



NSW Border Rivers: Floodplain harvesting in water sharing plans

Report to assist community consultation

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Summary

The government is currently implementing the NSW Floodplain Harvesting Policy across six northern inland designated floodplains: Border Rivers valley, Gwydir valley, Upper Namoi valley, Lower Namoi valley, Macquarie valley and Barwon–Darling valley. This process will result in the issuing of floodplain harvesting access licences in regulated and unregulated river water sources throughout the floodplains. Relevant water sharing plans will include rules for these licences.

The government will issue floodplain harvesting (regulated river) access licences to eligible landholders within the NSW Border Rivers Regulated River Water Source, requiring the *Water Sharing Plan for the NSW Border Rivers Regulated River Water Source* to include rules for these licences. Conversely, there are no floodplain harvesting (unregulated river) access licences to issue in the NSW Border Rivers Unregulated River Water Sources. As such, the *Water Sharing Plan for the NSW Border Rivers Unregulated and Alluvial Water Sources 2012* does not need to include rules.

This report aims to assist the community in understanding the proposed types of rules for floodplain harvesting (regulated river) access licences in the NSW Border Rivers Regulated River Water Source. It also explains the interaction between those rules, modelling and the expected environmental benefits once they are put in place.

Table 1 provides a summary of the proposed rules for floodplain harvesting (regulated river) access licences in the Border Rivers Regulated River Water Source. We are seeking feedback through a public submission process from **20 October 2020 until 30 November 2020**.

Table 1. Summary of proposed rules for floodplain harvesting (regulated river) access licences

Type of rule	Proposed rule for floodplain harvesting
Account management	Account limit: Maximum of 5 ML per unit share at any time Carryover: Unlimited, subject to the account limit
Available water determination	Initial available water determination of 5 ML per unit share, or initial available water determination of 1 ML per unit share, or a lesser amount to ensure compliance with the extraction limit. Available water determination of 1 ML per unit share every year after that, subject to increases or decreases to respond to growth or improved accuracy in calculating the extraction limit
Permanent trade	No nomination of works located in a trading zone that reflects management zones A and D established under the <i>Floodplain Management Plan for the Border Rivers Valley Floodplain 2020</i> by a floodplain harvesting (regulated river) access licence
Access rules	Restriction, where appropriate, to contribute to meeting flow targets in the Barwon–Darling Unregulated River Water Source. Restriction may be applied through a Section 324 order if: <ul style="list-style-type: none"> there is uncontrolled flow in one or more sections of the river restrictions are placed on supplementary water access licences to contribute to meeting the flow targets in the Barwon–Darling.
Protection of environmental flows	No proposed rules specifically for floodplain harvesting

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Introduction

The department has prepared this report to provide detail on the rules that will be included in the relevant water sharing plans for floodplain harvesting licences in the Border Rivers Valley Floodplain. The report explains how those rules interact with modelling and provide potential environmental benefits. It includes information on the submission process and the rules that are subject to consultation outcomes.

Importantly, the government will issue floodplain harvesting access licences only in the NSW Border Rivers Regulated River Water Source. So, this report details only the rules proposed to be included in the *Water Sharing Plan for the NSW Border Rivers Regulated River Water Source* for floodplain harvesting (regulated river) access licences.

Border Rivers Valley Floodplain

The Border Rivers Valley Floodplain was designated when the *Floodplain Management Plan for the Border Rivers Valley Floodplain 2020* commenced. The Border Rivers Valley Floodplain has areas of high ecological and cultural significance, designated as management zones A and D (see Figure 1). These areas have been identified as part of the development of the *Floodplain Management Plan for the Border Rivers Valley Floodplain 2020*.

Floodplain management plans provide the framework for coordinating the development of flood works on a whole-of-valley basis. This framework minimises future changes to flooding behaviour, improves the environmental health of floodplains and increases awareness of risk to life and property from the effects of flooding.

Conversely, floodplain harvesting relates to the taking of water from a floodplain. This activity is managed through the licensing framework and associated rules in water sharing plans. The Border Rivers Valley Floodplain has two water sharing plans: the *Water Sharing Plan for the NSW Border Rivers Regulated River Water Source 2009* and the *Water Sharing Plan for the NSW Border Rivers Unregulated and Alluvial Water Sources 2012*.

Implementing the NSW Floodplain Harvesting Policy in the Border Rivers Valley Floodplain will result in the issuing of floodplain harvesting (regulated river) access licences in the NSW Border Rivers Regulated River Water Source. This means that rules pertaining to floodplain harvesting will be included only in the *Water Sharing Plan for the NSW Border Rivers Regulated River Water Source 2009*. Notably, this water sharing plan is due for remake in 2020–21.

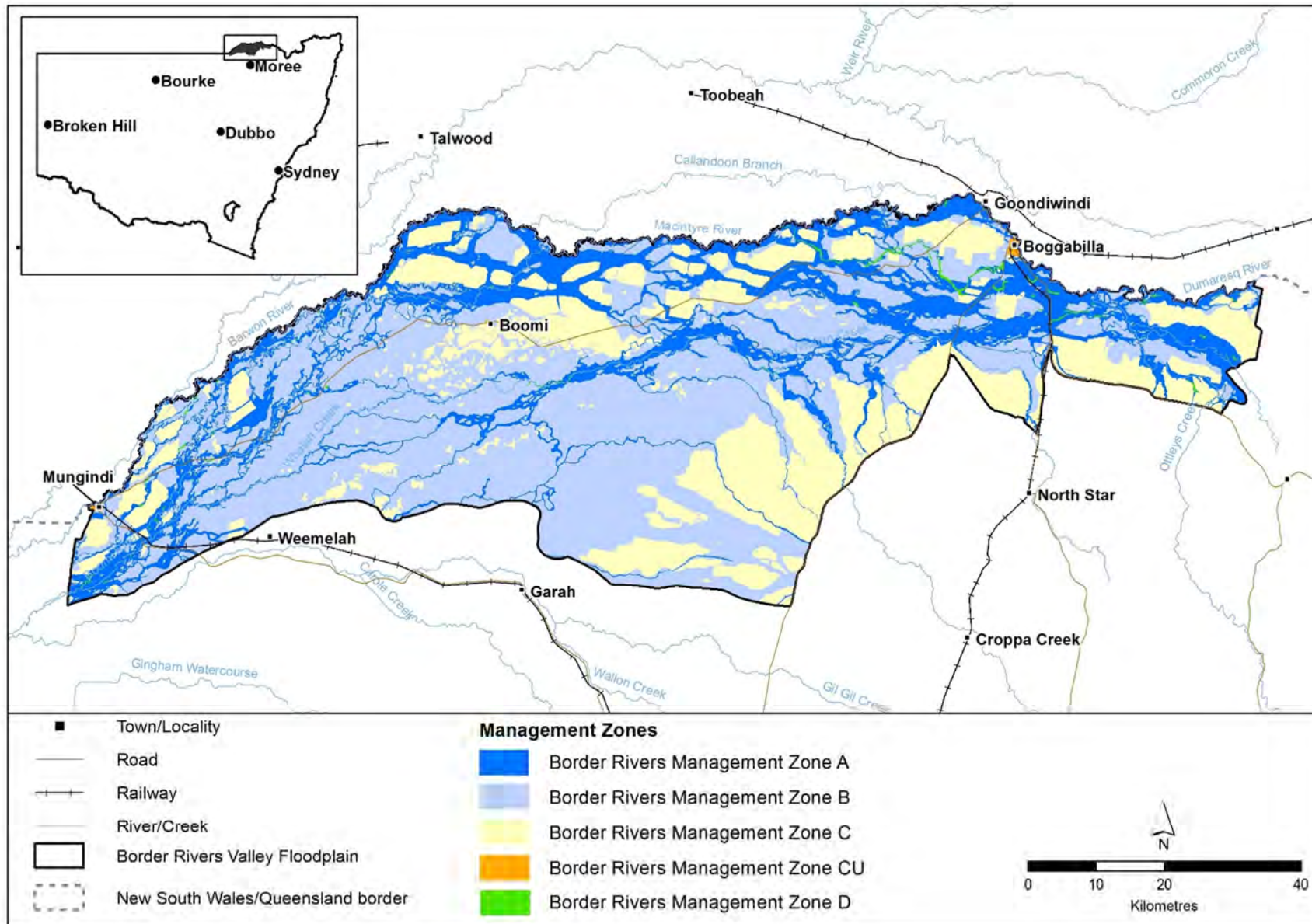


Figure 1. Border Rivers Valley Floodplain

Rules for floodplain harvesting in water sharing plans

As part of implementing the NSW Floodplain Harvesting Policy, the department is currently putting a process in place for issuing floodplain harvesting licences. The relevant water sharing plans will include rules for the management of these licences. For more information on the implementation process, please refer to the [Guideline for the implementation of the NSW Floodplain Harvesting Policy](#) on the department's website.

To some extent, the relevant water sharing plans for the northern inland valleys of NSW already incorporate water take associated with floodplain harvesting. Specifically, long-term average annual extraction limits specified in these water sharing plans and the sustainable diversion limit (SDL) specified in the Basin Plan 2012 (jointly referred to as **extraction limits**) include the take of water associated with floodplain harvesting within the plan area. These also place an upper limit on total extraction.

In addition to the extraction limits, several types of rules will apply to floodplain harvesting access licences once they are issued. The relevant water sharing plan will contain these rules, which relate to:

- share components for floodplain harvesting access licences (the total entitlements per water source at a specified point in time)
- compliance with extraction limits (how any new growth in floodplain harvesting is managed)
- available water determinations (how allocation accounts will be credited each water year)
- account management (limits on annual take and ability to carry over allocations)
- accounting for the take of on-farm contaminated run-off when there are insufficient allocations in an access licence account
- permanent and temporary trade
- mandatory conditions for access licences and water supply works
- access arrangements
- amendment provisions (to allow for adjustment of rules based on monitoring, evaluation and reporting).

Adaptive management for floodplain harvesting

The NSW water landscape is in a state of constant change, impacted by highly variable climatic factors and seasonal shifts. Due to this ever-changing state, a key objective of water sharing plans is to manage water sources in an adaptive way. For floodplain harvesting, this comprises:

- managing the amount of water available to be taken under floodplain harvesting access licences to ensure compliance with an extraction limit
- updating the modelled extraction limit estimate based on the best available information and increasing or decreasing the amount of water available to be taken under floodplain harvesting access licences in response to a change
- reviewing the rules for floodplain harvesting access licences after the first five years and, if appropriate, amending those rules and increasing or decreasing the amount of water available to be taken by floodplain harvesting access licences
- undertaking monitoring and evaluation of the floodplain to assess whether the rules for floodplain harvesting access licences are achieving the intended environmental and cultural outcomes.

Connectivity outcomes

Improving connectivity between valleys is an important aspect of water management. Licensing floodplain harvesting will improve connectivity outcomes in two ways: by applying water sharing plan rules and, consequentially, by increasing the amount of water returning from the floodplain into the river.

Four key types of rules for floodplain harvesting licences in water sharing plans will improve connectivity between valleys and increase water availability in downstream systems. These are:

- rules concerning compliance with extraction limits, which ensure that the amount taken from the floodplain is managed over the long-term, allowing for a proportion of flood flows to return to the river (**returned flows**)
- account-management rules, which ensure that growth is managed but maintain flexibility for the licence holder, contributing to the amount of returned flows
- trade rules, which prevent an increase in the amount taken from floodplains in identified areas with major flood flow paths, allowing for continued and unimpeded returned flows
- access rules implemented through Section 324 of the *Water Management Act 2000*, which aim to foreshadow potential restrictions to take during periods when return flows are most likely to contribute to meeting downstream targets.

More data collection and model enhancements are required to explicitly represent return flows in river system models. This is necessary to further improve management of floodplain harvesting in the northern basin. We have made a commitment under the *Floodplain Harvesting Action Plan* to invest in this work from July 2021.

Default rules for floodplain harvesting

The *Water Sharing Plan for the NSW Border Rivers Regulated River Water Source* requires a suite of rules to:

- ensure compliance with extraction limits
- reflect share components for licences
- prohibit temporary trade, consistent with the NSW Floodplain Harvesting Policy
- allow for take of contaminated run-off when there are insufficient allocations.

We provide more context for these rules on the following pages. **They are not subject to the outcomes of consultation.**

Compliance with extraction limits

Water sharing plans provide for the annual assessment of average extraction. If this assessment shows that the long-term average annual extraction limit has been exceeded by 3% in any year in the NSW Border Rivers Regulated River Water Source, steps must be taken to reduce the extraction back to within the limit.

Once floodplain harvesting licences are issued in the NSW Border Rivers Regulated River Water Source, the water sharing plan will include another rule. This rule will allow for extraction under these licences to be managed in response to exceeding the extraction limit. The rule says:

‘floodplain harvesting (regulated river) access licences will be reduced to respond to the exceedance that has occurred within those licences.’

In addition to compliance with the long-term average annual extraction limit, the *Basin Plan 2012* requires compliance with the SDL specified for the Border Rivers SDL resource unit. The Border

Rivers SDL resource unit comprises the NSW Border Rivers Regulated River Water Source and the NSW Border Rivers Unregulated River Water Sources.

Division 2 of Part 4 of Chapter 6 of the *Basin Plan 2012* specifies the requirements for complying with the SDL. As with exceeding the extraction limit, the same reduction response, as outlined above, is to be undertaken if the SDL has been exceeded. The *NSW Border Rivers Surface Water Resource Plan* will also be amended to outline the management response in relation to floodplain harvesting access licences.

Share components

A water sharing plan will provide details on the total share components for each licence category and basic landholder rights within the plan area at the time of plan commencement or amendment. In water sharing plans where floodplain harvesting licences are issued, the total share components for these licences will be included once they are issued.

In the NSW Border Rivers Regulated River Water Source, the total share components for floodplain harvesting (regulated river) access licences is estimated to be 43,000 unit shares. We will refine this estimate as we finalise the consultation process for property-specific entitlement determinations.

There are no floodplain harvesting (unregulated river) access licences to be issued in the NSW Border Rivers Unregulated River Water Sources.

Section 85A order (contaminated rainfall run-off)

Under Section 85A of the *Water Management Act 2000*, a water sharing plan can specify the relevant conditions under which water can be taken before sufficient allocations are credited to the licence. Effectively, a provision in a water sharing plan can allow for a licence to go into negative allocations, up to a limit of 100% of the share component. This negative balance is corrected when the next available water determination is made.

All water sharing plans that have floodplain harvesting (regulated river) access licences issued will include a provision allowing users to take contaminated rainfall run-off, even when there is insufficient allocation. The plans include this rule to improve water-quality outcomes by preventing agriculturally contaminated rainfall run-off from entering our rivers and floodplains.

Temporary trade

Under the NSW Floodplain Harvesting Policy, the trade of allocations (temporary trade) for floodplain harvesting access licences is prohibited. This is due to the episodic nature of floodplain harvesting events and unique on-farm conditions. Further, there may be instances where works capable of floodplain harvesting will require modification to prevent further floodplain harvesting if a trade out occurs. This would be difficult to do on a temporary basis.

All water sharing plans that have floodplain harvesting licences issued will include rules consistent with this restriction.

Mandatory conditions

Water sharing plans include mandatory conditions that apply to water supply work approvals and categories of access licences. To implement some of the default rules outlined above, the relevant water sharing plans will include the following types of mandatory conditions:

- a mandatory condition on water supply works to ensure they are modified or removed following a trade of share components (permanent trade) for approvals nominated by a floodplain harvesting access licence

- a mandatory condition on floodplain harvesting (regulated river) access licences to implement the provision consistent with Section 85A of the *Water Management Act 2000* in relation to contaminated rainfall run-off.

Also, a mandatory condition will be required for all water supply work approvals nominated by a floodplain harvesting access licence to implement the requirements under the NSW Floodplain Harvesting Measurement Policy.

Floodplain harvesting rules in the NSW Border Rivers Regulated River Water Source

The *Water Sharing Plan for the NSW Border Rivers Regulated River Water Source 2009* is due for remake. This will happen as part of the accreditation of the *NSW Border Rivers Surface Water Resource Plan*. The following rules are based on the water sharing plan before the remake process. However, we have highlighted any proposed changes to rules as part of the remake that interact or influence those proposed for floodplain harvesting.

Rules for floodplain harvesting access licences will vary between regulated and unregulated rivers. For regulated rivers, the rules will also vary from valley to valley based on public consultation, modelling outcomes and environmental benefits assessments. The rules for floodplain harvesting (regulated river) access licences that are subject to consultation outcomes are:

- account-management rules
- available water determinations
- permanent trade
- access arrangements
- amendment provisions.

The following paragraphs summarise these rules for other licence categories in the NSW Border Rivers Regulated River Water Source and provide information on the aim of the rules for floodplain harvesting (regulated river) access licences. The proposed rules for floodplain harvesting (regulated river) access licences appear in shaded boxes.

Account-management rules

Account-management rules vary across NSW and between categories of access licences. However, they generally consist of a combination of limits on the amount of water that may be:

- taken annually or over a number of consecutive years, or both, or
- held in an allocation account at any time or
- carried over from one year to the next.

For context, Table 2 summarises the account-management rules for licences other than floodplain harvesting (regulated river) access licences, as specified in the *Water Sharing Plan for the NSW Border Rivers Regulated River Water Source*.

Table 2. Account-management rules for the NSW Border Rivers Regulated River

Licence category	Take limit (annual)	Account limit	Carryover limit
Regulated river (general security)—A class	1 ML per unit share +/- trade	1 ML per unit share	Unlimited, subject to account limit
Regulated river (general security)—B class	1 ML per unit share +/- trade	1 ML per unit share	Unlimited, subject to account limit
Regulated river (high security)	Not specified	1 ML per unit share	Prohibited

Licence category	Take limit (annual)	Account limit	Carryover limit
Domestic and stock	Not specified	100%	Prohibited
Local water utility	Not specified	100%	Prohibited
Supplementary	Not specified	1 ML per unit share +/- trade	Prohibited

Floodplain harvesting is highly variable in nature. The NSW Floodplain Harvesting Policy provides that account-management rules will be developed on a valley-by-valley basis along with the proposed entitlements that recognise this variability.

There are three primary considerations that are used when developing account-management rules for floodplain harvesting:

- managing growth above the extraction limit that has already occurred
- managing growth above the extraction limit that may occur in the future
- flexibility for the licence holder.

Once developed the account-management rules are an input into the modelling used to generate entitlements. Account-management rules influence the entitlement size.

We have tested various combinations of account-management rules. Appendix 1 provides an illustration of the differences between annual and five-year accounting. The following paragraphs outline the results with a summary in Table 3.

Table 3. Interaction between the accounting period, policy objectives and the size of floodplain harvesting entitlements

Accounting period	Size of entitlements	Ability to control current growth	Ability to control future growth	Flexibility for the licence holder
Annual	Large	High	Low	Low
Five year	Moderate	High	Moderate	High

Annual accounting arrangements are likely to result in future growth that would require a response, such as reduced allocations, to avoid adverse downstream impacts. Future growth with annual accounting is likely, as entitlements would need to reflect maximum historical requirements. In effect, properties with infrequent access to water would receive an entitlement that is significantly larger than their long-term average.

Also, future changes to development, behaviour or trade could all lead to an increase in the utilisation of these entitlements, which would drive growth. For these reasons, we assert that adopting annual accounting arrangements does not reflect the public's best interest.

We propose five-year accounting arrangements for floodplain harvesting (regulated river) access licences in the NSW Border Rivers Regulated River Water Source, as they:

- control current growth
- provide the optimum level of protection against future growth
- deliver a range of positive environmental benefits, – as described in the *Environmental Benefits of Implementing the Floodplain Harvesting Policy Report*
- provide flexibility to licence holders.

Although we are seeking public comment on account-management rules it should be noted that a reduction in the accounting period will increase the size of entitlements and potentially reduce the level of environmental protection.

Proposed account-management rules for floodplain harvesting (regulated river) access licences in the NSW Border Rivers Regulated River Water Source:

1. Account limit: 5 ML per unit share
2. Carryover: unlimited, subject to the account limit.

Available water determinations

Available water determinations in the first year

Historically, an available water determination greater than 100% of the share component (1 ML per unit share) has been applied to some access licence categories in the first year following the start of a water sharing plan. This ensures the volume of water in a water allocation account reflects the:

- potential amount of carryover that would have been permitted under the *Water Act 1912* licence or
- use of long-term averages in determining the access licence entitlement and the associated need to take more in some years and less in others.

In addition to these factors, it is also important to consider:

- the impact that growth in floodplain harvesting has had on the environment and downstream users
- the critical drought conditions occurring throughout the basin.

We are inviting feedback on an initial available water determination of 1 ML per unit share at the lower end of the threshold and 5 ML per unit share at the upper end of the threshold.

The precise value for the initial available water determination will be subject to consultation outcomes.

Available water determinations after the first year

Most licence categories specify an available water determination of 1 ML per unit share for each year after the first water year (or a less amount if required to ensure compliance with extraction limits). Some licence categories, such as regulated river (general security—B class) access licences, allow an available water determination of greater than 1 ML per unit share if sufficient water is available.

To allow for flexibility in responding to growth in use or improved accuracy in calculating extraction limits, no limit is proposed for available water determinations for floodplain harvesting (regulated river) access licences in the NSW Border Rivers Regulated River Water Source after the first water year. An available water determination of less than 1 ML per unit share can be applied to ensure compliance with extraction limits. Conversely, an available water determination of greater than 1 ML per unit share can be applied as a method of adaptive management.

Proposed available water determination rules for floodplain harvesting (regulated river) access licences in the NSW Border Rivers Regulated River Water Source:

1. An available water determination, from 1 ML per unit share to 5 ML per unit share, in the first water year licences are issued, with the precise value subject to consultation outcomes.
2. An available water determination of 1 ML per unit share every year after the first year (or a lesser or greater amount to ensure compliance with the extraction limit or as a result of updating the extraction limit estimates).

Permanent trade rules

Permanent trade rules may vary from valley to valley, depending on:

- existing trade rules in the relevant water sharing plan
- any identified areas that require protection, such as:
 - environmental assets that depend on floodwater
 - any areas where entitlement may be concentrated.

Table 4 summarises trade restrictions in the *Water Sharing Plan for the NSW Border Rivers Regulated River Water Source*.

Table 4. Existing trade rules for the NSW Border Rivers Regulated River

Licence category	Permanent trade restriction	Temporary trade restriction
All licences	Only within the water source	Only within the water source
Supplementary	No net gain upstream of the Macintyre River and Dumaresq River junction	Only to or from supplementary water access licences
Supplementary	Only to or from supplementary water access licences	Only to or from supplementary water access licences

The combination of consultation outcomes and the environmental benefits assessment will influence whether the department will establish trading zones to guide the movement of permanent trade of floodplain harvesting share components or whether to permit permanent trade without restriction within the NSW Border Rivers Regulated River Water Source.

In assessing whether to establish trading zones for floodplain harvesting access licences, we must consider areas with identified high environmental values, cultural values, or both, as well as major flood flow paths. These areas are identified through the designation of floodplain management zones A and D in the *Floodplain Management Plan for the Border Rivers Valley Floodplain 2020*. The proposed permanent trade rules will be implemented through a restriction on the nomination of works (Section 71W of the *Water Management Act 2000*) in these areas. Figure 2 shows the proposed trading zones and NSW Border Rivers Regulated River Water Source.

In addition to the proposed trade rules, a condition may be imposed on water supply works as part of the trade assessment to modify or remove works used for floodplain harvesting. This condition will be imposed where changing or removing works is necessary to ensure that the portion of the floodplain harvesting licence that has been sold can longer be taken.

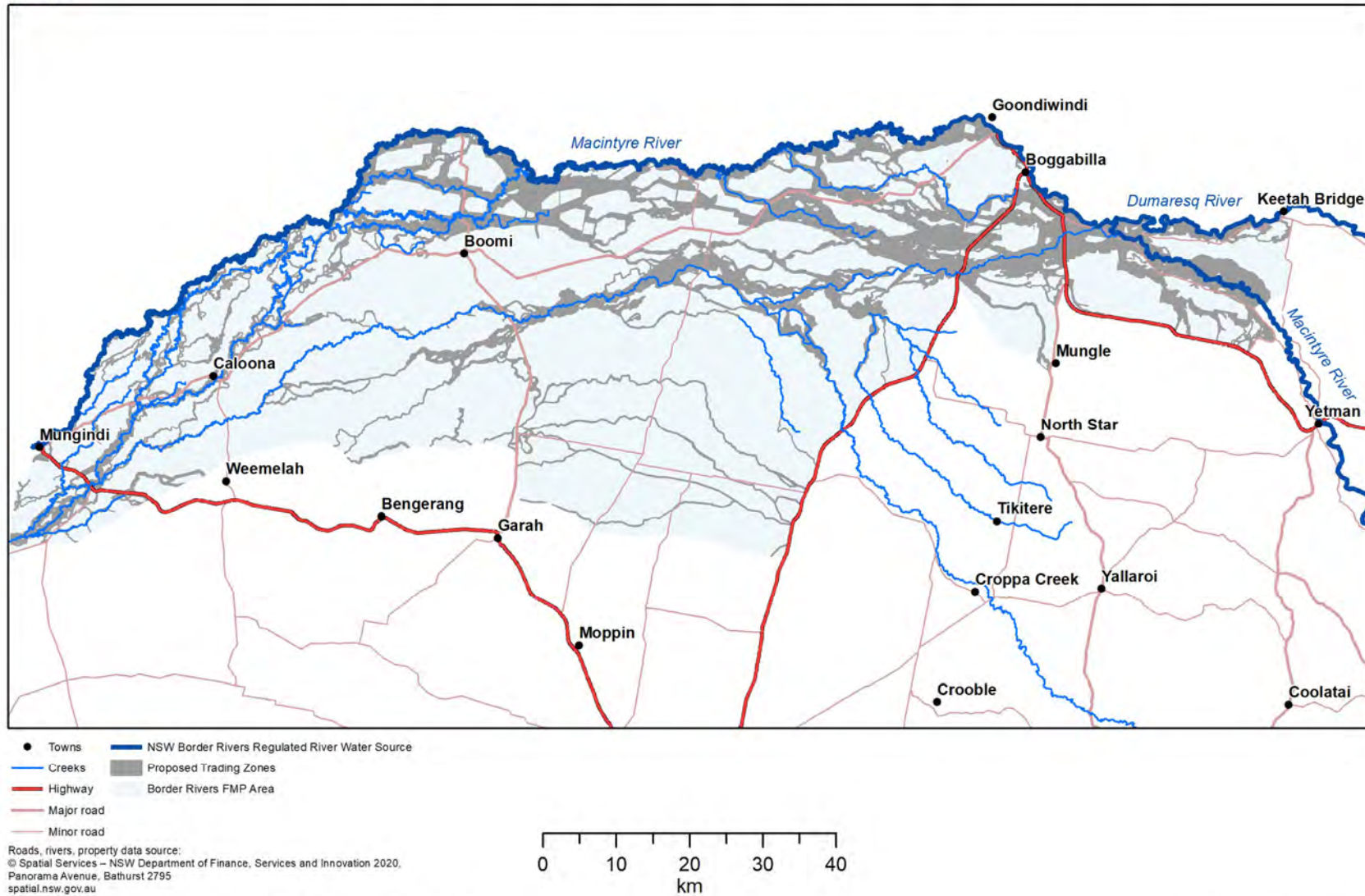
Proposed permanent trade rules for floodplain harvesting (regulated river) access licences in the NSW Border Rivers Regulated River Water Source:

1. Establishing a trading zone that reflects management zones A and D in the *Floodplain Management Plan for the Border Rivers Valley Floodplain 2020* (see Figure 2).

2. No nomination of works located in the established trading zone by a floodplain harvesting (regulated river) access licence.



Proposed Trading Zones for the Border Rivers Regulated River Water Source



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Map produced by DPIE Water, 2020-09-04

Figure 2. Proposed trading zones in the NSW Border Rivers Regulated River Water Source

Access rules

Water sharing plans specify access rules to protect the environment. The *Water Sharing Plan for the NSW Border Rivers Regulated River Water Source* specifies access rules for supplementary water access licences. Table 5 summarises these rules.

To help interpret the information in the table, an ‘uncontrolled flow’ is a flow that cannot be captured in a water storage and is in excess of that required to meet the needs of all water users, including environmental releases and any transmission losses. Triggers are specified for each section of the river that identify when an uncontrolled flow would occur.

Table 5. Existing access rules for supplementary water access licences

Access rule	Description
Flow targets in the Barwon–Darling	This rule restricts supplementary access, when required, to ensure outflows contribute to meeting flow targets specified for the Barwon–Darling Unregulated River Water Source. This rule is part of an overarching suite of rules designed to improve connectivity between the northern valleys and maintain flows into the Barwon–Darling. Appendix 2 details the flow targets for the Barwon–Darling Unregulated River Water Source .
Minimum flow at Mungindi	This rule provides for the maintenance of a minimum flow of 100 ML/day in the Barwon River at Mungindi during periods when supplementary access is permitted. This rule applies only from 1 September to 31 March. The goal of this rule is to improve low flows at the end of the Border Rivers system.
Limit on volume taken	This rule limits the amount that can be taken under supplementary access licences to 75% of the uncontrolled flow. This ensures that 25% of the uncontrolled flow is reserved for the environment.

A clear connection exists between the occurrence of uncontrolled flows and the ability to undertake floodplain harvesting. Although floodplain harvesting may be possible during periods when there is no uncontrolled flow, due to heavy rainfall, flow that is high enough to result in flooding will also meet the triggers for uncontrolled flow.

The connection between floodplain harvesting and uncontrolled flows means there may be potential to contribute to targets for existing supplementary water access rules. For example, when required, a temporary and partial restriction on floodplain harvesting (regulated river) access licences during periods of uncontrolled flow may contribute to improving connectivity with downstream river systems.

It is difficult to develop access rules for floodplain harvesting (regulated river) access licences that would ensure the protection of some end-of-system flows. However, there may be instances where a restriction on water take under floodplain harvesting (regulated river) access licences may contribute to fulfilling the aim of existing access rules. At this stage, the only legislative power to restrict floodplain harvesting (regulated river) access licences is through an order made under Section 324 of the *Water Management Act 2000*.

A water sharing plan cannot dictate when a Section 324 order should be made. It can, however, specify the circumstances under which an order may be considered and the intended outcome of the order.

Based on this consideration, we propose the following approach:

Proposed approach for floodplain harvesting (regulated river) access licences in the NSW Border Rivers Regulated River Water Source:

1. If required, a Section 324 order will be placed on floodplain harvesting (regulated river) access licences to help meet flow targets specified for the Barwon–Darling Unregulated River Water Source when the following occurs:

- (a) there is uncontrolled flow in one or more sections of the water source
- (b) a supplementary water announcement has been made
- (c) supplementary water access is restricted to ensure outflows help meet flow targets specified for the Barwon–Darling Unregulated River Water Source.

Appendix 2 details the flow targets for the Barwon–Darling Unregulated River Water Source.

To improve our knowledge of the influence that floodplain harvesting can have on end-of-system flows, we will make future improvements in integrating hydrologic and hydrodynamic model systems to investigate the importance of flow returning from the floodplain to the river.

Environmental flow rules

In addition to access rules that improve environmental outcomes, environmental flow rules specify how and when dams make specific releases for environmental purposes.

The *Water Sharing Plan for the NSW Border Rivers Regulated River Water Source* provides for two environmental flow rules: a daily environmental release and a stimulus flow. Table 6 summarises these rules.

Table 6. Environmental flow rules

Environmental flow rule	Description
Daily environmental release	<p>The daily environmental release aims to connect downstream pools and riffles and to curtail issues associated with extended flow recession.</p> <p>The rule requires a daily release from Pindari Dam. The volume of this release is the greater of 10 ML or the daily inflow into Pindari Dam. The maximum daily volume that can be released is 50 ML (1 September to 31 May) or 200 ML (1 July to 31 August).</p> <p>These releases are protected from extraction until the junction of the Severn River and Frazers Creek.</p>
Stimulus flow	<p>The stimulus flow aims to mirror a naturally occurring hydrograph, target pre-season cues to fish breeding, and regularly wet and inundate interconnected riparian areas.</p> <p>The rule requires that the volume and timing of a stimulus flow release from Pindari Dam complies with the advice of the environmental water manager. However, these releases generally take place from 1 August to 1 December.</p>

In addition to environmental flow rules, there are also licensed entitlements for environmental purposes in the Border Rivers Regulated River Water Source. Environmental water managers use these entitlements to improve environmental outcomes within the regulated river water source.

Neither environmental flow rules nor licensed entitlements aim to create overbank flow. Therefore, we do not suggest including rules in the *Water Sharing Plan for the NSW Border Rivers Regulated River Water Source* to protect these environmental flows from water taken under floodplain harvesting (regulated river) access licences.

Amendment provisions

Section 45 of the *Water Management Act 2000* allows for amendments to a water sharing plan. To improve transparency and increase confidence among stakeholders, we propose the inclusion of specific amendment provisions for floodplain harvesting (regulated river) access licences in the *Water Sharing Plan for the NSW Border Rivers Regulated River Water Source*. This will provide clarity on the types of amendments that may occur in the future and the justification for such changes.

Proposed amendment provisions for floodplain harvesting (regulated river) access licences in the NSW Border Rivers Regulated River Water Source:

An amendment provision to allow for introducing access rules:

- (a) to allow flexibility should environmental flows be targeted to create overbank flow or
- (b) in response to monitoring, evaluation and reporting outcomes of environmental benefits from licensing floodplain harvesting or
- (c) in response to improved understanding of the influence of floodplain harvesting on downstream flows.

Interaction of water sharing plan rules and modelling

The *Floodplain Harvesting entitlements for NSW Border Rivers Regulated River system—Model Scenarios* report describes how the source model of the Border Rivers Regulated River System (Border Rivers SM) was used to estimate the extraction limit for the NSW Border Rivers Regulated River Water Source. The report also describes how the Border Rivers SM was subsequently used to determine individual floodplain harvesting entitlements. It details of the relevant policy instruments, how models are used to implement these, how development levels and water-management arrangements were determined, and key results.

Computer models determine the extraction limit for the NSW Border Rivers Regulated River Water Source. These models with the applicable plan rules, simulate river basin behaviour based on the amount of irrigation development in the water source at a point in time. Then they calculated average diversions using climate data from the late 19th century to 2009.

The extraction limit estimate includes an estimate of floodplain harvesting extractions under specified baseline conditions. These baseline conditions refer to development levels at a point in time (2001–02), as well as management arrangements at a point in time (1 July 2009).

Management arrangements include water sharing plan rules as implemented, such as resource assessment, water accounting, storage operation and farm operation (especially regarding crop area and planting decisions).

A suite of model scenarios was developed to implement the floodplain harvesting licensing framework. These scenarios are:

- Plan limit scenario, which is based on infrastructure as at June 2002 as well as management arrangements and share components as at 1 July 2009; this scenario will also be used to update the long-term average annual extraction limit
- Current conditions scenario, which uses current levels of development and management rules to estimate the level of diversions without the floodplain harvesting licensing framework in place; this scenario also determines the reduction, if required, to comply with the long-term average annual extraction limit
- Eligible development scenario, which uses the levels of farm infrastructure development that were eligible as at 3 July 2008 and is used to determine individual shares of the total volume of floodplain harvesting entitlements
- Plan limit compliance scenario, an evolution of the current conditions scenario that applies the proposed account-management rules and floodplain harvesting licensing

framework to bring diversion back to the long-term average annual extraction limit; in this scenario, shares of the total are based on distribution of floodplain harvesting volumes from the eligible development scenario.

The Plan Limit and Current Conditions scenarios were both configured in the Border Rivers SM and run for the period of climate record (1889–2009). Table 7 summarises these results.

Table 7. Predicted long-term (1895–2009) average diversions (GL/year) under the *Plan Limit and Current Conditions* scenarios to determine growth in use for determining growth in use

Diversion category	<i>Plan Limit Scenario</i>	<i>Current Conditions Scenario</i>
General and High Security	92.1	92.6
Supplementary access	69.2	70.0
Floodplain harvesting	38.7	43.6
Total	200.0	206.1

The results show distinct growth in floodplain harvesting (overbank flow and rainfall run-off harvesting). This growth will be managed through the licensing framework and associated application of account management and extraction limit compliance rules.

Interaction of water sharing plan rules and environmental benefits

The *Environmental Outcomes of Implementing the Floodplain Harvesting Policy in the Border Rivers* report considers the predicted environmental benefits (that is, the ecological responses) to changed floodplain harvesting volumes in the Border Rivers valley after licensing floodplain harvesting. The report identifies floodplain water-dependent environmental assets and values, modelled hydrological changes, and predicted outcomes for floodplain ecosystems with and without licensing of floodplain harvesting. This assessment focuses on areas of the floodplain where floodplain harvesting occurs and uses a five-year accounting framework in the model.

Most assessed environmental watering requirements were achieved more frequently in the scenario modelled with licensing of floodplain harvesting than in the scenario without licensing of floodplain harvesting. In addition, improvements to floodplain hydrology (volumes, durations and timing of floods) suggest that environmental outcomes for the NSW Border Rivers will be largely beneficial.

For more information on the key findings and recommendations, please refer to *the Environmental Outcomes of Implementing the Floodplain Harvesting Policy in the Border Rivers* report on our website.

In addition to assessing the predicted environmental benefits of licensing floodplain harvesting, it is important to monitor, evaluate and report on the environmental benefits into the future. We have established a monitoring, evaluating and reporting program specific to floodplain harvesting. This program will assess the ongoing environmental benefits associated with licencing of floodplain harvesting and inform the approach to adaptive management.

Interaction of water sharing plan rules and returned flows

The *Modelled downstream effects of Returned Flows* report consider the predicted downstream benefits (i.e. water availability) after licencing floodplain harvesting in the Border Rivers. The implementation of floodplain harvesting licencing in the Border Rivers will provide an additional

volume of returned flows that are left in system contributing to overall connectivity between areas of the northern basin whilst providing flows towards Menindee and into the Murray. The report identifies how these returned flows impact access to A Class, B Class and C Class flows in the Barwon-Darling.

For more information on the key findings and recommendations, please refer to the *Modelled downstream effects of Returned Flows* report on our website.

Interaction of water sharing plan rules and cultural benefits

A report is underway to outline the identified cultural assets and values in the Border Rivers Valley Floodplain and to assess the predicted benefits to these assets and values after licensing floodplain harvesting. The Northern Basin Aboriginal Nations is leading the development of the report. The organisation is consulting extensively with the First Nations people of the Border Rivers valley. The report will focus on areas where identified cultural assets and values overlap with the occurrence of floodplain harvesting and will use a five-year accounting period in the modelled changes in hydrology.

The report development and associated consultation with First Nations people build on the extensive work done to identify cultural assets and values, which happened as part of the *Floodplain Management Plan for the Border Rivers Valley Floodplain 2020* and the *NSW Border Rivers Surface Water Resource Plan*. We expect a draft report and the start of consultation in October 2020.

Submission process

We will conduct targeted and broad public consultation on the rules for floodplain harvesting access licences proposed for inclusion in water sharing plans. This consultation will include a formal 40-day submission period. During this period, people can make submissions, with supporting information, to support or disagree with the proposed rules.

The formal submission period will run from **20 October 2020 to 30 November 2020**.

We will host a webinar for all stakeholders and the public, followed by a series of meetings with targeted stakeholders. These sessions will take place the week of 19 October 2020.

Amendments to water resource plans

The NSW Border Rivers Water Resource Plan, currently submitted for accreditation, will require amendment once floodplain harvesting (regulated river) access licences have been issued in the NSW Border Rivers Regulated River Water Source. Under the Basin Plan 2012, there is a requirement (10.08) for each SDL resource unit to describe the characteristics of each form of take. Currently, there is no specific reference to the number of access rights or associated total volume for floodplain harvesting (regulated river) access licences. This will be updated once licences have been issued.

Under Section 10.11 of the Basin Plan, a water resource plan must specify how annual actual take will not exceed the sustainable diversion limit (SDL) specified in Schedule 2 for the water resource plan area. The NSW Border Rivers Water Resource Plan will require amendment to include reference to the above rules concerning compliance with extraction limits for floodplain harvesting (regulated river) access licences.

As part of implementing the NSW Floodplain Harvesting Policy, there has been significant investment in finalising models that include the take by floodplain harvesting. These models will

result in proposed changes to the baseline diversion limit (BDL) in Schedule 3 of the *Basin Plan 2012* due to improved accuracy of the volumes associated with floodplain harvesting. The BDL is the SDL plus any water recovered for environmental benefit. For more information on changes to the BDL or SDL, please refer to www.mdba.gov.au/basin-plan-roll-out/sustainable-diversion-limits/changing

Any proposed changes to the NSW Border Rivers Water Resource Plan or *Basin Plan 2012* as a result of licensing floodplain harvesting will require approval from the Australian Government’s Minister for Resources and Water.

Appendix 3 details the proposed amendments to the NSW Border Rivers Water Resource Plan.

Summary of process

Figure 3 provides a simple outline of the process for incorporating floodplain harvesting (regulated river) access licences into the broader water management framework for the NSW Border Rivers Regulated River Water Source. Time frames are indicative.



Figure 3. Process for incorporating floodplain harvesting licences into management framework

Appendix 1. Illustration of account-management rules

Annual versus three- and five-year accounting scenario

Using annual accounting influences the size of modelled entitlements. With annual accounting, achieving the 10% reduction requires a much larger entitlement (see Table 8).

Comparatively, all three account-management frameworks result in the same 10% reduction over the long-term period. However, the lack of carryover in annual accounting, along with larger entitlements, leads to greater risk of growth in use.

The first modelled scenario (Growth test A) examined potential growth in the amount of water taken if new works were installed that doubled the amount that users could take each year. As Table 8 shows, annual accounting resulted in a 22% increase, three-year accounting resulted in a 28% increase and five-year accounting resulted in a 15% increase.

The second modelled scenario (Growth test B) examined potential growth when entitlement was traded into an area with more reliable access to water on the floodplain. To test this, a hypothetical outcome was examined where the full allocation was used each year. As Table 8 shows, in this scenario, annual accounting would lead to 286% growth, three-year accounting would lead to 81% growth and five-year accounting would lead to 44% growth. Importantly, this is an unlikely outcome. However, it illustrates the difference in sensitivities of the three sets of account-management rules.

Table 8. Assessment of accounting rules and potential for growth

Description	Annual accounting	Three-year accounting	Five-year accounting
Entitlement (ML)	7,800	3,605	2,810
Percentage reduction	-10%	-10%	-10%
Growth test A: theoretical potential for growth assuming amount taken doubles	22%	28%	15%
Growth test B: theoretical potential if account was fully used	286%	81%	44%

Appendix 2. Flow targets in the Barwon–Darling Unregulated River Water Source

The following information supports the proposed access rule for floodplain harvesting (regulated river) access licences in the Border Rivers Regulated River Water Source that contribute to the flow targets in the Barwon–Darling Unregulated River Water Source.

1. From September to February, and subject to two of the following flow events not already occurring during this period in that water year, a flow of:
 - a. 14,000 ML per day in the Darling River at Brewarrina for five consecutive days or
 - b. 10,000 ML per day in the Darling River at Bourke for five consecutive days.
2. From October to April, and subject to flows of the following quantity not already met during the preceding three months within this period, a flow of 2,000 ML per day in the Darling River at Wilcannia for five consecutive days, and
3. A flow of:
 - a. 150 ML per day in the Darling River at Wilcannia
 - b. 280 ML per day in the Darling River at Louth
 - c. 390 ML per day in the Darling River at Bourke
 - d. 550 ML per day in the Darling River at Brewarrina
 - e. 700 ML per day in the Barwon River at Walgett.

Note: The flow targets under (1) are intended to provide opportunity for the passage of fish, (2) are intended to protect flows needed to suppress blue-green algae blooms and (3) are intended to protect flows needed to meet basic landholder rights requirements.

Appendix 3. Proposed amendments to the NSW Border Rivers Water Resource Plan currently submitted for accreditation

Water resource plan reference	Basin Plan 2012 reference	Proposed amendment
1.8 Review and amendment	10.47	<p>Remove text from blue box relating to anticipated amendment of the <i>Water Sharing Plan for the NSW Border Rivers Regulated River Water Source 2020</i> and <i>Water Sharing Plan for the NSW Border Rivers Unregulated River Water Sources 2012</i> following the issue of floodplain harvesting access licences.</p> <p>Floodplain harvesting access licences will be issued in the NSW Border Rivers Regulated River Water Source. Therefore, amendment is required only for the <i>Water Sharing Plan for the NSW Border Rivers Regulated River Water Source 2020</i>.</p> <p>Remove text immediately underneath 'Box 1-4. Circumstances under which this Plan may be amended'. This is a description for floodplain harvesting amendments in water sharing plans and are likely to have material effect on the water resource plan.</p>
4.2 Priority environmental assets and priority ecosystem functions (blue-boxed text)	10.17 (3) 10.22 (b)	<p>Blue-boxed text</p> <p>Amend text to specify that growth in use of floodplain harvesting access licences will be managed through rules for compliance with a long-term annual diversion limit for the NSW Border Rivers SDL resource unit in a water accounting period. The <i>Water Sharing Plan for the NSW Border Rivers Regulated River Water Source 2020</i> will specify these rules.</p>
5.1.2 Complying with conditions of water access rights	10.08 (2) 10.08 (1) (c)	<p>Remove note under boxed text.</p> <p>Sections 91C and 91D of the <i>Water Management Act 2000</i> will be included for accreditation in blue-box text.</p>
5.1.2—Table 5-1: Forms of take and their related access rights and characteristics	10.08 (2) 10.08 (1) (c)	<p>Update row 8 to include number of access rights, total volume (ML per unit share) and mandatory conditions for floodplain harvesting (regulated river) access licences in the Border Rivers Regulated River Water Source.</p> <p>Update row 9 to clarify that no floodplain harvesting (unregulated river) access licences are to be issued in NSW Border Rivers Unregulated River Water Sources.</p>

Water resource plan reference	Basin Plan 2012 reference	Proposed amendment
5.3.2 SDL adjustments	Non -accredited text	Adjust SDL as a result of improvements in information about and modelling of floodplain harvesting take.
5.4 Determining available water—rules for take	10.11	Blue-boxed text Update ‘Take by Floodplain Harvesting’ to refer to relevant parts of the <i>Water Sharing Plan for the NSW Border Rivers Regulated River Water Source 2020</i> that ensure the quantity of water taken under floodplain harvesting (regulated river) access licences does not exceed the annual permitted take for the period. Remove floodplain harvesting from text relating to Section 10.11 of the <i>Basin Plan 2012</i> .
5.4 Determining available water—rules for take Floodplain harvesting and Section 10.11	Non-accredited text	Remove text and heading (white text): Floodplain harvesting and s10.11 immediately below the blue box.
5.4.4 Floodplain harvesting	Non-accredited text	Amend text to reflect the issuing of floodplain harvesting (regulated river) access licences in the NSW Border Rivers Regulated River Water Source and rules associated with these licences included in the <i>NSW Border Rivers Regulated River Water Source 2020</i> .
5.4.4 Floodplain harvesting additional information	Non-accredited text	Remove this subheading and associated explanatory text.
5.4.6 Corrective actions	Non-accredited text	Amend text to clarify that no floodplain harvesting (unregulated river) access licences will be issued in the NSW Border Rivers Unregulated River Water Sources.
5.4.7 Floodplain harvesting compliance	Non-accredited text	Amend text to reflect compliance measures for floodplain harvesting (regulated river) access licences; mandatory conditions for measurement, including timing; and updates to BDL and annual permitted take models. Amend text to clarify the method for determining annual permitted take for floodplain harvesting (regulated river) access licences.

Water resource plan reference	Basin Plan 2012 reference	Proposed amendment
5.5.2 Determining actual take	10.15(1) to 10.15(3)	<p>Blue-boxed text</p> <p>Include information on timing for implementing the measurement requirements for floodplain harvesting (regulated river) access licences, noting that the timing is subject to consultation outcomes associated with the proposed amendments to the <i>Water Management (General) Regulation 2018</i>.</p> <p>From 1 July 2021, annual actual take for floodplain harvesting (regulated river) access licences will be measured using storage devices for licence holders with storages greater than 1,000 ML or using other methods, such as gauge boards, for landholders with storages less than 1,000 ML.</p> <p>From 1 July 2022, annual actual take for floodplain harvesting (regulated river) access licences will be measured using storage devices for all licence holders.</p>
5.6 Annual permitted take	10.10 10.12	<p>Blue-boxed text</p> <p>Remove last paragraph that refers to anticipated amendment of the water resource plan, BDL and annual permitted take models.</p> <p>Insert additional text that confirms that the model will be used to recalculate the annual permitted take and the annual actual take from 1 July 2019.</p>
5.7.4 Floodplain harvesting	Non-accredited text	<p>Update text to reflect implementation of the NSW Floodplain Harvesting Policy in the Border Rivers valley, issuing of floodplain harvesting (regulated river) access licences in the NSW Border Rivers Regulated River Water Source and rules for these licences included in the <i>NSW Border Rivers Regulated River Water Source 2020</i>.</p>
5.7.4 Floodplain harvesting	10.24 and 10.25	<p>Blue-boxed text</p> <p>Update text to clarify the method for determining annual permitted take; specify rules to manage growth in use; and outline the measurement requirements and anticipated monitoring, evaluating and reporting for floodplain harvesting (regulated river) access licences in the NSW Border Rivers Regulated River Water Source. Also insert reference for including rules for floodplain harvesting (regulated river) access licences in the <i>NSW Border Rivers Regulated River Water Source 2020</i>.</p>

Water resource plan reference	Basin Plan 2012 reference	Proposed amendment
5.4.7.1 Growth in use of floodplain harvesting	Non-accredited text	Update text to refer to Section 5 of the water resource plan.
5.7.4.2 Monitoring floodplain harvesting	Non-accredited text	Update text to include reference to <i>Floodplain Harvesting Measurement Policy</i> and update table referencing the <i>Floodplain Harvesting Action Plan</i> to detail progress.
7.1 Information relating to measuring take	Non-accredited text	Replace white text, 'Floodplain Harvesting Monitoring Policy' with 'Floodplain Harvesting Measurement Policy' Update Table 7-1
7.1—Table 7-1: Information relating to measured and estimated take by class of access right	10.44, 10.45	Update table to include annual average quantity of water that is taken and measured, and annual average quantity of water that is taken and not measured for floodplain harvesting (regulated river) access licences in the NSW Border Rivers Regulated River Water Source.
Schedule C Consultation report	2.4.2	Update to include reference to valley-specific consultation conducted in relation to proposed rules for floodplain harvesting licences in water sharing plans.
Schedule D Risk assessment information	N/A	Update text to reflect the licensing of floodplain harvesting. The risk for floodplain harvesting will remain unchanged. Instead, it is the response to that risk that changes with the licensing of floodplain harvesting. Update Section 4.5.4 and 8.2.4 to past tense. Where the risk assessment says words to the effect of 'In NSW, the Floodplain Harvesting Policy and Healthy Floodplains Projects are converting this form of take into a licensable right. This form of take will be managed under the Floodplain licensing framework', change to past tense (for example, 'were converted' and 'is managed').
Schedule F Water for consumptive use information Table F-1: Parameters for the method for determining annual actual take	10.15(1) to 10.15(3)	Update table to clarify that no floodplain harvesting (unregulated river) access licences will be issued in the NSW Border Rivers Unregulated River Water Sources. Update footnote to clarify finalisation of the <i>Floodplain Harvesting Measurement Policy</i> .

Water resource plan reference	Basin Plan 2012 reference	Proposed amendment
Schedule F—Table F-2: Parameters for the method for determining annual permitted take	10.10, 10.12	Update table to clarify the method for determining annual permitted take for floodplain harvesting (regulated river) access licences in the NSW Border Rivers Regulated River Water Source. Update table to ensure that floodplain harvesting is included in the entitlements in the NSW Border Rivers annual permitted take model include floodplain harvesting.
Schedule F—Table F-3: Demonstration of annual permitted take method with the SDL	10.10(4)	Update text at the end of the table to reflect updates to the model that improve representation of floodplain harvesting.
Schedule F—Attachment A: BDL report	N/A	Update report to reflect updates to the model that improve representation of floodplain harvesting.
Schedule F—Attachment B: SDL report	N/A	Update report to reflect updates to the model that improve representation of floodplain harvesting.
Schedule I—Table I-1: Data sets and methods used in formation of the water resource plan	10.49	Update table to refer to NSW Border Rivers modelling reports.