Proposed arrangements for shepherding environmental water in NSW

Draft for consultation

Publisher
NSW Department of Primary Industries, Office of Water.
Level 18, 227 Elizabeth Street
GPO Box 3889
Sydney NSW 2001
T 02 8281 7777 F 02 8281 7799
information@water.nsw.gov.au
www.water.nsw.gov.au

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Introduction

The Commonwealth Government has purchased a number of NSW and Queensland water entitlements within the Barwon-Darling River and several of its tributaries, with further acquisitions likely to occur.

Water shepherding, which is a new and innovative concept in water management, is being proposed as a means by which the Commonwealth can optimise the use of these entitlements to meet environmental watering objectives within the Murray-Darling Basin. This concept involves moving water from the parent licence location to an environmental asset further downstream. Shepherding will enable the Commonwealth to make the most effective use of environmental water by giving it the capacity to achieve its watering objectives, not only in the water source where it holds entitlements, but also in downstream locations extending beyond the Menindee Lakes.

The full environmental benefit of implementing shepherding in the NSW portion of the Murray-Darling Basin will depend on the final volume of entitlements acquired to meet Basin Plan requirements and how these assets are managed under the Basin Plan and its associated environmental watering plans. Some analysis has been done on the long-term benefit to the Barwon-Darling as a result of the Commonwealth's existing acquisitions in this water source and implementing shepherding for these entitlements. This analysis shows an increase in flows at the end of the water source associated with leaving the entitlement in stream and not extracting it at the parent licence location. This benefit is outlined in Appendix A.

Whilst all indications are that water shepherding will give the Commonwealth greater scope and flexibility in the use of its environmental water acquisitions, under the current provision of both NSW legislation and the Murray-Darling Basin Agreement (the Agreement) shepherding cannot be implemented. In NSW, water is managed on a water source by water source basis, and transfers of water between unregulated and regulated water sources are prohibited.

Water Shepherding Memorandum of Understanding

In July 2010, the NSW and Commonwealth Governments entered into a Memorandum of Understanding (MoU) to facilitate the development of a comprehensive framework for water shepherding. The MoU deals with the shepherding of Commonwealth environmental water from the Barwon-Darling unregulated river and its tributaries to downstream water sources.

The objectives of the MoU are to:

- Optimise the use of all Commonwealth environmental water (CEW) for the environment
- Provide the capacity to deliver water to high priority environmental assets, and
- In the case of instream environmental watering, provide for protection for environmental flows to pass through the system as far as transmission losses allow.

The MoU establishes a plan for investigating the development of a new water management framework to facilitate shepherding of CEW. When this new framework is established, the NSW Government may consider the feasibility of extending the shepherding facility to other water users.

A key aspect of the MoU is the underlying principle that there will be no impact on third parties as a result of water shepherding. This principle is central to the proposed shepherding methodology.

The implementation of water shepherding downstream of the Barwon-Darling will depend on the Basin states agreeing to amendments to the Murray-Darling Basin Agreement to enable shepherded CEW to be recognised and stored when it enters Menindee Lakes.

The development and implementation of water shepherding arrangements is being completed in two phases. The present phase (Implementation Plan (Stage 1) deals with the identification and analysis of a proposed water shepherding methodology. The second phase is Implementation Plan (Stage 2) which will implement the proposed methodology.

What is water shepherding?

Water shepherding is a mechanism to enable a licence holder to access water from a nominated licence, in a water source downstream of the original licence location, where it can be made available for environmental use. The volume available at the downstream location is reduced to take into account the evaporation and transmission losses incurred between the original location of the parent licence and the downstream delivery point. Water shepherding is a new approach to the way in which a water entitlement may be used, as it provides a much greater degree of flexibility in regard to the location from where water may be taken.

Proposed approach to shepherding

Various approaches to water shepherding have been investigated. The options considered, and an explanation of the preferred approach, are outlined in the report *Shepherding Water for the Environment – Progress of the NSW Water Shepherding Project, 2011, w*hich is available on our NSW Office of Water website at www.water.nsw.gov.au.

The 'end-of–system accounting' water shepherding methodology was selected as the preferred approach to be progressed for detailed analysis and for consultation with key stakeholders.

This methodology establishes an accounting mechanism that is structured around the existing licensing and dealings framework. It includes the provision for volumes reaching the end of the Barwon-Darling unregulated river water source to be credited to a Menindee Lakes Storage shepherding account and the ability to recognise and use this shepherded water downstream.

The key elements of the framework are:

- The water to be shepherded will be sourced from the allocation accounts of water access licences purchased by the Commonwealth
- Shepherding water access licences (WALs) will be established in each water source where shepherding is to occur
- Shepherding WALs will be linked to a shepherding water management work, which will generally be located at the end-of-system in each NSW water source or at the final delivery location within the downstream water source. There will also be shepherding water management works located on the NSW side of the state border in the rivers where CEW is to be shepherded from Queensland
- Allocation assignment dealings will enable water to be moved within and between water sources
- The shepherded volume of allocation available in the downstream location will be reduced to take into account evaporation and transmission losses
- Rules in water sharing plans will govern the allocation assignment dealings, access to shepherded allocations, and use of these allocations, in order to prevent third party impacts
- Shepherded allocations can only move between water sources when water is physically moving from one water source to the other, in accordance with the rules that will be set out in the relevant water sharing plans and the access and use conditions on the shepherding WALs and works

- Water shepherded from a tributary will involve two allocation assignments – the first to move water through the tributary, and a second allocation assignment to move water from the tributary through the Barwon-Darling
- Water shepherded from Queensland will require an interstate allocation assignment to transfer it into NSW jurisdiction
- In times of resource constraints, shepherding downstream of the Barwon-Darling may be limited or suspended to prevent third party impacts.

The 'end-of-system accounting' option was preferred as it is a transparent, rules based approach that utilises water sharing plans and other existing frameworks established under the NSW *Water Management Act 2000 (the WMA).* It is also consistent with the guiding principles of the MoU, especially that water shepherding will not have an adverse impact on third parties.

The key features of the 'end-of-system accounting' methodology are consistent with the existing legal framework. However, amendments to NSW legislation and water sharing plans will be required to implement shepherding. The ability to shepherd Commonwealth environmental water from the Barwon-Darling into and through the Menindee Lakes Storages will be subject to multi-jurisdictional agreement.

Your feedback

Feedback is sought on the proposed shepherding arrangements. Information on how to have your say is available on our website at www.water.nsw.gov.au. All feedback will be provided to the Water Shepherding Taskforce for consideration in finalising the proposed shepherding arrangements. Please ensure your feedback is lodged before the end of the consultation period.

2. The 'end-of-system accounting' shepherding methodology

Shepherding licensing and dealing framework

The proposed methodology is based on the current licensing and dealing framework. The methodology is illustrated in Figure 1. A summary of the licensing and dealing framework is outlined in Figure 2.

Water access licences

Under the proposed shepherding methodology, the Commonwealth will hold zero share shepherding water access licences (WALs) to enable them to move water between water sources. The shepherding WALs will be a new category of access licence and will be held in addition to any other entitlements that the Commonwealth holds.

The Commonwealth will be able to shepherd CEW by transferring water held in the allocation account of an existing WAL (referred to as a parent WAL) to the new shepherding WAL, by an allocation assignment.

Approvals

The Commonwealth will need both a water management work approval and a use approval in respect of each of its parent WALs and shepherding WALs. Shepherding WALs will nominate a water management work at the end of the relevant water source or at the point of access of the shepherded allocation. The definition of a water management work will need to be expanded to specifically cater for the taking and use of water for shepherding and other environmental purposes.

Accounting

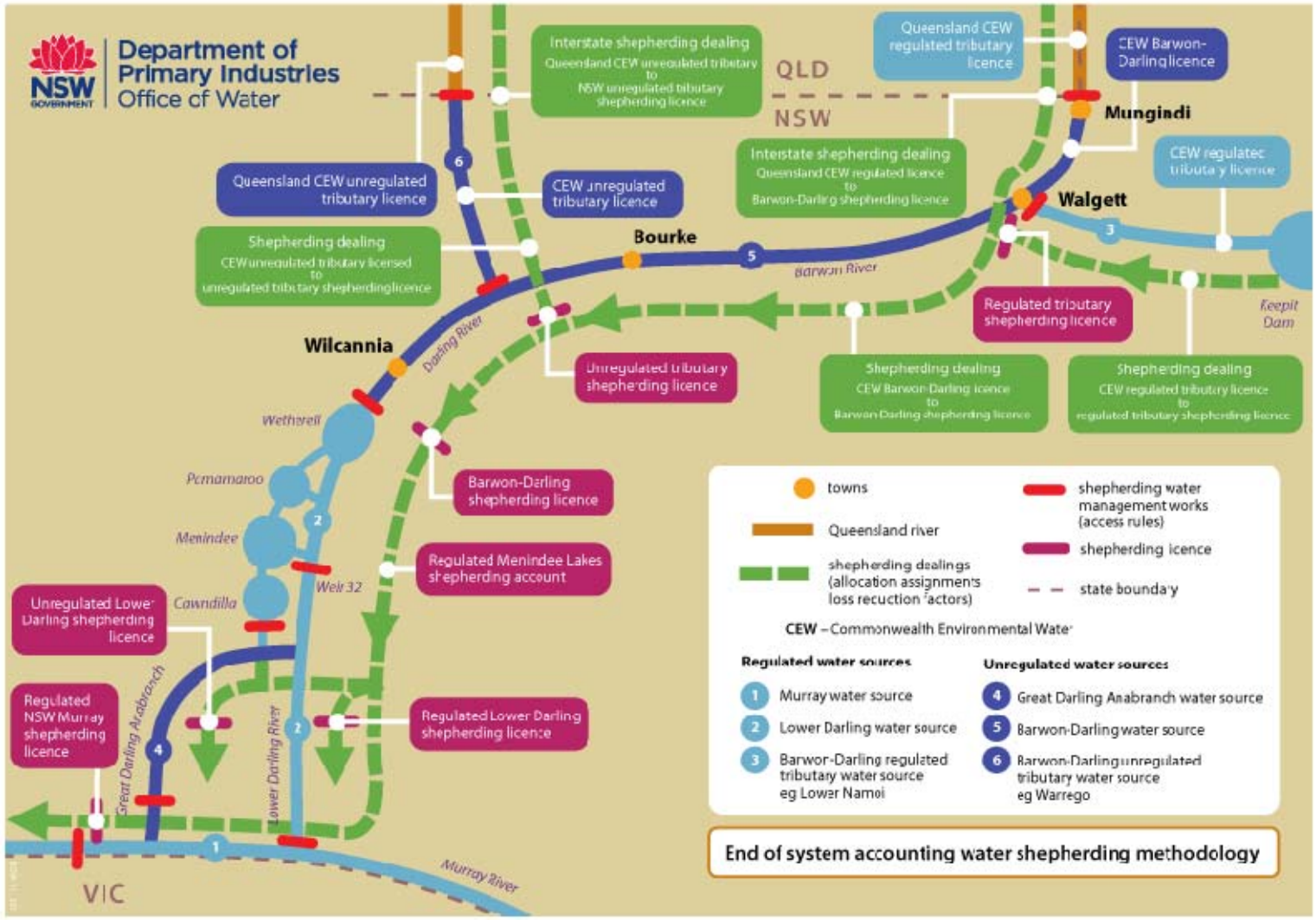
As with other categories of access licences, shepherding WALs will have an allocation account which records the volume of water available to the Commonwealth subject to the conditions on their licences and approvals and other legislative requirements such as rules in the relevant water sharing plans. The account will be credited when water is acquired through a shepherding allocation assignment and will be debited when water is taken through any of the shepherding water management works nominated on the licence or when water is assigned to another shepherding WAL allocation account.

Shepherding allocation account balances that have originated from parent licences in the Barwon-Darling, may be carried forward from one accounting year to the next accounting year, but only to the extent to which the water sharing plan for the Barwon-Darling unregulated river water source provides. Shepherding allocation account balances originating from a parent licence in any of the tributaries will have a fixed access period in which allocations can be accessed. Allocations remaining in the account after this period will be forfeited, as no carryover will be available.

Water can be traded into a shepherding WAL allocation account from a CEW licence using the dealing framework. Water can be traded out of a shepherding WAL account to another shepherding WAL account, by way of an allocation assignment. Transfers from a shepherding WAL to any other category of WAL will be prohibited in accordance with the provisions of the MoU.

Accounting rules are prescribed in individual water sharing plans. Account rules will need to be amended in all relevant water sharing plans to include specific provisions that will apply to shepherding WALs.

Figure 1. End-of-system accounting water shepherding methodology



Shepherding dealings

The primary dealing type that will apply to water shepherding will be allocation assignments. As with all allocation assignment dealings, those for the purposes of shepherding will also be required to go through an application and approval process.

Dealings within a water source

The Commonwealth may apply to undertake an allocation assignment dealing from a parent licence allocation account to a shepherding WAL allocation account in the same water source in accordance with the applicable shepherding dealing rules.

In the case of a regulated tributary water source, the allocation assignment must be accompanied by a water order of the same volume. State Water Corporation will then debit the parent licence allocation account and supply the ordered volume of water to the nominated work on the shepherding WAL at the end of the regulated water source.

In unregulated water sources and in regulated water sources below Menindee Lakes, a loss reduction factor will be applied to the assigned volume. The reduction factor accounts for losses incurred while the water is in transit and is necessary to avoid third party impacts. The reduction factor is not necessary in regard to delivery of the shepherded allocations to the end of the regulated tributaries of the Barwon-Darling, as losses for the delivery of water from the parent licence allocation account in these water sources is already accounted for in the assessment of the available resource before water is made available to the regulated river WALs.

Dealings between water sources

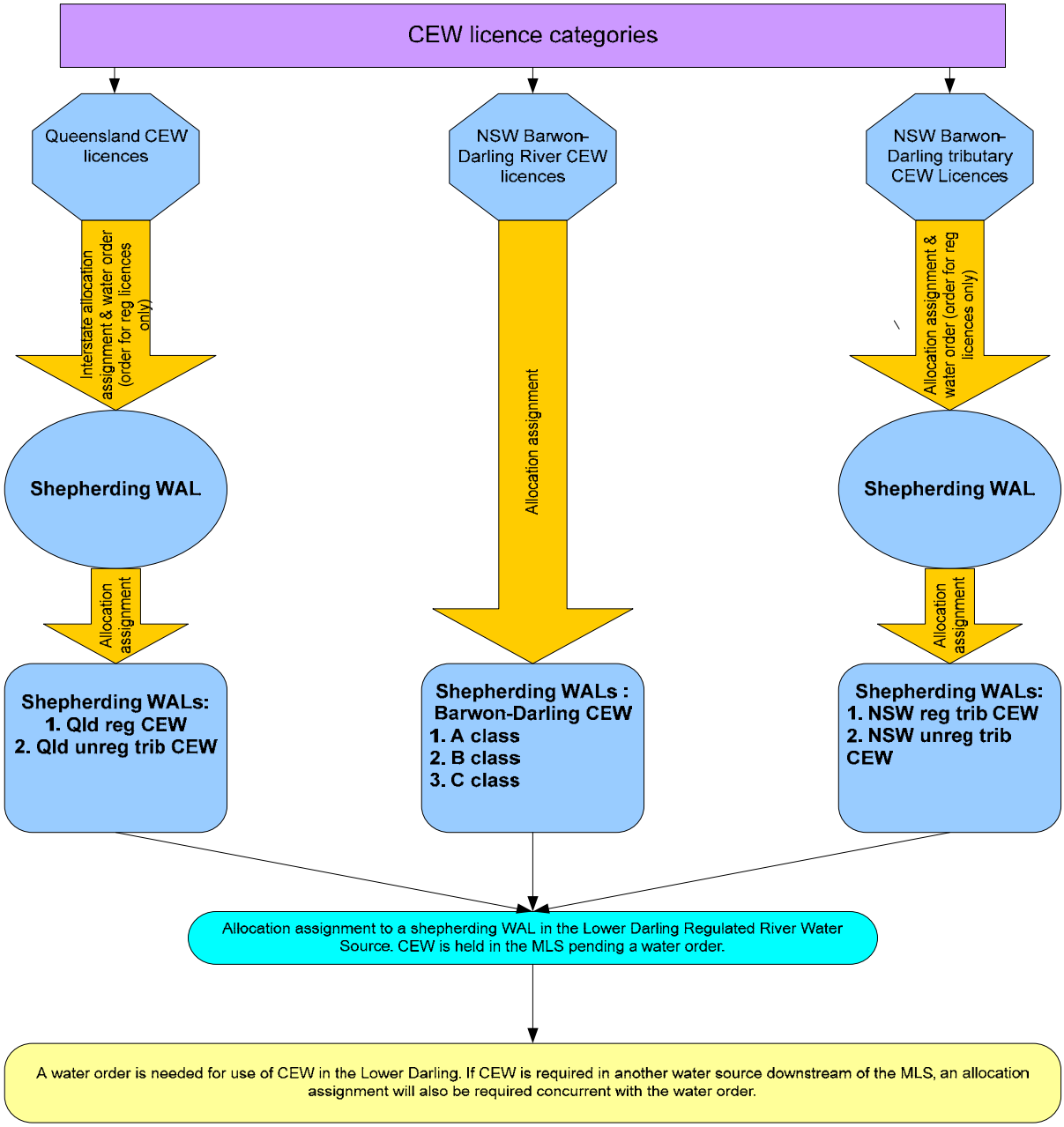
The Commonwealth may apply to undertake allocation assignment dealings between shepherding WALs in regulated and unregulated water sources. For example, to shepherd water from a regulated Barwon-Darling tributary to the Barwon-Darling, an allocation assignment between a regulated tributary shepherding WAL and a Barwon-Darling shepherding WAL will be necessary. A loss reduction factor would be applied to the assigned volume to account for its movement through the unregulated water source.

The dealing won't be completed until the shepherded water has arrived at the downstream access point ***and*** the relevant access and use conditions on the shepherding WAL and/or shepherding water management work approval are met. This may take a number of days.

When the water has entered the downstream water source, appropriate debits and credits to the licence allocation accounts will be made in each water source. In order to ensure that there are no third party impacts, the shepherding WAL allocation account in a downstream water source will not be credited unless the shepherded water is physically present in that water source.

Allocation assignments from a Lower Darling shepherding WAL allocation account to a shepherding WAL allocation account in the Murray regulated river water source or Lower Murray-Darling unregulated water source must be accompanied by a water order from the Menindee Lakes Storages shepherding account. A loss reduction factor will be applied to the assigned volume.

Figure 2. Licensing & dealing framework for water shepherding



3. Rules for water shepherding - Barwon-Darling system

The shepherding of water from a Commonwealth Barwon-Darling access licence to a Barwon-Darling shepherding WAL is proposed to occur via an allocation assignment. The shepherding WAL will nominate a water management work at the end of the water source; this is illustrated in Figure 3. To facilitate this shepherding dealing and to manage downstream impacts, specific water shepherding rules are required. The proposed dealing, access and use rules for shepherding within the Barwon-Darling are outlined below.

Dealing rules

Specific dealing rules are required to enable allocation assignments from the parent CEW WALs to the shepherding WALs. The dealing rules will be established in the relevant water sharing plans. The proposed dealing rules will:

- **permit allocation assignments** for the purposes of shepherding CEW allocation in the Barwon-Darling;
- ensure that shepherding allocation assignments are subject to an appropriate **shepherding loss reduction factor**;
- establish **individual water shepherding allocation assignment volumes and limits** for Commonwealth Barwon-Darling parent WALs.

Shepherding loss reduction factor

The assignment of allocation to a shepherding WAL will have a shepherding loss reduction factor applied to account for the transmission losses associated with the movement of water from the parent licence location to the end of the Barwon-Darling unregulated river water source. This is necessary to avoid third party impacts occurring downstream.

The shepherding methodology within the Barwon-Darling proposes that ***long-term average*** transmission losses will be adopted as the basis for shepherding loss reduction factors. The proposed loss reduction factors in Table 1 were modelled on the long-term average transmission losses from the top of each river section to the end of the Barwon-Darling unregulated river water source. The calculation of the long-term average transmission losses took into account floods and overbank events.

Table 1. Shepherding loss reduction factors in the Barwon-Darling

From Barwon-Darling river section	To	Long-term average transmission loss*
1: Mungindi to Walgett Weir Pool	End of the Barwon-Darling unregulated river water source	35.1%
2: Downstream Walgett Weir to Brewarrina		20.1%
3: Brewarrina to Bourke		16.2%
4: Bourke to Lake Wetherell		14.6%

Figure 3. End-of-system accounting water shepherding methodology – Barwon-Darling

Individual water shepherding allocation assignment volume and limit

This rule establishes an individual shepherding allocation assignment volume and water shepherding allocation assignment limit for the parent licence. This limits the volume of allocation that can be assigned, from a Barwon-Darling parent WAL allocation account to a Barwon-Darling shepherding WAL allocation account.

This rule is required to ensure allocation is not moved to the lowest location on the Barwon-Darling (which would then attract the lowest reduction factor), before assigning it to a water shepherding WAL.

Details of this rule are outlined in Appendix B.

Access and use rules

The ability to debit water from the shepherding WAL allocation account and credit it to a downstream account requires the establishment of water sharing plan rules to ensure that there are no adverse third party impacts downstream of the Barwon-Darling unregulated river water source. The rules will be given effect to by mandatory conditions imposed on shepherding access licences and approvals.

The shepherding WAL water allocation accounts would be debited in accordance with the conditions on the shepherding WAL and the nominated water management work located at the end of the water source and any relevant rules in the water sharing plan.

A key feature is that the Commonwealth's access to water at the end of the Barwon-Darling water source will be based on the level of access that the Commonwealth would have had at the parent licence location. Licence holder access to flows in the Barwon-Darling is controlled generally by commence and cease to pump access conditions and extraction limits. It is proposed that similar rules will apply to the Commonwealth's access to shepherded water at the end of the Barwon-Darling water source.

The following access and use conditions are proposed for the shepherding WAL:

- A **shepherding WAL use limit**
- An **individual daily extraction limit** for shepherding WALs
- **Commence-to-pump conditions** for shepherded A & B class shepherding WALs at the end of the Barwon-Darling water source
- Individual **commence-to-pump conditions** for individual C class shepherding WALs at the end of the Barwon-Darling water source.

Shepherding WAL use limit

This rule establishes a use limit for shepherding WALs. The limit will be based on the allocation that has been assigned to the water shepherding allocation account. This is different to rules for the use limits on other WALs in the Barwon-Darling, which are likely to be based on their share component (as proposed in the Draft Barwon-Darling water sharing plan). A different rule is required for shepherding WALs as they will have a zero share component. The effect of the rule is that the Commonwealth will only be permitted to debit (or use) allocation under a shepherding WAL that has been assigned to that shepherding WAL from a CEW parent licence. Further detail on this rule is included in Appendix B.

Individual daily extraction limits for shepherding WALs

The Draft Barwon-Darling water sharing plan proposes that all WALs have an individual daily extraction limit (IDEL). Under the proposed methodology for water shepherding, IDEL rules will be used to limit the maximum daily volume that can be accessed by shepherding WALs and shepherded

downstream of the Barwon-Darling system. This will be an accounting rule on the shepherding WAL for a particular class (i.e. A, B or C class) that will limit the daily volume that can be debited from the shepherding WAL account. The volume that can be accessed by the Shepherding WAL will be limited to the sum of the IDELs of all Barwon-Darling parent access licences held by the Commonwealth (of the relevant class), minus the volume of water taken that day by those parent access licences.

This rule is necessary to ensure there is no increase in the total daily system take from the Barwon-Darling water source, which could lead to third party impacts downstream. Further detail on this rule is included in Appendix B.

Commence to pump conditions for shepherded allocations

Commence to pump (CTP) conditions are used in the Barwon-Darling to define the minimum flow level at which access licence holders are permitted to take water.

This rule establishes A and B class shepherding allocation access conditions for the Wilcannia stream gauge. The CTP conditions proposed for the Wilcannia stream gauge are:

- Shepherding A Class CTP – 551 ML/d.
- Shepherding B Class CTP – 1,010 ML/d.

These CTPs are based on the average frequency of flows that exceed the CTP of licence holders in each class above Bourke, as this is where most of the A and B class parent WALs are located. They are intended to reflect the equivalent frequency of access of the parent A and B class licences.

C Class access licences in the Barwon-Darling have individual CTP conditions. It is proposed that C Class shepherding WALs will have individual CTP conditions equivalent to the frequency of access of flows that exceed the CTP condition attaching to the parent C class access licence. The proposed C class CTPs at the Wilcannia stream gauge for the existing C class Commonwealth entitlements in the Barwon-Darling are provided in Table 2. Further detail on this rule is included in Appendix B.

Table 2: CTPs for C class shepherded allocations at the end of the Barwon-Darling unregulated river water source

Parent licence	River section	Water shepherding C class CTP @ Wilcannia stream gauge	Frequency of flows that exceed the CTP @ Wilcannia stream gauge and at the parent licence location
Colly	1	4,195 ML/day	21%
Toorale	4	>1,243 ML/day and < 1,857 ML/day Access to 80 ML/day	37%
		> 1,857 ML/day Access to 390 ML/day	32%

4. Rules for water shepherding - Queensland and NSW tributaries

It is proposed that water shepherding from a Commonwealth access licence in a tributary of the Barwon-Darling to the Barwon-Darling and downstream water sources will occur via allocation assignment, as illustrated in Figure 4.

The tributary shepherding WAL will nominate a shepherding water management work at the end of the tributary. Allocation can be assigned from the parent WAL to the tributary shepherding WAL allocation account, and then, via a second allocation assignment to the relevant shepherding WAL allocation account in the Barwon-Darling. To facilitate these shepherding dealings and to manage downstream impacts, specific water shepherding rules are required. The proposed dealing, access and use rules for shepherding from tributaries of the Barwon-Darling are outlined below.

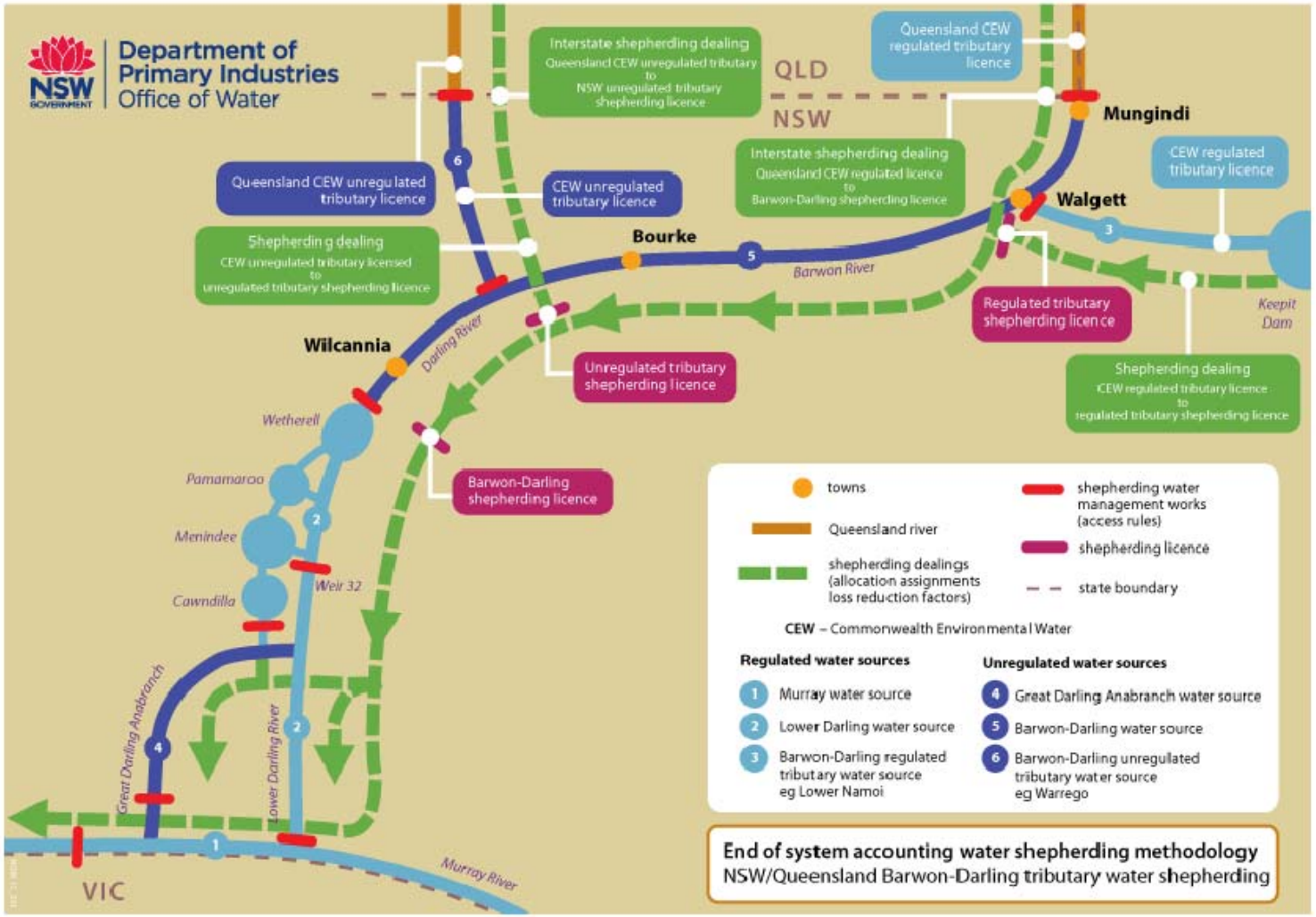
Shepherding from tributaries is more complex than shepherding within the Barwon-Darling itself. The shepherding of water from these unregulated and regulated tributaries will be dependant on the water actually flowing into the Barwon-Darling and reaching the end of the Barwon-Darling water source.

Fixed access period rules are proposed to ensure that actual flows from the relevant tributary accompany the allocation assignment to the next water source. A fixed access period rule establishes a time window in which shepherding allocations assigned to shepherding WALs can be accessed. Shepherding allocations cannot be debited from the allocation account of the shepherding WAL until the fixed access period begins. The ***commencement*** of this period of access to shepherded allocations at the end of the Barwon-Darling will be based on long-term average travel time from the tributary to the end of the Barwon-Darling. The **duration** of the period of access will be based on the length of time that shepherded allocations were accessed at the end of the tributary (or if Queensland shepherded water the length of time the shepherded water flowed over the border) (e.g. the event might have lasted 4 days), plus an allowance for flow variability.

If the water does not reach the end-of-system within the fixed access period, (e.g. because it is extracted by other licence holders or used in-stream), then the allocation cannot be accessed at the end of the Barwon-Darling, and that part of the shepherded allocation is forfeited. The fixed access period rule is required to negate third party impacts on stakeholders downstream of the Barwon-Darling.

The definition of the allowance for flow variability requires additional analysis that will be undertaken during Implementation Plan (Stage 2). There may be limited scope to extend a specific fixed access period to improve the Commonwealth's flexibility and capacity if the extension does not cause third party impacts.

Figure 4: End of system accounting water shepherding methodology – Barwon-Darling tributaries



Dealing rules

It is proposed to use dealing rules to facilitate the shepherding of water to the end of the tributary system and then through to the end of the Barwon-Darling water source. The following rules are proposed:

- Dealing rules to permit **allocation assignments** for the purposes of shepherding CEW allocation within a tributary, and to the Barwon-Darling. The allocation assignments will be based on the shepherded water actually flowing into the Barwon-Darling, as measured by stream gauges that will be installed at the Queensland/NSW border for Queensland shepherded water, and at the confluence of the tributaries and the Barwon-Darling River.
- Interstate dealing rules to permit **interstate allocation assignments** from Queensland to NSW shepherding WALs. (NB the current inter governmental agreement (IGA) between NSW and Queensland doesn't extend to shepherding scenarios. Therefore, the IGA will need to be amended, a new agreement formulated or some other arrangement entered into that is acceptable to both states).
- Specific rules that require allocation assignments to shepherding WALs in regulated tributaries to be concurrent with a water **order** from the parent licence regulated river allocation account. The order will be 'delivered' to a shepherding water management work located at the end of the regulated river water source.
- Dealing rules to ensure that shepherding allocation assignments are subject to an appropriate **shepherding loss reduction factor** on unregulated tributaries for the water shepherded through NSW. The loss reduction factor accounts for evaporation and transmission losses between the parent licence location and the shepherding water management work at the end of the tributary. The losses will be deducted from the assigned volume of allocation and will decrease the total volume that is available to shepherd into the Barwon-Darling. This is initially proposed to be a single loss reduction factor based on long term average transmission losses through the NSW tributary.

  Note: Losses within NSW regulated tributaries are socialised within the water source so there is no need to apply losses when allocation is assigned to a regulated tributary shepherding WAL.
- A second **shepherding loss reduction factor** will be applied to shepherding allocation assignments from regulated and unregulated tributaries to the end of the Barwon-Darling system (refer chapter 3). The loss reduction factor will be based on the river section where the tributary enters the Barwon-Darling.
- Dealing rules to establish **water shepherding allocation assignment volumes and limits** for the unregulated tributaries may need to be implemented in the future, depending on the level of detail of the loss reduction factor applied. This may be necessary to ensure allocation cannot be moved to the lowest location on the water source to minimise the shepherding loss reduction factor that would be applied.

Access and use rules

Shepherding WALs and shepherding water management works at the end of each tributary system, and the end of the Barwon-Darling, will have rules applied that govern access to and accounting for shepherded allocations. The following access and use limit rules are proposed for shepherding from a tributary:

- When shepherding from an **unregulated tributary**, a maximum **individual daily extraction limit** for shepherding WALs at the end of the tributary and at the end of the Barwon-Darling water source, will reflect the conditions on the parent licence that relate to maximum daily extractions. If no such conditions exist on the parent licence then a maximum daily extraction limit methodology will be developed to set these limits on tributary shepherding WALs to ensure that there are no adverse third party impacts.
- When shepherding from a **regulated tributary**, a maximum **individual daily extraction limit** for shepherding WALs at the end of the tributary and at the end of the Barwon-Darling water source will be defined as the daily measured ordered water that is delivered to the nominated stream gauge at the end of the water source.
- **Commence to pump (CTP) conditions** for access to shepherded allocations at the end of **unregulated tributaries** will reflect the reliability of access of the tributary parent licence.
- Access to shepherded allocations at the end of **regulated tributary** will be based on the delivery of the ordered water to the end of the regulated water source.
- **CTP conditions** for shepherded regulated and unregulated tributary flows at the end of the **Barwon-Darling** are proposed to be based on the Barwon-Darling water shepherding A class access licence CTP flow, which is the minimum flow necessary to ensure that the water reaches Lake Wetherell.
- A **fixed access period** rule is proposed for **unregulated tributary** shepherding allocation assignments, and to all shepherding allocation assignments from regulated and unregulated tributaries to the end of the **Barwon-Darling**. This will establish a time window in which shepherding allocations assigned to shepherding WALs can be accessed. It will ensure that actual flows from the tributary from which the shepherded allocations assignment originated accompany the allocation assignment into the next water source. Shepherded allocations cannot be accessed by the shepherding WAL until the fixed access period begins. Further, once the fixed access period ends any remaining allocation that did not reach the downstream shepherding WAL will be forfeited.
- To shepherd water from a tributary there must be a suitable stream gauge installed at the end of the tributary system or at another appropriate location.

5. Recognising shepherded water in Menindee Lakes / Lower Darling Regulated River water source and delivery downstream

Recognising shepherded water in Menindee Lakes Storages

The Murray-Darling Basin Agreement (the Agreement) does not provide for shepherded inflows into the Menindee Lakes Storages (MLS) to be treated or accounted for differently than other inflows. Under the terms of the Agreement any additional water resulting from shepherding would be automatically shared 50/50 between NSW and Victoria when the MLS is under the control of the Murray-Darling Basin Authority (the Authority).

Accordingly, the ability to shepherd Commonwealth environmental water from the Barwon-Darling into and through the MLS will be subject to multi-jurisdictional agreement, involving amendments to the Agreement. Amendments to NSW legislative instruments such as the *Water Sharing Plan for the NSW Murray and Lower Darling Regulated Rivers water source* will also need to be considered.

Various approaches to recognising shepherded water in MLS have been considered. These are outlined in Appendix C. The recommended scenario provides a basis for consultation with the Basin States on how shepherded water may be recognised in MLS.

The recommended scenario proposes that Commonwealth shepherded water be stored in the **unused airspace** of MLS, and an account be established under the Agreement to record the shepherded inflows as separate inflows to MLS (Scenario 2A). This option is described in Figure 5.

There is precedent to establish an account in unused airspace, as South Australia has the ability to store water in major storages in the Murray Darling (including Menindee Lakes) under Schedule G of the Agreement (Schedule G).

It is proposed that the shepherding account in MLS (the MLS account) would be operated by the Authority in accordance with rules set out in the Agreement, and that this account would operate in parallel with the NSW licensing framework.

The MLS account will record volumes of shepherded water which are being stored in the combined airspace of the MLS, after consideration of the volume stored under the South Australian storage right. The size of the MLS account would be limited to the unused airspace, and shepherded water would be the first to spill. Credits, debits, releases and spills would be administered by the Authority in accordance with rules in the Agreement.

The MLS account and the rules governing its operation would link to a Lower Darling shepherding WAL allocation account. The allocation account would be debited in accordance with the rules prescribed in the Agreement, which would include rules relating to accounting for evaporation losses and shepherded water being the first to spill.

By linking the MLS account under the Agreement with the shepherding WAL allocation account in the regulated Lower Darling River, the shepherding allocation will remain within the NSW licensing framework, but will be adjusted to reflect evaporation losses and spills whilst the water is stored in MLS.

To illustrate, the shepherding of water into MLS, an allocation assignment dealing under the NSW water management framework is required to transfer allocation from the Commonwealth's Barwon-Darling shepherding WAL allocation accounts to the Commonwealth's Lower Darling shepherding WAL allocation account. The rules in NSW statutory instruments such as the Access Licence Dealing Principles, relevant water sharing plans and mandatory conditions on access licences would contain

provision to ensure that evaporation losses in the MLS account are debited from the Lower Darling shepherding WAL allocation account.

Simultaneously, the shepherded water entering Menindee Lakes needs to be recognised as a flow entering the combined airspace under a new Schedule to the Agreement, instead of being part of the current flow sharing agreement between states. It is proposed that the Authority would credit the MLS account with the shepherded inflow, when an allocation assignment is undertaken.

The ability for water to be shepherded from the Barwon-Darling to the Lower Darling when there is no airspace available is also being considered to enable downstream environmental objectives to be achieved during these periods. For example, if the MLS is surcharged and the access conditions on the Barwon-Darling Shepherding WAL are met, the Commonwealth could complete a dealing to assign allocation to their Lower Darling Shepherding WAL, and simultaneously order that water for use/extraction downstream. If this type of dealing is permitted, the following types of conditions would apply:

- it would only be possible when there is no airspace for storage available to the Commonwealth, and
- it would only be possible when the Commonwealth's MLS account is at zero (because otherwise the Commonwealth could order the water already in their account).

Issues associated with the movement of water through the MLS when there is no airspace will need to be resolved during Implementation Plan (Stage 2). For example, currently when flood operations are in effect, no licensed water releases are made, that is, all releases are unregulated. If the Commonwealth wants to be able to release shepherded water during these periods, there would need to be an amendment of these rules.

The scenario outlined above is recommended as the preferred scenario because it is considered to be relatively simple and transparent, and will not impact on states' rights.

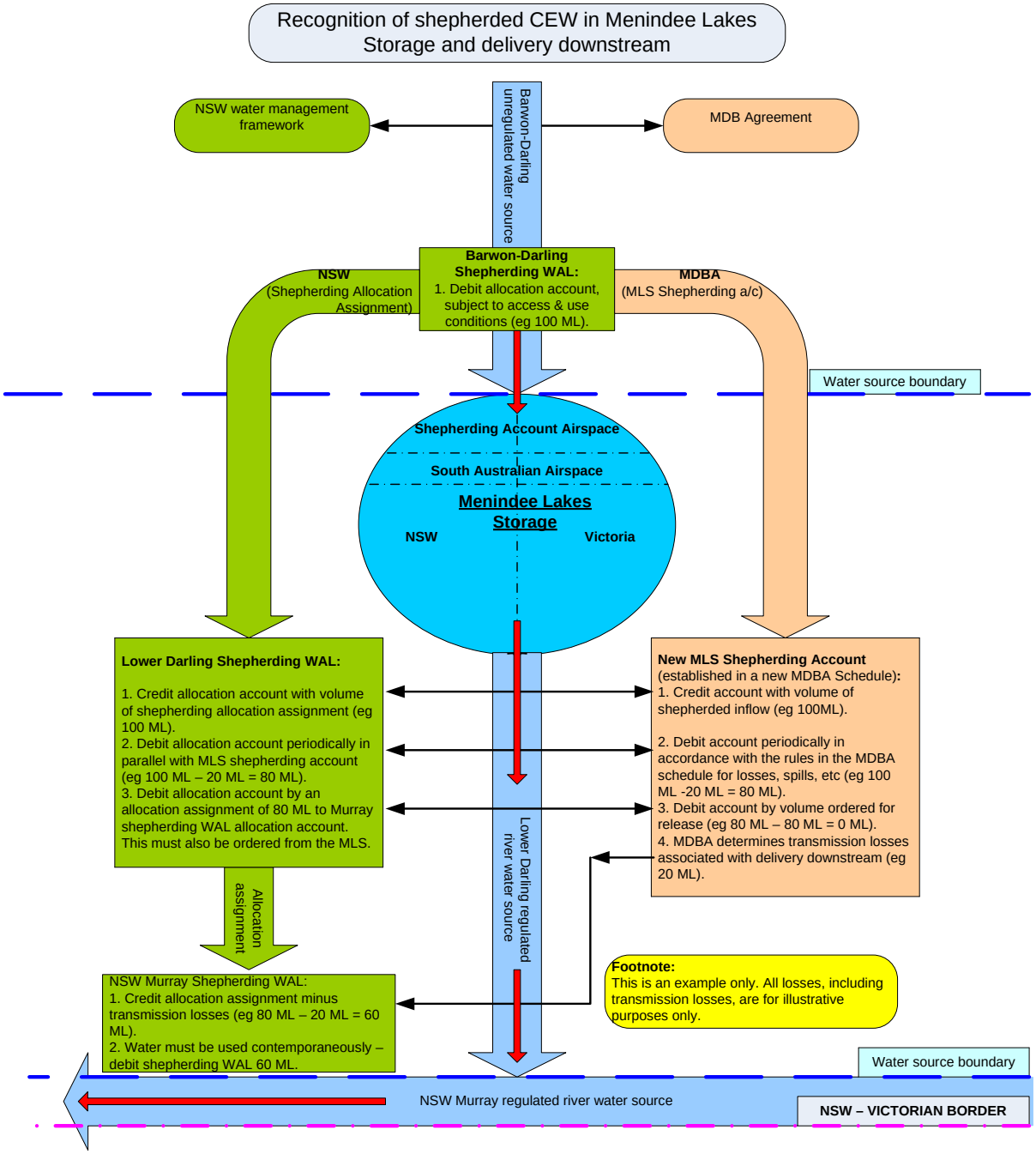
Delivering shepherded water downstream of Menindee Lakes Storages

The following principles have been developed in considering delivery of shepherded water downstream of MLS:

- The NSW allocation assignment dealings framework would continue to apply to water shepherding downstream. This framework will need to be linked to the proposed rules for the shepherding account in MLS, established under the Agreement
- All incremental transmission losses associated with the volume being shepherded downstream of MLS will be accounted for and debited from shepherding allocations assigned or extraction volumes permitted in the downstream location. For example, if the Commonwealth ordered a release of 6,000 ML, to be released at the same time as a MDBA release of 9,000 ML, this would cause the water to flow over-channel and cause higher losses than the in-channel release. The Commonwealth would be accountable for all the losses attributable to the additional 6,000 ML release
- Operational constraints, including the Lower Darling channel capacity and the release capacity at Weir 32 and the Cawndilla outlet, will influence the ability of the Commonwealth to shepherd water
- Interstate shepherding will be subject to amendment of the Murray-Darling Basin Agreement and the protocols under the Agreement regarding trade

- To deliver water downstream of Menindee Lakes, the Commonwealth would **order** water from the account attached to its Lower Darling shepherding WAL. If a release from Menindee Lakes can be made, the MDB Authority would debit the MLS shepherding account under the Agreement and make the release. NSW would then debit the Lower Darling shepherding WAL allocation account with the volume released
- If the water was to be extracted at a site in the Lower Darling Regulated River, the Commonwealth would nominate the extraction work on its Lower Darling shepherding WAL. The volume extracted at the nominated work would be the volume ordered less the transmission losses incurred in travelling from MLS to the nominated work
- If the water was to be delivered for in-stream purposes in the Great Darling Anabranch, the Commonwealth would nominate the relevant outlet (e.g., the Cawndilla outlet) on its Lower Darling regulated shepherding WAL for release into the Anabranch
- If the water was to be extracted from a work within the Great Darling Anabranch, for example, to provide water to a lake, an allocation assignment would be necessary to move allocation from the Lower Darling regulated shepherding WAL to a shepherding WAL in the Lower Darling unregulated water source (as the Anabranch, below Packers crossing, forms part of the unregulated water source). The volume extracted would be the volume ordered less the transmission losses incurred in travelling from MLS to the nominated work
- If the water was to be delivered to the NSW Murray River, an allocation assignment would be necessary to move allocation from the Lower Darling shepherding WAL to a shepherding WAL in the NSW Murray water source, with a shepherding loss reduction applied based on the delivery location
- Any shepherded allocation that is actually extracted from any of the water sources downstream of the MLS must be metered and recorded
- The delivery of water downstream is dependent on amendments being made to the Agreement to recognise shepherded CEW as being stored in the unused airspace of the MLS. Amendments will also be required to NSW legislation and statutory instruments including the *Water Sharing Plan for the NSW Murray and Lower Darling Regulated Rivers water source*

Figure 5. Scenario 2A - Storing shepherded water in MLS and delivery downstream



6. Shepherding in times of resource constraints

It is proposed that during periods of resource constraints, shepherding will need to be limited or suspended to ensure there are no adverse third party impacts on downstream stakeholders, and to ensure there is sufficient water to meet supply requirements during periods of critical human water needs. For the purposes of the water shepherding project, periods of resource constraint are defined as when the supply volume in the MLS falls below 480,000 ML until it returns to 640,000 ML.

Rules for limiting and / or suspending shepherding are being considered on the basis of resource availability and how it may apply under different scenarios of water availability described in the Murray Darling Basin Agreement. The Agreement sets out three Tiers of distribution of waters to States, including:

- **Tier 1** distribution of water under normal circumstances - the MLS is under MDBA control and NSW and Victoria have the right to use a maximum of 50% of storage capacity and inflows are shared 50/50 between NSW and Victoria, except in the period when the storage volume falls below 480,000 ML and until the volume next exceeds 640,000 ML NSW has the rights to use and manage all water within and flowing into the storage
- **Tier 2** distribution of water to ensure critical human water needs are met in times of severe water shortage, and
- **Tier 3** distribution of waters in extreme or unprecedented circumstances.

The following is considered a reasonable broad approach to defining the triggers for the limitations and / or suspension of shepherding under each Tier:

- **Tier 1 (MDBA control)** - There is no proposal to suspend shepherding under tier 1 distribution of waters when MLS is under MDBA management, as this is not seen as a time of resource constraint
- **Tier 1 (NSW control)** - There may be times when limitation and / or suspension is necessary under Tier 1 when the MLS are in NSW control as this is a time when resources need to be managed specifically to ensure supply to NSW
- **Tier 2 -** Suspension may be necessary under Tier 2 distribution of waters to ensure critical human water needs are met in times of severe water shortage, and
- **Tier 3** - It would be reasonable to suspend shepherding under Tier 3 distribution of waters as these are times of extreme or unprecedented resource constraints.

The exact triggers for when shepherding should be limited or suspended are to be fully considered during Implementation Plan (Stage 2). Specific feedback is being sought during consultation on the appropriate triggers for limitations and / or suspension of shepherding. This feedback will inform an analysis that will provide a basis for defining the appropriate triggers. As a basis for discussion two options for triggers to limit and / or suspend shepherding under Tier 1 have been identified. Options for consideration include:

- **Option 1** - Suspension of shepherding when the volume in MLS falls below 480,000 ML - suspension would continue until the volume in MLS exceeds 640,000 ML and MDBA resumes control of MLS. The shepherding account would then be reinstated. The intention is to prevent any adverse third party impacts on downstream water users and to continue to secure the 480,000 ML water supply requirements for NSW out of MLS during times of resource constraint.
- **Option 2** – Move management of MLS into NSW control when the volume in MLS falls below 480,000 ML plus the shepherded volume held in airspace and the Lakes remain under NSW control until the volume exceeds 640,000 ML plus the volume of water in the

shepherding account.[1] When MLS are in NSW control as per this new trigger then limit shepherding under particular circumstances prior to reaching the suspension trigger. Suspend shepherding when the volume in MLS approaches critical human water needs.

Further analysis of these options, and any other options that may be identified during consultation, will occur in the next phase of the project.

Specific circumstances may prevail during a suspension that requires CEW from MLS to be shepherded to achieve critical environmental watering objectives to avert or alleviate an environmental emergency. This would require rules giving NSW discretion during a period of suspension to allow CEW to be shepherded from the Barwon-Darling through MLS or to release shepherded CEW from the suspended MLS shepherding account, but only if the release would not adversely impact on water availability for NSW from the MLS. Specific feedback is also being sought during consultation on the appropriateness of providing a facility during a period of suspension to enable shepherded CEW in the suspended MLS account to be made available for critical environmental needs.

Temporary water restriction order

In addition to the suspension rules for shepherding, an order under section 324 of the WMA that prohibits or restrict the taking of water by licence holders in a water source due to a water shortage, would also apply to the shepherding WALs. This means the Commonwealth would not be able to 'take' water from the shepherding WAL whilst a temporary water restriction order was in effect.

Period of Special Accounting

Under the Agreement, periods of special accounting are declared for the Murray River when the Authority is satisfied that the total reserve allocated in the Murray River major storages to either NSW or Victoria at the end of the following May will be less than 1,250,000 megalitres.[2] The Authority must declare a period of special accounting between that State and South Australia.

The special accounting conditions in the Agreement were formulated on the basis that when the Menindee Lakes were in NSW control there would be no inflows from the Lower Darling to the River Murray. However, if the Commonwealth wanted to transfer shepherded CEW through the Lower Darling this would create a circumstance where there would be inflows into the Murray River. These inflows constitute a system inflow. The accounting rules during a period of Special Accounting provide that the South Australian share of this inflow increases by one third of the volume of inflow, to which NSW and Victoria must contribute equally. This effectively results in NSW "ceding" water to South Australia and Victoria contributing to a flow from its existing share.

To enable the Commonwealth to shepherd water into the Murray River from the Menindee Lakes during a period of special accounting, without causing a third party impact, amendments to the Agreement will be required. The amendments will need to recognise the shepherded volumes as being in addition to the state shares.

[1] E.g. If the shepherding account was 100,000 ML, and the total Menindee Lakes storage volume was 580,000 ML and falling, control of the Menindee Lakes would transfer from the Authority to NSW, because the volume available to the States would be less than 480,000 ML. The Lakes remain under NSW control until the volume exceeds 640,000 ML, plus the volume of water in the shepherding account.
[2] Cl 123 Agreement

7. Summary of model analysis for proposed shepherding arrangements

The end-of-system accounting water shepherding methodology proposes a number of new and innovative concepts in water management that will enable the Commonwealth to shepherd environmental water from the Barwon-Darling and its tributaries through to the Murray River. Hydrologic modelling has been completed in order to demonstrate the affects of the proposed methodology on the MLS and the regulated Lower Darling and Murray Rivers. The assumed shepherding arrangements demonstrate that there are no significant changes to the water sources where shepherding was modelled.

The modelling analysis demonstrated that:

- the draft proposed shepherding arrangements provide an effective mechanism that allows Commonwealth held allocations in the Barwon–Darling and it's tributaries to be shepherded into the MLS, and subsequently released into water sources downstream of the MLS, and
- the various components and features of the draft proposed shepherding arrangements resulted in no significant change directly attributable to shepherding.

The modelling analysis also demonstrates that shepherding into the MLS and subsequently into downstream water sources does not cause any significant changes to:

- the operation of the MLS or the regulated Lower Darling River and Murray River, or
- NSW licence holders and state allocations.

The results of the model analysis will vary depending on the assumed behaviour for the use of the CEW under the proposed shepherding arrangements. The low flow enhancement release strategy[3] for use of shepherded CEW tested in this model analysis was chosen to test the representation of the features of the draft proposed shepherding arrangements available in the model. This demonstrated the effectiveness of the new model shepherding features, and the results also showed that there would not be any significant third party impacts. Further modelling to test different assumed behaviour for the use of the CEW to demonstrate the feasibility of the shepherding mechanism is not considered necessary. Regardless of the assumed use behaviour, the outcome of the analysis is expected to remain the same (provided that the existing operating ranges and rules are applied such as at flows no greater than 9,000 ML/day below weir 32 or no shepherding when MLS is under NSW control), including:

- The properties of Barwon-Darling CEW licences that are reflected in Barwon-Darling shepherding licences provide a considerable degree of flexibility and scope to shepherd significant volumes to the MLS
- There is no significant change to long-term access for existing licences in the Barwon–Darling
- There is no significant change to the storage behaviour or the control of the MLS
- There is no significant change to the control of the MLS between NSW and the MDBA
- There is no significant change to Lower Darling River and NSW Murray River general security licence allocations. Note that these allocations are normally the most sensitive to changes in water availability as they have the lowest priority in the assignment of water allocations
- There are no significant changes to the Victorian and South Australian allocations

[3] The low flow enhancement release strategy included: shepherding Namoi allocations during periods of low flows from the Namoi and downstream of the MLS, shepherding Barwon-Darling allocation downstream of the MLS and releasing shepherded water from MLS to enhance low flows in the Lower Darling.

- No significant change in the operation of the Murray River system storages. (Noting that the release of shepherded water from the MLS has the potential to influence the operation of Lake Hume and Dartmouth, as the shepherded water contributes additional flows to the Murray River system).

The low flow enhancement release strategy had limited effectiveness as a strategy to shepherd allocation from the Barwon-Darling and it's tributaries through to the Lower Darling and Murray regulated systems. Some specific outcomes from the modelling analysis of this strategy included:

- Shepherding general security allocations from the Lower Namoi regulated river resulted in 26% of the long-term volume of shepherded allocations accessible at the end of the Barwon-Darling unregulated river water source and available to be credited to the MLS shepherding account
- On average 20.1 GL/yr of extra flow reaches the South Australian border in the long-term. This includes shepherded water released and spilled for the licences and methodology tested.

The analysis indicated that the CEWH will need to actively manage it's holdings in a way that considers a number of complex interactions and constraints (both physical and rule based) in order to effectively shepherd allocation from the Barwon–Darling and its tributaries to downstream water sources. For example, the actual volume that could be shepherded from tributaries may exceed the long-term average outcome modelled under the low flow enhancement strategy for shepherding allocations from the Lower Namoi regulated river by targeting periods when there is a higher likelihood of the shepherded water at the end of the Barwon-Darling water source meeting the shepherding A class licence access rules. It is expected that the CEWH will have significant interest in exploring additional strategies, however this is outside the scope of the current shepherding project.

8. Audit, report and review

Shepherding will involve the implementation of new and complex concepts and processes that will evolve over time. To ensure that the methodology is transparent and accountable, that there are no unintended impacts, and that management is adaptive and responsive, it is proposed that there be a formal review, audit and reporting process. This should identify any issues that may affect stakeholders, and if necessary, will provide guidance as to whether the methodology needs to be amended or suspended in certain circumstances.

Importantly, one of the overriding considerations of the shepherding project is that shepherding does not cause adverse third party impacts. An independent auditing and reporting process is proposed to ensure any unintended consequences are identified, and managed efficiently, appropriately and transparently.

Appropriate systems and procedures will be necessary to enable effective, efficient and informative monitoring and evaluation to feed into an auditing and reporting program.

The details of the independent audit, review and reporting arrangements are proposed to be developed during the next stage of implementation.

9. Frequently asked questions:

General

Why is water shepherding necessary?

The NSW and Commonwealth Governments are concerned that many environmental assets in the Murray-Darling Basin are under significant stress, and accordingly, both Governments are committed to restoring the health of rivers and wetlands in the Basin. Shepherding is a means by which water acquired by the Commonwealth can be directed to these assets. For example, modelling shows that there will be an average additional annual inflow of 23,700 ML per year into the Menindee Lakes Storage as a result of the two main CEW licences of Toorale and Colly in the Barwon-Darling unregulated river water source not being extracted at their historical locations for irrigation purposes, see appendix A. The implementation of shepherding will enable this water to be delivered to downstream environmental assets located on the regulated Lower Darling River, Great Darling Anabranch and the regulated River Murray.

Why can't the Commonwealth operate within the current regulatory frameworks?

Shepherding is not possible under the NSW framework because the Commonwealth (like any other licence holder) is restricted in its ability to move water between water sources. Further, the Murray Darling Basin Agreement (the Agreement) does not recognise shepherded CEW entering Menindee Lakes as being separate from State shares, and has no provision for shepherded CEW to be stored in Menindee Lakes for downstream use.

Will other water users have the ability to shepherd water?

The MoU provides for investigation into the feasibility of shepherding CEW. In the future the NSW Government may consider extending this facility to other licence holders.

What is the relationship between water shepherding and the Basin Plan?

The water shepherding project is being undertaken independently of the Basin Plan. However, it is likely that it will be used to deliver some of the environmental outcomes of the Basin Plan and may need to be reviewed once the Basin Plan is implemented.

How will water shepherding impact on other water users?

One of the guiding principles in the MoU is that entitlements and allocations held by other water users will not be enhanced nor diminished as a result of shepherding of environmental water. The dealings framework, transmission loss reductions factors and access and use rules are designed to ensure that there will be no directly attributable adverse impact on the entitlements and allocations of other water users as a result of shepherding. Examples of the rules that will apply to shepherding to ensure there are no third party impacts include:

- Dealing rules to ensure that shepherding allocation assignments are subject to an appropriate shepherding loss reduction factor.
- Access rules based on commence to pump conditions that will regulate the Commonwealth's access shepherded allocations, ensuring that actual flows are moving into the next water source.
- Accounting and use rules, including an individual daily extraction limit for shepherding that sets the maximum daily extraction limit for shepherding water in a particular class (i.e. A, B or C class) or from a particular tributary; and fixed access rules for shepherding from tributaries to ensure that the flows accessed at the end of a water source are flows attributable to the tributary from which the allocations were shepherded.

Will shepherding affect the MDB cap?

The MDB cap is administered under the Agreement. It establishes long-term caps on the volume of surface water used for consumptive purposes in river valleys within the Murray Darling Basin in order to protect and enhance the riverine environment. Assessment for compliance with the MDB Cap does not account for water taken for environmental purposes as extraction. This means the cap target is reduced by an amount attributable to the licenses use for environmental purposes. Accordingly, shepherding water for environmental purposes will not affect the MDB cap.

Will shepherding affect Long-term average annual extraction limits (LTAAEL) in water sharing plans?

LTAAELs are specified in NSW water sharing plans. They establish a limit on the total diversions from a water source or group of water sources. As extractions can increase through additional irrigation development or changes in practices, water sharing plans have a growth-in-use strategy to reduce extractions to the LTAAEL if this limit is exceeded. A growth-in-use response is triggered if extraction exceeds the LTAAEL by three percent or more in any year commencing from year two of a plan.

However, under the WMA, water committed as licensed environmental water is not accounted for as extraction when auditing compliance with the LTAAEL. It is intended that Commonwealth licences and shepherding licences will be prescribed as licensed environmental water. The effect of this is to exclude extractions made by the Commonwealth licences for environmental purposes from the reporting of compliance against the LTAAEL. This means that when assessing compliance with the LTAAEL, the use of the Commonwealth licences for environmental purposes cannot trigger a growth-in-use response. This is intended to provide:

- long-term protection of environmental water within the water source from extraction by other water users (as the LTAAEL is to be varied by an amount of any change to the amount of water committed as LEW originating within the water source), and
- protection to other licence holders in the water source against the effects of any activation of licences for environmental purposes above their previous long-term average diversion (as extractions, made by licences classified as LEW, for environmental purposes are excluded from the reporting of compliance against LTAAEL, and therefore won't trigger a growth in use response).

What if Commonwealth's activation of previously inactive licences affects Barwon-Darling licence holders?

Regardless of whether the Commonwealth licence is located on a regulated or unregulated tributary of the Barwon-Darling, or on the Barwon-Darling itself, there will be no detrimental impact on Barwon-Darling water users.

The shepherded water is not quarantined from extraction within the Barwon-Darling water source or its tributaries. The access location is moved from that of the parent licence to the end of the water source. Shepherded water is not physically accounted for until the end of the Barwon-Darling water source when it is debited from a shepherding WAL and credited to MLS shepherding account. Regardless of the level of activation of the Commonwealths licences, licence holders in Barwon-Darling may continue to access river flows in accordance with the conditions of their licence and other approvals and regulations. There won't be any less water physically in the river to access; there may be more water downstream of the parent licence location as a result of the shepherded allocations being left in the river to access at the end of the water source, although over the long-term no additional water can be accessed above the LTAAEL regardless of any increased flows.

What if the Commonwealth's activation of previously inactive licences affects water users in water sources downstream of Menindee Lakes?

The extent of the purchase of licences by the Commonwealth and how these licences will be used to achieve environmental objectives of the Basin Plan is unknown. It is therefore not possible to establish if a greater volume of water is likely to be shepherded, compared with the licences' previous individual long–term average annual extraction. Modelling analysis undertaken shows that the implementation of the draft proposed shepherding arrangements resulted in no significant change. The key guiding principle for introducing shepherding arrangements for CEW in NSW is that there are no third party impacts. As it is not possible to discern if an impact under these circumstances may occur, an adaptive management approach is considered appropriate, to ensure rules are developed and implemented if required. This adaptive management approach will form part of the criteria for the audit and review process to be detailed as part of the work to be competed during delivery of Implementation Plan (Stage 2). At that time the impacts of the Basin Plan and sustainable diversion limits, and the effect of these on the reliability and availability of water in downstream water sources may also be able to be considered.

If the non activation of CEW licences in the water sources of origin results in more flows in the Barwon-Darling, to what extent will this water be accessible by other water users?

Water users will continue to be subject to the LTAAEL, individual extraction limits, commence to pump conditions and other access and use rules, hence it is expected that there is no real net capacity for growth in extractions over the long-term.

Therefore, there will be no increase in extraction due to increased river flow due to shepherding in the long-term.

As domestic and stock users are limited to taking water for normal household purposes and for watering of livestock other than feedlots or other intensive animal raising enterprises, it is not expected that this usage will have any impact on shepherded flows.

Will shepherding dealings affect my ability to access water in the Barwon-Darling in accordance with my licence conditions and domestic and stock rights?

The end-of-system accounting methodology provides the Commonwealth with a share in the flow at the end of the Barwon- Darling system. It does not provide for Commonwealth water to be protected on an event basis as it moves through the Barwon-Darling. Accordingly, there will be no changes to the existing commence to pump conditions that apply to access licences as a result of shepherding. Shepherding will not affect basic landholder rights.

Barwon-Darling rules

What was the basis for establishing commence to pump conditions for shepherding WALs?

In establishing commence to pump conditions for access to flows at the end of the Barwon-Darling system, the following principles were considered:

- The need to ensure there would be no increased reliability of access by shepherded water allocations to the flows at the end of the Barwon-Darling system (as opposed to the parent location)
- The need to ensure there would be no potential to cause adverse third party impacts
- To allow for the combining of allocation from a variety of licences within the system to reduce the administrative complexity, i.e. one set of CTPs for A and B class regardless of the parent licence that allocation was assigned from
- The need to preserve the riparian flow

- The need to achieve a similar frequency of access at the end of the system as applies to the parent licence.

Why is it necessary to have a use limit for shepherding WALs?

Shepherding WALs retain the same characteristics, and are generally subject to the same rules as other WALs in regulated or unregulated water sources. The main difference with shepherding WALs is that they are zero share WALs, meaning the only allocation that is credited to the WAL is that which has been assigned to it under a dealing. Just like other WALs, shepherding WALs should be subject to a use limit to ensure that the Commonwealth cannot take more than its share of the water resource.

Rules for tributaries

Why is a single loss reduction factor proposed on unregulated tributaries?

There is minimal monitoring of flows and no numerical hydrological models in the unregulated tributaries due to the relatively low level of commercial development in these water sources. This makes it difficult to establish variable shepherding loss reduction factors within these water sources. Therefore it is proposed that a single loss reduction factor be used, based on an assessment of the long-term average transmission losses through the tributary. This analysis is proposed to be undertaken as part of the second stage of implementation, should it be more appropriate to apply multiple loss reduction factors for an unregulated tributary this can be done.

Why are there fixed access periods to access tributary flows, but no similar rule for flows originating in the Barwon-Darling?

To shepherd water allocations from Queensland and NSW tributaries of the Barwon-Darling rivers to downstream water sources specific rules are needed to manage the temporal aspects to ensure that:

- the additional water flows into the relevant downstream water source,
- this water is attributable to the relevant flow event from the tributary from which the water is being shepherded, and
- the system state that exits when the additional water (as a result of shepherded tributary CEW) enters the Barwon-Darling is essentially the same as the system state when the shepherded CEW is credited to the Lower Darling regulated shepherding WAL.

If there was no fixed access period then the shepherded tributary water could be taken at any time with potentially adverse third party impacts for stakeholders downstream of the Barwon-Darling unregulated river water source, including:

- Water being accessed as shepherded tributary water at the end of the water source and further credited to the next water source that would otherwise have belonged to another water user or the environment
- The additional shepherded tributary water contributes water to the system at a time when it is excess to requirements to the supply of the regulated water source downstream of the MLS. Shepherding access to water at a later time may be from flows that would have contributed to the regulated resource.

A fixed access period combined with, shepherding A Class access conditions at the end of the Barwon-Darling provides stakeholders with confidence that in most cases, the extra flows contributed to the Barwon-Darling from the tributary shepherding action will be the same ones that are accessed by the Barwon-Darling tributary Shepherding WAL at the end of the water source. Equally important is that the system state has not changed in any material way between the times when the tributary shepherding allocation assignment and related tributary flow event occurred to when the shepherded tributary allocations are accessed at the end of the water source.

There is no need for a fixed access period for water entitlements that originate in the Barwon-Darling, because the Commonwealth was always entitled to extract water from the Barwon-Darling water source under the terms of their Barwon-Darling licences. The current proposal simply moves the right to access the allocation within the water source, in the same way that other licence holders could trade their entitlement within the water source.

How will the fixed access periods be determined?

The fixed access period for shepherded water is based on three main factors:

- a long-term average travel time of flow in the tributary from the Queensland NSW border to the end of the tributary, from the end of a regulated water source to the end of the downstream unregulated tributary that flows into the Barwon-Darling plus / or in the Barwon-Darling from where the tributary enters to the end of the Barwon-Darling unregulated river water source, plus
- the time over which the shepherded allocation was actually delivered or flowed over the NSW Queensland border or from the tributary into the Barwon-Darling, plus
- an additional allowance to account for variability in flows and estimated flow travel times.

The long-term average travel time of flow would be established for relevant unregulated tributaries and sections of the Barwon-Darling using available information, e.g. stream gauging data or desk top assessment. These travel times would be established as part of the implementation plan (stage2).

The time over which the shepherded allocation was delivered or flowed into the relevant water source reflects:

- For a regulated water source, the days over which the water order was delivered to the end of the regulated tributary
- For Queensland shepherded flows the days over which the shepherded water from Queensland flowed over the border
- For a NSW unregulated tributary and Queensland shepherded water moving from the relevant tributary downstream, the days over which the tributary shepherding WAL nominating works at the end of the tributary is able to access flow in accordance with the conditions on the licence and its nominated work up to the volume limit of the allocation assignment.

The additional allowances to account for the variability of flows and estimated flow travel times is also to be detailed as part of the implementation plan (stage 2).

Why will all tributary shepherding WALs at the end of the Barwon-Darling have the same CTP conditions?

It is proposed to use the Barwon-Darling A class shepherding WALs at the end of the system. These CTPs were chosen as they are high enough to ensure that shepherded water will reach Lake Wetherell under all river flow conditions. It would be administratively complex and potentially less transparent to use individual CTPs, because individual CTP's would need to be established for each tributary shepherding event.

Can supplementary flow events be shepherded?

Yes, shepherding of water emanating from a supplementary access licence in regulated water sources would be permitted. It would be administered in the same manner as a water shepherding allocation assignment and order from a regulated water access licence. However there will be a difference in practise. If the Commonwealth shepherds a supplementary flow, the water will be derived from a rainfall event that causes a flow rather than from an order being placed for delivery from the regulated

resource. State Water Corporation would determine the actual volume of the Commonwealth's supplementary allocation that flowed past the shepherding water management work at the end of the regulated water source.

Recognising shepherded water in Menindee and downstream

Why is it proposed to allow the storing of shepherded water in the Menindee Lakes?

An objective of shepherding is to deliver additional water to environmental assets located on the regulated Lower Darling River, Great Darling Anabranch and the regulated Murray River. Enabling shepherded water to be stored in the Menindee Lakes allows these objectives to be achieved and provides flexibility in delivering this water. An alternative is that shepherded water be moved through the Menindee Lakes without storing it. The water would be credited to the MLS shepherding account under the Agreement, but immediately be debited, as it would be released straight away without using Menindee Lakes as storage, an amount would still be deducted for transmission losses as the water moves through the MLS, (see Appendix C). However, this would limit the ability of the Commonwealth to order water at specific times to enable delivery downstream. Volumes would be restricted in terms of quantity and timing, making it more difficult to target specific assets in downstream water sources.

Will storing shepherded water in MLS lead to increased losses?

In providing access to airspace in the Menindee Lakes to shepherded water there is the possibility that the shepherded water may cause a significant increase in storage losses. This could arise in circumstances where it becomes necessary to store water in Lake Menindee / Cawndilla when they would otherwise have been kept dry, resulting in increased evaporation. It could also arise because more inflows will be lost to dead storage.

The overriding principle is that the losses accounted as a result of the shepherding should not adversely impact on the volume or accessibility available to other stakeholders. Therefore, to avoid an impact occurring, the Commonwealth will be required to pay incremental loses associated with the shepherded volume.

What priority will shepherded water have in relation to South Australia's storage rights?

Schedule G of the Agreement sets out South Australia's right to store "deferred water" in airspace in MLS. This right has priority over a possible shepherding storage right.

What kind of rules will be required in the Agreement?

It is anticipated that there will need to be rules in the Agreement about inflow and airspace sharing, and account and delivery management. For example, rules will be needed to debit evaporation losses and to determine transmission losses, and to establish that shepherded water will be the first to spill.

How will the shepherding loss reduction factor be determined for shepherding downstream of Menindee?

It is proposed that the Authority will calculate transmission losses in accordance with the proposed rules set out in the Agreement. They will be calculated in an incremental basis. For example, if Commonwealth ordered a release of 6,000 ML, to be released at the same time as a MDBA release of 9,000 ML, this would cause the water to flow over-channel and cause higher losses than the in-channel release. The Commonwealth would be accountable for all the losses attributable to the additional 6,000 ML release.

If shepherded water is ordered for extraction downstream in the Lower Darling regulated river water source, the volume of water extracted from the nominated work would be the volume of the order minus transmission losses incurred travelling from Weir 32 to the nominated work. Water ordered is

debited from the Lower Darling shepherding WAL allocation account and, in parallel, the MLS shepherding account, once released from MLS.

If the shepherded water is assigned to another shepherding WAL in a downstream water source, the volume of the allocation assignment would be debited from the Lower Darling regulated shepherding WAL allocation account and this volume would be released from the MLS shepherding account. The ordered volume minus transmission losses incurred for delivery of that water to the work nominated on the shepherding WAL in the downstream water source would be assigned to the downstream shepherding WAL allocation account for contemporaneous use.

Can shepherded water be assigned to an allocation account in a downstream water source for later use?

No. Shepherded water delivered to a location downstream of MLS represents actual water arriving at the destination. The water that arrives and is available for extraction is the water that has been ordered, minus a volume calculated to account for transmission losses incurred in transit. This water must be used contemporaneously with the allocation assignment and water order.

Shepherding in times of resource constraints

How do the three tiers under the Murray Darling Basin Agreement affect access to water?

The Agreement sets out the distribution of waters to States under three tiers of water availability, these being:

- Tier 1 - distribution of water under normal circumstances,
- Tier 2 - distribution of water to ensure critical human water needs are met in times of severe water shortage, and
- Tier 3 - distribution of waters in extreme or unprecedented circumstances.

Refer to Page 20 for a description of how shepherding may operate in these circumstances.

When will shepherding be suspended under Tier 1 management arrangements?

Feedback is being sought on the proposed options for suspending and / or limiting shepherding during times of resource constraints. Refer to Page 20 and 21 for further details.

Further analysis (including modelling) of the identified options, and any other options that may be identified during consultation, will occur in the next phase of the project.

Will shepherding be permitted during a period of special accounting declared by the Authority?

Yes, subject to amendments being made to the Agreement to recognise the shepherded volumes as being in addition to the State shares, in order to avoid a third party impact.

Will shepherding per permitted under Tier 2 and 3 management arrangements?

It is proposed that shepherding be suspended under these arrangements. However, to achieve critical environmental watering objectives, availability of shepherding during times when it is otherwise suspended is to be considered during the next stage of the project following further analysis to ensure that there is no impact on availability of water to NSW and other stakeholders.

Appendix A. Benefits of proposed shepherding approach in the Barwon-Darling

The effect of non-extraction from CEW licences at Toorale (Darling and Warrego River junction) and Colly Farms (Barwon-Darling-River upstream of its confluence with the Mehi River) was analysed using the long-term "Integrated Quantity Quality Model' (IQQM). If the proposed shepherding methodology were implemented this should have the same outcomes in the Barwon-Darling as the non-extraction of CEW Barwon-Darling entitlements.

The results of the modelling indicate that by not extracting from these sites, net losses are increased by an average 3,300 ML per year, simply because there is more water in the river which is susceptible to evaporation, transpiration and seepage. The increased level of flow caused by CEW remaining in the Barwon-Darling caused minimal change to access for other licence holders in the water source. The existing management rules in the Barwon-Darling and those proposed in the water sharing plan prevent any increase in diversion from Barwon-Darling irrigators over the long-term.

On the other hand there is a long-term average annual increase of 23,700 ML per year in end-of-system flows. This shows that, should shepherding be implemented, leaving these entitlements in the river results in additional water at the end of the water source. Under the proposed shepherding arrangements the Commonwealth may have access to the allocations left in the river at the end of the water source[4] and use these allocations for environmental purposes in downstream water sources.

The IQQM was also used to assess the affects of leaving the CEW Toorale and Colly entitlements in the river against a set of key hydrological criteria for the Barwon-Darling. The results of this analysis are set out in Table 1 below. This was a long-term analysis done over the model period of 114 years (1894 to 2008). On an event by event basis there potentially could be measurable environmental benefits. However, the IQQM is a long-term analysis tool and individual event improvements can not be identified.

The benefits of this water being shepherded to downstream environments were not modelled as part of this work.

Table 1: Effects of leaving the CEW Toorale and Colly entitlements in the Barwon-Darling.

Key hydrological criteria tested	Results comparing current conditions model run with the non-extraction of CEW entitlements model run.
Rate of rise and fall in river levels: A significant change in flow could alter the channel stability and the opportunity for fish to relocate either from floodplain habitats to the main channel or along the channel to refuge pools.	In the long-term there is a small or no change in the rate of rise and fall in river levels.
Frequency of weir drown out: Identifies the potential change in frequency of the Brewarrina and Bourke weirs being hydraulically drowned out to enable fish passage, which is critical for fish migration and breeding	In the long-term there is a small or no change in the frequency of weir drown out.
Frequency of commence-to-fill of wetlands: Identifies the potential change in frequency that wetlands in the Barwon-Darling could commence-to-fill and re-connect to the river channel.	In the long-term there is a small or no change in the frequency of commence-to-fill of wetlands except for the Walgett flow threshold of 1,990 ML per day, where there is an increase of twelve events. The majority of the increases in modelled events occur in winter and summer.

[4] Subject to conditions on the shepherding licence and work approval, the rules in the water sharing plan and other associated legislative requirements.

Key hydrological criteria tested	Results comparing current conditions model run with the non-extraction of CEW entitlements model run.
Frequency of no flows and low flows: Identifies the potential change in frequency that there would be flow less than the ninety-ninth percentile (low flow rates exceeded 99% of the time).	In the long term there is a small or no change in the frequency of no flows and low flows.
Frequency of pulse or fresh flows: Identifies the potential change in frequency of flows of a particular flow rate being exceeded for a period of continuous days at Bourke and Louth.	In the long-term there is a small or no change in the frequency of pulse or fresh flows, except at Louth at flow thresholds of 10,000 ML per day for 10 days. Modelling indicates that there is a 11% increased frequency in summer events.

Appendix B. Details of proposed rules for Barwon-Darling shepherding

Individual water shepherding allocation assignment volume & limit

This rule establishes an individual shepherding allocation assignment volume and a total water shepherding allocation assignment limit. Together, these limitations restrict the volume of allocation that can be assigned, from each river section, from a Barwon-Darling WAL allocation account to a Barwon-Darling shepherding WAL allocation account.

Individual Shepherding allocation assignment volume

The individual daily extraction limit (IDEL) for the parent WAL, established in the water sharing plan, will be used to link the parent licence to a river section and to calculate a shepherding allocation assignment volume as a proportion of the total daily extraction limit (TDEL) for the river section and the total shares for that river section at the commencement of the water sharing plan.

$$\textit{Shepherding allocations assignment volume (ML)} = (A \div B) \times C$$

$$A = \textit{WAL River Section IDEL (ML/d)}$$

$$B = \textit{River Section TDEL (ML/d)}$$

$$C = \textit{Total River Section Shares at commencement of the plan (ML)}$$

Individual water shepherding allocation assignment limit

The water shepherding allocation assignment limit allows:

- Three times this shepherding allocation assignment volume to be assigned to a Barwon-Darling shepherding WAL allocation account in any one year, or
- 4.5 times the shepherding allocation assignment volume assigned to a Barwon-Darling shepherding WAL allocation account over any three year period.

This limit is based on the draft Barwon-Darling water sharing plan individual use limit that allows an access licence to use or assign allocation of a volume up to 3 times their share component in any one year up to 4.5 times over any three year period.

If additional allocation is purchased only allocation up to the water shepherding allocation assignment limit can be shepherded each year or over a three year period. If additional IDEL is purchased within a river section this will increase the water shepherding allocation assignment volume and enable additional allocation to be shepherded to a Barwon-Darling shepherding WAL from that licence in that river section.

Shepherding WAL use limit

In the Draft Barwon-Darling water sharing plan the annual use limit for access licences relate to the share component plus allocations that have been acquired under s71T in that water year. Under these rules, because water shepherding WALs will be zero share access licences, they would only be able to use (shepherd) the allocation that is assigned to them in that water year. This means assigned allocation cannot be carried forward from one water year to the next.

To address this, it is proposed that Barwon-Darling shepherding WALs that receive allocations assigned from a parent CEW licence held in the Barwon-Darling will have a use limit reflecting the allocation that has been assigned to the water shepherding WAL allocation account, rather than being based on the access licence share component, which is zero. Consistent with the proposed draft carry

over rules for the Barwon-Darling water sharing plan there will be no requirement for allocation held on shepherding WALs to be used in the same year that the allocation assignment dealing occurs.

Individual Daily Extraction Limit for shepherding WALs

The individual daily extraction limit (IDEL) for shepherding WALs establishes a maximum daily volume that can be shepherded downstream (that is, 'taken' from the Barwon-Darling). It is needed to ensure that, by recognising shepherded volumes as being available downstream, there is no increases in the potential total daily system take from the Barwon-Darling unregulated river water source and no adverse downstream third party impacts. The IDEL would be established through an accounting rule and implemented as a mandatory condition on the shepherding WAL. The proposed condition would set the maximum daily extraction limit for the shepherding WAL for a particular class (A, B or C class).

The IDEL for the shepherding WALs would be the sum of IDELs of the Commonwealth's Barwon-Darling parent WALs (of the relevant class), minus the volume of water taken that day under those unregulated river access licences.

Commence to Pump conditions for shepherding WALs

The shepherding A and B class CTP conditions for the Wilcannia stream gauge are at a level which will ensure that the shepherded flow reaches Lake Wetherell. To increase confidence that this is occurring, it is proposed that there also be a measureable flow at a new stream gauge established upstream of Lake Wetherell, subject to a suitable site being identified for location of a gauge.

Regardless of the installation of new gauges, a periodic review of the CTPs for the shepherded water at the end-of-system will be required to ensure the commence to pump triggers are appropriate.

A number of options have been considered in regard to determining CTP conditions for A, B and C class licences at the Wilcannia gauge.

The recommended method for A and B class establishes a CTP based on the average frequency of flows that exceed the CTP for all these classes of allocations for all Barwon-Darling licences above Bourke. These CTP conditions are:

- Shepherding A class CTP = 551 ML/day
- Shepherding B class CTP = 1,010 ML/day.

Adoption of these flow rates enables the application of a single CTP for A and B class shepherded flows while still providing reasonable access to these classes at the end of the water source. These CTPs are considered representative of the typical level of access for the majority of licence holders in the Barwon-Darling and reflects the most common levels of access by licence holders across the Barwon-Darling (noting that the majority of licences are above Bourke). These CTPs also ensure that the shepherded flows reach Lake Wetherell and protect riparian flows within the management zone.

The recommended option for C class CTPs is to establish individual CTPs based on the equivalent frequency of flows that exceed the CTP of the parent C class access licence. This method requires establishment of a separate shepherding WAL for each parent C class access licence.

Rules will be required in the water sharing plan to implement access conditions for the A, B and C class shepherding WALs.

Appendix C. Scenarios identified to recognise shepherded water in the MLS

The potential options identified for the recognition of shepherded water in the MLS were:

1. Shepherded water has a predefined storage right in the Menindee Lakes with a Commonwealth shepherding storage account for shepherded water.
2. Shepherded water has access to airspace in Menindee Lakes.
3. Shepherded water is stored as part of the South Australian storage right for the purpose of private carry-over.
4. Shepherded water flows through the Menindee Lakes without storage as transparent or translucent flows.

These options were considered and assessed in light of a number of criteria, as follows:

- Third party impacts,
- Ensure NSW State shares bear no greater risk than other jurisdictions as a result of shepherding,
- Likelihood of Basin States agreeing to the necessary changes to the MDB Agreement,
- Ability for CEWH to direct usage of the shepherded water downstream of the Barwon-Darling water source,
- Ability to account for losses for water shepherded through Menindee Lakes Storage and downstream,
- Ability to account for the movement of water between water sources,
- Ability to make shepherded water available in Victoria, South Australia, the River Murray, the Lower Darling Water source and the Great Darling Anabranch,
- Ability of CEWH to report on the amount of water used for watering environmental assets,
- Implementation complexity,
- Operational complexity,
- Administrative complexity, including licensing processes,
- Timeframe for implementation,
- Implementation risks, and
- Cost

Option 1: Shepherded water has a predefined storage right in the Menindee Lakes with a Commonwealth shepherding wholesale account for shepherded water.

This option provides the Commonwealth with a right to use a portion of the storage capacity to store shepherded CEW. Provision of a storage right for shepherded water will reduce the storage volume available to Victoria and NSW. The reliability of licences on the Murray River and Lower Darling River depends on the size of the storage right available to NSW and Victoria in the MLS. Hence, allowing the Commonwealth a portion of the MLS to store shepherded water will have an immediate third party impact on the reliability of supply for NSW and Victoria and their licensed users.

This option would not be acceptable to either the states or licence holders and is not recommended for further consideration.

Option 2: Shepherded water has access to airspace in Menindee Lakes

This option would enable shepherded water to be held in the remaining airspace of the MLS after the provisions of Schedule G (South Australian storage right) have been met. Two scenarios are considered below to recognise shepherded volumes. Both scenarios require the agreement of the Basin States to amend the Agreement, and both are based on the premise that shepherded water is stored in the MLS airspace only after the provisions of Schedule G have been met.

Scenario A: Management similar to the South Australia storage right

This is the preferred scenario. It is based on the creation of an account in the MLS, administered by the Authority and managed in accordance with rules set out in the Agreement. The shepherded water inflow is not intended to be part of the State's shares. It is in effect quarantined from the rest of the inflows.

The shepherded CEW inflow sits in the unused combined airspace of NSW and Victoria, which means there are no "internal spills". There is a precedent in Schedule G to establishing a shepherding storage account with rules.

This account in MLS under the Agreement would operate in parallel to the NSW water management framework. That is, to move water into MLS, under the NSW water management framework a shepherding dealing would transfer allocation from the Barwon-Darling shepherding WAL to the Lower Darling shepherding WAL. The rules in NSW statutory instruments such as the Access Licence Dealing Principles, relevant water sharing plans and mandatory conditions would contain links to the account rules under the Agreement, for example, to ensure that evaporation losses in the MLS account are debited from the Lower Darling shepherding WAL allocation account.

Option 2A operates on the assumption that the Commonwealth can only store water in MLS when there is "unused airspace" available. However, it may be possible for the Commonwealth to shepherd water from the Barwon-Darling to the Lower Darling when there is no airspace available. For example, if the MLS is full and the access conditions on the Barwon-Darling Shepherding WAL are met, the Commonwealth could do a dealing to assign allocation to their Lower Darling Shepherding WAL, and simultaneously order that water for use/extraction downstream[5]. The water would be credited to the MLS shepherding account under the Agreement, but immediately be debited, as it would be released straight away without using Menindee Lakes as storage. A predetermined amount would be deducted for transmission losses as the water moves through the MLS.

Scenario B: NSW and Victoria licence products in Menindee Lakes Storage.

This scenario is based on the creation of both NSW and Victorian licences for shepherded water, held by the Commonwealth in MLS. The Commonwealth would be able to do allocation assignment between the Barwon-Darling shepherding WAL allocation account and the NSW and Victorian licences in MLS (subject to the conditions of the shepherding WALs, nominated works and the rules in the Barwon-Darling water sharing plan etc). The shepherded inflows would be equally assigned to the NSW and Victorian licences. These licences would sit in each State's 'unused airspace'. Amendments to the Agreement would be required to set the rules for how the licence accounts would operate, including for example spill rules and crediting and debiting rules.

This scenario is significantly more complex than Scenario A as it assumes several licences will exist in the Lower Darling regulated water source for the purposes of shepherding – a Victorian licence account in MLS, a NSW licence account in MLS and a NSW shepherding WAL to which allocations will be credited from the MLS accounts. In addition, the Authority will need to maintain an account

[5] This can be done under the current framework as simultaneous dealings are provided for by s 71Y(6) of the WMA.

under the Agreement. There are a number of issues around the use of the airspace and changing inflow shares that will require amendments to the Agreement, including the addition of a Schedule and protocols.

Scenario B is not recommended as it is more complex to administer, is likely to involve changes to the Victorian legislation which may not be feasible, and delivers no benefits over Scenario A

Option 3: Shepherded water is stored as part of the South Australian storage right for the purpose of private carry-over.

This option permits shepherded water to be managed within the South Australian storage right. Whilst shepherded water could potentially be stored within this right if amendments were made to the Agreement, including Schedule G, a number of issues would need to be addressed. Because of the extreme priority of water for critical human water needs and the commercial aspects of carry over water, it is considered that including a third category of water will lead to greater complexity in managing the South Australian storage right.

Option 3 is not recommended because no advantage has been identified in amending Schedule G as opposed to creating a new schedule (that is, Option 2A). In contrast, establishing a separate schedule to deal with shepherded water is likely to be more transparent and less complex than amending the existing Schedule G.

Option 4: Shepherded water flows through the Menindee Lakes without storage as transparent or translucent flows.

This option considers the possibility of treating water shepherded in a transparent or translucent manner through the MLS. Neither concept enables the Commonwealth to hold shepherded water in MLS, thereby limiting the timing and use of water downstream. The ability for the Commonwealth to optimise environmental outcomes would be limited as the shepherded water would not have the access characteristics stored for later use.

Transparent flow

It is proposed that treating shepherded water as a transparent flow is **not** an appropriate conceptual framework because the transparent flow methodology does not consider losses. However, as shepherded water flows through Menindee Lakes Storage there will be evaporation and other losses. Therefore if this methodology was adopted for shepherding CEW, these losses would be met by other users in the system. This would result in third party impacts and would therefore be inconsistent with the principles of the MoU. Accordingly, transparent movement of shepherded water through Menindee Lakes is not recommended.

Translucent flow

Treatment of the shepherded water from the Barwon-Darling water source as a translucent flow through the Menindee Lakes would see a portion of the shepherded water inflow released from the lakes after a defined period. The delay in release would reflect possible travel time through the Lakes, and the reduced volume of the release would be to account for losses in the Lakes.

This option does not provide the CEWH with the flexibility to store and order the water at specific times when CEWH would prefer it to be delivered downstream of the Menindee Lakes. Volumes delivered downstream of Menindee would be restricted in terms of both quantity and timing, making it more difficult to target specific assets at specific times in these downstream water sources.