An aerial photograph of a river meandering through a floodplain. The river is a vibrant green, winding through a landscape of various shades of green and brown. The floodplain shows signs of erosion with distinct patterns. A dark, semi-transparent rectangular overlay is positioned in the center-right of the image, containing white text.

Section 43 Review of the Gwydir Floodplain
Management Plan

FINAL REPORT

June 2021

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 'Review method development and application to floodplain management plans'.

Authors: Andrew Little
Review: David Winfield, Neal Albert
Approved: Amanda Wealands

Version: Final
Date issued: 25 June 2021
Issued to: DPIE Water
Citation: Alluvium, 2021, Section 43 Review of the Gwydir Floodplain Management Plan, report prepared by Alluvium Consulting Australia for the DPIE Water, Sydney NSW

Cover image: abstract river image, Shutterstock

Executive Summary

Floodplain Management Plans (FMPs) provide a framework for coordinating the development of flood works on a whole of valley basis. The Gwydir Valley FMP commenced under the *Water Management Act 2000* (the Act) in 2016.

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 (S43A) the responsibility of the NRC, and all others (S43) by DPIE Water. Such a review must be undertaken for the purpose of ascertaining whether the plan'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 Section 43 Review of the Floodplain Management Plan for the Gwydir Valley Floodplain (Gwydir FMP) has been undertaken.

The review found that the Gwydir FMP is appropriate but not adequate to effectively implement the water management principles. Some amendments should be made to improve the adequacy of the Gwydir FMP .

Table 1 summarises the findings and recommendations from the review.

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 Gwydir 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 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 Gwydir 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
FG.01	The performance indicators in s.12 of the Gwydir FMP were not specific, measurable targets	Amend the performance indicators to include specific, measurable indicators and the timeframes of assessment	■					■
FG.02	The Gwydir 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	Consider amending the Gwydir FMP to include assessment requirements for the removal of existing flood works and the potential impacts on other floodplain users		■				■
FG.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 Gwydir FMP and it does not provide linkage potentially making it hard to find.	Amend the notes of the Gwydir FMP to include reference to online spatial mapping or consult PCO and Communications teams to determine best option for making information easy to locate		■				■
FG.04	Water quality provisions have not been included in the FMP as required under s.5(c) and recommended by s.30(e) of the Act	Seek advice regarding the best way to amend the Gwydir FMP for the inclusion of water quality provisions, such as blackwater		■		■		■
FG.05	The core provisions are clearly held in designated sections of the FMP, but the additional provisions were used to inform the FMP with the detail held in the background document.	Amend the notes include clear reference to the background document or consult PCO and Communications teams to determine best option for making information easy to locate		■		■		■
FG.06	The Section 44 audit has not been completed prior to this review	Note that the Audit report may include recommendations that could inform potential amendments to the Gwydir 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
FG.07	The Gwydir 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.				■		■
FG.08	The Gwydir FMP holds potential for amendment and adaption through its Part 10 clauses but there is no trigger for these amendments to occur				■	■	■
FG.09	There have been some provisions included in the latter Healthy Floodplains Project FMPs that have been flagged as beneficial to the FMPs					■	■
FG.10	The technical detail of the FMP has not been reviewed here as it was out of scope for this report.					■	■

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
	<p>A review of the technical detail and the performance of the management zones against monitoring data would be valuable in informing future reviews and should be conducted prior to the s43 Review (for this and other FMPs) to form part of the evidence base.</p> <p>A method for the review of the technical detail and potential amendments to the plan should be developed prior to the review to allow consistent review methods are used each time a technical review is conducted.</p>						
FG.11	<p>There needs to be clear guidance available to landholders around how changes can be made and a clear process</p> <p>Provide clarity on when amendments can be made to the FMP. If this is only during the 5- or 10-year review, then a register of requests should be made to allow ongoing request to be made and then.</p>					■	■
FG.12	<p>A significant risk was identified linked to loss of corporate knowledge that needs to be addressed to ensure the updates and reviews can be conducted with the best available knowledge</p> <p>Note the risk, no recommendation</p>					■	■
FG.13	<p>There has been feedback that the requirements for a flood work approval create too high a cost on landholders and that there is a potential for a marginal cost structure based on the size of the works</p> <p>Note the issue, there is no recommendation</p>					■	■
FG.14	<p>Need to progress with the 'hotspot' areas that were in the historic FMP but have since been removed. The lack of action in this area creates a risk of loss of trust and buy in from landholders</p> <p>Investigate how the hotspot areas present a risk to the integrity of the plan.</p>					■	■

Contents

1	Introduction	1
1.1	<i>Review objective</i>	1
2	About the Review	2
2.1	<i>Purpose of the Section 43 Review under the Act</i>	2
2.2	<i>FMP requirements under the Act</i>	2
2.3	<i>Method applied to this review</i>	3
	Review steps	3
	Evidence base	4
	Assessment	5
	Consultation	6
	Out of scope	6
3	Background and context to the Floodplain Management Plans subject of this review	7
3.1	<i>Background</i>	7
	Murray Darling Basin Plan	7
	Healthy Floodplains Project	7
	Gwydir FMP Development	7
4	Findings	9
4.1	<i>Section 43 review findings</i>	9
4.2	<i>Additional findings</i>	14
5	Review assessment	15
5.1	<i>Step 1: Logic assessment</i>	15
5.2	<i>Step 2: Provisions assessment</i>	16
5.3	<i>Step 3: Implementation assessment</i>	18
5.4	<i>Step 4: Review of the plan against the Principles</i>	19
5.5	<i>Step 5: Consultation to assess the plan against the principles</i>	21
	Summary of submissions received	22
	Feedback from submissions	22
	Targeted consultation	22
5.6	<i>Step 6: Synthesis of results</i>	25
6	References	26
	Attachment A: Review of the Gwydir Valley Floodplain Management Plan 2016	27
	A.1 <i>Floodplain Management Plan Logic</i>	28
	Review	28
	Assumptions	29
	Logic mapping to the Principles of the Act	30
	Recommendations	30
	A.2 <i>FMP development in accordance with the Provisions</i>	30
	FMP Provisions Assessment Table	30
	Recommendations	32
	A.3 <i>FMP Implementation in accordance with the Provisions</i>	32

General Comments	32
Recommendations	32
<i>A.4 FMP assessed if adequate and appropriate against the Principles of the Act.....</i>	<i>32</i>
Water Management Principles Assessment Table	32
General notes	35
Recommendations	35
<i>A.5 Consultation</i>	<i>36</i>
Targeted Agency Feedback	36
Submissions	37
Summary of submissions received	37
Feedback from submissions.....	37
Supporting Document Review	38
Recommendations	39
<i>A.6 Synthesis of Results.....</i>	<i>39</i>
General findings	39
Recommendations	41

Figures

Figure 1. <i>Review method (Alluvium 2021)</i>	4
Figure 2. <i>Gwydir FMP area (NSW DPIE, 2021)</i>	8

Tables

Table 1. Findings and recommendations of the s.43 review of the Gwydir FMP	ii
Table 2. Assessment definitions	5
Table 3 Findings summary	11
Table 4 Step 1 Logic assessment	15
Table 5 Step 2 Provisions assessment	17
Table 6 Step 4 Principles assessment	20
Table 7 Summary of feedback from targeted consultation	22
Table 8 Step 5 Principles assessment	24

Acronyms and Abbreviations

CSS	Catchment Simulation Solutions (primary contractor to WaterNSW for flood work application assessment)
DPIE	The Department of Planning, Industry & Environment
EES	Environment, Energy and Science within DPIE
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 DPIE Water. Such a review 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 of the Act, whether provisions remain adequate and appropriate for ensuring the effective implementation of the water management principles (s.43) for Gwydir FMP.

The scope of this review has been to review the FMP, and not the technical detail that informed their creation. 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 Gwydir FMP was conducted between 1 February 2021 and 30 May 2021.

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 Gwydir FMP logic (i.e., how its provisions and action contribute to achieving outcomes and objectives).
- Step 2 assessed if the Gwydir FMP is in accordance with the Act requirements for FMP provisions.
- Step 3 takes the outcomes of the NRC s.44 audit, however this was not conducted as the Audit had not been conducted at the time of the review.

- Steps 4 and 5 assess whether the Gwydir FMP is adequate and appropriate in accordance with the principles (s.5) by reviewing the Gwydir FMP document (Step 4) and supporting documentation and consultation (Step 5)
- Step 6 synthesises the information to form an assessment regarding whether the Gwydir FMP provisions remain adequate and appropriate for ensuring the effective implementation of the water management principles and make recommendations based on the assessment.

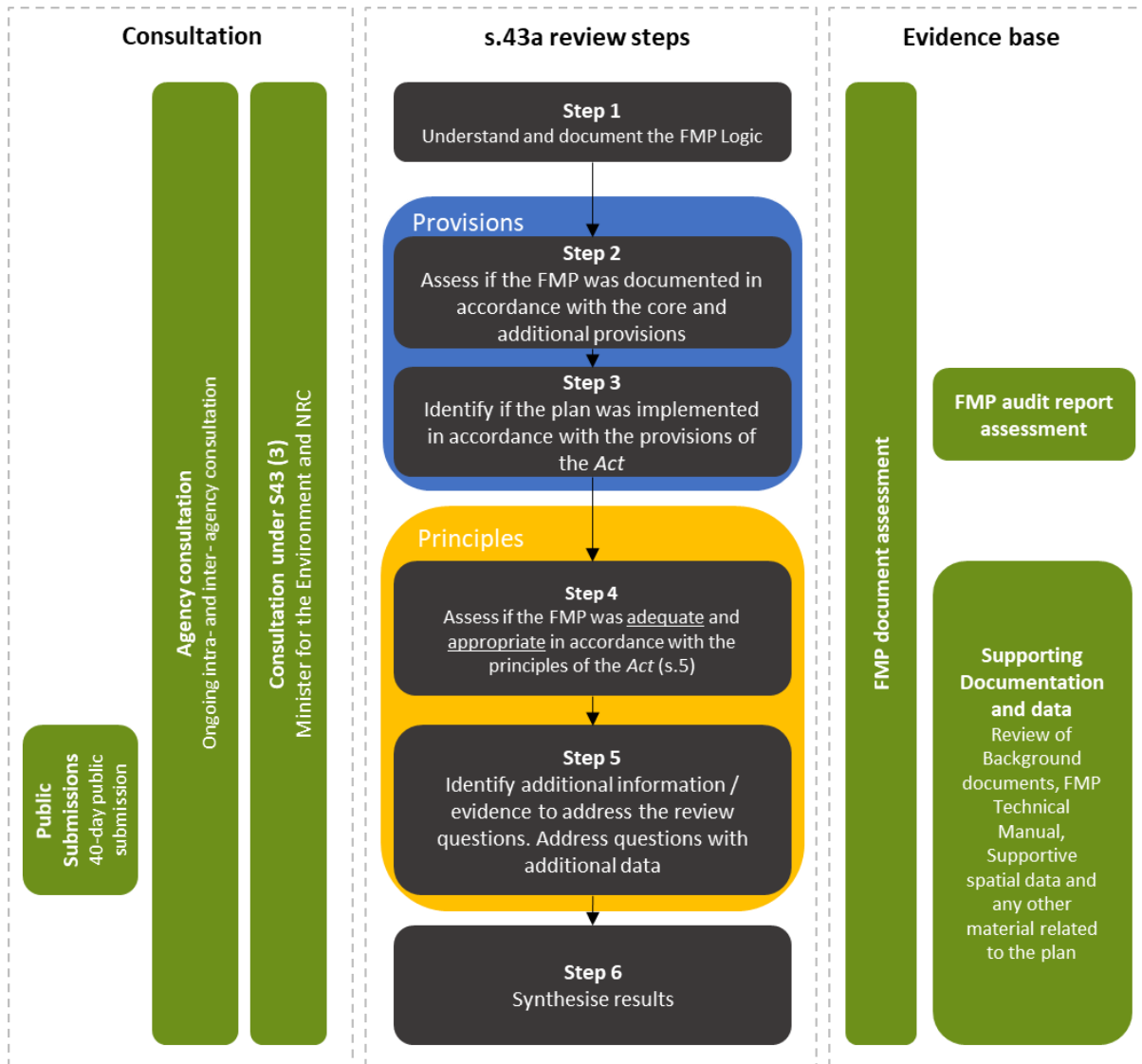


Figure 1. Review method (Alluvium 2021)

Evidence base

The review of the Gwydir FMP has included consideration on the Gwydir FMP document, informed by supporting documentation if 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 Gwydir FMP
- Submissions from public and stakeholder organisations
- Targeted interviews with DPIE Water, DPIE EES, 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 Gwydir Valley, Floodplain 2015, Volume 1, February 2015
- Technical Assessment Methods, Assessment Criteria, Implementation of the Floodplain Management Plan for the Gwydir Valley Floodplain 2016, February 2018. [unpublished]
- Technical Notes, Rules, Implementation of the Floodplain Management Plan for the Gwydir Valley Floodplain 2016, February 2018. [unpublished]
- Rural floodplain management plans: technical manual for plans developed under the *Water Management Act 2000*, 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 FMPs provisions remain adequate and appropriate for ensuring the effective implementation of the water management principles. The review has also determined if the plan 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 Section 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 plan may be appropriate for a legislated FMP, but the detail, rules and criteria are not to a level that allows effective implementation of the plan. 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 or 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 DPIE 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 6 April 2021 and 18 May 2021. The submissions page asked to provide feedback on the Gwydir 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:

- DPIE Water
- DPIE Environment, Energy and Science (DPIE EES)
- Natural Resources Access Regulator (NRAR)
- NRC
- WaterNSW (WaterNSW input was provided on their behalf by Catchment Simulation Solutions, the primary contractor for review of flood work approval application)

The reviewed 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:

- DPIE Water
- DPIE EES
- NRC

Out of scope

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

1. Conduct an audit of the Gwydir FMP, rather the method intends to draws on the previously completed s.44 audit as part of the review (where available).
2. Consider the process applied to develop the FMPs.
3. Review the outputs of hydraulic modelling or be conducting a review of the models themselves.
4. Examine accuracy of spatial data. The review will assess the functionality of the mapping but not the accuracy of the content

The s.43 review(s) 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 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.

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 DPIE, 2021), five of which have commenced.

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).

Gwydir FMP Development

The Gwydir FMP was developed under the Act under the HFP and commenced on 12 August 2016. It was the first of the six FMPs to be developed across the northern NSW Murray-Darling Basin, with the Barwon-Darling (30 June 2017), Upper Namoi (7 June 2019), Border Rivers (11 September 2020), Lower Namoi (11 September 2020) and Macquarie (due to commence 2021) valleys following after it. The Gwydir FMP replaced the Moomin Creek FMP 2020 and the Lower Gingham Watercourse FMP 2006 which were repealed upon commencement of the Gwydir FMP. The Gwydir FMP map is shown in Figure 2.

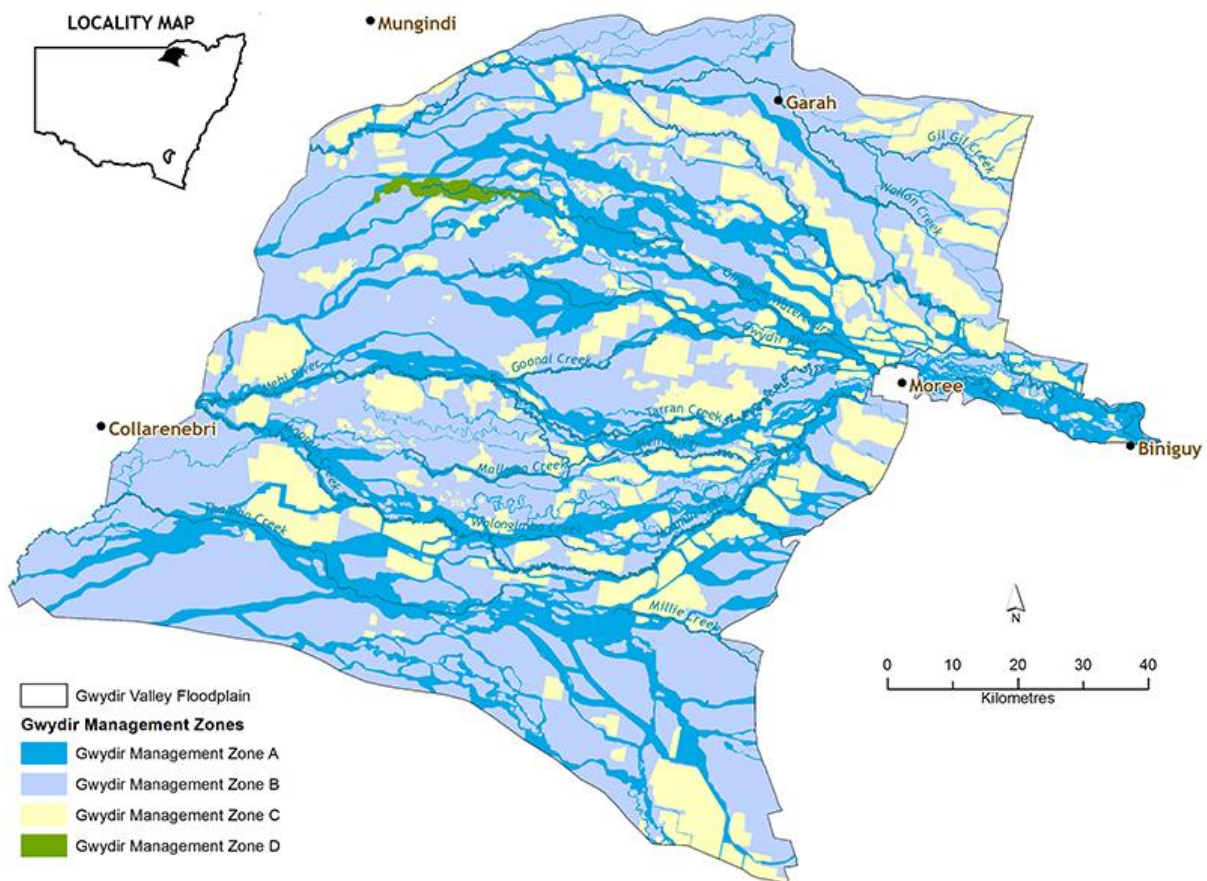


Figure 2. *Gwydir FMP area* (NSW DPIE, 2021)

4 Findings

4.1 Section 43 review findings

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

The Gwydir FMP meets the structural requirements of a management plan as detailed in Section 35 of the Act, with the inclusion of a vision statement, objectives, strategies and performance indicators included in the Gwydir FMP. Each of these was clearly articulated, with each given a separate section within the Gwydir FMP with an evident understanding of the Section 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 (FG.01).

Similarly, the core provisions of Section 29 were clearly identified within the Gwydir 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 Gwydir 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 (FG.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.

The assessment of the Gwydir FMP and its supportive documents to determine its adequacy and appropriateness for the effective implementation of the water management principles, found that the provisions were mostly adequate and appropriate, with two exceptions:

- The Gwydir FMP should be updated to include detail on the management of water quality during flood activity (FG.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 (FG.08). The FMP was considered adequate but not appropriate in ensuring the effective implementation of the principle in Section 5(2)(h)

The Gwydir FMP and the information in the background document (Department of Primary Industries, Water, 2015) showed that it was appropriate in ensuring the effective implementation of principle in Section 5(2)(e), *geographical and other features of Aboriginal significance should be protected*, but not adequate. It could be improved through the inclusion of specific assessment criteria regarding their protection and ensure that areas of Aboriginal significance are included in the Management Zone D area as part of the management zone review (FG.07). It is understood that there are steps taken to ensure the protection of sensitive information regarding the location of areas of importance, so if this hinders the ability for specific assessment criteria this should be included, and clarity provided on how the criteria protect the sites.

The audit report that was not published at the time of review is likely to be a valuable source of information regarding the implementation of the FMP and any issues in implementation that are a result of the adequacy and appropriateness of the FMP. It should be noted that the Audit report may include recommendations that could inform potential amendments to the Gwydir FMP (FG.06).

The review was able to refer to multiple sources of information to determine the adequacy and appropriateness of the Gwydir 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 plan order, to provide clear reference to the spatial mapping tool available on the DPIE Water website (FG.03) and the background document (FG.05). Consultation with agency staff was also able to highlight areas of improvement of the Gwydir FMP, with the lessons learned over the course of the HFP creating opportunity for amendments to the Gwydir FMP (FG.09), and given the technical information that informed its development has not been updated (see FG.05), there should be an update to the modelling and other detail that informed the Gwydir FMP potentially leading in to refinement of the management zones (FG.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 Gwydir 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 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

			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
FG.01	The performance indicators in s.12 of the Gwydir FMP were not specific, measurable targets	Amend the performance indicators to include specific, measurable indicators and the timeframes of assessment	■					■
FG.02	The Gwydir 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	Consider amending the Gwydir FMP to include assessment requirements for the removal of existing flood works and the potential impacts on other floodplain users		■				■
FG.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 Gwydir FMP and it does not provide linkage potentially making it hard to find.	Amend the notes of the Gwydir FMP to include reference to online spatial mapping or consult PCO and Communications teams to determine best option for making information easy to locate		■				■
FG.04	Water quality provisions have not been included in the FMP as required under s.5(c) and recommended by s.30(e) of the Act	Seek advice regarding the best way to amend the Gwydir FMP for the inclusion of water quality provisions, such as blackwater		■		■		■
FG.05	The core provisions are clearly held in designated sections of the FMP, but the additional provisions were used to inform the FMP with the detail held in the background document.	Amend the notes include clear reference to the background document or consult PCO and Communications teams to determine best option for making information easy to locate		■		■		■
FG.06	The Section 44 audit has not been completed prior to this review	Note that the Audit report may include recommendations that could inform potential amendments to the Gwydir 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
FG.07	The Gwydir 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.				■		■
FG.08	The Gwydir FMP holds potential for amendment and adaption through its Part 10 clauses but there is no trigger for these amendments to occur				■	■	■
FG.09	There have been some provisions included in the latter Healthy Floodplains Project FMPs that have been flagged as beneficial to the FMPs					■	■
FG.10	The technical detail of the FMP has not been reviewed here as it was out of scope for this report.					■	■

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
	<p>A review of the technical detail and the performance of the management zones against monitoring data would be valuable in informing future reviews and should be conducted prior to the s43 Review (for this and other FMPs) to form part of the evidence base.</p> <p>A method for the review of the technical detail and potential amendments to the plan should be developed prior to the review to allow consistent review methods are used each time a technical review is conducted.</p>						
FG.11	<p>There needs to be clear guidance available to landholders around how changes can be made and a clear process</p> <p>Provide clarity on when amendments can be made to the FMP. If this is only during the 5- or 10-year review, then a register of requests should be made to allow ongoing request to be made and then.</p>					■	■
FG.12	<p>A significant risk was identified linked to loss of corporate knowledge that needs to be addressed to ensure the updates and reviews can be conducted with the best available knowledge</p> <p>Note the risk, no recommendation</p>					■	■
FG.13	<p>There has been feedback that the requirements for a flood work approval create too high a cost on landholders and that there is a potential for a marginal cost structure based on the size of the works</p> <p>Note the issue, there is no recommendation</p>					■	■
FG.14	<p>Need to progress with the 'hotspot' areas that were in the historic FMP but have since been removed. The lack of action in this area creates a risk of loss of trust and buy in from landholders</p> <p>Investigate how the hotspot areas present a risk to the integrity of the plan.</p>					■	■

4.2 Additional findings

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

- There is a lack of clarity regarding the areas subject to the rural FMPs such as the Gwydir 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 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, and rural flood works applications might not be adequately considering risks to life and property in towns.

Other additional findings were:

- A significant risk was identified around a loss of corporate knowledge. Consultation identified that this risk needs to be addressed to ensure any future updates and reviews and the FMP implementation can be conducted with the best available knowledge.
- There has been feedback that the requirements for a flood work approval create too high a cost on landholders and that there is a potential for a marginal cost structure based on the size of the works.
- There is a need to progress with the 'hotspots' that were identified in previous FMPs 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 it is likely to be outdated and developed using outdated technology resulting in an inaccurate FMP. The technical information that informed the FMP development such as hydraulic modelling may need to be reviewed and updated.

5 Review assessment

5.1 Step 1: Logic assessment

The Gwydir 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 Gwydir 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 (FG.01). An overview of the finding is shown in Table 1.

The Gwydir 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 Gwydir FMP, but importantly 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 Gwydir 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 DPI Water offices in Moree and Calala, however the DPIE Water webpage contains an online spatial tool that allows viewing of the maps to property scale and the Gwydir FMP would benefit from including a reference to these within the FMP document notes (which are not considered part of the Gwydir FMP but are included in the document)(FG.03).

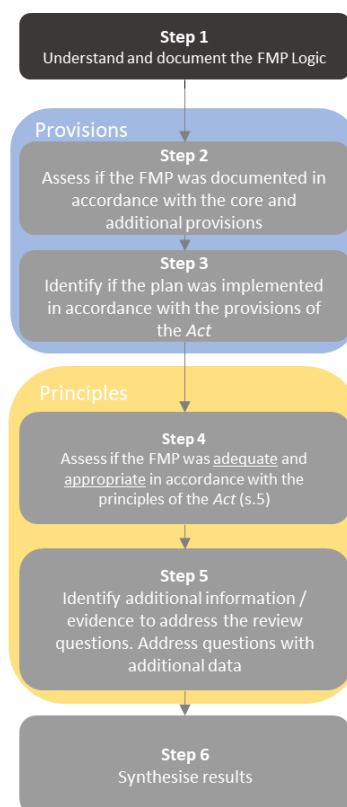


Table 4 Step 1 Logic assessment

	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)	✗

5.2 Step 2: Provisions assessment

The Gwydir 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:

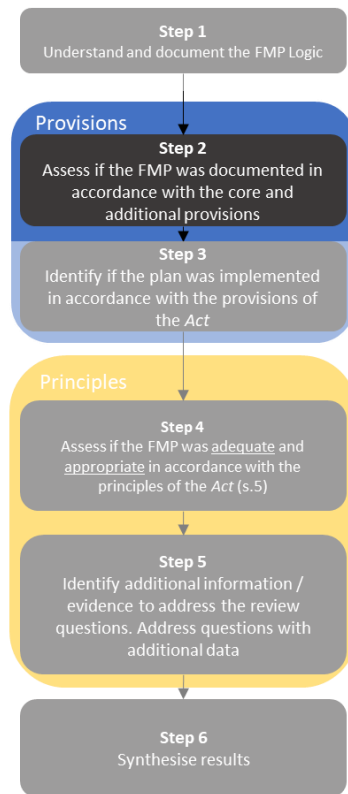
The floodplain management provisions of a management plan for a water management area must deal with the following matters—

- (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 plan order. The Gwydir 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 Gwydir 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 Gwydir FMP is held in the background document, which is available on the DPIE Water webpage, however the Gwydir FMP could be improved by including a reference to the document, such as through the notes (which are not considered part of the plan but are included in the document) or the communication of the location of additional information improved (FG.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 (FG.04).

Additionally, the Gwydir FMP was considered to have partially dealt with Addition 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 (FG.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	✗

Provision	Detail	Assessment
(f)	other measures to give effect to the water management principles and the objects of this <i>Act</i>	✓
(g)	such other matters as are prescribed by the regulations	✓
Legend		
✓	- Dealt with	○ - partially dealt with
		✗ - not dealt with

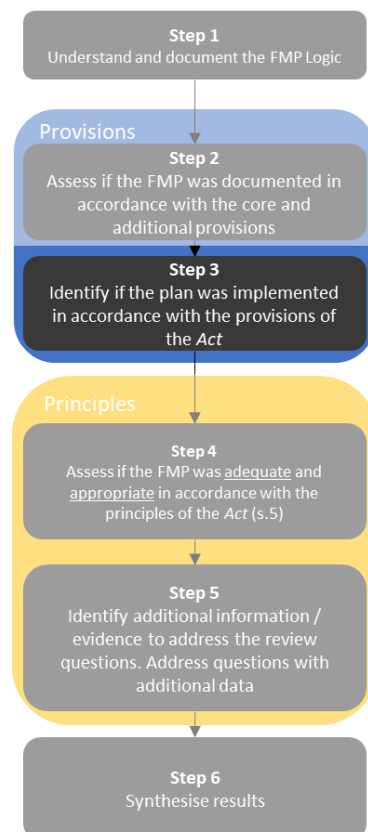
5.3 Step 3: Implementation assessment

Step 3 of the review aims to determine if the Gwydir 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, rather 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 s.44 Audit has not been completed at the time of the review, so Step 3 was not able to be conducted. It is recommended that the audit report be used to inform any amendments made to the Gwydir FMP (FG.06).

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 Gwydir FMP provisions to achieve the water management principles. It is the step that assess if the FMP is adequate and appropriate in accordance with the water management principles. This was done by assessing the Gwydir 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 Section 5 (2):

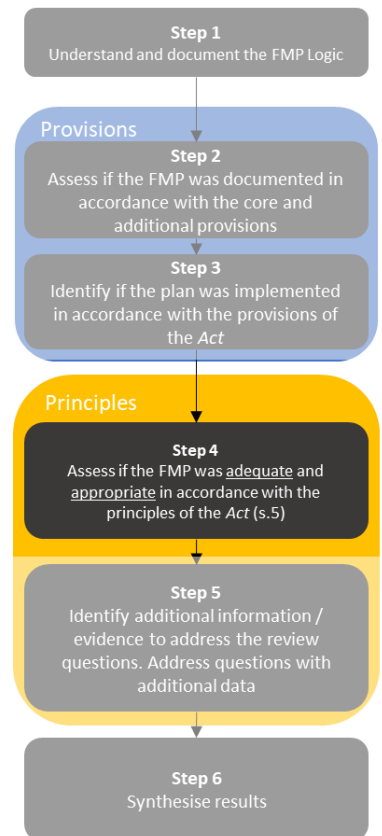
- (a) water sources, floodplains and dependent ecosystems (including groundwater and wetlands) should be protected and restored and, where possible, land should not be degraded, and*
- (b) habitats, animals and plants that benefit from water or are potentially affected by managed activities should be 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.*

The FMPs was assessed against each Principle in s.5 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 Gwydir FMP against the principles found that it is appropriate for the for ensuring the effective implementation of the water management principles though not all areas were adequate (see Table 6). The areas 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.

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 6 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
(2)(h)	Respond to monitoring and improvements in understanding of ecological water requirements	Appropriate but not adequate

Section	Principle	Step 4 Assessment
(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

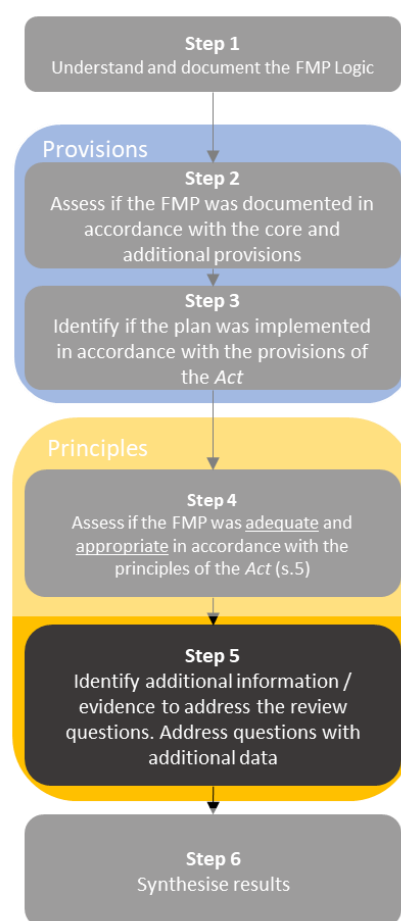
Consultation was conducted to gain input into the review of the FMPs against the principles. The consultation included targeted consultation with agency representatives from DPIE Water, DPIE EES, NRAR and NRC, along with an invitation for submissions for stakeholders. Email notifications were provided 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 Land Council
- Yarkuwa Indigenous Knowledge Centre

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

Step 5 allowed a follow up through additional evidence to address the question of whether the Gwydir 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 Gwydir Valley, Floodplain 2015, Volume 1, February 2015
- Technical Assessment Methods, Assessment Criteria, Implementation of the Floodplain Management Plan for the Gwydir Valley Floodplain 2016, February 2018
- Technical Notes, Rules, Implementation of the Floodplain Management Plan for the Gwydir Valley Floodplain 2016, February 2018
- Rural floodplain management plans: technical manual for plans developed under the *Water Management Act 2000*, 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.



Summary of submissions received

- seven Submissions received
- one provided through the webpage, six provided to the email address
- five individuals, two organisations

Feedback from submissions

New comments from the Submissions

- Background document shows Ramsar sites and important wetlands not included in the Ecological zone. Some appear to be in Zone C.
- Inconsistencies at the boundary with other plans (i.e. Namoi) such as zone thresholds, treatment of under application and different zone types (i.e. Zone A vs AD or AID)
- Groundwater recharge not properly considered

Comments raised on the supporting documentation

- The documentation that the FMP is based on is outdated.
- The documents that inform the FMP such as the Technical Manual do not have review or update requirements

Comments raised regarding technical updates

- The plan has not been updated with new information such as changes to approved works
- The plan has not been updated following flood events, monitoring or updates to the modelling
- There is a lack of information around transitioning into and out of the plan
- The management zones require review to ensure accuracy
- Climate change has not been considered

Comments covered elsewhere in the review

- Core provisions included in the FMP but not additional provisions
- Lack of detailed consultation during the review process. Documentation not included in the submission notification
- Lack of consultation with Aboriginal Groups

Out of scope feedback

- Some of the feedback provided was regarding the background document and not the Gwydir FMP
- There is a lack of clarity on how the Gwydir FMP fits in with other Gwydir management plans such as the water sharing plan
- Plans do not deal with floodplain harvesting

Targeted consultation

A summary of the feedback received in the targeted consultation is shown below in Table 7.

Table 7 Summary of feedback from targeted consultation

Item	Description	Source
1	Gwydir FMP should include allowances for ecological, cultural and heritage enhancement works consistent with the latter 5 FMPs developed under the Healthy Floodplains Project	DPIE Water
2	A review of management zones should be conducted with updated data and modelling. This should be conducted periodically, and the zones updated	DPIE Water
3	The Gwydir FMP should be amended to include Moree in the plan area under management zone CU	DPIE Water

Item	Description	Source
4	There are feedback registers and lessons learned from the duration of the Healthy Floodplains Project that should be reviewed for potential amendments to the Gwydir FMP	DPIE Water
5	During development of the Gwydir FMP, there was a large amount of education required, identifying that there is not enough passing of information to the landholders regarding the rules and requirements	DPIE Water
6	There is a significant risk linked to loss of corporate knowledge that needs to be addressed to ensure the updates and reviews can be conducted with the best available knowledge	DPIE Water
7	There is a lack of clarity around the requirements in urban areas in an FMP area. This needs to be made clear but is outside the scope of this review	DPIE Water
8	Need to progress with the 'hotspot' areas that were in the historic FMP but have since been removed. The lack of action in this area creates a risk of loss of trust and buy in from landholders	EES
9	The core provisions were included as key points within the Gwydir FMP structure, the additional provisions were used to inform the its development	EES
10	There has been feedback that the requirements for a flood work approval create too high a cost on landholders and that there is a potential for a marginal cost structure based on the size of the works	EES
11	There needs to be an increase in monitoring and data collection prior to amendment to ensure the best data available is being used	EES
12	There is a potential for conflict in plans at a rural and urban level.	EES
13	Governance created delays when the FMP was being created through the setup of Working Group and Interagency Region Panels. These need to be formed at the start of any plan development or amendment process to reduce the delays	EES
14	Work that has been done does indicate that the Gwydir FMP is easy to read, rules are clear, and the geographic areas are easy to locate	NRAR
15	There will need to be a process that can allow amendments to the FMP following feedback from NRAR that comes from compliance activities	NRAR
16	An audit of the Gwydir FMP has not been completed, due to be completed with findings released in the second half of 2021	NRC
17	Technical detail needs a review and management zone areas updated from that	WaterNSW (Consultant)
18	Some approvals have still been done on the Water Act 1912 system; better communication is required regarding the updated process	WaterNSW (Consultant)
19	There needs to be better model updates following approvals being granted to allow cumulative impacts to be properly recognised. Cumulative impacts clauses rely on those changes in the model to assess future applications. There are guidelines around how often the updates are conducted but it is not part of the FMP itself. Guidelines state that yearly updates or if there is a significant redistribution locally then the modelling should be updated.	WaterNSW (Consultant)
20	There is a lack of availability of model information for applicants in the area influenced by tributary flows, mainly in the upstream fringes	WaterNSW (Consultant)
21	There are guidelines in the Gwydir FMP that state that updates can be made through updates in data or modelling but do not legislate when it would happen, so a result no updates have been made. There is no clear process for the implementation of the Part 10 amendments including a trigger system	WaterNSW (Consultant)
22	The rules in the Gwydir FMP are black and white, which leaves no room for adaptability or for an application to be assessed on its merits. This includes examples of infrastructure protection works on very small properties being assessed against criteria designed for much larger properties. The FMPs need a balance between prescription and flexibility	WaterNSW (Consultant)

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 Section 43 review, a clear reference to the document should be included within the notes of the Gwydir FMP or improve the communication of the document's location (FG.05). A summary of the assessment is shown in Table 8, 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 Gwydir FMP includes sections that can be amended to allow for the adaptive management and responsive amendments required by provision 2(h), which was why it was considered appropriate, however the lack of a trigger to enforce the amendments, whether it is through a designated time period, flood event, technology or climate change adaption means that it was not considered appropriate (FG.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 Gwydir 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 (FG04).

Feedback received during consultation highlighted a number of additional areas that would improve the Gwydir FMP’s provisions. They were:

- There was a lack of clarity within the agencies and that has been communicated to agencies by the public around when amendments can be made to the FMP. If this is only during the 5- or 10-year review, then a register of requests should be made to allow ongoing request to be made and then. There needs to be clear guidance available to landholders around how changes can be made and a clear process (FG.08).
- There were a number of improvements made to the FMP detail and development over the course of the Healthy Floodplains Project. As the Gwydir was the first of the FMPs, amendments should be made based on the lessons learned from the project to ensure that the FMP’s is of the best possible quality and ensure consistency across the six northern valleys that the project developed FMPs for. Special consideration should be given to allowances for ecological, cultural and heritage enhancement works and to include Moree urban area and zone as Management Zone CU(FG.09).
- It was highlighted that the technical detail, such as hydraulic modelling was not included in the scope of this review and should be updated and potential changes to Management Zone made as a result (FG.10). There was a clear link to a requirement for regular updates to the FMP based on updated information (FG.08), not to update the rules and criteria but to refine the areas that they apply to.

Table 8 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

Section	Principle	Step 5 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)	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 - "Has the plan's provisions remain adequate and appropriate for ensuring the effective implementation of the water management principles of the Act?".

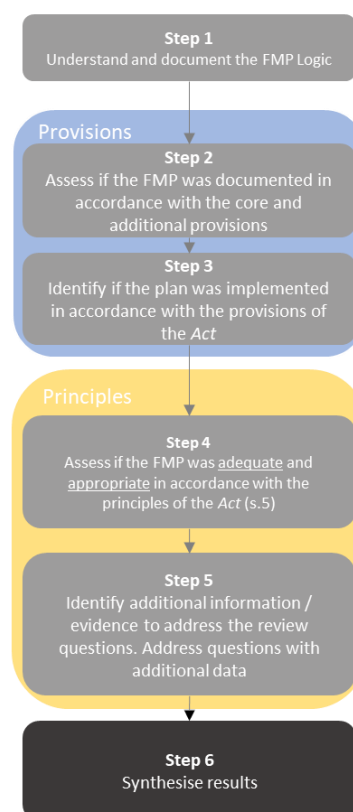
The evidence that has been collated in steps 1 to 5 through the formulation of the assessment tables and reasoning was gathered together to allow a full review of the FMP and its provisions. The findings and evidence were gathered together, and recommendations made for each finding. On collection of 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's 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 FMPs should:

- Be amended if they are mostly adequate and appropriate and amendments would make the FMPs 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 FMPs 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. (2015). *Background document to the floodplain management plan for the Gwydir Valley Floodplain 2015*. 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 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.

NSW DPIE. (2021, April 27). *NSW Healthy Floodplains Project*. Retrieved from PUB21/70: https://www.industry.nsw.gov.au/__data/assets/pdf_file/0005/179933/nsw-healthy-floodplains-project-fact-sheet.pdf

An aerial photograph of a river valley. A dark, winding river flows through the center of the image, surrounded by agricultural fields. The fields are divided into irregular shapes, some of which are circular or semi-circular, suggesting a specific farming or irrigation system. The colors range from dark green to light green and brown, indicating different types of crops or soil conditions. The overall scene is a complex, organic pattern of land use.

Attachment A:
Review of the Gwydir Valley Floodplain Management Plan 2016

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 Gwydir 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 Gwydir FMP: <i>The objectives of this Plan are to:</i> <i>(a) facilitate the orderly passage of floodwaters through the Gwydir 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 Gwydir Valley Floodplain, and</i> <i>(e) contribute to the protection of cultural, heritage and spiritual features of the Gwydir 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 Gwydir 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 4 Management Zones that are mapped in detail and are linked to clear reasoning for the zoning. The Management Zones are labelled as Zones A, B, C and D, each with a division in the FMP order	FMP Section 11

Logic Assessment	Assessment	Evidence	Reference	
		<p>that describes the flood works authorised in the zone, criteria for assessing existing structures and criteria for assessing flood work approvals.</p> <p>The Gwydir 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 determining flood frequency and subsequent choice of design flood for hydraulic modelling. The result 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>Additional mapping has been included to show the areas listed to be identified that is able to be referred back to the management zone mapping to support its delineation and related assessment criteria.</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, create 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 Gwydir FMP includes 5 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	

Assumptions

Strategies are not 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
FG.01	Amend	Review of the performance indicators to include specific, measurable indicators and the timeframes of 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 (2012)
	(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

Provision	Detail	Assessment			Evidence
					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
(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 of 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		○		
(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 in the FMP itself but zoomable mapping exists in the DPIE water website where the FMP is located
(e)	the preservation and enhancement of the quality of water in the water sources in the area during and after flooding			✗	Water quality is not covered in the 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

Provision	Detail	Assessment			Evidence
(g)	such other matters as are prescribed by the regulations	✓	○	✗	

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 legislation itself.

Recommendations

Finding Number	Item	Detail
FG.02	Amend	Include requirements for the removal of existing flood works and the potential impacts on other floodplain users
FG.03	Amend	Include reference to online spatial mapping in the note of the FMP
FG.04	Amend	Inclusion of water quality provisions, such as blackwater
FG.05	Amend	Include the background document as an attachment to the FMP or provide clear reference within the FMP text (even as a note)

A.3 FMP Implementation in accordance with the Provisions

General Comments

This step could not be completed as there has not been a s44 Audit at the time of review. An Audit is scheduled to be completed by Aug 2021 (Natural Resources Commission, 2021).

Recommendations

Finding Number	Item	Description
FG.06	Update	It is recommended that the s43 review be updated following the completion of the s44 audit

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	Adequate but not adequate	The FMP outlines clearly the environmental assets in the area and	Adequate and Appropriate	The background Document and the TAM Assessment

Section	Principle	Step 4 Assessment	Comment	Step 5 Assessment	Comment
	floodplains and dependent ecosystems		the intent of the management zone criteria is in part to protect flows to these locations. The FMP does not include the restoration of assets that are could be rehabilitated.		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)	Adequate but not adequate	The FMP identifies ecological assets in the area and include them in the consideration for Management zone delineation	Adequate and appropriate	The background document includes information on the flow corridors and the habitats that they provide flow to. These are included in the management zone delineation
(2)(c)	Protect (or enhance) water quality of all sources	Included but not adequate or appropriate	Some allowance has been for water quality protection through nutrient, sediment and carbon cycling but not in detail.	Included but not adequate or appropriate	
(2)(d)	Consider and minimise cumulative impacts of flood work approvals on water sources and their dependent ecosystems	Adequate but not adequate	The FMP uses a standardised base of the 2012 design flood for comparison that ensures cumulative impacts are considered. The FMP should clearly articulate that the flood levels for comparison are to be made against the 2012 development to ensure that modelling is conducted on a DEM with more development	Adequate and Appropriate Background Document and the Guide to Flood Study Reports clearly detail the definition and application of cumulative impacts as assessment criteria.	Areas where cumulative impacts are considered to be important have been included in the MZB delineation.
(2)(e)	Protect geographical and other features of Aboriginal significance	Adequate 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 not link included. The background document includes more information. No requirement for consultation to ensure applications are not adversely impacting these locations	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 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.

Section	Principle	Step 4 Assessment	Comment	Step 5 Assessment	Comment
					Consultation with 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 linages 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	Included but not adequate or appropriate	The FMP identifies the general positive and negative socio-economic impacts of flood works	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.	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 climate change or requirements for review of the FMP s detail, but does make a	Appropriate but not adequate	As per step 4. Not covered elsewhere

Section	Principle	Step 4 Assessment	Comment	Step 5 Assessment	Comment
			general allowance for changes to be made		
	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 but not adequate	Land degradation is management 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 Reports
(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

Step of 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 inf 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
FG.04	Amend	Amend the FMP for the inclusion of water quality provisions, such as blackwater
FG.05	Amend	Inclusion of the background document as an appendix to the FMP or provide a reference to the background document in the FMP notes

FG.07	Amend	Include a requirement to ensure Aboriginal assets are protected, potentially through consultation with DPIE Water or similar, in the assessment of flood work applications
FG.08	Amend	Include requirements for monitoring and review of the FMPs detail outside of the 5yr requirements such as resulting from a flood event. Include detail on the impacts of climate change and how they should be managed under the FMP. Triggers should be included in the Part 10 amendments to ensure that opportunities relating to flood events, technology upgrades or any other adaptive management opportunity is not missed

A.5 Consultation

Targeted Agency Feedback

Item	Description	Source
1	FMP should include allowances for ecological, cultural and heritage enhancement works consistent with the latter 5 FMPs developed under the Healthy Floodplains Project	DPIE Water
2	A review of management zones should be conducted with updated data and modelling. This should be conducted periodically, and the zones updated	DPIE Water
3	The FMP should be amended to include Moree in the FMP area under management zone CU	DPIE Water
4	There are feedback registers and lessons learned from the duration of the Healthy Floodplains Project that should be reviewed for potential amendments to the Gwydir FMP	DPIE Water
5	During development of the FMP, there was a large amount of education required, identifying that there is not enough passing of information to the landholders regarding the rules and requirements	DPIE Water
6	There is a significant risk linked to loss of corporate knowledge that needs to be addressed to ensure the updates and reviews can be conducted with the best available knowledge	DPIE Water
7	There is a lack of clarity around the requirements in urban areas in an FMP area. This needs to be made clear but is outside the scope of this review	DPIE Water
8	Need to progress with the 'hotspot' areas that were in the historic FMP but have since been removed. The lack of action in this area creates a risk of loss of just and buy in from landholders	EES
9	The core provisions were included as key points within the FMPs structure, the additional provisions were used to inform the FMPs development	EES
10	There has been feedback that the requirements for a flood work approval create too high a cost on landholders and that there is a potential for a marginal cost structure based on the size of the works	EES
11	There needs to be an increase in monitoring and data collection prior to amendment to ensure the best data available is being used	EES
12	There is a potential for conflict in plans at a rural and urban level.	EES
13	Governance created delays when the FMP was being created through the setup of Working Group and Interagency Region Panels. These need to be formed at the start of any plan development or amendment process to reduce the delays	EES
14	Work that has been done does indicate that the FMP is easy to read, rules are clear, and the geographic areas are easy to locate	NRAR

Item	Description	Source
15	There will need to be a process that can allow amendments to the FMP following feedback from NRAR that comes from compliance activities	NRAR
16	An audit of the Gwydir FMP has not been completed, due to be completed with findings released in the second half of 2021	NRC
17	Technical detail needs a review and management zone areas updated from that	WaterNSW (Consultant)
18	Some approvals have still been done on the Water Act system; better communication is required regarding the updated process	WaterNSW (Consultant)
19	There needs to be better model updates following approvals being granted to allow cumulative impacts to be properly recognised. Cumulative impacts clauses rely on those changes in the model to assess future applications. There are guidelines around how often the updates are conducted but it is not part of the FMP itself. Guidelines state that yearly updates or if there is a significant redistribution locally then the modelling should be updated.	WaterNSW (Consultant)
20	There is a lack of availability of model information for applicants in the area influenced by tributary flows, mainly in the upstream fringes	WaterNSW (Consultant)
21	There are guidelines in the FMP that state that updates can be made to the FMP through updates in data or modelling but do not legislate when it would happen, so a result no updates have been made. There is no clear process for the implementation of the Part 10 amendments including a trigger system	WaterNSW (Consultant)
22	The rules in the Gwydir FMP is black and white, which leaves no room for adaptability or for an application to be assessed on its merits. This includes examples of infrastructure protection works on very small properties being assessed against criteria designed for much larger properties. The FMPs need a balance between prescription and flexibility	WaterNSW (Consultant)

Submissions

Summary of submissions received

- Seven Submissions received
- One provided through the webpage, six provided to the email address
- Five individuals, two organisations

Feedback from submissions

New comments from the Submissions

- Background document shows Ramsar sites and important wetlands not included in the Ecological zone. Some appear to be in Zone C.
- Inconsistencies at the boundary with other plans (i.e. Namoi) such as zone thresholds, treatment of under application and different zone types (i.e. Zone A vs AD or AID)
- Groundwater recharge not properly considered

Comments raised on the supporting documentation

- The documentation that the FMP is based on is outdated.
- The documents that inform the FMP such as the Technical Manual do not have review or update requirements

Comments raised regarding technical updates

- The plan has not been updated with new information such as changes to approved works
- The plan has not been updated following flood events, monitoring or updates to the modelling
- There is a lack of information around transitioning into and out of the plan
- The management zones require review to ensure accuracy
- Climate change has not been considered

Comments covered elsewhere in the review

- Core provisions included in the FMP but not additional provisions
- Lack of detailed consultation during the review process. Documentation not included in the submission notification
- Lack of consultation with Aboriginal Groups

Out of scope feedback

- Some of the feedback was on the background document and not the plan
- There is a lack of clarity on how the Gwydir FMP fits in with other Gwydir management plans such as the water sharing plan
- Plans do not deal with floodplain harvesting

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 Gwydir Valley, Floodplain 2015, Volume 1, February 2015
- Technical Assessment Methods, Assessment Criteria, Implementation of the Floodplain Management Plan for the Gwydir Valley Floodplain 2016, February 2018
- Technical Notes, Rules, Implementation of the Floodplain Management Plan for the Gwydir Valley Floodplain 2016, February 2018
- Rural floodplain management plans: technical manual for plans developed under the *Water Management Act 2000*, 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.

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

Recommendations

Finding Number	Recommendation	Detail
FG.08	Consult	Provide clarity on when amendments can be made to the FMP. If this is only during the 5- or 10-year review, then a register of requests should be made to allow ongoing request to be made and then. There needs to be clear guidance available to landholders around how changes can be made and a clear process
FG.08	Amend	Include clear and specific triggers for the amendments under Section 10
FG.09	Amend	Include allowances for ecological, cultural and heritage enhancement works consistent with the latter 5 FMPs developed under the Healthy Floodplains Project. Amend the FMP area to include Moree and zone as Management Zone CU, consistent with the other FMPs developed under the Healthy Floodplains Project
FG.10	Review	Conduct a review the modelling and use the updated model result combined with consultation feedback to review the management zones and update if required
FG.11	Note	A significant risk was identified linked to loss of corporate knowledge that needs to be addressed to ensure the updates and reviews can be conducted with the best available knowledge
FG.12	Note	There has been feedback that the requirements for a flood work approval create too high a cost on landholders and that there is a potential for a marginal cost structure based on the size of the works
FG.13	Note	Need to progress with the 'hotspot' areas that were in the historic FMP but have since been removed. The lack of action in this area creates a risk of loss of just and buy in from landholders

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 improvements relate mainly to the lessons learned from the 5 FMPs developed under the Healthy Floodplains Project after the Gwydir FMP. The Gwydir 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 target consultation with DPIE EES.

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
FG.01	Amend	Review of the performance indicators to include specific, measurable indicators and the timeframes of assessment
FG.02	Amend	Include requirements for the potential removal of existing flood works and the potential impacts on other floodplain users
FG.03	Amend	Include reference to online spatial mapping to allow easy access
FG.04	Amend	Inclusion of water quality provisions, such as blackwater
FG.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 so that the information is clearly accessible
FG.06	Update	It is recommended that the s43 review be updated following the completion of the s44 audit
FG.07	Amend	Include a requirement to ensure Aboriginal assets are protected, potentially through consultation with DPIE Water or similar, in the assessment of flood work applications
FG.08	Amend	Include requirements for monitoring and review of the FMPs detail outside of the 5yr requirements such as resulting from a flood event. 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 Section 10
FG.09	Amend	Include allowances for ecological, cultural and heritage enhancement works consistent with the latter 5 FMPs developed under the Healthy Floodplains Project. Amend the FMP area to include Moree and zone as Management Zone CU, consistent with the other FMPs developed under the Healthy Floodplains Project
FG.10	Review	Conduct a review the modelling and use the updated model result combined with consultation feedback to review the management zones and update if required
FG.11	Consult	Provide clarity on when amendments can be made to the FMP. If this is only during the 5- or 10-year review, then a register of requests should be made to allow ongoing request to be made and then. There needs to be clear guidance available to landholders around how changes can be made and a clear process
FG.12	Note	A significant risk was identified linked to loss of corporate knowledge that needs to be addressed to ensure the updates and reviews can be conducted with the best available knowledge
FG.13	Note	There has been feedback that the requirements for a flood work approval create too high a cost on landholders and that there is a potential for a marginal cost structure based on the size of the works
FG.14	Note	Need to progress with the 'hotspot' areas that were in the historic FMP but have since been removed. The lack of action in this area creates a risk of loss of trust and buy in from landholders