



Section 43 Review of the Barwon-Darling
Floodplain Management Plan

FINAL REPORT

June 2022

alluvium



Alluvium recognises and acknowledges the unique relationship and deep connection to Country shared by Aboriginal and Torres Strait Islander people, as First Peoples and Traditional Owners of Australia. We pay our respects to their Cultures, Country and Elders past and present.

Artwork by Vicki Golding. This piece was commissioned by Alluvium and has told our story of water across Country, from catchment to coast, with people from all cultures learning, understanding, sharing stories, walking to and talking at the meeting places as one nation.

This report has been prepared by Alluvium Consulting Australia Pty Ltd for DPIE Water under the contract titled 'Section 43 Review of the Barwon-Darling Floodplain Management Plan'.

Authors: Chris Barnes
Review: David Winfield, Andrew Little
Approved: Neal Albert

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Executive Summary

Floodplain Management Plans (FMPs) provide a framework for coordinating the development of flood works on a whole of valley basis. The Barwon-Darling FMP commenced under the *Water Management Act 2000* (the Act) in 2017.

FMPs are designed to manage the development of new flood works and amendments to existing flood works to:

- Facilitate the orderly passage of floodwaters through the floodplain.
- Maintain flood connectivity to wetlands, other floodplain ecosystems, and areas of groundwater recharge.
- Contribute to the protection of ecological assets and values of the floodplain.
- Contribute to the protection of cultural, heritage and spiritual features of the floodplain that are significant to Aboriginal people and other stakeholders.
- Provide the strategic planning framework through which floodplain works are regulated by flood work approval application, assessment, issuing or rejection, and conditioning.
- Enable flow paths through which planned and held environmental water are provided.

Under the Act, review responsibilities are specified for management plans, with those with provisions dealing with water sharing (s.43A) the responsibility of the Natural Resources Commission (NRC), and all others (s.43) by DPE Water. Review under s.43 must be undertaken for the purpose of ascertaining whether the FMP's provisions remain adequate and appropriate for ensuring the effective implementation of the water management principles. The Review is to be conducted in consultation with the Minister for the Environment and the Natural Resources Commission.

A s.43 Review of the Floodplain Management Plan for the Barwon-Darling Floodplain (the FMP) has been undertaken.

The Review found that the Barwon-Darling FMP is appropriate but not adequate to effectively implement the water management principles. Some amendments should be made to improve the adequacy of the Barwon-Darling FMP. Table 1 summarises the findings and recommendations from the Review.

While the findings detail areas that the FMP can improve, and overall, the FMP was found to be appropriate but not adequate, it is important to note that the FMP was found to be adequate and appropriate for implementing most of the water management principles. The key factors that drove its adequacy and appropriateness in these areas were:

- The FMP is an unambiguous statutory instrument that is easy to read and is aligned with the requirements of the Act.
- The FMP provides clearly worded descriptions of the spatial information and is supported by mapping held within the FMP and an online spatial mapping tool.
- The core provisions under s.29 of the Act are all dealt with in clearly identifiable sections of the FMP.
- The additional provisions under s.30 of the Act were mostly easily identifiable as having informed the development of the FMP.
- The FMP shows a clear method for its development and is supported by a strong evidence base for the rules, criteria and delineation of the areas affected.

Table 1. Findings and recommendations of the s.43 review of the Barwon-Darling FMP

		Step in the Review assessment that informed finding						
Finding		Recommendation	Step 1. FMP logic	Step 2. Provisions	Step 3. Implementation	Step 4. Principles	Step 5 Consultation	Step 6. Synthesis
FBD.01	The performance indicators in s.12 of the FMP were not specific, measurable targets	Review of the performance indicators to include specific, measurable indicators and the timeframes for assessment	■					■
FBD.02	The FMP includes detail on the assessment of future flood work and modification of existing approved works but does not contain information on the potential impact of removing flood works as is suggested by s.30(b) of the Act	Include requirements for the potential impact of removing or modifying existing approved and unapproved flood works. In particular, risks to life and property from removing and not removing existing flood works.		■				■
FBD.03	The online spatial mapping is a very clear tool for the understanding and application of the management zone areas to specific property locations, but it is not located within the FMP and no direct link to it is provided in the FMP potentially making it hard to find.	Amend the plan to include a reference to the ArcGIS online version of the Management Zones Map		■				■
FBD.04	Water quality provisions have not been included in the FMP as required under s.5(2)(c) and provided for by s.30(e) of the Act	Inclusion of water quality provisions, such as management of blackwater		■		■		■
FBD.05	The core provisions (s.29 of Act) are clearly held in designated sections of the FMP, but the additional provisions (s.30) were used to inform the FMP with the detail held in the background document.	Include the background document as an attachment to the FMP or provide a reference to ensure ease of access. If the items not found in the FMP are considered to be held elsewhere, such as the background document, then clear reference should be included (for example as a Note) so that the information is clearly accessible. This would ensure all information is being considered by all parties to ensure effective implementation.		■		■		■
FBD.06	The Section 44 audit has made recommendations for amendments to the FMP to ensure plan provisions are given effect	Recommendations of the s.44 audit to be actioned by DPE Water or WaterNSW as appropriate.			■			■
FBD.07	The FMP has been clearly informed through consultation with Aboriginal groups and individuals and this information has informed the delineation of the zones, but there is no clear requirement for assessing applications based on the information.	Include a requirement to ensure geographical and other features of Aboriginal significance are protected, potentially through consultation with DPE Water or similar, in the assessment of flood work applications				■	■	■

		Step in the Review assessment that informed finding					
		Step 1. FMP logic	Step 2. Provisions	Step 3. Implementation	Step 4. Principles	Step 5 Consultation	Step 6. Synthesis
Finding	Recommendation						
FBD.08	The FMP holds potential for amendment and adaption through its Part 10 clauses but there is no trigger for these amendments to occur				■		■
FBD.09	The technical detail (including the hydraulic modelling and mapping) of the FMP has not been reviewed here as it was out of scope for this report.					■	■
FBD.10	The provisions within the FMP may be preventing land rehabilitation works and other NRM works from being undertaken because they are deemed to be flood work.					■	

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Acronyms and Abbreviations

CSS	Catchment Simulation Solutions (primary contractor to WaterNSW for assessment of flood work applications)
DPE	The Department of Planning & Environment
EHG	Environment and Heritage Group DPE
FMP	Floodplain Management Plan
FRMS	Flood Risk Management Study
FS	Flood Study
HFP	Healthy Floodplains Project
NRAR	Natural Resources Access Regulator
NRC	Natural Resources Commission
NRM	Natural Resource Management
The Act	<i>The Water Management Act 2000 (NSW)</i>
Water Act	<i>The Water Act 1912 (NSW)</i>

1 Introduction

FMPs provide the framework for coordinating the development of flood works on a whole-of-valley basis. FMPs are designed to manage the development of new flood works and amendments to existing flood works to:

- Facilitate the orderly passage of floodwaters through the floodplain,
- Maintain flood connectivity to wetlands, other floodplain ecosystems, and areas of groundwater recharge,
- Contribute to the protection of ecological assets and values of the floodplain,
- Contribute to the protection of cultural, heritage and spiritual features of the floodplain that are significant to Aboriginal people and other stakeholders,
- Provide the strategic planning framework through which floodplain works are regulated by flood work approval application, assessment, issuing or rejection, and conditioning,
- Enable flow paths through which planned and held environmental water are provided.

Under the Act, review responsibilities are specified for management plans, with those with provisions dealing with water sharing (s.43A) the responsibility of the Natural Resources Commission (NRC), and all others (s.43) by DPE Water. A review under s.43 must be undertaken for the purpose of ascertaining whether the FMPs provisions remain adequate and appropriate for ensuring the effective implementation of the water management principles. The Review is to be conducted in consultation with the Minister for the Environment and the NRC.

1.1 Review objective

The objective of the Review was to determine, in accordance with Section 43 (s.43) of the Act, whether provisions remain adequate and appropriate for ensuring the effective implementation of the water management principles (s.43) for Barwon-Darling FMP (the FMP).

The scope of this review has been to review the FMP, and not the technical detail that informed development of the FMP. Future applications of the Review method should include a review and update of the information that informed the FMPs creation, including hydraulic modelling, flood frequency, ecological analysis, Aboriginal and Cultural values and the social and economic impacts of floodplain management in the valleys.

2 About the Review

2.1 Purpose of the Section 43 Review under the Act

Section 43 of the Act determines the durations of FMPs, with subsection (2) holding the requirement that is the basis for this review. It states that:

(2) Within the fifth year after it was made, the Minister is to review each management plan (other than provisions dealing with water sharing) for the purpose of ascertaining whether its provisions remain adequate and appropriate for ensuring the effective implementation of the water management principles.

2.2 FMP requirements under the Act

The Act includes requirements for the principles (s.5) and format (s.35) of FMPs.

The following general principles of water management are stated in Section 5 (2):

- (a) water sources, floodplains and dependent ecosystems (including groundwater and wetlands) should be protected and restored and, where possible, land should not be degraded, and*
- (b) habitats, animals and plants that benefit from water or are potentially affected by managed activities should be protected and (in the case of habitats) restored, and*
- (c) the water quality of all water sources should be protected and, wherever possible, enhanced, and*
- (d) the cumulative impacts of water management licences and approvals and other activities on water sources and their dependent ecosystems, should be considered and minimised, and*
- (e) geographical and other features of Aboriginal significance should be protected, and*
- (f) geographical and other features of major cultural, heritage or spiritual significance should be protected, and*
- (g) the social and economic benefits to the community should be maximised, and*
- (h) the principles of adaptive management should be applied, which should be responsive to monitoring and improvements in understanding of ecological water requirements.*

The following specific principles relate to floodplain management are stated in Section 5(6):

- (a) floodplain management must avoid or minimise land degradation, including soil erosion, compaction, geomorphic instability, contamination, acidity, waterlogging, decline of native vegetation or, where appropriate, salinity and, where possible, land must be rehabilitated, and*
- (b) the impacts of flood works on other water users should be avoided or minimised, and*
- (c) the existing and future risk to human life and property arising from occupation of floodplains must be minimised.*

Section 35(1) states the required format of a management plan:

- (1) A management plan must include the following components—*
 - (a) a vision statement,*
 - (b) objectives consistent with the vision statement,*
 - (c) strategies for reaching those objectives,*
 - (d) performance indicators to measure the success of those strategies.*

The following core provisions relating to floodplain management are stated in Section 29:

The floodplain management provisions of a management plan for a water management area must deal with the following matters—

- (a) identification of the existing and natural flooding regimes in the area, in terms of the frequency, duration, nature and extent of flooding,*
- (b) the identification of the ecological benefits of flooding in the area, with particular regard to wetlands and other floodplain ecosystems and groundwater recharge,*
- (c) the identification of existing flood works in the area and the way they are managed, their benefits in terms of the protection they give to life and property, and their ecological impacts, including cumulative impacts,*
- (d) the risk to life and property from the effects of flooding.*

The following additional provisions relating to floodplain management are stated in Section 30:

The floodplain management provisions of a management plan for a water management area may also deal with the following matters—

- (a) proposals for the construction of new flood works,*
- (b) the modification or removal of existing flood works,*
- (c) restoration or rehabilitation of land, water sources or their dependent ecosystems, in particular in relation to the following—*
 - (i) the passage, flow and distribution of floodwater,*
 - (ii) existing dominant floodways and exits from floodways,*
 - (iii) rates of flow, floodwater levels and duration of inundation,*
 - (iv) downstream water flows,*
 - (v) natural flood regimes, including spatial and temporal variability,*
- (d) the control of activities that may affect or be affected by the frequency, duration, nature or extent of flooding within the water management area,*
- (e) the preservation and enhancement of the quality of water in the water sources in the area during and after flooding,*
- (f) other measures to give effect to the water management principles and the objects of this Act,*
- (g) such other matters as are prescribed by the regulations.*

2.3 Method applied to this review

The Review of the FMP was conducted between 21 February 2022 and 30 June 2022.

Review steps

The Review was conducted using the six-step process shown in Figure 1, each producing an assessment table to display the findings from the step. The FMP was reviewed following the process outlined in the “Review method for Floodplain Management Plans under Section 43 of the Water Management Act 2000 NSW” (Alluvium, 2021). The process, as shown in Figure 1, follows a review of the FMP logic, that it has dealt with the provisions and that it is adequate and appropriate for ensuring the effective implementation of the water management principles (s.43(2)).

The steps undertaken were;

- Step 1 assessed the FMP logic (i.e., how its provisions and actions contribute to achieving outcomes and objectives).
- Step 2 assessed if the FMP is in accordance with the Act requirements for FMP provisions.
- Step 3 takes the outcomes of the NRC s.44 audit to determine if the FMP was implemented in accordance with the provisions of the Act.
- Steps 4 and 5 assess whether the FMP is adequate and appropriate in accordance with the principles (s.5) by reviewing the FMP document (Step 4) and supporting documentation and consultation (Step 5)

- Step 6 synthesises the information to form an assessment regarding whether the FMP provisions remain adequate and appropriate for ensuring the effective implementation of the water management principles and make recommendations based on the assessment.

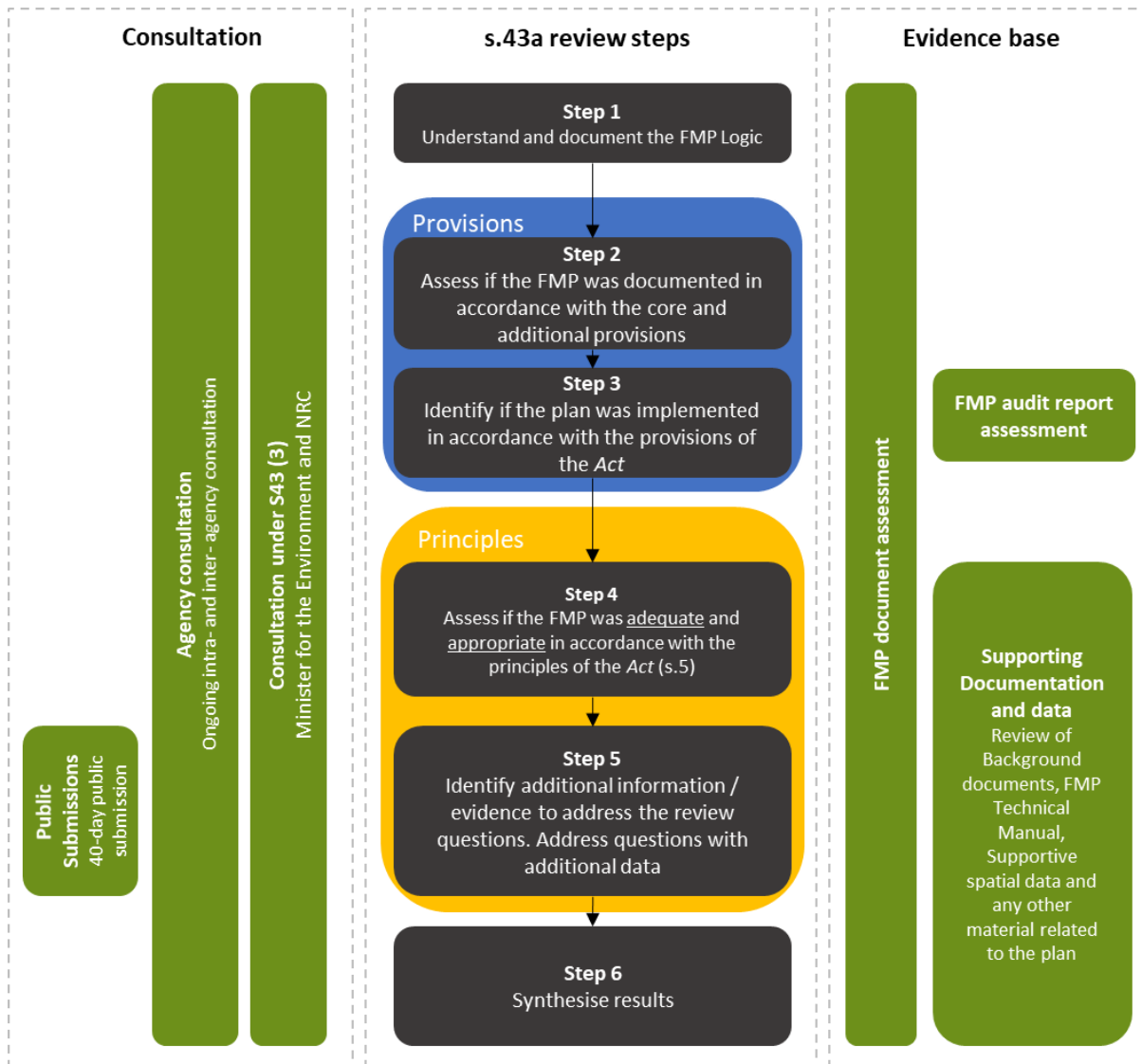


Figure 1. Review method (Alluvium 2021)

Evidence base

The Review of the FMP has included consideration on the FMP document, informed by supporting documentation where available, consultation with agency representatives and submissions from the public and stakeholder organisations against the logic, provisions and principles requirements under the Act. The information sources used during the Review were:

- The Barwon-Darling FMP 2017
- Submissions from public and stakeholder organisations
- Targeted interviews with DPE Water, DPE Environment and Heritage Group (EHG), DPI Agriculture, NRC, NRAR and WaterNSW
- The Rural floodplain management plans: technical manual for plans developed under the Water Management Act 2000
- Rural floodplain management plans, Water Management Act 2000, Background document to the floodplain management plan for the Barwon-Darling Valley Floodplain 2017, June 2017

- Technical Assessment Methods, Assessment Criteria, Implementation of the Floodplain Management Plan for the Barwon-Darling Valley Floodplain 2017, June 2019. [unpublished]
- Technical Notes, Rules, Implementation of the Floodplain Management Plan for the Barwon-Darling Valley Floodplain 2017, June 2019. [unpublished]
- Rural floodplain management plans: technical manual for plans developed under the *Water Management Act 2000*, Version, 2.1, June 2020
- Guide to Flood Study Reports, Technical Assessment Methods for flood work approvals under the *Water Management Act 2000*, Phase 4, Version 2.1B, May 2020. [unpublished]

Assessment

The s.43 review has been conducted for the purpose of ascertaining whether the FMP provisions remain adequate and appropriate for ensuring the effective implementation of the water management principles. The Review has also determined if the FMP has met the requirements of a plan under s.35 of the Act, as well as if it has dealt with the provisions under s.29 and s.30 of the Act. The details of how the FMP was assessed against the requirements is shown in Table 2.

Table 2. Assessment definitions

Item	Detail
FMP Logic (s.35)	
✓	The item as listed as a requirement under s.35 of the Act has been included in the FMP.
✗	The item that is listed has not need included in the FMP.
Provisions (s.29 and s.30)	
✓	The FMP utilises clearly defined and enforceable strategies to deal with all of the items detailed within the provision being assessed.
○	The FMP has either dealt with some of the aspects of the provision but not all, or there is detail held in the FMP on the provision but has not dealt with it through clearly defined strategies.
✗	The FMP does not contain detail on any of the aspects of the provision being assessed.
Principles (s.5)	
Adequate and appropriate	The FMP ensures the effective implementation of the principle by being an appropriate legislative tool of an adequate level of detail and enforceability. The FMP has a strategy for implementing the water management principles that uses prescriptive language, measurable detail, and enforceable rules. The FMP meets the requirements of the Act and is fit for purpose.
Adequate but not appropriate	The FMP holds the level of detail and rules for ensuring the effective implementation of the water management principles but is not appropriate to be enforced as a legislative tool. The FMP may hold the detail and information that could be used to implement the principles but may not be enforceable, have measurable standards and criteria that would allow the effective implementation. The FMP may hold up to date and clearly defined information, but the FMPs strategies may not be suited for the management of the floodplain and the implementation of the water management principles.
Appropriate but not adequate	The format, wording and enforceability of the FMP may be appropriate for a legislated FMP, but the detail, rules and criteria are not to a level that allows effective implementation of the FMP. The FMP may be suited for the management of the floodplain and implementing the water management principles, but the information may be outdated or insufficient.

Item	Detail
Included but not adequate nor appropriate	The FMP includes information on the water management principle, but it is not in a way that provides any detail on strategies for its implementation, criteria or rules that can be use or any other planning detail that would allow effective implementation.
Not included so not adequate or appropriate	The FMP does not make mention of the water management principle and it does not appear to have informed its development.

Consultation

The opportunity to make submissions was made available through the DPE Water website. Submissions were able to be made through an online tool, through a designated email address or in writing to a post office address between 11 April 2021 and 20 May 2022. A summary of the submissions is provided in Section 5.5. The submissions page asked to provide feedback on the Barwon-Darling FMP regarding:

- Is the FMP adequate and appropriate for ensuring the effective implementation of the water management principles?
- Are there issues with the FMP that were identified since commencement and impact on effectiveness of implementation?
- Are there potential amendments to the FMP that should be considered?

The agencies that were involved in the targeted consultation were:

- DPE Water
- DPE Environment and Heritage Group (DPE EHG)
- DPI Agriculture
- Natural Resources Access Regulator (NRAR)
- Natural Resources Commission (NRC)
- WaterNSW (Additional input was provided on behalf of WaterNSW by Catchment Simulation Solutions, the primary contractor for review of flood work approval application)

The Review included engagement with a Working Group of agency representatives to assist with the process and give guidance on the scope and interpretation of evidence. The Working Group consisted of representatives from:

- DPE Water
- DPE EHG
- NRC

Out of scope

In accordance with the agreed scope, the Review of the FMPs did not:

1. Conduct an audit of the FMP, rather the method intends to draw on the previously completed s.44 audit as part of the Review.
2. Consider the process applied to develop the FMPs.
3. Review the outputs of hydraulic modelling nor conduct a review of the models themselves.
4. Examine accuracy of spatial data. The Review assessed the functionality of the mapping but not the accuracy of the content
5. The s.43 review will identify issues as they are raised and include them in the assessment but may not always provide a recommended solution.

3 Background and context to the Floodplain Management Plans subject of this review

3.1 Background

Murray Darling Basin Plan

Current management of water for the environment in the Murray-Darling Basin must meet Basin Plan 2012 requirements. Floodplain management plans were designed to provide benefits to rural communities and the floodplain environment by allowing farmers to plan for future sustainable development based on a strategic scheme for the management of floodwaters (NSW DPIE, 2020). The Basin Plan is the legal framework to reset the balance of water use in the Basin. The Basin Plan sets environmental and other objectives for the Basin (supported by the Basin-wide Environmental Watering Strategy and Long-Term Watering Plans) and establishes new, lower sustainable extraction limits (SDLs) to achieve them. It also outlines the key actions, processes, and timeframes that Governments are to adopt to implement the Plan. Importantly, the Basin Plan does not set specific requirements for floodplain management planning, but FMPs may need to consider alignment with relevant obligations in the Basin Plan, such as key environmental assets and ecosystem functions.

Water-related environmental values of the Murray-Darling Basin were recognised, and a key feature in recent reform. A primary objective of recent water reform has been to protect and restore “water dependent” ecosystems of the Basin and their ecological functions. This included establishing the institutions and structures to allow environmental water to be recovered and delivered at a Basin-wide scale. Reform was required at a Basin scale to deliver a ‘healthy working basin’ with healthy and resilient ecosystems, vibrant and strong regional communities, and productive and sustainable water-dependent industries.

Healthy Floodplains Project

Commencing in 2013, the Healthy Floodplain Project (HFP) has aimed to drive reform in water management in northern NSW basin areas. Included in the scope of the project was the development of six new, valley-wide FMPs for the Border Rivers, Gwydir, Namoi (upper and lower), Barwon-Darling and Macquarie valleys (NSW DPE, 2017),

The HFP project has been implemented over a seven-year period for rural floodplains in the northern Murray-Darling Basin as part of the transition of water management from the provisions of the *Water Act 1912* (Water Act) to the provisions of the Act. The FMPs were created under a new approach to FMP development, utilising the 10-step process outlined in the *Rural floodplain management plans: technical manual for plans developed under the Water Management Act 2000* (NSW DPIE, 2020).

Barwon-Darling FMP Development

The FMP was developed under the Act under the HFP and commenced on the 30th of June 2017. In accordance with s.43 of the Act, it is due for review by 30 June 2022. It was one of the first of the six FMPs to be developed across the northern NSW Murray-Darling Basin, with the Gwydir Valley, Upper Namoi, Lower Namoi, Border Rivers and Macquarie valleys. The Barwon-Darling FMP replaced the following existing floodplain development guidelines:

- Guidelines for Flood Plain Development Darling River Little Bogan confluence to Yanda Creek confluence (WRC 1986a)
- Guidelines for Flood Plain Development Darling River Yanda Creek confluence to Louth (WRC 1986b)

The FMP area is shown in Figure 2.

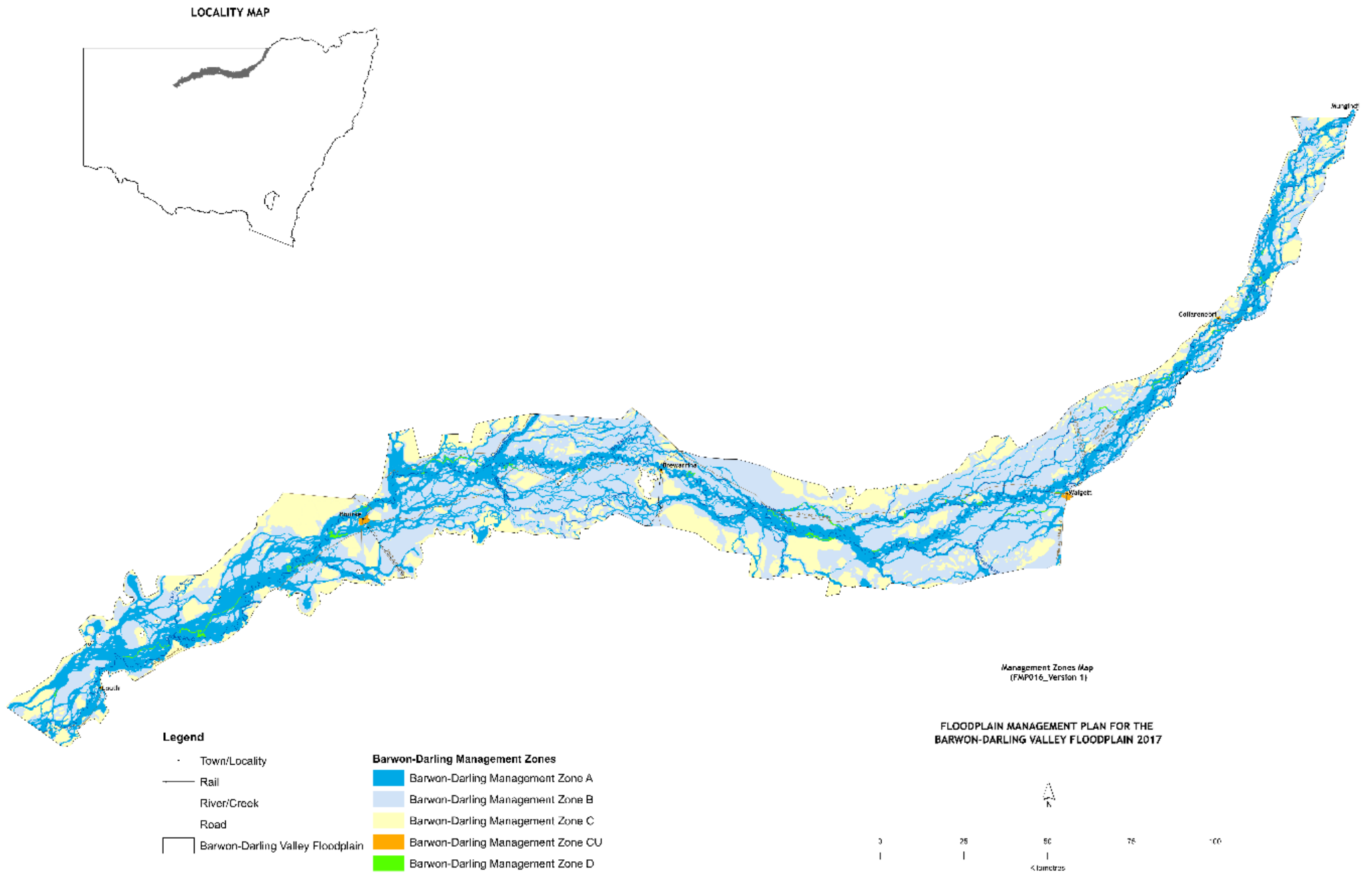


Figure 2. Barwon-Darling FMP area (NSW DPE, 2017)

4 Findings

4.1 Section 43 review findings

The Section 43 review found the Barwon-Darling FMP appropriate but not adequate to ensure the effective implementation of the water management principles, and amendments should be made.

The FMP meets the structural requirements of a management plan as detailed in s.35 of the Act, with the inclusion of a vision statement, objectives, strategies and performance indicators included in the FMP. Each of these was clearly articulated, with each given a separate section within the FMP with an evident understanding of the s.35 requirements. The performance indicators were highlighted as an area of improvement, as they are not specific and measurable which limits their effectiveness. These should be amended with more detailed performance indicators with clear timeline that they are to be achieved (FBD.01).

Similarly, the core provisions of s.29 were clearly identified within the FMP, again with each given its own section to address the provisions. The additional provisions were not provided their own sections, given the less prescriptive requirement when compared to the core provisions, but it was evident that they were considered during the development. The FMP could be improved through the inclusion of requirements for the potential removal of existing flood works and the potential impacts on other floodplain users (FBD.02), although this is an additional provision that FMPs *may also deal with* (s.30) and is not a mandatory requirement for the management plan.

While overall, the FMP was found to be appropriate but not adequate, it is important to note that the FMP was found to be adequate and appropriate for implementing most of the water management principles. The two exceptions were:

- The FMP should be updated to include detail on the management of water quality (FBD.04) as is required under the principle in Section 5(2)(c).
- Part 10 of the FMP should be updated to include clear triggers for the adaptive management provisions that it holds (FBD.07). The FMP was considered adequate but not appropriate in ensuring the effective implementation of the principle in Section 5(2)(h)

The s.44 Audit undertaken by NRC found that the FMP had not been given full effect to in accordance with the Act. The Audit report includes recommendations that could inform potential amendments to the FMP (FBD.06).

The Review was able to refer to multiple sources of information to determine the adequacy and appropriateness of the FMP, particularly in Step 5. These sources were key to the findings and are vital to understanding the FMP and the areas that it is effective. To ensure its effectiveness, the information should be easier to locate, potentially through the use of the notes of the FMP order, to provide clear reference to the spatial mapping tool available on the DPE Water website (FBD.03) and the background document (FBD.05).

In assessing the FMP's performance against the water management principles, the Review found that the FMP should be amended to provide clear and specific triggers to update the provisions under part 10 (FBD.08).

Consultation with agency staff led to the recommendation that there should be an update to the modelling and other detail that informed the FMP potentially leading to refinement of the management zones (FBD.09).

Wider consultation found that the provisions of the plan may be preventing NRM works from being undertaken in some management zones due their definition as flood work. This led to the recommendation that a review should be undertaken to assess how ecological enhancement works and other NRM works should be considered in the FMP to ensure these works are not inhibited by the FMP (FBD.10).

While the findings detail the areas that the FMP can improve, it is important to note that for most of the areas of review the Barwon-Darling FMP was found to be adequate and appropriate for ensuring the effective implementation of the water management principles. The key factors that drove its adequacy and appropriateness were:

- The FMP is an unambiguous statutory instrument that is easy to read and is aligned with the requirements of the Act.
- the FMP provides clear compliance criteria governing the assessment, issue (or refusal) and conditioning of flood work approvals for new or amended flood works.
- The FMP provides clearly worded descriptions of the spatial information, and is supported by mapping held within the FMP and an online spatial mapping tool.
- The core provisions under s.29 of the Act are all dealt with in clearly identifiable sections of the FMP.
- The additional provisions under s.30 of the Act were mostly easily identifiable as having informed the development of the FMP.
- The FMP shows a clear method for its development and is supported by a strong evidence base for the rules, criteria and delineation of the areas affected.

Table 3. Findings summary

Finding	Recommendation	Step in the Review assessment that informed finding					
		Step 1. FMP logic	Step 2. Provisions	Step 3. Implementation	Step 4. Principles	Step 5 Consultation	Step 6. Synthesis
FBD.01	The performance indicators in s.12 of the FMP were not specific, measurable targets	■					■
FBD.02	The FMP includes detail on the assessment of future flood works but does not contain information on the potential impact of removing flood works as is suggested by s.30(b) of the Act		■				■
FBD.03	The online spatial mapping is a very clear tool for the understanding and application of the management zone areas to specific property locations, but it is not located within the FMP and no direct link to it is provided in the FMP potentially making it hard to find.		■				■
FBD.04	Water quality provisions have not been included in the FMP as required under s.5(2)(c) and provided for by s.30(e) of the Act		■		■		■
FBD.05	The core provisions (s.29 of Act) are clearly held in designated sections of the FMP, but the additional provisions (s.30) were used to inform the FMP with the detail held in the background document.		■		■		■
FBD.06	The Section 44 audit has made recommendations for amendments to the FMP to ensure plan provisions are given effect			■			■

		Step in the Review assessment that informed finding					
Finding	Recommendation	Step 1. FMP logic	Step 2. Provisions	Step 3. Implementation	Step 4. Principles	Step 5 Consultation	Step 6. Synthesis
FBD.07	The FMP has been clearly informed through consultation with Aboriginal groups and individuals and this information has informed the delineation of the zones, but there is no clear requirement for assessing applications based on the information.				■	■	■
FBD.08	The FMP holds potential for amendment and adaption through its Part 10 clauses but there is no trigger for these amendments to occur				■		■
FBD.09	The technical detail (including the hydraulic modelling and mapping) of the FMP has not been reviewed here as it was out of scope for this report.					■	■
FBD.10	The provisions within the FMP may be preventing land rehabilitation works and other NRM works from being undertaken because they are deemed to be flood work.					■	

4.2 Additional findings

During the targeted consultation with agencies and through the Review of the FMP, there were additional findings that were considered to be important for inclusion in the findings, but out of scope of the s.43 Review. These additional findings were:

- There is a lack of clarity regarding the areas subject to the rural FMPs such as the FMP and an urban flood management plan and if there is a hierarchy of FMPs or if they should be considered together
- There is uncertainty about how flood works should be assessed for approvals in areas that are not subject to an FMP. These works may still impact local flood activity but may not be in a designated floodplain and are not within an FMP area
- The NRC Audit found that mandatory conditions had not been provided with all flood work approvals during the Audit period. The consultation phase of the Review identified that the mandatory conditions had not been written at the time of the commencement of the FMP. Consideration should be given to linking the creation of the mandatory conditions to the commencement of the FMP to ensure the implementation of the Provisions in Part 9 of the FMP.
- The NRC audit noted that the mandatory conditions had not been coded into the Water Licencing System (WLS). With mandatory conditions having now been written, these should be coded into the WLS and the appropriate notifications issued to give effect to the FMP provisions and water management principles as per the Audit recommendations.

The lack of clarity in these areas has the potential to create issues for the implementation of the FMPs. It may mean that compliance and enforcement activities are at risk, the principles of the Act may not have been given effect to, and rural flood works applications might not be adequately considering risks to life and property in towns.

Other additional findings were:

- There is a need to progress with the Improving Floodplain Connections project, which looks at the existing works that were identified in the development of the FMP as hindering the management of flood activity through flow conveyance either safely through the valley or to flood dependent areas.
- The review of the technical information was not included in the scope of this Review, but the consultation process identified that in places there are some discrepancies in the model results which lead to localised inaccuracies in the FMP (management zone delineation). The technical information that informed the FMP development such as hydraulic modelling may need to be reviewed and updated as recommended in this review (FBD.09).

5 Review assessment

5.1 Step 1: Logic assessment

The FMP was assessed against a plan logic, informed by the requirements under Section 35(1) of the Act. Section 35(1) requires that every plan includes:

Section 35(1) states the required format of a management plan:

(1) *A management plan must include the following components—*

- (a) *a vision statement,*
- (b) *objectives consistent with the vision statement,*
- (c) *strategies for reaching those objectives,*
- (d) *performance indicators to measure the success of those strategies.*

The Review found that the FMP met the requirements in Section 35(1) of the Act, however as the performance indicators are not specific and measurable it is impossible to determine if the objectives and vision statement that they relate to are being met (FBD.01). An overview of the finding is shown in Table 1.

The FMP includes a clear vision statement, with objectives that are easy to link with the vision statement and are easy to understand. The strategies that are listed within the FMP are supported by its content, through its delineation of Management Zones based on a clear and informed process, that link to a set of mandatory criteria to be used in the assessment of flood work approval applications.

Much of the information on the strategies used to achieve the objectives has been included as mapping within the FMP document. This includes an overview of the plan area, Management Zones, flood extent, floodway network, ecological assets, existing works and peak flow distribution. A reference has been included for how physical maps can be viewed, listing DPE Water offices in Dubbo and Calala (Tamwoth). In addition, the DPE Water webpage contains an online spatial tool¹ that allows viewing of the maps to property scale. The FMP should include a reference to these online resources as a Note within the FMP.(FBD.03).

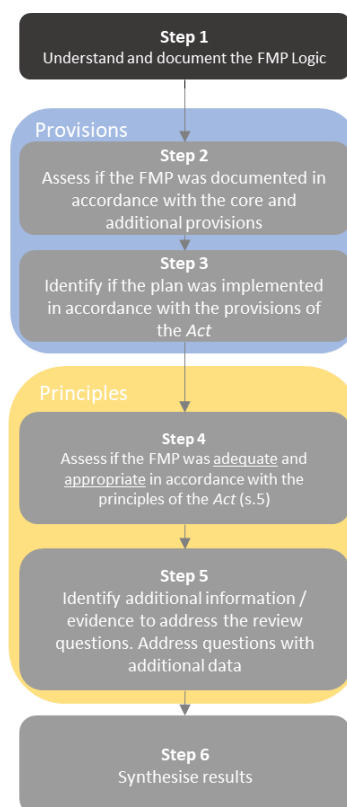


Table 4. Step 1 Logic assessment

Logic Assessment		Assessment
1	Does the FMP contain a vision statement (s.35(1)(a))	✓
2	Does the FMP contain objectives (s.35(1)(b))	✓
3	Are the objectives consistent with the vision statement (NA if objectives are not present) (s.35(1)(b))	✓
4	Are there strategies for achieving the objectives (NA if objectives are not present) (s.35(1)(c))	✓
5	Are there performance indicators to measure the success of the strategies (NA if strategies are not present) (s.35(1)(d))	✓
6	Are the performance indicators SMART (Specific, Measurable, Attainable, Relevant, Time based) and clear (NA if performance indicators are not present)	✗

¹ Barwon-Darling FMP Management Zones – June 2017. <https://arcg.is/00zX8u>

5.2 Step 2: Provisions assessment

The FMP was assessed against provisions for floodplain management plans as required under Section 29 and 30 of the Act. The following core provisions relating to floodplain management are stated in Section 29:

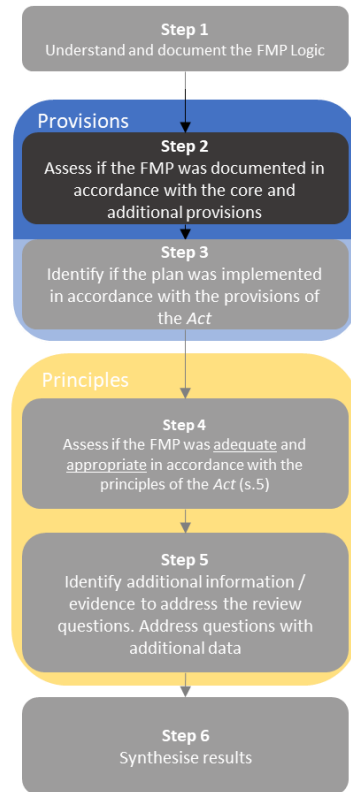
The floodplain management provisions of a management plan for a water management area must deal with the following matters—

- (a) identification of the existing and natural flooding regimes in the area, in terms of the frequency, duration, nature and extent of flooding,*
- (b) the identification of the ecological benefits of flooding in the area, with particular regard to wetlands and other floodplain ecosystems and groundwater recharge,*
- (c) the identification of existing flood works in the area and the way they are managed, their benefits in terms of the protection they give to life and property, and their ecological impacts, including cumulative impacts,*
- (d) the risk to life and property from the effects of flooding.*

The following additional provisions relating to floodplain management are stated in Section 30:

The floodplain management provisions of a management plan for a water management area may also deal with the following matters—

- (a) proposals for the construction of new flood works,*
- (b) the modification or removal of existing flood works,*
- (c) restoration or rehabilitation of land, water sources or their dependent ecosystems, in particular in relation to the following—*
 - (i) the passage, flow and distribution of floodwater,*
 - (ii) existing dominant floodways and exits from floodways,*
 - (iii) rates of flow, floodwater levels and duration of inundation,*
 - (iv) downstream water flows,*
 - (v) natural flood regimes, including spatial and temporal variability,*
- (d) the control of activities that may affect or be affected by the frequency, duration, nature or extent of flooding within the water management area,*
- (e) the preservation and enhancement of the quality of water in the water sources in the area during and after flooding,*
- (f) other measures to give effect to the water management principles and the objects of this Act,*
- (g) such other matters as are prescribed by the regulations.*



The result of the Review, summarised in Table 5, found that the provisions of the FMP ‘deal with’ the core provisions (s.29), each with a unique section within the FMP order. The FMP has been able to ‘deal with’ most of the additional provisions (s.30), at least in part. The additional provisions are less stringent in their wording, with Section 30 of the Act stating that *floodplain management provisions of a management plan for a water management area may also deal with the additional provisions* (underline added here). More detail is held in Attachment A.

The FMP was rated as having partially dealt with a number of the provisions, as it was clear that they had informed its development but were not as explicit in the description as the Core provisions, which *must* be dealt with. Much of the information around the core provisions and how they have informed the FMP is held in the background document, which is available on the DPE Water webpage, however the FMP could be improved by including a reference to the document, such as through the FMP Notes (which are not considered part of the FMP but are included in the document as stated in Section 7(4) of the FMP) or the communication of the location of additional information improved (FBD.05).

The only provision that was considered to not have been dealt with was in Section 30 (e), that requires the FMPs to deal with *the preservation and enhancement of the quality of water in the water sources in the area during and after flooding*. It was not clear if quality of water in the water sources was considered when the FMP and its provisions were being drafted (FBD.04).

Additionally, the FMP was considered to have partially dealt with Additional Provision 30(b) *the modification or removal of existing flood works*, in that it includes information regarding the modification of works but not the potential impacts of the removal of works (FBD.02).

Table 5. Step 2 Provisions assessment

	Provision	Detail	Assessment
Core Provisions	29	The floodplain management provisions of a management plan for a water management area must deal with the following matters—	
	(a)	identification of the existing and natural flooding regimes in the area, in terms of the frequency, duration, nature and extent of flooding	✓
	(b)	the identification of the ecological benefits of flooding in the area, with particular regard to wetlands and other floodplain ecosystems and groundwater recharge	✓
	(c)	the identification of existing flood works in the area and the way they are managed, their benefits in terms of the protection they give to life and property, and their ecological impacts, including cumulative impacts,	✓
	(d)	the risk to life and property from the effects of flooding	✓
Additional Provisions	30	The floodplain management provisions of a management plan for a water management area may also deal with the following matters—	
	(a)	proposals for the construction of new flood works	✓
	(b)	the modification or removal of existing flood works	○
	(c)(i)	restoration or rehabilitation of land, water sources or their dependent ecosystems, in particular in relation to the passage, flow and distribution of floodwater	○
	(c)(ii)	restoration or rehabilitation of land, water sources or their dependent ecosystems, in particular in relation to existing dominant floodways and exits from floodways	○
	(c)(iii)	restoration or rehabilitation of land, water sources or their dependent ecosystems, in particular in relation to rates of flow, floodwater levels and duration of inundation	○
	(c)(iv)	restoration or rehabilitation of land, water sources or their dependent ecosystems, in particular in relation to downstream water flows	○
	(c)(v)	restoration or rehabilitation of land, water sources or their dependent ecosystems, in particular in relation to natural flood regimes, including spatial and temporal variability	○
	(d)	the control of activities that may affect or be affected by the frequency, duration, nature or extent of flooding within the water management area	✓
	(e)	the preservation and enhancement of the quality of water in the water sources in the area during and after flooding	✗
	(f)	other measures to give effect to the water management principles and the objects of this Act	✓

Provision	Detail	Assessment
(g)	such other matters as are prescribed by the regulations	✓
Legend		
✓	- Dealt with	○ – partially dealt with
		✗ - not dealt with

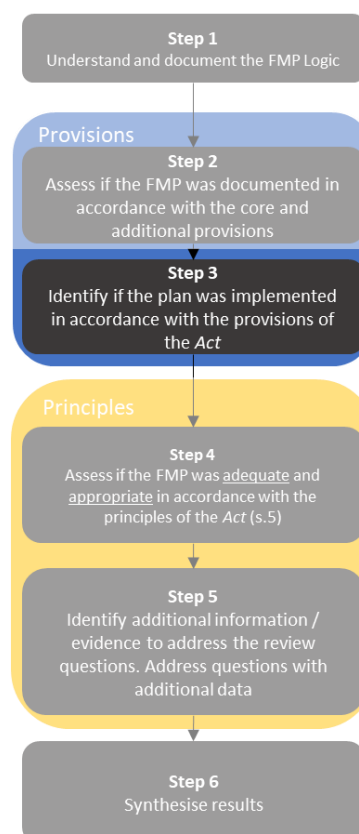
5.3 Step 3: Implementation assessment

Step 3 of the Review aims to determine if the FMP was implemented in accordance with the provisions of the Act is based on the findings of an s.44 Audit.

This step of the s.43 review is about using the s. 44 audits findings, as one evidence base for s.43 review. The scope of the Review is not to repeat the audit and its scope, but rather to draw on the findings to inform the Review of the FMP, focussing on the areas of the Audit that relates to its adequacy and appropriateness and not its implementation.

The implementation assessment was to review the s.44 Audit report and its findings and assessing them against the provisions under the Act. It involved critically reviewing the implementation of the provisions in the FMPs to consider:

1. Whether the source of a non-implementation finding identified in the Audit is due to the adequacy and appropriateness of the FMP.
2. Whether the non-implementation findings identified at point (1) are relevant to the effective implementation of the water management principles
3. Any issues identified in the audit findings about whether the FMP fails to clarify roles and responsibilities in a way that prevents effective implementation of the water management principles



The Audit Report found that the monitoring of performance indicators *‘performance indicators have not been specifically aligned to the Objectives of that Plan’* and also that the performance indicators were not SMART. The audit also found that *‘no metrics or targets have been identified within the Plan, to define the intended outcomes and monitoring processes for the nominated performance indicators’*.

The Audit did acknowledge that the *Healthy Floodplain Project Monitoring MER plan* does address this issue in part by linking the monitoring process and the FMP objectives in general. It also acknowledges that work is progressing within DPE Water to further develop the MER plan.



The Audit has found opportunity for improvement of the FMP through the department leading the monitoring and evaluation of performance indicators to measure the success of the strategies to reach the objectives of the FMP. This recommendation and the others contained within the Audit should be implemented (FBD.06).

In relation to the performance monitoring provisions, the Audit states that *‘[the] Plan includes provisions to satisfy this requirement of the Act, DPIE-Water has not implemented the identified monitoring processes during the audit period.’* The Audit provides a recommendation in this regard with a suggested action as well.

The audit noted that the mandatory conditions required by the FMP to be included on flood work approvals had not been developed by DPE-Water at the time of audit. This prevented water regulation officers in NRAR and WaterNSW from including them in any approvals. In the absence of the mandatory conditions, the discretionary conditions were applied requiring the construction of the works to be in accordance with the approved flood work approval maps. In this Review, the lack of mandatory conditions was deemed to be an implementation issue sitting with the DPE Water and not considered to have been caused by the provisions included in the FMP.

Through the audit period there had been inadequate sharing of spatial data between NSW Government agencies to support assessments of approvals and the assessment of cumulative impacts from flood works.

Table 6. Step 3 Implementation assessment

Provision	Detail	Assessment	
Core Provisions	29	The floodplain management provisions of a management plan for a water management area must deal with the following matters—	
	(a)	identification of the existing and natural flooding regimes in the area, in terms of the frequency, duration, nature and extent of flooding	NA
	(b)	the identification of the ecological benefits of flooding in the area, with particular regard to wetlands and other floodplain ecosystems and groundwater recharge	NA
	(c)	the identification of existing flood works in the area and the way they are managed, their benefits in terms of the protection they give to life and property, and their ecological impacts, including cumulative impacts,	✘
	(d)	the risk to life and property from the effects of flooding	NA
Additional Provisions	30	The floodplain management provisions of a management plan for a water management area may also deal with the following matters—	
	(a)	proposals for the construction of new flood works	NA
	(b)	the modification or removal of existing flood works	NA
	(c)(i)	restoration or rehabilitation of land, water sources or their dependent ecosystems, in particular in relation to the passage, flow and distribution of floodwater	NA
	(c)(ii)	restoration or rehabilitation of land, water sources or their dependent ecosystems, in particular in relation to existing dominant floodways and exits from floodways	NA
	(c)(iii)	restoration or rehabilitation of land, water sources or their dependent ecosystems, in particular in relation to rates of flow, floodwater levels and duration of inundation	NA
	(c)(iv)	restoration or rehabilitation of land, water sources or their dependent ecosystems, in particular in relation to downstream water flows	NA
	(c)(v)	restoration or rehabilitation of land, water sources or their dependent ecosystems, in particular in relation to natural flood regimes, including spatial and temporal variability	NA
	(d)	the control of activities that may affect or be affected by the frequency, duration, nature or extent of flooding within the water management area	NA
	(e)	the preservation and enhancement of the quality of water in the water sources in the area during and after flooding	NA
	(f)	other measures to give effect to the water management principles and the objects of this Act	NA
(g)	such other matters as are prescribed by the regulations	NA	
Legend			
 - Implemented NA - Not reviewed  - Not Implemented			

5.4 Step 4: Review of the plan against the Principles

Step 4 is a theoretical, desktop observation of the adequacy and appropriateness of the FMP provisions to achieve the water management principles. It is the step that assesses if the FMP is adequate and appropriate in accordance with the water management principles. This was done by assessing the FMP in isolation, with the understanding that additional documentation and consultation to better understand its adequacy and appropriateness will come in step 5.

The following general principles of water management are stated in s.5 (2) of the Act:

(a) water sources, floodplains and dependent ecosystems (including groundwater and wetlands) should be protected and restored and, where possible, land should not be degraded, and

(b) habitats, animals and plants that benefit from water or are potentially affected by managed activities should be protected and (in the case of habitats) restored, and

(c) the water quality of all water sources should be protected and, wherever possible, enhanced, and

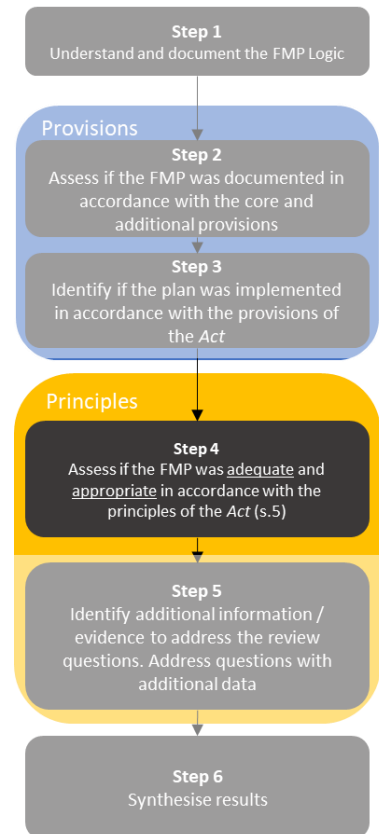
(d) the cumulative impacts of water management licences and approvals and other activities on water sources and their dependent ecosystems, should be considered and minimised, and

(e) geographical and other features of Aboriginal significance should be protected, and

(f) geographical and other features of major cultural, heritage or spiritual significance should be protected, and

(g) the social and economic benefits to the community should be maximised, and

(h) the principles of adaptive management should be applied, which should be responsive to monitoring and improvements in understanding of ecological water requirements.



The following specific principles relate to floodplain management are stated in s.5(6) of the Act:

(a) floodplain management must avoid or minimise land degradation, including soil erosion, compaction, geomorphic instability, contamination, acidity, waterlogging, decline of native vegetation or, where appropriate, salinity and, where possible, land must be rehabilitated, and

(b) the impacts of flood works on other water users should be avoided or minimised, and

(c) the existing and future risk to human life and property arising from occupation of floodplains must be minimised.

The FMPs was assessed against each Principle in s.5 of the Act to consider:

1. Are there rules designed to ensure the implementation of the principles?
2. Are the rules sufficient for the implementation to be effective?
3. Are the criteria used in the rules appropriate?
4. Have the steps outlined in the Technical Manual been followed using reasonable and well documented evidence?
5. Is there sufficient detail provided, such as mapping and data?
6. Is there sufficient supporting documentation to justify the rules and criteria of the FMP?

7. Does the FMP make provisions 'of a savings or transitional nature consequent on the replacement of the FMP' as allowed under s.43 (4)?
8. Does the FMP make allowances for changes to data, such as return frequency/severity changes in flood events or the impacts of climate change?

The Review of the FMP against the principles found that it is appropriate for ensuring the effective implementation of the water management principles, though not all areas were adequate (see Table 7). The areas found to be appropriate but not adequate were:

- 2(a) *water sources, floodplains and dependent ecosystems (including groundwater and wetlands) should be protected and restored and, where possible, land should not be degraded*
- 2(b) *habitats, animals and plants that benefit from water or are potentially affected by managed activities should be protected and (in the case of habitats) restored*
- 2(d) *the cumulative impacts of water management licences and approvals and other activities on water sources and their dependent ecosystems, should be considered and minimised*
- 2(e) *geographical and other features of Aboriginal significance should be protected*
- 2(h) *the principles of adaptive management should be applied, which should be responsive to monitoring and improvements in understanding of ecological water requirements*
- 6(a) *floodplain management must avoid or minimise land degradation, including soil erosion, compaction, geomorphic instability, contamination, acidity, waterlogging, decline of native vegetation or, where appropriate, salinity and, where possible, land must be rehabilitated*

Note that principle 2(h) was divided into two sections to allow detailed assessment.

With respect to principle 2 (e) it should be noted that Part 2 of the FMP does acknowledge the Traditional Owners of the lands within the FMP area, but there is no explicit acknowledgement of the Traditional Owners of the lower-Darling (Baakandji) and other Native Title claimants in the area.

While all the principles are considered in the Step 5 assessment, the areas that were adequate but not appropriate were noted for detail consideration.

There were two areas not found to be adequate or appropriate, they were:

- 2(c) *protect (or enhance) water quality of all sources.*
- 2(g) *the social and economic benefits to the community should be maximised*

This was considered to only be partially covered, having been mentioned as part of the FMP document but were not considered to have provided detail to ensure effective implementation.

Table 7. Step 4 Principles assessment

Section	Principle	Step 4 Assessment
	is the management plan adequate and appropriate for ensuring the effective implementation of the general principles to;	
(2)(a)	Ensure the effective protection and restoration of water resources floodplains and dependent ecosystems	Appropriate but not adequate
(2)(b)	Protect habitat animals and plants that benefit from water (across the floodplain) or potentially affected by managed activities (flood work)	Appropriate but not adequate
(2)(c)	Protect (or enhance) water quality of all sources	Not adequate and appropriate
(2)(d)	Consider and minimise cumulative impacts of flood work approvals on water sources and their dependent ecosystems	Appropriate but not adequate
(2)(e)	Protect geographical and other features of Aboriginal significance	Appropriate but not adequate
(2)(f)	Protect geographical and other features of major cultural heritage or spiritual significance	Adequate and appropriate
(2)(g)	Maximise social and economic benefits to the community	Not adequate and appropriate

Section	Principle	Step 4 Assessment
(2)(h)	Respond to monitoring and improvements in understanding of ecological water requirements	Appropriate but not adequate
(2)(h)	Apply the principles of adaptive management	Appropriate but not adequate
and to determine is the management plan adequate an appropriate for ensuring the effective implementation of the floodplain management principles to:		
(6)(a)	Avoid or minimise land degradation from floodplain management (i.e., flood works)	Appropriate but not adequate
(6)(b)	Avoid or minimise the impacts of flood works on other water users	Adequate and appropriate
(6)(c)	Minimise existing and future risk to human life and property from occupation of floodplain	Adequate and Appropriate

5.5 Step 5: Consultation to assess the plan against the principles

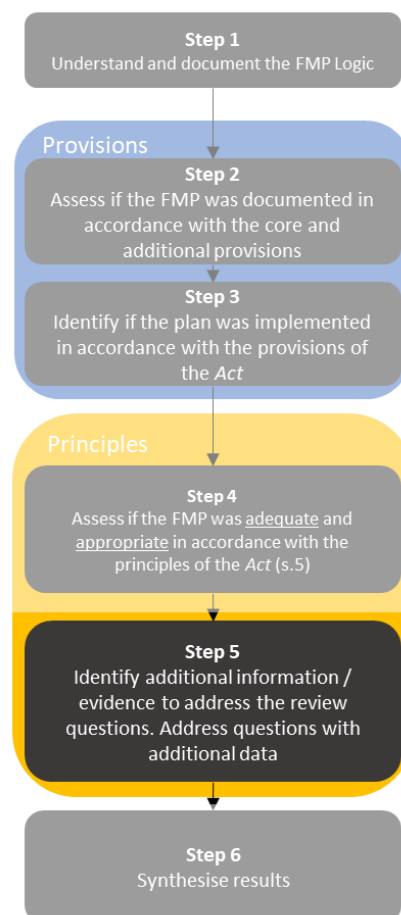
Consultation was conducted to gain input into the Review of the FMPs against the principles. The consultation included targeted consultation with agency representatives from DPE Water, DPE EHG, DPI Agriculture, NRAR, WaterNSW and NRC, along with an invitation for submissions for stakeholders. Email notifications were provided to key stakeholders encouraging submissions, and representatives from Aboriginal organisations were consulted and encouraged to provide submissions. Members of the following Aboriginal representation organisations were contacted seeking their input to the Review and notifying them the submission process;

- Northern Basin Aboriginal Nations
- Native Title Service Corp
- NSW Aboriginal Council
- Local Aboriginal Land Councils
- NSW Aboriginal Council

The WaterNSW primary contractor for licencing, Catchment Simulation Solutions (CSS), provided additional input to the Review on behalf of WaterNSW.

Step 5 allowed a follow up through additional evidence to address the question of whether the FMP is adequate and appropriate for ensuring the effective implementation of the water management principles. It utilised evidence gained through consultation and in the supporting documents. The documents reviewed in Step 5 were:

- Rural floodplain management plans, Water Management Act 2000, Background document to the floodplain management plan for the Barwon-Darling Valley Floodplain 2017, June 2017
- Technical Assessment Methods, Assessment Criteria, Implementation of the Floodplain Management Plan for the Barwon-Darling Valley Floodplain 2017, June 2019. [unpublished]
- Technical Notes, Rules, Implementation of the Floodplain Management Plan for the Barwon-Darling Valley Floodplain 2017, June 2019. [unpublished]
- Rural floodplain management plans: technical manual for plans developed under the *Water Management Act 2000*, Version, 2.1, June 2020
- Guide to Flood Study Reports, Technical Assessment Methods for flood work approvals under the Water Management Act 2000, Phase 4, Version 2.1B, May 2020. [unpublished]



Summary of submissions received

- Four submissions received
- one provided through the webpage, three provided to the email address
- one individual, three organisations

Feedback from submissions

New comments from the Submissions

- Lack of acknowledgement or consideration for the Lower Darling River water users and cultural groups (Baakandji people) and the impacts of upstream activities on them
- Concern that ecological and cultural impacts may arise from them being used for Floodplain Harvesting activities. Desire for lagoons added to Management Zone D
- Management Zone A rules perceived as onerous and are preventing erosion rehabilitation works within Management Zone A. Desire for ecological enhancement works that restore natural floodplain patterns and processes are removed from the definition of flood works
 - Request that the principles and techniques for restoring natural patterns and processes are codified
 - Request that an expert panel is convened to codify the principles and techniques to meet the definition of ecological enhancement works.
- Lack of clarity around rules where multiple Management Zones occur within a single property.
- Some lack of clarity in reference to metrics requiring the Minister’s discretion e.g. ‘adequate flood connectivity’
- Provisions relating to the cumulative impacts of existing works are only specified in Management Zone A and D.

Out of scope feedback

- Some of the feedback provided was regarding the development of the floodway network and its relationship with existing flood works
- Desire for all unapproved works and works which impede flood flow to be decommissioned or modified. Update provisions in Part 8 as per allowances made in Part 10 of the FMP (cl 55 (c))
- There is a lack of clarity on how the Barwon-Darling FMP fits in with other management plans such as the water sharing plan
- Plans do not deal with floodplain harvesting
- Concerns about specific pieces of infrastructure with approvals granted by Local Government
- Desire to have the impacts of existing flood works (before commencement of the FMP) to be shown in order to satisfy the provisions relating to protection of cultural and ecological assets.

Targeted consultation

A summary of the feedback received in the targeted consultation is shown below in Table 8.

Table 8. Summary of feedback from targeted consultation

Item	Description	Source
1	Lack of clarity around existing works. Perhaps messaging around this has not worked	DPE Water
2	Consider the inclusion of groundwater dependant ecological assets and groundwater dependant ecosystems if there is new information.	DPE Water
3	Monitoring of plan implementation hasn’t been done very closely	DPI Agriculture
4	Concern around the cumulative impact criteria and it being a case of ‘first in, best dressed’	DPI Agriculture
5	Should be consideration of government funded amendments to previously approved works which will improve floodplain connectivity. This may alleviate some of the cumulative impacts. Need to ensure the provisions do not preclude this kind of amendment to previously approved works to allow this to happen.	DPI Agriculture
6	Opportunity to improve the coordinated monitoring to assess effectiveness of plan	DPE EHG

Item	Description	Source
7	No linkage between existing problematic works and the FMP with no commitment or obligation to act on these works.	NRC
8	Plan doesn't look at problematic works which aren't unauthorised.	NRC
9	More direct and clear language around MER to make more specific and simpler to Audit	NRC
10	Mandatory conditions should adopt clearer language. Current conditions have proven difficult to audit.	NRC
11	Objectives not specific and measurable.	NRC
12	The WLS cannot understand works covering multiple zones.	NRC
13	Remove language which allows the bypass of conditions/considerations	NRC
14	Management zones used to set regulatory priorities. As Improving Floodplain Connections project progresses it may evolve NRAR understanding of the FMP	NRAR
15	Considered that the rules in the FMP need to be less ambiguous in order for them to be enforced	NRAR
16	Sometimes not clear what the intent of the rules are	NRAR
17	The Barwon-Darling plan has only received 6 applications so the FMP and provisions haven't been 'stress tested'	WaterNSW (Consultant)
18	Review of MZ A through the review of applications suggests it may be too conservative. Potentially a model error	WaterNSW (Consultant)
19	Uncertainty around whether council is giving due consideration to the FMP. Perhaps needs better coordination/communication with councils	WaterNSW (Consultant)
20	Mandatory conditions and Technical Assessment Manual only received recently	WaterNSW
21	Rules contained in cl 43 for MZ C potentially onerous if this zone was intended to be for works in an area with a low likelihood of impact.	WaterNSW

The principles that were highlighted in Step 4 were each checked following the Step 5 review to ensure that the assessment of additional information resulted in an adequate and appropriate marking. Given the volume of information that is held in the background document and its importance in the s.43 Review, a clear reference to the document should be included within the notes of the FMP or improve the communication of the document's location (FBD.05). A summary of the assessment is shown in Table 9, with the principles that were considered adequate and appropriate in Step 4 carrying that rating into Step 5. Principles 2(a), 2(b), 2(d), 2(e), 2(g) and 6(a) that were highlighted in Step 4 were all able to be changed to adequate and appropriate following the review of supporting documentation. There were two provisions that were not able to be rated adequate and appropriate:

- 2(h) *the principles of adaptive management should be applied, which should be responsive to monitoring and improvements in understanding of ecological water requirements*

The FMP's provisions for the effective implementation of principle 2(h) was considered to be appropriate but not adequate. Part 10 of the FMP includes sections that can be amended to allow for the adaptive management and responsive amendments required by provision 2(h). These allowances are why the provisions were considered appropriate, however the lack of a trigger to require the amendments to be addressed, whether it is through a designated time period, flood event, technology or climate change adaptation means that it was not considered adequate (FBD.08).

- 2(c) *protect (or enhance) water quality of all sources*

The FMP's provisions for the effective implementation of principle 2(c) was considered to be not adequate and appropriate. The protection or enhancement of water quality was mentioned as a consideration through nutrient, sediment and carbon cycling but was not covered in any detail and did not appear to inform the development of the FMP. To be considered adequate and appropriate the FMP should be amended to include

clear indications of how water quality should inform flood work approval assessment, or the background document amended to provide clarity on how water quality informed the FMP's development (FBD.04).

Consultation with agency staff led to the recommendation that there should be an update to the modelling and other detail that informed the FMP potentially leading to refinement of the management zones (FBD.09).

Table 9. Step 5 Principles assessment

Section	Principle	Step 5 Assessment
5	is the management plan adequate and appropriate for ensuring the effective implementation of the general principles to:	
(2)(a)	Ensure the effective protection and restoration of water resources floodplains and dependent ecosystems	Adequate and Appropriate
(2)(b)	Protect habitat animals and plants that benefit from water (across the floodplain) or potentially affected by managed activities (flood work)	Adequate and appropriate
(2)(c)	Protect (or enhance) water quality of all sources	Not adequate and appropriate
(2)(d)	Consider and minimise cumulative impacts of flood work approvals on water sources and their dependent ecosystems	Adequate and Appropriate
(2)(e)	Protect geographical and other features of Aboriginal significance	Adequate and Appropriate
(2)(f)	Protect geographical and other features of major cultural heritage or spiritual significance	Adequate and appropriate
(2)(g)	Maximise social and economic benefits to the community	Adequate and Appropriate
(2)(h)	Respond to monitoring and improvements in understanding of ecological water requirements	Appropriate but not adequate
(2)(h)	Apply the principles of adaptive management	Appropriate but not adequate
	and to determine is the management plan adequate an appropriate for ensuring the effective implementation of the floodplain management principles to:	
(6)(a)	Avoid or minimise land degradation from floodplain management (i.e., flood works)	Adequate and Appropriate
(6)(b)	Avoid or minimise the impacts of flood works on other water users	Adequate and appropriate
(6)(c)	Minimise existing and future risk to human life and property from occupation of floodplain	Adequate and Appropriate

5.6 Step 6: Synthesis of results

Step 6 involves the synthesis of earlier review steps to address the overall review question - "Have the plan's provisions remained adequate and appropriate for ensuring the effective implementation of the water management principles of the Act?".

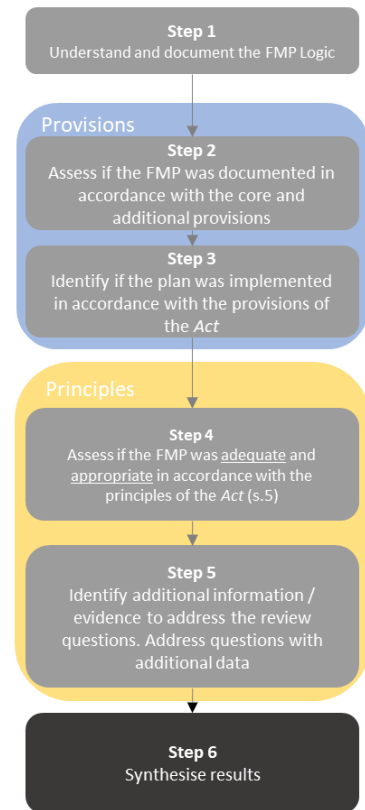
The evidence that has been collated in steps 1 to 5 through the formulation of the assessment tables and reasoning was gathered together to allow a full review of the FMP and its provisions. The findings and evidence were gathered together, and recommendations made for each finding. On collection of all of the findings and the individual assessment for each of the logic requirements, provisions and principles an assessment against the review question.

Once the FMP was assessed against the review question, a recommendation was determined based on the scale of the findings and recommendations and based on whether the FMP provisions remain adequate and appropriate for ensuring the effective implementation of the water management principles of the Act.

The recommendation was to decide if the FMP should:

- Be amended if they are mostly adequate and appropriate and amendments would make the FMP adequate and appropriate (where plans are within their ten-year term)
- Be extended if they are adequate and appropriate (where plans have reached the end of their ten-year term), or
- Be replaced if the FMP is not adequate and appropriate and the amendments are of a number or nature that replacement is considered more practical (where plans have reached the end of their ten-year term)

The Step 6 synthesis resulted in the findings and recommendations as outlined in Section 4.



6 References

Alluvium. (2021). *Review method for Floodplain Management Plans under Section 43 of the Water Management Act 2000 (NSW)*. Sydney.

Department of Primary Industries, Water. (2017). *Background document to the Floodplain Management Plan for the Barwon-Darling Valley Floodplain 2017*. Department of Primary Industries, Water.

Natural Resources Commission. (2021). *Water management plan audits*. Retrieved from <https://www.nrc.nsw.gov.au/wsp-audits#fmpaudit>

NSW DPE. (2017, March 10). *NSW Healthy Floodplains Project*. Retrieved from PUB21/70: <https://legislation.nsw.gov.au/view/pdf/map/c1d09028-0572-4892-8ca2-eda97e0d7470>

NSW DPIE. (2020). *Historical floodplain management plans*. Retrieved April 27, 2021, from <https://www.industry.nsw.gov.au/water/plans-programs/healthy-floodplains-project/plans/rural-fmp-under-part-8>

NSW DPIE. (2020). *Rural floodplain management plans: technical manual for plans developed under the Water Management Act 2000*. NSW Department of Planning, Industry and Environment.

An aerial photograph of a river system winding through a floodplain. The river is a vibrant green color, contrasting with the surrounding brown and tan earth. The floodplain is characterized by numerous oxbow lakes and meanders, creating a complex, organic pattern. A semi-transparent black rectangular box is overlaid on the center of the image, containing white text.

Attachment A:
Review of the Barwon-Darling Floodplain Management Plan 2017

A.1 Floodplain Management Plan Logic

Review

Note that the assessment has been conducted as a pass/fail test. No partial marks were considered.

	Logic Assessment	Assessment	Evidence	Reference
1	Does the FMP contain a vision statement (s.35(1)(a))	✓	From the FMP: <i>The vision of this Plan is to contribute to a sustainable, healthy and working floodplain by managing the development of new flood works and amendments to existing flood works to protect the passage of floodwater through the floodplain, whilst recognising the need to minimise the risk to life and property.</i>	FMP Section 8
2	Does the FMP contain objectives (s.35(1)(b))	✓	From the FMP: <i>The objectives of this Plan are to:</i> <i>(a) facilitate the orderly passage of floodwaters through the Barwon-Darling Valley Floodplain, and</i> <i>(b) minimise the risk to life and property from the effects of flooding, and</i> <i>(c) maintain flood connectivity to wetlands, other floodplain ecosystems, and areas of groundwater recharge, and</i> <i>(d) contribute to the protection of the ecological assets and values of the Barwon-Darling Valley Floodplain, and</i> <i>(e) contribute to the protection of cultural, heritage and spiritual features of the Barwon-Darling Valley Floodplain that are significant to Aboriginal people and other stakeholders.</i>	FMP Section 10
3	Are the objectives consistent with the vision statement (NA if objectives are not present) (s.35(1)(b))	✓	Objectives (a) and (b) reflect the vision statement around protecting floodwater passage, minimising risk to life and property and sustainable, healthy and working floodplain. Sustainable and healthy reflected through the objectives (c), (d) and (e). Both areas covered through management of development	Logic assessment #1 and #2
4	Are there strategies for achieving the objectives (NA if objectives are not present) (s.35(1)(c))	✓	Strategies are clearly outlined and link directly to the objectives. From the FMP: <i>The strategies of this Plan are to:</i> <i>(a) establish management zones for coordinating flood work development, and</i> <i>(b) identify the existing and natural flooding regimes in the area, and</i> <i>(c) delineate a floodway network that has adequate hydraulic capacity and continuity to effectively convey floodwaters, and</i> <i>(d) identify ecological assets and the ecological benefits of flooding, and</i> <i>(e) identify cultural assets and the cultural benefits of flooding, and</i> <i>(f) identify existing flood works, and</i> <i>(g) establish rules for the granting or amending of flood work approvals.</i> The detail in the FMP reflects the strategies as they are described. It contains 5 Management Zones that are mapped in detail and are linked to clear reasoning for the zoning. The	FMP Section 11

Logic Assessment	Assessment	Evidence	Reference	
		<p>Management Zones are labelled as Zones A, B, C, CU and D, each with a division in the FMP order that describes the flood works authorised in the zone, criteria for assessing existing structures and criteria for assessing flood work approvals.</p> <p>The FMP contains a high degree of detail on the existing and natural flood regimes through the area as intended by the listed strategy, which is supported by the information held in the Background document and was clearly used to inform the formulation of the FMP through the flood frequency analysis and subsequent choice of design flood for hydraulic modelling.</p> <p>The understanding of the flood regimes described has helped develop a floodway network that illustrates the movement of floodwaters through the valley and is easy to visually compare to the management zone mapping to support the reasoning for the zoning.</p> <p>The rules for granting or amending flood work approvals is clearly included in the management zone divisions of the FMP. The strategies listed in the FMP for achieving the objectives cascade in a logical fashion, through developing an understanding of the floodplain characteristics, creating management zones based on the area's importance for conveying flood flows and requirement for achieving the objectives, and a clear list of criteria that are to be used for flood work approvals</p>		
5	Are there performance indicators to measure the success of the strategies (NA if strategies are not present) (s.35(1)(d))	✓	The FMP includes five performance indicators that link directly to the strategies included in the FMP	FMP Section 12
6	Are the performance indicators SMART goals and clear (NA if performance indicators are not present)	✗	The performance indicators used to 'measure the success of the strategies' focus on 'the extent to which' the items are impacted or influencing flood flows rather than identifying clear measurable indicators	FMP Section 12

Assumptions

Strategies are not explicitly linked to the objectives, so links were made by the reviewer

Logic mapping to the Principles of the Act

General Principles	Plan Logic	General Principles	Plan Logic	Floodplain management Principles	Plan Logic
(2)(a)	Objective c, d Strategy a, d, g	(2)(e)	Objective e Strategy e, g	(6)(a)	Objective a Strategy a, f, g
(2)(b)	Objective c, d Strategy a, d, g	(2)(f)	Objective e Strategy e, g	(6)(b)	Objective a, b Strategy a, f, g
(2)(c)	Objective a, c Strategy b	(2)(g)	Objective a Strategy c, d, i	(6)(c)	Objective a, b Strategy a, f, g
(2)(d)	Objective a, Strategy a, c, g	(2)(h)	-		

Recommendations

Finding Number	Recommendations	Detail
FBD.01	Amend	Review of the performance indicators to include specific, measurable indicators and the timeframes for assessment

A.2 FMP development in accordance with the Provisions

FMP Provisions Assessment Table

Provision	Detail	Assessment			Evidence	
	29	The floodplain management provisions of a management plan for a water management area must deal with the following matters—				
Core Provisions	(a)	identification of the existing and natural flooding regimes in the area, in terms of the frequency, duration, nature and extent of flooding	✓			The FMP includes clearly articulated nature, frequency, duration, and extent of natural and existing flooding and how they differ. Mapping is included of flood extents and peak flows at an identified event (1976)
	(b)	the identification of the ecological benefits of flooding in the area, with particular regard to wetlands and other floodplain ecosystems and groundwater recharge	✓			The FMP clearly outlines the expected ecological benefits of flooding in the FMP area, the assets expected to benefit from flooding and their location. The FMP includes details of the areas in the FMP boundary expected to allow ground water recharge. More detail is included in the background document
	(c)	the identification of existing flood works in the area and the way they are managed, their benefits in terms of the protection they give to life and property, and their ecological impacts, including cumulative impacts,	✓			The FMP outlines the clear identification of flood works, through description of the types of works and spatial mapping of their location. The potential positive and negative impacts of existing works on ecological assets, cultural assets, socio-economic impacts and the cumulative impacts are clearly articulated.
	(d)	the risk to life and property from the effects of flooding	✓			The tangible and intangible impacts of flooding on human life and property have been articulated, including the strategies in the FMP that these risks have been considered and where in the FMP the strategies can be found.
	30	The floodplain management provisions of a management plan for a water management area may also deal with the following matters—				
	(a)	proposals for the construction of new flood works	✓			Rules for granting or amending flood work approvals in the FMP area are broken down by management zone, and rules are held entirely within the FMP and not linked to legislation removing issues arising if the legislation is repealed
	(b)	the modification or removal of existing flood works			○	The criteria for approval include details for existing works and the assessment for the modification of approved work. FMP does not cover requirements for the removal of work but does allow for modification of the FMP to include removal of existing flood works.
	(c)(i)	restoration or rehabilitation of land, water sources or their dependent ecosystems, in particular in relation to the passage, flow and distribution of floodwater			○	The FMP includes general information on the ecological benefits of flooding, and the ecological assets that have been identified in the FMP area but does not detail the locations or extent that land, water sources or dependent ecosystems will be restored or rehabilitated.
	(c)(ii)	restoration or rehabilitation of land, water sources or their dependent ecosystems, in particular in relation to existing dominant floodways and exits from floodways			○	

Provision	Detail	Assessment	Evidence
(c)(iii)	restoration or rehabilitation of land, water sources or their dependent ecosystems, in particular in relation to rates of flow, floodwater levels and duration of inundation	○	
(c)(iv)	restoration or rehabilitation of land, water sources or their dependent ecosystems, in particular in relation to downstream water flows	○	
(c)(v)	restoration or rehabilitation of land, water sources or their dependent ecosystems, in particular in relation to natural flood regimes, including spatial and temporal variability	○	
(d)	the control of activities that may affect or be affected by the frequency, duration, nature or extent of flooding within the water management area	✓	The FMP includes clear management zone areas, described in the FMP and shown spatially, that are linked to the criteria for assessment. Mapping of the zones is not clear entirely clear in the FMP itself but a more easily navigable spatial map (Web GIS) is linked on the DPE Water website where the FMP can be accessed from.
(e)	the preservation and enhancement of the quality of water in the water sources in the area during and after flooding		✗ Water quality impacts were identified as a result of the historic context, however, the FMP does not discuss the preservation or enhancement of water quality in the Baron-Darling FMP
(f)	other measures to give effect to the water management principles and the objects of this Act	✓	Objects and principles are fully covered in other areas of the assessment
(g)	such other matters as are prescribed by the regulations	✓	N/A

There is information held in the background document and spatial mapping outputs, however these are not included in the FMP. It appears to be assumed that the FMP is found through the Healthy Floodplains Project webpage rather than the NSW Legislation portal.

Recommendations

Finding Number	Item	Detail
FBD.02	Amend	Include requirements for the potential impact of removing or modifying existing approved and unapproved flood works. In particular, risks to life and property from removing and not removing existing flood works.
FBD.03	Amend	Amend the plan to include a reference to the ArcGIS online version of the Management Zones Map
FBD.04	Amend	Inclusion of water quality provisions, such as blackwater
FBD.05	Amend	Include the background document as an attachment to the FMP, or provide a reference to ensure ease of access. If the items not found in the FMP are considered to be held elsewhere, such as the background document, then clear reference should be included (for example as a Note) so that the information is clearly accessible

A.3 FMP Implementation in accordance with the Provisions

General Comments

An s.44 Audit of the FMP was published in March 2022 by the Natural Resources Commission. The Review summarises the s.44 Audit findings in order to inform the review of 'whether [the FMP] provisions remain adequate and appropriate for ensuring the effective implementation of the water management principles'. Note that this s.43 Review has not revisited, extended, or interpreted the Audit findings. The Audit findings may be relevant for the following reasons:

- Some implementation difficulties may be due to the adequacy and appropriateness of the FMP. This information may inform the review of whether the FMP is adequate and appropriate to **implement the principles**.
- However, the FMP may be adequate and appropriate to **implement the principles** even if the Audit found provision/s have not been implemented for other reasons not relevant to adequacy and appropriateness of the FMP.
- A plan that is not adequate and appropriate to implement the principles may be implemented perfectly. This may shed light on what needs to change in the FMP if you can compare it to evidence showing the FMP is inadequate.
- Theoretical observation of the FMP provisions may also lead to a determination regarding if plan provisions are adequate.
- The root cause identified in Audit report as to why the FMP was not implemented may be useful in the Review insofar as they lead to inadequate provisions rather than just administration / circumstantial cause.
- An Audit report may say whether MER, flood monitoring, environmental monitoring was undertaken. This may help understand if the FMP is adequate or not (only if it is implemented). Some extrapolations may be needed where there is partial implementation using the theoretical observation as to whether a provision should deliver its intended outcome.

Plan

The Audit Report found that the monitoring of performance indicators 'performance indicators have not been specifically aligned to the Objectives of that Plan' and also that the performance indicators were not SMART. The audit also found that 'no metrics or targets have been identified within the FMP, to define the intended outcomes and monitoring processes for the nominated performance indicators'.

The Audit did acknowledge that the *Healthy Floodplain Project Monitoring MER plan* does address this issue in part by linking the monitoring process and the FMP objectives in general. It also acknowledges that work is progressing within DPE Water to further develop the MER plan.



The Audit has found opportunity for improvement of the FMP through recommendations that could inform potential amendments to the FMP (FBD.06). The Audit found that flood work approvals sought and granted within the audit period were not notified of relevant mandatory conditions as required to give effect to the Act.

Implementation

In relation to the performance monitoring provisions, the Audit states that '[the] Plan includes provisions to satisfy this requirement of the Act, DPIE-Water has not implemented the identified monitoring processes during the audit period.' The Audit provides a recommendation in this regard with a suggested action.

The audit noted that the mandatory conditions required by the FMP had not been developed at the time of audit and this prevented water regulation officers in NRAR and WaterNSW from including them in any approvals. In the absence of the mandatory conditions, the discretionary conditions was applied requiring the construction of the works to be in accordance with the approved flood work approval maps.

Through the audit period there had been inadequate sharing of spatial data between NSW Government agencies to support assessments of approvals and the assessment of cumulative impacts from flood works.

Implementation Assessment Criteria		
Assessment		Description
Implemented		The Audit found that the FMP was implemented in accordance with the particular provision
Not Implemented		The Audit found that the FMP was not implemented in accordance with the particular provision
Not reviewed	NA	The Audit did not review the particular provision, or the Audit was not able to draw enough evidence to make a determination in relation to the particular provision

Provision	Detail	Assessment			Evidence
Core Provisions	29	The floodplain management provisions of a management plan for a water management area must deal with the following matters			
	(a)	identification of the existing and natural flooding regimes in the area, in terms of the frequency, duration, nature and extent of flooding		✗	NA
	(b)	the identification of the ecological benefits of flooding in the area, with particular regard to wetlands and other floodplain ecosystems and groundwater recharge			NA Not discussed.
	(c)	the identification of existing flood works in the area and the way they are managed, their benefits in terms of the protection they give to life and property, and their ecological impacts, including cumulative impacts		✗	Cumulative impact assessment has not occurred. The Audit states that 'This is largely because the floodplain model for the FMP has not been updated to reflect new works as originally intended at Plan commencement. This limits the ability to undertake cumulative impact assessment as floodplain development continues.'
	(d)	the risk to life and property from the effects of flooding			NA
Additional Provisions	30	The floodplain management provisions of a management plan for a water management area may also deal with the following matters			
	(a)	proposals for the construction of new flood works			NA The Audit found that 'approval applications were generally assessed and processed in accordance with legislative requirements'. The audit found however, '... that mandatory conditions were missing on all but one of the approvals sampled, which included only two of the relevant mandatory conditions.' In this Review, the lack of mandatory conditions was deemed to be an implementation issue sitting with the DPE Water and not considered to have been caused by the provisions included in the FMP

Provision	Detail	Assessment			Evidence
(b)	the modification or removal of existing flood works			NA	
(c)(i)	restoration or rehabilitation of land, water sources or their dependent ecosystems, in particular in relation to the passage, flow and distribution of floodwater			NA	
(c)(ii)	restoration or rehabilitation of land, water sources or their dependent ecosystems, in particular in relation to existing dominant floodways and exits from floodways			NA	
(c)(iii)	restoration or rehabilitation of land, water sources or their dependent ecosystems, in particular in relation to rates of flow, floodwater levels and duration of inundation			NA	
(c)(iv)	restoration or rehabilitation of land, water sources or their dependent ecosystems, in particular in relation to downstream water flows			NA	
(c)(v)	restoration or rehabilitation of land,			NA	

Provision		Detail	Assessment			Evidence
		water sources or their dependent ecosystems, in particular in relation to natural flood regimes, including spatial and temporal variability				
	(d)	the control of activities that may affect or be affected by the frequency, duration, nature or extent of flooding within the water management area			NA	
	(e)	the preservation and enhancement of the quality of water in the water sources in the area during and after flooding			NA	
	(f)	other measures to give effect to the water management principles and the objects of the Act			NA	
	(g)	such other matters as are prescribed by the regulations			NA	

Recommendations

The s.44 Audit makes a number of recommendations of the department to ensure the implementation of the FMP gives effect to the Act. A number of these recommendations are outside the scope of this Review however are still recommended to be implemented.

The audit found that mandatory approval conditions were not provided to all but one of the applications approved during the audit period. However as the implementation of this is the responsibility of the department it is not within the scope of this Review.

Finding Number	Item	Description
FBD.06	Implement	Recommendations of the s.44 audit to be actioned by DPE Water or WaterNSW as appropriate.

A.4 FMP assessed if adequate and appropriate against the Principles of the Act

Water Management Principles Assessment Table

Note that if the step 5 assessment offered no additional information for the principle it was left blank. Further information on the step 5 assessment is included in Section 5.

Section	Principle	Step 4 Assessment	Comment	Step 5 Assessment	Comment
5	is the management plan adequate and appropriate for ensuring the effective implementation of the general principles to;				
(2)(a)	Ensure the effective protection and restoration of water resources floodplains and dependent ecosystems	Appropriate but not adequate	The FMP outlines clearly the environmental assets in the area and the intent of the management zone criteria is in part to protect flows to these locations. The FMP does not discuss the rehabilitation of degraded assets.	Adequate and Appropriate	The background Document and the TAM Assessment Criteria details the requirements for protection of ecosystems and maintaining flow paths
(2)(b)	Protect habitat animals and plants that benefit from water (across the floodplain) or potentially affected by managed activities (flood work)	Appropriate but not adequate	The FMP identifies ecological assets in the FMP area and includes them in the delineation of Management zones.	Adequate and appropriate	The background document includes information on flow corridors and dependant habitats. These are included in the management zone delineation
(2)(c)	Protect (or enhance) water quality of all sources	Not adequate and appropriate	Some allowance has been for water quality protection through maintaining identified nutrient, sediment and carbon cycling values but not described in detail.	Not adequate or appropriate	
(2)(d)	Consider and minimise cumulative impacts of flood work approvals on water sources and their dependent ecosystems	Appropriate but not adequate	The FMP uses a standardised base of the large design flood (1976 event) for comparison that ensures cumulative impacts are considered. The FMP should clearly articulate the accepted baseline flood levels, extents and topographic conditions to allow for a consistent basis for comparison of flood impacts.	Adequate and Appropriate	Areas where cumulative impacts are considered to be important have been included in the MZ B, MZ C and MZ CU delineation. Background Document and the Guide to Flood Study Reports clearly detail the definition and application of cumulative impacts as assessment criteria
(2)(e)	Protect geographical and other features of Aboriginal significance	Appropriate but not adequate	Aboriginal values and assets have been listed as included in the development of the FMP. No specific detail on its usage is covered in the FMP, with reference made to the background document but no link included.	Adequate and Appropriate	The background document discusses the use of the Aboriginal Site Decision Support Tool to inform the FMP s development. It also discusses how the specifics of the information are not able to be included in published documents

Section	Principle	Step 4 Assessment	Comment	Step 5 Assessment	Comment
			No requirement for consultation to ensure applications are not adversely impacting these locations.		and therefore not able to be included in the FMP. Information is included regarding the type of asset and importance to the local Aboriginal communities. Targeted consultation with the ATWG and Aboriginal leaders and the community is also included as part of the development.
(2)(f)	Protect geographical and other features of major cultural heritage or spiritual significance	Adequate and appropriate	The list of registers used to identify cultural assets has been included and linkages to the criteria in the management zones for their protection. Consultation is effectively built into the process through the inclusion of registers rather than the register as it was at the time of drafting	Adequate and appropriate	Covered in the FMP – no further requirements
(2)(g)	Maximise social and economic benefits to the community	Not adequate and appropriate	The FMP identifies the general positive and negative socio-economic impacts of flood works. Plan does not have a proactive framework to 'maximise' social and economic benefits.	Adequate and Appropriate	The Background document to the FMP includes information on the role of socio-economic benefits in the FMPs Development. This includes informing the delineation of management zones and reducing the impact on existing development
(2)(h)	Respond to monitoring and improvements in understanding of ecological water requirements	Appropriate but not adequate	The FMP includes a section on authorised amendments to the FMP. This includes modifications to the FMP area, management zones and flooding regimes, ecological asset types or locations. The FMP does not include triggers for the amendments to be made.	Appropriate but not adequate	As per step 4. Not covered elsewhere
(2)(h)	Apply the principles of adaptive management	Appropriate but not adequate	The FMP includes a section on authorised amendments to the FMP (Part 10). This includes modifications to the FMP area, management zones or the assets identified in the FMP area. FMP does not include detail on potential changes from	Appropriate but not adequate	As per step 4. Not covered elsewhere

Section	Principle	Step 4 Assessment	Comment	Step 5 Assessment	Comment
			<p>climate change or requirements for review of the FMP in detail, but does make a general allowance for changes to be made.</p> <p>The FMP does not include triggers for the amendments to be executed. Triggers may include large flood events, climate change impacts or scientific discoveries .</p>		
and to determine is the management plan adequate an appropriate for ensuring the effective implementation of the floodplain management principles to:					
(6)(a)	Avoid or minimise land degradation from floodplain management (i.e., flood works)	Appropriate but not adequate	Land degradation is managed through the management of flow velocities. Soil erodibility is managed through ‘the minister’s opinion’ on flow velocities	Adequate and Appropriate	Reference to erosion in the requirements for inclusion as part of the application is in the Guide to Flood Study Report
(6)(b)	Avoid or minimise the impacts of flood works on other water users	Adequate and appropriate	The impacts on adjacent landholders are included in the assessment criteria in the management zones with allowances made for modifications to requirements or conditions.	Adequate and appropriate	Impact on other users is included a clear consideration within the Guide to Flood Study Report.
(6)(c)	Minimise existing and future risk to human life and property from occupation of floodplain	Adequate and appropriate	The FMP utilises the development of a floodway network and management zones linked to assessment criteria to address the risk to life and property	Adequate and Appropriate	Covered in the FMP – no further requirements

General notes

The steps outlined in the Technical manual appear to similar to the method used here, as the two were developed concurrently. Most of the information that informs the process and development is held in the background document which is linked in part of the FMP but not included.

The Guide to Flood Study Reports document does not include any reference to the principles of the Act or that they should be considered when undertaking a study. The guide states that it is for use in technical reports used for processing applications in all rural floodplains in NSW where there is an FMP prepared under the Act but does not detail the objects or principles of the act it is working under. The guide contains multiple references to considering things to be ‘adequate’ and/or ‘appropriate’ with no additional definition, which creates some confusion.

Recommendations

Finding Number	Recommendation	Detail
FBD.07	Amend	Include a requirement to ensure geographical and other features of Aboriginal significance are protected, potentially through consultation with DPE Water or similar, in the assessment of flood work applications
FBD.08	Amend	Include requirements for monitoring and review of the FMPs detail outside of the 5 year requirements such as resulting from a flood event or identification of known risk to life and property or a significant risk to the environment. Include detail on the impacts of climate change and how they should be managed under the FMP. Include clear and specific triggers for the amendments under Part 10.

A.5 Consultation

Targeted Agency Feedback

Item	Description	Source
1	Lack of clarity around existing works. Perhaps messaging around this has not worked	DPE Water
2	Consider the inclusion of groundwater dependant ecological assets and groundwater dependant ecosystems if there is new information.	DPE Water
3	Monitoring of plan implementation hasn't been done very closely	DPI Agriculture
4	Concern around the cumulative impact criteria and it being a case of 'first in, best dressed'	DPI Agriculture
5	Should be consideration of government funded amendments to previously approved works which will improve floodplain connectivity. This may alleviate some of the cumulative impacts. Need to ensure the provisions do not preclude this kind of amendment to previously approved works to allow this to happen.	DPI Agriculture
6	Opportunity to improve the coordinated monitoring to assess effectiveness of plan	DPE EHG
7	No linkage between existing problematic works and the FMP with no commitment or obligation to act on these works.	NRC
8	Plan doesn't look at problematic works which aren't unauthorised.	NRC
9	More direct and clear language around MER to make more specific and simpler to Audit	NRC
10	Mandatory conditions should adopt clearer language. Current conditions have proven difficult to audit.	NRC
11	Objectives not specific and measurable.	NRC
12	The WLS cannot understand works covering multiple zones.	NRC
13	Remove language which allows the bypass of conditions/considerations	NRC
14	Management zones used to set regulatory priorities. As Improving Floodplain Connections project progresses it may evolve NRAR understanding of the FMP	NRAR
15	Considered likely that the rules in the FMP need to be less ambiguous in order for them to be enforced	NRAR

Item	Description	Source
16	Sometimes not clear what the intent of the rules are	NRAR
17	The Barwon-Darling plan has only received 6 applications so the FMP and provisions haven't been 'stress tested'	WaterNSW (Consultant)
18	Review of MZ A through the review of applications suggests it may be too conservative. Potentially a model error	WaterNSW (Consultant)
19	Uncertainty around whether council is giving due consideration to the FMP. Perhaps needs better coordination/communication with councils	WaterNSW (Consultant)
20	Mandatory conditions and Technical Assessment Manual only received recently	WaterNSW
21	Rules contained in cl 43 for MZ C potentially onerous if this zone was intended to be for works in an area with a low likelihood of impact.	WaterNSW

Submissions

Summary of submissions received

- Four submissions received
- one provided through the webpage, three provided to the email address
- one individual, three organisations

Feedback from submissions

New comments from the Submissions

- Lack of acknowledgement or consideration for the Lower Darling River water users and cultural groups (Baakandji people) and the impacts of upstream activities on them
- Concern that ecological and cultural impacts may arise from them being used for Floodplain Harvesting activities. Desire for lagoons added to Management Zone D
- Management Zone A rules perceived as onerous and are preventing erosion rehabilitation works within Management Zone A. Desire for ecological enhancement works that restore natural floodplain patterns and processes are removed from the definition of flood works
 - Request that the principles and techniques for restoring natural patterns and processes are codified
 - Request that an expert panel is convened to codify the principles and techniques to meet the definition of ecological enhancement works.
- Lack of clarity around rules where multiple Management Zones occur within a single property.
- Some lack of clarity in reference to metrics requiring the Minister's discretion e.g. 'adequate flood connectivity'
- Provisions relating to the cumulative impacts of existing works are only specified in Management Zone A and D.

Out of scope feedback

- Some of the feedback provided was regarding the development of the floodway network and its relationship with existing flood works
- Desire to for all unapproved works and works which impede flood flow to be decommissioned or modified. Update provisions in Part 8 as per allowances made in Part 10 of the FMP (cl 55 (c))

- There is a lack of clarity on how the FMP fits in other management plans such as the water sharing plan
- Plans do not deal with floodplain harvesting
- Concerns about specific pieces of infrastructure with approvals granted by Local Government
- Desire to have the impacts of existing flood works (before commencement of the FMP) to be shown in order to satisfy the provisions relating to protection of cultural and ecological assets.

Supporting Document Review

Documents included in the Step 5 Assessment are:

- Rural floodplain management plans, Water Management Act 2000, Background document to the floodplain management plan for the Barwon-Darling Valley Floodplain 2017, June 2017
- Technical Assessment Methods, Assessment Criteria, Implementation of the Floodplain Management Plan for the Barwon-Darling Valley Floodplain 2017, June 2019. [unpublished]
- Technical Notes, Rules, Implementation of the Floodplain Management Plan for the Barwon-Darling Valley Floodplain 2017, June 2019. [unpublished]
- Rural floodplain management plans: technical manual for plans developed under the *Water Management Act 2000*, Version, 2.1, June 2020
- Guide to Flood Study Reports, Technical Assessment Methods for flood work approvals under the *Water Management Act 2000*, Phase 4, Version 2.1B, May 2020. [unpublished]

The Review findings from the Step 5 document review have been included in the table in Section 4

Recommendations

Finding Number	Recommendation	Detail
FBD.09	Review	Conduct a review of the modelling and any other technical information used to inform the management zones, its rules and the effective implementation of the plan. The model update should consider recent flood events and their impact on the hydrologic analysis developed for the FMP. Use the updated flood risk information combined with consultation feedback to review the management zones and update where required.
FBD.10	Review	A review should be undertaken to assess how ecological enhancement works and other NRM works should be considered in the FMP to ensure these works are not inhibited by the FMP.

A.6 Synthesis of Results

General findings

The FMP is **appropriate but not adequate** for ensuring the effective implementation of the water management principles, and is able to be improved in some areas. The FMP can be considered appropriate, however the improvements identified through the later FMP development would ensure its adequacy.

The FMP makes a clear distinction between the core principles that must be dealt with (s.29) and the additional provisions that may be dealt with (s.30). The core provisions are dealt with in dedicated sections of the FMP, ensuring the level of detail required by s.29 is included, whereas the additional provisions have been used to inform the development of the FMP, guiding decisions on its management zone areas and related criteria. The information for the additional provisions is held more in the background document that describes the development of the FMP in accordance with the *Rural floodplain management plans: technical manual for plans developed under the Water Management Act 2000*. This approach was confirmed in the targeted consultation with DPE EHG.

The FMP includes authorised amendments (contained in Part 10), however, to ensure the FMP is able to respond to updates in information and technology and to apply the principles of adaptive management (s.5(2)(h)) triggers should be included to ensure that the adaptive amendment opportunities are not missed.

The FMPs background document and online spatial mapping however these are only found when accessing the FMP via the Healthy Floodplains Website. Ease of access when accessing the FMP through the NSW Legislation web page should be added, potentially through the use of notes, to ensure that all users are able to access.

Recommendations

Finding number	Item	Detail
FBD.01	Amend	Review of the performance indicators to include specific, measurable indicators and the timeframes of assessment
FBD.02	Amend	Include requirements for the potential impact of removing or modifying existing approved and unapproved flood works. In particular, risks to life and property from removing and not removing existing flood works.
FBD.03	Amend	Amend the plan to include a reference to the ArcGIS online version of the Management Zones Map
FBD.04	Amend	Inclusion of water quality provisions, such as blackwater
FBD.05	Amend	Include the background document as an attachment to the FMP or provide a reference to ensure ease of access. If the items not found in the FMP are considered to be held elsewhere, such as the background document, then clear reference should be included (for example as a Note) so that the information is clearly accessible. This would ensure all information is being considered by all parties to ensure effective implementation.
FBD.06	Update	It is recommended that the recommendations of the s44 audit be actioned.
FBD.07	Amend	Include a requirement to ensure geographical and other features of Aboriginal significance are protected, potentially through consultation with DPE Water or similar, in the assessment of flood work applications
FBD.08	Amend	Include requirements for monitoring and review of the FMPs detail outside of the 5 year requirements such as resulting from a flood event or identification of known risk to life and property or a significant risk to the environment. Include detail on the impacts of climate change and how they should be managed under the FMP. Include clear and specific triggers for the amendments under Part 10.
FBD.09	Review	Conduct a review of the modelling and any other technical information used to inform the management zones, its rules and the effective implementation of the plan. The model update should consider recent flood events and their impact on the hydrologic analysis developed for the FMP. Use the updated flood risk information combined with consultation feedback to review the management zones and update where required.
FBD.10	Review	A review should be undertaken to assess how ecological enhancement works and other NRM works should be considered in the FMP to ensure these works are not inhibited by the FMP.