HEALTHY FLOODPLAINS

Draft floodplain harvesting monitoring and auditing strategy

Consultation outcomes

August 2019

NSW Department of Planning, Industry and Environment | dpie.nsw.gov.au

Published by NSW Department of Planning, Industry and Environment

dpie.nsw.gov.au

Title: Draft floodplain harvesting monitoring and auditing strategy

Subtitle: Consultation outcomes

First published: August 2019

Department reference number: INT19/95985

More information

www.industry.nsw.gov.au/water

Contents

Introduction

Floodplain harvesting is the capture and use of water flowing across a floodplain during floods or heavy rain. The NSW Government introduced the NSW Floodplain Harvesting Policy in 2013 to protect downstream users and the environment by regulating and controlling floodplain harvesting. The policy was amended in 2018 to strengthen the licensing framework and improve its implementation.

Under the policy, the Department of Planning, Industry and Environment will grant landholders undertaking legitimate floodplain harvesting a water supply work approval and licence to authorise their activities. Bringing floodplain harvesting into the state's water licencing framework will ensure that floodplain harvesting take remains within the limits set out in NSW water sharing plans and the Murray–Darling Basin Plan. In this way, all water users will get their fair share and the environment is kept healthy.

While the policy applies to all floodplain harvesting within NSW, it is being implemented as a priority in the five northern NSW valleys where floodplain harvesting is most prevalent: the Border Rivers, Gwydir, Namoi, Barwon–Darling and Macquarie valleys. The NSW Government may expand the implementation to other areas if analysis shows the risks to be sufficiently high and the benefits to the community and the environment outweigh the implementation costs.

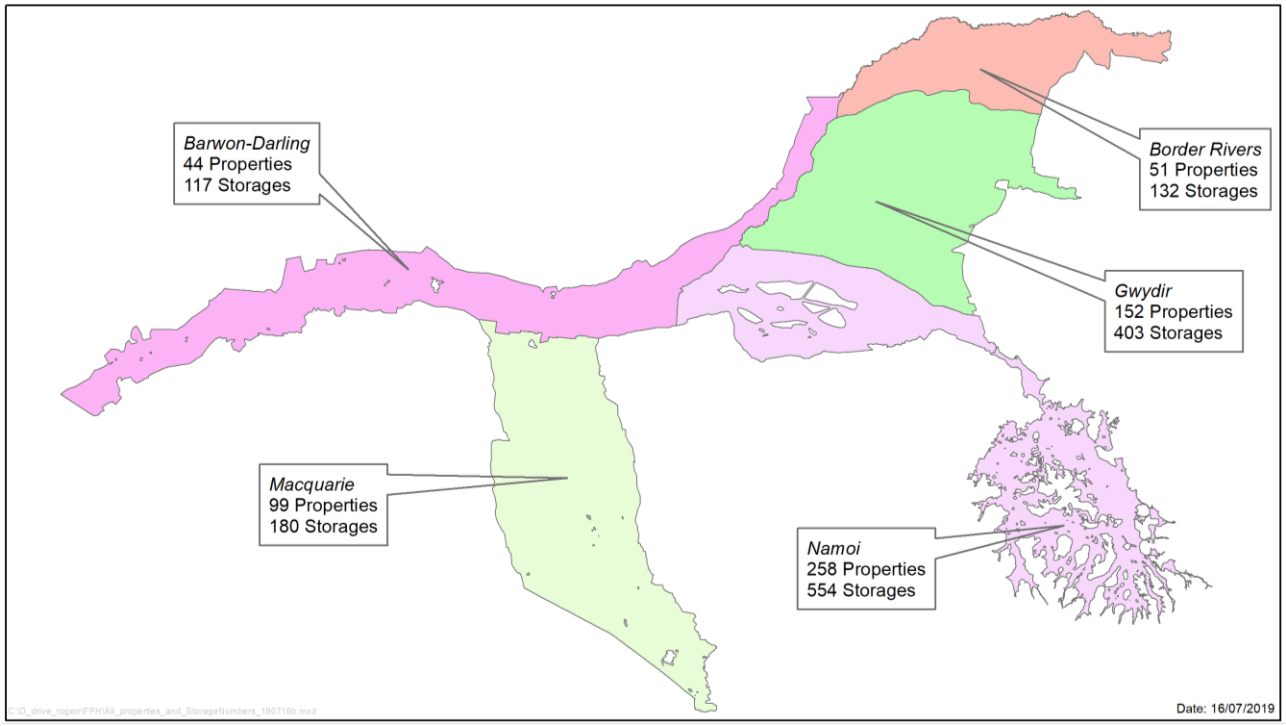

Figure 1. Summary statistics for floodplain harvesting properties and storages in the Northern Basin.

To ensure transparency and build stakeholder trust and confidence, the department instituted an independent peer review of the implementation of the NSW Floodplain Harvesting Policy. The final report is available on the department's website.

We have released an action plan to address the peer review recommendations, and to lay out the process, supporting documentation and timelines for completing implementation of the policy across the five northern NSW valleys. We will discussed this with stakeholders as part of consultations across NSW during September 2019.

This document focuses on consultation we have undertaken relating to monitoring floodplain harvesting following implementation of the policy in the northern valleys.

Background

Historically, floodplain harvesting extractions have been unlicensed and unmonitored in NSW. A significant benefit that will come from implementing the NSW Floodplain Harvesting Policy is that, for the first time, the water harvested from floodplains will be able to be accurately measured and accounted for, and can be included as part of the wider statewide management of water resources. This will provide a better understanding of water use throughout the state, while ensuring that all water users get their fair share and the environment is kept healthy.

Critical to the successful implementation of the policy and its ongoing improvement is collecting accurate measurement data on floodplain harvesting. The data is needed to determine if harvesting volumes have exceeded limits specified in relevant water sharing plans. If so, we can actively manage floodplain harvesting within each valley to ensure enough water is available for downstream water users and the environment.

Consultation with stakeholders on a measurement approach began in 2014 with a pilot study testing technologies to measure floodplain harvesting take.

In March 2017, the NSW Government released a draft Floodplain Harvesting Monitoring Policy for public consultation. After consultation, we proposed a staged approach to implementing monitoring to take into account the challenges of measuring floodplain harvesting diversions, but improve rigour over time.

In November 2018, the government released an updated draft Floodplain Harvesting Monitoring and Auditing Strategy for public consultation. A copy of the 2018 draft strategy is available at industry.nsw.gov.au/floodplain-harvesting

Murray–Darling Basin reviews

There have been a number of recent reviews of the Murray–Darling Basin that have made recommendations related to floodplain harvesting.

In November 2017, the Murray–Darling Basin Water Compliance Review recommended that by 30 June 2022, 95% of floodplain harvesting take be accurately measured. The Murray–Darling Basin Compliance Compact was developed to address this recommendation.

The Compliance Compact states that by 30 June 2019 the NSW and Queensland governments must have committed to programs for improving floodplain harvesting measurement. You can find information about the NSW improvement program for floodplain harvesting measurement on the department's website at industry.nsw.gov.au/floodplain-harvesting

In March 2019, the final report of the independent panel looking into fish deaths in the Lower Darling was released. The panel, chaired by Professor Robert Vertessy, recommended that NSW and Queensland improve their assessment of the hydrologic impacts of floodplain harvesting. You can view the Vertessy panel report on the MDBA website at www.mdba.gov.au

The final report from the Independent Review of NSW Floodplain Harvesting Policy Implementation was released in August 2019. The review recommended that measuring floodplain harvesting be made a priority. You can view the Independent Review report on the department's website at industry.nsw.gov.au/water/plans-programs/healthy-floodplains-project/harvesting

The 2018 draft Floodplain Harvesting Monitoring and Auditing Strategy

The 2018 draft Floodplain Harvesting Monitoring and Auditing Strategy proposed a staged approach to floodplain harvesting monitoring. This approach involved the department:

- putting in place a final monitoring and auditing strategy
- reviewing and evaluating the strategy over the first two years
- revising the strategy, if necessary.

The 2018 draft strategy included as a minimum requirement that licence holders to have a gauge board and calibrated storage curves for each permanent on-farm storage used for floodplain harvesting. The gauge boards would be used to measure the changes in the water level of permanent storages and that this level would be converted into a storage volume using the calibrated storage curve.

Water users would be responsible for record-keeping and reporting under a self-reporting system. They would need to make and record manual readings:

- daily during a floodplain harvesting event
- weekly during the irrigation season (1 October to 28 February)
- monthly for all other times.

The 2018 draft strategy proposed that the Natural Resources Access Regulator would verify the reported take. It also proposed that the NSW Government would pay for the installation of gauge boards, storage curves and the initial verification of any existing storage monitoring equipment.

Consultation on the 2018 draft strategy

To ensure the final strategy is practical, effective and robust, the department sought community and industry feedback on the 2018 draft strategy.

We invited the public to make submissions from 26 November 2018 to 15 February 2019 through the Have Your Say portal on our website, or via email. We notified key stakeholders via media releases and email, and placed advertisements in the Northwest Magazine, West Magazine and The Land. We received 32 submissions in total.

In October and December 2018 we held a series of workshops on the draft strategy. Workshops held in Dubbo, Sydney and Tamworth in October were combined with consultation on the Independent Review. These workshops introduced attendees to key elements of the draft strategy, and discussed the complexity of measuring floodplain harvesting water entering into temporary storages. These workshops were attended by 60 people.

In December, workshops were held in Moree, Narrabri, Narromine, Bourke and Sydney, along with a webinar. These workshops provided greater detail about measurement and reporting requirements, data verification and compliance. These workshops had a total of 155 participants. Attachment A gives a breakdown of number of participants at each event.

What you told us

The main areas of concern identified in the submissions and workshops were that self-reporting would not adequately support compliance, reporting requirements were too onerous and impractical, and that gauge boards were not an up-to-date technology.

Attachment B summarises all the feedback we received.

When considering your feedback, we took into account the following policy objectives that underpin the new measurement strategy. The strategy must ensure that:

- all floodplain harvesting take is measured
- measurement devices are accurate, reliable and tamper-proof
- measurement requirements are practical and cost-effective, and can be effectively and safely implemented

- measurement data is readily available to inform farming decisions, landholder calculations of take, and monitoring and evaluation programs
- measurement requirements generate data sufficient to trigger, where appropriate, an investigation into non-compliance.

Proposed changes based on feedback

Your feedback is an essential part of policy development. In the case of the 2018 draft strategy, it highlighted concerns and the need to modify the strategy in two broad areas—reporting requirements and technology, and rainfall run-off.

Reporting requirements and technology

Your feedback

You told us that you were concerned about:

- self-reporting not adequately supporting compliance
- the proposed reporting frequency being onerous, particularly during dry periods
- safety considerations when manually recording daily storage levels during a flood or rainfall event
- separating changes in on-farm storage volume during a floodplain harvesting event into floodplain harvesting and non-floodplain harvesting components
- gauge boards not being up-to-date technology
- costs for users with small or infrequently used storages
- gauge boards not being calibrated frequent enough.

What we are proposing to do to address your concerns

To address your concerns we are proposing to change the way the strategy introduces monitoring and measurement, and the technology used.

Previous approach

The 2018 draft strategy proposed a three-year, staged approach to monitoring that initially required at a minimum the use of gauge boards and calibrated storage curves to measure changes in water volumes in on-farm water storages.

The approach relied on the verification of self-reported data against multiple lines of evidence such as remote sensing to detect compliance breaches. It was proposed that after two years we would evaluate the success of this approach and make any necessary changes, including moving to new and updated technologies.

New approach

We are now proposing to implement an improvement program for floodplain harvesting in two complementary phases (see Table 1).

In phase one, we will immediately put in place arrangements for measuring floodplain harvesting take that will focus on obtaining accurate, reliable and tamper-proof data from all private on-farm storages used for floodplain harvesting. This will ensure that we can effectively manage floodplain harvesting within the extraction limits set in water sharing plans and the Basin Plan water resource plans. It will also provide measurement data to inform compliance and allow the evaluation of the policy settings.

For phase one, we are proposing that landholders install continuous storage meters on all on-farm storages used for floodplain harvesting, rather than the gauge boards specified in the 2018 draft strategy. The storage meters will have sensors to automatically detect water level, which will be converted to a volume by linked storage volume curves developed for each storage.

Data loggers attached to the storage meters will upload storage level data remotely and automatically to our iCloud (Eagle.io) using telemetry-enabled technology. The devices will have tamper proof seals and/or tamper detection technology, and will comply with the *Data Logging and Telemetry Specifications 2019*, which is available from the department's website at industry.nsw.gov.au/water-reform/metering-framework/telemetry

The proposed phase one requirements, including the use of continuous storage meters that automatically generate data, addresses the concerns about onerous and unsafe reporting requirements, as well as eliminating errors or inconsistencies self-reporting.

In phase two, and based on your feedback, we are proposing to commit to the development of a best-practice guideline for measuring floodplain harvesting take in collaboration with Queensland Government and the Murray–Darling Basin Authority. Developing the guideline will take time. Once completed, it will ensure that floodplain harvesting is measured consistently across state borders and is based on the best available information.

Proposed phase one and two measurement requirements meet all stated policy objectives and align with the policy settings within the NSW Non-Urban Water Metering Framework.

Table 1. Proposed two phase approach to measuring floodplain harvesting take

Phase	Involves	Timing
One Immediate arrangements	**Technology** Licence holders must install and maintain accurate, reliable and tamper-proof continuous storage meters on all permanent on-farm storages: • New devices must be tested and approved by Manly Hydraulics Laboratories against device acceptability standards. • Existing devices must be certified by a duly qualified person against device acceptability standards. • All devices must meet the *Data Logging and Telemetry Specifications 2019.* • The cost of continuous storage meters will be part subsidised through the NSW Healthy Floodplains Project. **Accounting** Individuals can choose simple or complex accounting for floodplain harvesting take on an event-by-event basis: • Simple accounting will attribute all storage volume changes during a floodplain-harvesting event as take. • Complex accounting will allow deductions from the total storage volume change during a floodplain harvesting event to account for any non-floodplain harvesting input to the storage during that event, e.g. used irrigation water, direct rainfall to storage, other licensed water. • Complex accounting will require additional evidence to support any deductions claimed including daily on-farm rainfall records, daily meter data records, daily irrigation diary, etc. The evidence requirements to claim each deduction will be included in the final strategy. **Compliance** Activities will involve: • physical inspections of infrastructure used for floodplain harvesting to ensure compliance with the work approval conditions • audits of reported floodplain harvesting events relative to changes in water storage volumes reported by data generated from storage meters • remote sensing, LiDAR and photogrammetry audits to assess floodplain harvesting take compliance with licence conditions.	Device acceptability standards established by Oct 2019 (based on 2014 pilot program) Testing of measurement technology (Dec 2019–April 2020) Installation of measurement technology (April 2020–June 2021) Compliance commences at the same time as entitlements (no later than July 2021).

Phase	Involves	Timing

Two
Develop and implement a measurement guideline
	Guideline development
	Develop a best-practice guideline for floodplain harvesting measurement:
	• The guideline will be developed in collaboration with the Queensland Government and the Murray-Darling Basin Authority, and in consultation with other stakeholders.
	Guideline implementation
	Implement the new guideline:
	• Technology installed on private on-farm storages under phase one arrangements will be permitted to remain in place until failure.
	• The new guideline may also include requirements for:
	  ○ redundancy measurement systems
	  ○ improved methods for disaggregating storage volume changes into floodplain harvesting and non-floodplain harvesting components
	  ○ other measurement/metering requirements in addition to the phase one arrangements.
		Develop between July 2019 – June 2021
		
		Implement between July 2021 - June 2022

Rainfall run-off

Your feedback

You told us that you were concerned about:

- rainfall run-off from developed land being 'artificially created'
- not being able to disaggregate the contaminated first flush from other forms of take
- some chemical residues not being caught by capturing the first flush
- an inability to access rainfall run-off creating business inefficiencies and an increased pollution risk.

What we are proposing to do to address your concerns

To address your concerns we are proposing to change the way strategy addresses contaminated water, and the levels of rainfall run-off that can be taken.

Previous approach

In 2018, the *Water Management Act 2000* and the NSW Floodplain Harvesting Policy were amended to allow water users to capture agriculturally contaminated rainfall run-off, even if they had used all allocated floodplain harvesting take. This was not additional water, but would be debited from accounts when the next available water determination was made.

The 2018 draft strategy proposed that users could take up to the first 55 millimetres of rainfall run-off after a registered chemical was applied. This could occur when an account balance reached zero, but the volume of water taken would be debited from the next available water determination.

The NSW Floodplain Harvesting Policy excludes 'used irrigation water' from the definition of floodplain harvesting because this water has already been legally taken under a right or licence.

The 2018 draft strategy considered that this exclusion related exclusively to excess irrigation water collected as tail-water returns.

New approach

In response to feedback about contaminated rainfall run-off, we are proposing that:

- the policy will consider 100% of rainfall run-off contaminated
- rainfall run-off can be taken by floodplain harvesting licences, up to a limit of 100%, when water allocation accounts reach zero. This water will be debited from accounts when the next available water determination is made.

We are currently considering whether we need to change any other aspects of our monitoring approach in order to reflect the additional rainfall run-off that may be occurring due to the application of irrigation water. We will publically report on our analysis of this issue, how the monitoring approach reflects it, and any changes necessary in the strategy address the issue.

Next steps

We will hold further stakeholder workshops in September 2019 to discuss the changes to the draft strategy.

You can find details for the workshops on our website at industry.nsw.gov.au/water/plans-programs/healthy-floodplains-project/monitoring-and-auditing-strategy

Once we have considered feedback from these consultation sessions, we will finalise and release the strategy, which will come into effect through conditions on floodplain harvesting licences. The floodplain harvesting compliance framework will be operational at the same time as entitlements (no later than 1 July 2021).

The Natural Resources Access Regulator will be responsible for implementing the strategy (industry.nsw.gov.au/natural-resources-access-regulator).

WaterNSW will be responsible for the accounting and billing associated with floodplain harvesting (waternsw.com.au).

Attachment A—Previous workshops

Table 2. Workshop 1 locations and participants

Location	Date	Participation
Dubbo	Monday 8 October, 2018	27
Sydney	Wednesday 10 October, 2018	20
Tamworth	Friday 12 October, 2018	13

Table 3. Workshop 2 locations and participants

Location	Date	Participation
Moree	Monday 3 December 2018	47
Narrabri	Monday 3 December 2018	40
Narromine	Wednesday 5 December 2018	33
Bourke	Thursday 6 December 2018	16
Sydney	Friday 7 December 2018	10
Webinar	Monday 10 December 2018	18 registered 9 active

There was a total of 215 participants across all events.

Attachment B—Stakeholder feedback summary

Stakeholder feedback directly relating to the draft strategy

Reporting requirements and technology

Support for:

- the minimum requirement of calibrated storage curves and gauge boards to enable the calculation of changes in storage volumes
- the choice of a measurement system above the minimum requirements being at the discretion of the licence holder
- the staged approach to monitoring and auditing. An evidence-based monitoring framework will assist with baseline data, compliance and enforcement
- verification and the use of remote sensing and aerial imagery to reduce the onus on water users to self-report. This would also foster community confidence, particularly if NRAR data is made public
- daily reading and recording requirements during rainfall. Most irrigation farmers have to check the pumps during this time
- the use of farm water balance models to determine volumes of water attributed to tail water return.

Concerns/comments that:

- gauge boards are a minimalist and outdated approach that may increase the risk of non-compliance. The Compliance Compact commits NSW to take advantage of emerging technologies such as telemetered systems, which are tamper proof and provide real-time data
- monitoring devices should align with the evidentiary provisions of the *Water Management Act 2000* (sections 367A and B) to ensure that measurement and monitoring can meet the criminal standard of proof
- calibrating gauge boards every 10 years is inadequate—more frequent checks of between one to five years is recommended
- new or additional monitoring must be fit for purpose, cost effective and produce data through a methodology that is repeatable, auditable and fosters confidence and integrity
- automated technology is already used in many other parts of the basin and gives volumetric extraction in real time and at not less than 95% accuracy. This technology should be considered the minimum reading method for floodplain harvesting
- automated technology such as telemetry will:
    - increase the accuracy and certainty of monitoring
    - reduce human error
    - enable more efficient framing practices
    - reduce the recording burden on farmers and government departments
    - reduce safety risks to workers who would have to manually read gauges in severe weather events
    - engender greater public confidence
- tamper-evident meters and associated telemetry should be installed by July 2019

- Aboriginal people should be trained to install meters and telemetry in the Northern Basin
- metering can be used to measure harvested water that is generally diverted from levees into channels which then flow into storages. Where channels are dry, the inflow from overland flow can be metered through a pipe
- LiDAR can be used to calculate volumes of harvested water
- auditing only 10% of floodplain harvesters in any one year is inadequate. Determining floodwater take by remote sensing would improve transparency and compliance of the whole sector. The strategy should aim to audit 50% of floodplain harvesters in the early years of program implementation
- verification should measure evapotranspiration via satellite imagery. Farm water balances should be reconciled with crop production. Crop production should be reconciled with industry seed inputs and grain production
- self-reporting data will be inaccurate given the history of non-compliance
- there appears to be no checks or safeguards against recording water volume in storages
- the adoption of advanced systems will not negate the need for self-assessment. Self-reporting will always be required to categorise each of the forms of take in a storage
- the frequency of recording is time consuming and onerous for landholders (especially if manual methods of reading are relied upon). This may expose individuals to unintended non-compliance and is likely to create large volumes of data with no value to regulators
- daily manual recording may risk the safety of employees who are required to check gauges during severe weather events
- the objective of the strategy should be to confidently measure floodplain take volumetrically, not to regulate individual behaviours and on-farm management procedures. The inclusion of rainfall run-off into the licencing component of floodplain harvesting has created regulatory burden. The onerous reporting requirements are largely driven by the need to capture data around rainfall, not floodplain take
- reporting frequency is onerous, requiring a substantial amount of work. Recommended that the take of floodplain harvesting be determined either quarterly or at the end of the water year. This is when all other forms of metered take, losses/tailwater and rainfall can be quantified. This will allow the volume of overland flow to be balanced
- irrigation farmers have previously agreed to report annually on floodplain harvesting take. There was a request that changes to these historic agreements be explained prior to implementation of a new approach
- the NSW Government establish reporting periods for potential floodplain harvesting events linked to known floodplain triggers or break-out points represented within the flood inundation models
- monitoring more regularly during an event will improve the reliability of calculation and minimise data loss issues earlier rather than at the end of the season. This would reduce the imposition on floodplain harvesting entitlement holders to provide continuous reporting on storage capacities when no flood water has been received or extracted
- to assist floodplain harvesting measurement, use farm water balances reconciled with crop production, including industry seed inputs and grain production.

Rainfall runoff

Support for:

- preventing agricultural contaminants entering river systems.

Concerns/comments that:

- first-flush rules could encourage irrigators to discharge contaminated run-off into the environment when they have reached or are close to reaching entitlement limits. The licence holder will have the choice of releasing water without guarantees that the water released is not contaminated
- first-flush rules benefit the cotton industry under best-practice management with no legislation permitting the first two inches of take. Contaminated water is open to exploitation
- the department should provide legislation supporting the requirement for all Basin states to measure and license rainfall
- the inclusion of rainfall runoff is not legislatively required as part of the original agreement to licence access to overland flow.

Temporary storage requirements

Concerns/comments that:

- the risk of an increase in the use of temporary storages is overstated. Given the investments in efficient storage, the volumes routed through temporary storage ultimately are profile filling and will not result in a change to the reportable take
- it is important that all water take including that in temporary storages is measured. This will ensure that total floodplain harvesting take remains within the limits of an individuals' floodplain harvesting access licence
- all storages must be reduced to the capacity of the volume of the licence
- the definition of temporary storages is vague and should be clarified
- the storage of floodplain water on irrigation fields is an outdated and inefficient method of storing water and must not be included in the strategy
- the requirements for temporary storages are unnecessary and have the potential to undermine on-farm efficiencies and result in non-compliance during the peak of a flood. Temporary storage provides much-needed breathing space during a peak flood
- temporary storages will increase take
- the strategy implies that water supply works and licences will need to be altered for the application of water onto fields and paddocks. The strategy does not consider the complications for modern irrigation, i.e. those from bankless channel fields
- temporary storage diversions are net of evaporation and therefore will be under-reported
- temporary storages appear to allow for indefinite storage with minimal reporting and exemptions.

Stakeholder feedback indirectly relating to the draft strategy

Flood works

Concerns/comments that:

- historical, illegal floodworks have the capacity to divert flows and augment floodplain harvesting. Work should be undertaken to map floodplain harvesting infrastructure with a view to permanently decommission works that fall outside the proposed licensing envelope and impede the passage of flood events
- lawful structures (e.g. levees) that allow the licence holder to take more than their licence permits will remain in situ with the additional water being discharged by the user. There should be clarity around how this will be monitored to ensure that the unlawful component of the diversion is being discharged.

Compliance

Concerns/comments that:

- NRAR must be adequately and permanently staffed and resourced to ensure continuous and independent verification
- storages will need to be monitored to ensure that they are not being unlawfully augmented. Basin states should have uniformity between offence provisions
- the proposed compliance regime does not meet the NSW Quality Regulatory Services Initiative
- the economic benefit of non-compliance is high. It is unlikely that individuals will reduce historical take voluntarily without a high level of scrutiny and regulation. The draft strategy does not qualify how graduated and proportionate the response to non-compliance will be.

Trading

Concerns/comments that:

- rainfall will be shifted in large transactions between farms. Recommend that rainfall should be excluded from the trading framework
- appropriate trade monitoring and compliance procedures must be in place before floodplain harvesting access licences are allowed to be traded. More information is required about the risks and benefits
- a compliance and enforcement strategy in relation to the decommissioning of levees post-trade should be developed. Where levees serve a secondary purpose and must remain in situ, they will need to be monitored to ensure that they are not being used to divert overland flows unlawfully
- trading is problematic and should not be allowed as there is no process for assessing cumulative environmental impacts on downstream environments
- trade will increase or create take in other areas. If trade occurs, an auditor should visit properties to ensure structures used are not impeding the floodplain and affecting downstream users.

Environmental flows

Concerns/comments that:

- environmental flows will be harvested by irrigators.

Equity issues for harvestable rights

Concerns/comments that:

- as rainfall runoff is included in the policy, floodplain harvesters must not be disadvantaged by the implementation of this policy, compared to those who have a harvestable right
- the strategy must be equitable between floodplain and non-floodplain areas.

General issues

Concerns/comments that:

- there is no explanation for why floodplain harvesting take was capped at 1993–94 levels
- there is not enough detail about how the irrigator behaviour data collected will guarantee the determination of the 1993–94 levels
- not enough evidence has been provided to the public to guarantee floodplain harvesting earthworks after 1993–94 are decommissioned
- the strategy and the policy contravene OECD principles. Floodplain harvesting is in breach of federal and NSW state statutory requirements
- the draft strategy does not adequately meet the criteria set out in the Murray–Darling Basin Compliance Compact, the NRAR Regulatory Policy or the approach under the NSW Quality Regulatory Services Initiative
- monitoring entitlements will ensure the needs of the environmental and downstream users are met
- government needs to clearly specify what area (regulated sections) is included before any licences are issued or all floodplain harvesting should stop
- no socio-economic study has been carried out on the impacts of floodplain harvesting to unregulated licence holders and floodplain graziers
- floodplain harvesting in the Northern Basin has huge financial, social and environmental impacts on the whole Murray–Darling Basin.