

MDBA ANALYSIS OF THE GUTTRUM AND BENWELL FORESTS

ENVIRONMENTAL WORKS PROJECT BUSINESS CASE:

PROPONENT: VICTORIA

The MDBA's advice covers the following criteria in the Basin Officials Committee agreed *Phase 2 Assessment Guidelines for Supply and Constraint Measure Business Cases* (the Guidelines):

- Eligibility (3.1)
- Ecological values of the site (4.2)
- Ecological objectives and targets (4.3)
- Anticipated ecological outcomes (4.4)
- Hydrology of the area and environmental water requirements (4.5)
- Operating regime (4.6)
- Assessment of risks and impacts of the operation of the measure (4.7)
- Complementary actions and interdependencies (4.9)
- Project governance and project management arrangements - legal and regulatory requirements (4.11.2)

Business case assessments by the Department of the Environment will include advice from the MDBA on the technical feasibility and fitness for purpose of proposals as per section 4.8 of the Guidelines.

Key points/summary

- The proposal meets the definition of a 'supply measure' under the Basin Plan and has adjustment potential.
- Information provided for ongoing operations and maintenance resourcing does not currently meet the phase 2 business case criteria and until this issue is resolved, there will be a significant risk for this project. Decommissioning works is not a suitable risk management action as this would negate the SDL adjustment benefits. A clear statement of ownership, funding and responsibility for ongoing operations and maintenance is required to meet phase 2 business case requirements.
- There is evidence that the project will provide ecological benefits, however there are issues where proposed hydrological targets exceed natural flows and are inconsistent with the Basin Plan. The operating regime set out in the business case must be amended in the detailed design phase of the project to avoid inundation at frequencies above natural levels. This will be required by no later than the end of August 2015 to allow sufficient time for the proposal to be modelled.

1. Eligibility (3.1)

The proposal meets the eligibility requirements under the Guidelines for further assessment and consideration in the SDL adjustment mechanism.

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 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 the Guttrum and Benwell Forests is provided (Chapter 3; Ecological Associates, 2014 – Ecological Justification; North Central CMA 2014 Ecological Objectives and Hydrological Requirements Justification paper). It is noted that:

- little is known of native fish populations within the site although it is assumed that it supports a number of species with EPBC status (Murray cod, Trout cod and Silver perch); and
- the structure of the forest ecosystem has been altered and degraded in some parts through non-flow related threats (grazing, timber harvesting, quarrying and weed invasion).

3. Ecological objectives and targets (4.3)

Generally, ecological objectives and targets are specified consistent with the assessment criteria. Evidence to demonstrate that inundation at rates above natural levels provide additional ecological benefits and do not harm the environment through an artificially high inundation regime needs to be provided, or the operating regime amended, to meet Guideline criteria.

Site specific targets for the site have been cross-referenced against the broad Basin Plan objectives, however their relationship with site specific objectives and targets in Appendix D of ‘The proposed Environmentally sustainable level of take for surface water of the Murray–Darling Basin: method and outcomes’ (November 2011) (ESLT report) is not directly addressed. The MDBA’s assessment is that the site specific targets are not inconsistent with those objectives.

Targets are reasonably comprehensive and represent many but not all of the key values. Some ecological targets have been quantified however further evidence/analysis is required to enable a determination as to whether the selected targets are adequate or meaningful. For example, is a target to observe a range of age classes of Murray cod and Golden Perch meaningful, and can this be expected irrespective of supply measure operation?

Several targets are not self-contained and require interpretation. For example, a target of over 95 per cent of semi-permanent wetlands having a flooding regime that maximises healthy condition by 2040 requires the determination of the flooding regime to maximise the wetland health. The business case and supporting documentation describe the ideal flooding regime for semi-permanent wetlands (as part of the environmental water requirements) and it is then assumed that this is the ideal flooding regime to maximise condition.

Other targets describe the required inundation extent and frequency but do not specify the elements of flow regime required to support the ecological value (i.e. duration, interval between events, seasonality). Supporting documentation indicates that there is increasing evidence that duration is as important as frequency in terms of whole of forest response. In contrast, the environmental water requirements and risk assessments cover all of these elements of the flow regime. It is unclear why these aspects of the flow regime have not been integrated into the targets.

Further justification of the ecological targets is provided in the Monitoring and Evaluation Plan and largely they appear quantifiable and meaningful. It is, however, recommended that the proponent provide further evidence/analysis for targets where the rationale is unclear, e.g. on what basis is it considered reasonable that more than 50 per cent of threatened flora species will be observed. The intent of the targets to inform future monitoring and become an integral part of adaptive managing works operation to optimise environmental outcomes is sound.

Some targets reference an assessment date of 2040 (over 20 years after expected construction). While acknowledging that there are likely to be time lags in ecological response, consideration should be given to a range of interim targets to complement long-term targets by measuring progress and informing adaptive management in the shorter term (e.g. intervention monitoring).

Ecological Associates (2014) note that achievement of ecological objectives at Guttrum Forest is threatened by grazing. In addition, they suggest a review of forest management in relation to ongoing timber harvesting. The potential implications of these activities and other disturbances such as quarrying on achievement of targets is not clearly described.

More explanation is required regarding how the hydrological targets recommended relate to the proposed operating regime where discrepancies exist. In a number of instances these do not appear to align directly e.g. frequencies of inundation at the higher end of the target range with operation duration slightly less than the target for River Red Gum with flood tolerant understorey.

Of particular note, the prevalence of semi-permanent wetland inundation is proposed in the business case to occur up to 100 per cent of years in the maximum scenario (Table 8-1 and chapter 9.4). This exceeds natural inundation frequency (see Table 7-3) and is inconsistent with the Ecological Associates recommended watering regime of nine in ten years. Furthermore the basis for adopting the frequency of nine years in ten is not clearly explained given that hydrological requirements for ecological vegetation classes provided in the NCCMA 'Ecological Objectives and Hydrological Requirements: justification paper' ranges between five - six years in ten (it is assumed that it is based on a frequency

of natural conditions developed from hydrological analysis rather than from specific ecological information). The rationale for deviating from the recommended regime should be clearly explained including commentary on whether prolonged inundation may have negative consequences for wetland productivity.

Review of spells analysis undertaken by Gippel (2014), particularly of prevalence (percentage of years), would be needed to ascertain if the recommended regimes are above natural frequencies. Frequency mean analysis is presented however recommendations are expressed as prevalence which is a slightly different metric.

Victoria has provided additional information which indicates that the operating regime in the business case, in which above natural frequencies are proposed, is not how the project will actually be run. The operating regime set out in the business case must be amended as per the additional information when developing the detailed design of the project, to avoid inundation at rates above natural levels. In the interim, the MDBA will pursue discussion with Victoria to resolve the issue, and to ensure that any modelling undertaken is consistent with the intent of the additional information. The amended regime will be need to be settled by the proponent as soon as possible, and certainly no later than the end of August 2015, to allow sufficient time for the proposal to be modelled.

There appears to be an error in Section 9.3 which states that the 26,000 ML/d threshold (for inundating the River Red Gum Forest with a flood dependent understorey) is met four in ten years under current conditions and three in ten years under Basin Plan 2750 GL. Based on figures presented within Table 8-2 it is assumed this should be five in ten years for Basin Plan.

The business case states that the River Red Gum (flood tolerant understorey) water regime class water requirements are largely met by current conditions. This statement is not supported by the hydrological and ecological evidence presented in the business case (Table 7-3 indicates the flow thresholds that inundate this water regime class (>28,000 ML/d) are in deficit compared to natural conditions). Although it is recognised that the proposed supply measure operation will not influence this higher part of the floodplain this inconsistency should be clarified.

4. Anticipated ecological outcomes (4.4)

4.1 Anticipated ecological benefits (4.4.1)

Anticipated ecological benefits described in the business case generally meet business case assessment criteria. Some additional clarification would be helpful to understand the benefits more fully.

It is noted that a monitoring program is discussed and proposed to be linked to Basin Plan reporting requirements under chapters 8 and 10.

The business case identifies nine ecological vegetation classes, eight of which have some level of conservation significance (there are some minor inconsistencies between the business case and attached documents on the number of ecological vegetation classes and their conservation status). It should be ascertained what percentage of each of these classes benefit from the improved inundation regime.

The Expert Peer Review Panel which Victoria engaged to review the submitted supply measure proposals, highlighted in their report that the principal ecological outcomes of each project are

focused on enhancing vegetation and bird habitat with benefits to other organisms assumed to accrue collaterally from the changes to the regime or as a result of habitat related improvements with improved conditions of the vegetation. This approach coupled with the lack of knowledge of native fish populations within the site mean the benefits and outcomes for native fish are uncertain.

4.2 Potential adverse ecological impacts (4.4.2)

Potential adverse ecological impacts are covered to an acceptable level for the business case, noting that responsibility for actioning these strategies (including funding to adequately resource) must be incorporated into the detailed design and implementation of the proposal.

Potential adverse ecological impacts are assessed, with mitigation measures developed and described for the key ecological risks resulting from the works operation. Mitigation strategies for the five main ecological risks seem to be appropriate and practical.

After risk mitigation strategies have been applied, pest fish still have a residual risk rating of high and giant rush colonisation of moderate. Recent carp population modelling undertaken by the Arthur Rylah Institute highlights the significant risk of work sites providing conditions favourable to carp, and the potential for increased carp populations is of concern for all environmental works. Implementation of identified mitigation measures and proposed monitoring will be essential to manage this issue. A risk mitigation strategy includes an initial high outflow to the Murray River before the forests are emptied to send a signal for native fish to escape. However, the operating strategy does not include this.

There are differences in the residual risk rating for environmental works proposals in the Mallee CMA and North Central CMA areas e.g. carp/pest fish. Given the similar characteristics of the proposals and the mitigation measures proposed it is unclear why these ratings differ.

The mitigation strategy for several of the environmental impacts is to develop an environmental watering plan and adaptively manage using a thorough monitoring and evaluation program. The steps required to establish these management tools is not described in any detail in the business case (responsibilities, resourcing, timeframes, and scope). There is a long-term monitoring and evaluation plan for ecological targets but this does not provide information on sampling intervals or cover intervention monitoring (i.e. monitoring individual managed events to observe ecological response).

When considered in total, implementation of the mitigation measures for all the risks represents a large commitment of resources. As the supply measure is assessed on the basis that the risk mitigation strategies are put in place, it is important to ensure that responsibility for implementation of these strategies (including funding to adequately resource) is clearly defined in the detailed design in the event that the risk materialises. These include for example:

- additional monitoring (e.g. environmental watering plan adaptive management, effectiveness of fish stranding controls, Giant Rush colonisations, organic matter loads, dissolved oxygen levels, temperature);
- additional on-ground actions (e.g. physical removal of encroaching red gums); and
- additional planning and management functions (e.g. integrate water management with other sites in seasonal water planning process, develop a 'fish exit strategy' to inform regulator operation during the drawdown phase to maintain fish passage).

Lloyd Environmental (2014) identify a number of ecological risk knowledge gaps across all proposal sites (inadequate knowledge of biotic water requirements, presence and distribution of threatened species, effect of watering frequency on accumulation of organic material on the floodplain) which are considered likely to be applicable to the North Central CMA. There is therefore the potential that ecological risks have been underestimated due to a lack of available information. Given this uncertainty, these risks require further consideration throughout the life of the project i.e. detailed design, construction and operation and a monitoring and evaluation program will be essential to mitigate these risks.

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

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

The business case and supplementary information provide sufficient information to explain the project's current hydrology, and changes associated with the supply measure proposal. This meets the requirements of the Guidelines. To assist the proposal's integration into the MDBA's model-based assessment framework further clarification and refinements are likely to be required.

A hydraulic model was developed for the project using the MIKE-FLOOD modelling suite and was assessed by Fluvial Systems independently. There is a level of uncertainty around soil infiltration behaviour.

Taking into account the inflows under each operating scenario and the return flows to the River Murray, the estimated net water use in terms of the volume of environmental water retained on the floodplain has been determined. These volumes do not account for ramp up to peak flows, ramp down at the end of a watering event or contingency water used to maintain water levels in the event of waterbird breeding.

Notwithstanding these issues, the assumptions used to represent the measure have been documented and the models and information provided appear sufficient for the proposal to be integrated in the assessment framework at this stage.

5.2 Environmental water requirements (4.5.2)

Information has been provided to the appropriate level of detail to meet the Guidelines criteria.

Environmental water requirements are described within the business case and supporting documentation. The environmental water requirements are based on reinstating a near natural flow regime for the semi-permanent wetlands and the River Red Gum forest with a flood dependent understorey. Discussion on the frequency at which different vegetation types will be inundated, with reference to environmental water requirements, is discussed in the ecological objectives and targets section.

6. Operating regime (4.6)

The business case does not provide a detailed operating regime, however the initial proposal of potential operating regimes is at a level of detail appropriate for concept design stage and is sufficient for initial modelling purposes. It is anticipated that further modelling to support a more detailed

operating plan will be undertaken as this project is progressed. Noted below are areas in which further work should be carried out in the development of detailed designs.

The business case sets out the role of each key asset for the range of operating scenarios. The preferred timing, frequency and duration have been detailed for each operating scenario in the proposed operating plan for the works.

The design of the various assets is robust and allows for adaptive management of the scheme over time.

Monitoring

There is not enough information about the monitoring activities to determine if there is sufficient monitoring planned to support operations and water accounting. Information about water entering, flowing within and exiting the site is necessary for the effective management of environmental watering events and their co-ordination with other river operations activities.

The business case indicates that the monitoring and evaluation plan will be formalised once funding has been confirmed. However, there should be a clear indication of the amount of resources required to undertake the program.

Accounting for the delivery and use of environmental water

All watering sites will need fully-developed water accounting arrangements supported by well-resourced monitoring in order to determine environmental water use. There are a number of methods that could be used and it is expected that accounting arrangements will be similar to equivalent sites under The Living Murray. Information about water entering, flowing within and exiting the site is necessary for the effective management of environmental watering events and their co-ordination with other river operations activities.

Water returning to the River Murray from the assets should be measured to allow re-crediting where possible. The MDBA is working with Victoria on this through the PPM Implementation Plan for the River Murray System. The business case does not discuss linkages between this work and the proposal, for example how water use will be measured or estimated.

Where irrigation infrastructure is used to deliver water to environmental sites, it is expected that arrangements will be put in place to secure delivery and set out how competing demands will be managed.

Use of environmental water

There is the potential for interaction between the proposed project and constraints, which may reduce, although not remove the benefits. The project allows for a directed, efficient delivery of environmental water and targeted inundation under dry conditions.

Achieving proposed flows will require close collaboration with river operators and other environmental water holders, such as the CEWH and VEWH. There is insufficient information to assess whether arrangements are in place to ensure that environmental water can be delivered to the asset. Delivering proposed flows to watering sites will involve the use of held environmental water and it may not be possible in practice to deliver flows according to the preferred timing, frequency and duration detailed in proposed operating scenarios. There may be issues with an environmental water

holder's watering priorities and whole-of-system operational considerations and allowing for this is not apparent in the business case.

In particular, whether approvals/licences etc. are required to ensure the regulators can extract water from the river, and whether arrangements are in place to manage flows between MDBA and other river operators is not clear. The Reference Group to assist and advise on commissioning and operation for each project will include the CEWH and VEWH, providing opportunities for input at this stage. The business case does not describe any consultation with water holders during the development of the proposal, and does not identify environmental entitlements required.

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

The risk management approach adopted is consistent with the AS/NZS ISO 31000:2009 standard and the level of detail is appropriate for application at the concept design stage. However, a number of risks have not been mitigated in the current business case to a level which meets Guideline criteria, as noted below.

Operation and maintenance

Information provided for ongoing operations and maintenance resourcing does not meet the phase 2 business case criteria and until this issue is resolved, there will be a significant risk for this project.

The risk assessment of potential operation impacts lists lack of funding for ongoing operation, maintenance and management as a high risk to project success. The proposed mitigation actions aim to reduce the residual risk to low and include maintaining strong relationships with funding bodies and suspending operations if there are insufficient resources. Decommissioning works and/or suspending operations are not suitable risk management actions as they would negate the SDL adjustment benefits. In addition, a lack of resources for maintenance would result in asset impairment quite quickly. Should resourcing be reinstated at some later point, operation of those assets may not be possible. A clear statement of ownership, funding and responsibility for ongoing operations and maintenance is required to meet phase 2 business case requirements.

This assessment does not consider the risk of insufficient resourcing for operations and maintenance from the perspective of being able to operate works into the future to achieve the benefits upon which the SDL adjustment is based. A failure to operate due to lack of funding would result in the intended ecological equivalent outcomes not being achieved, in effect a project in which the adjustment is not delivered on an ongoing basis. As such, this risk is not adequately mitigated without a clear funding source.

The MDBA considers that funding of operations and maintenance of these assets must be assured by the relevant state.

Ownership and governance

While the business case outlines the issues to be taken into consideration for determining governance arrangements, it does not provide information on about important issues such as the ownership of the assets created as part of this project and responsibility for on-ground operation of the works.

There is a risk that the works could become impaired if the organisation responsible for operating the works does not have an experienced engineering crew to promptly undertake repairs, especially following high flows.

Water Quality

A semi-quantitative assessment of potential salinity impacts of environmental works and measures has been done by Jacobs but no analysis has been provided for other water quality parameters as stated in chapter 9, part 2 of the Basin Plan.

The business proposal will alter the frequency, duration and extent of inundation floodplain. There is the potential for salt to be mobilised through changes in groundwater level and surface wash-off with subsequent impacts on the River Murray. Significant resources for monitoring and modelling are required to assess these adverse impacts and the proponent needs to articulate clearly management options for allocating appropriate resources for this purpose.

The business case does not assess the cumulative downstream water quality impacts of operating a range of supply measures in the same year. Section 6.25 indicates that the nature of any downstream salinity and/or water quality impacts, and any potential cumulative impacts with other measures, cannot be formally ascertained at this time because of other upstream impacts. However, the specific water quality impact on the river associated with this measure can be assessed on its own using modelling.

Other risks

The risk of levee failure has been addressed in the business case and mitigating measures are included to reduce the target risk for all levees relied upon for the project to flow. It is expected that optimisation of the proposed works to manage levee risks will occur during detailed design which may result in cost savings.

Water delivery costs for the delivery of water to the site through the Torrumbarry Irrigation area are mentioned in the business case but no ongoing costs are provided for this as a review of Goulburn-Murray Water tariff structure is currently underway.

All other significant operating risks and impacts have been identified and controls put in place to reduce these risks. Risks that retain a moderate risk rating once mitigation controls are implemented have additional considerations listed in the business case.

8. Complementary actions and interdependencies (4.9)

The business case partly meets the Guidelines criteria for complementary actions and interdependencies.

The business case identifies the surface water SDL resource unit affected by the measure and states that any potential inter-dependencies for this supply measure and its associated SDL resource unit, in terms of other measures, cannot be formally ascertained at this time.

The MDBA expects that the proposed works will be operated as part of a reach based approach potentially including Gunbower, Koondrook-Perricoota and Guttrum Benwell Forests. Careful consideration will need to be given as to how these works are best co-ordinated in order to achieve whole-of-system outcomes, and further details should be provided as to how best to manage co-ordinated watering to achieve outcomes as part of the next phase.

Linkages between constraints and the supply measure have not been addressed in the business case and should be considered where relevant in the assessment of the project.

9. Project governance and project management arrangements (4.11)

9.1 Legal and regulatory requirements (4.11.2)

The business case has provided most of the required legal and regulatory requirements and an appropriate management strategy for each. This criteria will be further reviewed in the Department of the Environment's assessment.

Some limitations to the information provided are:

- a possible need for legislative change for securing native vegetation offsets has been identified, but a management strategy for this change is not provided – however non-legislative options are also being explored;
- the business case flags that no new agreements need to be created with water holders in the Basin. This conclusion has been provided without any context around the consideration of the project's requirements for environmental water. It is noted that the Reference Group to assist and advise on the commissioning and operation for each project will include the CEWH and VEWH, providing opportunities for input at this stage. However consideration of how the timings and volumes of environmental water required might be accessed is not readily apparent;
- NSW statutory approvals are identified as being relevant, however the business case indicates that no new inter-jurisdictional agreements are needed. Further information about why an agreement with NSW is not considered necessary has been requested but not yet provided; and
- while the business case identifies that no changes to water sharing frameworks and river operations rules and practices are required, consideration of how the implementation of the project will be reflected in the Victorian Murray Water Resource Plan should be considered in the future.

Easements and rights of access

In order to guarantee the ability to operate the project works into the future, the owner of the asset or its agent will need to obtain and hold:

- the right to construct, operate and maintain the assets and the specific land required for these assets including land needed to gain access to the assets; and
- rights of access to all land impacted by a project for purpose of implementing the operating regime in order to achieve the intended ecologically equivalent outcomes upon which the SDL adjustment is based.

Although the business case includes some information about the need for easements and access rights, there is insufficient information about who is responsible for ensuring they are obtained, or who the beneficiary of the rights will be.

The MDBA's experience with similar infrastructure suggests that not addressing these issues early can impact the effective operation of the assets. The business cases should include a commitment by the relevant state that they will obtain and hold these rights.