

An aerial photograph showing a flooded area. In the foreground, there are several houses and buildings surrounded by water. A large area of trees is also submerged. In the background, a town is visible across a river. A bridge spans the river, and a red structure is visible on the left side.

Mallee Floodplain Management Strategy 2018-2028

Mid-term review



Mallee Catchment Management Authority (CMA) acknowledges and respects Traditional Owners, Aboriginal communities and organisations. We recognise the diversity of their cultures and the deep connections they have with Victoria's lands and waters. We value partnerships with them for the health of people and country.

Mallee CMA Board, management and staff pay their respects to Elders past, present and emerging and recognise the primacy of Traditional Owners' obligations, rights and responsibilities to use and care for their traditional lands and waters.

Regional Overview

The Mallee Catchment Management Authority region stretches from Nyah, in the east, to the South Australian Border along the Victorian side of the Murray River, and down to towns including Birchip in the south, covering 39,939 square kilometres.

The Mallee Floodplain Management Strategy (MFMS) was published in 2018 to provide a single, regional planning document for floodplain management and a high-level regional work program to guide future investment priorities over the next ten years (2018-2028). Developed in partnership with regional stakeholders, the MFMS supports and focuses the coordinated effort of land managers, government agencies and the wider community, while building on past achievements and recognising future challenges.

The MFMS adapted the vision from the Victorian Floodplain Management Strategy to reflect the Victorian Mallee's long term (50-year) aspirations for flood management: *'The Mallee community understands flooding and actively manages its flood risks.'* To further define strategic directions for flood management in the Mallee region and help guide priorities for action, four long term (>10 years) objectives were also established:

- To support a flood resilient community
- To reduce existing flood risks
- To avoid future flood risks
- To manage residual flood risks

Since the MFMS was published, the Mallee CMA region experienced a significant flood event in late 2022 as a result of Victoria's wettest October on record. Floodwaters from the confluence of the Edward and Murray River systems had the greatest impact on the elevated river levels that were experienced in our region into early 2023. Levels recorded at Mildura during December were the highest recorded since the 1956 floods.



Strategy Implementation

The Mallee Floodplain Management Strategy (MFMS) Implementation Committee (IC) has been established to oversee the implementation of the MFMS and Regional Workplan (RWP). Mallee CMA delivers executive support to the IC, including: coordination of two meetings annually (provision of agendas, minutes and associated papers/reports); coordinating and writing of reports to document progress against the implementation of the RWP; monitoring and evaluation; along with communication and support for development of funding submissions to assist in the implementation of the RWP.

The Mallee Floodplain Implementation Committee comprises representatives from; Mallee CMA, Department of Energy, Environment and Climate Action (DEECA), Victoria State Emergency Response (VIC SES), Mildura Rural City Council, Swan Hill Rural City Council, Yarriambiack Shire Council, Buloke Shire Council and Hindmarsh Shire Council.

The CMA engaged Projectura Pty Ltd to facilitate the consultation process to inform the MFMS mid-term review. Two workshops were facilitated with the MFMS Implementation Committee to discuss strategy implementation, changes to priority actions, and to develop an updated regional works and implementation plan. These workshops occurred on Monday 3 April and Wednesday 24 May 2023.



Achievements So Far

Robinvale Levee

Reconstruction of the Robinvale township levee to upgrade its flood protection to the one percent Annual Exceedance Probability flood level was completed in November 2021 by the Swan Hill Rural City Council.

Construction of the levee has resulted in an increased resilience to the impacts of floods for the Robinvale community and a reduced risk of financial losses due to property damage from floods.

The upgraded levee has opened opportunities for further development of the township by enabling future subdivisions and new developments (including construction of new tourism orientated facilities). Newly constructed road crossings across the levee have significantly improved the ability to safely access the riverbank area, including for emergency purposes.

Further development of the clay material borrow pit into a constructed wetland will have significant environmental benefits including provision of new habitat for the local wildlife species and reduction of pollutants in the drainage water prior to it entering the Murray River.

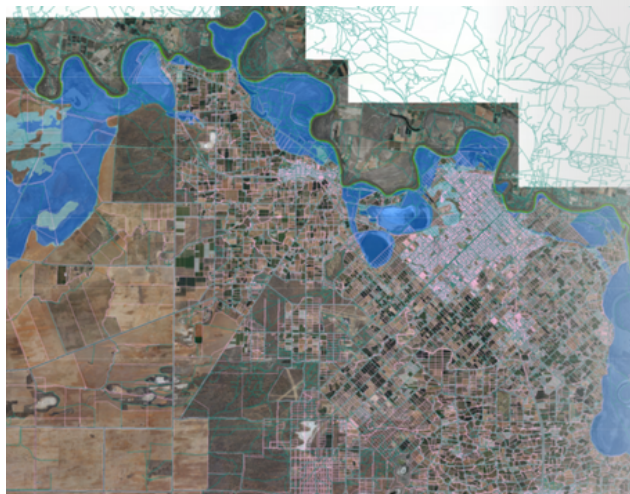
The project, which began in 2017, cost a total of \$1.78M, including a \$980,000 contribution from the Victorian Government.



Mid Murray Flood Study

The objective of the Mid-Murray Flood Mapping and Intelligence Project was to produce contemporary flood mapping and intelligence information for the Murray River from Piangil (Tooleybuc) to the Victorian – South Australian border.

The study has produced flood mapping for a range of riverine flooding scenarios including – 20%, 10%, 5%, 2% & 1%, 0.5%, 0.2%, 1993 & 2016 and the minor, moderate and major flood class levels for each location along the Murray River through the study area. Data from the Mid Murray flood study was invaluable during the 2022 flood event, informing timely and accurate protection works for critical infrastructure and prevention of loss of personal and public assets.



Challenges

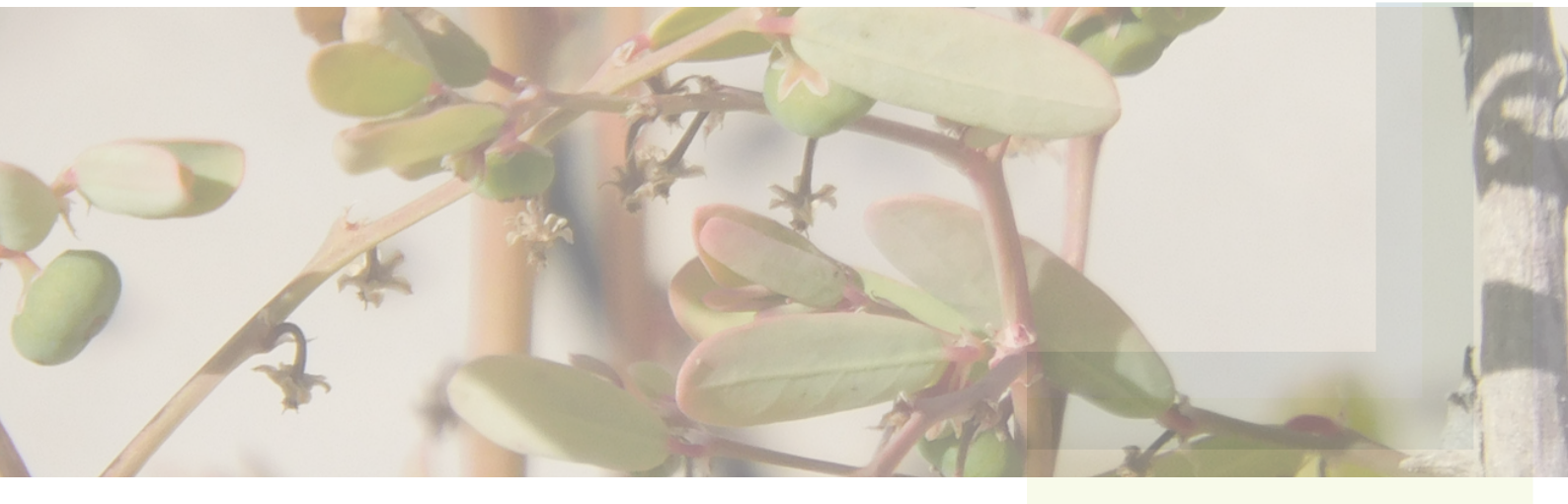
During the consultation process, Implementation Committee members considered a range of challenges they were either facing, or could see emerging.

Agency	Implementation challenges	Emerging challenges to consider
Mallee CMA	<ul style="list-style-type: none"> Planning Scheme Amendments not updated to reflect best available data, therefore development occurring in flood prone areas are being assessed against outdated data. Seeking funding to complete actions and meeting the in-kind contributions required. Critical flood studies not completed due to lack of available resources or eligibility restrictions to access funding for Southern Mallee communities. 	
DEECA		<ul style="list-style-type: none"> Program planning to fund CMAs to look at levees. Understanding where levees sit in a landscape and capturing an understanding of conditions and spatial data to be used as an operational tool. Updating Municipal Flood Emergency Plans (MFEPs).
VICSES	<ul style="list-style-type: none"> Accountability and continual maintenance of levees. Dynamic nature of data and continual change. 	<ul style="list-style-type: none"> Collaborating cross-border (VIC/NSW) to share information during flood events. Mid-Murray Flood Study released but not verified for NSW. NSW residents are looking for data where none is available.
Mildura Rural City Council		<ul style="list-style-type: none"> Collaborating with authorities around decommissioning of channels. Response time to properly prepare and construct levee banks (e.g. with standard drawings) following recent flooding. Landowners dislike levee banks crossing land boundaries and the high costs of permanently keeping levee banks on private property. Accessing contractors for flood works around holidays. Preparedness and coordination between all floodplain management parties.
Buloke Shire Council	<ul style="list-style-type: none"> Decommissioning (or lack thereof) of channel system, e.g., drainage of piping where needed and removing where they shouldn't be. Consultation with the community. 	
Yarriambiack Shire Council	<ul style="list-style-type: none"> Promotion to the community is lacking. Time and budget to do planning scheme amendments. 	<ul style="list-style-type: none"> Rain events are more challenging than flood events.

Changes to Priority Actions

As a result of the Implementation Committee discussions, a number of new regional priorities were identified for inclusion in the workplan:

Agency	New priority	Region
MCMA	Support Bureau of Meterology in gauge renewal project.	Region-wide
VICSES	Update community messaging tailored for relevant towns/communities.	Region-wide
VICSES	Source and incorporate 2022 flood data into MFEPs.	Region-wide
MCMA, VICSES	Develop or improve remote flood level gauging.	Region-wide
MCMA	Undertake LiDAR survey to update landscape scale flood study including stormwater for southern Mallee CMA region (Buloke and Yarriambiack Shires).	Southern Mallee CMA region
MCMA	Improve management and clarify responsibilities around flood levees.	Region-wide
MCMA	Provide technical and project management support to councils to update planning schemes as per planning scheme amendments.	Region-wide
MCMA	Undertake a LiDAR survey to identify and map all flood mitigation infrastructure (e.g. levees, channels, roads), which alters the flow of flood water within the region, with detailed assessment of infrastructure as required/where relevant.	Region-wide
MCMA	Updates to Mid Murray flood study - detailed survey work with data from 2022 flood to help inform.	Murray River floodplain
MCMA	Updates to Mid Murray flood study to include stormwater modelling.	Murray River floodplain



Appendix I: Regional work plan

Updated projects and priorities as part of the MFMS.



Completed



Not yet started



In progress



New priority











Description	Location	Lead	Comments	Progress	Status update notes	Priority
Actions from current MFMS Regional Works Plan 2018-22						
Develop a community flood portal with an interactive reporting functionality which allows a user to search for a particular address, obtain a property report and visually identify flood information related to that address.	Region-wide	MCMA	To commence in next three year cycle subject to funding.	✗	DEECA is currently undertaking a similar project through Digital Twin Victoria (DTV). Will be reviewed once this has been completed to establish if it meets CMA requirements.	Low - medium
Support the Bureau of Meteorology and regional monitoring partnerships in the renewal of old gauges including both Australian Height Datum (AHD) elevation and height from bottom of the creek.	Region-wide	DEECA	Complete and now business as usual. The Bureau is not responsible for maintenance of Victoria's water monitoring gauge network. The gauge network is owned and maintained by a number of partners through the Regional Water Monitoring Partnerships (RWMP). Individual gauge owners are responsible for repair or replacement at end of life. DEECA will coordinate an investigation into change of gauge datum where a community identifies a compelling reason to do so as part of an improvement to an existing service. The RWMP is aware of gaps in knowledge of gauge zero and is working to address this.	✓		Medium
Develop processes to share data with cross border (regional, further upstream and state) agencies.	Region-wide	DEECA	Complete and now business as usual. Current project management and associated processes ensure Victorian floodplain managers actively engage with cross border partners. Three flood studies on the Murray River - Swan Hill and District, Echuca and District and Murray River downstream of Nyah are being delivered by multi agency steering committees with representation from both Victorian and NSW Governments. All future projects will follow this model.	✓		Medium











Work to incorporate Aboriginal cultural heritage values in emergency management planning and response activities via consultation with Aboriginal Victoria and other relevant stakeholders.	Region-wide	All	Ongoing as required.	N/A	Consultation with First People State Relations and other relevant stakeholders is standard practice within councils and MCMA.	Low
Consult with Traditional Owners when floodplain management activities are carried out.	As required	All	Ongoing as required.	N/A	Consultation with Traditional Owners is standard practice within councils and CMA.	Low
Undertake a LiDAR survey to identify and map all flood mitigation infrastructure (e.g. levees, channels, roads) which alters the flow of flood water within the region, with detailed assessment of infrastructure as required/where relevant.	Region-wide	MCMA	Currently in progress through flood studies - mid Murray Flood Study expected completion July 2023.	➤➤➤	Need to secure funding for region wide flood study in our southern region to complete fully.	Medium - high
Investigate the positive and negative flood impacts presented by road and rail infrastructure and decommissioned channels.	Region-wide	MCMA	Currently in progress through flood studies.	➤➤➤	Need to secure funding for region wide flood study in our southern region to complete fully.	Medium
Undertake three yearly LiDAR updates across the broader landscape at appropriate scales for future flood and stormwater planning.	Region-wide	MCMA	Additional LiDAR surveys completed in January 2020, within MRCC area only.	✓	Needs additional funding.	Low - medium
Enhance the real-time transmission of rainfall and stream flow data from key flood monitoring sites by ensuring that data is remotely accessible by at least two telemetry pathways.	Region-wide	DEECA	No action currently prioritised for the Mallee region. A program of dual telemetry upgrades is being funded and implemented across the state where gauges have been identified as being critical or important to support flood forecasting and warning services. No sites within the Mallee region are currently earmarked for upgrade, but can be considered where the relevant community has identified an upgrade is warranted, and they are prepared to pay for ongoing maintenance through their local council.	N/A		Low
Evaluate the potential to provide localised neighbourhood-scale flash flood warning services where there is a history of flash flooding.	Region-wide	DEECA, VICSES	Pilot program in progress. DEECA is working with Bureau of Meteorology, EMV and Melbourne Water to build on an existing trial within the metropolitan area and extend based on technological opportunities and prioritised communities.	➤➤➤		Medium










Complete updated flood mapping and distribute to councils.	As required	MCMA	Amendment C106 (mild) gazetted.	✓	Completed but will need review following completion of flood study.	High
Develop process to streamline the ability for the CMA to provide councils with latest updated flood information as it is developed.	Region-wide	MCMA	Working with councils more closely to ensure process occurs more quickly.	✓	Ongoing.	Low - medium
Identify funding opportunities to assist in costs associated with updating planning schemes.	Region-wide	MCMA	Funding available through DEECA to assist councils to update planning schemes.	✓		Medium
Incorporate updated flood mapping, flood intelligence and local knowledge into MFEP for all flood affected communities, incorporating new flood studies, townships, levees, survey required etc.	As required	VICSES	MFEP will be updated as new data/mapping available from flood studies.	✓	Ongoing.	High
Develop catchment plans to summarise main points out of Municipal Flood Emergency Plans.	Region-wide	VICSES	Drafts have been developed.	✓		Medium
Develop pre-plans for public warnings – informing communities of impending flood.	Region-wide	VICSES	Drafts are being developed for Mildura, Robinvale, Birchip and Culgoa. Awaiting flood study outcomes to finalise.	➤➤➤		Medium
Undertake operational readiness training/exercises for all Local Flood Guides that incorporate MFEPs into operation responses (in Incident Control Centres), using a risk based approach to prioritise within current VICSES resources.	Region-wide	VICSES	On hold due to COVID-19 (MRCC, SHRCC), BSC, regional exercising completed.	➤➤➤		Medium
Pre-develop community messaging tailored for relevant towns/communities with known impacts for various AEPs, using a risk based approach to prioritise within current VICSES resources.	As required	VICSES	Priority towns finalised. Indicative messaging completed. Awaiting completion of flood studies to finalise.	➤➤➤		Medium
Develop community engagement activities and/or awareness products, relating to high flood risk townships and communities. This may include installing community signs, gauge boards or community led response plans.	As required	VICSES	Community awareness products completed, trialled in Rochester. Locations finalised. Signs: Culgoa, Birchip, Robinvale, Mildura x2 or 3, Colignan, Nangiloc.	✓		Medium

Develop catchment plans to summarise main points out of Municipal Flood Emergency Plans.	Region-wide	VICSES	Drafts have been developed.	✓		Medium
Undertake a detailed River Murray flood study (including stormwater modelling, where appropriate) to investigate various riverine and stormwater flooding scenarios for different flood magnitudes).	River Murray floodplain	MCMA	Mid-Murray mapping and intelligence flood study currently taking place, expected completion 2023.	➤➤➤	Study did not incorporate stormwater modelling.	High
Formalise management responsibilities for the Murray River levees (based on the flood study).	River Murray floodplain	DEECA	In progress. DEECA is not the lead agency for determining ongoing maintenance arrangements for rural levees. DEECA have developed a framework and guidance notes for managing flood mitigation infrastructure which have been finalised in consultation with the CMAs and will be placed on the DEECA website (with links from CMA sites) shortly.	✓	Funding has been secured from DEECA to undertake whole of catchment levee study. This has been identified as a new priority.	High
Review/update 2011 Tyrrell/Lalbert flood mapping. This review should include an assessment of the benefits and risks of: • The channel decommissioning project. Some landholders consider channel retention as an important part of future flood mitigation whereas other landholders see them as possible contributors to future flood scenarios. • The existing informal levee bank network.	Tyrrell and Lalbert floodplains	MCMA	Flood study completed in March 2021.	✓	This action has been completed. Funding is currently being sourced to undertake a flood study for the entire catchment in conjunction with the Buloke and Yarriambiack Shires.	Medium - high
Formalise or decommission channels and levees (based on the review).	Tyrrell and Lalbert floodplains	TBD	Dependent on results of flood study.	✗	Not currently funded.	Medium
Review Culgoa flood study.	Culgoa	MCMA	Part of Tyrrell/Lalbert Creek Flood study which commenced in June 2019.	✓		Medium
Update the Robinvale Flood Study to include the reconstructed Robinvale Levee.	Robinvale	MCMA	Will be updated once levee is constructed.	✗	Levee construction finalised, flood study and planning scheme will need to be updated following finalisation of Mid Murray flood study.	Medium
Update the 2007 Beulah flood study (Warracknabeal and Beulah Flood Study, Water Technology 2007).	Beulah	MCMA	Completed	✓	This action has been completed. Funding is currently being sourced to undertake a flood study for the entire southern catchment in conjunction with the Buloke and Yarriambiack Shires and North Central CMA. This will be included as a new action.	Medium

New priorities

Support Bureau of Meterology in gauge renewal project.	Region-wide	MCMA	Federally funded project in conjunction with SES and Bureau of Meteorology.			Medium
Update community messaging tailored for relevant towns/communities.	Region-wide	VICSES	SES/Bureau of Meteorology updating messaging following 2022 flood event.			
Source and incorporate 2022 flood data into MFEPs.	Region-wide	VICSES			SES in conjunction with relevant councils and CMA's forming sub committee to commence review.	Medium
Undertake LiDAR survey to update landscape scale flood study, including stormwater, for southern Mallee CMA region (Buloke and Yarriambiack Shires).	Southern Mallee CMA region	MCMA			Not currently funded.	High
Develop or improve remote flood level gauging.	Region-wide	MCMA, VICSES				Medium - high
Improve management and clarify responsibilities around flood levees.	Region-wide	MCMA			DEECA funding has been secured and project has commenced.	High
Provide technical and project management support to Councils to update planning schemes as per planning scheme amendments.	Region-wide	MCMA			DEECA funding has been provided to councils.	High
Undertake a LiDAR survey to identify and map all flood mitigation infrastructure (e.g. levees, channels, roads), which alters the flow of flood water within the region, with detailed assessment of infrastructure as required/where relevant.	Region-wide	MCMA			Not currently funded.	High
Updates to Mid Murray flood study - detailed survey work with data from 2022 flood to help inform.	Murray River floodplain	MCMA			Not currently funded.	High
Updates to Mid Murray flood study to include stormwater modelling.	Murray River floodplain	MCMA			Not currently funded.	High

Document lessons learnt from recent events for future emergency preparedness.	Mildura municipality	Mildura Rural City Council				
Document how to undertake internal modelling for flood level predictions.	Mildura municipality	Mildura Rural City Council				
Improve coordination of data sharing between agencies.	Mildura municipality	Mildura Rural City Council				
Expand the capacity of wetlands.	Mildura municipality	Mildura Rural City Council				
Inspect levee banks to determine future retention and management.	Mildura municipality	Mildura Rural City Council				
Have a levee bank construction plan for Mildura.	Mildura municipality	Mildura Rural City Council				
Improve management of stormwater in areas of new development.	Swan Hill municipality	Swan Hill Rural City Council				
To be kept abreast of outcomes regarding CMA investigation into unmanaged levees.	Swan Hill municipality	Swan Hill Rural City Council				
Source updated LiDAR data.	Buloke municipality	Buloke Shire Council				
Undertake flood studies to understand and manage impact of decommissioned channel systems.	Morton Plains	Buloke Shire Council				
Develop Shire wide flood plans to plan for flood and stormwater infrastructure requirements.	Buloke municipality	Buloke Shire Council				
Include storm water harvesting as part of the development of drainage plans and strategy.	Birchip/Culgoa/Sea Lake	Buloke Shire Council				

Undertake study to understand natural flow path through Marlbed drainage line and Sea Lake drainage line (Dunmunkle system) and develop flood mitigation strategies.	Morton Plains, Marlbed Reserve, Green Lake	Buloke Shire Council				
Investigate and re-establish a natural flow path between Morton Plains, around the township of Birchip, north to Marlbed Reserve and channel reserve, otherwise recognised as the Dunmunkle line north of the Watchupga East Road.	Morton Plains, Marlbed Reserve, Green Lake	Buloke Shire Council				
Develop concept level infrastructure priorities for each study.	Buloke municipality	Buloke Shire Council				
Source updated LiDAR data.	Yarriambiack municipality	Yarriambiack Shire Council				
Improve ability to gauge flood levels.	Yarriambiack municipality	Yarriambiack Shire Council				
Improve stormwater management.	Yarriambiack municipality	Yarriambiack Shire Council				
MFMS long-term priorities						
Undertake a detailed Murray River flood study (including stormwater modelling, where appropriate to investigate various riverine and stormwater flooding scenarios for different flood magnitudes.	Region-wide	MCMA	Long-term priority in MFMS.			High
Develop a community flood portal with an interactive reporting functionality which allows a user to search for a particular address, obtain a property report and visually identify flood information related to that address.	Region-wide	MCMA	Long-term priority in MFMS.			Medium
Support the Bureau of Meteorology and regional monitoring partnerships in the renewal of old gauges, including both AHD elevation and height from bottom of the waterway.	Region-wide	DEECA	Long-term priority in MFMS.			Medium

Develop processes to share data with cross border (regional, further upstream and state) agencies.	Region-wide	DEECA	Long-term priority in MFMS.	✓		Medium
Work to incorporate Aboriginal Cultural Heritage values in emergency management planning and response activities via consultation with Aboriginal Victoria and other relevant stakeholders.	Region-wide	All	Long-term priority in MFMS.	N/A	Standard practice for Local Government Authorities and CMA.	Low
Consult with Traditional Owners when floodplain management activities are carried out.	Region-wide	All	Long-term priority in MFMS.	N/A	Standard practice for Local Government Authorities and CMA.	Low
Undertake a LiDAR survey to identify and map all flood mitigation infrastructure (e.g. levees, channels, roads), which alters the flow of flood water within the region, with detailed assessment of infrastructure as required/where relevant.	Region-wide	MCMA	Long-term priority in MFMS.	✗		Medium
Enhance the real-time transmission of rainfall and stream flow data from key flood monitoring sites by ensuring that data is remotely accessible by at least two telemetry pathways.	Region-wide	DEECA	Long-term priority in MFMS.	✗		Low
Evaluate the potential to provide localised neighbourhood-scale flash flood warning services where there is a history of flash flooding.	Region-wide	DEECA	Long-term priority in MFMS.	➤➤➤		Medium
Complete updated flood mapping and distribute to local governments.	As required	MCMA	Long-term priority in MFMS.	✓	Amendment C106 (Mild) complete.	High
Investigate opportunity to develop region-wide flood mapping.	Region-wide	MCMA	Long-term priority in MFMS.	✗		Medium
Develop process to streamline the ability for the CMA to provide local government bodies with the latest updated flood information as it is developed.	Region-wide	MCMA	Long-term priority in MFMS.	✓		Medium

Identify opportunities to assist in costs associated with updating planning schemes.	Region-wide	MCMA	Long-term priority in MFMS.	✓		High
Incorporate updated flood mapping, flood intelligence and local knowledge into MFEP for all flood affected communities, incorporating new flood studies, townships, levees, studies required, etc.	Region-wide	MCMA	Long-term priority in MFMS.	➤➤➤		Medium
Develop catchment plans to summarise main points out of MFEPs.	Region-wide	VICSES	Long-term priority in MFMS.	✓		Medium
Develop pre-plans for public warnings – informing communities of impending flood.	Region-wide	VICSES	Long-term priority in MFMS.	➤➤➤		Medium
Undertake operational readiness training/exercises for all Local Flood Guides that incorporate MFEPs into operation responses (in Incident Control Centres), using a risk based approach to prioritise within current VICSES resources.	Region-wide	VICSES	Long-term priority in MFMS.	➤➤➤		Medium
Pre-develop community messaging tailored for relevant towns/communities with known impacts for various AEPs, using a risk based approach to prioritise within current VICSES resources.	As required	VICSES	Long-term priority in MFMS.	➤➤➤		Medium
Develop community engagement activities and/or awareness products relating to high flood risk townships and communities. This may include installing community signs, gauge boards or community led response plans.	As required	VICSES	Long-term priority in MFMS.	✓		Medium