



Australian Government



# Floodplain harvesting position statement

Expectations from the Authority

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The Murray–Darling Basin Authority pays respect to the Traditional Owners and their Nations of the Murray–Darling Basin. We acknowledge their deep cultural, social, environmental, spiritual and economic connection to their lands and waters.

The guidance and support received from the Murray Lower Darling Rivers Indigenous Nations, the Northern Basin Aboriginal Nations and our many Traditional Owner friends and colleagues is very much valued and appreciated.

Aboriginal people should be aware that this publication may contain images, names or quotations of deceased persons.

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# Executive Summary

Water is a scarce and precious resource, and water managers need to understand all forms of water take to better monitor and regulate water use. Floodplain harvesting can be an important form of water take in some catchments and occurs when water flowing across the floodplain is captured and stored for future use.

Overbank flows are a key component of the natural hydrological cycle in unregulated river systems. In the northern Murray–Darling Basin catchments, river flows associated with larger rainfall events flow out across lowland floodplain areas. These floodplains contain important ecological assets, including wetlands, and have rich deep soils that support a highly productive irrigated agricultural industry.

Floodplain harvesting, if well managed, allows for water to be taken and stored when it is plentiful and then used at a later time when water is scarce—without needing to extract water from the river during periods of lower flow.

Even though it has been legally allowed to occur, floodplain harvesting has not always been well quantified or accounted for. Strengthened management arrangements need to be implemented in some areas to ensure the practice does not impact floodplain environments, river flows and other water users. Improved measurement and accounting will also increase confidence and transparency around the effectiveness of management and regulation.

Queensland and New South Wales governments are implementing reforms that will improve measurement and in many valleys will lead to volumetric licensing of floodplain harvesting. In Queensland this is a continuation of the current process, which began in 2003.

The Murray–Darling Basin Authority (MDBA) commends both governments for their efforts and has the following expectations:

1. **To ensure transparency and accountability for water use:** arrangements need to be put in place that ensure floodplain harvesting is effectively measured, fully brought into the Basin’s water accounting system, and complies with sustainable limits.
2. **To give confidence in the regulation of floodplain harvesting:** where there has been historical growth in floodplain harvesting and floodplain structures, transparent information on growth and its potential impact on environments and downstream users needs to be evaluated and made available to all stakeholders.
3. **To give confidence in estimates of floodplain harvesting volume used for water planning:** data, processes and methods used to estimate historical and current levels of floodplain harvesting need to be transparent, make use of multiple lines of evidence, and have a strong focus on independent oversight and review.

4. **To ensure floodplain harvesting structures are well managed:** arrangements need to be in place that manage impacts on the environment and downstream users while enabling the most efficient storage and use of floodplain harvesting water.
5. **To ensure floodplain harvesting is legal:** a monitoring and compliance framework is needed that ensures compliance with rules for water take and associated infrastructure.
6. **To independently verify water take and use:** measurement, monitoring and compliance needs to make best use of available technology.
7. **To provide confidence that the floodplain harvesting reforms will be implemented:** water resource plans need to clearly set out programs and pathways to improve measurement and management of floodplain harvesting.

# Understanding floodplain harvesting and overland flows

**Floodplain harvesting** is when the water that flows across the floodplains during a flood or rainfall event is collected and subsequently used.

Measuring these floodplain flows is difficult because they occur intermittently in our variable climate and often cover vast low-lying areas.

Water is harvested from a floodplain using purpose-built infrastructure. These are known as works and include:

- infrastructure specifically constructed to enable floodplain harvesting, including pumps, structures or other works that divert water into or from storages, supply channels, depressions or otherwise hold back flows
- infrastructure for multiple purposes that facilitate floodplain harvesting, such as:
  - levees, conveying works and off-river storages constructed in billabongs or depressions
  - below-ground level channels that deliver water into storages
  - works that collect rainfall runoff and deliver that water into storage.

Water outside of the river on floodplains is difficult to regulate because measurement across such wide areas is challenging. In addition to the water that is harvested into storages, floodwater also soaks into the deep soils and enters the groundwater, some is lost through evaporation in wetlands or transpiration from floodplain, and some returns through small channels back into the main river.

Estimates of the volume of floodplain harvesting take have often been based on available information about the overall amount of water that is moving across the floodplain. The total volume of that water is then divided into floodplain harvesting versus other natural losses such as evaporation and seepage in to groundwater, based on the best knowledge available. While instream flow gauges have allowed the floodplain water balance to be matched to known river flows, the certainty around how much water on the floodplain was harvested versus how much went to groundwater, wetlands and losses has been much more uncertain

Historically it has been very difficult to accurately measure how much floodplain water has been 'harvested' or captured for use. In the northern Basin, on-farm storages are typically used to store water from multiple sources, such as streams, groundwater and floodplain harvesting. The same storage and distribution infrastructure (such as pumps, pipelines and channels) are then used for both harvesting and using the stored water (sometimes for multiple purposes and crops).

This means **water measurement and accounting in this context is highly complex, and several lines of evidence are often required to measure what has been harvested from the floodplain.**

While it has been difficult to quantify the volume of floodplain harvesting with certainty, the actual volume diverted may be reflected in recordings of stream flow in the areas where floodplain harvesting occurs. In addition, potential growth in floodplain harvesting is able to be detected by monitoring the scale and location of floodplain harvesting structures. Better measurement of floodplain harvesting will enable more precise quantification of the volume of water diverted by existing structures. When a new and better understanding of the volume of floodplain harvesting is determined it is likely that the baseline diversion limit for valleys where floodplain harvesting is occurring will change. Where this results in an increase this does not mean that there has been growth in floodplain harvesting. A change in the estimates of the baseline diversion limit simply reflects a more precise and certain volume of what was already legally being taken.

Because the amount of floodplain harvesting was reflected and captured by long term records of stream flow, there is confidence that the impacts of floodplain harvesting are adequately considered in the determinations of environmentally sustainable limits of take that underpin the Basin Plan settings.

Any changes to the baseline diversion limits that result from better measurement and certainty around the volume of water taken by floodplain harvesting will not have an impact on the environmentally sustainable limits of take.

This is because the updated estimates do not give additional access to water. The improvements simply give a clearer picture of the amount of water that was already legally being taken (to better establish limits), and more clearly brings that water use into the accounting system that ensures that use does not grow and become unsustainable.

Better understanding and more certainty about the volumes associated with floodplain harvesting will enable better management of this form of water use. Without good measurement and monitoring it is very difficult to fully regulate and conduct compliance on floodplain harvesting, and it is very difficult to model and assess the impacts of floodplain harvesting on other users and the environment.

## Licensing floodplain harvesting

Harvesting water from floodplains reduces the amount of water reaching or returning to rivers. This decreases the amount of water available to meet downstream river, wetland and floodplain needs. Floodplain harvesting can affect the connectivity between the local floodplain wetlands and the river through the loss of water and the redirection of flood flows. If it is allowed to grow unchecked, it will erode the reliability of water supply to existing downstream water users.

Licensing floodplain harvesting extractions is an effective way to manage significant floodplain harvesting activities when effective measurement and monitoring regimes are in place. This will provide certainty and security for eligible floodplain water users to access the resource and ensure that water use remains within sustainable limits.

Work is underway in New South Wales and Queensland to gain an improved understanding of how much water is harvested from floodplains now and what was being harvested prior to the Basin Plan. It has been very difficult to accurately measure how much floodplain harvesting occurs, and therefore this water use is not fully accounted under the existing arrangements. However, harvesting has been included in water models as part of the overall ‘transmission losses’ of flood flows.

The Queensland Government has prevented growth in floodplain harvesting by a system of authorisations and licenses that have been in place since the announcement of a moratorium on works in 2000, and the completion of their first water plans in 2003–04. However, there are management and compliance limitations due to incomplete measuring and accounting. Queensland continues working with floodplain harvesters to extend measuring and licensing arrangements. Under arrangements in Queensland, a water license is required where there is a risk that existing infrastructure constraints may no longer prevent growth at the property scale. Under Queensland’s state water plans put in place in early 2019, it is anticipated that priority floodplains in Queensland will be licensed and measured by 2022 and then the baseline diversion limit will be revised with the improved knowledge base.

In New South Wales the volume of allowable floodplain harvesting has been regulated at levels set under the Basin arrangements in 2000. However, arrangements to effectively estimate, monitor and ensure compliance with these regulatory arrangements have lagged significantly. As a result, a substantial reform program is being undertaken by New South Wales that will see estimates of the volume of floodplain harvesting improved, and its take fully licensed and measured to ensure limits are applied.

To ensure improved estimates of floodplain harvesting in New South Wales are robust and transparent, the New South Wales Government and the MDBA have commissioned an independent review of the assumptions and inputs into floodplain harvesting modelling, and its alignment with implementation of the New South Wales Floodplain Harvesting Policy 2013 (amended 2018). After the review, the New South Wales Government will commence the process of issuing individual licenses, revise the baseline diversion limit, and determine how this can be incorporated into New South Wales water resource plans.

The MDBA acknowledges the continued efforts of New South Wales and Queensland to improve arrangements for floodplain harvesting. Both states have spent around five years working with landholders legally harvesting floodplain water to improve the information base, model usage and then move towards a system of regulation and licensing.

# Improved management of floodplain harvesting

Improving water accounting is a priority for all Basin state governments, and the MDBA is aware it will need continued effort and resourcing over the coming years. Accurate measurement and accounting is vital to operating and enforcing limits on water use. If particular uses, such as floodplain harvesting, are not brought into the accounting system the water used for these activities cannot be fully regulated.

Under the Basin Plan, the MDBA and the Basin states are jointly responsible for ensuring water take does not exceed the sustainable diversion limits. For this purpose, measurement, accounting and compliance of floodplain harvesting must be improved. It is important that any change to licenses and new or improved information about water use is reflected across the whole water management system and in day-to-day operations.

1. **To ensure transparency and accountability for water use:** arrangements need to be put in place to fully bring floodplain harvesting into the Basin’s water accounting system, to ensure it complies with sustainable limits, and enable floodplain harvesting to be effectively measured.

Floodplain harvesting has been included in the Murray–Darling Basin Agreement’s Cap on surface water diversions (the Cap) since 1995, and is likewise included as part of the baseline diversion limits and sustainable diversion limits (or ‘SDLs’) imposed by the Basin Plan. Limits imposed by the Cap (and SDLs) are an overall limit for all forms of take and do not on their own regulate individual methods of taking that water—**as long as overall limits are not breached**.

Both Queensland and New South Wales have clearly noted their intention to restrict floodplain harvesting usage so that it does not exceed the amount of water that could be used under baseline diversion limits as defined in the Basin Plan. In both states, this will typically limit floodplain harvesting take to the volumes accessible given levels of development in place in the year 2000. These limits will then be consistent with existing arrangements for other water use, and represent a level of take agreed under the Basin Plan. The Authority notes that, despite the overall limits to water use provided by the Cap and SDLs, there is a strong public concern about the historical growth of floodplain harvesting as an individual form of take and the potential impact on environments and other downstream users.

2. **To give confidence in the regulation of floodplain harvesting:** where there has been historical growth in floodplain harvesting and floodplain structures, transparent information on growth and its potential impact on environments and downstream users needs to be evaluated and made available to all stakeholders

Improving the water accounts is a critical element of future water management in the Basin. It is not optional. Governments must continue to research and generate the best available information and use this information in local water plans. It will never be possible to count every drop, but through continued efforts all governments and water users will have a better understanding of water use in the Basin.

Floodplain harvesting has to date been accounted for through methods of estimation that have a significant level of uncertainty. This means that there is also uncertainty around the actual volume of floodplain water legally able to be taken. Better methods for measuring floodplain harvesting are likely to result in a change to the understanding of volumes that are associated with legal floodplain harvesting and the associated annual accounting and reporting. Updates to limits that reduce uncertainty do not mean more water is available for use. It just brings existing use into the regulated system, ensuring it can be monitored and that use does not grow over time.

The Australian public expect that the information used to define sustainable levels of take is of a high standard, represents the best available knowledge and is open to scrutiny. The Authority is absolutely committed to evidence-based decision making and doing this in a transparent manner. It is critical to have estimates of historical take and current use that are as accurate as possible. Estimates of historical take that are lower than what was occurring could impact on water users and communities, and estimates that are higher could impact on the environment.

**3. To give confidence in estimates of floodplain harvesting volume used for water planning:** data, processes and methods used to estimate historical and current levels of floodplain harvesting need to be transparent, make use of multiple lines of evidence, and have a strong focus on independent oversight and review

The impact of floodplain harvesting is not isolated to the volume of water being taken. Floodplain harvesting infrastructure can restrict and divert the flow of water across the floodplain and affect other users and important environmental assets. It is important that these impacts are understood and fully considered for proposals for new and modified floodplain harvesting infrastructure.

Infrastructure can range from off stream storages that store water harvested from flood events, banks and channels that intercept and move water that is flowing across the floodplain, to natural features such billabongs and flood runners that can be modified to move and store water for later use.

Carefully constructed and used, this infrastructure can ensure that water moving during flood events can be captured, stored and used efficiently without unnecessary impacts on other users and the environment. Poorly managed, floodplain harvesting infrastructure can divert water away from other users and wetlands, affect downstream flows or pond water and flood neighbours.

Additional structures built on the floodplain, such as roads, railways and levees, similarly can interfere with the natural flow of water across the floodplain. These structures are generally regulated under other state and commonwealth planning and development laws.

The New South Wales government acknowledge and are dealing with the impacts of all floodplain structures through specific catchment based Floodplain Management Plans that set rules and assessment criteria to manage local and cumulative impacts of structures on floodplain flows.

**4. To ensure floodplain harvesting structures are well managed:** arrangements need to be in place that manage impacts on the environment and downstream users while enabling the most efficient storage and use of floodplain harvesting water

To effectively measure floodplain harvesting the methods provided must be based on the best available information and data. The measurement methods should take advantage of emerging technology such as remote sensing, modelling and hydrometrics.

The Basin Compliance Compact has been agreed to by the Australian Government and the Basin states as a framework towards strengthening water management and compliance in the Basin. The Compact includes commitments from both New South Wales and Queensland to improve measurement of water take, prioritising take by the highest risk users, and includes take by floodplain harvesting.

New South Wales and Queensland have committed to publishing programs for the improved measurement of floodplain harvesting by the 30 June 2019. The MDBA is working with both States to collaborate and align the programs.

The MDBA, Queensland and New South Wales have also [developed and published a series of modelling practice notes](#) to assist in producing models that are able to more accurately estimate floodplain harvesting take with improved transparency and consistency.

Since 2018, the MDBA has been building capability and applying remote sensing data for a variety of work programs. The development of analysis tools and collaborative effort with Geoscience Australia has led to the ability of the MDBA to access both Sentinel (from 2016) and Landsat (from 1987) satellite imagery within 1–2 days of image capture. This gives us the ability to identify structures on a floodplain that impede, divert and/or store water.

**5. To ensure floodplain harvesting is legal:** a monitoring and compliance framework is needed that ensures compliance with rules for water take and associated infrastructure

The biggest drawback of this imagery is that it only provides information on the area of water present in farm storages - not the volume water in the storage, or changes to the storage itself.

The MDBA is pursuing remote sensing methods for determining on-farm volumes across the northern Basin. There is work occurring internally, and with Geoscience Australia and CSIRO, to estimate on-farm storage volumes. The MDBA is also seeking historical actual data for on-farm storage levels to allow these new methods to be validated.

These tools and methods provide one line of evidence to support compliance activities. For example, it is useful for the determination of growth in on-farm storages, or if there has been illegal infrastructure built to hold or divert water on the landscape. This collaboration has also provided a method to determine where water is, or has been, in the landscape and in on-farm storages since 1987.

The Northern Basin Commissioner is also championing the use of alternative technologies for measurement and compliance and is promoting the exploration of technologies, existing or in development in other industries that may meet the needs of the MDBA.

**6. To independently verify water take and use:** measurement, monitoring and compliance needs to make best use of available technology

Finalisation of the reforms in both New South Wales and Queensland will take some time. The MDBA has strong expectations for interim management arrangements for floodplain harvesting in WRPs.

These arrangements will need to align with state commitments under the Basin Compliance Compact, manage floodplain harvesting in a way that ensures growth is constrained, ensure the reforms are transparent and programmed, and result in improved measurement as soon as possible.

The MDBA is working with both Queensland and New South Wales to facilitate the delivery of their floodplain harvesting improvement programs. The MDBA will encourage these programs to be adaptable in enabling both the States to incorporate the use of emerging technologies, and consider currently available technologies.

The Commonwealth has a role in accrediting such arrangements as they are brought forward in water resource plans.

**7. To provide confidence that the floodplain harvesting reforms will be implemented:** water resource plans need to clearly set out programs and pathways to improve measurement and management of floodplain harvesting.

# Conclusion

Historical management and measurement of floodplain harvesting has been limited, and knowledge of the volumes being taken before the Basin Plan came into effect has been poor. Substantial investment has been made to improve this knowledge since the Plan was established.

This is allowing governments to better understand what has historically been taken and reflect this in the diversion limits that underpin the Basin Plan, substantially improving our ability to manage this form of take. As the Basin Plan takes effect, it is critical to bring floodplain harvesting fully into the accounting system. These reforms are important.

The Authority is committed to improved management and transparency, and commends New South Wales and Queensland for embarking on their respective reform programs. The expectations for future management of floodplain harvesting within this document are intended to provide transparency and public assurance of the Authority's position.

The Authority's vision for floodplain harvesting is that it is carefully managed, fully accounted, and is conducted in an efficient way that minimises impacts to the environment and other users.

Emerging technology will improve governments' ability to verify actions occurring on the ground, and provide open and transparent access to information for the public.

Currently, more needs to be done to ensure water use across the Basin can be regulated effectively. The Authority is supportive of the New South Wales and Queensland commitments to reform, and expects future management arrangements that align with the key points raised here.

The Basin must be managed as a whole-connected system, so it remains healthy and productive for all Australians, both now and in the future.

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