

Department of Planning and Environment

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Rural floodplain management plans in the southern Murray–Darling Basin

What we heard during initial consultation

July 2023





Acknowledgement of Country

The Department of Planning and Environment acknowledges that it stands on Aboriginal land. We acknowledge the Traditional Custodians of the land and we show our respect for Elders past, present and emerging through thoughtful and collaborative approaches to our work, seeking to demonstrate our ongoing commitment to providing places in which Aboriginal people are included socially, culturally and economically.

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Overview of engagement

Rural floodplain management plans (FMPs) provide the framework for coordinating the development of flood works on a whole-of-valley basis. FMPs set rules and assessment criteria for applications for flood work approvals within a declared floodplain.

The Department of Planning and Environment's Water group (the department) is replacing 10 historical FMPs developed under the *Water Act 1912* in the Murray, Murrumbidgee, Billabong Creek and Lachlan valleys with four valley-wide FMPs developed under the *Water Management Act 2000*.

The first step in the process is the development of hydraulic models that estimate how flood water moves through each valley. To assist in the development and calibration of these models, the department sought flood information from landholders throughout the four valleys such as flood photos, drone footage and verbal accounts. This information supplements data from governmental sources such as gauge and satellite data. The information collected during the historic flood events in 2022 was particularly important as it occurred recently and represented a large flood event.

In addition to the collection of flood information, the department provided information on the process and timing for developing the four FMPs and listened to landholders and other stakeholders on local concerns or issues related to floodplain management and flood events.

The department has also engaged with First Nations communities throughout the four valleys with a view of forming positive working relationships. It is anticipated that First Nations engagement will be ongoing prior to, during, and after broad public consultation.

The engagement was undertaken throughout May, June, and July 2023 and involved:

- a public information webinar
- 5 introductory briefing webinars with key stakeholder groups
- 36 one-hour public information sessions across 12 regional locations
- Introductory sessions with First Nations communities across 11 regional locations.

The department engaged with 286 people during this process. For more information, please refer to Table 1 and Figure 1.

A recording of the public webinar session is available on the department's website (www.industry.nsw.gov.au/water/stakeholder-engagement/roundup/stay-up-to-date).

This report summarises:

- the types of flood information collected
- how the flood information will be used in the development and calibration of the hydraulic models
- the concerns or issues that were raised throughout the four valleys (Table 2)
- the next steps in the FMP development process.

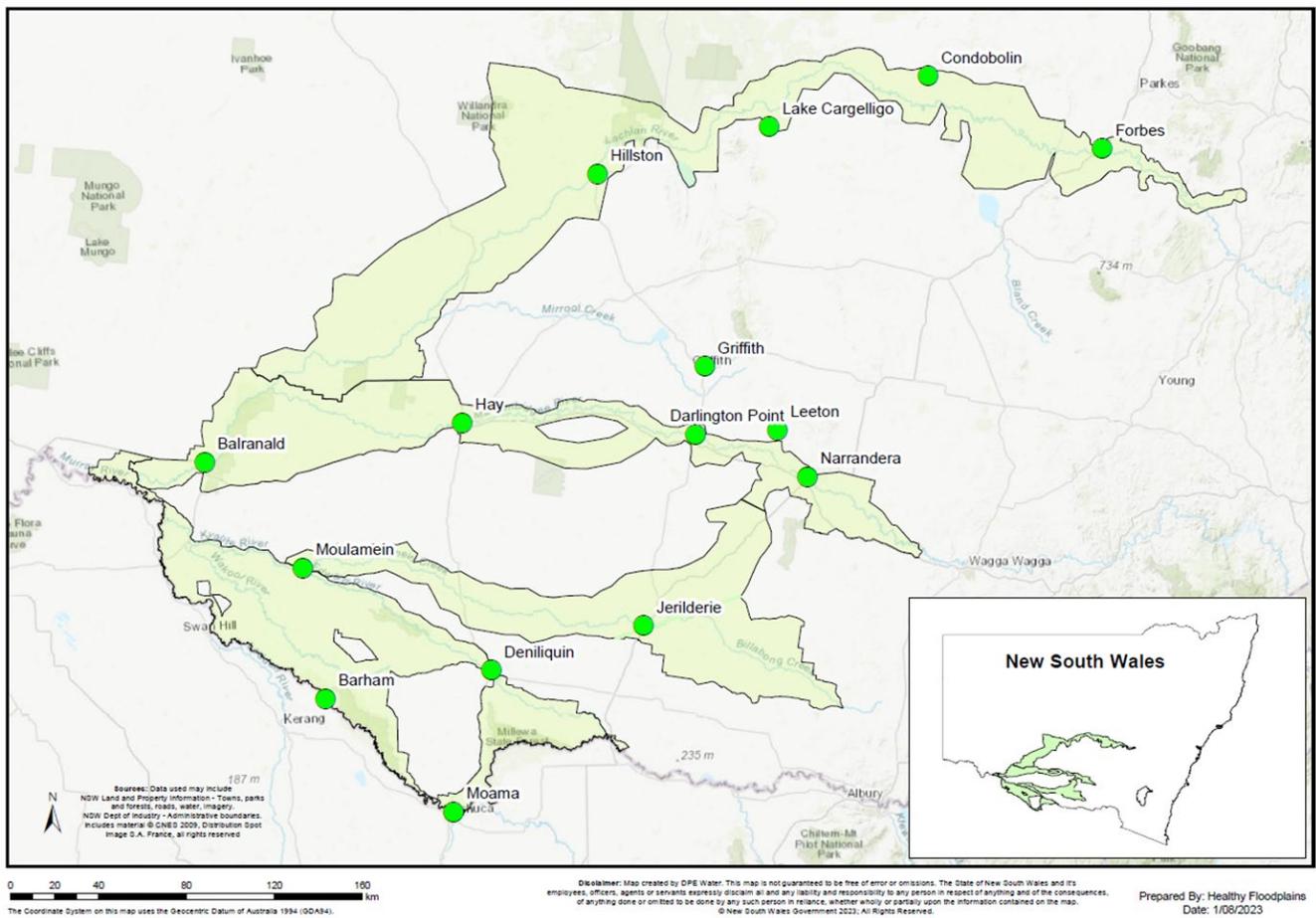
The department would like to thank all those that participated in the engagement, particularly those that provided information that will assist in the development and calibration of the hydraulic models.

Table 1. Overview of engagement attendance May to July 2023

Date	Location	Participants
17 May 2023	Water Engagement Roundup presentation	98
29 – 31 May 2023	Introductory briefing webinars	38
29 May	Victorian Government	2
30 May	NSW and Commonwealth agencies	19
30 May	Local government	6
31 May	Environmental groups	2
31 May	Agriculture and irrigation interests	9
14 - 28 June 2023	Public information sessions	121
14 June	Jerilderie	15
15 June	Deniliquin	11
15 June	Moama	9
16 June	Barham	5
20 June	Forbes	15
20 June	Condobolin	3
21 June	Lake Cargelligo	4
21 June	Hillston	12
27 June	Narrandera	10
27 June	Darlington Point	7
28 June	Hay	11
28 June	Moulamein	19
7 June - 25 July 2023	First Nations introductory sessions	29
7 June	Griffith	2
7 June	Leeton	1

Date	Location	Participants
8 June	Narrandera	3
14 June	Deniliquin	3
15 June	Moama	1
11 July	Hay	2
11 July	Hillston	1
12 July	Condobolin	4
13 July	Forbes	5
13 July	Lake Cargelligo	3
25 July	Balranald	4
	Total (All Events)	286

Figure 1. A map of the regional locations visited during the initial consultation



Types of flood information collected

Landholders and other key stakeholders, such as local councils, provided a range of data to the department including ground and aerial flood level imagery and identification of areas where flood flow connectivity was compromised. To date, the department has collected an abundance of flood images, some drone footage and a significant number of verbal accounts of the 2022 flood event across all four valleys. There was also an abundance of historical flood information provided such as historical flood photos and descriptions of floodplain behaviour during past events from the 1950s to 2016.

Flood information and hydraulic models

The purpose of a FMP is to coordinate flood work development on a floodplain to ensure that flood water can move freely to and from rivers and creeks. To do this, we first need to understand how water moves across the landscape when it floods.

Hydraulic models are used to simulate the movement of flood water through river channels, wetlands, and the wider floodplain. This is important in determining a floodway network for a FMP. A floodway network represents those areas of a floodplain that have the deepest and fastest flowing flood water and pose the greatest risk to life and property.

Hydraulic models have several parameters that need to be calibrated to correctly represent how flood water behaves. The choice of values for these parameters can significantly affect the accuracy of the model outputs and lead to incorrect delineation of the floodway network. Some of these parameters are described below.

The department has collected government-held data, including the WaterNSW gauging network, available satellite imagery, and other observations collected by various NSW Government agencies. These datasets are relatively sparse and therefore the community data we obtained is valuable to fill in the gaps.

Roughness

The models represent the “roughness” of the ground surface which will vary the way flood water flows over the land. Flood water travels slower through dense vegetation compared to a cleared field. As part of the calibration process, flood observations, such as gauge data, satellite imagery, flood images, or footage, are compared to the model results, and the parameters like roughness are modified if the model is not aligning with the observed information.

Model grid size

The model grid size, which is the spatial distance between calculation points, can have a significant impact on the accuracy of results. In particular, if areas with a high variation in topography are represented too coarsely, the flow distribution between different flow paths will be impacted. Typically, modellers aim for around four to five grid cells to adequately represent a hydraulic feature such as a floodway.

Structure representation

All structures on the floodplain should be represented in the model with a high level of accuracy. If structures are not represented correctly, they will behave differently. For example, water may overtop a levee sooner in the model than it does in reality, or water may be constricted by a bridge to a greater degree in the model than in reality.

Flood imagery and associated verbal accounts can assist in identifying and representing structures accurately. For example, a photo showing a levee being overtopped during a flood along with details of the height of the levee can demonstrate how high the flood water was at a given time and how the flood water may behave in the future.

Boundary conditions

Each model needs to identify the inflow conditions at the upstream start of the project area and outflow conditions at the downstream finish of the project area.

Representation of inflows is critical so that the model has the appropriate volumes and flow rates within the study area. Similarly, at the downstream boundary, water needs to be removed from the model at the correct rates to avoid artificially increasing or decreasing flooding.

Key themes raised through feedback

Table 2. Feedback received and departmental response

Feedback	Departmental response
<p>Unapproved flood structures</p> <ul style="list-style-type: none">• Impact on the landscape and cultural assets• Impact on the ability to predict flood behaviour during times of flood	<p>Concerns over unapproved works in the landscape were consistently raised throughout all consultation events. During the 2022 floods, a significant number of unapproved structures were identified and reported.</p> <p>The Natural Resources Access Regulator (NRAR) is responsible for undertaking compliance action for unapproved flood works.</p> <p>As part of developing the hydraulic models, the department will be mapping all structures on the floodplain and categorising those that may be unapproved.</p> <p>As part of this process, the department will:</p> <ul style="list-style-type: none">• provide all modelling information to the relevant emergency management agencies such as the Commonwealth, NSW State Emergency Service (NSW SES), and other states, so that it may assist in their future flood predictions, and• work with NRAR and WaterNSW to bring priority unapproved flood works into compliance. <p>FMPs will assist by identifying unapproved works, setting clear and consistent rules under which flood works can be approved, and providing information to NRAR to assist in prioritising the remediation of these works.</p> <p>To report concerns regarding unapproved works, please visit the NRAR website at www.nrar.nsw.gov.au/report-suspicious-water-activities.</p>

Feedback	Departmental response
	<p>You can also contact NRAR on 1800 633 362 during business hours or via email nrar.enquiries@nrar.nsw.gov.au.</p>
<p>I have historical levees. Do I need a flood work approval?</p>	<p>All flood works require a flood work approval unless an exemption applies. A flood work is defined under the <i>Water Management Act 2000</i> as a work, such as an embankment, that is:</p> <ul style="list-style-type: none"> • situated in or near a river, estuary or lake, or within a floodplain, and • is likely to have an effect on the flow of water to or from a river, estuary or lake, or distribution or flow of flood water in times of flood. <p>A flood work includes all associated pipes, valves and metering equipment. There are some exemptions to requiring a flood work approval, such as an embankment around a house, shed or silo, subject to conditions.</p> <p>For more information on exemptions, please refer to www.watarnsw.com.au/___data/assets/pdf_file/0011/128963/Understanding-exemption-approvals.pdf.</p> <p>To check if you already have an approval, please visit WaterNSW Water Register at waterregister.watarnsw.com.au.</p> <p>To apply for a flood work approval, please visit www.watarnsw.com.au/approvals.</p> <p>Important: Under section 95 (3) of the <i>Water Management Act 2000</i> applications for flood work approvals, including those for historical works, are assessed and determined based on the rules in the relevant FMP on the day of determination. The assessment cannot be based on the rules that were in place when the works were constructed.</p> <p>The approval, if granted, only takes effect from the day the decision to grant the approval is made. Retrospective approvals cannot be granted.</p>
<p>What types of works need a flood work approval?</p>	<p>See response above.</p>
<p>I have reported an unapproved structure, but I have not heard back</p>	<p>NRAR has received a significant number of complaints about unapproved flood works during and following the 2022 flood events. As part of the development and implementation of FMPs, the department will work with NRAR and WaterNSW to bring priority unapproved flood works into compliance.</p> <p>FMPs will assist in resolving this issue by identifying the approval status of existing flood works, setting clear and consistent rules under which existing flood works can be brought into approval, and providing information to NRAR to assist in prioritising the remediation of these unapproved works.</p>

Feedback	Departmental response
<p>Impact of historical approved structures on the landscape</p>	<p>All flood works have an impact on flood flow distribution. FMPs are not retrospective; their purpose is to coordinate the assessment and approval of existing unapproved works as well as new or modified flood works.</p> <p>Existing flood work approvals will remain valid even if they do not meet the current requirements for a flood work approval. However, there will be rules in the new FMPs that deal with any proposed amendments to these approvals, ensuring that any changes to the works will focus on reducing impacts on flood behaviour.</p>
<p>Impact of public roads and railways on flood behaviour during a flood and exemption from requiring a flood work approval</p>	<p>The effects of public works such as roads and railway embankments on flood behaviour were raised across all valleys.</p> <p>There are some exemptions to requiring a flood work approval, such as a work that is constructed under a development authorisation from council or the construction of a public road or railway, subject to conditions. In these situations, the approval is obtained as part of a broader project.</p> <p>For more information on exemptions, please refer to www.waternsw.com.au/___data/assets/pdf_file/0011/128963/Understanding-exemption-approvals.pdf.</p> <p>Despite not requiring a flood work approval, the relevant determining authority must consider the rules in an applicable FMP when approving or refusing projects located on a floodplain.</p> <p>The new FMPs will assist in this process by developing new hydraulic models that show flood behaviour and setting clear and consistent rules which require consideration when projects of this type are being assessed.</p>
<p>Emergency response (cross agency and interstate communication) during the 2022 floods was inadequate</p>	<p>Concerns were raised in relation to communication prior to and during the 2022 flood events. Feedback was received in relation to communication issues across agencies and between NSW and Victorian agencies. This feedback will be provided to the relevant agencies.</p> <p>The NSW Government, through the Department of Planning and Environment, the NSW Reconstruction Authority and the NSW SES, plays an important role in managing flood risk to the community before, during and after floods, across the state.</p> <p>The department is responsible for setting the rules for flood works on rural floodplains through the development of floodplain management plans. We also provide support to local water utilities to deal with threats to town water supplies during and after floods, across the state.</p> <p>The Department's Environment and Heritage group works with local councils in urban areas to better understand and manage the risks and costs of flooding and to consider flood risk in their decision making. This includes supporting the NSW SES to fulfil its role as the legislated combat agency for flooding in NSW.</p>

Feedback	Departmental response
	<p>In response to the 2022 flood events and in line with the recommendations made in the NSW Flood Inquiry, the NSW Reconstruction Authority was established in December 2022 to better prepare communities for disasters, such as the 2022 flood events. For more information on the NSW Reconstruction Authority, please refer to www.dpie.nsw.gov.au/nsw-reconstruction-authority.</p> <p>We will continue to work closely with our colleagues in other Government agencies in NSW and Victoria to support all aspects of floodplain and emergency flood management.</p>
<p>Impact of dam releases on flood behaviour prior to or during a flood</p>	<p>The way dams are managed and the timing of water releases prior to or during the 2022 flood events was raised by stakeholders, particularly in the Lachlan and Murray valleys.</p> <p>Dams are managed by WaterNSW. Water is captured and stored in dams to fulfil customer orders, via the river system that the dam is located on. It is also used to provide environmental flows for the river system. In times of flood, dams in regional NSW can be used for flood mitigation, where water is released in anticipation of rain to allow additional airspace to capture inflows. WaterNSW proactively engages with stakeholders and landholders who may be impacted by dam releases.</p> <p>For more information on dam management, please refer to www.waternsw.com.au/water-services/water-storage/managing-dams-and-reservoirs.</p> <p>For more information on dam management and flood mitigation, please refer to www.waternsw.com.au/water-services/extreme-weather-response/floods.</p> <p>The impact of regulated releases of water from dams will be considered as part of developing the hydraulic models and FMPs.</p>
<p>The historical FMPs have not been implemented</p>	<p>Concerns were raised that the existing, localised FMPs have not been implemented properly and this has impacted flood behaviour during the 2022 floods.</p> <p>The Natural Resources Commission (NRC) audited the 10 historical FMPs in the southern Murray–Darling Basin in 2020. The NRC concluded that the provisions in the FMPs had not been given full effect and that the department should work with WaterNSW and NRAR to address works requiring modification and raise community awareness of the requirements for a flood work approval under the <i>Water Management Act 2000</i>. In 2021, a review was also undertaken of the FMPs, under section 43 of the <i>Water Management Act 2000</i>. This review found that the FMPs were not adequate and appropriate and should be replaced with valley-wide FMPs developed under the <i>Water Management Act 2000</i>.</p> <p>In response to the audit and review, the department is replacing the FMPs with four whole-of-valley FMPs. The new FMPs will focus on the rules for flood work applications by providing clear, consistent assessment criteria</p>

Feedback	Departmental response
	<p>for all floodplain users. They will also consider existing floodplain management planning arrangements in each of the historical FMPs. Some actions in the historical FMPs, such as strategic breaching of levees during floods and other modifications to flood works, will be investigated in the development of the new FMPs.</p> <p>The new FMPs will be audited by the NRC and reviewed under section 43 of the <i>Water Management Act 2000</i> prior to their replacement at the end of their 10-year term. This will ensure they are effectively implemented.</p> <p>As the lead agency for rural floodplain management under the <i>Water Management Act 2000</i>, the department is building its technical capabilities to better support WaterNSW and NRAR to implement the FMPs. We will continue to work closely with our colleagues in other government agencies in NSW and Victoria to support all aspects of floodplain and emergency flood management.</p>
<p>There are no local contacts for NRAR or WaterNSW anymore</p>	<p>This feedback has been shared with NRAR and WaterNSW.</p> <p>WaterNSW local offices can be found on their website. Use the link below to book an appointment with a Water Regulation Officer, noting offices are only open Tuesdays for face-to-face meetings:</p> <p>www.waternsw.com.au/customer-services/help-and-support.</p> <p>Through its outreach program, NRAR engages directly with water users across regional NSW to help them understand and comply with the water rules.</p> <p>NRAR has established teams in Dubbo, Tamworth, Deniliquin, and Albury who regularly visit properties across regional NSW, meeting water users face-to-face.</p> <p>NRAR's outreach program complements its other monitoring and audit campaigns and enables the agency to hear directly from licence holders, provide information to help them understand their obligations, and better understand reasons for non-compliance.</p> <p>You can contact NRAR by phone on 1800 633 362 or by email nrar.enquiries@nrar.nsw.gov.au.</p>
<p>What is the relationship between FMPs and Reconnecting River Country?</p>	<p>FMPs set the rules for flood work development across a floodplain. They do not deal with the take of water or environmental flows.</p> <p>The Reconnecting River Country Program is investigating the potential to relax or remove constraints that restrict the delivery of water for the environment in the Murray and Murrumbidgee valleys. The program is currently in the development phase funded to October 2023 by the Australian Government. The program is a key Murray–Darling Basin Plan initiative that is being led by Water Infrastructure NSW.</p> <p>The NSW and Australian governments are currently discussing next steps for the program. If funded, the program will proceed to final business case</p>

Feedback	Departmental response
	<p>development to assess feasibility, recommend a flow option, and provide implementation costs for the Australian Government assessment and investment decision to proceed to implementation.</p> <p>If a decision is made to fund and implement the program, the Reconnecting River Country Program will enable water for the environment to be released from storages to connect rivers with wetlands and low-level floodplains. These flows would be much smaller than the large design floods used in FMPs.</p> <p>Any flood works that are proposed as part of the Reconnecting River Country Program will be required to be assessed against the rules in the new Murray and Murrumbidgee FMPs.</p> <p>We are drawing on hydraulic modelling data developed by the Reconnecting River Country to assist in developing our hydraulic models. This provides efficiency and consistency in modelling approaches between these two complementary programs.</p> <p>For more information on the Reconnecting River Country Program, please visit water.dpie.nsw.gov.au/water-infrastructure-nsw/sdlam/reconnecting-river-country-program.</p>
<p>Which flood event will be used in the modelling?</p>	<p>FMPs will use a large design flood (large flood event) and small design flood (smaller and more frequently occurring flood event). The large design flood is used to identify and confirm the extent of the floodway network. The small design flood is used to identify and confirm flood flow pathways to ecological and cultural assets on the floodplain, and ensure those pathways are included in the floodway network.</p> <p>Large and small design flood events are usually based on recorded historical events that are preferably within the living memory of a local community. This approach enables the community to comprehend the magnitude of the flood events being modelled.</p> <p>With a significant amount of information available for the 2022 floods, these events are being considered as part of the process to select design floods for each of the FMPs.</p>
<p>The need for Mirrool Creek to have an FMP</p>	<p>The department has received a significant amount of information in relation to the need for an FMP to be developed for Mirrool Creek.</p> <p>The current focus of the department is to replace the existing localised FMPs in the southern Murray–Darling Basin with four valley-wide FMPs by 2025. The department is also considering areas that may require an FMP in the future, including Mirrool Creek.</p>

Next steps

The department will be engaging with First Nations communities throughout the remainder of 2023. The aim of this consultation is to identify and confirm flood-dependent Aboriginal cultural assets and values within each valley. This engagement will be ongoing prior to, during and after broad public consultation periods. This work complements other programs within the department aimed at engaging First Nations communities, such as co-designing the Aboriginal Water Strategy, establishing Regional Aboriginal Water Committees, developing Cultural Watering Plans and developing an Aboriginal Cultural Competency Framework. For more information on these initiatives, please refer to water.dpie.nsw.gov.au/plans-and-programs/aboriginal-water-program.

There will be two further stages of public consultation for each FMP, as described below.

The first stage of consultation will seek feedback on the core elements of the draft FMP such as the boundary, floodway network, flood-dependent ecological and cultural assets, and deviations from default rules. This is anticipated to occur in early 2024 for the Murray and Murrumbidgee valleys and in mid-2024 for the Billabong Creek and Lachlan valleys.

Based on feedback received during stage 1, the second stage of consultation will seek feedback on the draft FMP which will include proposed management zones throughout the floodplain and associated rule set for each management zone. This is anticipated to occur in mid-2024 for the Murray and Murrumbidgee valleys and in early 2025 for the Billabong Creek and Lachlan valleys.

The department is aiming to have FMPs commenced for all four valleys by the end of 2025. These FMPs will replace the 10 historical FMPs, which will be repealed as part of the approval process.