

# Final Report Overview

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Independent Panel Assessment of the Management  
of the 2020 Northern Basin First Flush Event

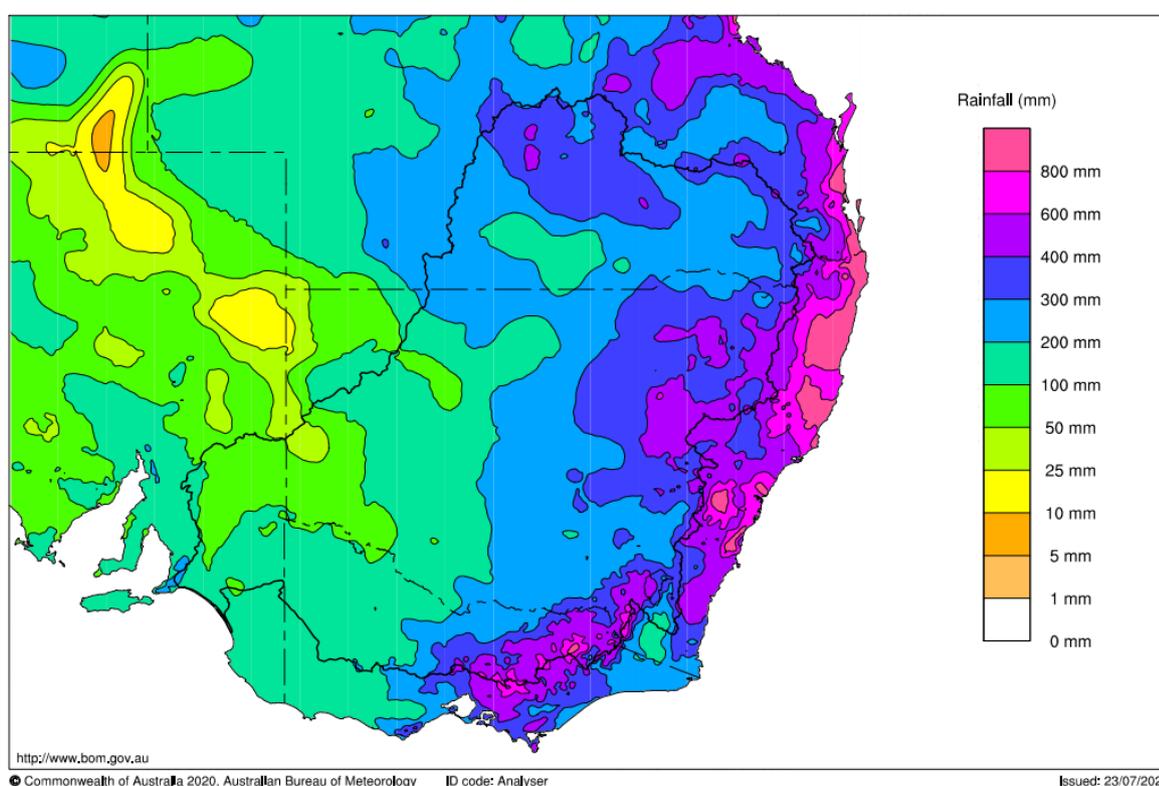
September 2020

# Overview

## Background

From late January to the end of April 2020, widespread rain fell across various parts of north-west New South Wales (NSW) and southern Queensland, with some parts receiving more than 200 mm of rain in just a couple of days (see map below). This rainfall created significant inflows to the Northern Murray-Darling Basin Border Rivers, Peel, Namoi, Gwydir and Macquarie valleys and along the Barwon-Darling River, for the first time in several years following an extended record drought.

Australian rainfall analysis (mm) 1 January to 30 April 2020  
Australian Bureau of Meteorology



Map of rainfall across Murray-Darling Basin from 1 January 2020 to 30 April 2020.

**Source:** Bureau of Meteorology, July 2020.

A series of temporary restrictions on water extractions (including by floodplain harvesting) across the northern NSW rivers of the Murray-Darling Basin were introduced in January-March 2020 under the provisions of the NSW Water Management Act 2000 (WM Act), to responsively manage the first flows and prioritise water security for critical human and environmental needs which had been exacerbated by the extreme drought. This became known as the 2020 Northern Basin First Flush event. It was the first time that NSW managed a first flush event in this way.

In March 2020, the NSW Government commissioned an independent assessment into the management of the 2020 Northern Basin First Flush event following the 2018-2019 drought in the Northern Murray-Darling Basin.

The objectives of this assessment were to:

1. Provide transparency about the decision-making processes that were used to manage the event under the [Water Management Act 2000 \(NSW\)](#).
2. Recommend strategies to improve the management of first flush events under the *Water Management Act 2000* (WM Act) in the future, including:
  - a. system and process changes which would improve the management of a first flush event by the New South Wales (NSW) Department of Planning, Industry and Environment – Water (DPIE Water), the Natural Resources Access Regulator (NRAR) and WaterNSW, and
  - b. regulatory, planning or policy changes (including to relevant Water Sharing Plans) which would improve the management of a first flush event.

An Independent Panel (the Panel), consisting of Dr Wendy Craik and Greg Claydon, was appointed to review the actions undertaken, consult with affected water users and communities, and report on how systems and processes, and transparency in water management, could be improved in relation to first flush events.

This report sets out the Panel's key findings and recommendations based on a review of documents, discussions with government agencies and key stakeholders, and public feedback provided through surveys, written submissions and a public webinar.

## What the Panel heard

As part of its assessment, the Panel consulted with NSW, Commonwealth and agencies in other states, as well as local community, Traditional Owner and Indigenous community, water user and environmental representatives. It also carried out two rounds of public consultation, asking for feedback about the event generally as well as on a draft report. The approach to and extent of consultation, including the absence of face-to-face discussions and local site visits, were impacted by the restrictions imposed as a result of the COVID-19 pandemic.



The Panel interviewed NSW agency officials who were directly involved in managing the 2020 first flush event from DPIE Water, NRAR, WaterNSW and DPI Fisheries. The Panel also consulted with the Commonwealth Environmental Water Office, Murray-Darling Basin Authority, Bureau of Meteorology, the Energy, Environment and Science team of DPIE, Queensland Department of Natural Resources, Mines and Energy, Victorian Department of Environment, Land, Water and Planning, Commonwealth Department of Agriculture, Water and the Environment, the NSW State Emergency Services, the DPIE Deputy Secretary Water and staff of the Office of the Hon. Melinda Pavey, NSW Minister for Water.



A Water User Reference Group (WURG) was set up to provide the Panel with advice, particularly on the issues and impacts of decision-making approaches and communications. WURG members were nominated by peak bodies as follows:

- NSW Irrigators' Council nominated an irrigation representative for each of the Northern NSW tributaries, the Lower Darling and the Barwon-Darling areas,

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- Local Government NSW nominated a local government representative for each of the Northern NSW tributaries, Lower Darling and Barwon-Darling areas,
  - the Barkandji Traditional Owners, Northern Basin Aboriginal Nations and the Murray Lower Darling Rivers Indigenous Nations each nominated a representative,
  - the Environmental Defender's Office nominated a representative for environmental interests; and
  - the Australian Floodplain Association nominated a representative for its interests.

The group met seven times with the Panel prior to publication of the final report and a communique was published for each meeting on the DPIE website.

The Panel also spoke separately with native title applicant groups for the Ngemba, Ngiyampaa, Wangaaypuwan and Wayilwan People, and Gomeroi nations, and the Chair of the Southwest Water Users group.



The Panel invited initial public feedback on the first flush event and how it was managed from 11 May to 7 June 2020, and received 144 online survey responses and 29 written submissions which assisted the Panel to shape the draft report's findings and recommendations. The draft report was publicly exhibited from 13 July to 9 August 2020. On Monday 27 July 2020, 89 people participated in a public online webinar in which the Panel presented and answered questions regarding the draft report's findings and recommendations. The Panel received 29 written submissions on the draft report, which together with other feedback throughout the assessment process, shaped this report's final findings and recommendations.

## Key Findings

### **Management of the 2020 Northern Basin First Flush Event was complex.**

When the 2020 Northern Basin First Flush event began, environmental and river systems were under severe stress due to record drought conditions. Since mid-2017, there had been only one period when rainfall produced any significant inflow into the Barwon-Darling River, and in 2019, the only source of inflows into some sections of that river had come from releases of held environmental water. Individuals and communities from the north to the south were also under severe financial, emotional, cultural and physical distress.

When rain did finally fall in early 2020, it did not do so in a single event. The 2020 Northern Basin First Flush event was the product of a number of rainfall and flow events in many locations, some much larger than initially forecast, in a large and complex basin. Further, real-time management of uncontrolled flows (including floodplain flows) to provide for critical water needs throughout the Basin is a relatively new approach to managing water for the NSW Government, and this was the largest event to which real-time management has been applied. The event also took place at a time when a number of key water planning and management reforms essential to enabling effective real-time management are still being implemented, and while the information about, and understanding of, high and low flows and extractions and flow behaviour on floodplains, are limited.

Management of the 2020 Northern Basin First Flush event was also substantially complicated by floodplain harvesting issues. At the beginning of the event, a regulation was introduced

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which, for the first time, exempted the need for certain floodplain harvesting to be licenced. On the same day, a temporary water restriction was made which, also for the first time, prohibited the take of water via floodplain harvesting.

**The first flush event achieved some wonderful outcomes for an environment and communities in need.**

Ultimately, the 2020 Northern Basin First Flush event led to some wonderful and much needed outcomes for communities in need. Water supplies were secured for Goondiwindi, Boggabilla, Mungindi, Collarenebri, Walgett, Brewarrina, Bourke, Wilcannia, Menindee, Sunset Strip and Pooncarie. Menindee Lakes received enough water to enable a pulse release which re-started the Lower Darling River without fish kills or blue-green algae outbreaks. Thousands of kilometres of rivers flowed for the first time in many months and the Barwon-Darling was reconnected with its tributaries and the Murray River. It enabled fish and other aquatic animals to move up and down significant lengths of the rivers, and catchments in the Northern Basin have shown improvements in water quality. The use of discretionary section 324 temporary water restrictions (also known as embargoes) under the provisions of the WM Act to protect these first critical inflows demonstrated the commitment of the NSW Government to provide water for critical human needs and to protect and restore water for the environment, and this has been recognised by the CEWO, the MDBA and some members of the Lower Darling communities.

**These positive outcomes have been overshadowed by significant levels of frustration and stress across communities.**

Despite the meeting of critical human and environmental water needs across the Northern Basin during the event, many water users, affected communities and others believed that the NSW agencies did not do a good job managing the event. The public provided feedback that they considered that communications were extremely poor, the objectives largely unknown, and that there were missed opportunities and substantial biases towards or away from certain water users and uses. The lack of engagement also prevented Traditional Owners and Indigenous communities from maximising the social and cultural benefits that the event aimed to achieve.

**The Panel believes that there was insufficient resourcing in place to adequately plan and communicate for the first flush event.**

As a result there was inadequate engagement, planning, incident management preparedness, transparency and communication for and of the event, which led to unpredictability for communities and water users, and did not help to rebuild the community's low levels of confidence and trust in NSW water management.

Insufficient planning and preparation was undertaken for the 2020 Northern Basin First Flush event - most significantly, in regard to not informing and engaging water users, Traditional Owners and communities when preparing the objectives, targets and principles, not preparing water users, Traditional Owners and communities for the first flush event, and not developing adequate incident management arrangements. Clear criteria, principles, and targets to manage the event were prepared, but these were completed only days before the event substantially unfolded, and these were not publicly communicated. Floodplain harvesting, and how this would be incorporated into the management framework, was not taken into account in any substantial way. Nor was any information provided to the public (in particular floodplain harvesters) about its treatment in a first flush event. While WaterNSW has some incident management capabilities associated with flood and water quality incidents, those systems were not applied to the 2020 Northern Basin First Flush event.

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**The decision-making framework and flow forecasting were reasonably robust, but there are some important improvements to be made.**

As a whole, the Panel believes that water agency officers had reasonable decision-making processes in place to do a relatively good job of ensuring critical human and environmental water needs were met across the whole of the Northern Basin in NSW, based on the information and resources they had at the time. They demonstrated great focus, courage, tenacity and determination in their efforts to manage what was a very dynamic, stressful, complex and imperfect situation. However, some important improvements can be made to the decision-making framework.

In order to better manage the expectations of communities and water users, more work is needed to clearly articulate the critical human and environmental water needs that water managers will seek to protect in first flush management, and the connectivity objectives and how they will be achieved. Not all elements of targets were quantified (for example, native title, stock and domestic and harvestable rights requirements and town water supplies). Concerns have been raised about the absence of clear triggers that will determine the need to depart from, and the ability to return to, operation of normal Water Sharing Plan arrangements (given that temporary water restrictions effectively suspend rights to take water pursuant to Water Sharing Plan rules). Some groups in the community still have concerns on how upstream and downstream needs will be balanced, others are sceptical of the use of flow forecasting, and still others believe that there is no justification to adopt different rules during a first flush event unless there is evidence that operation of the Water Sharing Plan rules would not have led to the same outcome as the restrictions during the 2020 Northern Basin First Flush event.

NSW made substantial efforts to use the best available information to make decisions, but there were some significant data gaps relating to flows entering NSW from Queensland, floodplain harvesting extraction and flow data, unregulated extraction data, channel capacity and allowances for water to move to downstream locations. The dynamic nature of the event, coupled with inadequate incident management preparedness, meant that local scale insights, needs, demands and impacts did not factor into decision-making as they ideally would. Some stakeholders raised concerns that the conservative nature of WaterNSW's flow forecasting model unnecessarily compromised economic opportunities. However, the Panel is of the view that the approach taken by both WaterNSW in its flow forecasting and DPIE Water's decision-making was understandable having regard to the severity of drought conditions across the Northern Basin and the objectives of the First Flush. In addition, an independent review by Barma Water Resources of WaterNSW's flow forecasting model has found it to be sound and appropriate and has shown that it did not underestimate flows, as submitted by some stakeholders. Nevertheless, that review has also identified opportunities for improvement, generally in line with the Panel's assessment.

**Transparency of decision-making and communications need to be improved for future events.**

While the decision-making framework met statutory requirements for making temporary water restrictions under section 324 of the WM Act, the decision-making process was opaque. The community was not clear on who was doing what, why, or when, which led to communication and confidence issues, and frustrations. All of this contributed to a lack of trust and a strong view that the 'goal posts' were shifted during the event.

Community levels of trust in NSW water management have been low and in need of rebuilding since the July 2017 Four Corners program "Pumped". Not releasing information prior to the event was a significant shortfall in transparency. Inadequate systems to communicate information during the event made it very difficult for people to have confidence in the integrity of the Government's decisions, and even those with good knowledge of water issues and rules had difficulty following the decisions made during the event. While a great deal of information

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was available, the manner of publication did not cater to enhancing the broader community's understanding of how water was being managed.

The lack of clarity denied water users the ability to plan their operations, compounding already high levels of stress and anxiety following the prolonged drought, and it denied Traditional Owners and Indigenous communities the opportunity to celebrate the positive cultural outcomes that were being generated by flows through the river system as the event unfolded.

There was a strong unmet demand for information about the event as it unfolded and after it was over. Adequate resources were not put aside to meet this demand. Delays in publishing information allowed speculation about extraction, impacts and outcomes of the event to become de facto truths, and promoted views of mistrust, secrecy and mismanagement. It inhibited a productive, fact-based discussion on the benefits and costs of first flush events and constrained the Panel's assessment, particularly for its draft report.

**Use of temporary water restrictions demonstrated NSW Government's commitment to protecting environmental water and implementing some, but not all, of the recommendations arising from the Ken Matthews inquiry, Vertessy report and NRC review.**

Management of the first flows under temporary water restrictions was both an explicit and courageous effort to achieve connectivity within and between otherwise ephemeral and intermittent water sources in the NSW Northern Basin and the NSW Government successfully took immediate steps to protect critical water needs for towns and the environment, consistent with the WM Act and the Government's response to the Vertessy report and the Natural Resources Commission (NRC) review. Water supply was secured and town weir pools filled for 11 communities across the Northern Basin. Menindee Lakes received 12-18 months of water supply. The Lower Darling was successfully restarted without significant fish deaths, blue green algae outbreaks or a salinity problem. River connectivity allowed fish and other aquatic animals to move up and downstream, significant areas of wetlands including Ramsar sites were inundated and refuge pools were replenished.

But regrettably, there was an overall failure to engage with Traditional Owners and Indigenous communities in managing this event to ascertain native title and cultural flow requirements (to the extent they fall within critical water needs), and to enable communities to enjoy the social and cultural benefits of protecting first flushes. For some, this exacerbated already elevated levels of frustration and disenchantment.

Separately, while there was some communication between NSW and Queensland in managing the first flows, there was no formal coordinated approach, including at an operational level.

Further, a key finding of the Matthews inquiry was a need for transparency in water regulation. The Panel is of the view that genuine transparency was not achieved before, during or immediately after the 2020 Northern Basin First Flush event. Information that was available was not necessarily accessible or timely, and there was a lack of communication to water users and the public about the objectives and rationale for water restrictions prior to the event. There was a lack of consultation and public communication regarding both the introduction of the floodplain harvesting regulation and the floodplain harvesting restriction, and there has not been accessible timely reporting during or after the event. There was also no clear framework to ensure equitable access to information for the full range of people impacted by water management, or a transparent set of engagement arrangements in place before or during the event.

However, management of the event did demonstrate consistency with other Ken Matthews inquiry recommendations in the sense that internally, there was clarity of roles and

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responsibilities between agencies and collaborative relationships between the agencies lifted overall performance during the event. Agency officers showed great dedication and commitment, and mutual support of colleagues in their attempt to manage the event under sometimes very difficult conditions. However, this internal clarity did not translate to clarity for water users, Traditional Owners and communities who did not necessarily have a good understanding of who was doing what, why, or where a point of contact could be found.

**The continued implementation of NSW reforms regarding metering, floodplain harvesting and connectivity is crucial to improving first flush management.**

While NRAR compliance investigations related to the temporary water restrictions are ongoing, this event reinforced the need for the agreed NSW water management reforms to be fully implemented. Both management of the event, as well as compliance and enforcement activities, would have benefited from the pending reforms for non-urban water metering and telemetry, and floodplain harvesting licensing and measurement. The use of LiDAR and satellite remote sensing technology to measure on-farm water storages is an important development, but further progress is required. It is vital that reforms continue, not only for reasons of achieving better water management generally, but also because they will help improve management of future first flush events. Communicating progress of the reform agenda will also help to keep water users and the community informed, with a view to building understanding and trust.

**While first flush events could be successfully managed under temporary water restrictions, embedding arrangements in the regulatory and policy framework would enhance transparency and certainty.**

The dynamic use of temporary water restrictions as part of the 2020 Northern Basin First Flush event successfully supported a responsive decision-making process based on real-time information. However, given the level of mistrust and perceived absence of transparency in NSW water management, the continued use of these discretionary orders, especially outside of a clear, publicly consulted framework to manage first flushes, is likely to consistently lead to accusations of favouritism and incompetence.

Severe droughts are expected to increase in frequency and severity with a drying climate. Water users and the community have expressed strong support for including details about first flush management arrangements in the WM Act and Water Sharing Plans as an alternative to the use of temporary water restrictions under section 324 of the WM Act, to increase transparency and certainty, provide a forum to ensure proper consideration of the relevant issues, and ensure that the lessons learnt from the 2020 Northern Basin First Flush event are not lost with the passage of time and turnover of agency staff.

The Panel notes that there still remains a strong unmet demand for information about the event. Despite requests from the Panel and stakeholders, a comparison between the outcomes achieved under the restrictions, and those that would have been achieved under existing Water Sharing Plan rules without the restrictions over the course of the event, has still not been completed or published. It will be important for such comparison work to be completed as a matter of priority and before further first flush changes are embedded in the regulatory and policy framework.

## Recommendations

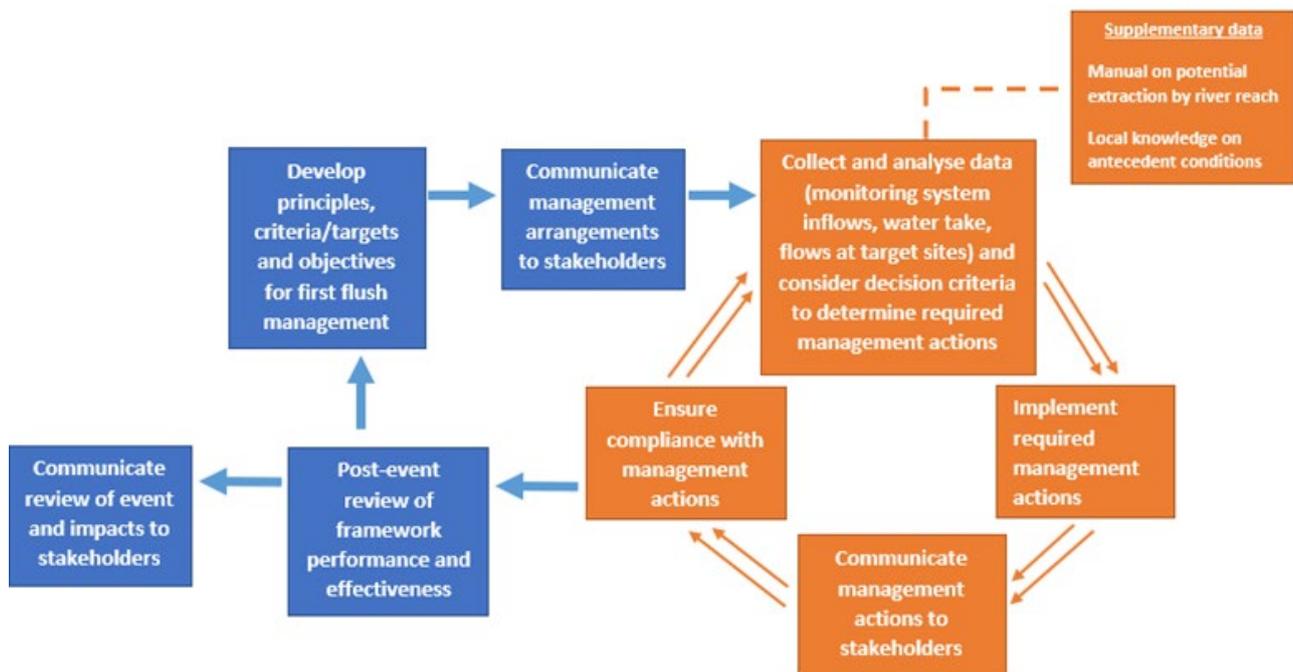
Following its assessment, the Panel recommends the NSW Government takes the following steps to improve first flush management in NSW:

1. Develop first flush arrangements, in consultation with water users, Traditional Owners and communities, that clearly articulate how connectivity within and between water

sources in the Northern Basin, and critical human and environmental water needs, will be provided for during first flush events.

Connectivity must be a primary objective of first flush management in the Northern Basin if insufficient water is available to meet tributary and downstream critical water needs. However, the arrangements to meet downstream critical water needs, of necessity, also have to be reflective of and responsive to the ephemeral and intermittent flow nature of the rivers in the Northern Basin.

2. Incorporate learnings from the 2020 Northern Basin First Flush event into systems that will be used to manage any future first flush event that arises in the short term, by:
  - a. updating flow forecasting models,
  - b. ensuring DPIE-EES is involved in future management,
  - c. undertaking and publishing a comparison of what outcomes would have been achieved if temporary water restrictions were not put in place,
  - d. updating models to reflect the capacity of water sources to contribute to meeting downstream targets,
  - e. revising the objectives, principles and targets used to manage the event having regard to this information (and any further work completed pursuant to recommendation 3 below), and
  - f. seeking feedback on the revised objectives, targets and principles.
3. Ensure the evidence base and methodology for first flush management is quantified, science-based and made publicly available, including estimated requirements to meet critical water needs (including basic landholder rights and cultural flow requirements that fall within critical water needs).
4. Review and update incident management systems for managing first flush events, including to develop a communications plan to support first flush management. The revised system should reflect the elements in the following diagram (blue boxes indicating the steps to be undertaken outside of the event, and the orange boxes indicating steps to be undertaken during an event. As far as practicable, management actions should be communicated prior to being undertaken, and the progress of flows and achievement of targets should be communicated as the event unfolds):



5. Until there are further provisions for first flush event management embedded in the regulatory and policy framework, publish guidance materials which outline how the NSW Government will use temporary water restrictions to manage first flush events.
6. Make any temporary water restrictions required to manage first flush events on a proactive basis (that is, before rain is forecast) to enhance the ability of water users and communities to plan their activities and minimise any potential adverse effects of restrictions.
7. Embed the management of first flush events in the regulatory and policy framework for managing drought. This is required to improve certainty that critical water needs will be protected in extreme events, improve predictability for Traditional Owners, communities and water users, and ensure that the lessons learnt from the 2020 Northern Basin First Flush event are not lost with the passage of time and/or changes of agency staff. An example of the types of matters that could be incorporated into the WM Act, Extreme Events Policy, Water Sharing Plans and Incident Response Guides is set out in the table below. Any framework adopted must be developed in discussion with communities, Traditional Owners and Indigenous communities (including the Barkandji Traditional Owners, Northern Basin Aboriginal Nations and the Murray Lower Darling Rivers Indigenous Nations) and water users.

What will be set out?	Rationale	Example
<b>WM Act</b>		
<ul style="list-style-type: none"> <li>● Objectives for managing first flush events</li> <li>● Requirement for Water Sharing Plans covering the Murray-Darling Basin to include rules for first flush management which must provide, to the extent practicable, for:               <ul style="list-style-type: none"> <li>○ connectivity within and between water sources, and</li> <li>○ the protection of critical water needs.</li> </ul> </li> </ul>	<p>The objectives for first flushes should be consistent across all areas of the Basin and, given their broad nature, should not change over time. They should also be tied to the existing legal requirements under the WM Act and the Basin Plan 2012.</p>	<p>Objective of first flushes</p> <ul style="list-style-type: none"> <li>● meet critical human water needs – provide flow locally and downstream, particularly to replenish town water supply weir pools and provide water supply for basic landholder rights (native title, stock and domestic and harvestable rights) and cultural water requirements that fall within critical water needs</li> <li>● meet critical environmental water needs – provide flow along the length of the river systems to ensure re-connection of rivers and drought refuge pools.</li> </ul>
<b>Extreme Events Policy</b>		
<ul style="list-style-type: none"> <li>● Scope to be expanded to explain how water will be managed as intensity of drought reduces, as well as increases</li> <li>● Principles for allowing access to flows in first flush events</li> </ul>	<p>The principles for allowing access to flows should be consistent across all areas of the Basin.</p> <p>However, given the level of detail and likely need to adjust these with time and experience, it is not appropriate to embed these in the WM Act.</p>	<p><b>Principles</b></p> <ul style="list-style-type: none"> <li>● Consider providing access to upstream water users under normal rules if the nearest downstream targets are met or forecast to be met <b>and</b> there is an assessment that this event will not meaningfully contribute to meeting any other downstream targets.<sup>1</sup></li> <li>● Where an event is predicted to meaningfully contribute to meeting the next downstream target, the temporary water restriction should not be lifted</li> <li>● When an event has met local targets and is no longer expected to contribute to meeting downstream targets or is in excess of that required to meet downstream targets, some local extraction relief could be allowed.</li> <li>● Temporary water restrictions should apply to a consistent upstream network of both unregulated and regulated rivers systems in a valley, to provide sufficient volumes of water to meet critical water needs, avoid interceptions by extractors, and avoid inequitable sharing between users.</li> </ul>

<sup>1</sup> Noting that the concept of ‘meaningful’ needs to be properly defined, as referred to in section 7.3 of this report.

		<ul style="list-style-type: none"> <li>● Early relaxation of upstream access restrictions prior to downstream targets being met should only occur if there is very high confidence in downstream flow predictions meeting targets.</li> <li>● When flow predictions are used for early relaxation of restrictions on upstream access, river system distribution efficiency assumptions must reflect the antecedent extended dry conditions</li> </ul>
<b>Water Sharing Plans</b>		
<ul style="list-style-type: none"> <li>● Describe and establish the point at which first flush rules kick in (triggers for first flush management)</li> <li>● Describe the process to be followed to achieve the objective of first flush events in the relevant water source: <ul style="list-style-type: none"> <li>○ what critical water needs will be provided for</li> <li>○ what local factors are to be considered (e.g. channel capacity)</li> <li>○ how requirements for the critical water needs (targets) are to be quantified</li> <li>○ how it will be known when take is restricted or permitted</li> </ul> </li> <li>● Require Incident Response Guides to set out critical water needs at each stage of drought</li> </ul>	<p>The procedure for managing first flush events should take into account unique local factors.</p> <p>Embedding this in Water Sharing Plans will provide transparency and certainty to community members that relevant matters will be taken into account, and how the water source will be managed. Embedding triggers for first flush management will ensure that Water Sharing Plans are better equipped to deal with drought scenarios and will avoid the need for section 324 orders to override Water Sharing Plan rules.</p> <p>Implementation will require quantifying native title rights and cultural water requirements and developing reasonable use guidelines where applicable.</p>	<p><b>Trigger for first flush rules</b></p> <ul style="list-style-type: none"> <li>● Normal access rules cease to apply when the decision-maker determines that a water source is in stage 4 drought</li> <li>● Instead, access is only allowed by Ministerial announcement</li> <li>● Generally, the decision-maker must not allow access unless satisfied that the requirements for the following critical water needs have been, or are forecast to be, met: <ul style="list-style-type: none"> <li>○ stock and domestic watering (under basic landholder rights)</li> <li>○ native title rights and cultural flow requirements that fall within critical water needs</li> <li>○ town water supply for X years</li> <li>○ the critical environmental needs in the specific water source</li> </ul> </li> <li>● However, access may be permitted where the decision-maker is satisfied that access will not compromise the ability to provide for critical in-stream or downstream needs</li> <li>● The decision-maker is to determine the requirements to meet critical water needs having regard to: <ul style="list-style-type: none"> <li>○ Long term water plan</li> <li>○ Antecedent conditions</li> <li>○ Advice from a local committee</li> </ul> </li> </ul> <p>Announcements are to be published on XX website at YY time</p>
<b>Incident Response Guides</b>		
<p>Updated based on the Water Sharing Plans process at each stage of drought to identify:</p> <ul style="list-style-type: none"> <li>○ What are the specific needs for the Water Sharing Plan area?</li> <li>○ What are the current antecedent conditions?</li> <li>○ What are the targets (numbers) required to meet the specific needs, based on the antecedent conditions?</li> <li>○ how first flush targets can be modified during an event if circumstances warrant.</li> </ul>	<p>Provides transparency to targets but enables best available evidence to be taken into account at the time it is required.</p>	<p><b>Example targets to meet critical water needs</b></p> <p>As at [insert date]:</p> <ul style="list-style-type: none"> <li>● River Gauge A: XW ML</li> <li>● River Gauge B: XY ML</li> <li>● River Gauge C: XZ ML</li> </ul>

8. Improve flow forecasting modelling and real-time monitoring capability, including measurement of extractions and the hydrometric system for inflows and monitoring end of system flows. This will require, among other things:

- a. timely implementation of the non-urban water metering reforms and floodplain harvesting licensing, measurement and reporting policy, and

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- b. putting in place more formal processes to obtain timely forecasts of flows expected across the Queensland/NSW border.
  9. Current (and future) reform programs should be accompanied by clear implementation plans, and the Government should publish regular reports of progress against these implementation plans on a collective basis.
  10. Improve and resource communication coordination and capability, including by establishing a water reform engagement group which includes the full spectrum of interests and impacted parties, including irrigator, Indigenous, environmental, local government, floodplain graziers and riparian water users from both the Northern and Southern basin.

In the face of climate change, the occurrence of cease to flow events is increasing. While the 2020 Northern Basin First Flush event ultimately led to some wonderful outcomes for the environment and communities in critical need, the NSW Government must take steps to avoid a repeat of some of the aspects of the 2020 Northern Basin First Flush event in the interests of agency staff, communities and water users.

Generally, the recommendations recognise the need to focus the use of limited resources on those efforts that will provide the greatest value in that they will support both first flush and other areas of water reform. However, sufficient resourcing will still be required to implement these recommendations. A suggested timetable for actions to implement these recommendations is provided at Appendix L for consideration by the NSW Government.

Over the course of its assessment, the Panel observed a strong appetite for improving first flush management, across government agencies, water users and communities. It is hopeful that taking prompt action consistent with the recommendations of this report will achieve that objective.