



Floodplain Harvesting Action Plan

September 2019



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Minister's foreword



Northern Basin generated more than \$1.6 billion from irrigated agricultural production in 2017-18, according to Australian Bureau of Statistics figures. Water harvested from floodplains is crucially important to the irrigation industry in the northern Basin. In this area, private investment in infrastructure to harvest water from floodplains compensates for the unreliability of the small and sparsely spread public dams.

Valley-based limits defined in the state water sharing plans set how much water can be taken by floodplain harvesting, and it's important that we measure and manage harvesting to ensure a fair share of water for downstream users and to protect the environment and the health of river systems throughout the Basin.

The NSW Floodplain Harvesting Policy sets out the process for bringing floodplain harvesting into the water licensing framework. This is now being rolled out across the Northern Basin valleys. It involves creating new work approvals, licences, rules and ways of measuring floodplain harvesting so that the harvesting take can be managed within the legal limits. We believe this is the best way to ensure that all water users, and the environment, get their fair share.

Regulating floodplain harvesting is a complex and ambitious water reform project, but a vitally important one. To provide transparency, build community trust and improve confidence in the process, the

government commissioned an independent peer review into the implementation of the policy. The final report was released in September 2019. It has validated the significant investment that we have already made, but highlighted that there is still more to do.

This action plan is the NSW Government's response to the independent peer review. It responds to all recommendations made in the review report, and sets out the processes and timeframes to complete implementation of the policy across key areas in northern NSW by June 2021. More broadly, it demonstrates the intention of the government to complete important water reforms in the state.

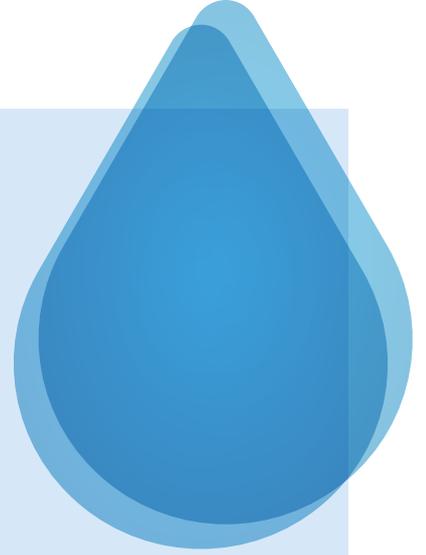
It's taken many years and more than \$37 million to collect the data, build the models and get ready to regulate floodplain harvesting in the five NSW northern valleys where harvesting is most prevalent: the Border Rivers, Gwydir, Namoi, Macquarie and Barwon-Darling.

The NSW Floodplain Harvesting Policy and this action plan are the culmination of that important work, and I am excited to see the benefits that implementing this plan, and improving and refining it over time, will bring to water users, the environment and the entire state.

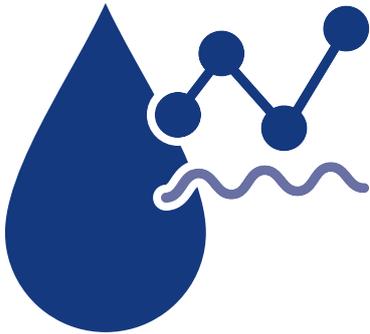
The Hon. Melinda Jane PAVEY, MP
Minister for Water, Property and Housing

FLOODPLAIN HARVESTING OCCURS WHEN WATER FLOWS ACROSS A FLOODPLAIN DURING A FLOOD OR FOLLOWING SIGNIFICANT RAINFALL

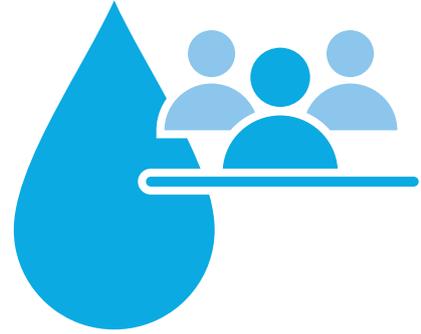
Purpose-built infrastructure known as works help users take water from the floodplain. These works include pumps, pipes, regulators and supply channels that are used in combination with levees to capture floodplain water and to transfer it into private on-farm storages for later use.



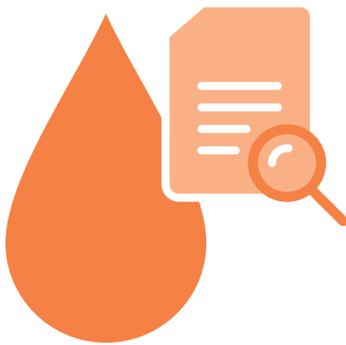
Taking action on floodplain harvesting



1. Use the best available facts, data and scientific analysis to underpin the licensing framework and explain this work to you



2. Set clear rules for floodplain harvesting and consult with you about them



3. Ensure rules are followed



4. Improve floodplain harvesting management over time

Our priorities

We will work with you to:

- provide clarity about how floodplain harvesting will be managed
- better protect the environment and downstream water users
- provide certainty for irrigators legally taking water from a floodplain
- provide a licensing framework that supports compliance
- ensure you have a say in water sharing rules for floodplain harvesting
- rebuild trust in water management in NSW.

Implementing a robust floodplain harvesting framework

The NSW Government through the Department of Planning, Industry and Environment has been working with water users and the public to put in place a licensing system and monitoring regime for floodplain harvesting. We expect to be in a position to issue licences to eligible properties for floodplain harvesting by mid-2021.

In 2008 the NSW Government announced that water users harvesting water from floodplains would need a licence and an approval to use the works. To facilitate this, the department developed the NSW Floodplain Harvesting Policy. The policy, introduced in 2013, is now being implemented across the Northern Basin.

- The policy sets out who is eligible for a floodplain harvesting licence and the process for getting one.
- The policy affects about 600 properties and 1400 privately owned on-farm water storages in the Northern Basin.

- The Natural Resource Access Regulator (NRAR) will enforce the licensing framework to ensure that floodplain harvesting remains within legal limits.

By 2021, we expect the licensing framework for floodplain harvesting to be operational in all water sharing plans. This includes having water sharing rules in place for floodplain harvesting.

We are also working to have a robust measurement, monitoring and evaluation program in place to help determine if the rules are effective and being followed, and whether they need to be modified over time.

We are introducing a robust licensing and monitoring system for floodplain harvesting to ensure that all users and the environment get their fair share of water.

Timeline

3 July 2008	- The NSW Government announced a licensing framework for floodplain harvesting
2013	- NSW Floodplain Harvesting Policy came into effect - NSW Healthy Floodplains Project began—a joint initiative of the NSW and Australian governments
2014-17	- Implementation of the policy —assessment of registrations of interest for approval to floodplain harvest
2018	- NSW Floodplain Harvesting Policy amended in response to consultation - Independent review of the policy implementation - Public consultation on a draft Monitoring and Auditing Strategy

Where we are now

Water has been harvested from floodplains in NSW for more than 30 years.

NSW water sharing plans set out water sharing rules within the state. This includes limits on the volume of water that can be harvested from floodplains. These limits are set to keep floodplain harvesting levels at or below the long-term volume that was capable of being taken in the 1993-94 water year.

While the limits exist, to date the floodplain harvesting water take has not been regulated. As we implement the NSW Floodplain Harvesting Policy, licences will define the volume of water users can continue to legally harvest from floodplains.

Bringing floodplain harvesting into the water licensing system will ensure the volume of water harvested stays within NSW water sharing plan limits.

We are using multiple sources of information to determine the amount of water that has been taken historically by floodplain harvesting and how much is being taken now.

The information is being collected and analysed in collaboration with the Murray-Darling Basin Authority (MDBA) and GeoScience Australia. Information sources include farm surveys, on-ground mapping of all floodplain harvesting works, satellite imagery and remote sensing. We have also used flood models that have been built to help with rural floodplain management planning.

The intent is to use the best available information to determine appropriate licensing volumes for floodplain harvesting.

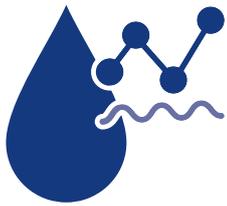


Findings from recent reviews

Stakeholders and recent reviews into floodplain harvesting and the Murray Darling Basin Plan (Basin Plan) have revealed a range of issues relating to floodplain harvesting, one issue of concern to stakeholders is the difficulty of accurately measuring water harvested from floodplains. We are working with stakeholders and industry to overcome these issues as part of the policy implementation process.

Review	Findings
Independent Review of NSW Floodplain Harvesting Policy Implementation	<ul style="list-style-type: none"> • NSW is on the right track—the investment in science and modelling will significantly improve the estimates of floodplain harvesting. • There has been a lack of transparency in the modelling. There is more work to do in order to demonstrate to stakeholders that the models make use of the best available information and are fit for purpose. • Once the modelling is finalised, the government should tell stakeholders what information has been used in the model and how the model will be used to determine licence volumes. • As the models do not represent flood water that returns to the river from the floodplain, the models cannot assess the benefits of the licensing framework on downstream flows. More work needs to be done to assess and communicate the anticipated downstream benefits of the licensing framework. • Adaptability should be built into the management framework for floodplain harvesting to allow it to be improved over time in response to better information. • Working out how to effectively and efficiently monitor floodplain harvesting needs to be a priority.
Probity review into floodplain harvesting licensing	<ul style="list-style-type: none"> • Licensing processes used were lawful and well documented. • The eligibility criteria for a floodplain harvesting licence was applied consistently.
Independent assessment of the 2018–19 fish deaths in the lower Darling	<ul style="list-style-type: none"> • NSW and Queensland should improve their assessment of the hydrologic impacts of floodplain harvesting. • There is a need to improve the credibility of information about floodplain harvesting.

Action Plan for Floodplain Harvesting



Use the best available facts, data and scientific analysis to underpin the licensing framework, and explain this work to you

What we are doing	How we will do it	By when
Show you how the models work	<ul style="list-style-type: none"> Report on how sensitivity and uncertainty in the model has been treated by the department and how much it affects users 	Q4 2019
	<ul style="list-style-type: none"> Report on the significance of additional rainfall runoff due to irrigation and how this is being managed 	Q4 2019
	<ul style="list-style-type: none"> Write to individuals to explain the parameters that we will use to work out their licence entitlements 	Q4 2019 & Q1 2020
	<ul style="list-style-type: none"> For each valley, report: <ul style="list-style-type: none"> on how the model has been built (model build report) on how the model helped determine floodplain harvesting entitlements (model scenario report) 	Q3 2020
Comply with good modelling practice	<ul style="list-style-type: none"> In the model build and model scenario reports, show how the revised modelling complies with the good modelling practice notes that have been developed by Basin states, the MDBA and the CSIRO 	Q3 2020
Assess the environmental benefits of implementing the policy	<ul style="list-style-type: none"> Report for each valley on: <ul style="list-style-type: none"> how the expected changes in floodplain harvesting diversions from implementing the policy will improve environmental outcomes areas where licensed environmental water deliveries need to be protected from interception by floodplain harvesting 	Q3 2020
Explain the modelling and the benefits of implementing the policy	<ul style="list-style-type: none"> Hold a focus workshop with peak water user groups in northern NSW valleys to provide information about how the modelling approach applied to individual farms is supported by sensitivity testing 	Q3-Q4 2019
	<ul style="list-style-type: none"> Hold workshops with stakeholders to explain the model build, model scenario and environmental assessment reports on a valley-by-valley basis 	Q3 2020



Set clear rules for floodplain harvesting and consult with you about them

What we are doing	How we will do it	By when
Respond to recent reviews	<ul style="list-style-type: none"> Publish all independent reviews about policy implementation, including: <ul style="list-style-type: none"> the Independent Review of NSW Floodplain Harvesting Policy Implementation a summary of the probity review Release a response to each recommendation of the Independent Review of NSW Floodplain Harvesting Policy Implementation 	<p>Q2-Q3 2019</p> <p>Q3 2019</p>
Set out how the policy will be implemented	<ul style="list-style-type: none"> Release a guideline about how the department is implementing the policy Release proposed water sharing plan and water resource plan rule changes for floodplain harvesting 	<p>Q3 2019</p> <p>Q3 2020</p>
Talk with you about implementation of the policy	<ul style="list-style-type: none"> Hold workshops with stakeholders to explain the guideline Hold workshops with stakeholders about proposed water sharing plan and water resource plan rule changes 	<p>Q3 2019</p> <p>Q3 2020</p>
Issue floodplain harvesting licences and amend water sharing and water resource plans	<ul style="list-style-type: none"> Release draft entitlements to individuals for comment Finalise licences and amend water sharing and water resource plans for re-accreditation 	<p>Q3 & Q4 2020</p> <p>Q2 2021</p>



Ensure the rules are followed

What we are doing	How we will do it	By when
Set up robust monitoring for floodplain harvesting	• Meet Compliance Compact obligations by publishing a program for improved measurement of floodplain harvesting	Q2 2019
	• Release the final Floodplain Harvesting Measurement Strategy	Q4 2019
	• Require licence holders to install telemetry-ready, continuous water level loggers on all on-farm storages used for floodplain harvesting	Q2 2020– Q2 2021
	• Commence enforcement of the new floodplain harvesting licensing framework through the Natural Resources Access Regulator	Q3 2021
	• Develop a best practice guideline for floodplain harvesting measuring in partnership with Queensland and MDBA.	Q2 2019– Q2 2021
	• Implement the best practice guideline	Q3 2021– Q2 2022
Continue to invest in new technology that supports the auditing and compliance of floodplain harvesting	• Support the development of technologies that enable better auditing and compliance of floodplain harvesting, including through the department’s Water Technology Pilot Program	From Q3 2019
Bring existing unapproved floodworks into compliance	• Encourage the Natural Resource Access Regulator to address unapproved floodworks on a risk basis in order to improve outcomes for the environment and downstream water users	From Q3 2019



Improve floodplain harvesting management over time

What we are doing	How we will do it	By when
<p>Improve data and information about floodplain harvesting</p>	<ul style="list-style-type: none"> • Collect floodplain harvesting diversion data by implementing the Floodplain Harvesting Measurement Strategy • Consider opportunities to expand the river gauging network to improve the quantification of return flows from the floodplain to the river • Continue to invest in remote sensing in order to improve our understanding of flood flow breakouts and return flows from the floodplain to the river • Undertake modelling to assess the impacts of climate change on floodplain harvesting, as well as on downstream water users and the environment • Invest in robust monitoring and evaluation programs to better understand the hydrological and ecological impacts of floodplain harvesting 	Q3 2021
<p>Improve model calibration and capability</p>	<ul style="list-style-type: none"> • Recalibrate models using floodplain harvesting measurement data • Improve model capability by explicitly representing flows from the floodplain to the river using all new data and information collected 	From 2025
<p>Make changes to rules if needed</p>	<ul style="list-style-type: none"> • Review water sharing rules and amend them as necessary to improve the management of floodplain harvesting over time based on improved data and information 	From 2025

Timeline



Who's who in floodplain harvesting management in NSW

STATE

Department of Planning, Industry and Environment

- Responsible for implementing the policy
- Responsible for floodplain harvesting management as a surface water diversion
- Responsible for modelling floodplain harvesting take
- Responsible for the Floodplain Management Program, providing expert advice on flood modelling, risk assessment, management options, planning and environmental considerations, and community engagement
- Leads negotiations with the Australian Government, including the MDBA, and other jurisdictions

WaterNSW

- Responsible for the accounting and billing associated with floodplain harvesting

Natural Resource Access Regulator

- Responsible for ensuring compliance with the Floodplain Harvesting Measurement Strategy
- Responsible for compliance activities associated with unapproved flood works

Independent Pricing and Regulatory Tribunal (IPART)

- IPART are the NSW agency responsible for periodically reviewing and determining licensing fees

FEDERAL

Murray-Darling Basin Authority

- Independent, expertise-based statutory agency
- Responsible for planning the basin's water resources, with all planning decisions made in the interest of the basin as whole
- Responsible for accrediting water resource plans, which in NSW will include an estimate of the historical floodplain harvesting take

Department of Agriculture and Water Resources

- Responsible for the management and use of water resources, including the National Water Initiative, the Murray-Darling Basin Plan, urban water policy and reform, and water quality improvement
- Administers the funding for the NSW Healthy Floodplains Project as per the Water Management Partnership Agreement

The Department of Planning, Industry and Environment's responses to the key recommendations of the Independent Review of NSW Floodplain Harvesting Policy Implementation Draft Report

Item	Recommendation	Response	Timeframe
Modelling approaches			
1	Significant further documentation and justification of the rainfall-runoff model used, and the parameters chosen in each valley, soil type, and farm enterprise is required before the inclusion of the rainfall-runoff component within the models can be considered suitable or not. This should not be seen as a decision as to whether rainfall runoff should be included as part of licensed take, but that without documentation and justification, the current approach cannot be properly evaluated for suitability in estimating this component and further analysis is required to establish a way forward.	The department will publish model build reports for each valley. These reports will include information about the rainfall run-off model used and parameters chosen. The model build reports will be independently reviewed prior to release.	Q3 2020
2	Where possible, undertake a comparison of floodplain breakout volumes assumed in the model against other evidence. A number of "response curves" are used to estimate the likely overbank flows at particular breakout points in the models. Cross-verification of these likely volumes against other lines of evidence would be highly desirable to ensure that the assumed volumes are within the bounds of realistic estimates. Where this is not possible, modellers should identify uncertainty so that some policy measures may be included in water sharing plans to take corrective action should future work show that the assumptions and likely volumes need revision.	The model build reports will include estimates of breakout volumes where this information is available. They will also identify sources of uncertainty, steps that have been taken to reduce this uncertainty, and future steps that will be taken to further reduce model uncertainty. The department will publish a detailed guideline about how the policy is being implemented. This guideline will explain how improvements in information and models will be used to inform adaptive management	Q3 2020 Q3 2019
3	As a future improvement to the models, undertake data collection and model reconfiguration to represent return flows and down-floodplain flows so that downstream impacts can be better determined.	The department will invest in new data to improve its understanding of floodplain flows and diversions so that current model capability can be expanded to more explicitly represent the return of floodwater from the floodplain back into the river. These model enhancements will allow the testing of different water sharing rules for floodplain harvesting in order to better assess environmental, social, cultural and economic outcomes. The guideline will explain how the adaptive management framework set up through water sharing plans will allow for improved management of floodplain harvesting over time.	Q3 2021 and beyond Q3 2019

Item	Recommendation	Response	Timeframe
Documentation			
4	Complete the documentation required as outlined in this final report, make it publicly available and hold workshops with industry, community and other stakeholders to explain it. For clarity and transparency and improved understanding, this should be done as a matter of utmost priority and before the issuing of floodplain harvesting water access licences to individuals.	<p>The department will release:</p> <ul style="list-style-type: none"> • an action plan in response to the independent peer review • a guideline about how the NSW Floodplain Harvesting Policy is being implemented. The guideline will include information about: <ul style="list-style-type: none"> - the licensing process - calculating entitlements - how entitlements will be managed through water sharing plans and water resource plans - monitoring, evaluation and adaptive management • a report about the sensitivity testing that has been undertaken to support floodplain harvesting modelling approaches in the Northern Basin • model build, model scenario and environmental assessment reports for each valley. <p>Stakeholder workshops are planned to explain and discuss the plans, guidelines and reports when they are released.</p>	<p>Q3 2019</p> <p>Q3 2019</p> <p>Q4 2019</p> <p>Q3 2020</p>
5	Prepare a comprehensive guideline outlining in detail the process steps used, or to be used, for implementing the policy – in particular the process for floodplain harvesting licensing, including matters for decision-making, and for defining and calculating floodplain harvesting volumes and share components.	<p>The department will release a guideline about how the NSW Floodplain Harvesting Policy is being implemented. The guideline will include information about:</p> <ul style="list-style-type: none"> • the licensing process • calculating entitlements • how entitlements will be managed through water sharing plans and water resource plans • monitoring, evaluation and adaptive management. 	Q3 2019
6	As a matter of priority, complete the model build and scenario reports for each valley, with the reports to be explicit about how the matters raised in this review have been handled. Subject to review and consideration of the final reports, appropriate sections of the draft reports for the Border Rivers and the Gwydir Valley could be used as templates for the other valleys.	<p>The department will publish two reports for each valley outlining how the model:</p> <ul style="list-style-type: none"> • is built (model build report) • was used to determine floodplain harvesting entitlements (model scenario report). 	Q3 2020
7	Document compliance with good modelling practice in the model build and scenarios reports.	<p>The department, in collaboration with the Murray–Darling Basin Authority, Basin states and the CSIRO, has developed practice notes for modelling across the Murray–Darling Basin. The model build and model scenario reports will demonstrate how the models are consistent with the high-level principles contained in these practice notes.</p> <p>In the model build reports, the department will also demonstrate how it has been consistent with its more detailed internal model development guidelines.</p>	Q3 2020

Item	Recommendation	Response	Timeframe
8	Document an assessment of model uncertainty and suitability for application, including where future improvements should be made to reduce that uncertainty, in the model .	See item 6	See item 6
9	As a matter of priority, the department should communicate a stronger narrative around what the differences before and after implementation of the policy will mean, especially in respect to differences in progressively updated floodplain harvesting volumes from any previous communications. A simple fact sheet outlining the best available information about volumes of water and take, including floodplain harvesting take, for each valley, with provisions for updating as new or improved information becomes available, would be helpful for transparency and clarity and placing the importance of the policy implementation in context.	The guideline will provide a stronger narrative around the environmental benefits of implementing the policy. The model build and scenario reports will show how implementing the policy will reduce the current volume of water taken by floodplain harvesting where it is in excess of existing limits. The department will prepare environmental assessments that show on a valley-by-valley basis the benefits of implementing the policy	Q3 2019 Q3 2020 Q3 2020
Stakeholder engagement and communication			
11	On-farm information used in the model should be communicated and confirmed with landholders to provide greater transparency around how the entitlement has actually been calculated and evaluated. This should also include estimates from the model of the volumes of different consumptive use sources that have been determined for each farm.	The department will write to individuals to explain the parameters used in determining their licence entitlements. Where values used are significantly different to those in irrigator behaviour questionnaires, the letters will include reasons. Letters will also include modelled diversion data for each property. Individuals will have 28 days to make a submission citing any other evidence that they consider relevant. All submissions will be reviewed by the independent review committee.	Q4 2019– Q1 2020
12	The department should hold workshops with industry, community and other stakeholders in each of the respective valleys to further explain the policy implementation guideline and the valley-specific model build and scenario reports after they have been prepared.	The department will hold workshops with stakeholders to talk about: <ul style="list-style-type: none"> • the guideline • model build and model scenario reports. 	Q3 2019 Q3 2020
Water planning and management			
13	Acquisition of robust floodplain flow and floodplain harvesting monitoring data is essential to verify volumes and water balances into the future, and to confirm the meeting of the policy objectives and compliance. Consequently, the reviewers recommend that monitoring and auditing proceed as matters of priority.	The department placed a draft floodplain harvesting monitoring and auditing strategy on public exhibition during 2018–19. A floodplain harvesting monitoring consultation outcomes and recommendation report is being prepared for public release. A final floodplain harvesting monitoring and auditing strategy will be put in place as a priority.	Q3 2019 Q4 2019

Item	Recommendation	Response	Timeframe
14	As the final floodplain harvesting volumetric entitlements are determined and quantified, an assessment of third-party (downstream users) impact, including cumulative impact, needs to be completed to clearly show stakeholders that downstream outcomes will be improved and/or accounted for in the implementation of the policy.	<p>The model build and scenario reports will show how implementing the policy will reduce the current volume of water taken by floodplain harvesting where it is in excess of existing limits.</p> <p>The department will prepare environmental assessments that show the benefits of implementing the policy on a valley-by-valley basis.</p>	<p>Q3 2020</p> <p>Q3 2020</p>
15	Water sharing plan amendment rules, consisting of flow management rules and access rules for floodplain harvesting licences in addition to account management rules, be considered, especially to minimise impacts of floodplain harvesting on down-floodplain environments and to protect held environmental water.	<p>The department will publish a guideline detailing how it will adaptively manage floodplain harvesting over time.</p> <p>In its work on active management of environmental water as part of the delivery of the NSW Water Reform Action Plan, the department will consider the risks and opportunities to protect held environmental water delivery from floodplain harvesting.</p>	<p>Q3 2019</p> <p>Q4 2019</p>
16	The department and the MBDA should, as a matter of priority, develop agreed next steps for implementation of the policy and the preparation and accreditation of water resource plans under the Basin Plan, taking account of the findings and recommendations from this independent review. These next steps should include independent assessment and verification of responses to the recommendations in this final report to determine and transparently demonstrate whether the responses meet all aspects of the recommendations.	<p>The department has released the NSW Floodplain Harvesting Action Plan.</p> <p>Responses to each recommendation of the independent review can be found in this table.</p> <p>There is a misalignment between the implementation of the policy and the accreditation of water resource plans. The department will publish a fact sheet that details how floodplain harvesting will be managed in water resource plans prior to implementation of the policy.</p> <p>The guideline will contain general information about how floodplain harvesting will be managed under both water sharing and water resource plans.</p>	<p>Completed</p> <p>Q3 2019</p> <p>Q3 2019</p>

Summary of the Department of Planning, Industry and Environment's responses to the recommendations of the Independent Review of NSW Floodplain Harvesting Policy Implementation Draft Report

Item	Recommendation summary	Response	Timeframe
1 6 9	A comprehensive guideline outlining in detail the process steps for implementing the policy, including matters for decision-making, should be prepared by the department and made publicly available to demonstrate transparency and raise confidence.	The department will release a guideline about how the NSW Floodplain Harvesting Policy is being implemented. The guideline will include information about: <ul style="list-style-type: none"> the licensing process calculating entitlements how entitlements will managed through water sharing plans and water resource plans monitoring, evaluation and review of the policy and policy settings. This guideline will be independently reviewed prior to release.	Q3 2019
2	As a matter of priority, the model build and scenario reports for each valley should be completed by the department and made publicly available. Each of the reports should be explicit about how eligible floodplain harvesting works have been determined, including how IBQ information has been used. Subject to review and consideration of the final reports, appropriate sections of the draft reports for the Border Rivers and the Gwydir could be used as templates for the other valleys.	The department will publish two reports for each valley outlining how the model: <ul style="list-style-type: none"> is built (model build report) was used to determine floodplain harvesting entitlements (model scenario report) The reports will include information about how irrigator behaviour questionnaires were used as one of multiple lines of evidence to determine floodplain harvesting licences. These reports will be independently reviewed prior to release.	Q3 2020
		The guideline will provide information about the licensing process, including how the eligibility of works were determined.	Q3 2019
3 8 11	The department should hold workshops with industry, the community and other stakeholders in each of the respective valleys to further explain the guideline and reports after they have been prepared.	Stakeholder workshops will be held to explain the guideline and give an overview of the model build reports and model scenario reports that will be released in Q3-Q4 2020.	Q3 2019
		When the final model build and model scenario reports are released, the department will hold targeted meetings in each valley.	Q3 2020
4	As part of the implementation process, it will be important to clearly communicate what the differences will mean for water users, particularly in respect to reported floodplain harvesting volumes and how recovered water may improve downstream outcomes.	The model scenario reports will include information about how and why the department's estimates of the floodplain harvesting take have changed over time. This will include comparative information on levels of development in 1993-94 (Cap level), 2000 (NSW water sharing plans), 3 July 2008 (cut off date for a works authorisation under the policy) and present day.	Q3 2020
		The model scenario report will include information about the differences between the amount of water being taken before licences were implemented compared to the water take allowed after licences are issued.	
		The department will prepare environmental assessments that show the benefits of implementing the policy on a valley-by-valley basis. These reports will be independently reviewed prior to release.	

Item	Recommendation summary	Response	Timeframe
5	As a matter of priority, the department and the Murray-Darling Basin Authority (MDBA) should publish an updated summary document to succinctly describe what BDLs and SDLs are, and how BDLs and SDLs may change with updated information as it becomes available, including floodplain harvesting volumes determined in accordance with the policy.	The MDBA has recently published videos and fact sheets about how BDLs and SDLs may change with updated information. These can be found on the MDBA's website . The MDBA has also released position statements about the process for setting an alternative estimate of a surface water BDL (see Basin Plan Water Resource Plan Requirements Position Statement 3F). Information about how and why BDL estimates have changed, as well as reasons why further changes based on monitoring of floodplain harvesting diversions may be needed, will be included in the model scenario reports.	Complete Q3 2020
7	As a matter of priority, the model build and scenario reports for each valley should be completed by the department and made publicly available. Each of the reports should be explicit about how water sharing plans, BDLs and SDLs are to be amended based on the modelling work. Subject to review and consideration of the final reports, appropriate sections of the draft reports for the Border Rivers and the Gwydir could be used as templates for the other valleys.	The model build reports will include information about how models may be updated in the future when monitoring and measurement of floodplain harvesting yields further data. The guideline will include information about how any model updates will inform future amendments to water sharing plans. This may include rule changes or annual water determinations. The department will publish information explaining how floodplain harvesting will be dealt with in water resource plans.	Q3 2020 Q3 2019 Q3 2019
10	As a matter of priority, the model build and scenario reports for each valley should be completed by the department and made publicly available. Each of the reports should be explicit about the issuing of individual farm floodplain harvesting water access licences and explain how any share components will be determined based on the modelling work. Appropriate sections of the draft reports for the Border Rivers and the Gwydir can be used as templates for the other valleys.	The model scenario reports will include information about how modelling is used to determine share components. The guideline that will include information about calculating entitlements, the licensing process and how entitlements will be managed within water sharing plans and water resource plans.	Q3 2020 Q3 2019
12	The model build reports for each valley should be completed by the department and made publicly available. Each of the reports should be explicit about how information from floodplain management planning under the NSW Water Management Act 2000 is being considered in the hydrological modelling and the implementation of the policy. Appropriate sections of the draft reports for the Border Rivers and the Gwydir can be used as templates for the other valleys.	The guideline will include information about the licensing process The model build reports will include information on how floodplain modelling was used to inform hydrologic modelling.	Q3 2019 Q3 2020
13	As part of good policy practice, the department, in consultation with stakeholders, should review and evaluate the successes and opportunities for improvement in the development and implementation of the policy after the current implementation work in the northern NSW valleys has been completed.	The department will evaluate the policy, including the development process used. This will be done following the policy's implementation in the northern valleys and include lessons learnt during the development and implementation stages. Stakeholder input will be sought during the review and evaluation process.	To commence once implementation of the policy in the Northern valleys has been finalised (2022 and beyond)

Item	Recommendation summary	Response	Timeframe
14	As a matter of priority, the model build reports for each valley should be completed by the department and made publicly available. Each of the reports should be explicit about how properties eligible for floodplain harvesting with regulated licences prior to 3 July 2008 have been represented in the models and how all other eligible properties have been handled.	The guideline will include information about calculating entitlements in regulated and unregulated systems.	Q3 2019
		The model build reports will provide information about how properties that were eligible for assessment under the NSW Floodplain Harvesting Policy in regulated systems have been represented in models.	Q3 2020
15	The model build reports should be explicit about advice given to the department by stakeholders and the department's response to that advice. This includes advice from the numerous modelling discussions held with stakeholders and industry representatives. If there is conflicting advice, the department and stakeholders should engage in additional dialogue about how to improve or handle the available evidence and approaches, recognising any risks and uncertainties involved.	The model build reports will be clear about how advice from stakeholders has acted as one of the multiple lines of evidence used to determine entitlements. Where other evidence was prioritised over stakeholder advice, the model build reports will provide reasons. A description of what has been done to reduce model uncertainty and what will be done to reduce uncertainty in the future will be detailed in the model build reports.	Q3 2020
16	When preparing a comprehensive guideline that details the steps involved in implementing the policy, the department should include clear information on how decisions about the determination of allowable take have paid due regard to downstream impacts, including matters of national environmental significance.	The guideline will provide clear information about the basis for setting the current long-term average annual extraction limits, and how these limits balance the needs of the environment with consumptive use.	Q3 2019
17	The behaviour parameters for individual or groups of farms should be communicated to the relevant landholders to demonstrate that the parameters are an appropriate representation of infrastructure and behaviours. The reasons for their selection should also be outlined. This is a transparency measure and is not intended to open a debate on specific values. The final parameters chosen, especially around key aspects such as crop water use, cropping area available, permanent and temporary storage volumes used, should be provided to landholders to demonstrate how their volumetric entitlement was determined.	The department will write to individuals to explain the parameters used in determining their licence entitlements. Where values used are significantly different to those in irrigator behaviour questionnaires, the letters will include reasons why. Individuals will have 28 days to make a submission citing any other evidence that they consider relevant. All submissions will be reviewed by an independent committee.	Q4 2019– Q1 2020
18	Communication of the adopted farm behaviour parameters for individual farms (or groups of farms) needs to be made back to the relevant landholders to demonstrate that the parameters are an appropriate representation of infrastructure and behaviours. The communication should be done before draft entitlements are issued in order to provide transparency to the entitlement holder on the parameters used to determine the entitlement volumes, and to allow for modifications to be made where supported by evidence.	See item 17	See item 17

Item	Recommendation summary	Response	Timeframe
19	As a matter of priority, the model build and scenario reports for each valley should be completed by the department and made publicly available. In particular, the reports should detail the decision rules used to determine when and why different data inputs are considered, used or rejected.	The model scenario reports will include a summary about why different data inputs have or have not been used. This summary will be referred to throughout the reports.	Q3 2020
		The department will write to individuals to explain the parameters used in determining their licence entitlements. Where values used are significantly different to those in irrigator behaviour questionnaires, the letters will include reasons why. Individuals will have 28 days to make a submission citing any other evidence that they consider relevant. All submissions will be reviewed by an independent review committee.	Q4 2019– Q1 2020
20 & 22	As a matter of priority, the model build and Scenario reports for each valley should be completed by the department and made publicly available. In particular, the reports should detail the decision rules used to determine when and why different data inputs are considered, used or rejected. It would also be useful to plot or otherwise represent the variability in information received within the IBQs and comparisons made to other lines of evidence to demonstrate that the selected model parameters or data inputs are consistent with that variability.	See item 19	See item 19
21	There is a need to ensure that the chosen parameters relating to particular farms or enterprises are realistic in relation to farm activity, and are verified with landholders. Currently, parameters are chosen to maximise calibration performance and consistency against multiple lines of evidence, but no real verification against farm-scale operations (other than crop area from IBQs) are made. It is therefore recommended that when the final volumetric entitlement is made, the landholder is provided with the farm parameters used to determine that entitlement. This will ensure that the chosen parameters adequately represent the way the farm is operated and how it may need to change under a different amount of volumetric use. For basins where modelling is yet to be completed, further consultation with landholders around the information being used in the models would help to demonstrate transparency, and we note that previous efforts through the Modelling Consultative Committee in the Gwydir may provide better collaboration opportunities to refine the modelling.	<p>The guideline will include information about the licensing process.</p> <p>The department will hold a focus workshop with peak water user groups in Northern NSW valleys to provide information about how the broad modelling approach applies to individual farms, supported by sensitivity testing.</p> <p>The department will write to individuals to explain the parameters used in determining their licence entitlements. Where values used are significantly different to those in irrigator behaviour questionnaires, the letters will include reasons why. Individuals will have 28 days to make a submission citing any other evidence that they consider relevant. All submissions will be reviewed by an independent review committee.</p>	<p>Q3 2019</p> <p>Q3 2019</p> <p>Q4 2019– Q1 2020</p>
23	The department should undertake sensitivity testing of a number of case-study farms to examine the changes in entitlement estimates with variations in farm infrastructure operations to examine if this variability is significant (or not).	The department will prepare and release a report that assesses model uncertainty and tests the sensitivity of key model assumptions (model sensitivity report).	Q4 2019

Item	Recommendation summary	Response	Timeframe
24	Verification of model uncertainty against agreed model uncertainty criteria is needed, especially to support the statement in Section 8.1.2 on page 38 of Volumetric floodplain harvesting entitlement determination—Gwydir River Valley, DPI Water Surface Modelling, September 2016.	The model sensitivity report will include information about sources of uncertainty, the qualitative impact these sources have had on entitlements, and what the department will do to reduce this uncertainty overtime. The model build reports will demonstrate consistency with good modelling practice (see item 6).	Q4 2019 Q3 2020
25	As a matter of priority, the model build and scenario reports for each valley should be completed by the department and made publicly available. Each of the reports should be explicit about model uncertainties and how any associated potential adverse impacts have been mitigated.	The model sensitivity, build and scenario reports will include information about sources of uncertainty, the qualitative impact these sources have had on entitlements, and what we will do to reduce this uncertainty over time.	Q3 2020
26	The department should publish all independent reviews relevant to the implementation of the policy and its responses to and actions taken following the reviews. This should include independent assessment and verification of responses to the recommendations in this final report to determine and transparently demonstrate whether the responses meet all aspects of the recommendations. Stakeholders should be engaged in these processes.	The department published: <ul style="list-style-type: none"> the Independent Review of NSW Floodplain Harvesting Policy Implementation draft report on 8 May 2019. a summary of the probity review into floodplain harvesting was released on 8 May 2019. The department's response to each of the final recommendations in the 2019 Independent Review can be found in this table. An action plan to address the independent peer review has been released and will be discussed with stakeholders at workshops.	Complete Complete
27	Consideration of the impacts of future climate change should be undertaken in future modelling exercises. Some analysis as to the representativeness of the existing long-term climate sequence to simulate recent climate conditions and the likely impact of this on floodplain harvesting take needs to be completed.	In line with the NSW Floodplain Harvesting Policy (2013), floodplain harvesting licence entitlements are based on long-term average annual extraction limits. The limits are determined using computer models based on more than one hundred years of climate data. The department's modelling team has a forward work plan to determine the impacts of future climate on floodplain harvesting and how to include this information in models. Any information about the future climate will be considered during five-yearly reviews of NSW water sharing plans and the development of the department's regional water strategies.	2020 and beyond
28	As a matter of priority, the model build and scenario reports for each valley should be completed by the department and made publicly available. Each of the reports should be explicit about how potential future climates have been considered, including potential impacts and mitigations. The approach should be consistent with any requirements under the Basin Plan.	The model build reports will set out the current climate sequence used to determine entitlements in line with the policy. The department's modelling team has a forward work plan to determine the impacts of future climate on floodplain harvesting. Any information about the future climate will be considered during five-yearly reviews of NSW water sharing plans and the development of the department's regional water strategies.	Q3 2020 2020 and beyond

Item	Recommendation summary	Response	Timeframe
29	The process followed is satisfactory in the absence of any other measurement methods, though some further verification of actual volumes, perhaps by comparison with estimated volumes for specific events as derived from other methods, is warranted. Given that the entire process of volumetric entitlement, measurement of growth and determination of floodplain harvesting take is determined based on this volume, a method of validation that has some direct link to actual OBF volumes, rather than a result by difference, would provide further confidence that the numbers being derived reflect reality. This does not indicate that the current process has inadequacies, just that a separate validation process would provide greater confidence in the results obtained.	The Dept will continue to use best available evidence to confirm overbank flow volumes used in the models. This will be reported in the model build reports.	Q3 2020
30	Consideration of sensitivity testing with key model parameters such as OBF volumes, crop watering volumes, floodplain harvesting storage, temporary storage operation, etc. should be conducted with at least one valley/basin model to show the likely variations in floodplain harvesting take and which of these parameters is the most sensitive to determining that value. Without a formal sensitivity assessment there is no method available to identify which model parameters are most influential in determining volumetric take. This would assist the modellers in evaluating which parameters require additional focus to improve the confidence in the results obtained.	The model sensitivity report will include sensitive analysis of key model parameters and their influence on both valley and individual volumetric estimates.	Q4 2019
31	Significant further documentation and justification of the rainfall-run-off model used and the parameters chosen in each valley, soil type, and farm enterprise are required before the suitability of the inclusion of the rainfall-run-off component within the models can be considered.	The model build reports will include information about the rainfall run-off model used and parameters chosen.	Q3 2020
32	More comprehensive, defensible analysis of the sensitivity and quantum of this rainfall run-off should be undertaken, preferably by a third-party. This should then form part of model development documentation along with information on how this is incorporated within the models and how it will be accounted for in a volumetric entitlement.	The department will commission an independent assessment of how well the additional rainfall run-off due to irrigation is being reflected in models and any implications that this has for licences and monitoring. The results of this work will be published.	Q4 2019
33	It would be useful within the model appendices to include an indication of the amount of infrastructure, assessed as eligible or ineligible works, was accounted for in the relevant model scenarios. to demonstrate what has been considered in each scenario. It is realised that this information at the fine scale is very sensitive, but at least broader indications of what has been included or excluded would provide further transparency.	The model scenario reports will detail the infrastructure at different points in time and the evidence used to make these assessments.	Q3 2020

Item	Recommendation summary	Response	Timeframe
34	The guideline for implementing the policy should outline how existing, ineligible works are to be managed through compliance and enforcement.	Following implementation of the policy in a given designated floodplain, it will be an offence harvest water from floodplains without having the appropriate licence and approval. The Natural Resources Access Regulator will be responsible for compliance and enforcement.	Q3 2021
35	While the process of data collection, verification, validation and data use is sound, some assessment of farm-by-farm variability, supported by the sensitivity testing recommended in responses to other questions in this final report, needs to be completed to confirm that the responses and data uses are appropriate and that the simplification and lumping processes do not unduly cause inequity in required reductions in floodplain harvesting take.	The model sensitivity report will include sensitive analysis of key model parameters and their influence on both valley and individual volumetric estimates.	Q4 2019
36	Further explanation of the differences between IBQs and remotely sensing temporary storage volumes would be useful to improve transparency, but these differences as they relate to floodplain harvesting take doesn't appear to be of great significance from the evidence reviewed.	The model build reports will include a summary of the temporary storages nominated by the landholders in their irrigator behaviour questionnaire. It will also provide a description of the remote sensing analysis undertaken by the department to verify the presence of water outside permanent storages but within the property boundaries after a few known events.	Q3 2020
37	As a matter of priority, the model build reports for each valley should be completed by the department and made publicly available. Each of the reports should be explicit about how crop irrigation demands have been determined, including how IBQ information has been used. Appropriate sections of the draft reports for the Border Rivers and Gwydir can be used as templates for the other valleys.	The department published crop water use assumptions for floodplain harvesting in October 2018. The model build reports will include a summary of what data sources have been used for crop irrigation demands.	Complete Q3 2020
38	The department should engage with irrigator groups, industry and cotton researchers in each of the respective valleys to further discuss crop irrigation demands and variations observed, with a view to mutually increasing understanding and transparency.	The model sensitivity report will include sensitive analysis of key model parameters and their influence on both valley and individual volumetric estimates. The department will hold a focus workshop with peak water user groups in Northern NSW valleys to provide information about the modelling approach applied to individual farms and how it is supported by sensitivity testing.	Q4 2019 Q3 2019
39	An updated fact sheet about the process for floodplain harvesting licensing in unregulated systems, possibly building on the documents made available to the reviewers, could be published and more targeted information could be provided to landholders involved in or impacted by the issuing of licences in unregulated systems.	The guideline will include information about the licensing process in unregulated systems. The department will send out letters to owners of properties engaged in unregulated floodplain harvesting to explain the calculation process for their individual circumstances. Submissions will be considered by an independent review committee.	Q3 2019 Q4 2019- Q1 2020

Item	Recommendation summary	Response	Timeframe
40	As a matter of priority, the model build reports for each valley should be completed by the department and made publicly available. Each of the reports should be explicit about how farm irrigation supply system and in-field efficiencies have been determined. Appropriate sections of the draft reports for the Border Rivers and Gwydir can be used as templates for the other valleys.	The model build reports will explicitly include information about how farm irrigation, farm system and in-field efficiencies have been determined. See recommendation 38.	Q3 2020
41	As a matter of priority, the model build and scenario reports for each valley should be completed by the department and made publicly available. Each of the reports should be explicit about how cropped areas have been determined and verified. Appropriate sections of the draft reports for the Border Rivers and Gwydir can be used as templates for the other valleys.	The model build and scenario reports will be explicit about how cropped areas have been determined and verified.	Q3 2020
42	As a matter of priority, the model build reports for each valley should be completed by the department and made publicly available. Each of the reports should be explicit about how on-farm water balances have been verified. Appropriate sections of the draft report for the Border Rivers can be used as templates for the other valleys.	The model build and scenario reports will be explicit about how on-farm water balances have been verified.	Q3 2020
43	Some verification or validation of the final OBF and floodplain harvesting values needs to occur, ideally in collaboration with water users. Currently, the process is to use all of the information available to determine these values, but there is no process by which these numbers are then independently validated. It is recommended that a method of validation is adopted, if possible using an alternative data source (e.g. the former Office of Environment and Heritage hydraulic models of specific events) to examine whether the OBF volumes are appropriate (i.e. that sufficient OBF has occurred for the volumes determined in the model). This may be as simple as comparisons of a number of key OBF events in a valley or basin.	See item 30	See item 30
44	As a matter of priority, the model build and scenario reports for each valley should be completed by the department and made publicly available. Each of the reports should be explicit about how the latest account management rules have been represented in the models and fully explain the results and implications of applying the entitlements and account management rules framework.	The model scenario reports will show the results of different entitlement and account management rule combinations against the policy objectives. The department will prepare environmental assessments that show on a valley- by -valley basis the benefits of implementing the policy (see recommendation 4).	Q3 2020

Item	Recommendation summary	Response	Timeframe
45	As the final floodplain harvesting volumetric entitlements are determined and quantified, an assessment of third-party (downstream users) impact, including cumulative impact, needs to be completed to clearly show stakeholders that downstream outcomes will be improved and/or accounted for in the implementation of the policy. In the absence of a water sharing plan, typically, this would form part of a regulatory impact assessment or similar process, but the inter-relationship between the individual floodplain harvesting licensing decisions and water sharing plan decisions needs to be explained and understood. We have not sighted evidence of this.	The model build and scenario reports will show how implementing the policy will reduce the current volume of water taken by floodplain harvesting where it is in excess of existing limits.	Q3 2020
		The department will prepare environmental assessments that show on a valley-by-valley basis the benefits of implementing the policy.	Q3 2020
46	Water sharing plan amendment rules, consisting of flow management rules/ access rules for floodplain harvesting licences in addition to account management rules, should be considered, especially to minimise impacts of floodplain harvesting on down-floodplain environments.	The department will publish a guideline detailing how the department will adaptively manage floodplain harvesting over time.	Q3 2019
47	In preparing a comprehensive guideline outlining in detail the process steps used, or to be used, for implementing the policy, the department should be transparent and clear about the statutory decisions required for floodplain harvesting licences and those for water sharing plan amendments, and any inter-relationships.	The guideline will outline the legislative requirements for taking water associated with floodplain harvesting and the proposed rules in water sharing plans for licences. It will also explain the water sharing plan amendment provision and how that is part of adaptive management.	Q3 2019
48	Water sharing plan amendment rules, consisting of flow management rules/ access rules for floodplain harvesting licences should be considered in addition to account management rules, especially to protect held environmental water from floodplain harvesting, including under a future scenario within constraints-relaxed operating conditions.	In the department's work on active management of environmental water as part of the delivery of the NSW Water Reform Action Plan, it will consider the risks to held environmental water delivery from floodplain harvesting and opportunities to protect that water.	Q4 2019

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PUB19/421