SDL Adjustment Stocktake Report

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1. Executive summary

1.1. Purpose

At the Murray-Darling Basin Ministerial Council meeting held on 29 May 2015, ministers agreed to commission a stocktake of the supply, constraints, and efficiency measures within the sustainable diversion limit (SDL) adjustment program set out in the Basin Plan. The objective of the stocktake is to provide independent advice to the Ministerial Council on the potential effectiveness of measure proposals under consideration by jurisdictions, and address the prospects of any additional proposals that could provide a further supply contribution.

1.2. Stocktake process

To provide a response to the terms of reference, a fundamental action at the initiation of the stocktake was to establish assessment criteria based on the key factors that influence the achievement of desired outcomes for each project. These were used to determine the level of confidence associated firstly with ratings for the estimated supply contribution and secondly with meeting delivery targets for each of the projects. The key factors include environmental outcomes; information adequacy; satisfactory progress in project development; project independence and connectivity between projects; resolution of any issues; the management of risks; confidence in the basis of supply contribution estimates (such as modelling) and whether factors which may limit the supply contribution are addressed.

The terms of reference for the stocktake indicated the stocktake was not to analyse policy matters which became evident in its evaluations. However, there were policy matter issues raised in the stocktake which influence decisions. Some minor comments have been made on these.

1.3. Key findings of the stocktake

1. Based on available information, the stocktake's plausible estimate of the supply contribution, including constraints, for projects currently considered under the SDL adjustment provisions of the Basin Plan is approximately 500 GL. The stocktake considers that this estimate could be potentially increased through provision of better quality information and the development and implementation of a finalisation plan and roadmap to 30 June 2016. This plan would list and proactively address key issues that are limiting the potential of projects. This could give rise to a higher level of confidence that some delayed projects will be ready for approval and will be delivered in the timeframes required under the Basin Plan.

2. Limitations on the current potential supply contribution are principally associated with the project scope (i.e. the nature of the projects and the complexity of the economic, social and local environmental factors which currently pose limitations) and progress in the development and submission of existing project proposals rather than the limits of change provisions within the Basin Plan or the application of the ecological elements scoring method.

3. Process and resourcing issues are delaying the progress of supply projects, resulting in decreased certainty in project outcomes.

4. Limits of change are an issue for environmental works proposals however there is insufficient information to suggest that the limits of change will be a major restriction on the supply measure program as a whole, particularly as a significant proportion of the projects under consideration will mitigate their effects. The stocktake believes that the impacts of the limits of change are not such that negotiating a change to existing policy arrangements is warranted.

5. There is limited potential for new projects and no additional supply measures are likely to be brought forward within the timeframes however there are some opportunities for project enhancements that may be worthwhile considering.

6. The achievement of supply measure contributions will be heavily dependent on the delivery of a number of complex projects. There would be merit in developing protocols for these projects when a significant contribution may be expected, and complete resolution of project details is unlikely to be reached by 30 June 2016. The protocol would need to contain provisions to allow conditional agreement for obviously attractive proposals by that date, subject to an agreed sunset provision, to resolve outstanding issues.

7. There is moderate to high confidence that the efficiency measures program can deliver the Commonwealth's program objective of 106 GL by mid-2019. However, there is a considerable risk that the program aim of 450 GL by 2023/24 will not be met. Better engagement is required between the Commonwealth and the states to resolve a number of issues where different views about the performance of various on-farm efficiency driven programs exist and to ensure that community and state jurisdictional support for the program is ongoing.

8. The constraints program is in its early stages, however states are on track to deliver business cases within agreed timeframes. It is expected that further refinement of works programs and costs will still be necessary after business cases are received with significant risks and outcome uncertainty remaining until negotiations with affected landholder and community responses to detailed on- ground plans are complete.

9. There is likely to be a significant supply contribution in the event that constraint projects are proposed as supply projects. The stocktake considers that the River Murray constraints program could enhance the supply contribution by 30 - 100 GL. Consideration of constraints projects has been factored in to the stocktake's plausible estimate.

10. Climate extremes are dealt with in the ecological elements scoring method used in the SDL adjustment mechanism. An Independent Review Panel of scientists has endorsed this method and further investigation is unlikely to lead to an agreement for its change. The stocktake is of the view that the development of other assessment approaches will be impractical within the timeframes available. In addition, the costs in terms of resources expended for particular issues with the method raised by jurisdictions during the stocktake and discussed in this report are likely to outweigh any benefit from revisiting the method.

1.4. Way forward

The stocktake recommends that the Ministerial Council endorse a finalisation plan and roadmap to 30 June 2016 which introduces proactive mechanisms to bring all SDL adjustment projects to business case submission.

These will identify issues noted in this report and set out agreed obligations and responsibility to address those that require management or policy decisions to remove impediments to progress, including resourcing. The obligations include in part:

- a commitment by states to develop and implement proactive management actions to ensure the submission of outstanding business cases for supply projects with a significant anticipated supply contribution within required timeframes;;
- identify any resourcing issues which are impeding the states' ability to deliver business cases within agreed timeframes; and
- introduce conditional protocols to the extent possible to address agreement on the resolution of issues still outstanding at 30 June 2016 for the more complex projects.

Non-resolution of the above issues will impede the delivery and implementation of the SDL adjustment program and hinder its potential.

2. Introduction

2.1. Sustainable diversion limit adjustment provisions in the Basin Plan

The Basin Plan established new sustainable diversion limits (SDLs) that reflect an environmentally sustainable limit of take while balancing the socio-economic impacts of water recovery. To achieve a healthy, working basin the Basin Plan prescribes a basin-wide long-term average SDL for surface water of 10,873 GL/y, which represents a reduction of 2,750 GL/y of water from the 2009 baseline diversion level of 13,623 GL/y. The environmental outcomes achieved with this level of environmental water recovery are referred to as the Basin Plan's benchmark.

During public consultation on the proposed Basin Plan submissions were received supporting the use of an SDL adjustment mechanism. Basin ministers requested the MDBA to include an SDL adjustment mechanism in the Basin Plan to take into account potential projects that could:

i) use less water to achieve equivalent environmental outcomes; or
ii) improve the environmental outcomes without worsening the social and economic impacts; and
iii) operate within the range of 2,400 GL to 3,200 GL, and potentially further.

Consistent with the above, the SDL adjustment mechanism contained in the provisions of Chapter 7 of the Basin Plan allows SDLs to be adjusted in response to initiatives that achieve either better environmental outcomes, or better social and economic outcomes relative to those in benchmark conditions. The Basin Plan allows for an adjustment to the SDLs to occur in 2016 and take effect in 2019, with a final reconciliation of total achieved SDL adjustment in 2024. The 10,873 GL/y benchmark SDL may increase with more water available for consumptive users if rivers can be run more efficiently for the same environmental outcomes, or may decrease if efficiency measures and/or the removal of constraints allows more water to be used to increase environmental outcomes, provided that social and economic outcomes are not diminished.

In addition, a constraints management strategy has been developed under the Basin Plan to progress projects that relax or remove constraints and improve the delivery of environmental water. It is intended that constraints projects will maximise environmental benefits attainable through supply and efficiency measures and improve environmental outcomes.

2.2. SDL adjustment measures

By 30 June 2016, the Murray-Darling Basin Ministerial Council will agree a package of measures comprised of supply, efficiency and constraints projects (the SDL adjustment package). Together, these are intended to ensure that the objectives of the Basin Plan can be delivered in a way that maximises benefits for the environment and limits social and economic impacts.

Supply measures directly generate an increase in SDLs (i.e. reduced water recovery) and are, predominantly, environmental works, changes in river operations or evaporative savings. They make more effective use of environmental water than under the benchmark allowing for a higher SDL, providing that at least equivalent environmental outcomes are achieved.

The objective of the efficiency measure program is to provide more water to the environment by reducing consumptive use in ways that will not lead to negative social and economic impacts. Efficiency measures include, for example, improving the effectiveness of on-farm irrigation or piping delivery channels in irrigation areas. As the water made available from efficiency projects is to be directed towards improving environmental outcomes, the result will be that the water recovery volume would increase above the benchmark of 2,750 GL/year.

Constraints are impediments to flow delivery, predominantly river height operational limits based on regulated rivers' channel capacity to avoid overbank flows and third party impacts. Other constraints can be low-lying bridges, policy or administrative issues, access to works on private and public lands, and the commence-to flow-heights of effluent streams. The removal of constraints can improve the ability to deliver environmental water outcomes and they can therefore interact beneficially with supply and efficiency measures.

There is the potential for constraint measure projects to be nominated by jurisdictions for consideration in the supply measures package, where they meet criteria for supply measures set out in the Basin Plan. The Commonwealth has advised that there is nothing to preclude jurisdictions pursuing Commonwealth supply measure funding for a constraints proposal.

2.3. SDL adjustment stocktake

At the Ministerial Council meeting held on 29 May 2015, ministers agreed to commission a stocktake of the supply, constraints, and efficiency measures within the SDL adjustment program under a set of terms of reference (Appendix A). The objective of the stocktake is to provide independent advice to the Ministerial Council on the potential effectiveness of measure proposals, either submitted or still under consideration but not submitted by states, and address the prospects of any additional proposals that could provide additional supply contribution outcomes. To meet that objective the stocktake's approach was to direct its analyses to an assessment of the levels of confidence in both SDL adjustment project delivery and supply contribution potential.

For the efficiency and constraints programs a similar assessment was applied against key criteria specifically developed for those measures that would need to be satisfied to give confidence that the programs could be successfully delivered.

3. SDL adjustment mechanism

Under the *Intergovernmental Agreement on Implementing Water Reform in the Murray-Darling Basin* (IGA) Basin States are responsible for developing supply and constraint measure projects, including any necessary consultation with the community. The projects are subject to a phased assessment process conducted by basin jurisdictions. Development of the efficiency measures program is the responsibility of the Commonwealth.

The IGA states that all phases will be completed by 16 March 2016. The roles and responsibilities of the MDBA and basin governments in the SDL adjustment process are also outlined in the IGA.

Governments have been working collaboratively to develop and assess supply, efficiency and constraint proposals in accordance with the IGA. States initially developed a list of potential supply projects (pre-feasibility) and in some cases undertook community and stakeholder consultation to identify concerns with their preliminary list, and potential opportunities to add projects.

3.1. Assessment framework

The Basin Plan SDL adjustment process sets out a method for determining equivalent environmental outcomes. This is known as the default method and was negotiated by basin jurisdictions in the settlement of the Basin Plan in 2012 (refer to Schedule 6 of the Basin Plan for details of the default method). The approach was based upon extensive consultation with an independent scientific panel and basin governments. Within the assessment framework, additional environmental benefits allow SDLs to be progressively increased as long as the regional environmental outcomes score remains above the benchmark score, reliability of supply is maintained, and the limits of change are met.

The BOC has agreed assessment guidelines for supply and constraints measures for each phase in the development of the SDL adjustment package including feasibility, business case and confirmation. Assessments are to be undertaken by all basin jurisdictions, with the MDBA providing technical advice. To date, states have largely focused on the development of supply measure projects, and jurisdictional evaluations of project business cases are in many instances outstanding (see Appendix B). A number of business cases have yet to be submitted for assessment.

Under the IGA, the MDBA provides without prejudice advice to the BOC on potential benefits from projects and dependencies between them. This includes an indicative impact on the SDL, environmental outcomes, state water shares and other states' water resources. This advice informs the BOC in its determination of a preferred package of projects by 30 June 2016. The MDBA is also providing interim advice to the BOC on the progress of adjustment measures, the first of which was supplied on 24 June 2015.

3.2. Limits of change

The limits of change in the Basin Plan are a set of safeguards to ensure that the SDL adjustment is not overly detrimental to the achievement of specific environmental outcomes. For the River Murray they permit the redistribution of allowable change between individual limits within a site which allows some flexibility in how these are maintained, but limits the degree of trade-off. The flexibility for trade-offs is not available for Lower Lakes limits of change.

4. Stocktake assessment process

This stocktake has undertaken a preliminary assessment of 36 supply and constraint measures under consideration by jurisdictions, noting that very limited information is available at this stage for some of the projects. A preliminary assessment has also been made of the efficiency measures program. The assessment summary for each supply measure project is detailed in Appendix C, the efficiency measures program in Appendix D, and constraints projects in Appendix E.

4.1. Information assembly and consultation

A stocktake inception meeting was held in Canberra on 23 June 2015 at which senior officers in the Department of Environment (DoE) and the MDBA went through the expected stocktake scale and scope in the tabled terms of reference; the drivers of the stocktake's very short timeframe and oversight arrangements for the stocktake including a steering committee comprising jurisdictional representatives and the MDBA.

To collate information necessary for this stocktake a number of meetings and teleconferences were held with jurisdictional representatives, experts and the MDBA. Information, gained through these consultations considerably assisted in the stocktake assessment of a range of supply contribution volume estimates for projects. The MDBA's June advice to the BOC was also used to provide information on the MDBA's assessment of the adjustment potential of supply measure projects.

Issues faced by the stocktake included the limited time to complete the assessment given the broad scope of the terms of reference and the extensive scale of reports and papers made available to the stocktake. In addition the need to consult with expert participants, either grouped in meetings or through individual briefings placed time pressures on the work. It should be noted that the level of cooperation was extremely high.

4.2. Stocktake assessment objectives/criteria

The prime objective of the stocktake is to provide the Ministerial Council through the BOC with advice on opportunities to improve the effectiveness of supply, constraints and efficiency measures programs and suggestions for additional SDL adjustment proposals. A fundamental action at the stocktake's initiation was to establish assessment criteria as the foundation to respond to the objective.

The stocktake has made an assessment of the level of confidence associated with key factors for success and the achievement of desired outcomes for each project which could assist BOC to advise the Ministerial Council on opportunities to improve the effectiveness of the SDL adjustment program.

Criteria used to analyse supply projects include environmental outcomes; information adequacy; level of progress; dependency and connectivity; the significance of specific issues; risks; modelling; basis for estimating the supply contribution, limiting factors; investment, and

importantly confidence in meeting delivery targets. A similar approach was used for constraints and efficiency projects with criteria tailored specifically for those programs.

4.3. Project categorisation and level of confidence in delivery

It became apparent early in the stocktake that levels of uncertainty across the measures and within the projects varied considerably, driven primarily by project scope and the quality of the information available. This led the stocktake team to develop a framework to deal with uncertainty. The framework assigns a level of confidence, highest, high, moderate or low to individual projects, based on the level of confidence associated with two key aspects:

1. the quality of information available to make the supply contribution estimates; and
2. the likelihood of the project, as presented, being approved and implemented within the Basin Plan timeframes.

For each of these aspects there is a varying range of uncertainty. For example, the projects grouped in the highest level of confidence category have all had their business cases submitted, contain no risks that can't be readily addressed and have been modelled. The other categories of projects progressively contain higher levels of uncertainty either through having not been modelled, not being developed to business case stage or having significant issues which would need to be overcome. Details are shown in Table 1 below.

Table 1 – Basis of project categorisation for the stocktake

Confidence category for project delivery	Basis of categorisation
Highest level of confidence	Business case submitted Supply contribution estimated through modelling No major risks or impediments to delivery.
High level of confidence	Business case prepared or under preparation Supply contribution not estimated through modelling Reasonable basis for supply contribution estimate No major risks or impediments to delivery.
Medium level of confidence	Business case under preparation Supply contribution not estimated through modelling Reasonable basis for supply contribution estimate Significant outstanding issues but with reasonable prospect of resolving.
Low level of confidence.	Feasibility stage Supply contribution not estimated through modelling Basis for estimate of supply contribution volume based on limited information Low prospect of resolving outstanding issues.

For each project the stocktake estimated supply measure contributions based on modelling completed to date, expert advice from meetings with and briefings from state representatives, MDBA modellers, state modellers and MDBA river operators and from the analyses of a raft of documents.

Where projects haven't been modelled and uncertainty exists the stocktake has estimated a range. The low range estimate of the supply contribution for each project has been established on a conservative basis and has a higher level of certainty whereas the certainty of the high end of the estimate range is likely to be less. The high estimate in one case (the ten projects modelled in the MDBA's June advice) is based on the outcome of identified refinements for a project that will assist to increase its supply contribution potential.

A level of discounting on the estimated supply contribution for each project has been applied to reflect confidence in the quality of the information underpinning the estimate. In the case of the highest level of confidence category projects have been directly modelled. There is no uncertainty and therefore no discount has been applied.

Table 2 shows the level of discounting adopted for each of the project categories. Individually, a higher level of discount has been applied to the supply contribution increase from the lower end to the upper end estimates for a project due to the lower certainty of reaching the upper end estimate.

For each project category overall the discounting level increases as the certainty decreases, i.e. the highest confidence category has the lowest level of discounting, and conversely the low certainty category has the highest level of discounting applied to its supply contribution estimates. This reflects the fact that there is a progressive increased risk that projects will either be modified or not proceed as the level of confidence in projects outcomes decreases.

It should be noted that there is also considerable uncertainty on the interaction between supply projects, which will impact on estimated individual supply contributions as projects are progressively added to the package of measures modelled. This risk is factored into discounts for projects which have not been modelled.

Whilst the level of discount can be debated, values adopted in this stocktake are considered appropriate for the assessed levels of certainty in supply contribution potential. Varying the discount rate does not increase project outcome certainty. Tables 3 – 5 show assessment conclusions for supply projects detailed in Appendix C. Tables 6 and 7 show conclusions for constraint projects (Appendix D) and the efficiency program (Appendix E) respectively.

Table 2 - Discount factors applied to project supply contribution volumes

Confidence in the supply contribution estimate	Level of discount
Highest-level of confidence in project delivery – modelling outcomes known	No discount applied to the low estimate. 10% discount applied to the upper bound of the supply contribution estimate to reflect future modelling outcome uncertainty.
High-level of confidence in project delivery – modelling outcomes unknown	10% discount applied to low estimate. 50% discount applied to the upper bound of the supply contribution estimate to reflect future modelling outcome uncertainty.
Medium level of confidence in project delivery	40% discount applied to low estimate. 80% discount applied to the upper bound of the supply contribution estimate to reflect the uncertainty of the complexity of issues to be resolved and the likelihood of project change.
Low level of project outcome confidence	90% discount applied. Lower probability of project proceeding.

Table 3 - Projects exhibiting high confidence level of delivering supply contribution volumes - modelled

	Project name				
	TLM environmental works (6 projects)	Hume Dam airspace management and pre-releases	Barmah-Millewa Forest Environmental Water Allocation rule changes	South East Flows	Flexible rates of fall below Hume
Criteria used to assess confidence levels	**Confidence level**				
Environmental outcomes evident	High	High	High	High	Moderate
Adequacy of information	High	Moderate	High	High	High
Satisfactory progress in project development	High	High	High	High	High
Project independence	Moderate	Moderate	High	High	High
Issues likely to be resolved	High	Moderate	Moderate	High	High
Risks managed	High	High	Moderate	High	Low to moderate
Supply contribution estimate basis (modelling)	High	High	High	High	High
System-wide river operation rules change impacts minimum	High	Low to moderate	High	High	Moderate
Factors limiting supply contribution estimate managed	Moderate	Moderate	High	N/A	Moderate
Investment-ready	High	High	High	High	High
Certainty of implementation within Basin Plan timeframes	High	High	High	High	High
Potential for constraint removal to improve supply contribution	Moderate	High	High	High	Moderate
Plausible supply contribution range	136 GL*	70GL*	40 GL*	Assists limits of change maintenance to support overall supply contribution	0*
Overall confidence rating	**HIGH**	**HIGH**	**HIGH**	**HIGH**	**HIGH**

*A possible increase of 30 GL in the plausible supply contribution is the total for all projects in Table 3 collectively

Table 4 – Projects exhibiting high confidence level of delivering supply contribution volumes - not modelled

	Project name				
	Nine Victorian works and measures	Riverine recovery	Nimmie Caira	Modification of weirs on the Murray	Snowy Water Licence
Criteria used to assess confidence levels	**Confidence level**				
Environmental outcomes evident	High	Moderate	High	Moderate - high	High
Adequacy of information	High	High	Moderate - high	Moderate - high	Low
Satisfactory progress in project development	High	High	Moderate - high	Moderate	Moderate
Project independence	High	High	Moderate - high	Moderate - high	Moderate
Issues likely to be resolved	Low - moderate	High	Moderate	Moderate - high	Moderate
Risks managed	High	High	Moderate	High	Moderate
Basis for supply contribution estimate	Moderate	High	Low	Low	Moderate - low
System-wide river operation rule change impacts minimum	High	Moderate	Moderate	High	Low
Factors limiting supply contribution estimate are managed	Moderate	High	Moderate	High	Moderate -low
Investment-ready	Moderate	High	High	Low	High
Certainty of implementation within Basin Plan timeframes	High	High	High	High	High
Potential for constraint removal to improve supply contribution	Low	High	High	High	High
Plausible supply contribution range	40 – 50GL	5GL	20 – 50GL	5 – 10GL	30 -60 GL
Overall confidence rating	**HIGH**	**HIGH**	**HIGH**	**HIGH**	**HIGH**

Table 5 – Projects exhibiting moderate and low confidence level of delivering plausible supply contribution volumes

	Project name						
	Murrumbidgee CARM	**Murrumbidgee and Murray National Parks**	**Upper Murrumbidgee flow enhancement**	**Murrumbidgee River - Yanco Creek offtake**	**Menindee Lakes***	**Alternative supply systems Murrumbidgee effluent creeks**	**Improved Regulation of River Murray**
Criteria used to assess confidence levels	**Confidence level (overall moderate)**					**Confidence level (overall low)**	
Environmental outcomes evident	Low	Moderate	Moderate	Low - moderate	Low (moderate)	Moderate	Low
Adequacy of information	Low - Moderate	Low	Low	Low	Low (moderate - high)	Low	Moderate
Satisfactory progress in project development	Moderate	Moderate	Low	Low - moderate	Low (not relevant)	Low	Low - moderate
Project independence	Moderate	High	Moderate	Moderate - high	Moderate (high)	Moderate	High
Issues likely to be resolved	Low - moderate	Low	Low	Low - moderate	Low- (high)	Low	Low
Risks managed	Low - moderate	Low	Low	Moderate	Low (high)	Low	Low to moderate
Confidence in basis for supply contribution estimate (modelling)	Low	Low	Low	Low	Moderate (high)	Low	Low
Minimal impacts from changes to river operational rules	Moderate	Low	Moderate	Low	Low (high)	Moderate	Moderate

	Project name						
	Murrumbidgee CARM	**Murrumbidgee and Murray National Parks**	**Upper Murrumbidgee flow enhancement**	**Murrumbidgee River - Yanco Creek offtake**	**Menindee Lakes***	**Alternative supply systems Murrumbidgee effluent creeks**	**Improved Regulation of River Murray**
Criteria used to assess confidence levels	**Confidence level (overall moderate)**					**Confidence level (overall low)**	
Factors limiting supply contribution estimate are managed	Moderate	Moderate	Low - moderate	Low -moderate	Low (moderate)	Low - moderate	Low
Investment-ready	High	Low	Low	Low	Moderate (moderate)	Low	Low - moderate
Certainty of implementation within Basin Plan timeframes	Moderate	Moderate	Moderate	Moderate	Low (high)	Low - moderate	Low - moderate
Potential for constraint removal to improve supply contribution	High	High	High	High	High	High	High
Plausible supply contribution range	10 – 20GL	5 – 10GL	10 - 20GL.	10 - 15GL	50 – 80GL	5 -10GL	30 - 100GL
Overall confidence rating	**MODERATE**	**MODERATE**	**MODERATE**	**MODERATE**	**MODERATE**	**LOW**	**LOW**

* For Menindee confidence levels have been assessed based on the limited documentation provided so far. It is extremely likely that current confidence levels will change, possibly significantly, once a business case is submitted by NSW. The confidence statements shown in brackets reflect the stocktake's judgements from verbal advice given to the stocktake and certain barriers which exist today can be resolved in totality or in part.

Table 6 - Constraints projects assessment outcomes

	Project name				
	River Murray - Hume to Yarrawonga	**River Murray –Yarrawonga to Wakool Junction and downstream (including SA)**	**Goulburn Valley**	**Murrumbidgee Valley**	**Gwydir Valley**
Criteria used to assess confidence levels	**Confidence level**				
Adequacy of information	Moderate	Low	Moderate	Moderate	Moderate
Satisfactory project progress	High	Low	High	High	High
Significant identified issues likely to be resolved	Moderate	Low	Moderate	Moderate	Moderate
Significant issues not identified in documentation can be managed	High	Low	Moderate	Moderate	Low
External risks are managed	High	Low	Moderate	Moderate	Moderate
Factors limiting supply measure contribution estimate are managed	Moderate - high	Low - moderate	Low	Low	N/A
Project independence	High	High	High	High	High
Investment-ready	Not assessed	Not assessed	Not assessed	Not assessed	Not assessed

	Project name				
	River Murray - Hume to Yarrawonga	**River Murray –Yarrawonga to Wakool Junction and downstream (including SA)**	**Goulburn Valley**	**Murrumbidgee Valley**	**Gwydir Valley**
Criteria used to assess confidence levels	**Confidence level**				
Contribution to supply projects	**30 - 100 GL** Level of confidence depends on the extent\that Murray constraints below Yarrawonga are addressed **30 – 50GL** if constraint lifted to 50GL/d **80 -100 GL** if constraint lifted to 65GL/d		**10 - 20GL** Low	**10 - 20GL** Low	**Nil** High
Certainty of implementation within Basin Plan timeframes	Moderate	Moderate - low	Moderate - low	Moderate - low	Moderate
Current confidence level	**HIGH**	**MODERATE - LOW**	**MODERATE - LOW**	**MODERATE - LOW**	**MODERATE**
General comments and future areas of focus	Project is of major significance to the success of supply and efficiency measure programs	Project is of major significance to the success of supply and efficiency measure programs but with a number of concerns	Project has the potential to deliver a supply measure benefit	Project has the potential to deliver a supply measure benefit	Project has the potential to deliver a small supply measure benefit

5. Stocktake plausible supply contribution estimate

Stocktake analysis shows that a plausible estimate of supply measure outcomes is approximately 508 GL, taking into account confidence in both a project's delivery and the likelihood of the project to achieve the upper bound of the likely supply contribution volume (see Table 7). Volumes will also be dependent upon interactions between projects as they are added into the modelling framework.

Table 7 Estimate of plausible supply contribution outcomes within required timeframes

Project categories	Low estimate SDLSC*	Nominated discount % and discounted low estimate SDLSC	Potential increase from low estimate SDLSC	Nominated discount % and discounted increase from low estimate SDLSC	Plausible outcome for SDLSC
Highest certainty– modelled SDL volumes Projects in '10 Pack' · TLM environmental works (6 projects) · Hume Dam airspace · Barmah-Millewa operating change · South East flows · Flexible rates of fall below Hume	**246GL**	**0%**	**30GL**	**10%**	
		246GL		**27GL**	**273GL**
High certainty - modelled SDL volumes unknown · Riverine recovery · Nimmie Caira · Modification of weirs on the Murray · Snowy Water Licence (RMIF) · Vic nine works and measures	**100GL**	**10%**	**75GL**	**50%**	
		90GL		**38GL**	**128GL**
Moderate certainty - issues more problematic or modelled outcomes unknown · Murrumbidgee CARM · Murrumbidgee and Murray National Parks · Yanco Creek offtake -Murrumbidgee River · Menindee Lakes · Upper Murrumbidgee Flow Enhancement	**80GL**	**40%**	**55GL**	**80%**	
		48GL		**11GL**	**59GL**
• · Constraint project contribution from River Murray	**30GL**	**40%**	**70GL**	**80%**	
		18GL		**14GL**	**32GL**
Low certainty – problematic issues – lower chance of resolving · Improved Regulation of the River Murray · Murrumbidgee effluent creeks	**35GL**	**90%**	**75GL**	**90%**	
		4GL		**8GL**	**12GL**
· Constraint project contribution from • Murrumbidgee and Goulburn	**20GL**	**90%**	**20GL**	**90%**	
		2GL		**2GL**	**4GL**
Total assessed supply contribution range	**511GL**	**408GL**	**325GL**	**100GL**	**508GL**

*SDLSC – SDL supply contribution

5.1. Factors potentially limiting the supply contribution

Table 7 also shows the potential supply contribution increase above the low range estimate for projects when grouped into the categories according to their uncertainty levels. For the 34 projects listed in Table 7 this totals 325 GL. As discussed in Section 4.3 this volume, other than the 30 GL estimated to be available from fully utilising the limits of change provisions for the ten modelled projects, primarily represents the uncertainty associated with the estimates due to the limited information available. The stocktake has assumed that 100 GL of the 325 GL can be captured, after applying the relevant discount levels.

The stocktake has concluded that reducing uncertainty through the resolution of project issues, together with some possible project enhancement (discussed in Section 6) will offer the greatest potential to increase the supply contribution for supply measure projects.

The highest levels of uncertainty exist within NSW projects, as these projects are generally not as advanced as those in other jurisdictions. NSW has indicated in stocktake briefings that it is striving to bring forward business cases within the agreed timeframes. However, processes may need to be reviewed to achieve this outcome and allow adequate time to assess projects.

In its paper, *Interim advice on supply measures - June 2015,* the MDBA advised BOC that the size of the overall supply contribution can be limited by one of three factors: the budget; the environmental outcome score and the limits of change (including reliability). The stocktake has examined these factors and determined that for supply measures while the overall budget is a broad limiting factor, it is actually uncertainty in the resolution of issue complexity associated with projects and the trade-offs and compromises required to achieve a realistic outcome that becomes the major limiting factor before budget considerations come into play. For the stocktake this is referred to as project scope.

The scope of all projects examined by the stocktake is limited by the reality of the physical conditions at the site, the available water resources and any water supply commitments. The stocktake considers that these factors will inevitably lead to local and regional environmental, social and economic trade-offs necessitating compromise and further limitations on project delivery and potential project supply contributions.

A further possible limitation is whether the states satisfy the MDBA that policy measures assumed in the modelling for the benchmark conditions are in place. The supply contribution as shown in Table 7 assumes that states will meet the prerequisite policy measures as assumed in the Basin Plan modelling.

The other two limitations raised in the MDBA's June advice, namely environmental outcomes and limits of change, are also in the stocktake's terms of reference and are discussed below.

5.1.1. Environmental outcomes

The Basin Plan requires at least equivalent environmental outcomes to be achieved by supply measure projects. Projects are assessed under an ecological elements method developed by CSIRO and commissioned by the MDBA as per its responsibilities under Schedule 6 of the Basin Plan.

A number of issues have been previously considered by jurisdictions and the MDBA through a Technical Working Group, with the view that some refinements to the assessment framework might lead to an increase in the supply contribution. The more significant of these are as follows:

Adding a form of dry-spell weighting to the method

Within the assessment framework, climate extremes are considered through the use of an annual time series that scores the health of each ecological element. Concern has been expressed about the adequacy of the method in dealing with these extremes and whether the framework was sufficiently sensitive to dry spells (the interval between watering events) and floods. A particular concern has been expressed by some jurisdictions that the method does not adequately represent the benefits of environmental works during dry spells.

The stocktake has reviewed the available documents and notes that environmental works projects do increase environmental outcome scores in response to extreme dry sequences. It also notes that the sensitivity of the ecological elements method has been tested and independently reviewed several times with the most recent review being in April 2015, following comments on the issue by Victoria. The review was conducted by a panel of four independent scientists (referred as the Independent Review Panel (IRP)) nominated by jurisdictions to review CSIRO's method. This latest advice from the IRP follows the February 2015 review of the analyses undertaken separately by the MDBA and Victoria. Both of these used statistical techniques to test how the environmental outcome score responded to differences in the frequency of flow events and the length of dry spells, however the MDBA's approach had the benefit of using modelled time series data generated from a trial implementation of the SDL adjustment method.

The analytical work has been extensive with Victoria of the opinion that their analysis had demonstrated that the scoring method was relatively insensitive to the length of dry spells. Subsequently Victoria has suggested an additional emphasis in the scoring method to further recognise the value of works which allow the length of dry spells to be better managed in extreme droughts through the addition of a dry spell weighting.

In contrast the CSIRO-led project team and the MDBA's view, based on analysis that showed that the increases in environmental outcomes score correlated with both decreases in the length of dry spells and increases with inundation frequency, is that the existing method sufficiently incorporates both the frequency and the length of dry spell flow regime characteristics. The MDBA also concluded that its results showed that the benefit of environmental works to meet ecological outcomes is likely to be amplified during periods of low water availability.

In reviewing the analyses and differing points of view the IRP found no compelling evidence to warrant a change to the method noting that they did not consider that there was any significant scientific weight to the argument raised by Victoria that the method is insensitive to dry spells.

The stocktake notes that the issue primarily relates to the assessment of the benefit of environmental works. To test the sensitivity of the issue it is noted that modelling to date has shown that the TLM works are expected to generate a supply contribution of at least 136 GL. The estimate for the remaining environmental works in the current supply measure program is likely to be a further 50 GL. If additional dry-spell weighting increased the supply contribution by an amount of around 10 per cent, or 20 GL, this would represent a relatively small volume in the context of the total supply measure program. Having regard to this and the conclusion of the IRP, the stocktake considers that effort should be directed to where the potential significant improvement in supply contribution will come from, i.e. reducing uncertainties associated with the scope of projects now under consideration by the states. In addition, as this issue has been extensively debated, the stocktake considers further investigation is unlikely to lead to an agreement to change the method.

The stocktake is also of the view that the development of other approaches will be impractical within the timeframes available, when taking into account the period of time taken to develop and test the current method.

Incorporating an environmental significance weighting

The Basin Plan allows for consideration of weightings for environmental significance in the method. Currently this is addressed through the inclusion of the relative areas of water dependent ecosystems inundated within a reach.

The issue of land tenure, i.e. considering private versus public land as part of environmental significance weighting for the ecological elements scoring method, was a contentious issue during the finalisation of the default method in the Basin Plan in 2012. Written advice provided at that time by the IRP was that "land tenure is not seen as a consistent surrogate for ecological significance or conservation value across the basin". An approach based on land tenure was also explicitly considered by CSIRO in its development of the ecological elemental method but was deemed unsuitable.

Whilst the IRP considers the ecological elements method fit for purpose**,** ecological significance weighting was one of the matters identified for potential future refinements during development and was again raised by jurisdictions during the stocktake. Refinements to the environmental significance weighting would not require a change to the default method set in the Basin Plan and if jurisdictions can provide evidence for changes it may make an additional contribution, noting that the IRP recommended that any proposed alternative environmental significance weightings be subject to an independent scientific review prior to acceptance.

The stocktake considers that as there is still not agreement on this issue it would be worthwhile to test the sensitivity of the areas of contention to ascertain whether the issue is material. If tests show that the outcome would not be material in comparison to potential improvements associated with project scope there would be a compelling case not to progress this issue any further.

5.1.2. Limits of change

The limits of change for the River Murray limit the degree of trade-off between individual environmental outcome scores within a site to protect the achievement of environmental outcomes under the Basin Plan. Examination of the results for ten projects modelled as a package and reported within the MDBA's June advice to the BOC show that there are:

- 14 out of 45 overbank flow indicators;
- 6 out of 8 freshes flow indicators; and
- 4 out of 7 Coorong, Lower Lakes and Murray Mouth indicators

within 1% of not meeting the limits of change set in the Basin Plan, with a supply contribution of 246 GL. It should be noted that these projects are largely works based and the modelling had not fully explored redistribution to increase the supply outcome.

In their June advice, importantly the MDBA analysis showed that the equivalent environmental outcome score for this package is still significantly higher than the benchmark environmental outcome score, indicating that its full supply contribution potential has not yet been maximised within the scope allowed in the Basin Plan. This has been acknowledged by MDBA modellers who have suggested that there is scope to closely match the score of the package to the benchmark score which could increase the supply

measure outcome of this package by up to 30 GL. Confirmation of this volume would require further model run iterations, expected in the next MDBA interim advice to the BOC, although it is anticipated that the progressive introduction of additional projects could change the result. The next MDBA interim advice point, scheduled for November 2015, would be an appropriate time to report back on progress in this area.

Based on the information available the stocktake considers that it is unlikely that the limits of change will be a major restriction on the supply measure program as a whole. While an issue for environmental works proposals, a significant proportion of the projects under consideration will mitigate the effects of the limits of change, described further below.

Analysis has shown that environmental works based projects in effect compete for available environmental water. It is also possible that some non-works proposals could compete. However, a number of proposed projects are expected to effectively contribute additional water or change the timing of flows, which may assist to ease limits of change restrictions when incorporated into the total modelling package as a group of projects. For example, the Menindee project will add more water to the system, and the RMIF project adds flexibility in accessing environmental water currently held in the Snowy Mountains Scheme which will allow increased River Murray flows (RMIF) at critical times. These types of projects can assist in reducing the potential for supply contribution restrictions as a result of the limits of change.

Identifying those supply measure proposals which could ease specific limits of change indicators and have a beneficial impact on the supply contribution could significantly change the jurisdictional assessment of the importance of some projects. It is suggested that the jurisdiction's SDL Adjustment Technical Working Group, which has oversighted the modelling work to date, could conduct further investigation into the extent to which individual limits of change are key factors and consider if the current prioritisation of measures for modelling integration remains appropriate in light of this.

The stocktake believes that the impacts of the limits of change are not such that negotiating a change to existing policy arrangements is warranted. The scope exists to improve outcomes without policy changes, and any policy debate would inevitably divert attention and resources from those required to resolve issues associated with project scope. It is recommended that additional modelling effort be applied to maximise supply contributions within the current limits of change as the modelling package develops. This should be done in close association with jurisdictional representatives on the Technical Working Group.

5.1.3. Excluding the Goulburn River from the application of the scoring method

For the purpose of the Basin Plan the Goulburn River is part of the Southern Basin Region, and has been included within the modelling framework for SDL adjustment purposes. The adjustment process relies on the ecological elements scoring method to have some ability to redistribute the use of environmental water amongst flow indicators at a site to balance outcomes. The Basin Plan includes a note (in Schedule 6.06) which would suggest that the Goulburn River could be removed from the scoring framework as, initially, no supply measure projects were identified for this system. However this removal can only occur while maintaining the in-valley (local + shared) recovery volume.

It has been argued that removing the Goulburn River from the scoring system could remove limit of change constraints on the Goulburn and therefore increase the supply contribution potential of the River

Murray projects. Alternatively it has been suggested that because supply contributions are distributed pro-rata between valleys, excluding the Goulburn means there would be less valleys to distribute the contribution and therefore limits of change may be reached sooner in the valleys that remain in the scoring framework.

The stocktake believes it is not possible to conclusively resolve this issue without modelling both scenarios under the final package of supply measures. However this is likely to be resource intensive and hold up the development of the package by the June 2016 deadline. The stocktake has assumed that Goulburn constraints project can make a contribution to enhance supply measure projects on the Murray. If this is the case the stocktake is of the opinion that the Goulburn should not be excluded. Continuing discussion on this issue simply increases the uncertainty of outcomes for possibly only minimal gain.

5.2. Other issues impacting the performance of the supply measures program

Process and resourcing issues are delaying the supply project progress, resulting in decreased outcome certainty. These issues have become apparent in stocktake discussions with jurisdictions and include:

- delays in starting and submitting business cases have resulted in states (predominantly NSW) working concurrently on multiple complex projects. States should consider whether it is possible to streamline approvals process to hasten the submission of business cases;
- outstanding issues identified in business case evaluations such as ongoing operation and maintenance costs for environmental works are holding up progression of the project;
- business cases have been submitted without required information for both modelling and the evaluation of projects against the BOC agreed guidelines; and
- limited modelling resources have been available to support the development of business cases.

6. Other possible measures and refinements

As per the terms of reference the stocktake has examined where possible refinements to the current suite of projects could provide a beneficial effect on the supply contribution. The stocktake has also examined a range of options to provide advice on projects which may contribute to a supply contribution beyond those currently under consideration, projects identified but not progressed by jurisdictions and potentially the application of new operating technologies not yet in use. The most prospective improvement is through the refinement of existing projects consideration.

6.1. Project refinements

6.1.1. The Menindee Lakes Scheme (MLS)

The delivery of the Basin Plan will provide an extra 150 GL of inflow from the northern Murray-Darling Basin to the Menindee Lakes, however this water is not designated as additional environmental water after reaching Menindee. This additional volume was not intended to provide a windfall gain to downstream water users, however would provide some support to maintain reliability of supply. On condition that the reliability of users downstream of Menindee and in the River Murray is not adversely affected, some of this additional water could retain its environmental status and provide an additional supply measure. This would require agreement from Victoria and South Australia.

Whilst the stocktake has taken a conservative approach to the establishment of a plausible supply estimate it is important to establish how the estimate might change if higher levels of confidence were able to be ascribed to some potentially high return projects. To demonstrate this, as a project with significant supply contribution potential a sensitivity analysis was undertaken for the MLS project. Analysis showed that through various refinements there is the potential to add about 40 GL to the supply contribution with a high level of confidence. Other variations on this project have also been identified which could increase this further.

6.1.2. Hume Dam airspace

River Murray operators have identified the potential to modify proposed Hume Dam operational rules to improve outcomes and reduce risks. Further proposed enhancements may require consideration of options to mitigate reliability issues. An accounting and rights impact assessment is still required. This may significantly increase the supply contribution and should be investigated further.

6.1.3. River Murray operation

It has been suggested that increased outflows for some of the environmental sites on the River Murray should be considered to more quickly remove surplus or degraded water after watering. Faster water egress would achieve better environmental outcomes, as there will less risk of water quality decline such as black water events developing.

6.1.4. Improved operating tools

The use of better operating tools now becoming available, such as better real time information and tighter compliance of ordering and supply protocols, could be developed as a proposal to improve

operating efficiency on the River Murray. To a large extent this is being picked up in two of the current proposals i.e. the Murrumbidgee CARM and Improved River Regulation projects.

6.2. Potential new projects

The stocktake has attempted to identify additional potential supply projects not recognised in state submissions. The stocktake has not reconciled the list with states' submitted prefeasibility lists. The objective of proposing additional projects is to assess the potential for a further supply contribution. The stocktake considers that an examination of the potential new projects could be undertaken by the states. It is likely a number have already been recognised by the states but not submitted for a raft of reasons. A list of potential projects considered by the stocktake is at Appendix F. It is recognised that this list is at a very preliminary stage, and there is likely to be minimal prospectivity associated with these projects. As noted, the most prospective projects have largely been progressed by states.

6.3. Projects identified but not progressed by jurisdictions

Over the last eighteen months Basin States have canvassed a wide range of proposals as possible supply measure projects. The most prospective projects have generally proceeded to the feasibility stage while the remaining proposals have been classified as not sufficiently worthwhile to warrant committing limited resources to progress. Several potential projects in this category were drawn to the attention of the stocktake and examined to determine whether they warranted further investigation. These are briefly discussed below.

6.3.1. NSW Healthy Floodplains project

This is a northern basin project aimed at setting limits to flood plain harvesting. It was not proposed as a supply project due to predicted difficulties with the establishment of an appropriate licencing framework within the required timeframes. In addition, no environmental scoring framework has been developed for the northern basin due to the lack of projects brought forward in that area. Northern basin projects are unlikely to have any meaningful supply contribution. Similar comments apply to other northern basin projects initially considered by NSW.

6.3.2. Review of Lake Victoria operating rules

Investigations into this project did not proceed because of the close interaction of Lake Victoria operations with the Menindee Lakes. Reconfiguring the Menindee Lakes will have an impact on the operation of Lake Victoria therefore a separate review is likely to be superfluous.

Similar comments apply to potential rule changes that could make better use of additional dilution flows (defined in the MDB Agreement and supplied when target storage levels in the Menindee Lakes and the upper River Murray are exceeded) into South Australia now that flow conditions into South Australia have radically changed with the supply of additional environmental flows under the Basin Plan.

7. Constraints

7.1. Progress on constraints

In 2014 Basin Ministers determined that business cases for seven key focus areas were to be developed for consideration in the SDL Adjustment Mechanism. Agreement has been reached for the MDBA to develop the business case for the Hume to Yarrawonga and the Yarrawonga-Wakool and downstream (including South Australia) reaches of the River Murray on behalf of the New South Wales, South Australian and Victorian Governments. The River Murray business cases will be developed in an integrated manner.

New South Wales has committed to develop business cases for the Lower Darling, Murrumbidgee and Gwydir Valleys whilst Victoria has agreed to develop a business case for the Goulburn Valley. Business cases are due to be completed by the end of November 2015. The Lower Darling business case will be dependent upon the nature of any supply measure proposal brought forward for the Menindee Lakes.

7.2. Consideration of constraints measures as supply measures

There is potential for constraints measures to be submitted as supply measures and to be assessed for a supply contribution. Under the Basin Plan constraints put forward as supply measures are only required to achieve equivalent, rather than improved environmental outcomes. With the exception of the Upper Murrumbidgee Environmental Flow Enhancement Project no state has brought forward a constraint for consideration under the supply measure program.

7.3. Summary of findings on the constraints program

An assessment of each constraint measure project is shown in Appendix E and is discussed briefly below. As with supply projects, a confidence level has been applied against the key factors assessed under this stocktake. Constraints projects are heavily reliant on community acceptance due to the need to address issues relating to third party impacts from changed flow heights, for example through the purchase of easements and upgrading bridges and roads and culverts to improve access during higher flow events. Even with on-going community consultation there is a high likelihood that the potential project configuration within business cases will be modified after their submission. At the point at which BOC must make a determination on the package of constraints it is likely that uncertainty will remain until a level of community acceptance and confirmed detailed design are progressed.

It is noted that the current program has limited funding, and prioritisation decisions have been taken which may limit the size and potentially the number of tributary projects which can be undertaken as a result.

The stocktake is confident that the constraints program is progressing satisfactorily given the complexity and extent of the projects, however the final outcome will be subject to the resolution of third party concerns, and practicality and funding issues. The stocktake has a higher level of confidence that the River Murray program can be delivered up to modest levels of constraint relaxation through a staged process. It is less confident in the outcomes of the Goulburn and Murrumbidgee due to the limited available capital budget and the need to trial and confirm concepts involved with the coincidence of releases from storages and downstream tributary flows on these systems.

7.3.1. Murray reaches

The constraint project is on track for business case delivery by the end of November 2015. This should allow a refinement of uncertainties associated with agriculture and public infrastructure costs however significant uncertainty will still remain.

Preliminary modelling has shown that removal of River Murray constraints in the Hume to Yarrawonga and the Yarrawonga to Wakool Junction reaches to allow targeted environmental flows up to 40,000 ML/d and 65,000 ML/d respectively could enhance possible supply contributions by as much as 80 – 100 GL. If the 65,000 ML/d target is reduced to 50,000 ML/d, the plausible estimate of the supply contribution is likely to be reduced to around 30 – 50 GL. The stocktake's plausible supply contribution estimate of 508 GL assumes 50,000 ML/d for the Yarrawonga to Wakool Junction reach, as it is likely a staged approach could be applied. If not staged and 65,000 ML/d is adopted, the 508 GL estimate may rise by 40GL. This illustrates the difficulty in arriving at a firm plausible estimate without agreed flow target outcomes.

7.3.2. Murrumbidgee

The project is on track for business case by the end of November 2015. Work is currently being undertaken to improve confidence around works and costs. Earlier work in the development of the Constraints Management Strategy has provided a good basis for the development of the business case.

The major risks for the implementation of this project relate to engagement timeframes and consultation with landholders to gain acceptance to proposals as project definition becomes clearer.

Based on River Murray modelling, it is anticipated that the volume of the Murrumbidgee and Murray supply contribution could be enhanced by between 10 – 20 GL if Murrumbidgee constraints are lifted.

7.3.3. Gwydir

The project is on track for the delivery of the business case by the end of November. Similar comment applies to the Gwydir as for the Murrumbidgee, however this project is further complicated by a possible requirement to deal with fish access issues along the river.

This project will result in considerable local benefit in the Gwydir Valley however will not contribute to supply contribution enhancement in downstream systems.

7.3.4. Goulburn

The project is on track for the delivery of a business case by the end of November 2015. The Victorian Goulburn-Broken Catchment Management Authority has undertaken work on relevant issues since 2005 and hydraulic modelling began in 2010.

Work is currently underway to improve cost estimate information quality and prove concepts relating to topping-up downstream tributary flows with regulated releases from an upstream storage (Eildon). This will be critical to the business case. Based on River Murray modelling, it is anticipated that the River Murray projects supply contributions could be enhanced by between 10 – 20 GL if constraints on the Goulburn are lifted to the 40,000 ML/d target below Shepparton. There is a low confidence in this estimate as it depends on the ability to manage the delivery risks associated with topping-up flow events and community and stakeholder reaction to the proposed program which may not be known for some time.

8. Efficiency measures

The efficiency measures program is scheduled to run over nine years from 2015 with the objective of increasing environmental water by 450 GL without socio-economic impacts. This program is an integral part of the SDL adjustment process and could also have a significant bearing on the level of supply contribution volumes that can be achieved given the adjustment limit of five per cent of the SDL prescribed in the Basin Plan of 10,873 GL.

This limit means that a supply contribution of 650 GL would require an offset of 106 GL of efficiency measure entitlements by 1 July 2019.

The Commonwealth Department of the Environment's (DoE) efficiency measures funding program aims to achieve an amount of 106 GL by July 2019 and 450 GL in total by the end of 2023/24. To deliver this measure the DoE are in the process of establishing the Commonwealth's On Farm Further Irrigation Efficiency (COFFIE) program. The program is only in its early stages, but builds on the experience of previous on-farm efficiency programs run by the Commonwealth and state governments. In this case the program design differs because it seeks to obtain 100 per cent of the water from on-farm efficiency savings undertaken under the program whereas previous programs allowed farmers to retain a proportion of the savings.

The Commonwealth proposes the use of regional/local delivery partners to deliver the program under clear guidelines and to initiate a pilot of the proposed arrangements as soon as the program design is finalised.

8.1. Summary of stocktake findings on the efficiency measures program

The stocktake notes an area of concern with over-lap of the existing On Farm Irrigation Efficiency Program (OFIEP) and the state based programs funded by the Commonwealth (including the Victorian Farm Modernisation Project (VFMP) and the NSW Integrated Farm Modernisation Program (IFMP)) which are all designed to support bridging the gap measures. DoE advise that the COFFIE program is not intended to compete with the other established on-farm bridging the gap programs however this has not allayed some jurisdictional concern that it will have an adverse impact on the state-based programs, including irrigation modernisation programs funded by the Commonwealth and states. An assurance that this is not intended should be documented to minimise state concerns.

There is a need to clearly communicate with stakeholders how these programs interact as the VFMP and IFMP programs are still running. There are distinct differences between each of the programs associated with the return of water, the nature of the works allowed and the areas where the COFFIE program will target. It is understood the OFIEP will not run further rounds of water recovery and is to be replaced by COFFIE which is solely targeting the efficiency measure objective. It is intended to run the COFFIE program over the full Murray-Darling Basin although the Commonwealth advise that care will be taken to avoid competing with existing bridging the gap programs.

It is noted that even though the state-based bridging the gap programs are unlikely to directly compete with COFFIE, there may be inequity perceptions in the irrigation community where there is unequal access to the programs and the amounts of water retained on-farm under each of these. Differences between the programs may also raise concerns about the potential for adverse impacts on regional productivity with more water leaving farms under the COFFIE program.

Another area of concern has been the level of certainty that the COFFIE will reach its targets. Based on recent experience with Rounds 4 and 5 of the OFFIEP, where these program rounds have been heavily oversubscribed, the DoE has expressed confidence that this interest will translate to the COFFIE program when it is instigated and deliver the 2019 106 GL target. Although the program requires farmers to return 100% of the water savings, higher than that required under the bridging the gap on-farm programs, this is compensated for by allowing farmers a greater degree of freedom on the type of measures they employ to achieve the savings. This is seen as a crucial factor to the success of the program.

A further risk to the program is anecdotal evidence that current dry conditions could start to affect farmers' appetite to subscribe to future programs while the dry conditions persist. Victorian advice is that the VFMP currently run by the Goulburn-Broken Catchment Management Authority is likely to see a commitment of only $15 million against the $50 million program on offer. Part of this is attributed to community concerns about uncertainty in relation to water prices, and therefore investment decisions, as a result of experiences under recent dry conditions. It is also likely to be attributed to the design of the program, which rigidly specifies that 55% of on-farm savings are to be returned to the program and limits the nature of the works that farmers can undertake. This design was intended to improve regional development opportunities however it does not meet the needs of many farmers.

Efficiency contributions under the program can also be provided by alternative arrangements to on-farm works. These arrangements need to be proposed by a Basin State following assessment by that state that they will have neutral or improved socio-economic outcomes. DoE advise that they expect that states will need to propose such measures in later years of the program to achieve the 450 GL by the 2023/24 timeframe. At this stage the stocktake considers this problematic because there are no obvious areas where this water could be obtained although this conclusion may well change in the future. The Water Amendment Bill 2015 currently in the federal Parliament seeks to amend the Basin Plan to enable the participation of consumptive water users in off-farm water saving measures to be deemed to be socio-economically neutral and therefore more readily funded as efficiency measures. This may assist with addressing this issue.

The stocktake believes that there is relatively high confidence that the efficiency measures program can deliver the DoE target of 106GL by mid-2019, however there is a considerable risk that the recovery of the 450GL target by 2023/24 will not be met. It should be noted that if the supply measures do not meet 650 GL the application of the 5% limit on the SDL adjustment allowed under the Basin Plan would mean the program aim to reach 106 GL in efficiency measures by 2019 may not be required.

It is recommended that better engagement occur between the Commonwealth and states to resolve a number of issues where different views about the performance of various on-farm efficiency driven programs exist. It is worth noting that the success of the efficiency measures program is closely linked to the outcome of the supply measures program.

9. Modelling

Modelling of supply measure projects to determine the potential supply contribution is a critical factor in improving the certainty of investment decisions. It is would be desirable that this work should be complete by April 2016 to assist basin governments in their determination of the SDL adjustment package by 30 June 2016.

To date progress with modelling has relatively been slow and challenging. This is largely due to delays in the provision of suitable data by states, mainly NSW, to the MDBA for each project and the time required to replicate project concepts in the model. Considerable time has also been invested in testing the Ecological Elements scoring method to ensure it was fit-for-purpose.

To ensure the best use of limited modelling resources, projects have been prioritised for modelling based on criteria agreed by Basin States and the Commonwealth. Priorities to date have been determined by the likely size and extent of the supply contribution potential, the availability of data and the level of risk associated with a proposal.

Because of the resource intensive nature of this work and the delays experienced to date, projects are not being modelled on a stand-alone basis, but are being progressively added to the model to build up a package of measures. This approach is necessary to minimise the risk of not meeting the timeframes for investment decisions and also recognises that there are other factors involved in the decision to package up projects such as the funding framework which is at the package level. This does not allow individual projects to be assessed and directly compared with other projects on a like for like basis although it is recognised that this was never the intent. This progressive inclusion of individual projects may result in the supply contribution of projects added at later stage in the modelling package to be assessed as lower/higher than what they otherwise might be. Later projects could benefit if preceding projects in the model added water or changed timing in positive way.

It is the view of the stocktake that the prioritisation and modelling approaches are reasonable given the time constraints for investment decisions. At the time of the stocktake ten separate supply measure proposals have been modelled. The modelling program set out in the jurisdictionally agreed prioritisation matrix aims to model a total of 28 supply measures although current estimates are that modelling of 20 supply projects will be complete by April 2016.

Proposed arrangements have been suggested to supplement the MDBA modelling team with state modelling resources (either directly or indirectly) to endeavour to have all supply measures modelled by April 2016. This would be highly desirable but the April timeframe is likely to be ambitious. Not achieving this outcome will lower the confidence in investment decisions.

10. Key findings

1. Based on available information, the stocktake's plausible estimate of the supply contribution, including constraints, for projects currently considered under the SDL adjustment provisions of the Basin Plan is approximately 500 GL. The stocktake considers that this estimate could be potentially increased through provision of better quality information and the development and implementation of a finalisation plan and roadmap to 30 June 2016. This plan would list and proactively address key issues that are limiting the potential of projects. This could give rise to a higher level of confidence that some delayed projects will be ready for approval and will be delivered in the timeframes required under the Basin Plan.

2. Limitations on the current potential supply contribution are principally associated with the project scope (i.e. the nature of the projects and the complexity of the economic, social and local environmental factors which currently pose limitations) and progress in the development and submission of existing project proposals rather than the limits of change provisions within the Basin Plan or the application of the ecological elements scoring method.

3. Process and resourcing issues are delaying the progress of supply projects, resulting in decreased certainty in project outcomes.

4. Limits of change are an issue for environmental works proposals however there is insufficient information to suggest that the limits of change will be a major restriction on the supply measure program as a whole, particularly as a significant proportion of the projects under consideration will mitigate their effects. The stocktake believes that the impacts of the limits of change are not such that negotiating a change to existing policy arrangements is warranted.

5. There is limited potential for new projects and no additional supply measures are likely to be brought forward within the timeframes however there are some opportunities for project enhancements that may be worthwhile considering.

6. The achievement of supply measure contributions will be heavily dependent on the delivery of a number of complex projects. There would be merit in developing protocols for these projects when a significant contribution may be expected, and complete resolution of project details is unlikely to be reached by 30 June 2016. The protocol would need to contain provisions to allow conditional agreement for obviously attractive proposals by that date, subject to an agreed sunset provision, to resolve outstanding issues.

7. There is moderate to high confidence that the efficiency measures program can deliver the Commonwealth's program objective of 106 GL by mid-2019. However, there is a considerable risk that the program aim of 450 GL by 2023/24 will not be met. Better engagement is required between the Commonwealth and the states to resolve a number of issues where different views about the performance of various on-farm efficiency driven programs exist and to ensure that community and state jurisdictional support for the program is ongoing.

8. The constraints program is in its early stages, however states are on track to deliver business cases within agreed timeframes. It is expected that further refinement of works programs and costs will still be necessary after business cases are received with significant risks and outcome uncertainty remaining until negotiations with affected landholder and community responses to detailed on-ground plans are complete.

9. There is likely to be a significant supply contribution in the event that constraint projects are proposed as supply projects. The stocktake considers that the River Murray constraints program could enhance the supply contribution by 30 - 100 GL. Consideration of constraints projects has been factored in to the stocktake's plausible estimate.

10. Climate extremes are dealt with in the ecological elements scoring method used in the SDL adjustment mechanism. An Independent Review Panel of scientists has endorsed this method and further investigation is unlikely to lead to an agreement for its change. The stocktake is of the view that the development of other assessment approaches will be impractical within the timeframes available. In addition, the costs in terms of resources expended for particular issues with the method raised by jurisdictions during the stocktake and discussed in this report are likely to outweigh any benefit from revisiting the method.

11. The way forward

The stocktake recommends that the Ministerial Council endorse a finalisation plan and roadmap to 30 June 2016 which introduces proactive mechanisms to bring all SDL adjustment projects to business case submission.

This will identify issues noted in this report and set out agreed obligations and responsibility to address those that require management or policy decisions to remove impediments to progress, including resourcing. The obligations include in part:

- a commitment by states to develop and implement proactive management actions to ensure the submission of outstanding business cases for supply projects with a significant anticipated supply contribution within required timeframes;;
- identify any resourcing issues which are impeding the states' ability to deliver business cases within agreed timeframes; and
- introduce conditional protocols to the extent possible to address agreement on the resolution of issues still outstanding at 30 June 2016 for the more complex projects.

Non-resolution of the above issues will impede the delivery and implementation of the SDL adjustment program and hinder its potential.

Appendix A – Stocktake terms of reference agreed by the Ministerial Council

STOCKTAKE OF SUSTAINABLE DIVERSION LIMIT (SDL) PROPOSALS

Purpose

To provide advice to Ministers on opportunities to improve the effectiveness of governments' supply measure, constraints measure and efficiency measure proposals and suggestions for further proposals that could provide additional SDL adjustment outcomes.

Tasks

1. Review all existing and in progress supply and constraints measure proposals and the proposed efficiency measure program in the context of the SDL adjustment mechanism and provide advice on whether all potential supply measures are being examined;
2. Provide specific advice on any other measures and refinements that have not yet been investigated that could effectively contribute to an SDL adjustment, paying particular attention to operational or rules based measures.

Process

BOC to meet on 11 June to agree on engaging consultants to undertake this work and to provide a report to Council by 31 July 2015.

Appendix B – Assessment status of supply measures

Proponent	Project title	Status	Jurisdiction assessment received	Assessments outstanding
Victoria/ New South Wales	Improved Regulation of River Murray	Phase 1 Feasibility study submitted to SDLAAC for review 28 November 2014. Revised version submitted to SDLAAC in April 2015.	Waiting on advice from the Water Liaison Working Group	-
NSW	Improved Flow Management Works at the Murrumbidgee River - Yanco Creek Offtake	Phase 2a - business case development. Feasibility study approved (5 June 2015) to be developed into a business case.	-	-
NSW	Alternative supply systems for effluent creeks – Murrumbidgee River	Phase 2a - business case development. Feasibility study approved (5 June 2015) to be developed into a business case.	-	-
NSW	Modification of weirs along the Murray	Phase 2a - business case development. Feasibility study approved (11 November 2014) to be developed into a business case.	-	-
NSW	Computer Aided River Management (CARM) Murrumbidgee	Phase 2a - business case development. Feasibility study approved (11 December 2014) to be developed into a business case.	-	-

Proponent	Project title	Status	Jurisdiction assessment received	Assessments outstanding
NSW	Nimmie Caira infrastructure modifications	Phase 2a - business case development. Feasibility study approved (11 December 2014) to be developed into a business case.	-	-
NSW	Water Management Works Millewa and Yanga National Parks	Phase 2a - business case development. Feasibility study approved (17 March 2015) to be developed into a business case.	-	-
NSW	Snowy Hydro Licence amendments to call environmental water	Phase 2a - business case development. Feasibility study approved (17 March 2015) to be developed into a business case.	-	-
Victoria	Gunbower Forests	Phase 2b - business case submission. Business case documents referred for consideration 22 September 2014.	MDBA Victoria South Australia Commonwealth	NSW,
Victoria	Lindsay Island (Stage 1) including Walla Walla, Websters and Horseshoe	Phase 2b - business case submission. Business case documents referred for consideration 22 September 2014.	MDBA Victoria South Australia Commonwealth	NSW
Victoria	Mulcra Island	Phase 2b - business case submission. Business case documents referred for consideration 22 September 2014.	MDBA Victoria South Australia Commonwealth	NSW

Proponent	Project title	Status	Jurisdiction assessment received	Assessments outstanding
Victoria	Hattah Lakes	Phase 2b - business case submission. Business case documents referred for consideration 22 September 2014.	MDBA Victoria South Australia Commonwealth	NSW
Victoria	Guttrum and Benwell State Forests floodplain enhancement project	Phase 2b - business case submission. Business case submitted 12 January 2015.	MDBA Victoria Draft South Australia Commonwealth QLD indicated no response	NSW
Victoria	Gunbower National Park floodplain management project	Phase 2b - business case submission. Business case submitted 12 January 2015.	MDBA Victoria Draft South Australia Commonwealth Qld indicated no response	NSW
Victoria	Hattah Lakes North floodplain management project	Phase 2b - business case submission. Business case submitted 12 January 2015.	MDBA Victoria Draft South Australia Commonwealth Qld indicated no response	NSW
Victoria	Wallpolla Island floodplain management project	Phase 2b - business case submission. Business case submitted 12 January 2015.	MDBA Victoria Draft South Australia Commonwealth	NSW

Proponent	Project title	Status	Jurisdiction assessment received	Assessments outstanding
			Qld indicated no response	
Victoria	Burra Creek floodplain management proposal	Phase 2b - business case submission. Business case submitted 12 January 2015.	MDBA Victoria Draft South Australia Commonwealth Qld indicated no response	NSW
Victoria	Nyah floodplain management project	Phase 2b - business case submission. Business case submitted 12 January 2015.	MDBA Victoria Draft South Australia Commonwealth Qld indicated no response	Qld, NSW
Victoria	Vinifera floodplain management project	Phase 2b - business case submission. Business case submitted 12 January 2015.	MDBA Victoria Draft South Australia Commonwealth Qld indicated no response	Qld, NSW
Victoria	Lindsay Island (Stage 2) floodplain management project	Phase 2b - business case submission. Business case submitted 12 January 2015.	MDBA Victoria Draft South Australia Commonwealth Qld indicated no response	Qld, NSW

Proponent	Project title	Status	Jurisdiction assessment received	Assessments outstanding
Victoria	Belsar Yungera floodplain management project	Phase 2b - business case submission. Business case submitted 12 January 2015.	MDBA Victoria Draft South Australia Commonwealth Qld indicated no response	Qld, NSW
NSW	TLM environmental works and measures	Phase 2b - business case submission. Business case documents referred for consideration 8 December 2014.	MDBA Victoria South Australia Commonwealth	Qld, NSW
South Australia	South East Flows Restoration Project	Phase 2b - business case submission. Business case submitted for consideration 23 December 2014.	MDBA Victoria	Commonwealth, Qld, NSW,
South Australia	Chowilla floodplain TLM works	Phase 2b - business case submission. Business case summary submitted for consideration 23 December 2014.	MDBA Victoria Commonwealth	Qld, NSW
South Australia	Riverine recovery project	Phase 2b - business case submission. Business case submitted for consideration 23 December 2014.	MDBA Victoria	Commonwealth, Qld, NSW
Victoria/ New South Wales	Hume Dam airspace management and pre-releases	Phase 2b - business case submission. Business case documents submitted for consideration 1 April 2015.	-	All

Proponent	Project title	Status	Jurisdiction assessment received	Assessments outstanding
Victoria/ New South Wales	Operating rule change to the use of the Barmah-Millewa Forest Environmental Water Allocation	Phase 2b - business case submission. Business case documents submitted for consideration 1 April 2015.	-	All
Victoria/ New South Wales	Flexible rates of fall in river levels downstream of Hume Dam	Phase 2b - business case submission. Business case submitted 10 June 2015.	-	Not yet due
NSW	Structural and operational changes at Menindee Lakes	Pre-feasibility · Under a project agreement with the Commonwealth, NSW is investigating options for a Menindee Lakes project including the nature of water savings. It is likely that this project will be expanded to include related rule-based changes.		
NSW	Upper Murrumbidgee environmental flow enhancement	Pre-feasibility · Initial scoping report prepared · Further assessment and modelling required		

Appendix C - Assessment of supply project contribution potential

The stocktake evaluation of supply projects examined a number of criteria including the following:

Information adequacy

A high confidence level rating was based on the quality and scope of the data provided though documentation and supplementary advice from meetings, teleconferences and individual briefings from jurisdictions and the MDBA's experts.

A low confidence rating indicates a paucity of data. Moderate means the data is reasonably sufficient but latent risk is evident.

Project progress

The stocktake's evaluation was fundamentally focused on business case delivery. Those proposals with a business case submitted were assigned a high confidence against this criterion. The ratings for other projects were more judgemental and had regard to available documentation (feasibility studies etc.) and advice from key personnel within jurisdictions including MDBA staff.

Dependency on other submitted projects to achieve outcome

The level of confidence within this criterion is either dependant on documentation identifying dependencies or connectivity with other projects, or if not reported judgement based on advice from jurisdictions and the MDBA together with the stocktake teams' experience. A high confidence rating is based on a mix of documented evidence and advice. A low rating indicates uncertainty exists.

Significance of any recognised unresolved issues

This criterion covers risks associated with issues recognised in documentation or conveyed to the stocktake in consultations but which remain unresolved. The confidence levels reflect the issue's significance and the potential for resolution. A high confidence rating is applied if the issues have a good prospect of resolution based on current information available and the status of the project.

External risks

The rating depended on external risks identified from the documentation and/or briefings. If the risk was seen as being significant with high level of certainty, a low confidence was applied. Low uncertainty risk and/or complexity and connectivity produced a high level of confidence.

Basis for supply contribution estimate

The estimated supply contribution is based on expert judgement, documentation and experts' briefings and experience within the stocktake team. It is highly influenced by modelling outcomes, and business case availability and content also drove the assignment of confidence levels.

Plausible supply contribution

A potential low estimate and high estimate of each project's supply contribution, expressed in GL, have been made based on current knowledge within documentation, the status of the project (business cases available or not) and expert judgement.

The low estimate has a higher level of certainty whereas the high estimate is likely to be more problematic. The high estimate in some cases is based on the outcome of identified potential refinements for a project that may assist to increase its supply contribution potential.

Impacts from changes to operation rules minimal

In assigning confidence levels for this criterion the primary aim was to assess whether flow rates and volumes of water influenced environmental outcomes. The ratings were judgmental based on advice in documents and consultations as well as experience.

A high confidence rating was assigned when the level of connectivity with all the projects were judged to be significant.

Key factors limiting project supply contribution addressed

Ratings were based on advice from experts within jurisdictions and documentation. High confidence ratings were assigned when business cases were available coupled with this supplementary advice. Low ratings were given when such information was limited.

Investment considerations

As for many of the above factors confidence ratings were significantly dependent on information availability. Business case availability was the key determinant.

Certainty of implementation within Basin Plan timeframes

This was probably the most difficult confidence level to assess. For those projects with business cases the information provided good signposts for certainty here. For other projects the assessment became more judgmental and tended to be toward the moderate to low levels.

Supply projects assessed

The Living Murray environmental works (NSW/Vic/South Australia)		
Description	The six environmental works measures funded under the TLM initiative extend over 36,650 ha of floodplains and wetlands adjacent to the River Murray. The works include: Gunbower and Koondrook-Perricoota Forests (x2), Hattah Lakes (x1), and Riverland-Chowilla Floodplain (x3).	
Project type	Environmental works	
Key criteria and stocktake assessment		**Confidence**
Environmental outcomes	The TLM works facilitate additional watering, reducing periods between dry spell events and increase the extent, frequency and duration of inundation.	**High**
Information adequacy	Sufficient	**High**
Project progress	Business case documents submitted and works largely completed	**High**
Dependency on other submitted projects to achieve outcome	Marginal dependency. Operational costs/budgets based on assumed flow conditions which could be affected by other measures. This could influence performance of works; therefore connectivity with other projects is moderate	**Moderate**
Significant identified issues likely to be resolved	No significant issues identified by proponent. No significant stakeholder concerns.	**High**
Significant issues not identified in documentation can be managed	Increasing outlet capacity of regulating structures for return flows may enhance some projects.	**N/A**
External risks managed	Well-addressed	**High**
Basis for supply contribution estimates	Modelling	**High**
Plausible project supply contribution range	136 GL* The projects were modelled as part of initial 10 pack included in the MDBA's June advice. The volume estimated by the stocktake is inferred from this advice.	**High**
Minimal impacts from changes to river operational rules	The need for rules to assist in achieving proposed environment outcomes through coincident timing of environmental water releases with natural freshes (piggy-backing) is recognised and addressed.	**High**

The Living Murray environmental works (NSW/Vic/South Australia)		
Key factors limiting project supply contribution addressed	Limits of change addressed in modelling but have significant influence on outcomes.	**Moderate**
Investment considerations	Investment committed and expenditure undertaken. Implementation of constraints measures may marginally influence works operational costs. Some additional funds may be required if any outlet capacities are increased.	**High**
Certainty of implementation within Basin Plan timeframes	Works largely completed.	**High**
General comments and areas of focus	**Focus areas** **1. Significant project as recognised through decision to construct works.** **2. Further iteration of modelling will maximise estimated benefits within limits of change.**	

*A possible increase of 30 GL in the plausible supply contribution is the total for all projects modelled in the 10 pack collectively

Hume Dam airspace management and pre-releases (Vic/NSW)		
Description	Consideration of future airspace management in Hume Dam in which pre-releases could provide enhanced environmental outcomes. When environmental water releases are anticipated, the revised airspace evacuation and filling rules impact on timing of releases and both target airspace volumes and pre-releases. The revised rules create more spill events from Hume Dam than observed in the benchmark model outcomes.	
Project type	Rule changes to both storage targets and release rules.	
Key criteria and stocktake assessment		**Confidence**
Environmental outcomes	More frequent inundation of larger floodplain-wetland areas in Upper Murray Reach and increase in flows downstream at key times. Environmental outcomes scores are significantly increased above benchmark scores.	**High**
Information adequacy	Sufficient but no discussion on water accounting. Reliability of rights modelled but not reported in documentation	**Moderate**
Project progress	Business case submitted. Stakeholder engagement delayed, subject to in-principle approval of business case.	**High**
Dependency on other submitted projects to achieve outcome	No direct dependency but will influence RMIF and Barmah-Millewa account and other downstream project release strategies.	**Moderate**
Significant identified issues likely to be resolved	Potential adverse downstream landholders' reaction identified. Comprehensive plan for stakeholder engagement strategy required. Potential for a contingent liability if a challenge as result of flooding. This is likely a minor risk but needs consideration.	**Moderate**
Significant issues not identified in documentation can be managed	River Murray operators have identified the potential to modify proposed rules to improve outcomes and reduce risks. Further proposed enhancements may require rights reliability to be underwritten by the Commonwealth Environmental Water Holder. An accounting and rights impact assessment is still required.	**Moderate**
External risks managed	External risks identified – risk mitigation strategy proposed.	**High**
Basis for supply contribution estimate	The project was modelled as part of initial '10 pack package' included in the MDBA's June advice. 70 GL is an Initial estimate directly inferred from MDBA modelling. Further iteration of modelling may potentially boost the project's supply contribution potential by 5 GL based on expert judgment.	**High**

Hume Dam airspace management and pre-releases (Vic/NSW)		
Plausible supply contribution range	70GL*.	**High**
Key factors limiting supply contribution managed	Trade-offs for changes in flood mitigation outcomes; Inflow and demand forecasts Improvements add to beneficial outcomes; harmony operations with Dartmouth and Lake Victoria.	**Moderate**
Minimal impacts from changes to river operational rules	This project results in significant changes to the flow regimes. Further modelling is necessary to reduce uncertainty	**Low to moderate**
Investment considerations	Minor costs as no works involved. Minor contingent liability may exist.	**High**
Certainty of implementation within Basin Plan timeframes	Somewhat dependent on the resolution of landholder issues. Accounting matters will need structured policy considerations as water rights are involved.	**High**
General comments and areas of focus	**High value project can be introduced as a rule change.** **No direct costs but potential contingent liability remains from the downstream flooding of private land.** **A dedicated team to assist in addressing project issues could be considered.** **Focus areas** **1 - Proposed rule changes need to be refined with River Murray operators.** **2 - Connectivity issues require examination.**	

*A possible increase of 30 GL in the plausible supply contribution is the total for all projects modelled in the 10 pack collectively

Barmah-Millewa Forest Environmental Water Allocation rule changes (Vic/NSW)		
Description	Revise operating rules for the Barmah-Millewa Forest environmental water allocation (BMFEWA) to ensure better coordination with other environmental watering initiatives by only triggering BMFEWA watering if a four month flood had not yet occurred, and no longer make releases from the BMFEWA in December.	
Project type	Rule change	
Key criteria and stocktake assessment		**Confidence**
Environmental outcomes	More effectively use the total water available to the environment to add a small number of spill events that inundate the Barmah-Millewa Forest.	**High**
Information adequacy	Sufficient	**High**
Project progress	Business case submitted. Stakeholder engagement delayed, subject to in-principle approval of business case.	**High**
Dependency on other submitted projects to achieve outcome	Not dependent, but linkages likely with the National Parks watering and any changed flow regimes as a result of lifting constraints.	**High**
Significant identified issues likely to be resolved	No major issues identified by proponent. Operators suggested some concerns with the Bullatale Creek regulator operations.	**High**
Significant issues not identified in documentation can be managed	Jurisdictional assessment of the business case not yet complete. Operators expressed some concerns about operating the Bullatale Creek regulator and this concern was not addressed in the business case. No landholder issues identified.	**Moderate**
External risks managed	Identified – not likely to be significant.	**Moderate**
Basis for supply contribution estimate	The project was modelled as part of initial '10 pack package' included in the MDBA's June advice. The volume estimated by the stocktake is inferred from this advice.	**High**
Plausible project supply contribution range	40 GL*	**High**
Minimal impacts from changes to river operational rules	Any rule changes that impact on flows and/or their timing through the forest reaches could impact on contribution value but generally positive.	**High**
Key factors limiting project supply contribution managed	None identified.	**High**

Barmah-Millewa Forest Environmental Water Allocation rule changes (Vic/NSW)		
Investment considerations	No works, therefore relatively low costs to deliver a significant supply contribution.	**High**
Certainty of implementation within Basin Plan timeframes	Moderate to high level of success based on prior experience with management and operational issues.	**High**
General comment	**The project has good identified outcomes.**	

*A possible increase of 30 GL in the plausible supply contribution is the total for all projects modelled in the 10 pack collectively

South East Flows (South Australia)		
Description	Allow outflows from the Upper South East drainage system to be redirected into the Coorong South Lagoon.	
Project type	Works	
Key criteria and stocktake assessment		**Confidence**
Environmental outcomes	Localised benefits for salinity outcomes in the Coorong South Lagoon.	**High**
Information adequacy	Sufficient	**High**
Project progress	Business case submitted	**High**
Dependency on other submitted projects to achieve outcome	Not dependent, but linkages to upstream projects likely to improve benefits by providing a small buffer to mitigate limits of change.	**High**
Significant identified issues likely to be resolved	Not identified.	**High**
Significant issues not identified in documentation can be managed	Nil identified.	**High**
External risks managed	Identified – not likely to be significant.	**High**
Basis for supply contribution estimate	The project was modelled as part of initial '10 pack package' included in the MDBA's June advice.	**High**
Plausible supply contribution range	No direct contribution to supply contribution however will facilitate other projects by helping to maintain limits of change in the Coorong South Lagoon.	**High**
Minimal impacts from changes to river operational rules	Nil.	**High**
Key factors limiting project supply contribution	No contribution being sought.	**N/A**
Investment considerations	Fully funded under other programs. No investment decision required in 2016.	**High**
Certainty of implementation within Basin Plan timeframes	High confidence	**High**
General comments	**South Australia has secured funding for the project through other programs. The stocktake considers it a worthwhile project.**	

Flexible Rates of Fall - 6 inch rule (Vic/NSW)		
Description	Refine existing rules to allow the daily change in river level (discharge at Hume Dam) to vary by greater amounts. The additional flexibility improves Hume Dam operation efficiency which can provide water savings to entitlement holders, including the environment.	
Project type	Rule change	
Key criteria and stocktake assessment		**Confidence**
Environmental outcomes	More environmentally effective river management and efficient in water savings.	**Moderate**
Information adequacy	Sufficient	**High**
Project progress	Business case submitted – changes to the rule are currently being trialled.	**High**
Dependency on other submitted projects to achieve outcome	Not dependent, but linkages likely	**High**
Significant identified issues likely to be resolved	No significant issues have been identified in the business case or the current trial.	**High**
Significant issues not identified in documentation can be managed	Some level of uncertainty as to the determination of 6 inches as the appropriate level, including the adequacy of data available at the time of its determination, and its currency.	**High**
External risks managed	Potential increased risk of bank slumping.	**Low - Moderate**
Basis for supply contribution estimate	The project was modelled as part of initial 10 pack included in the MDBA's June advice. The volume estimated by the stocktake is inferred from this advice.	**High**
Plausible supply range	0 – 10 GL depending on demands*.	**High**
Impacts of changes to river operational rules	There are currently protocols to limit rates of rise and fall which will require amending.	**Moderate**
Key factors limiting project supply contribution addressed	Level of demand - lower peak demands allow operators more flexibility but reduce the opportunity for water savings. This has been the trend in recent years.	**Moderate**
Investment considerations	No works, with marginal costs related to monitoring technology.	**High**

Flexible Rates of Fall - 6 inch rule (Vic/NSW)		
Certainty of implementation within Basin Plan timeframes	High confidence	**High**
General comments and area of focus	**Contributes to supply contribution outcomes at minimal cost. The supply contribution benefit has been incorporated in '10 pack package' outcomes.** **Need to check for impacts on bank stability throughout the reach** **Focus area** **1 – Continue current trials to improve confidence in on-ground outcomes.**	

*A possible increase of 30 GL in the plausible supply contribution is the total for all projects modelled in the 10 pack collectively

Victorian environmental works and measures (9 projects) (Vic)		
Description	Each of Victoria's nine separate environmental works and measures projects aims to provide enhanced environmental outcomes though the use of regulators, levees and pumps to deliver environmental water to floodplain and wetland ecosystems using less water than is otherwise needed for managed overbank flows.	
Project type	Works	
Key criteria and stocktake assessment		**Confidence**
Environmental outcomes	The works projects can provide significant environmental benefits by maintaining high value areas of floodplain in a healthy condition, and allow the maintenance of these areas as critical habitat refuges during extreme dry periods.	**High**
Information adequacy	Sufficient.	**High**
Project progress	Business cases submitted.	**High**
Dependency on other submitted projects to achieve outcome	Not dependent, but operation of works will be linked to other Murray works projects to maximise supply contribution volumes.	**High**
Significant identified issues likely to be resolved	Some risks have been identified and addressed by the proponent but there are risks areas to still be addressed.	**Moderate**
Significant issues not identified in documentation can be managed	Ongoing operation and maintenance costs have not been addressed raising concerns about long-term sustainability of the projects. Additional value could be ascribed to this project, if extreme dry periods become more frequent in the future under climate change. Egress of water from forest may need to be considered as an issue for water quality.	**Low**
External risks managed	None identified. Implementation of the TLM works provides management experience for issues that might arise with this package of works.	**High**
Basis for supply contribution estimate	Inferred from the modelling of TLM works using a relative estimate of area watered.	**Moderate**
Plausible supply contribution range	40 - 50 GL	**Moderate**
Minimal impacts from changes to river operational rules	Linkages to projects involving rule changes, especially those projects that relate to changing flow timing patterns	**High**

Victorian environmental works and measures (9 projects) (Vic)		
Key factors limiting project supply contribution addressed	Limits of change.	**Moderate**
Investment considerations	Smaller projects in the group of nine are likely to yield a relatively low supply contribution volume benefit at a significant cost. The regional and community benefits of maintaining all nine projects needs to be considered.	**Moderate**
Certainty of implementation within Basin Plan timeframes	High confidence	**High**
General comments and area of focus	**Subject to resolution of ongoing operation and maintenance costs, the package of projects is well positioned to proceed.** **Focus area** **1 - Ongoing operation and maintenance cost issues need attention.**	

Riverine recovery project (South Australia)		
Description	The proposal would convert savings in South Australia to a callable entitlement from Hume Dam, which will allow the water to be used for environmental purposes both upstream and downstream of the original savings.	
Project type	Environmental works	
Key criteria and stocktake assessment		**Confidence**
Environmental outcomes	Potential wetland evaporative savings through activities that restore wetlands along the South Australian River Murray e.g. re-introducing wetting and drying cycles	**Moderate**
Information adequacy	Sufficient.	**High**
Project progress	Business case submitted.	**High**
Dependency on other submitted projects to achieve outcomes	No dependencies.	**High**
Significant identified issues likely to be resolved	Ongoing operation and maintenance costs have not been addressed raising concerns about the long-term sustainability of the project. Other risks have been identified and addressed by the proponent.	**High**
Significant issues not identified in documentation can be managed	None significant.	**High**
External risks managed	None identified.	**High**
Basis for supply contribution estimate	Advice from South Australia is that 5GL from the project has been transferred to the CEWH.	**High**
Plausible supply contribution range	5 GL.	**High**
Minimal impacts from changes to river operational rules	Unlikely to have an impact	**Moderate**
Key factors limiting project supply contribution addressed	None identified.	**High**
Investment considerations	Fully funded under other programs. No investment decision required in 2016	**N/A**

Riverine recovery project (South Australia)		
Certainty of implementation within Basin Plan timeframes	High confidence	**High**
General comment	**The stocktake considers this is a worthwhile project under the SDL adjustment program with the cost being met from another program.**	

Nimmie-Caira infrastructure modifications (NSW)		
Description	The proposal aims to more effectively deliver environmental flows to the Nimmie-Caira floodplain and other parts of the Lowbidgee.	
Project type	Environmental works and potential changes in river operational rules	
Key criteria and stocktake assessment		**Confidence**
Environmental outcomes	The proposal would potentially deliver flows across the floodplain back to the Murrumbidgee River, through the reconfiguration of water delivery infrastructure. Significantly improve watering regime of a Ramsar wetland.	**High**
Information adequacy	Insufficient documentation for stocktake to assess outcomes with high confidence but verbal briefings indicated potential significant positive outcomes.	**Moderate - high**
Project progress	Business case under development but briefings illustrates potential for good outcomes. NSW environmental experts strongly support actions in this area.	**Moderate - high**
Dependency on other submitted projects to achieve outcomes	Not dependent however there will be linkages with Murray and Murrumbidgee projects, which could improve outcomes. Timing of flows from the Murrumbidgee to the Murray could be an issue.	**Moderate - high**
Significant identified issues likely to be resolved	Benchmark modelling for lower Murrumbidgee does not reflect reality. Modelling for supply project may result in lower than expected flows to the Murray although local environmental benefit will be higher. Use of Nimmie-Caira infrastructure to provide 3000 ML/d by-pass flows now not proposed but included within a memorandum of understanding (MoU) between NSW and the Commonwealth. The NSW proposal may not meet the scope of the proposal as specified in the MoU. This will therefore not ease limits of change to the previously expected extent. The lack of documentation means that the stocktake has a number of unresolved issues with regards to the project. In briefings with NSW, it is apparent that the knowledge level is high and this lack will be addressed in NSW papers still to be submitted.	**Moderate**
Significant issues not identified in documentation can be managed	Details of operational protocols need to be established. Understanding the interactions with other projects on the Murrumbidgee and the Murray is a key issue.	**Low - moderate**

Nimmie-Caira infrastructure modifications (NSW)		
External risks managed	No additional risks identified other than some remaining landholders require consultation and the need to address potential flooding of private lands. Institutional risk of potential non-compliance against a Commonwealth/NSW MOU.	**Moderate**
Basis for supply contribution estimate	Estimated range is based on expert judgment. Low confidence in accuracy of estimate as modelling has not been undertaken.	**Low**
Plausible supply contribution range	20 – 50 GL. The benefit of the by-pass is included within this range (estimated at 10 GL) but may not be in the submitted proposal.	**Low**
Minimal impacts from changes to river operational rules	The impacts of the undefined river operational rule may be both positive and negative. Verbal briefings suggest significant environmental improvements to extensive wetland from removal of most irrigation use.	**Moderate**
Key factors limiting project supply contribution addressed	The requirement to comply with the signed MoU may delay the decision on this project.	**Moderate**
Investment considerations	Fully funded as a State Priority Project. No investment decision required in 2016.	**N/A**
Certainty of implementation within Basin Plan timeframes	High confidence that that the project will be implemented within required timeframes even though the final scope of the project is unclear.	**High**
General comments and areas of focus	**Project outcomes are relatively uncertain as project scope and potential impacts are unclear from lack of documentation. However, the level of detail presented by NSW suggests this uncertainty will be reduced considerably in the near future.** **Focus areas** 1 - **Advance finalisation of the business case**. **2 - Address MoU matters as identified.**	

Modification of weirs along the Murray (NSW)		
Description	The project aims to improve environmental water delivery through weir pool manipulation, construction of a replacement pump station for Lake Cullulleraine (in Victoria), and works in the Carrs, Capitts and Bunberoo Creek systems to provide evaporative and seepage water savings.	
Project type	Works	
Key criteria and stocktake assessment		**Confidence**
Environmental outcomes	Lowering the weir pool can be used to return wetlands to a more natural wetting-drying regime, while raising it can allow water to reach areas that would be difficult to water under most conditions. The strategy of raising and lowering should provide an environmental benefit compared to an artificial weir pool level.	**Moderate - high**
Information adequacy	Sufficient	**Moderate - high**
Project progress	Business case under development.	**Moderate**
Dependency on other submitted projects to achieve outcomes	Close linkage with other River Murray works proposals. Operations will need to be coordinated to maximise a supply contribution.	**Moderate - high**
Significant identified issues likely to be resolved	No major issues identified.	**Moderate - high**
Significant issues not identified in documentation can be managed	Ongoing operation and maintenance costs to be resolved.	**Moderate**
External risks managed	None identified	**High**
Basis for supply contribution estimate	Estimated range is based on expert judgment. Low confidence in accuracy of estimate as modelling has not been undertaken.	**Low**
Plausible supply contribution range	5 – 10 GL	**Low**
Minimal impacts from changes to river operational rules	Not significant in supply contribution considerations.	**High**

Modification of weirs along the Murray (NSW)		
Key factors limiting project supply contribution addressed	Not evident in documentation.	**High**
Investment considerations	More information on costs required.	**Low**
Certainty of implementation within Basin Plan timeframes	High confidence of meeting targets.	**High**
General comments and areas of focus	**Complementary to other works in this reach and no obvious matters likely to inhibit outcomes.** **Focus areas** **1 –This project should be considered in conjunction with Victoria's works proposals.** **2 – More information on costs required.**	

Amendments to River Murray Increased Flows (RMIF) - 2011 Snowy Water Licence Schedule Call Out Provisions (NSW)		
Description	Provide a means to better manage decisions to control the timing of the River Murray Increased Flow (RMIF) through water released from the Snowy Scheme into Hume.	
Project type	Rule change	
Key criteria and stocktake assessment		**Confidence**
Environmental outcomes	The proposal would allow more flexibility in targeting environmental outcomes in the River Murray below Lake Hume.	**High**
Information adequacy	Insufficient information for the stocktake to assess outcomes with confidence.	**Low**
Project progress	Business case yet to be submitted. Proposed operating rules fully developed and agreed by the BOC. Snowy Hydro has provided information to address modelling and accounting concerns.	**Moderate**
Dependency on other submitted projects to achieve outcomes	Not dependent, but linkages to other River Murray supply projects which enable access to secure water quantities including Hume Dam airspace.	**Moderate**
Significant identified issues likely to be resolved	Resolution of outstanding institutional issues such as: · Water ownership and costs associated with the RMIF entitlement on the River Murray; and · Formal agreement is required to resolve water control decision responsibility for sharing Above Target Water (ATW).	**Moderate**
Significant issues not identified in documentation can be managed	Reservations are still held by states on the agreed ATW 800 GL trigger in the revised Snowy Water licence which determines when access to the Environmental Account in the scheme can be drawn on.	**Moderate**
External risks managed	Snowy Hydro's day-to-day operation decisions in releasing ATW for electricity purposes may influence the environment's access to the ATW and add to uncertainty levels.	**Moderate**
Basis for supply contribution estimate	Estimated range is based on expert judgment. Low confidence in accuracy of estimate. The confidence level could be improved.	**Moderate - low**

Amendments to River Murray Increased Flows (RMIF) - 2011 Snowy Water Licence Schedule Call Out Provisions (NSW)		
Plausible supply contribution range	30 - 60 GL.	**Moderate - low**
Minimal impacts from changes to river operational rules	Operational strategy still to be devised.	**Low**
Key factors limiting project supply contribution addressed	To increase the confidence in Snowy Hydro's approach to using ATW having regard to their business drivers.	**Moderate -low**
Investment considerations	No works, relatively low costs to deliver significant supply contribution volume at times more acceptable to water interests. NSW is seeking to issue a licence to the CEWH which contains provisions relating to RMIF's outcome and to raise a charge to cover NSW costs. This remains unresolved and is delaying decisions by the Ministerial Council.	**High**
Certainty of implementation within Basin Plan timeframes	Yes.	**High**
General comments and areas of focus	**Likely to be a high value project. A high priority should be given to resolving uncertainties relating to access to ATW and its cost issues** **A paucity of information inhibits project development. Until information is forthcoming confidence levels against the stocktake's assessment criteria will be on the low side.** **Focus areas** **1 – Increase the effort to reduce the level of uncertainty relating to ATW sharing access.** **2 – Attempt to resolve NSW/Commonwealth licence issues.**	

Computer Aided River Management (CARM) Murrumbidgee (NSW)		
Description	The CARM project aims to use better real-time information in the form of metering, inundation models and loss estimates and allow operators to more accurately make releases to meet downstream orders. The saved operational loss may then be calculated and set aside to achieve environmental outcomes.	
Project type	Predominantly rule changes but with some monitoring works.	
Key criteria and stocktake assessment		**Confidence**
Environmental outcomes	If the environment receives a callable entitlement as a result of the envisaged saving, this would allow delivery of previous losses (noting that these were also contributing to environmental outcomes) in a more managed way. Whether CARM operation achieves additional environmental outcomes and a supply contribution is yet to be tested within the assessment framework. The 200 GL water savings within dams is not directly transferable as a supply contribution. Based on briefing advice and experiences, it is suggested the contribution is significantly lower.	**Low**
Information adequacy	Insufficient information available on the supply contribution estimate. The implications for the River Murray from CARM need to be assessed through modelling.	**Low - moderate**
Project progress	Business case under development.	**Moderate**
Dependency on other submitted projects to achieve outcomes	Not dependent but it will influence supply contributions for other Murrumbidgee based projects in both a positive and negative way.	**Moderate**
Significant identified issues likely to be resolved	The CARM concept is still to be proven in practice as outcomes are only based on modelling to date.	**Low - moderate**
	Modelling is currently being undertaken by NSW to assess the size of new entitlement available to the environment having regard to maintaining supply and reliability to downstream users.	**Low - moderate**
	Substantial operational loss savings have been identified from more efficient operation. However, a high proportion of these would have been usefully re-regulated in the River Murray under previous operations. Therefore savings in operational losses will not translate directly into a supply contribution.	**Low**

Computer Aided River Management (CARM) Murrumbidgee (NSW)		
Significant issues not identified in documentation can be managed	None at this time however issues may arise through the implementation trial.	**Moderate**
External risks managed	Impacts on reliability to other users, if the size of the new licence is not appropriately determined.	**Low - moderate**
Basis for supply contribution estimate	Estimated range is based on expert judgment. Low confidence in accuracy of estimate as modelling has not been undertaken.	**Low**
Plausible supply contribution range	10 – 20GL	**Low**
Minimal impacts from changes to river operational rules	With CARM operational there will be a change in flow regime in the regulated streams. The degree of forecasting success could be beneficial to environmental management.	**Moderate**
Key factors limiting project supply contribution	Moderate confidence in delivery of both the amount of the entitlement to be issued and the supply contribution.	**Moderate**
Investment considerations	Capital costs largely met from other programs.	**N/A**
Certainty of implementation within Basin Plan timeframes	Moderate confidence that contributions nominated for CARM can be proven within timeframes.	**Moderate**
General comments and area of focus	**The assumptions used to convert operational savings to an environmental licence will need to be confirmed against operational experience. This may need to be done as part of the reconciliation of project outcomes in 2024 to reconcile actual operations with forecast model assumptions** **Focus area.** **1 – NSW to provide further information to improve level of confidence relating to the supply contribution assessment.**	

Murrumbidgee and Murray Valley National Parks water management works (NSW)		
Description	A suite of works aimed at delivering a more appropriate watering regime to core wetland communities within nominated national parks.	
Project type	Environmental works	
Key criteria and stocktake assessment		**Confidence**
Environmental outcomes	The proposal identifies benefits including improved native fish outcomes and a reduction in the frequency and level of flooding on public and private land.	**Moderate**
Information adequacy	Insufficient to assess outcomes with confidence.	**Low**
Project progress	Business case under development.	**Moderate**
Dependency on other submitted projects to achieve outcomes	Not dependent. As linked to other projects, additional water will ease the limits of change.	**High**
Significant identified issues likely to be resolved	Information paucity prevents assessment. Water egress from forests may need to be considered as a water quality issue.	**Low**
Significant issues not identified in documentation can be managed	The proposed works design and operation is not finalised and operation and maintenance costs are also an issue.	**Low**
External risks managed	None identified	**Low**
Basis for supply contribution estimate	Estimated range is based on expert judgment. Low confidence in accuracy of estimate as modelling has not been undertaken. Up to 33 GL of evaporative savings estimated by NSW.	**Low**
Plausible supply contribution range	5 – 10 GL	**Low**
Minimal impacts from changes to river operational rules	Uncertain from paucity of information.	**Low**
Key factors limiting project supply contribution addressed	Not evident.	**Moderate**
Investment considerations	Cost benefit to be determined.	**Low**
Certainty of implementation within Basin Plan timeframes	More information needed.	**Moderate**
General comments and area of focus	**An information paucity inhibits project development and until resolved confidence levels against stocktake criteria will be on the low side.** **Focus area** **1 - NSW will need to address information gaps.**	

Upper Murrumbidgee environmental flow enhancement		
Description	Raising the operational flow limit at Gundagai for improved mid-river wetlands environmental outcomes.	
Project type	Combination of works and rule changes	
Key criteria and stocktake assessment		**Confidence**
Environmental outcomes	The project could potentially allow better achievement of the mid- Murrumbidgee 44,000 ML/d Basin Plan flow target and result in watering a large area more frequently. It is unclear as to the level of specific environmental benefits.	**Low - moderate**
Information adequacy	Insufficient for the stocktake to assess outcomes with confidence.	**Low**
Project progress	Pre-feasibility phase. Very limited access to information on this project.	**Low**
Dependency on other submitted projects to achieve outcomes	Not dependent although closely linked to Murrumbidgee constraints project.	**Low**
Significant identified issues likely to be resolved	The project is in early stage of development. The main issues will relate to landholder impacts (access and minor flooding) along the river with higher targeted flows. There are council concerns about local flooding.	**Low**
Significant issues not identified in documentation can be managed	Relationship with the constraint measures program and CARM.	**Low**
External risks managed	None identified.	**Moderate**
Basis for supply contribution estimate	Judgemental by stocktake as information not available.	**Low**
Plausible supply contribution range	5 -10GL	**Low**
Minimal impacts from changes to river operational rules	Uncertain from paucity of information	**Low**
Key factors limiting project supply contribution addressed	None identified	**Moderate**

Upper Murrumbidgee environmental flow enhancement		
Investment considerations	Availability of business case to enable timely investment decisions. Likely to benefit from any implementation of the Murrumbidgee constraints program enabling key constraints to be lifted if a supply contribution can be justified.	**Low**
Certainty of implementation within Basin Plan timeframes	More information needed	**Moderate**
General comments	**Project outcomes are quite uncertain, as potential impacts are unclear.** **Until information is forthcoming confidence levels against the stocktake's assessment criteria will be on the low side.**	

Improved flow management works at the Murrumbidgee River - Yanco Creek offtake		
Description	This proposal involves returning the Yanco Creek system closer to a pre-development wetting/drying regime, while improving infrastructure that supplies irrigation and stock and domestic water.	
Project type	Works and rules	
Key criteria and stocktake assessment		**Confidence**
Environmental outcomes	Upgrades to Yanco Weir on the Murrumbidgee would result in more control over flows through the proposed Yanco Creek regulator. This would provide the Commonwealth Environmental Water Holder, (CEWH)/the NSW Office of Environment and Heritage with more flexibility in managing environmental water within the Murrumbidgee system.	**Low - moderate**
Information adequacy	Insufficient for the stocktake to assess outcomes with confidence.	**Low**
Project progress	Business case under development. Briefing from NSW has added to confidence levels albeit only marginally.	**Low - moderate**
Dependency on other submitted projects to achieve outcomes	There will be linkages with Murrumbidgee projects. The CARM project will lead to a tightening of main river flows and less opportunities for diversions of current losses for environmental use.	**Moderate - high**
Significant identified issues likely to be resolved	The Basin Plan excluded Yanco Creek and its environmental value was not recognised. As there are limited data sets the application of the Ecological Elements scoring framework is problematic. This will need to be addressed.	**Low**
Significant issues not identified in documentation can be managed	A large number of risks have been identified, which NSW believes can be readily managed. The range of risk studies required is likely to be costly and time consuming and magnifies the potential delay. Water savings estimates may require a conservative approach. Additional water will contribute positively but marginally to limits of change issues.	**Low - moderate**
External risks managed	No additional risks identified.	**Moderate**
Basis for supply contribution estimate	Estimated range is based on expert judgment. Low confidence in accuracy of estimate as modelling has not been undertaken.	**Low**
Plausible supply contribution range	10 - 15 GL.	**Low**

Improved flow management works at the Murrumbidgee River - Yanco Creek offtake		
Minimal impacts from changes to river operational rules	Would benefit in changes to timings of flows in the Murrumbidgee but would be influenced by CARM, possibly negatively.	**Low**
Key factors limiting project supply contribution addressed	None identified. The Yanco Creek system is not a highly efficient carrier of flows without some remedial works undertaken. Configuration could lead to positive outcomes but difficult to have confidence without data.	**Low -moderate**
Investment considerations	Probable low cost benefit and uncertainty of delivery access changes both positive and negative from other projects without indications of main river rules and modelling.	**Low**
Certainty of implementation within Basin Plan timeframes	Moderate confidence if some priority given to advance progress	**Moderate**
General comments and areas of focus	**Lack of environmental data for Yanco likely to inhibit project development until resolved.** **A paucity of information inhibits project development. Until information is forthcoming confidence levels against the stocktake's assessment criteria will be on the low side.** **Basin jurisdictions need to consider how this project will be assessed under the current assessment framework.** **Focus area** **1 – To resolve how the assessment project will deliver outcomes with higher confidence.**	

Structural and operational changes at the Menindee Lakes Scheme (MLS) (NSW)		
Because of the lack of submitted documentation, the stocktake assessment for this project is based on prior papers and reports, advice from state and Commonwealth officers with a background in the project and from the stocktake team's experience. It is a complex project. ***There are two adjudged assessments of confidence in the table against each criterion which reflect how outcomes might respond to better information[1].***		
Description	Re-configure structures and operational and water sharing changes at Menindee Lakes to reduce the use of Cawndilla Lake and change the operating rules. This aims to reduce evaporative losses and increase river flows in the Lower Darling and River Murray, with consequential environmental benefits.	
Project type	Combination of works and rule changes	
Key criteria and stocktake assessment		**Confidence[2]**
Environmental outcomes	The project has significant potential to improve outcomes. However, there is insufficient information to quantify local and downstream benefits.	**Low – (moderate)**
Information adequacy	Insufficient submitted documentation for stocktake to assess outcomes with confidence.	**Low - (moderate - high) [3]**
Project progress	The project is complex with a range of options investigated over a number of years. A feasibility study has not yet been submitted by NSW to be assessed on suitability to proceed to the business case stage however it is understood that NSW is developing a business case. The preferred NSW option for works (including Broken Hill supplies) and operating rule changes is expected to be established before the end of 2015.	**Low -(not relevant)**
Dependency on other submitted projects to achieve outcome	There are linkages with other projects related predominantly to rule changes, which will influence operational management of other basin storages. There will be obvious benefits for other projects by providing additional volumes to downstream lakes and increasing the limits of change buffer, which could increase supply contribution outcomes from other projects.	**Moderate-(moderate)[4]**

[2] Confidence levels have been assessed based on the limited documentation provided so far. It is extremely likely that current confidence levels will change, possibly significantly, once a business case is submitted by NSW. The confidence statements shown in brackets, which reflect the stocktake team's judgements from verbal advice given to the stocktake and certain barriers, which exist today can be resolved in totality or in part.

[3] Advice from NSW provided to the stocktake through briefings has assisted with reasonable judgment on issues

[4] The stocktake team has attempted to assess connectivity and the process is outlined in the report.

Structural and operational changes at the Menindee Lakes Scheme (MLS) (NSW)		
Significant identified issues likely to be resolved	The delay in submission of documents by NSW means this project is well behind others in the assessment cycle and has delayed the MDBA's modelling of the project Agreement on how the proposal is to be modelled is required. The scoring framework is not adapted to water savings projects, therefore it is difficult to assess full environmental benefit.	**Low - (High)[5]**
Significant issues not identified in documentation can be managed	There are a number of issues identified by the stocktake, each with a different level of uncertainty for resolution.	
	· Potential for additional benefits from extra 150 GL inflow from Northern Murray Darling Basin under the Basin Plan (not recognised as environmental water after reaching Menindee) could be incorporated into the package, but require agreement from Victoria and South Australia.	**Low - (Low to moderate)[6]**
	· Resolution of MDB Agreement changes needed for the 640/480 control rule. Other Agreement changes likely on existing special accounting and Additional Dilution Flow provisions within the Agreement	**Low - (High)[7]**
	· Supply to Tandou could become less reliable under a new configuration of storage management	**High - (High)[8]**
	· The project is complicated by record low inflows to Menindee and current scarcity implications for Broken Hill urban supply.	**Low - (Moderate)[9]**

[5] If modelling is completed. This may be delayed unless affirmative actions taken to advance the MLS measure.

[6] With a scoring framework in place, this would rise to high.

[7] Because of the hydrologic variability in the upper Darling Barwon River, with high losses and travel times confidence levels remain uncertain if commitment to address MDB Agreement issues changes.

[8] NSW are considering options to provide Tandou from the river. Costs could be an issue. As Tandou is now under new management [recently by a large company], buy backs may be difficult

[9] As NSW is independently attempting to resolve Broken Hill supply, it will not remain an issue. Groundwater aspects appear to be solved but disagreement with the Commonwealth may still remain.

Structural and operational changes at the Menindee Lakes Scheme (MLS) (NSW)		
	· Opportunity will exist to enhance the MLS project, if current demands on MLS were to be reduced.	**High - (High)**
External risks managed	Community acceptance may be problematic, even though advice is there are a number of water users demonstrating attitudinal change towards participation in the projects proposed.	**Low - (Low)**[10]
	Resolution of protocols for management of flow changes from above and below the MLS. Implications of water shepherding of northern environmental water to the MLS will influence savings.	**Low - (Low)**[11]
	Changes in Hume operations because of changes in the flow regime of water entering the Murray will require confirmation of maintaining consumptive use reliability.	**Low - (High)**[12]
Basis for supply contribution estimate	The MDBA and NSW have modelled a number of options, the most recent of which delivered an evaporative saving of 80GL, not directly transferable to a supply contribution. The final project option is not yet known. Advice from NSW and judgement by the stocktake team led to the supply contribution estimate.	**Low - (High)**[13]
Plausible supply contribution range	50 – 80GL There is potential to achieve up to 100GL if the project were enhanced to include consideration of the approximately 40 GL available from lowering demands on the MLS and considering flows from the northern basin.	**Moderate - (Moderate)**[14]
Minimal impacts from changes to river operational rules	Considerable implications which add to risk, Issues cover institutional areas requiring Agreement changes, works and linkages and dependencies with other projects.	**Low – (High)**
Key factors limiting project supply contribution addressed	Local environmental and social considerations have reduced scope of reconfiguration works originally investigated by NSW and the Commonwealth for Menindee Lakes.	**Low - (Moderate)**[15]
Investment considerations	Funding for works including Broken Hill supply issues is available from other Commonwealth and NSW programs (subject to investment criteria being met); therefore from a	**Moderate (Moderate)**

[10] Third party agreements

[11] Will remain a significant concern without conciliation.

[12] Dependent on modelling outcomes. Delays in modelling could mean deferral of a decision on MLS.

[13] With modelling and agreement on issues a higher supply contribution is possible

[14] Remains as moderate because of project complexity.

[15] As the project advances some local issues may be no longer relevant.

Structural and operational changes at the Menindee Lakes Scheme (MLS) (NSW)		
	supply contribution perspective, the project is highly cost effective and could provide a substantial supply contribution. It is unlikely that outstanding issues will be fully resolved by June 2016 when the adjustment package is to be agreed. As a very significant project, conditional agreement to include in the package may be warranted.	
Certainty of implementation within Basin Plan timeframes	Low confidence if all issues not fully resolved by 30 June 2016. High confidence if a process can be agreed to resolve significant MDB Agreement issues by, say, December 2016.	**Low - (High)**
General comments and areas of focus	**Getting agreement within the required timeframe on the MLS project is problematic but MLS projects are potentially of high supply contribution value.** **There would be benefits in assigning priority to progress the MLS project in the short term. Acceptance of NSW proposal will remain until risks addressed and resolved. Recognise the potential benefits of the MLS proposal and assign it a high priority for resolution.** **A paucity of information inhibits project development. Until information is forthcoming confidence levels against the stocktake's assessment criteria will be on the low side.** **Focus areas** **1 – NSW to submit a work plan for MLS with an objective of fast tracking its progression** **2 – Establish a working group to fast track this project.**	

Alternative supply systems for effluent creeks Murrumbidgee River (NSW)		
Description	Return parts of five creek systems closer to a pre-development wetting/drying regime, while improving infrastructure that supplies irrigation and stock and domestic water.	
Project type	Works	
Key criteria and stocktake assessment		**Confidence**
Environmental outcomes	This project, along with the CARM project and the Yanco Creek regulator, could provide the Commonwealth Environmental Water Holder/Office of Environment and Heritage with more flexibility in managing flows within the Murrumbidgee system.	**Moderate**
Information adequacy	Insufficient for the stocktake to assess outcomes with confidence.	**Low**
Project progress	Data is not available. A business case is currently under development. NSW have indicated that they intend to submit it soon.	**Low**
Dependency on other submitted projects to achieve outcomes	Not dependent, but linkages likely with other Murrumbidgee projects.	**Moderate**
Significant identified issues likely to be resolved	Requires agreement with all landholders to provide alternative supply arrangements. This is likely to be problematic and could affect the number of creek systems in the final package. Low cost benefit.	**Low**
Significant issues not identified in documentation can be managed	Additional savings may mitigate against the limits of change. Converting savings to licence entitlements is required to achieve a supply contribution.	**Low**
External risks managed	Not identified.	**Low**
Basis for supply contribution estimate	The estimated range is based on expert judgment. There is low confidence in the accuracy of the estimate. NSW has estimated the supply contribution for the project as between 22 and 88 GL.	**Low**
Plausible supply contribution range	10 - 20 GL	**Low**

Alternative supply systems for effluent creeks Murrumbidgee River (NSW)		
Minimal impacts from changes to river operational rules	Not significant.	**Moderate**
Key factors limiting project supply contribution addressed	Conversion of water savings to a licence to avoid third party impacts.	**Low - moderate**
Investment considerations	Probable low cost-benefit. There is uncertainty over the final project design given likely landholder concerns.	**Low**
Certainty of implementation within Basin Plan timeframes	Subject to finalising a business case and obtaining landholder agreement.	**Low - moderate**
General comments and area of focus	**Project scope may change.** **A paucity of information inhibits the project's development. Further information may increase confidence levels in scope and delivery.** **Addressing landholders' concerns will be paramount to achieving a supply contribution from the project.** **Focus area** **1 - An effort should be made to increase confidence if NSW sees this project as having worthwhile potential as a supply project.**	

Improved Regulation of River Murray		
Description	The proposal is to embed the improved operating practices applied during the recent drought to determine the allowances for operational losses required to run the River Murray. This aims to better reflect the expected system operations under future demand and the improved operational management capability of river operators.	
Project type	Rule change	
Key criteria and stocktake assessment		**Confidence**
Environmental outcomes	Environmental outcomes are improved through increased water availability to all entitlement holders including the environment.	**Low**
Information adequacy	Sufficient	**Moderate**
Project progress	Feasibility study still under assessment. Draft Water Liaison Working Group advice has been provided on operational feasibility, which will inform the jurisdictional response to this proposal.	**Low - moderate**
Dependency on other submitted projects to achieve outcomes	Close linkage with other Murray proposals as additional water (through better timing) would be available.	**High**
Significant identified issues likely to be resolved	Jurisdictions expressed significant concerns about the ability to lock in behaviour under future demand conditions. Concerns have been raised over evidence to justify change to model assumptions in the benchmark model.	**Low**
Significant issues not identified in documentation can be managed	Operators advise that there is evidence of behavioural change in delivering water throughout the Murray-Darling Basin. However future demand patterns are uncertain and these, in river operators' view, are significant drivers of outcomes in the modelling, especially those for environmental flow management. The proposal requires $700,000 to implement practices to ensure sustainable outcomes however the Commonwealth advised that the supply measure program would not attract funding for rules based projects and therefore this would require state funds.	**Low**

Improved Regulation of River Murray		
External risks managed	Concern has been expressed in jurisdictional briefings about Victoria's modelled outcomes.	**Low to moderate**
Basis for supply contribution estimate	The estimated range is based on initial Victorian modelling and expert judgment. Low confidence in accuracy of estimate as MDBA modelling has not been undertaken.	**Low**
Plausible supply contribution range	30 - 100GL	**Low**
Minimal impacts from changes to river operational rules	There are no impacts as operational allowances as per the project are currently being applied. The concern is whether these practices can be maintained over the long term under variable conditions.	**Moderate**
Key factors limiting project supply contribution	The project has uncertainty because there is no direct change to operating rules, only assumptions about operational loss volume commitments. The proposal is based on additional annual allocations, rather than an entitlement.	**Low**
Investment considerations	High value project if concept proven, but questions remain about Commonwealth investment criteria.	**Low - moderate**
Certainty of implementation within Basin Plan timeframes	Low confidence that agreement will be reached	**Low**
	Readily implemented if concept can be proven.	**Moderate**
General comments and area of focus	**The project has uncertainty because there is no direct change to operating rules. Until resolution of feasibility, forthcoming confidence levels against the stocktake's assessment criteria will be low to moderate.** **Area of focus** **1. The Commonwealth may wish to consider flexibility in program funding support for operating rule projects.**	

Appendix D - Assessment of efficiency measures

Efficiency measures program		
Description	Nine-year program commencing 2015 to increase environmental water by 450 GL without socio-economic impacts.	
Program outline	Objective to be achieved through: · Projects that lead to the recovery of consumptive water from improvements in on-farm efficiency; or · Alternative arrangements proposed by a Basin State and assessed by the State as improving socio-economic outcomes.	
Key criteria and stocktake assessment		**Assessment outcome**
Information adequacy	Adequate for initial assessment of program. Insufficient to assess risk of non-delivery.	More information desirable
Project progress	Concept developed and program design is largely complete. Initiation of pilot phase is still subject to agreement with the states on program approach.	
Unresolved recognised issue significance	· Engagement and agreement with all states delaying program roll out and potentially putting at risk the DoE recovery target of 106 GL by 1 July 2019. · 106 GL target considered achievable by DoE, however reservations raised by Victoria. · Program running in parallel with other on-farm programs raises equity concerns over program differences and may impact take-up. · Constraints on program catchment area to avoid competition with other programs have not been communicated well to states. · The 450 GL target by June 2014 is likely to require some alternative arrangements to be put forward by states – none apparent at this time.	Significant issues with program delivery
Significance of issues not identified	The program is intended to run over the entire Murray-Darling Basin to ensure maximum outcomes, however access has been restricted to avoid competition with other programs which may impact on the ability to reach overall targets.	Potentially significant
External risks managed	Severe drought reduces interest in take-up. Increased competition for water could raise market value beyond the purchase cap. Insufficient alternative water recovery arrangements are available under this program if off-farm options are needed.	Potentially significant

Efficiency measures program		
Key factors limiting program delivery	Availability of willing participants. Irrigation districts excluded in Victoria to protect viability, which results in a reduced catchment area for the program. States may fail to come forward with acceptable alternative arrangements in later years of program.	Potentially significant
Interdependencies	Linkage with supply measures program due to 5% limit on adjustment specified in the Basin Plan.	Potentially significant
Investment considerations	Not likely to impact on SDL adjustment decision required in mid- 2016. Program design specifies investment criteria for individual projects brought forward.	N/A
Implementation certainty	Moderate delivery confidence of short-term target due to success of previous on-farm programs. Low to medium delivery confidence of long-term 450 GL aim due to the magnitude of the program and the impact of diminishing returns.	Moderate to low confidence
General comment and areas of focus	**Further consideration of issues identified is warranted.** **Areas of focus** **1. Work closely with Basin States to resolve program issues.** **2. Undertake analytical work to better understand risks.**	

Appendix E - Assessment of constraint measures

Hume to Yarrawonga		
Description	Undertake a program of measures – · to allow environmental flows of up to 40,000 ML/d to be delivered through the Hume to Yarrawonga reach of the River Murray, generally in winter and spring; · to better connect floodplains and wetlands with the river; and · in conjunction with downstream constraint projects, to allow overbank flows to be delivered along the length of the River Murray and its effluent streams.	
Key criteria and stocktake assessment		**Assessment outcome**
Information adequacy	Adequate for initial assessment of program.	Moderate confidence
Project progress	Concepts and costs at the feasibility level have been established and development of business case has commenced with the MDBA acting as the delivery agent for NSW and Victoria under the direction of a Steering Committee. Business case expected to be completed by end November 2015 and is on-schedule.	High confidence
Significant identified issues likely to be resolved	Have engaged consultants to review costs on impacts on agriculture and public infrastructure of increased flows. Some stakeholder concern about flows at 40,000 ML/d	High confidence likely to be resolved
Significant issues not identified in documentation can be managed	Potential for a contingent liability if a challenge as result of flooding. This is likely a minor risk but needs consideration.	High confidence
External risks managed	High-level risk assessment undertaken. No additional risks identified.	High confidence
Factors limiting supply measure contribution estimate are managed	The major limiting factor is likely to be landholder acceptance and the potential for one or several landholders to hold out on accepting proposals. Other potential limiting factors identified in the risk assessment are more likely to be readily resolved.	Moderate
Interdependencies	Directly linked to the constraints program downstream of Yarrawonga. The supply and the efficiency programs can be considerably enhanced by the implementation of this and downstream River Murray constraints projects.	High confidence

Hume to Yarrawonga		
Contribution to supply projects	All River Murray constraints (including below Yarrawonga) addressed - 50 to 100 GL	Moderate confidence
Investment considerations	Early work has shown that the Hume to Yarrawonga constraints program is a prerequisite program for the success of the project to provide additional environmental values on the River Murray. The likely significant add on benefit to the supply measure program	N/A
Certainty of implementation within Basin Plan timeframes	Low to moderate chance of not fully delivering the program by 2024. The implications of not having the project in operation (i.e. the reconciliation for SDL adjustments) at that time would need discussion if it becomes apparent there is a high risk the project will not be delivered in the timeframe.	Moderate confidence
General comment	**Project is of major significance to success of supply and efficiency measure programs.**	

River Murray –Yarrawonga to Wakool Junction and downstream (including SA)		
Description	Undertake a program of measures: · to allow environmental flows of up to 65,000 ML/d to be targeted downstream of Yarrawonga generally in winter and spring; · to better connect floodplains and wetlands with the river; and · in conjunction with upstream constraint measures, to allow overbank flows to be delivered along the length of the River Murray and its effluent streams.	
Key criteria and stocktake assessment		**Assessment outcome**
Information adequacy	Adequate for initial assessment of program.	Low confidence
Project progress	Concepts and costs at the feasibility level have been established and development of business case has commenced with the MDBA acting as the deliver agent for NSW and Victoria under the direction of a steering committee. Business case completion expected by end November 2015 and is 'on-schedule'.	Low confidence
Significant identified issues likely to be resolved	Lack of high quality data means there a relatively low confidence of understanding on-ground impacts of high flow levels on individual properties. A staged approach of progressively moving from lower flow targets to higher flow targets is likely to be adopted Yarrawonga to Wakool reach. Downstream reaches less likely to be problematic. Uncertainty exists in the nature of future infrastructure requirements	Low confidence
Significant issues not identified in documentation can be managed	Potential for a contingent liability if a challenge as result of flooding. This is likely a minor risk but needs consideration.	High confidence
External risks managed	High-level risk assessment undertaken. No additional risks identified.	Low confidence
Factors limiting supply measure contribution estimate are managed	The major limiting factor is likely to be landholder acceptance and the potential for one or several landholders to 'hold out' on accepting proposals. Project may be more readily acceptable at 50,000 ML/d target.	Low – moderate confidence

River Murray –Yarrawonga to Wakool Junction and downstream (including SA)		
Interdependencies	Strong dependency on Hume to Yarrawonga constraint project. Other supply projects the efficiency program can be considerably enhanced by implementation of this and downstream River Murray constraints projects.	High confidence
Contribution to supply measures	With all Murray constraints (including upstream of Yarrawonga) addressed – 30 – 50 GL (constraint lifted to 50GL/d) to 80 -100 GL (constraint lifted to 65GL/d)	Moderate confidence
Investment considerations	Early work has shown that the Yarrawonga to Wakool Junction constraints program is a prerequisite program for the success of the measure to provide additional environmental values on the River Murray. The likely significant 'add on' benefit to the supply measures program	N/A
Certainty of implementation within Basin Plan timeframes	Low to moderate chance of not fully delivering the program by 2024. The implications of not having the measure in operation (i.e. the reconciliation for SDL adjustments) at that time would need discussion if it becomes apparent there is a high risk the project will not be delivered in the timeframe.	Moderate confidence
General comment	**Project is of major significance to success of the supply and efficiency measure programs.**	

Goulburn Valley		
Description	Undertake a program of measures: · to allow environmental flows of up to 40,000 ML/d to be targeted downstream of Shepparton generally in winter and spring; and · to better connect floodplains and wetlands with the river.	
Key criteria and stocktake assessment		**Assessment outcome**
Information adequacy	Adequate for initial assessment of program.	Moderate confidence
Project progress	Concepts and costs at the feasibility level have been established. Considerable background work done on project. Business case completion expected end November 2015 and is on-schedule.	High confidence
Significant identified issues likely to be resolved	Work is currently underway to improve the quality of information on cost estimates and prove the concepts associated with 'topping-up' downstream tributary flows with regulated releases from an upstream storage (Eildon)	Moderate confidence
Significant issues not identified in documentation can be managed	Potential for a contingent liability if a challenge as result of flooding. This is likely a minor risk but needs consideration.	High confidence
External risks managed	High-level risk assessment undertaken. No additional risks identified. Waranga Basin irrigation supply operating arrangements may need revising.	Moderate confidence
Factors limiting supply measure contribution estimate are managed	Confirming the feasible of 'topping up' up tributary flows from Eildon to efficiently achieve target outcomes. Landholder acceptance of proposed operation and agreement to flood easements	Low confidence
Interdependencies	Nil	High confidence
Contribution to supply measures	10 -20 GL	Moderate
Investment considerations	Available funding and cost of works.	N/A
Certainty of implementation within Basin Plan timeframes	Low to moderate chance of not fully delivering by 2024. This (i.e. the reconciliation for SDL adjustments) would need discussion if it becomes apparent there is a high risk the project will not be delivered in the timeframe.	Moderate confidence
General comment	**The project has the potential to deliver a supply measure benefit.**	

Murrumbidgee Valley		
Description	Undertake a program of measures: · To allow a flow of 40,000 ML/day (6.3 metres) to be delivered at Wagga Wagga and; · To better connect floodplains and wetlands with the river.	
Key criteria and stocktake assessment		**Assessment outcome**
Information adequacy	Adequate for initial assessment of program.	Moderate confidence
Project progress	Concepts and costs at the feasibility level have been established. Business case on schedule for submission by end November 2015.	High confidence
Significant identified issues likely to be resolved	Landholder acceptance likely to be an issue. Local government drainage concerns.	Moderate confidence
Significant issues not identified in documentation can be managed	Potential for a contingent liability if a challenge as result of flooding. This is likely a minor risk but needs consideration.	High confidence
External risks managed	High-level risk assessment undertaken. No additional risks identified.	Moderate confidence
Factors limiting supply measure contribution estimate are managed	Landholder acceptance of proposed operation and agreement to flood easements.	Low confidence
Interdependencies	Nil	High confidence
Contribution to supply measures	10 -20 GL	Moderate confidence
Investment considerations	Available funding and works cost.	N/A
Certainty of implementation within Basin Plan timeframes	Low to moderate chance of not fully delivering the program by 2024. The implications of not having the measure in operation (i.e. the reconciliation for SDL adjustments) at that time would need discussion if it becomes apparent there is a high risk the project will not be delivered in the timeframe.	Moderate confidence
General comment	**Project has the potential to deliver a supply measure benefit.**	

Gwydir Valley		
Description	Undertake a program of measures: · To allow flows of 450ML/d to 700ML/d (1.15 and 1.21 metres) in the Gingham Watercourse. · To allow flows of 450ML/d to 800ML/d (2.24 and 2.66 metres) to the Lower Gwydir. · To allow flows of 350ML/d to 550ML/d to be delivered in the Mallowa Creek and; · To better connect floodplains and wetlands with the river	
Key criteria and stocktake assessment		**Assessment outcome**
Information adequacy	Adequate for initial assessment of program.	Moderate confidence
Project progress	Concepts and costs at the feasibility level have been established. Business case completion expected by end November 2015 and is 'on-schedule'.	High confidence
Significant identified issues likely to be resolved	Work is currently underway to improve the quality of information on cost estimates	Moderate confidence
Significant issues not identified in documentation can be managed	Potential for fishways to be required as part of the project Potential for a contingent liability if a challenge as result of flooding. This is likely a minor risk but needs consideration.	Moderate – high confidence
External risks managed	High-level risk assessment undertaken. No additional risks identified.	Moderate confidence
Factors limiting supply measure contribution estimate are managed	Landholder acceptance of proposed operation and agreement to flood easements.	Moderate confidence
Interdependencies	Nil	High confidence
Contribution to supply measures	Nil	High confidence
Investment considerations	Available funding and cost of works.	N/A
Certainty of implementation within Basin Plan timeframes	Low to moderate chance of not fully delivering the program by 2024.	Moderate confidence

Appendix F – Potential new projects - not analysed for feasibility

Type of SDL measure	Project option	Brief/outline	Comments	Attitudes to option	Source papers - confidential
Rules	Flexibility in delivering South Australia's monthly entitlement	Currently the MDB Agreement has provision for variations in fixed entitlements; a capacity share in Hume Dam storage; and limited use of Additional Dilution Flow policy from Menindee, which creates the potential for some operational flexibility to modify flows to South Australia.	To introduce this proposal would require, for example: · Amendments to the Agreement · New operational protocols to enable more flexible flow targets. · Changes to ADF provisions.	Minimal use of change to date. There may be some acceptance in South Australia.	MDBA BOC Scoping Report on the Agreement [2010]
Rules	Greater use of private assets to carry flows through constraint reaches between Yarrawonga and Wakool Junction.	Use private irrigation works, which have the potential to transport flows downstream bypassing constraint reaches.	Access to such works currently exists formally with Murray Irrigation allowing Mulwala Canal to carry MDBA orders downstream. A review of the current access agreement might be worthwhile as the situation is different from 1995 when the agreement was formed.	Murray Irrigation would need to be approached. The proposal offers commercial benefits. If access were to be improved there would need to be a new MoU/Heads of Agreement and commercial considerations will be critical. A low supply contribution is likely.	NSW holds the MoU

Type of SDL measure	Project option	Brief/outline	Comments	Attitudes to option	Source papers - confidential
Rules	Debit of irrigation and other entitlements based on orders rather than use.	Policy change in accounting for debits against water allocated each season for licenced users based on orders rather than diversions, Environmental water has this accounting arrangement now accounts based on releases from the dams.	Currently applied in NSW mainly in northern streams and in Qld. In those valleys irrigators generally have off-river storages to store waters ordered if rain occurs. Scoping off-river positions in southern valleys would give an indication of acceptability to irrigators. Funds would be needed to have an off- river storage to store rain rejection or have an accounting arrangement to reclassify flows.	There would likely be water users reactions from both the irrigation industry in the southern valleys and from some environmental groups	Private papers WM*
Supply/ constraint	Control of flows by regulators at Koondrook – Perricoota Forests.	Better control at these forests to control the ingress and egress of flows to Koondrook – Perricoota Forests.	There seems to be acceptance of managing ingress and egress of flows in forests. NSW's/ Victoria's views would be essential. A 250ML/day limitation at the downstream outlet currently impacts on the scheme's ability to fully realise the potential benefits of the works.	Should have support but foresters would seek access assurances during floods. Good potential for a supply contribution.	
Changes to Vic carryover rules	Recognise environmental benefits from a carryover rules change on entitlement that occurred since SDL benchmark was established.	Change in rules results in more water carried over and storages operating at higher levels on average with potentially more spills.	Modelling required however future behaviour of entitlement holders under the rules is still uncertain. Rules could also be changed impacting on benefits.	Initial preliminary Victorian proposal not being pursued for reasons outlined in comments	

Type of SDL measure	Project option	Brief/outline	Comments	Attitudes to option	Source papers - confidential
Changes in Victorian reserve policy	An outcome of the Millennium Drought was to change Victorian reserve policy after the benchmark was established.	Higher reserves result in higher storages levels on average and more spills.	The policy change has already occurred. There is potential to bring this forward as a supply project. Modelling is required. If implemented as a supply measure, future reserve policy changes would be limited.	Initial preliminary Victorian proposal currently not being pursued for reasons outlined in comments.	

Appendix G - Glossary of terms

Airspace	Airspace is the difference between the actual volume of water in storage and the volume when full. There are provisions in storages to assign a permanent airspace by lowering the full supply level.
Baseline diversion limits	A baseline from which to determine required reductions in diversions. The baseline adopted is a combination of limits established by state law (e.g. existing water resource plan limits), defined levels of take where there are no established limits, and in some cases, the limits established by the Murray–Darling Basin cap arrangements where these establish the lowest limit.
Baseline scenario.	In this report is associated with the models used by MDBA to assess the ESLT. The baseline scenario includes the consumptive use, rules and sharing arrangements relating to water resource plan policies as at June 2009.
Benchmark	The Basin Plan established new sustainable diversion limits for surface water of 10,873 GL/y. The environmental outcomes achieved with this level of environmental water recovery are referred to as the Basin Plan's benchmark.
Blackwater event	Deterioration in river/wetland water quality normally associated with high dissolved organic carbon and low dissolved oxygen levels. Can lead to large scale fish deaths.
Carryover	An arrangement that allows the holder of a water access entitlement to retain water allocation not taken in one water accounting period, and then take or trade it in the next water accounting period.
Channel capacity sharing	The primary object of channel capacity sharing is to assign "delivery rights" for shares of the channel capacity of those natural streams and man-made works, which are within the existing delivery systems between authorised water uses.
Connectivity	The connections between natural habitats, such as a river channel, adjacent wetland areas and along the length of rivers, including connections above ground (surface water) or below ground (groundwater).
Constraints	Constraints can be the channel capacity limitations to pass smaller flows; physical structures along or near the river, like bridges and roads that stop water getting to some areas in the volumes and at times it is most needed.

Constraints Management Strategy	The Strategy provides an overarching framework, outlines the key directions that work needs to take and includes key principles that will guide work into the future to get better environmental results for wetlands and rivers through addressing constraints while avoiding, managing or mitigating impacts to local communities and industries. It identifies areas where changing constraints would provide the best environmental gains.
Constraints measures	Constraints are impediments to flow delivery, predominantly river height operational limits based on regulated rivers' channel capacity to avoid overbank flows and third party impacts.
Consumptive use	Consumptive use describes the use of water for irrigation, industry, urban and stock and domestic use, or other private purposes.
Discount factor	A level of discounting on the estimated supply contribution for each project has been applied to address the level of delivery uncertainty. Whilst the level of discount can be debated, values adopted in this stocktake are considered appropriate for the assessed levels of certainty in supply contribution potential
Dry spell and wet spells	Ecological Element responses are defined in response to wet and dry spells at an annual time step. A Dry spell is defined as a number of successive years in which the relevant SFI is not met. Wet spell is defined as a number of successive years that the relevant SFI is met – it does not imply continuous inundation, since the method has no way to distinguish whether the relevant SFI is not met.
Ecological elements weighting	The current ecological elements (EE's) represent a simplified sub-set of ecological outcomes for birds, fish and vegetation, restricted by available scientific knowledge and consistent data across the southern basin.
Efficiency measures	Efficiency measures are projects that operate to decrease the quantity of water required for consumptive use compared with the quantity required under the benchmark conditions of development. They allow more water to be recovered for the environment (that is, above 2,750 GL recovery target currently required to meet the SDL) without causing additional social and economic impacts. An example would be improving the efficiency of on-farm irrigation, and transferring the water savings for environmental use. The Australian Government has announced a funding program to recover a further 450 GL of water through such projects. This program is additional to existing projects under the Sustainable Rural Water Use and Infrastructure Program.

Effluent stream	A stream flowing out of a river lake, reservoir, etc.
Environmental water	The water provided to wetlands, floodplains or rivers, to achieve a desired outcome, including benefits to ecosystem functions, biodiversity, and water quality and water resource health.
Gigalitre [GL]	Gigalitre is equivalent to one thousand megalitres or 1 billion litres
In-channel flows	Flows within the banks of a river or other watercourse.
Lower Lakes	The lower lakes are the estuary lakes of the River Murray where it meets the Southern Ocean in South Australia. Covering over 140,000 hectares, it includes 23 different wetland types that range from fresh water to saltier than the sea.
Phase 1	The objective of Phase 1 is to identify the measures that could deliver an SDL adjustment or improve the effectiveness of environmental water delivery, and that warrant consideration for development of a business case for assessment under Phase 2. Phase 1 Assessments were originally intended to have been completed in 2013.
Phase 2[a] and [b]	Phase 2 considers alternative solutions and identifies assumptions, benefits, costs and risks. The business case should provide a compelling case for supporting a preferred option. Phase 2 Assessments were to have been completed by 30 June 2015. Evaluation of measures involving operating rule changes will be dependent on detailed hydrologic modelling and as such would generally be undertaken as part of Phase 2.

Phase 3	For all constraint, supply and efficiency measures, each project agreed to advance to Phase 3 will require confirmation by the proponent. At Phase 3 the proponent must demonstrate that funding for the measure is agreed in principle, with final funding arrangements subject to confirmation of outcomes associated with the measure through operation of the SDL adjustment mechanism. All phases are expected to be completed by 31 December 2015
Plausible supply contribution estimates	A potential low estimate and high estimate of each project's supply contribution, expressed in GL, have been made based on current knowledge within documentation, the status of the project (business cases available or not) and expert judgement. The low estimate has a higher level of certainty whereas the high estimate is likely to be more problematic. The high estimate in some cases is based on the outcome of identified potential refinements for a project that may assist to increase its supply contribution potential.
Prerequisite policy measures	These priority policy measures are also being progressed through the SDL adjustment mechanism, where they are a mandated requirement under the Basin Plan for achieving an SDL adjustment, described as prerequisite policy measures.
Recovery of environmental water	Occurs through investment in water-saving infrastructure or through water purchases from voluntary sellers.
Reliability	Reliability of water available is a measure of how often a certain amount of water supply can be expected.
Riparian	Relates to a riverbank or floodplain, and often refers to the edges of any water body, including lakes and dams.
Riverine	Related to a river – for example riverine salinity, riverine plants
River Murray Increased Flows	River Murray Increased Flows (RMIF) is water recovered under investment in the Snowy Joint Government Enterprise and available as environmental water for the River Murray. This water is managed under The Living Murray environmental watering framework once it is made available to the Murray–Darling Basin Authority.

Storage capacity sharing	Storage capacity sharing is a conceptual method of storage operation by allocating vertical portions of the storage capacity, system losses and shares of the inflows into storages and potentially the sharing of channel capacity and downstream tributary inflows. Under this arrangement, it is incumbent upon the holders of the share to manage their own storage volumes, airspace and risks associated with water availability.
Supply measure	A supply measure is a measure that operates 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 subject to equivalent environmental outcomes.
Sustainable Diversion Limit	The sustainable diversion limits (SDLs), on the amount of water that can be taken out of the system for consumptive use, including for households, industry and farming. SDLs are not fixed amounts. Instead the SDLs represent limits on average water diversions over the long-term. The actual limits on water use will vary according to water availability in that year, in line with State water resource plans. This ensures sufficient flexibility to adapt with Australia's highly variable climatic conditions.
Sustainable Diversion Limit adjustment mechanism	The Basin Plan 2012 allows for an SDL adjustment mechanism through the provisions of Chapter 7. Governments can prepare supply, efficiency and constraint measure projects. All projects must be completed by 2024. Once the final outcomes from these measures are known, the Murray-Darling Basin Authority will assess whether any final adjustments need to be made to the SDLs. Any adjustment to the SDL must ensure equivalent or better environmental, social and economic outcomes. Overall, the SDL cannot be adjusted up or down by more than five percent.
The Sustainable Diversion Limit Adjustment Assessment Committee	The Sustainable Diversion Limit Adjustment Assessment Committee was established by the Basin Officials Committee to enable close consultation with Basin states. The committee comprises representatives of all Basin states and is chaired by the Commonwealth Department of Environment. The MDBA participates as a non-voting member and provides secretariat and technical support.
Third-party interests	Other persons or businesses not involved in the decision, potentially impacted by action

Appendix H - Abbreviations

ADF	Additional Dilution Flow (to South Australia from MLS)
BOC	Murray-Darling Basin Officials Committee
CARM	Computer Aided River Management
CEWH	Commonwealth Environmental Water Holder
COFFIE	Commonwealth's On Farm Further Irrigation Efficiency program
CSIRO	Commonwealth Scientific and Industrial Research Organisation
DoE	Commonwealth Department of the Environment
HoA	Heads of agreement
IFMP	NSW Integrated Farm Modernisation Program
IGA	Intergovernmental Agreement on Implementing Water Reform in the Murray-Darling Basin
IRP	Independent Review Panel
MDB	Murray-Darling Basin
MDBA	Murray-Darling Basin Authority
MLS	Menindee Lakes Scheme
MoU	Memorandum of understanding
NSW	New South Wales
OFIEP	On Farm Irrigation Efficiency Program
Qld	Queensland
RMIF	River Murray Increased Flows
SDL	Sustainable Diversion Limit
SDLSC	Sustainable Diversion Limit Supply Contribution
SDLAAC	Sustainable Diversion Limit Adjustment Assessment Committee
TLM	The Living Murray
VFMP	Victorian Farm Modernisation Project