

**INDEPENDENT REVIEW OF NSW FLOODPLAIN HARVESTING POLICY IMPLEMENTATION  
PROPOSED MATTERS FOR DETAILED REVIEW**

**EXECUTIVE SUMMARY**

As part of the development and implementation of the Floodplain Harvesting Policy in NSW, the Department of Industry has requested that the modelling and implementation of the policy be independently reviewed. This process is currently underway and the matters in this document provide for a “scope of review” into matters identified through presentations by the Department, discussions with stakeholders and formal submissions made to the independent reviewers.

There has been considerable investment and policy development into improving the management of floodplains in the Northern NSW areas of the Murray Darling Basin, with policy settings for floodplain harvesting set by successive governments since 1995. The overall water reforms in the Basin have meant that governments need to continue to investigate and implement policy reforms in order to meeting Basin Plan obligations.

This review is part of that process and will ultimately form part of the justification process for the Floodplain Harvesting Policy implementation to the Murray Darling Basin Authority. The implementation of this policy is based in technical modelling and assessment of supporting data and is being completed across a number of basins.

The primary objective of this review is to therefore provide transparency around that technical information and to also provide stakeholders with the confidence that the technical rigour and supporting processes are suitable to support policy implementation. It is not intended that the review focus on individual concerns or property scale concerns. Rather, it will provide a process by which stakeholder concerns with the process, information, data and models can be assessed and any issues or limitations noted. Associated with this will be recommendations around how these issues may be dealt with prior to establishing draft licenses for floodplain harvesting. It will therefore focus on the elements of importance to the implementation of the policy, rather than focusing on fine scale detail.

The review is to be conducted based on the Matters for Detailed Review presented here, using a collaborative and consultative process with the Department, MDBA, other state agencies and concerned stakeholders. It is intended that the review progress through until April/May 2019 with the final results presented to interested parties in that timeframe.

## 1.0 BACKGROUND

The NSW Floodplain Harvesting Policy (The Policy) was first published in May 2013 and amended and updated in September 2018. (See [industry.nsw.gov.au](http://industry.nsw.gov.au) for more information.)

The Policy is progressively being implemented, starting with the NSW Border Rivers, Barwon-Darling, Namoi, Gwydir and Macquarie valleys in northern NSW.

To improve stakeholder confidence, the NSW Department of Industry (the Department), together with the Murray Darling Basin Authority (MDBA), have commissioned an independent review of implementation of the Policy, including independent peer review of revised floodplain harvesting modelling in northern NSW.

The focus of the independent review is to ensure that the modelling is technically robust, based on the best available information and that implementation of the NSW Floodplain Harvesting Policy is consistent with relevant legislation and other related policies.

The scope of the independent review contains both technical and policy implementation related matters.

## 2.0 PROCESS TO IDENTIFY MATTERS FOR DETAILED REVIEW

The independent reviewers (Tony Weber of Alluvium Consulting Australia and Greg Claydon, a sub-consultant to Alluvium) have used the following to propose matters for detailed review of the implementation of the Policy:

1. Reading of relevant published materials on the Department's website;
2. Attendance at stakeholder workshops in Dubbo, Sydney and Tamworth during early October, 2018, during which staff from the Department and the MDBA made presentations about their approach to implementation of the Policy and workshop attendees made comments and sought clarifications;
3. Face to face, telephone and email discussions with stakeholders as requested by them following the above workshops;
4. Consideration of written submissions requested from stakeholders by 16 November (subsequently extended to early December 2018 as requested by some stakeholders);
5. Further discussions with the Department and the MDBA about, and further review of, draft documents prepared by the Department, recognising that there is still very substantial documentation to be undertaken.

In keeping with the focus of the review, the independent reviewers now propose to investigate, analyse and make comments in their draft Review Report about the matters outlined below. Feedback about this proposal is welcomed, recognising that additional matters may also be identified as the review further progresses.

The independent reviewers do note that the submissions covered a wide range of issues associated with floodplain harvesting, with some being beyond the scope of this review, highlighted by the following examples:

- Some submissions highlighted that floodplain harvesting should be made illegal due to adverse downstream impacts and lack of equity;
- Others questioned whether the components of take, including rainfall runoff and floodplain harvesting, are equitably shared across all users in a basin;

- Specific details regarding individual works and draft licensing amounts.

The independent reviewers' task is not to assess these as they relate back to original policy decisions or individual circumstances, but rather to assess whether the policy is being implemented consistent with legislation and policy and that this is appropriately represented in the models. The above examples and other policy comments have been forwarded to the Department for their consideration and subsequent direct response.

### **3.0 OVERVIEW OF SUCCESS FACTORS FOR IMPLEMENTATION**

The independent reviewers propose that their Review Report will outline whether, based on the information provided to them, and their assessments, the approaches to implementation of the Policy:

- are based on the best available data and information, and, where assumptions have had to be made about that data and information, those assumptions are reasonable, robust, defensible, transparent and auditible based on the available evidence;
- are based on sound numerical modelling concepts, inputs and results and the numerical modelling is "fit-for-purpose" and appropriately documented;
- consider and treat on-farm and downstream water users and uses equitably and consistently, in line with the Policy objectives;
- can be applied in a repeatable and consistent way across the northern NSW valleys;
- can accommodate further updates should new data or information provide justifiable evidence to overcome any previously identified limitations;
- are supported by provisions in the NSW Water Management Act 2000, the Commonwealth Water Act 2007 and the Murray-Darling Basin Plan 2012;
- are appropriate for granting floodplain harvesting water access licences and being incorporated into water sharing plans; and
- have been sufficiently explained to and understood by stakeholders.

### **4.0 OVERVIEW OF MATTERS FOR DETAILED REVIEW**

In considering the information below, it is important to keep in mind that the terms of reference for the review require the independent reviewers to consider implementation of the Policy, not the Policy itself, though some interpretation is invariably required.

Each section below contains a brief description of the issue and proposes focus questions to be considered by the independent reviewers.

#### **4.1 Appropriate Conceptualisation of Policy Implementation**

Many irrigator and non-irrigator stakeholders asserted that the implementation of the Policy would involve specification, at least initially, of a volume of floodplain harvesting take that is "no more and no less" than would be permitted to be taken lawfully at the time of negotiations around the policy development.

There has been some confusion and doubt amongst some stakeholders as to the interpretation of the amended and updated 2018 Policy, including the definitions and legal underpinnings of floodplain harvesting and rainfall runoff, and how they have been or may be accounted for in the Baseline Diversion Limits (BDLs) and Sustainable Diversion Limits (SDLs) and other relevant matters under the Murray-Darling Basin Plan 2012.

There has also been some confusion among some stakeholders as to the dates that are relevant to quantifying floodplain harvesting entitlements and how data and information about on-farm infrastructure and irrigator behaviour at those dates have been collected and used.

*4.1.1 Do the guidelines and process steps for implementation of the Policy adequately cover the determination of eligible floodplain harvesting works and the identification of irrigator behaviour at the appropriate time?*

*4.1.2 Do the guidelines and process steps for implementation of the Policy adequately cover and explain if, when and how, water sharing plans, BDLs and SDLs are to be amended, including any legal provisions that apply, consistent with the NSW Water Management Act 2000, the Commonwealth Water Act 2007 and the Murray-Darling Basin Plan 2012?*

*4.1.3 Do the guidelines and process steps for implementation of the Policy adequately cover the issuing of individual farm floodplain harvesting water access licences and explain how any share components will be determined, including processes for a review of any individual anomalies?*

*4.1.4 What is the basis for the proposed and/or designated floodplain boundaries and what is classed as floodplain flows?*

*4.1.5 Have the pros and cons of alternative approaches to determining individual farm floodplain harvesting water access licenses and share components been considered and compared with the currently adopted approach for Policy implementation?*

## **4.2 Appropriate Conceptualisation of the Numerical Modelling at Appropriate Scales**

Traditionally, numerical hydrologic models have been used to assess and consider impacts of different water infrastructure and water management approaches at basin, valley and sub-valley scales.

Using numerical hydrologic models, combined in some cases with hydraulic models, to determine individual farm based water entitlements and volumetric shares is an extension of this traditional approach.

Some stakeholders have questioned whether there are too many complexities, uncertainties or plain unknowns associated with the modelling of on-farm floodplain harvesting take to enable a consistent, reliable and defendable determination of farm based volumetric floodplain harvesting entitlements. A particular difficulty encountered when trying to develop numerical model estimates of floodplain harvesting is the lack of measured data to use for validation. In the absence of measured data, multiple lines of evidence may be used to try to build some additional confidence in the estimate of floodplain harvesting and its uncertainty.

*4.2.1 Do the models properly represent regulated and unregulated systems (including the Barwon-Darling) in accordance with the Policy intent?*

*4.2.2 Do the models and determination of allowable take have due regard to downstream impacts such as Matters of National Environmental Significance?*

4.2.3 *Is the conceptualisation of the modelling at appropriate spatial and temporal scales to evaluate individual farm take and behaviours and represent these adequately in a draft entitlement?*

4.2.4 *What are the multiple lines of evidence and have they been used in a transparent way to provide for the conceptualisation of the numerical models and the inputs to those models.*

4.2.5 *Is there evidence in the documentation as to what data, information and assumptions (including from Irrigator Behaviour Questionnaires - IBQs) have been used or not used and why?*

4.2.6 *With respect to the influence of the IBQs on model parameterisation, when was on-farm information reported from the IBQs used or not used and how were inconsistencies between other data sources and the IBQs reconciled?*

4.2.7 *What is the verification process at the farm scale?*

4.2.8 *Are the lines of evidence used repeatable and auditable?*

4.2.9 *Is the representation of flow paths, on-farm infrastructure including temporary and permanent storages, irrigated areas and their operational arrangements in the models appropriate and supported by the best available evidence?*

4.2.10 *Are the uncertainties in the numerical modelling approach sufficiently known and understood at the farm scale to enable individual farm based water entitlements and volumetric shares to be confidently and equitably determined?*

4.2.11 *Is the numerical modelling approach “fit-for-purpose”, including model structure, appropriate calibration, validation and documentation to provide confidence in same?*

4.2.12 *What mitigations have been used to offset unacceptable outcomes due to the existence of various uncertainties, and are they adequate?*

### **4.3 Appropriate Climatic Considerations**

A number of stakeholders made comments about past and future climate change, and the variability of climate across the valleys where the Policy is to be implemented. They questioned the understanding of the representativeness of the climate series in terms of understanding present day conditions.

4.3.1 *With respect to understanding the representativeness of the climate series in terms of understanding present day conditions, does a long term climate sequence reduce any recent climatic shifts such as step changes and has this been examined at all?*

4.3.2 *To better understand the resolution of the climate data (both rainfall and evapotranspiration), what are the implications of broadscale climate inputs when assessing farm scale conditions?*

4.3.3 *Has a potential future drying climate been considered in the implementation of the Policy?*

#### **4.4 Appropriate Identification of Floodplain Flows and Rainfall Runoff Volumes Available for Taking**

Several stakeholders have expressed views as to whether the taking and use of rainfall runoff from irrigated lands should or should not be included in the floodplain harvesting definition as it is in the amended and updated 2018 Policy. In any event, implementation of the Policy by way of a whole of on-farm water balance requires explicit consideration of and accounting for volumes of water from both “overbank” on-farm floodplain flows and flows on the floodplain that may emanate from rainfall runoff from dryland and irrigated areas “up floodplain”.

*4.4.1 Are the data, information and assumptions used to generate/estimate “overbank” on-farm floodplain locations, flow rates, volumes, timings, frequencies and durations appropriate and supported by the best available evidence, including local floodplain knowledge from within government and external stakeholders?*

*4.4.2 Specifically, how is calibration/verification of floodplain volumes undertaken and is this appropriate and supported by the best available evidence?*

*4.4.3 With respect to consistency between different lines of evidence regarding overland/floodplain flows, what is the variability in each of the data sources and between them and how has this been reconciled?*

*4.4.4 Is the data, information and assumptions used to generate/estimate on-farm rainfall runoff rates, volumes, timings, frequencies and durations from both dryland and irrigated areas appropriate, supported by the best available evidence and consistent with the Floodplain Harvesting Policy intent?*

*4.4.5 Why was a particular rainfall-runoff model chosen, how was it calibrated and how is it downscaled to paddock conditions at the farm?*

*4.4.6 How does the rainfall-runoff model account for different irrigation behaviours (e.g. watering prior to rainfall events) and how does this relate to other water uses?*

#### **4.5 Appropriate Identification of On-Farm Infrastructure to Temporarily or Permanently Take and Store Floodplain Flows**

Several stakeholders have expressed views as to whether the use of temporary storage facilities should or should not be included in the floodplain harvesting licensing arrangements. In any event, implementation of the Policy by way of a whole of on-farm water balance does require consideration of and accounting for volumes of water from both temporary and permanent storage facilities.

On-farm water take and storage can be very complex, involving multiple facilities that may be operated differently depending on the real-time circumstances. Approaches to operations may also change over the years as experience is gained, efficiencies are improved, works are modified, and an adaptive approach to management is adopted. Identifying levels of on-farm development that existed in the past (eg in 1993/94 for which the Murray-Darling Basin cap on diversions is defined, in 1999/2000 for which most water sharing plans define limits, or on 3 July 2008 which is a key date for eligible floodplain

harvesting works), and the water management behaviours that may have existed then, are especially challenging.

*4.5.1 Does the modelling reflect the impacts of eligible works only and are other structures (illegal, changed as a result of trading of entitlements, or otherwise) assumed to be included or excluded from the models and do they allow for disaggregation of the Plan limit into volumetric shares?*

*4.5.2 Is the adopted base case scenario clear within the model in terms of the timeframe it is intended to represent and is this supported by the best available evidence?*

*4.5.3 Is the data, information and assumptions used to identify on-farm diversion and take works, permanent storages, irrigated areas, and modelling of how they have been/are used, appropriate, supported by the best available evidence, and consistent with the Floodplain Harvesting Policy intent?*

*4.5.4 Is the data, information and assumptions used to identify on-farm temporary storages, and model representation of how they have been/are used, appropriate, supported by the best available evidence, and consistent with the Floodplain Harvesting Policy intent?*

*4.5.5 What has been/is the relative significance of the volumes taken into temporary storages and is the management of any risks associated with that significance appropriate?*

#### **4.6 Appropriate On-Farm Water Use Considerations**

On-farm water use is influenced by location, crop and soil type, watering system, irrigator behaviour, among other things. On-farm water use can come from several sources, including direct irrigation and irrigation from storages that hold supplementary water access entitlements, floodplain harvesting water, rainfall runoff, used and contaminated water.

*4.6.1 Is the data, information and assumptions used to generate/estimate crop (and any pre-water) irrigation demand volumes, timings, frequencies and durations appropriate and supported by the best available evidence? Do they represent the different cropping conditions in the relevant basins?*

*4.6.2 Where floodplain harvesting in unregulated systems is to be assessed, is the process available for determining rate of water use, groundwater use, unregulated water an appropriate method for determining floodplain harvesting entitlements?*

*4.6.3 Is the data, information and assumptions used to generate/estimate on-farm irrigation supply system and in-field efficiencies appropriate and supported by the best available evidence?*

*4.6.4 Is the data, information and assumptions used to validate on-farm cropped areas appropriate and supported by the best available evidence?*

#### **4.7 Appropriate On-Farm Water Balance Considerations**

There are a range of water sources measured, estimated or exempt from licensing (with allowances such as the harvestable right from dryland areas) that are managed (taken,

interfered with, used or recycled) on-farm at any given time – daily, weekly, monthly, seasonally, annually, multi-yearly.

*4.7.1 Is the data, information and assumptions used to validate on-farm water balances appropriate, supported by the best available evidence and consistent with regulation and policy, including allowances for contaminated runoff and used irrigation water?*

*4.7.2 In reconciling the water balance, what other losses are included or implicit in the on-farm modelling and how are these handled in terms of rainfall-runoff assessments, for example?*

*4.7.3 Are the uncertainties in the water balance calculations known and understood to the extent that any residual unknowns in the water balance calculations can be meaningfully and reliably determined?*

#### **4.8 Appropriate Application of Water Accounting Rules**

Some stakeholders were of the view that there is insufficient information currently available to determine the potential impact of floodplain harvesting volumetric limits and account management rules on downstream flows, recognising their importance to downstream landholders' livelihoods, Matters of National Environmental Significance and the ecological character of floodplain and instream environmental assets.

*4.8.1 Are the account management rules effectively represented in the model and is that representation consistent with the Floodplain Harvesting Policy intent.*

*4.8.2 Does the numerical model configuration allow for appropriate simulation of downstream flows and is it sufficiently sensitive for assessing impacts that may arise from floodplain harvesting licences, changes in floodplain harvesting volumes and account rules, including impacts on Matters of National Environmental Significance, and the efficient and effective use of environmental water holdings?*

*4.8.3 What is the effectiveness of the account management rules to mitigate event based environmental risks, and the evidence used to determine residual risk?*

*4.8.4 What is the effectiveness of the account management rules, or other event based mechanisms, to protect held environmental water from floodplain harvesting, including under a future scenario within constraints relaxed operating conditions?*

#### **4.9 Appropriate Measurement and Monitoring**

A draft Floodplain Harvesting Monitoring and Auditing Strategy (November, 2018) has been released by the Department for consultation. Public feedback on the draft Strategy has been invited until 15 February, 2019.

While appropriate measurement and monitoring, reporting and auditing, compliance and enforcement are integral elements of implementation of the Policy, consideration of the draft Strategy per se is not within the scope of this independent review.

Nevertheless, the independent reviewers may have regard to their implications when considering the matters outlined above, and requirements for the management of any risks

that could emerge. This may also include identifying any potential inconsistencies or misalignments of the measurement and compliance regime with the intent and implementation of the Policy, including any arrangements for trading of entitlements.

#### **4.10 Consideration of Any Suggestions to Overcome Any Identified Limitations in Policy Implementation**

The review process will also be used to determine whether there are any limitations in the information collected for modelling and its treatment in the modelling that critically compromises the meeting of key objectives of the Policy. The independent reviewers will make recommendations as to how these can be resolved, including consideration of whether this should occur within the timeframes of the review or at a later date.