



FLOODPLAIN HARVESTING – BORDER RIVERS VALLEY

# Rainfall run-off exemption and modelling outcomes

---

Supplementary report

March 2021



Published by NSW Department of Planning, Industry and Environment

[dpie.nsw.gov.au](http://dpie.nsw.gov.au)

Title: Rainfall run-off exemption and modelling outcomes

Subtitle: Supplementary report

First published: March 2021

Department reference number: PUB21/139

---

© State of New South Wales through Department of Planning, Industry and Environment March 2021. You may copy, distribute, display, download and otherwise freely deal with this publication for any purpose, provided that you attribute the Department of Planning, Industry and Environment as the owner. However, you must obtain permission if you wish to charge others for access to the publication (other than at cost); include the publication in advertising or a product for sale; modify the publication; or republish the publication on a website. You may freely link to the publication on a departmental website.

Disclaimer: The information contained in this publication is based on knowledge and understanding at the time of writing (March 2021) and may not be accurate, current or complete. The State of New South Wales (including the NSW Department of Planning, Industry and Environment), the author and the publisher take no responsibility, and will accept no liability, for the accuracy, currency, reliability or correctness of any information included in the document (including material provided by third parties). Readers should make their own inquiries and rely on their own advice when making decisions related to material contained in this publication.

## Executive summary

The department has proposed a regulation to exempt some of the rainfall runoff that is collected in a tailwater return drain from requiring a water access licence and a water supply works approval. Further information about this exemption is available on our website.

The successful commencement of this exemption impacts the way floodplain harvesting is modelled in the Border Rivers Valley, as its practical effect is to exclude this volume from the definition of floodplain harvesting. For transparency, this report shows the impact that the proposed exemption will have on entitlements as well as environmental and downstream outcomes.

This report shows that the most significant changes resulting from the exemption relate to the volume estimates of floodplain harvesting and the entitlements required to deliver the outcomes of the NSW Floodplain Harvesting Policy.

Environmental outcomes are predominately driven by changes in overbank flows and hence are insensitive to the proposed rainfall runoff exemption.

Likewise, downstream outcomes are insensitive to the proposed rainfall exemption, because of the volumes involved and because the rainfall runoff exemption will only apply at times when there is no other overland flow being taken.

# Contents

<b>Executive summary</b> .....	<b>i</b>
<b>Effect of the rainfall run-off exemption on floodplain harvesting modelling – NSW Border Rivers valley</b> .....	<b>i</b>
<b>Rainfall run-off exemption</b> .....	<b>1</b>
<b>Impact on floodplain harvesting modelling</b> .....	<b>2</b>
<b>Impact on environmental outcomes</b> .....	<b>4</b>
Predicted hydrological outcomes .....	4
Predicted environmental outcomes .....	4
<b>Impact on downstream outcomes analysis</b> .....	<b>4</b>
<b>Next steps</b> .....	<b>5</b>

# Effect of the rainfall run-off exemption on floodplain harvesting modelling – NSW Border Rivers valley

The proposed rainfall run-off exemption has the potential to impact floodplain harvesting modelling in the NSW Border Rivers valley. This report clarifies the scale of this potential impact on licence shares, the environment, and downstream outcomes. This report should be read in conjunction with the report: [Floodplain harvesting entitlements for the NSW Border Rivers regulated river system \(DPIE Water\)](#).

## Rainfall run-off exemption

The department has proposed a regulation to exempt rainfall run-off that is collected in a tailwater return drain from requiring a water access licence and a water supply works approval. The successful commencement of this exemption impacts the way floodplain harvesting is modelled in the NSW Border Rivers Valley.

A tailwater return drain is used to collect used irrigation water. When water is applied to a field, the water that does not soak into the soil runs off and is collected in a tailwater drain for reuse. This water has already been measured and accounted for under a relevant licence. When it rains, rainfall run-off mixes with the used water in the tailwater drain. It is impossible to confidently and accurately measure and account for the volume of rainfall run-off separately from the volume of used irrigation water.

Run-off from land that has been developed for irrigation can be up to four times higher, on average, than undeveloped land due to levelling and drainage earthworks, and the regular application of water for irrigation. It is not yet resolved whether all or part of the rainfall runoff water collected in irrigation tailwater systems constitutes a diversion. This runoff can also contain silt, nutrients, and other agricultural products that should be kept out of rivers and streams.

The department has committed to the development of a state-wide policy for assessing and managing the growth in runoff collected through tailwater drains as an interception activity under the Basin Plan 2012. This policy will also consider the approach being taken by other Basin States through their Water Resource Plans and will ensure NSW farmers can manage their properties efficiently, while ensuring that overall water take is within legal limits.

The proposed regulation clarifies when rainfall run-off harvested from a tailwater return drains needs to be measured. Measuring the volume of rainfall-runoff captured in tailwater return drains would not be required when the drains are the only structure intercepting water. At all other times, the exemption would not apply, and the volume of water collected in tailwater return drains **must** be measured and accounted for under a water access licence.

For modelling, the following practical definitions have been applied<sup>1</sup>:

**Exempt** rainfall runoff harvesting is defined as that which occurs from fallow or cropped areas on days when no water is being harvested from outside the farm.

**Non-exempt** rainfall runoff harvesting is defined as all runoff harvesting that occurs when water is being harvested from outside the farm.

<sup>1</sup> Rainfall run-off from undeveloped land on a farm is not exempt and is modelled separately to run-off from developed land on the farm.

The Water Management (General) Amendment (Exemption for Rainfall Run-off Collection) Regulation 2020 is expected to commence in March 2021.

## Impact on floodplain harvesting modelling

Modelling undertaken by the department was used to estimate the volume of water taken by floodplain harvesting in the NSW Border Rivers regulated river system. This modelling work is described in the NSW Border Rivers Model Build<sup>2</sup> and NSW Border Rivers Scenarios<sup>3</sup> reports that are now available on the department's website. These reports should be read in conjunction with this report.

The modelling results in the Border Rivers Scenarios report have assumed that the rainfall run-off exemption will be in place when licensing of floodplain harvesting formally commences. Should the exemption not be in place:

- the diversion limit set by the water sharing plan will need to be revised to include all rainfall run-off harvesting
- assessment of growth in water use in the valley will need to be revised to include all rainfall run-off harvesting
- licences will need to be recalculated to include all rainfall run-off harvesting.

Results from the NSW Border Rivers Scenarios report are shown in

[Table 1](#). Additional details have been included to show the exempt and non-exempt rainfall run-off harvesting model results.

**Plan Limit Scenario** – the version of the Border Rivers Valley model that estimates the limit on diversions set by the water sharing plan.

**Current Conditions Scenario** - the version of the Border Rivers Valley model that estimates the current level of diversions.

**(Valley Scale) Compliance Scenario** - the version of the Border Rivers Valley model that estimates the level of diversions with the proposed licences and management rules in place.

<sup>2</sup> *Building the river system model for the NSW Border Rivers regulated river system* (DPIE Water 2020)

<sup>3</sup> *Floodplain harvesting entitlements for the NSW Border Rivers regulated river system* (DPIE Water)

**Table 1 Modelled long-term (1895 to 2009) average diversions under the Plan Limit Scenario and Current Conditions Scenario to determine growth in use and the Valley Scale Compliance Scenario**

<b>Diversions category</b>	<b>(A) Plan Limit Scenario GL/year</b>	<b>(B) Current Conditions Scenario GL/year</b>	<b>(C) Valley Scale Compliance Scenario GL/year (with exemption)</b>
General and high security	92.1	92.6	93.0
Supplementary access	69.2	70.0	71.2
Floodplain harvesting			
Overbank flow harvesting	33.7	38.1	32.9
Exempt rainfall Harvesting	5.8	6.3	6.1
Non-exempt rainfall harvesting	5.0	5.5	5.1
<b>Total diversions (less exempt RR)</b>	<b>200.0</b>	<b>206.1</b>	<b>202.2</b>
<b>Total diversions</b>	<b>205.7</b>	<b>212.5</b>	<b>208.3</b>
<b>Estimated floodplain harvesting licence shares</b>			<b>51,700</b>

Note: Totals may have slight differences due to rounding.

These results show that, without the exemption, the Plan Limit for the regulated river system would be adjusted to be 5.8 GL/year higher with a total Plan Limit of 205.7 GL/year.

The model results for the Valley Scale Compliance Scenario (Column C) show that non-exempt harvesting (the sum of the overbank flow harvesting and the non-exempt rainfall run-off harvesting) has been brought back within its equivalent share of the Plan Limit, and no further reductions would be applied to non-exempt harvesting. The total diversions under the Valley Scale Compliance Scenario remain slightly above the Plan Limit due to the increases in general security and supplementary use above their equivalent share of Plan Limit.

There is a small increase in the exempt rainfall run-off harvesting between the Plan Limit and Current Conditions scenarios of 0.5 GL/year. This growth was not included in the design of licences. If it were included, total harvesting under the Valley Scale Compliance Scenario (the sum of all three forms of harvesting at Column C is 44.1 GL/year) would remain less than total harvesting under the Plan Limit (the sum at Column A is 44.5 GL/year).

This suggests that, if the exemption were not in place, the outcomes from licensing floodplain harvesting would remain much the same for the NSW Border Rivers regulated river system. The total number of licence shares would need to be increased to approximately 55,500 shares, to reflect that all rainfall run-off harvesting would be reported against the licence.

## Impact on environmental outcomes

The assessment undertaken by the department to estimate the environmental outcomes from licensing floodplain harvesting on the NSW Border Rivers floodplain is described in the NSW Border Rivers Environmental Outcomes report<sup>4</sup> that is available on the department's website. The analysis reported here is a summary of the hydrological and environmental outcomes of implementing the NSW Floodplain Harvesting Policy (the policy) with the exemption applied. The results reflect predicted changes across the 9 breakout zones in the NSW Border Rivers.

No quantitative analysis of the without exemption model scenario has been undertaken, instead our estimated outcomes are based on the small amount of growth in exempt rainfall run-off harvesting described in the previous section.

### Predicted hydrological outcomes

Magnitude (e.g. flood volume), frequency, duration and timing are all ecologically important hydrological features of the floodplain flow regime. A range of ecologically relevant flow metrics were used to describe high-level changes to floodplain hydrology. Implementing the policy with the exemption applied is predicted to increase the mean annual volume in flood years<sup>5</sup> by more than 12% in 8 of the 9 breakout zones. The estimated change in long-term average diversions and annual end-of-system flows with and without the exemption applied suggests there are unlikely to be substantial changes to the hydrological outcomes in this valley.

### Predicted environmental outcomes

The predicted ecological responses to changes in floodplain hydrology provide an assessment of the potential environmental outcomes. The ecological responses are based on the achievement of the environmental water requirements (EWRs) for documented assets and values on the floodplain. The percentage change results reported in the NSW Border Rivers Scenarios report provide a high-level summary of the average change to a number of metrics important for waterbirds, native vegetation and native fish across the floodplain with the policy implemented and the exemption applied.

The achievement of these key environmental water requirements are predicted to increase in all breakout zones with the exemption applied, as described in the NSW Border Rivers Scenarios report. It is difficult to identify if the small changes in long term average diversions (

[Table 1](#)) and end-of-system flows without the exemption would influence these outcomes.

However, it is unlikely that any substantial changes in the predicted environmental outcomes would occur.

## Impact on downstream outcomes analysis

The licensing of floodplain harvesting, and its return to within statutory limits, will restrict the volume of water that can be taken from the floodplain and return water to the river system. It is not yet possible to estimate what improvement to flows in rivers and creeks may occur from this restriction to water taken on the floodplain. However, any improvements in upstream systems such as the NSW Border-Rivers (which provides on average 18% of Barwon-Darling inflows) may translate to improvements further downstream in the Barwon-Darling River system.

<sup>4</sup> [Environmental outcomes of implementing the Floodplain Harvesting Policy in the Border Rivers valley \(DPIE Water 2020\)](#)

<sup>5</sup> A flood year is considered any year where flow was modelled on the floodplain

The assessment undertaken by the department to estimate the downstream outcomes of implementing the policy is described in the Border Rivers Downstream Outcomes Report<sup>6</sup> available on the DPIE Water website. This assessment tested what the outcomes would be if all reductions in floodplain harvesting resulted in water being returned to river flows. This represents an upper limit to the potential improvements in river flows that is unlikely to actually occur in practice, as we know that not all water that flows on the floodplain will return the river. However, the results are shown to provide affected communities important context regarding the potential for downstream benefits to occur.

Results show that the licensing framework with the rainfall run-off exemption in place may increase the average contribution of the Border Rivers regulated river system to the Barwon-Darling by 5.5 GL/year (1.0%), noting that this is an upper limit to the benefit that is unlikely to be achieved in practice. Without the rainfall run-off exemption, this upper limit to average downstream flow improvements is 5.8 GL/year (1.1%). There is only a small difference in the potential upper limit of downstream benefits between the two modelled scenarios, and therefore no significant difference in the likely improvements to downstream river flows.

## Next steps

The department will update the model build and scenario report to accompany the making of the water sharing plan. These updates will reflect whether the tailwater exemption has been made.

Updates will not be made to the environmental outcomes or downstream outcomes reports as the purpose of these reports was to inform public submissions on draft rules.

---

<sup>6</sup> [Modelled downstream effects of licensing floodplain harvesting in the NSW Border Rivers Valley \(DPIE Water 2020\)](#)

---

© State of New South Wales through Department of Planning, Industry and Environment 2021. The information contained in this publication is based on knowledge and understanding at the time of writing (March 2021). However, because of advances in knowledge, users should ensure that the information upon which they rely is up to date and to check the currency of the information with the appropriate departmental officer or the user's independent adviser.