



HEALTHY FLOODPLAINS PROJECT

Gwydir: Floodplain harvesting in water sharing plans

Report to assist community consultation

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Summary

The NSW Floodplain Harvesting Policy is currently being implemented across the following 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 and will require rules for these licences to be included in the relevant water sharing plans.

Floodplain harvesting (regulated river) access licences will be issued to eligible landholders within the Gwydir Regulated River Water Source, requiring rules for these licences to be included in the *Water Sharing Plan for the Gwydir Regulated River Water Source*.

Floodplain harvesting (unregulated river) access licences will also be issued in the Gwydir Unregulated River Water Sources, requiring rules for these licences to be included in the *Water Sharing Plan for the Gwydir Unregulated River Water Sources 2012*.

This report has been developed to assist the community and water users in understanding the types of rules proposed for floodplain harvesting (regulated river) access licences and floodplain harvesting (unregulated river) access licences in the Gwydir valley, and the interaction between those rules, modelling and anticipated environmental benefits once implemented.

A summary of the proposed rules for floodplain harvesting (regulated river) access licences in the Gwydir Regulated River Water Source is provided in Table 1 below with feedback being sought through a public submission process from **12 February until 12 March 2021**.

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

Type of rule	Proposed rule for floodplain harvesting (regulated river)
Account management	Account limit: Maximum of 5 ML per unit share at any time
Available water determination	Initial available water determination of 5 ML per unit share, <u>or</u> Initial available water determination of 1 ML per unit share 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	Establishing trading zones that largely reflect unregulated river water sources to protect important wetlands. No permanent trade of floodplain harvesting (regulated river) access licences between trading zones. No nomination of works located outside the Gwydir Valley floodplain.
Granting or amending water supply works nominated by a floodplain harvesting (regulated river) access licence	No modification of works located in management zones A or D established under the <i>Floodplain Management Plan for the Gwydir Valley Floodplain 2016</i> . No new works constructed in management zones A or D. No new or modified works outside management zones A or D if the construction or modification would result in an increased rate of take for works located in management zone A or D.

<p>Access rules</p>	<p>Water must not be taken from works that are located in the following management zones and are nominated by a floodplain harvesting (regulated river) access licence when active management is being applied:</p> <ul style="list-style-type: none">• Upper Gingham Watercourse Management Zone• Lower Gingham Watercourse Management Zone• Mallowa Creek Management Zone <p>Note. This proposed rule is based on the creation of overbank flow in the above management zones during periods of active management.</p>
<p>Protection of environmental flows</p>	<p>No rules proposed specifically for floodplain harvesting (regulated river) access licences</p>

A summary of the proposed rules for floodplain harvesting (unregulated river) access licences in the Gwydir Unregulated River Water Sources is provided in Table 2 below with feedback being sought through a public submission process from **12 February until 12 March 2021**.

Table 2 Summary of proposed rules for floodplain harvesting (unregulated river) access licences

Type of rule	Proposed rule for floodplain harvesting (unregulated river)
Account management	Take limit: 3 ML per unit share over three consecutive years Account limit: 3 ML per unit share at any time
Available water determination	Initial available water determination of 1 ML per unit share. Available water determination of 1 ML per unit share every year after that, subject to decreases to respond to growth.
Permanent trade	Permanent trade of floodplain harvesting (unregulated river) access licences will reflect the existing permanent trade rules that are applied to unregulated river access licences in the Gwydir Unregulated Water Sources. No nomination of works located outside the Gwydir Valley floodplain. No nomination of new works located in management zones A or D.
Granting or amending water supply works approvals nominated by a floodplain harvesting (unregulated river) access licence	No modification of works located in management zones A or D established under the <i>Floodplain Management Plan for the Gwydir Valley Floodplain 2016</i> . No new works constructed in management zones A or D. No new or modified works outside management zones A or D if the construction or modification would result in an increased rate of take for works located in management zone A or D.
Access rules	Water must not be taken from works that are located in the following management zones and are nominated by a floodplain harvesting (unregulated river) access licence when active management is being applied: <ul style="list-style-type: none"> • Upper Gingham Watercourse Management Zone • Lower Gingham Watercourse Management Zone • Mallowa Creek Management Zone <p>Note. This proposed rule is based on the creation of overbank flow in the above management zones during periods of active management.</p>

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Introduction

This report has been prepared to provide detail on the rules that will be included in the relevant water sharing plans for floodplain harvesting licences in the Gwydir Valley Floodplain and how those rules interact with modelling and provide potential environmental benefits. Information on the submission process and the rules that are subject to consultation outcomes is included.

Floodplain harvesting access licences will be issued in both the Gwydir Regulated River Water Source and some of the Gwydir Unregulated River Water Sources. This report provides detail on the proposed rules to be included in the *Water Sharing Plan for the Gwydir Regulated River Water Source* for floodplain harvesting (regulated river) access licences and the *Water Sharing Plan for the Gwydir Unregulated River Water Sources 2012* for floodplain harvesting (unregulated river) access licences.

Gwydir Valley Floodplain

The Gwydir Valley Floodplain (Figure 1) was established as part of the commencement of the *Floodplain Management Plan for the Gwydir Valley Floodplain 2016*. The Gwydir Valley Floodplain has areas of high flood flow connectivity and ecological and cultural significance designated as management zones A and D.

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.

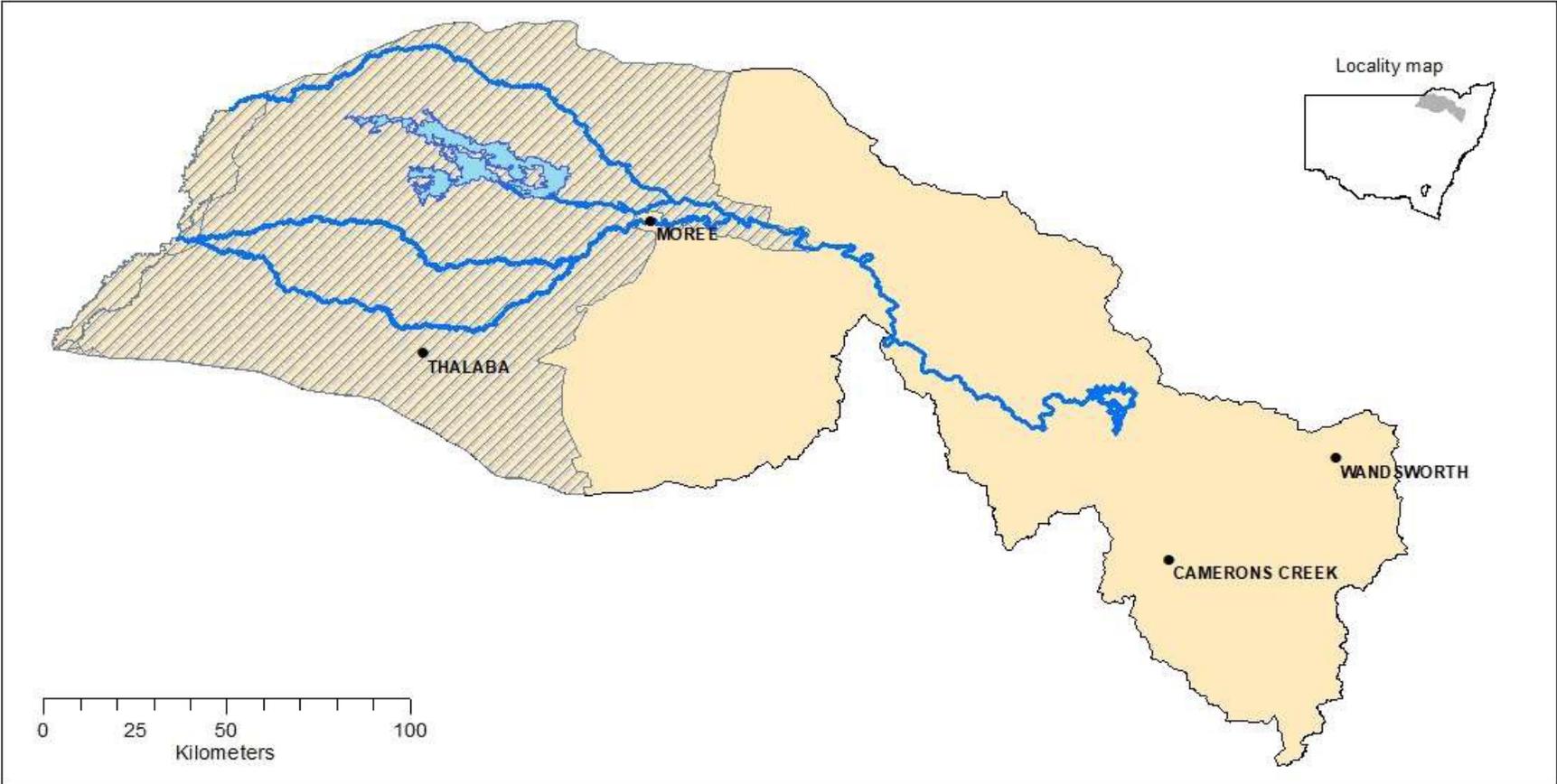
Implementation of the NSW Floodplain Harvesting Policy in the Gwydir Valley Floodplain will result in the issuing of:

- floodplain harvesting (regulated river) access licences in the Gwydir Regulated River Water Source
- floodplain harvesting (unregulated river) access licences in the following Gwydir Unregulated River Water Sources:
 - Gingham Watercourse Water Source
 - Mehi River Water Source
 - Slaughterhouse Creek Water Source
 - Thalaba Creek Water Source

This means that rules pertaining to floodplain harvesting will be included in both water sharing plans.



Gwydir Valley designated floodplain



Legend

- Town/locality
- ▨ Designated floodplain
- Gwydir wetlands
- Gwydir Unregulated Water Sharing Plan
- Gwydir Regulated River

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Figure 1 Gwydir Valley designated floodplain

Rules for floodplain harvesting in water sharing plans

As part of the implementation of the NSW Floodplain Harvesting Policy, a process for issuing floodplain harvesting licences is currently being undertaken. Rules specific to the management of these licences will be included in the relevant water sharing plans. For more information on the implementation process, please refer to the Guideline for the implementation of the floodplain harvesting policy at industry.nsw.gov.au/water.

To some extent, the take of water associated with floodplain harvesting activities has already been incorporated into the relevant water sharing plans for the northern inland valleys of NSW. Specifically, long-term average annual extraction limits 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 activities within the plan area and place an upper limit on total extraction.

In addition to the extraction limits, there are several types of rules that will apply to floodplain harvesting access licences once they are issued. The relevant water sharing plan will contain 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 the 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 carryover allocations)
- granting or amending of water supply works nominated by a floodplain harvesting access licence
- trade (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 future outcomes including data from monitoring, evaluation and reporting).

Difference between floodplain harvesting regulated river & unregulated river access licences

Floodplain harvesting (regulated river) access licences will be issued in the Gwydir Regulated River Water Source. Floodplain harvesting (unregulated river) access licences will be issued in some of the Gwydir Unregulated Rivers Water Sources. The method for determining regulated and unregulated entitlements is different. This difference has implications for the type of rules that are placed on each type of licence in order to manage water take.

A brief explanation of the two licence determination processes and a summary of differences (Table 3) has been provided. For a more detailed understanding of the process please refer to the [Guideline for the implementation of the NSW Floodplain Harvesting Policy](#) on our website.

Table 3 Summary of difference between floodplain harvesting (regulated river) and floodplain harvesting (unregulated river) access licences

Licence category	Determination process	Rules	Number of licences
Floodplain harvesting (regulated river)	Modelling based on eligible works	Subject to public consultation outcomes	~120
Floodplain harvesting (unregulated river)	Repeat of the volumetric conversion	Reflect those for unregulated river access licences where appropriate and subject to public consultation outcomes	~10

Determining floodplain harvesting (regulated river) access licences

Extraction limits for regulated rivers are calculated using computer models that simulate river basin behaviour based on more than 100 years of climatic data, the amount of irrigation development in the water sharing plan area at specified points in time, and the applicable water sharing plan rules. These models have been updated as part of the implementation of the NSW Floodplain Harvesting Policy and now include data that represents floodplain harvesting.

The department will determine floodplain harvesting entitlements associated with regulated rivers using three key steps:

1. update river system models to represent floodplain harvesting activities for individual properties
2. assess extraction limits to ensure compliance with them
3. use the river system model to determine individual floodplain harvesting entitlements, ensuring that the total take of water will be within the relevant extraction limit and that any effects are distributed as equitably as possible among eligible floodplain harvesting properties.

Determining floodplain harvesting (unregulated river) access licences

In unregulated river water sources (other than the Barwon–Darling), most floodplain harvesting is already catered for within existing unregulated river access licence share components. This is because when licences in unregulated rivers were converted from the *Water Act 1912* to the *Water Management Act 2000*, the volumetric conversion process effectively considered all forms of water take including that from the floodplain.

However, for some properties where it can be clearly demonstrated that the volumetric conversion process did not sufficiently cater for floodplain harvesting, a floodplain harvesting entitlement may be issued. The share component will be determined by a repeat of the same volumetric conversion process.

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, a key objective of water sharing plans is to manage water sources in an adaptive way. For floodplain harvesting, this will comprise:

- 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, where appropriate, 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
- 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. Licencing floodplain harvesting will improve connectivity outcomes in two distinct ways; through the application of water sharing plan rules and, consequentially by increasing the amount of water returning from the floodplain into the river.

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

- compliance with the extraction limits 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**), and
- account management rules ensure that growth is managed while maintaining flexibility for the licence holder, contributing to the volume of returned flows, and
- trade rules that prevent an increase in the amount taken from floodplains in identified areas with major flood flow paths, allowing for continued and unimpeded returned flows.

Existing river system models do not represent the increase in return flows from the floodplain to rivers and creeks expected as a result of implementing the *NSW Floodplain Harvesting Policy*. However, a sensitive assessment to evaluate the potential downstream benefits of return flows has been undertaken to inform stakeholders in the *Modelled downstream effects of returned flows* report.

Further data collection and model enhancements are required to explicitly represent return flows in river system models and further improve the management of floodplain harvesting in the Northern Basin. Without modelling return flows the department is unable to develop and test the efficacy of event-based restrictions for floodplain harvesting. We have made a commitment under the Floodplain Harvesting Action Plan to invest in improving the representation of return flows work from July 2021.

Amendment provisions have also been provided that clearly and transparently indicate the potential for developing event-based access rules for floodplain harvesting based on the outcomes of improved modelling processes.

Default rules for floodplain harvesting

There is a suite of default rules for floodplain harvesting that are required in water sharing plans to:

- ensure compliance with extraction limits, and
- reflect share components for licences, and
- restrict take of water to overland flow, and
- prohibit temporary trade, consistent with the NSW Floodplain Harvesting Policy.

These rules are described below for context and are **not subject to the outcomes of consultation**.

Compliance with the extraction limit

Water sharing plans provide for the annual assessment of total licenced extraction within the plan area. If this assessment shows that the long-term average annual extraction limit has been exceeded, by 5% over 5 consecutive years in the Gwydir Unregulated River Water Sources and by 3% in any year or over any 3 consecutive years in the Gwydir Regulated River Water Source, steps must be taken to reduce extraction to back within the limit.

In water sharing plans where floodplain harvesting licences are issued, the following rules will be included to allow for extraction under these licences to be managed in response to an exceedance in the extraction limit:

- In unregulated river water sharing plans, floodplain harvesting (unregulated river) access licences will be reduced at the same rate as unregulated river access licences to respond to an exceedance, and
- In regulated river water sharing plans, 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, there is a requirement under the *Basin Plan 2012* to comply with the sustainable diversion limit (SDL) specified for the Gwydir SDL resource unit. The Gwydir SDL resource unit comprises the Gwydir Regulated River Water Source and the Gwydir Unregulated River Water Sources.

The requirements for complying with the SDL are specified in Division 2 of Part 4 of Chapter 6 of the *Basin Plan 2012*. The same response, as outlined above, is to be undertaken if the SDL has been exceeded. The Gwydir Surface Water Resource Plan will also be amended to outline the management response in relation to an exceedance of the SDL caused by floodplain harvesting licences (see Appendix 3).

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 Gwydir Regulated River Water Source, the total share components for floodplain harvesting (regulated river) access licences is estimated to be 89,342 shares.

In the Gwydir Unregulated River Water Source, the total share components for floodplain harvesting (unregulated river) access licences is estimated to be 6,655 shares.

These estimates will be refined as the consultation process for property-specific entitlement determinations is finalised.

Take from overland flow

Floodplain harvesting entitlements are being with consideration for the capacity of take and frequency of access for each eligible property. The frequency of access to floodplain harvest varies across the floodplain. These events are highly episodic and, in some cases, only occur once in every five years.

Floodplain harvesting licences will allow for the lawful taking of water from a floodplain. This includes rainfall runoff and overbank flow. Collectively, this is termed 'overland flow' and is defined under section 4A of the *Water Management Act 2000*.

A water sharing plan can specify the source or location from where water can be taken under a certain licence category. A mandatory condition will be included in all water sharing plans where floodplain harvesting access licences are issued that restricts the take of water under these licences to overland flow. Diverting water from rivers or creeks under a floodplain harvesting licence will not be permitted.

Temporary trade

Under the NSW Floodplain Harvesting Policy, the trade of allocations (temporary trade) for floodplain harvesting access licences is not permitted. This is due to the episodic nature of floodplain harvesting events and unique on-farm conditions. There may be also be instances where the works capable of floodplain harvesting will require modification to prevent further floodplain harvesting if a trade out occurs. This would be difficult to undertake on a temporary basis.

Rules consistent with this restriction will be included in all water sharing plans that have floodplain harvesting licences issued.

Mandatory conditions

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

- 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, and
- A mandatory condition on floodplain harvesting (regulated river) and floodplain harvesting (unregulated river) access licences that restricts the take of water to overland flows.

Further, mandatory conditions will be required in order to implement the requirements under the *NSW Floodplain Harvesting Measurement Policy*.

Floodplain harvesting rules in the Gwydir Regulated River Water Source

The *Water Sharing Plan for the Gwydir Regulated River Water Source 2016* will be remade as part of the accreditation of the Gwydir Surface Water Resource Plan. The rules described below are based on the water sharing plan prior to the remake process. However, any proposed changes to rules as part of remake that interact or influence those proposed for floodplain harvesting have been highlighted.

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

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

A summary of these rules for other licence categories in the Gwydir Regulated River Water Source is provided below, along with information on the intent of the rules for floodplain harvesting (regulated river) access licences. The proposed rules for floodplain harvesting (regulated river) access licences are shown in shaded boxes below.

Account management rules

Account management rules vary across NSW and between different categories of access licences but 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.

The existing account management rules for licences other than floodplain harvesting (regulated river) access licences, as specified in the *Water Sharing Plan for the Gwydir Regulated River Water Source*, are summarised in Table 4 for context.

Table 4 Existing account management rules for the Gwydir Regulated River

Licence category	Take limit (annual)	Account limit	Carryover limit
Regulated river (general security)	3 ML per unit share +/- trade in any year, and 3 ML per unit share +/- trade over 3 consecutive years	1.5 ML per unit share	Subject to account limit
Regulated river (high security)	Not specified	1 ML per unit share	Not permitted
Domestic and stock	Not specified	100%	Not permitted
Local water utility	Not specified	100%	Not permitted
Supplementary	Not specified	Not specified	Not permitted

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 in conjunction with the proposed entitlements that recognise this variability.

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

1. Managing growth above the extraction limit that has already occurred, and
2. Managing growth above the extraction limit that may occur in the future, and
3. Risk the environment and downstream communities
4. Flexibility for the licence holder.

The size of entitlements is influenced by the account management rules and the considerations specified above are influenced by the size of modelled entitlements.

Various combinations of account management rules have been tested. An illustration of the differences between annual and 5-year accounting is shown in Appendix 1. A summary of the results is shown in Table 5 and outlined below.

Table 5 Interaction between accounting period and FPH outcomes

Accounting period	Entitlement size	Ability to control current growth	Ability to control future growth	Risk to environment and downstream	Flexibility for licence holders
Annual	Large (reflects maximum take)	High	Low	High	Low
Five year	Moderate (reflects average take)	Moderate	Moderate	Low	High

Annual accounting arrangements are likely to result in future growth that would require a response action, such as reduced allocations, to avoid adverse downstream impacts. Future growth with annual accounting is likely as entitlements would need to be approximately three times larger than

the entitlements created under five-year accounting in order to achieve the same level of historical diversions.

Furthermore, future changes to development, behaviour or trade could all lead to an increase in the utilisation of these entitlements that would drive growth. For these reasons it is asserted that adopting annual accounting arrangements do not reflect the public's best interest.

Five-year accounting arrangements are proposed for floodplain harvesting (regulated river) access licences in the Gwydir Regulated River Water Source. This accounting period matches the frequency of accessing floodplain harvesting water whilst:

- controlling current growth, and
- providing the optimum level of protection against future growth, and
- delivering a range of improvements for environmental outcomes – as described in the *Environmental Benefits of Implementing the Floodplain Harvesting Policy Report*, and
- providing flexibility to licence holders.

The department acknowledges the complex nature of account management rules. We have developed a short animation to better inform the public and to assist with making a submission on the rules. The animation can be viewed on our website; industry.nsw.gov.au/water/plans-programs/healthy-floodplains-project/water-sharing-plan-rules.

Whilst public comment is being sought on account management rules it should be noted that a reduction in the accounting period will increase the size of entitlements and reduce the level of environmental protection.

Proposed account management rules for floodplain harvesting (regulated river) access licences in the Gwydir 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 carry over that would have been permitted under the *Water Act 1912* licence or
- use of long-term averages in the determination of 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, and
- the critical drought conditions recently experienced 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 is subject to consultation outcomes and is intrinsically linked to the account management rules above.

It is important to note that an initial available water determination will be applied pro-rata if the rules for floodplain harvesting (regulated river) licences are included in the *Water Sharing Plan for the*

Gwydir Regulated River Water Source at a date that does not reflect the start of a water year (1 July). For example, if there is only 9 months left in a water year when the rules are included, an initial available water determination would be applied at a rate of 0.75.

Available water determinations after the first year

For most licence categories, an available water determination of 1 ML per unit share is specified for each year after the first water year (or a less amount if required to ensure compliance with any extraction limits). For some licence categories, such as regulated river (general security) access licences, an available water determination of greater than 1 ML per unit share is permitted if there is sufficient water available.

To allow for flexibility in responding to a growth in use or improved accuracy in calculating the extraction limits, no limit is proposed for available water determinations for floodplain harvesting (regulated river) access licences in the Gwydir 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 any extraction limits and, conversely, an available water determination of greater or less than 1 ML per unit share can be applied to respond to improved accuracy in calculating the extraction limit.

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

1. An available water determination, between the range of 1 ML per unit share and 5 ML per unit share, in the first water year licences are issued, with the precise value being 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 improved accuracy in calculating the extraction limit estimates)

Permanent trade

Rules for the trade of entitlement, known as permanent trade rules, are established in water sharing plans to protect sensitive areas from extraction that may occur as a result of entitlements concentrating in a specific location. Common trade rules include:

- no trade or no net gain (concentration) of entitlement upstream or downstream of an environmental asset, or
- no trade between water sources.

The permanent trade rules may vary between valleys, depending on:

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

Existing trade restrictions specified in the *Water Sharing Plan for the Gwydir Regulated River Water Source* are summarised in Table 6.

Table 6 Existing trade rules for the Gwydir Regulated River

Licence category	Permanent trade restriction	Temporary trade restriction
All licences	Only within the water source	Only within the water source
Domestic & Stock, Regulated River (General Security), Regulated River (High Security)	No net gain from 1 July 2004 in: (a) the Gwydir River downstream of Tyreel Regulator, (b) the Mehi River downstream of the Moomin Creek junction, (c) Moomin Creek, and (d) Carole Creek	No net gain from 1 July 2004 in: (a) the Gwydir River downstream of Tyreel Regulator, (b) the Mehi River downstream of the Moomin Creek junction, (c) Moomin Creek, and (d) Carole Creek
Supplementary	Only to/from supplementary water access licences	Only to/from supplementary water access licences

Schedule 3 of the *Basin Plan 2012* establishes the Basin water market and trading objectives and principles. Free trade of surface water is required except where establishing a restriction is required due to a physical constraint, lack of connectivity, or the environment may be harmed. Trading restrictions must be justified to the Murray-Darling Basin Authority as part of the Water Resource Plan accreditation process.

Whilst free trade is a desired outcome, the establishment of trade rules is particularly important in water sources with sensitive environmental areas. Valleys such as the Gwydir and Macquarie contain highly sensitive, internationally recognized RAMSAR wetlands. Trade of entitlement that results in concentration upstream of these locations could decrease inflows and impact environmental outcomes.

There are two distinct areas of intent that have been considered in the development of permanent trade rules for floodplain harvesting (regulated river) access licences;

1. preventing concentration of entitlement in areas where extraction may impact sensitive environmental areas, such as the Gwydir wetlands or Macquarie marshes, and
2. protection of identified areas that are important for flood flow connectivity or contain identified environmental or cultural assets or values.

Concentration of entitlement impacting sensitive environmental areas

It is proposed to establish rules that restrict the permanent trade of floodplain harvesting (regulated river) access licences that largely reflect the trade rules for unregulated river access licences. This involves the establishment of trading zones that largely reflect the unregulated river water source boundaries. The proposed trading zones have been designed in a way that protects the Gwydir RAMSAR wetlands as well as other sensitive environmental water delivery sites in the Mehi Water Source. The proposed trading zones are limited to the designated floodplain and are shown on Figure 2.

In the Gwydir Regulated River Water Source, trade rules would involve:

- trade permitted within a trading zone, and
- trade not permitted between trading zones

The establishment of trading zones and associated restriction on trade between trading zones supports the significant improvements to in-valley environmental assets shown in the Environmental Outcomes of implementing the NSW Floodplain Harvesting in the Gwydir Valley

report. Movement of entitlement, particularly concentration in areas that may impact environmental assets may erode the benefits quantified in this report.

The proposed trading zones will also ensure that floodplain harvesting (regulated river) access licences only take water within the Gwydir Valley floodplain. This restriction is consistent with the implementation of the NSW Floodplain Harvesting Policy and licence determination process. The Gwydir Valley floodplain was established under the *Water Management (General) Regulations 2018* and is shown in Figure 1. The restriction to within the Gwydir Valley floodplain will also be imposed by a rule that restricts floodplain harvesting access licences nominating works located outside the Gwydir Valley floodplain.

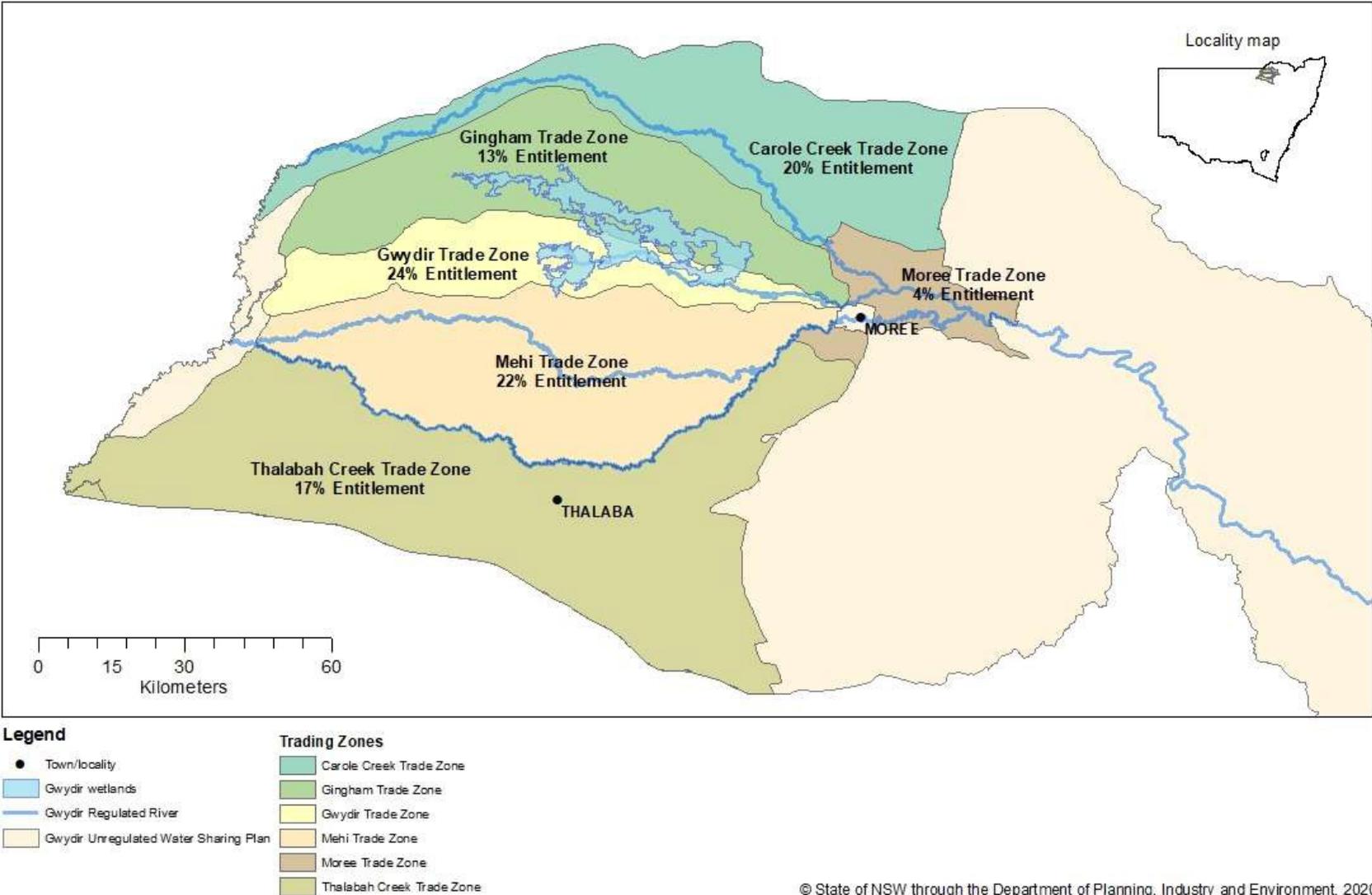
In addition to the proposed trade rules, a condition may be imposed on water supply works as part of the trade assessment to modify or remove works used for floodplain harvesting. This condition will be imposed where the modification or removal of works is required, to ensure that the portion of the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

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

1. Establishing trade zones largely reflective of the unregulated river water sources (Figure 2)
2. No trade between trading zones
3. No nomination of works located outside the Gwydir Valley designated floodplain by a floodplain harvesting access licence



Proposed Gwydir Valley Trading Zones



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Figure 2 Proposed Gwydir valley trading zones

Protection of identified areas

Floodplain management plans identify areas of the floodplain that are important for flood flow connectivity or contain flood dependent environmental and/or cultural assets and values. These areas have been designated in the *Floodplain Management Plan for the Gwydir Valley 2016* as management zones A and D (Figure 3).

An initial assessment of the Gwydir eligible properties shows that 94% of properties that will receive a floodplain harvesting (regulated river) access licence have a work located within management zones A or D respectively.

To protect the identified assets in management zones A and D, the intent is to develop a rule for floodplain harvesting (regulated river) access licences that ensures that the works used for floodplain harvesting located within these areas do not increase in capacity nor increase in number. Put simply, the rules will cap the capacity for or rate of diversion in these areas. The rules will not impact works that are currently installed.

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

1. no nomination of new works located in management zones A or D, as specified in the Floodplain Management Plan for the Gwydir Valley Floodplain 2016.

This prevents a floodplain harvesting licence from taking water through works in these management zones that are not currently nominated on a floodplain harvesting licence

New or amended water supply work approvals

A series of rules has been developed that would restrict the granting of new water supply work approvals or modification of existing water supply work approvals if the work concerned is located within management zone A or D and the water supply work approval is nominated by a floodplain harvesting access licence.

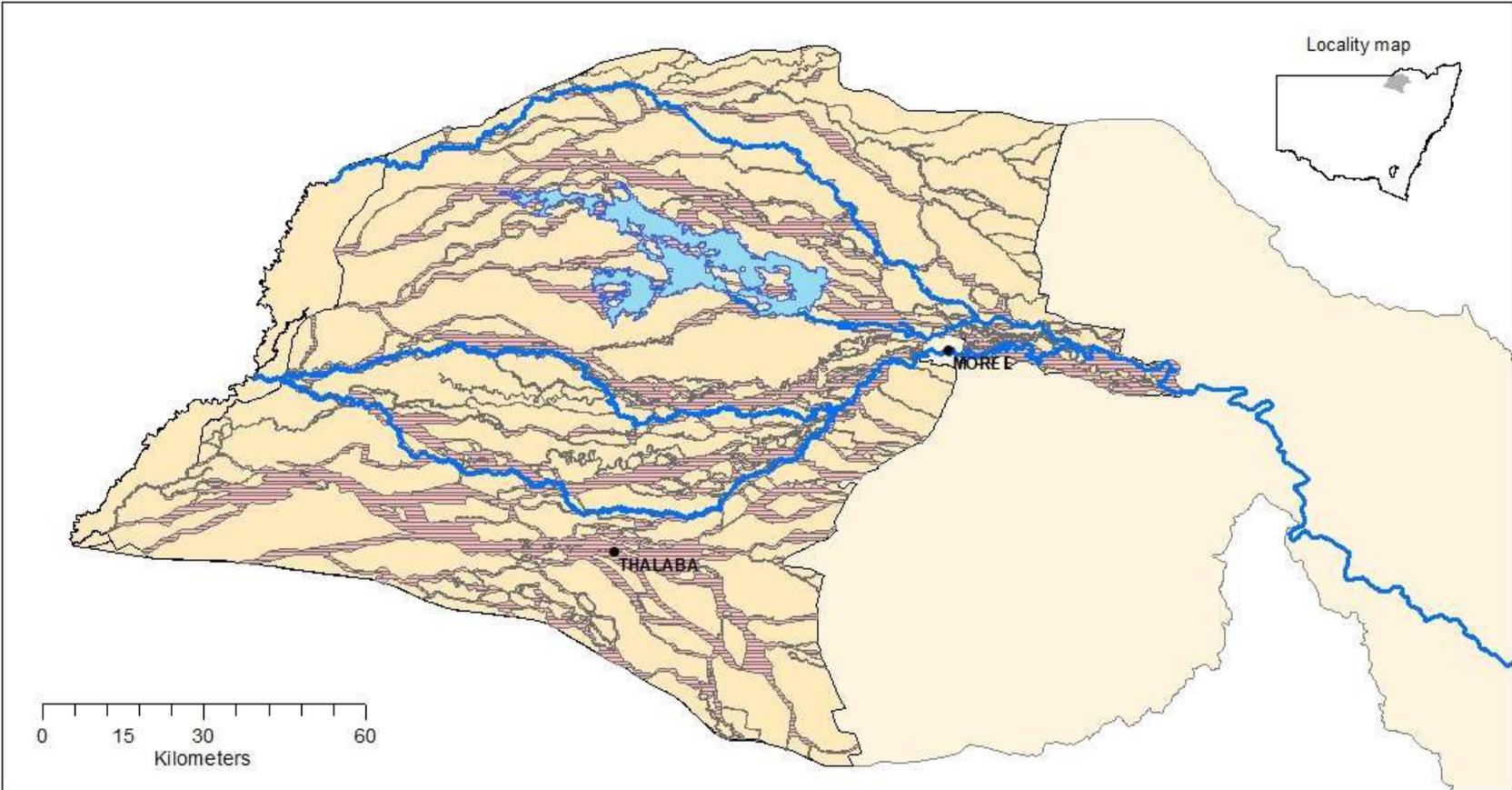
The intended outcome of the proposed rules is to complement and support the trade rules in restricting growth in the take capacity of works located within areas of identified environmental and/or cultural value.

Proposed rules for water supply works nominated by a floodplain harvesting (regulated river) access licences in the Gwydir Regulated River Water Source:

1. no modification of works located in management zones A or D if the modification would result in an increase in capacity for that work, and
2. no new works constructed in management zones A or D, and
3. no new or modified works outside management zones A and D if the construction or modification would result in an increased rate of take for works located in management zone A or D.



Proposed zones to be protected in the Gwydir Valley



- Legend**
- Town/locality
 - Designated floodplain
 - Gwydir wetlands
 - Gwydir Unregulated Water Sharing Plan
 - Gwydir Regulated River
 - Management Zones A & D - Gwydir Floodplain Management Plan

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Figure 3 Proposed zones to be protected in the Gwydir valley

Access rules

Access rules are specified in water sharing plans for the purpose of environmental protection. In the *Water Sharing Plan for the Gwydir Regulated River Water Source* there are access rules specified for supplementary water access licences. These are summarised in Table 7.

Table 7 Existing access rules for supplementary water access licences

Access rule	Description
Limit on volume taken	This rule limits the amount that can be taken under supplementary access licences to 50% of the uncontrolled flow. This ensures that 50% of the uncontrolled flow is reserved for the environment.
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.

Access under supplementary water access licences is provided by an announcement made by the Minister. This allows supplementary take to be managed on an event by event basis.

There is no power under the *Water Management Act 2000* that allows for the announcement of access to floodplain harvesting events. Without an announcement system it is difficult to implement rules that would partially restrict access to floodplain harvesting on an event basis.

Access rules that enable event-based management of floodplain harvesting is however a desired outcome. The department has two options for implementing event-based management:

1. Temporary Water Restriction Orders

Temporary Water Restriction Orders made under section 324 of the *Water Management Act 2000* are one of the few legislative tools available that can be used to place event-based restrictions on floodplain harvesting (regulated river) access licences. A Section 324 order is used to restrict all take in a water source by a particular licence type if it is determined to be in the public interest.

2. Prohibiting access until downstream flow targets are met.

It is not be possible to develop access rules for floodplain harvesting (regulated river) access licences based on downstream flow targets until river system models are improved to represent the return of floodplain flows to the river.

This is because we are not able to assess the effectiveness of these types of restrictions in delivering on downstream flow targets and the relative impact that they will have on floodplain harvesting licences.

The NSW Government has committed through the Floodplain Harvesting Action Plan to improving our river system models to represent return flows from the floodplain to the rivers and using this to refine the management of floodplain harvesting licences to further improve downstream outcomes. Whilst we expect to commence work on this in 2021, it is a complex technical exercise that we don't expect to have complete before 2025.

Accordingly, we are **proposing amendment provisions that will allow for the future inclusion of access rules** for floodplain harvesting (regulated river) access licences.

Active management

Active management is used to protect environmental water as it flows through an unregulated river water source. The definition of the water source includes rivers, lakes, streams and water flowing

across the surface of the ground. Under this definition, unregulated river access licences are prevented from taking actively managed water, even if it flows out of a river and across a floodplain (overbank flow).

Active management rules apply to unregulated river access licences in the Gwydir Unregulated River Water Sources with an extraction component that specifies any of the following management zones:

- Upper Gingham Watercourse Management Zone, or
- Lower Gingham Watercourse Management Zone, or
- Mallowa Creek Management Zone.

In the circumstance where actively managed water contributes to overbank flows, there is a potential intersection between active management and floodplain harvesting. Without specific access rules, these actively managed overbank flows may be legally taken under a floodplain harvesting (regulated river) access licence if that licence nominates works (pipes, pumps, channels) located in a management zone where active management applies. This protected water is intended to flow across the surface of the floodplain, supporting floodplain dependent ecosystems and achieving environmental outcomes. It is not intended that this protected water is diverted by floodplain harvesters.

In response to recommendations made as part of the Independent Review of NSW Floodplain Harvesting Policy Implementation, the Department has committed to considering “the risks and opportunities to protect held environmental water delivery from floodplain harvesting”.

Based on this commitment, we propose to restrict take under a floodplain harvesting (regulated river) access licence if:

- the licence nominates works located in a management zone where active management applies, and
- active management is being used to purposely created overbank flow.

These rules will be implemented through conditions on floodplain harvesting (regulated river) access licences.

Proposed access rules for floodplain harvesting (regulated river) access licences in the Gwydir Regulated River Water Source:

1. Take is not permitted through works located in a management zone subject to active management when active management is being used purposely to create overbank flow

The Department is committed to a process of continuous improvement and adaptive management. If the scope of active management changes as part of any future amendments, then the options for implementing active management provisions for floodplain harvesting (regulated river) access licences would be explored at that point.

Environmental flow rules

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

The *Water Sharing Plan for the Gwydir Regulated River Water Source* provides for two distinct environmental flows; a minimum flow to be passed through to the Gwydir wetlands and an Environmental Contingency Allowance. These are summarised in Table 8.

Table 8 Existing environmental flow rules

Environmental flow rule	Description
Minimum flows passed through to Gwydir wetlands	The minimum flows rule aims to provide a base level of watering for the Gwydir wetlands. The volume to reach the wetlands is to be the lesser of: (i) the sum of flows in the Horton River at Rider, Myall Creek at Molroy, and Halls Creek at Bingara, plus any water spill or pre-release for flood mitigation purposes from Copeton Dam water storage, and (ii) 500 megalitres per day (hereafter ML/day)
Flow after extreme wet period	Following an extreme wet period some or all of the minimum flow can be redirected to elsewhere in the water source or the Gwydir Unregulated River Water Sources to support fundamental ecosystem health.
Environmental contingency allowance (ECA)	An ECA is established in Copeton Dam and credited whenever an available water determination for regulated river (general security) access licences is made. Water is released from the ECA in accordance with an annual release program created by the ECA Operations Advisory Committee. ECA releases are intended to achieve environmental outcomes including the support of colonially nesting native bird breeding events, native fish populations, invertebrates, threatened species, inundation and to maintain aquatic ecosystem health.

In addition to environmental flow rules, there is a volume of held environmental water in the Gwydir Regulated River Water Source. This water is used to improve environmental outcomes while being managed in-channel to avoid third party impacts.

The environmental flow rules listed in Table 8 in their current form are not intended to create overbank flow in the Gwydir Regulated River Water Source. Therefore, it is not proposed to include rules in the *Water Sharing Plan for the Gwydir Regulated River Water Source* to protect the environmental flows from take under floodplain harvesting (regulated river) access licences.

Amendment provisions

Water sharing plans may be amended under section 45 of the *Water Management Act 2000*. To improve transparency and confidence among stakeholders, it is proposed to include specific amendment provisions in relation to floodplain harvesting (regulated river) access licences in the *Water Sharing Plan for the Gwydir 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 Gwydir Regulated River Water Source:

1. An amendment provision to allow for access rules to be introduced:

(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 licencing floodplain harvesting, or

(c) in response to improved understanding of the influence of floodplain harvesting on downstream flows

(d) in response to improved integration of hydrologic and hydrodynamic model systems.

2. An amendment provision to allow for trade rules to be modified based on any review undertaken of the existing trade rules in the Gwydir Unregulated River Water Sources.

Floodplain harvesting rules in the Gwydir Unregulated River Water Source

Current estimations show that approximately 10 floodplain harvesting (unregulated river) access licences will be issued in the following water sources:

- Gingham Watercourse Water Source
- Mehi Water Source
- Slaughterhouse Creek Water Source
- Thalaba Creek Water Source

The process for determining floodplain harvesting (unregulated river) access licences is the same as that used to determine unregulated river access licences. As the entitlement determination process is the same, it is proposed to apply the same rules to floodplain harvesting (unregulated river) access licences as currently exist for unregulated river access licences in the relevant water source and/or management zone, where appropriate. This will ensure consistency, equality of rights and access to the water source while avoiding any unintended consequences such as restricting the take of localised rainfall.

Rules that are specifically designed to protect water flowing within rivers and streams, and not flows on the floodplain, will not be applied to floodplain harvesting (unregulated river) access licences.

Account management

Account management rules vary across NSW and between different categories of access licences but 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.

The existing account management rules for unregulated river access licences, as specified in the *Water Sharing Plan for the Gwydir Unregulated River Water Sources 2012*, are summarised in Table 9 below for context.

Table 9 Existing account management rules for the Gwydir Unregulated River

Licence category	Take limit (annual)	Carryover limit
Unregulated river	3 ML per unit share +/- trade over three consecutive years	1 ML per unit share
Local water utility	300% +/- trade over three consecutive years	100%
Domestic and stock	300% +/- trade over three consecutive years	100%

Proposed available account management rules for floodplain harvesting (unregulated river) access licences in the Gwydir Unregulated River Water Sources:

1. Take limit: 3 ML per unit share over 3 consecutive water years
2. Account limit: 3 ML per unit share at any time

Available water determinations

The *Water Sharing Plan for the Gwydir Unregulated River Water Sources 2012* provides for a maximum available water determination of 1 ML per unit share to be made for unregulated river access licences at the start of each water year. Further, an initial available water determination of 2 ML per unit share was made for unregulated river access licences when the plan commenced.

Proposed available water determination rules for floodplain harvesting (unregulated river) access licences in the Gwydir Unregulated River Water Sources:

1. An initial available water determination of 1 ML per unit share
2. An available water determination of 1 ML per unit share every year (or a lesser amount to ensure compliance with the extraction limit)

Permanent Trade

The permanent trade rules may vary between valleys, depending on:

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

Existing permanent trade rules specified in the *Water Sharing Plan for the Gwydir Unregulated River Water Source 2012* are summarised in Table 10.

Table 10 Existing permanent trade rules for the Gwydir Unregulated River Water Source

Licence category	Permanent trade restriction
All licences	No trade: <ul style="list-style-type: none"> • Between water sources • From the Gwydir River Trading Zone to the Upper Gwydir River Tributaries Trading Zone, or • Between trading zones in the Moredun Creek Water Source, or • Between trading zones in the Copeton Dam Water Source, or • Between trading zones in the Mehi River Water Source • Within the Slaughterhouse Creek Water Source • Within the Carole Creek Water Source
All licences	No trade into significant lagoons and wetlands identified in Schedule 4 & 5 No trade within significant lagoons and wetlands identified in Schedule 4 & 5

The department proposes to apply the trade rules that currently exist for unregulated river access licences to floodplain harvesting (unregulated river) access licences. This will ensure consistency, equality of rights and access to the water source.

In addition to the existing trade rules, the department proposes a permanent trade rule that will restrict trade to within the Gwydir Valley floodplain. This will ensure that floodplain harvesting (unregulated river) access licences only take water within the Gwydir Valley floodplain. This restriction is consistent with the implementation of the NSW Floodplain Harvesting Policy and licence determination process. The Gwydir Valley floodplain was established under the *Water Management (General) Regulations 2018* and is shown in Figure 1.

Consistent with floodplain harvesting (regulated river) access licences, consideration of identified areas with high environmental value and/or cultural values has been undertaken. These areas are identified through the designation of management zones A and D in the *Floodplain Management Plan for the Gwydir Valley Floodplain 2016*.

To protect the identified assets in management zones A and D, the intent is to develop a rule for floodplain harvesting (unregulated river) access licences that ensures that the works used for floodplain harvesting located within these areas do not increase in capacity nor increase in number. Put simply, the rules will cap the capacity for or rate of diversion in these areas. The rules will not impact works that are currently installed.

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 the modification or removal of works is required, to ensure that the portion of the floodplain harvesting licence that has been sold can longer be taken.

Trade rules in the Gwydir Unregulated River Water Sources are being reviewed as part of the upcoming plan remake. Amendment provisions have been included to support change to the proposed trade rules as a result of that review.

Proposed permanent trade rules for floodplain harvesting (unregulated river) access licences in the Gwydir Unregulated River Water Sources

1. Rules that reflect existing trade rules for unregulated river access licences, as specified in Table 10.
2. Permanent trade of a floodplain harvesting access licence restricted to within the Gwydir Valley designated floodplain
3. No nomination of works located outside the Gwydir Valley floodplain by a floodplain harvesting access licence
4. No new nomination of works located in management zones A or D by a floodplain harvesting (unregulated river) access licence

New or amended water supply work approvals

A series of rules has been developed that would restrict the granting of new water supply work approvals or modification of existing water supply work approvals if the work concerned is located within management zone A or D and the water supply work approval is nominated by a floodplain harvesting access licence.

The intended outcome of the proposed rule is to restrict growth in the take capacity of works located within areas of identified environmental and/or cultural value.

Proposed rules for water supply works nominated by a floodplain harvesting (unregulated river) access licences in the Gwydir Unregulated River Water Sources:

4. no modification of works located in management zones A or D if the modification would result in an increase in capacity for that work, and
5. no new works constructed in management zones A or D, and
6. no new or modified works outside management zones A and D if the construction or modification would result in an increased rate of take for works located in management zone A or D.

Access rules

Active management

Active management is used to protect environmental water as it flows through an unregulated river water source. The definition of the water source includes rivers, lakes, streams and water flowing across the surface of the ground. Under this definition, unregulated river access licences are prevented from taking actively managed water, even if it flows out of a river and across floodplain (overbank flow).

Active management rules apply to unregulated river access licences in the Gwydir Unregulated River Water Sources with an extraction component that specifies any of the following management zones:

- Upper Gingham Watercourse Management Zone, or
- Lower Gingham Watercourse Management Zone, or
- Mallowa Creek Management Zone.

In the circumstance where actively managed water contributes to overbank flows, there is a potential intersection between active management and floodplain harvesting. Without specific access rules, these actively managed overbank flows may be legally taken under a floodplain harvesting (unregulated river) access licence if that licence has works (pipes, pumps, channels) located in a management zone where active management applies. This protected water is intended to flow across the surface of the floodplain, supporting floodplain dependent ecosystems and achieving environmental outcomes. It is not intended that this protected water is diverted by floodplain harvesters.

In response to recommendations made as part of the *Independent Review of NSW Floodplain Harvesting Policy Implementation* the Department committed to considering “the risks and opportunities to protect held environmental water delivery from floodplain harvesting”.

Based on this we proposed to restrict take under a floodplain harvesting (unregulated river) access licence if:

- the take occurs through works that located in a management zone where active management applies, and
- active management is being used to purposely created overbank flow.

These rules will be implemented as mandatory conditions on floodplain harvesting (unregulated river) access licences.

Proposed access rules for floodplain harvesting (unregulated river) access licences in the Gwydir Unregulated River Water Sources:

1. Take is not permitted through works in a management zone subject to active management when active management is being used purposely to create overbank flow

The Department is committed to a process of continuous improvement and adaptive management. If the scope of active management changes as part of any future amendments, then the options for implementing active management provisions for floodplain harvesting (unregulated river) access licences would be explored at that point.

Amendment provisions

Water sharing plan may be amended under section 45 of the *Water Management Act 2000*. To improve transparency and confidence among stakeholders, it is proposed to include specific amendment provisions in relation to floodplain harvesting (unregulated river) access licences in the *Water Sharing Plan for the Gwydir Unregulated River Water Source 2012*. 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 (unregulated river) access licences in the Gwydir Unregulated River Water Source:

1. An amendment provision to allow for access rules to be introduced:
 - (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 licencing floodplain harvesting, or
 - (c) in response to improved understanding of the influence of floodplain harvesting on downstream flows.
 - (d) in response to improved integration of hydrologic and hydrodynamic model systems
2. An amendment provision to allow for trade rules to be modified based on any review undertaken of the existing trade rules in the Gwydir Unregulated River Water Sources.

Interaction of water sharing plan rules and modelling

The *Floodplain Harvesting entitlements for Gwydir Regulated River system, Model Scenarios Report* describes how the Source Model of the Gwydir Regulated River System (Gwydir SM) was used to estimate the extraction limit specified for the Gwydir Regulated River Water Source, and to subsequently estimate individual floodplain harvesting entitlements. This report includes discussion of the relevant policy instruments, how models are used to represent these, how development levels and water management arrangements were determined, and key results.

The estimate of the extraction limit for the Gwydir Regulated River Water Source is determined using computer models that simulate river basin behaviour based on the amount of irrigation development in the water source at a point in time with the applicable plan rules, then averages diversions using climate data from the late 19th century to the present.

The extraction limit estimate includes an estimate of floodplain harvesting extractions under the specified baseline conditions. These baseline conditions refer to development levels and management conditions at a point in time.

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

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

- i. Plan limit scenario: For the Gwydir, this reflects the level of development and management conditions in place at 1993/94
- ii. Current conditions scenario: Current levels of development and management rules used to estimate the level of diversions without the floodplain harvesting licensing framework in place and determines the reduction if any required to comply with long-term average annual extraction limit.
- iii. Eligible development scenario: the levels of farm infrastructure development that was present or otherwise eligible as at 3 July 2008 and is used to determine individual shares of the total volume of floodplain harvesting entitlements.
- iv. Plan limit compliance scenario: an evolution of the current conditions scenario with the proposed account management rules and the floodplain harvesting licensing framework applied to bring diversion back to the long-term average annual extraction limit, with shares of the total based on distribution of floodplain harvesting volumes from (iii).

The Plan Limit and Current Conditions scenarios were both configured in the Gwydir SM and run for the period of climate record (1895-2015). The results of this are summarised in Table 11.

Table 11 Long term average diversions (1895-2009) for determining growth in use

Diversion component	Long term average diversion (Gigalitres per year)	
	Plan limit	Current conditions
General and High Security	216.5	217.8
Supplementary Access	111.3	92.6
Floodplain harvesting	103.7	121.0
TOTAL	431.5	431.5

The results show a distinct growth in floodplain harvesting (overbank flow and rainfall runoff harvesting). This growth will be managed through the licencing 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 Gwydir Valley* report considers the predicted environmental benefits (i.e. ecological responses) to changed floodplain harvesting volumes in the Gwydir valley after licencing floodplain harvesting. The report includes the identification of floodplain water-dependent environmental assets and values, modelled hydrological changes, and predicted outcomes for floodplain ecosystems with and without licencing of floodplain harvesting. This assessment has a targeted focus on areas of the floodplain where floodplain harvesting occurs and uses a 5-year accounting framework in the model.

Modelling suggests that the environmental water requirements of native vegetation, native fish and waterbirds in this zone would be met more often, by an average of 82%, 97% and 142% respectively. in the scenario modelled with licencing of floodplain harvesting compared to without licencing of floodplain harvesting.

For more information on the key findings and recommendations, please refer to the *Environmental outcomes of implementing the Floodplain Harvesting Policy in the Gwydir Valley* report on our website.

In addition to assessing the predicted environmental benefits of licencing floodplain harvesting, it is important to undertake on-going monitoring, evaluation, and reporting (MER) of the environmental benefits into the future. A MER program has been established specific to floodplain harvesting. This program will assess the on-going 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 licencing floodplain harvesting - NSW Border Rivers and Gwydir* report considers the predicted downstream benefits (i.e. water availability) after licencing floodplain harvesting in the NSW Border Rivers and Gwydir valleys.

Any gains in upstream systems such as the NSW Border-Rivers (which provides on average 18% of Barwon-Darling inflows) or the Gwydir (6% of Barwon-Darling inflows) may translate into the

downstream. These additional volumes originating in each of the Barwon-Darling tributary valleys contribute to connectivity between the broader northern Murray-Darling Basin (the Basin) and provision of increased flows towards Menindee and into the Murray.

The behaviour of these additional volumes can be predicted using numerical simulation models. With adoption of a series of assumptions the modelling analysis indicates that implementation of the *Policy* within the NSW Border Rivers will result in a 5.5 GL return of water to floodplains, rivers and creeks. In addition, licencing floodplain harvesting in the Gwydir valley is simulated to provide an additional 52.9 GL within this water source.

This leads to an increase in average annual inflows to the Barwon-Darling of 43.0 GL. This additional volume in the Barwon-Darling attenuates, reducing as it travels through the system towards the southern Basin. By the time these foregone diversions reach Wilcannia an average annual benefit of 26.2 GL (1.9%) is realized at Wilcannia.

The report identifies how these returned flows impact access to A Class, B Class and C Class flows in the Barwon-Darling Unregulated River Water Source before adding to the northern Basin contributions to the Lower Darling and Murray systems. The report analyses any changes to allocation in these systems based on upstream *Policy* implementation.

For more information on the key findings and recommendations, please refer to the *Modelled downstream effects of licencing floodplain harvesting - NSW Border Rivers and Gwydir* report on our website.

Interaction of water sharing plan rules and cultural outcomes

A report is being developed that outlines the identified cultural assets and values in the Gwydir Valley Floodplain and assesses the predicted benefits to these assets and values after licensing of floodplain harvesting. Development of the report is being led by the Northern Basin Aboriginal Network (NBAN) who are consulting extensively with the First Nation Peoples of the Gwydir Valley.

This report focuses on areas where identified cultural assets and values in the Gwydir Valley Floodplain overlap with the occurrence of floodplain harvesting.

The development of the report and associated consultation with First Nations builds on the extensive work done to identify cultural assets and values that has occurred as part of developing the *Floodplain Management Plan for the Gwydir Valley Floodplain 2020* and the Gwydir Surface Water Resource Plan.

Submission process

Targeted and broad public consultation will be undertaken on the rules for floodplain harvesting access licences proposed to be included in water sharing plans. As part of this consultation, a formal submission period of 28 days will be provided. During this period, submissions may be made, with supporting information, to support or disagree with the proposed rules. The formal submission period will be from 12 February until 12 March 2021, inclusive.

We will host a webinar for all stakeholders and the public followed by a series of meetings with targeted stakeholders. These sessions will commence in the week beginning 8 February 2021.

Amendments to water resource plans

The Gwydir Surface Water Resource Plan, currently submitted for accreditation, will require amendment once floodplain harvesting (regulated river) access licences have been issued in the Gwydir Regulated River Water Source and floodplain harvesting (unregulated river) access

licences have been issued in the Gwydir Unregulated River Water Sources. 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. At present, there is no specific reference to the number of access rights or associated total volume for floodplain harvesting (regulated river) and floodplain harvesting (unregulated 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 SDL resource unit. The Gwydir Surface Water Resource Plan will require amendment to include reference to the rules outlined above in relation to compliance with the long-term average annual extraction limit for floodplain harvesting (regulated river) and floodplain harvesting (unregulated 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 may result in proposed changes to the baseline diversion limit (BDL) specified in Schedule 3 of the Basin Plan 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 mdba.gov.au/basin-plan-roll-out/sustainable-diversion-limits/changing

Any proposed changes to the Gwydir Surface Water Resource Plan or Basin Plan as a result of licencing floodplain harvesting will require approval from the Australian Government's Minister for Resources and Water.

Appendix 2 details the proposed amendments to the Gwydir Surface Water Resource Plan.

Summary of process

The following flow diagram (Figure 4) represents a simple outline of the process for incorporating floodplain harvesting access licences into the broader water management framework. Timeframes are indicative.



Figure 4 Process for incorporating FPH licences into management framework

Appendix 1: Illustration of account management rules

Annual versus 5-year accounting scenario

The use of annual accounting influences the size of modelled entitlements. Using annual accounting, a much larger entitlement is required to achieve a 10% reduction. This is shown in Table 12.

Comparatively, both 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 may lead to a greater risk of growth in use.

The first scenario modelled (Growth test A) examined potential growth in the amount taken if new works were installed that doubled the amount that could be taken each year. As shown in Table 12, annual accounting resulted in a 22% increase while the 5-year accounting resulted in a 15% increase.

The second scenario modelled (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 able to be used each year. As shown in Table 12, in this scenario annual accounting would lead to 286% growth while the 5-year accounting would lead to 44% growth. Importantly, this is not a likely outcome but, for illustrative purposes, demonstrates the difference sensitivities of the two sets of account management rules.

Table 12 Assessment of different accounting rules and potential for growth

	Annual accounting	3-year accounting	5-year accounting
Entitlement	7,800	3,605	2,810
% reduction	-10.0%	-10.0%	-10.0%
Growth test A: Theoretical potential for growth assuming amount taken doubled	22%	28%	15%
Growth test B: Theoretical potential for if account was fully used	286%	81%	44%

Appendix 2: Proposed amendments to the Gwydir Surface Water Resource Plan currently submitted for accreditation

Table 13 Proposed amendments to the Gwydir Surface Water Resource Plan

Water resource plan reference	Basin Plan reference	Proposed amendment
1.8 Review and amendment	10.47	Remove text from blue box relating to anticipated amendment of the <i>Water Sharing Plan for the Gwydir Regulated River Water Source 2020</i> and <i>Water Sharing Plan for the Gwydir Unregulated River Water Sources 2012</i> following the issue of floodplain harvesting access licences.
		Remove text immediately underneath “Box 1-4. Circumstances under which this Plan may be amended”. This is a description for FPH amendments in WSPs are likely to have material effect on WRP.
4.1.1 Identification of planned environmental water for the Gwydir surface WRPA	10.09 (1)	Clarify that the rules applying in unregulated rivers to protect PEW do not apply to floodplain harvesting. PEW is specifically protected within banks and does not contribute to overland flows.
4.2 Priority environmental assets and priority ecosystem functions (boxed text)	<u>10.17 (3)</u> , <u>10.22 (b)</u>	<u>Boxed text</u> Amend to 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 Gwydir SDL resource unit in a water accounting period. These rules will be specified in the <i>Water Sharing Plan for the Gwydir Regulated River Water Source 2020</i> and <i>Water Sharing Plan for the Gwydir Unregulated River Water Sources 2012</i> .
4.4.1 Active Management	Non accredited text	Clarify the application of active management to floodplain harvesting unregulated licences
5.1.2 Complying with conditions of water access rights	10.08 (2), 10.08 (1) (c)	Ensure that Part 10 of the <i>Water Management (General) Regulation 2018</i> is represented accurately regarding floodplain harvesting measurement equipment

		<p>Removal of note under boxed text.</p> <p>Inclusion of sections 91C and 91D of the <i>Water Management Act 2000</i> will be included for accreditation.</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>Row 8 updated to include number of access rights, total volume (ML per unit share) and mandatory conditions for floodplain harvesting (regulated river) access licences in the Gwydir Regulated River Water Source.</p> <p>Row 9 updated to include number of access rights, total volume (ML per unit share) and mandatory conditions for floodplain harvesting (unregulated river) access licences in the Gwydir Unregulated River Water Source.</p>
5.3.1 Establishing the initial SDL	Non accredited text	Confirm WSP clause numbers are the same after amendment
5.3.2 SDL adjustments	Non accredited text	SDL to be adjusted as a result of improvements in information about, and modelling of, floodplain harvesting take.
5.4 Determining available water – rules for take	<u>10.11</u>	<p><u>Blue boxed text</u></p> <p>Update ‘Take by Floodplain Harvesting’ to refer to relevant parts of the <i>Water Sharing Plan for the Gwydir Regulated River Water Source 2020</i> and the <i>Water Sharing Plan for the Gwydir Unregulated River Water Sources 2012</i> that ensure the quantity of water taken under floodplain harvesting access licences does not exceed the annual permitted take for the period.</p> <p>Remove floodplain harvesting from text relating to section 10.11 of the Basin Plan.</p>
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.
5.4.2 AWDs in the regulated river water source	Non accredited text	Include text about AWDs for floodplain harvesting (regulated river) access licences and the option to reduce AWDs within those licences to respond to growth in use
5.4.3 AWDs in the unregulated river water sources	Non accredited text	Include text about AWDs for floodplain harvesting (unregulated river) access licences and the option to reduce AWDs within those licences to respond to growth in use

5.4.4 Floodplain Harvesting additional information	Non accredited text	Remove section. Embed text in previous sections
5.4.6 Corrective actions	Non accredited text	Amend text to clarify any growth in use of floodplain harvesting licences will be corrected through a reduced AWD in those licences.
5.4.7 Floodplain harvesting compliance	Non accredited text	<p>Amend text to reflect compliance measures for floodplain harvesting access licences, mandatory conditions for measurement, including timing, and updates to BDL and APT models.</p> <p>Amend text to clarify the method for determining annual permitted take for floodplain harvesting (regulated river) access licences.</p>
5.5.2 Determining actual take	<u>10.15(1) to 10.15(3)</u>	<p><u>Blue boxed text</u></p> <p>Include information on timing for the implementation of the measurement requirements for floodplain harvesting 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 1000 ML or using other methods, such as gauge boards, for landholders with storages less than 1000 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	<u>10.10, 10.12</u>	<p><u>Blue boxed text</u></p> <p>Remove last paragraph that refers to anticipated amendment of the water resource plan, BDL and APT 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	Update entire section including boxed text to reflect implementation of the NSW Floodplain Harvesting Policy in the Gwydir valley including the issuing of floodplain harvesting (regulated river) & floodplain harvesting (unregulated river) access licences in the Gwydir Regulated River & Unregulated River Water Sources and rules for these licences included in appropriate water sharing plans.
	10.24 and 10.25	<p><u>Blue boxed text</u></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 for floodplain harvesting (regulated river) access licences in the Gwydir Regulated River Water Source and Gwydir Unregulated River Water Sources. Also include reference to the amendment made to the WSP for the Gwydir Regulated River Water Source 2020 and WSP for the Gwydir Unregulated River Water Sources 2012 to include rules for floodplain harvesting (regulated river) access licences.</p> <p>May need possible rerun of risk assessment. If the risk is reduced below medium, then these sections no longer apply</p>
5.4.7.1 Growth in use of floodplain harvesting	Non accredited text	<p>Update text to refer to section 5 of the water resource plan.</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 for floodplain harvesting access licences in the Gwydir Valley. Also include reference to amendments made to the <i>Gwydir Regulated River Water Source</i> and the <i>Water Sharing Plan for the Gwydir Unregulated River Water Sources 2012</i> to include rules for floodplain harvesting access licences.</p>
5.7.4.2 Monitoring Floodplain Harvesting	Non accredited text	Update text to include reference to <i>Floodplain Harvesting Measurement Policy</i> and update the table referencing the Floodplain Harvesting Action Plan to show progress made.
7.1 Information relating to measuring take	Non accredited text	<p>Replace white text 'Floodplain Harvesting Monitoring Policy' with 'Floodplain Harvesting Measurement Policy'</p> <p>Update Table 7-1 to include timeframe thresholds and requirements of measurement policy</p>

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 access licences in the Gwydir Valley.
Schedule A Water sharing plans		Update to reflect new WSP names.
Schedule F Water for consumptive use information Table F – 1 Parameters for the method for determining Annual Actual Take	<u>10.15(1) to 10.15(3)</u>	Update footnote to clarify finalisation of the <i>Floodplain Harvesting Measurement Policy</i> .
Schedule F – Table F – 2 Parameters for the method for determining Annual Permitted Take	<u>10, 10.12</u>	Update table to clarify the method for determining annual permitted take for floodplain harvesting access licences in the Gwydir Valley
Schedule F – Table F – 3 Demonstration of APT 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 C: Consultation Report (section 2.4.2)		A general update to the section on FPH explaining consultation is complete, licensing framework has been established would be beneficial.
Attachment A to Schedule F: BDL report.		BDL report should be updated (to incorporate the FPH modelling) and numbers updated to reflect the latest information.
Attachment B to Schedule F: APT report		APT report should be updated (to reflect updated BDL) and numbers updated to reflect the latest information.
Risk Assessment Section 4.5.4 and 8.2.4 Consolidated risk table 4.5.4 “current critical mechanism” row.		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 licencing framework” change to past tense. E.g. “were converted” and “is managed”.