, and microbiota) are provided.

Quantitative assessments of the changes to inundation of key flood-dependent vegetation communities are given.

An analysis of the ability to achieve the preferred water regime of floodplain biota (presented in Table 4) relative to the benchmark is not explicitly presented. The proponent should therefore confirm if this will be part of the detailed design phase as this analysis is important in providing a quantitative assessment of the anticipated ecological benefits.

Investigations are ongoing into potential ecological benefits of the weir pool manipulation component of the proposal, including through trial operations. The proponent has indicated that initial trial results will be used to inform the SARFIIP floodplain operating strategies being developed by 2018 with the aim of normalising annual weir pool operations by the completion of SARFIIP in 2020. The proponent anticipates that any enhancements to the weir manipulation regime beyond those outlined and subsequent notification could be recognised as part of the 2024 reconciliation process.

Monitoring and evaluation (ME) is required to maximise ecological outcomes, manage risks and to refine ecological objectives and targets. ME plans for Pike and Katarapko floodplains are currently being developed and the proponent anticipates completion by October 2016. These plans will outline key monitoring needs and provide recommendations about the responsibilities for commissioning, reviewing, and actioning of monitoring data. They do not specify the source of funding for monitoring.

Given that ME is integral to the successful implementation of the proposal, there should be a clear indication that ME funding is available or an identification of how funded will be obtained.

The proponent has indicated that operations and maintenance (OM) budgeting will include consideration of ME funding needs. The default position, subject to outcomes of the multi-jurisdictional discussion of these issues, is that the South Australian government is responsible for the ongoing funding of OM costs, estimated at over \$4 million annually. The associated risk assessment (page 79) indicates that the consequence of not securing this funding is only moderate, which may be an underestimate given the importance of ongoing OM for the proposal to be effective.

A clear picture of the likely ecological benefits are presented—a flooding regime that reflects more natural patterns, as evidenced by:

- Inundation maps
- Estimates of areas/duration/frequency of inundation
- Listing of benefits of floodplain responses to inundation with specific consideration for likely benefits at Pike and Katarapko

There are frequent references to published scientific studies, state agency publications, and environmental management plans.

4.2. Potential adverse ecological impacts (4.4.2)

A thorough ecological risk assessment has been undertaken. For thirteen ecological risks there remains a moderate residual risk after mitigation measures are implemented. The proponent suggested that most risks can be mitigated to a satisfactory level by avoiding frequent operation of the regulators at maximum elevation under low flow conditions. If unacceptable risks are detected during an operational regime, the proposed monitoring will provide data to inform operation decisions, which may include abandoning the inundation event.

Appropriate treatments are identified for the potential risks. Monitoring is identified as a key mitigation strategy for a number of risks. The security of South Australia government funding of these ongoing costs is critical to the successful implementation of the proposal (as the default position unless other funding arrangements are agreed).

The risk assessments concerning adverse ecological impacts have been adequately addressed as follows:

- The approach taken is consistent with accepted practices for similar documents e.g. the Chowilla Floodplain operating plan documents
- They are based on scientific evidence
- They cover a broad range of risks with a sufficient level of consideration documented.

All but one residual risk rating are considered low to moderate. With careful attention in the development of operating plans and undertaking operations, risks can be managed as per the proposed mitigation strategies.

One residual risk—fire hazard at Katarapko—remains high due to increased fuel loads associated with growth of floodplain vegetation. The incorporation of suitable visitor management, fire restrictions, and other management plans are proposed. The MDBA is unable to comment on the adequacy of this risk mitigation strategy.

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

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

Managed inundation using works, across both Pike and Katarapko floodplains, is outlined. Managed parameters comprise the timing, frequency, duration, and equivalent natural flows.

The vegetation mapping (figure 7) may represent a different vegetation layer than is currently being used in the SDL adjustment mechanism. The proponent needs to justify any change to the current representation in the mechanism, subsequently affecting results presented in table 6 and elsewhere.

While some details of the operating regime are supplied (section 11 and supporting documentation), MDBA requires the latest hydrodynamic model to test these operating strategies. Documents are required that demonstrate the hydrodynamic model has been well calibrated and is fit for assessing this project.

During previous SDL Adjustment Technical Working Group meetings, South Australia has mentioned that the works area has been conceptualised to model in the SOURCE platform. This capacity is yet to be transferred to the MDBA for implementation in MSM and Bigmod platforms. Once received, further review is required.

5.2. Environmental water requirements (4.5.2)

Environmental water requirements of floodplain biota are provided to define the preferred water regime (Table 4). Scientific literature is cited as supporting evidence for the environmental water requirements e.g. Roberts and Marston 2011, Rogers and Ralph 2010, and Bice et al. 2014.

There are some inconsistencies between the requirements outlined in table 4 and the literature cited. This particularly relates to inundation duration. Key examples are the proposed minimum duration for Black Box woodland, and Lignum shrub land inundation of less than 1 month, shorter than the period specified in the cited literature (Roberts and Marston 2011 and Rogers and Ralph 2010). The proponent should clarify and confirm the preferred watering regime with reference to relevant scientific literature to ensure the operating regime is based on the best available information on flood dependent biota requirements. More explanation is required on how the proposed operating regime relates to the preferred watering regime of floodplain biota.

It is uncertain how effective the proposal is in reinstating the watering regime compared to the benchmark. Given the aim is to achieve a flooding regime that more closely aligns with that experienced before development, it is assumed the information presented in Denny (in prep-a) and Denny (in prep-b) provides an indication of the likelihood of achieving the preferred watering regime. An explicit analysis should be undertaken as part of the detailed design phase when the design specification and operational details become clearer.

The environmental water requirements (EWRs) are supported by scientific evidence. Local scale assessments and investigations are still occurring to refine this understanding. The EWRs are linked to the values, objectives, and targets and are presented in biotic groups which clearly match relevant objectives and targets. The desired frequency at which different vegetation types will be inundated and the period of inundation can be clearly understood from table 4. The approach taken is consistent with presentation of EWRs in TLM environmental water management plans.

6. Operating regime (4.6)

The proposal describes a proposed operating regime using a set of water controlling regulators to raise the levels of weir pools four and five to inundate the Pike and Katarapko floodplains.

Information is provided:

- To support the feasibility of raising the weir pools
- On the risks and impacts under the operating regime

Any negative impacts or actions relating to river operations are not evident in the Risk Management Strategy (RMS).

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

The proposal involves the inundation of the Pike and Katarapko floodplains which can potentially mobilise floodplain salt stores, with consequent impact on salinity in the River Murray and adjacent landscape. The proponent has provided adequate analysis and results in terms of long-term salinity impacts and mitigation strategies.

8. Complementary actions and interdependencies (4.9)

It is likely this proposal interacts mostly with the existing Chowilla TLM works where targeted flow regimes are not dissimilar. The proposal's operating strategies will need to be included in the Murray model so that watering requirements can be rostered and scheduled depending on environmental water availability and other works operations.

When the proposal is fully incorporated into the modelling framework, interactions with other proposals (such as salinity) can be reviewed.

9. Project governance and project management arrangements (4.11)

9.1. Legal and regulatory requirements (s4.11.2)

The proposal does not appear to impact any transitional or interim plans. If any actions in the proposal result in an amendment to a transitional or interim water resource plan, MDBA would expect the Basin State to seek accreditation of the amendment in the normal manner.