The Living Moorabool 2016 – 2023

Evaluation Report

November 2024 up-date

The conclusions and recommendations in this evaluation report are currently being worked through by the CCMA in consultation with Barwon Water and Wadawurrung Traditional Owner Aboriginal Corporation. Although additional resourcing is required to implement all recommendations in full, significant progress is being made and planned. Since this report was delivered, we have secured 4 years of Environmental Contribution funding for the co-ordinator role to support the delivery of some of the key recommendations identified in this report, including appropriate project governance, communications, and engagement across all Living Moorabool Flagship activities. In addition, we are working closely with project partners to develop a more integrated and catchment wide program incorporating the Living Moorabool Flagship project and the many other projects being undertaken in the catchment. This also includes incorporating the impacts of Moorabool River works and threats on the downstream Geelong community and environmental assets of the Lower Barwon River, Ramsar wetlands and estuary. Developing an appropriate governance structure for the program is central to this objective. We also continue to develop stronger links with Wadawurrung Traditional Owners to ensure cultural values of the Moorabool are protected and enhanced.

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Project reporting period: The scope for the evaluation of the Living Moorabool Flagship project includes the temporal scope of EC4 and most of EC5 (July 2016 – August 2023)
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Final

Acknowledgements

The Corangamite Catchment Management Authority works on the lands, waters and seas of the Wadawurrung People of the Kulin Nation and the Kirrae Whurrong, Djagurd Woorroong, Gulidjan and Gadubanud People of the Maar Nation and acknowledges them as the Traditional Owners. We pay our respects to the Elders past and present.

The Living Moorabool Flagship project is implemented on the lands and waters of the Wadawurrung People of the Kulin Nation.

In addition, we would like to thank Corangamite CMA staff and representatives from agencies, local government, Landcare and other community representatives who made time available for interviews and provision of information in support of this review, participating in a workshop and reviewing the draft report. We also acknowledge the work of Kismet Forward in undertaking interviews and facilitation of the Sense-making workshop.

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Version Control

Version	Date	Author/s	Reviewed by	Revisions made
1	4/1/2024	H. Watts	R Limb	Merger of DECCA summary with CCMA evaluation template
2	3/4/2024	H Watts	CMA and other delivery partners	Review of draft report
3	14/5/2024	H. Watts	Robyn Vale	Editorial review
4	13/6/2024	H. Watts	Rachel Limb	Submission to DECCA and upload to knowledge base

Summary

1. Introduction

Project description

The Living Moorabool Flagship has a collective vision of a Living Moorabool as defined by Healthy People, Healthy Environment and Healthy Culture. These three pillars, the long-term outcomes and associated strategies are expressed in Figure 2: Outcome hierarchy for the Living Moorabool" within the main body of the report. These were defined at a stakeholder planning session in late 2018, which included representatives from Barwon Water, Central Highlands Water, Golden Plains Shire, City of Greater Geelong, Wadawurrung Traditional Owners Aboriginal Corporation (WTOAC), People for a Living Moorabool, Landcare networks and individual landholders. The current spatial area for the Flagship is the West Branch of the Moorabool from the outlet of Lal Lal Reservoir to the confluence with the Barwon River (priority reaches 32-5, -4, -3, -2, -1) and Sutherlands Creek (priority reach 32-7).

Currently, the State Government's environmental contribution (EC) is the primary funding source for environmental flows, riparian restoration, and citizen science interventions in the Living Moorabool. The Flagship has been successful in partnering and leveraging other funds to support these interventions and more work will be required to plan and support the remaining pillar strategies. Environmental flows, riparian restoration, and citizen science interventions have been established within the footprint of the Flagship prior to its commencement in 2016/17.

The outcome statements and performance expectations are identified in the Monitoring, Evaluation and Learning Plan for the Flagship (Corangamite CMA, 2023).

Evaluation purpose and scope

The Living Moorabool Flagship was launched in 2016-2017. Corangamite CMA planned for an evaluation to be implemented during 2023-2024 to ensure the Flagship could be adapted, based on evidence from Flagship implementation and progress towards longer term outcomes. In addition, the Department of Energy, Environment and Climate Action (DEECA) as the primary funder for the Flagship had requirements for an evaluation to be undertaken before the end of June 2024 (end of EC5 funding tranche).

The following table summarises how Corangamite CMA and DEECA will use the findings.

The scope for the evaluation of the Flagship includes the whole spatial footprint for the Living Moorabool (refer to Figure 1) over the timeframe of July 2016 until December 2023 (note some of the data from the CMA's spatial system is up to August 2023).

The only pillar (as presented in the outcome hierarchy in Figure 2) to not be considered is the cultural values, as this is still to be developed with WTOAC.

Proposed purpose and use of Flagship Waterway evaluation	DEECA	CMAs
ACCOUNTABILITY: As a funding requirement and input to DEECA's evaluation of EC5	✓	✓
LEARNING and OUTCOMES: Understand progress towards outcomes and impacts of external factors	✓	✓
FORMATIVE: Inform the development/assessment of EC6 funding proposals	✓	✓
LEARNING: Building capacity and knowledge for future evaluation		✓
LEARNING: Understand if MERI activities are allowing CMAs to readily track and assess change	✓	✓

DEECA required the following Key Evaluation Questions (KEQs). Evaluation to be addressed:

KEQ1: How well has the Flagship delivered on the planned activities and outputs?
KEQ2: What (major) factors impacted on the effectiveness of Flagship implementation, either positively or negatively?
KEQ3: Have there been any unintended outcomes (negative or positive) from the Flagship implementation?
KEQ4: How effective has project governance been? (NB: incorporates "What evidence is there of active implementation of MERI and adoption of learning and improvement processes?")
KEQ8: What progress has been made towards the stated project outcomes?

Furthermore, Corangamite CMA has included the following KEQs to inform implementation of the Flagship:

KEQ5: To what extent is good practice being applied?
KEQ6: What has been put in place to address knowledge gaps?
KEQ7: How have we addressed assumptions?
KEQ9: Do the approaches remain appropriate?
KEQ10: Based on our learnings, what do we want to change?

Figure 3: Simple hierarchy and levels that the evaluation questions address" presents where in the hierarchy each of the questions is focused. The findings to each of these questions is presented in a different order to above and is tied to building a picture of how implementation activities (KEQs 4,5,1,2,3,6,7) have contributed to outcomes (KEQ8) and from this understanding what may need to change (KEQ 9, 10).

Methodology

The Flagship monitoring, evaluation and learning (MEL) Plan was updated in 2023 to reflect new requirements from DEECA (Corangamite CMA, 2023), and this evaluation approach is based on the detail in that plan. Figure 4: Summary of Evaluation Process" outlines the stages of the evaluation and Appendix 4 provides a table of evidence sources and evaluation approaches for each of the KEQs.

While more information on the approach can be found in the main body, it is worth noting that the evaluation was primarily led by Corangamite CMA with a small governance group; the services of a consultant was procured to assist with undertaking the semi-structured interviews with CMA personnel and key external stakeholders. This consultancy also facilitated a sense-making workshop that was held with key delivery partners. The sense-making workshop enabled a collective to review the findings and contribute to KEQ 9 and 10. The agenda for the sense-making workshop is in Appendix 8.

Limitations

Best available evidence was collected to address each of the evaluation questions. This sometimes means accessing some information that is not directly related to the Moorabool catchment. To ensure the process was rigorous within the evaluation constraints, a triangulation approach was applied. Triangulation is the process of looking at something from different perspectives and looking for patterns and diversity of views (Patton, 2002). The triangulation approaches included:

- Sources – using different sources of evidence including studies, peer reviewed literature, investor reports, GIS collected information and interviews
- Interviews – using a variety of interviewees from within the CMA and external to the CMA
- Sense-making workshop – diversity of delivery agents from within the CMA and external to the CMA
- Multiple reviewers – the draft evaluation report was made available to delivery agents within the CMA and externally as well as a couple of reviewers who are not close to delivering the Flagship.

Report Structure

This summary has been presented within a full report. The more detailed evaluation report is important to capture the detail for use by Corangamite CMA staff and to provide a more detailed record over time of project implementation and adaption reasoning. The evaluation report is structured to include the summary, main body including context, findings and recommendations as well as any appendices for additional detail. Section 3 of the report provides the evaluation findings for KEQs 1-7; Section 4 of the report provides the evaluation findings for KEQ8 and Section 5 addresses KEQ 9 and 10.

Overall synopsis

The Living Moorabool Flagship is a large, complex Flagship with many strategies that are beyond the traditional funding for a CMA but are all critical to achieving the Vision for the Living Moorabool. It is also one of the key actions identified Rivers of the Barwon (Barre Warre Yulluk) Action Plan (Catchments, Waterways, Cities and Towns Division, 2021) This evaluation has enabled the CMA and key delivery partners to reflect on what has been achieved since 2016/17 until December 2023 and use this to improve the Flagship delivery going forward.

It is evident from the findings that there is progress towards the longer-term outcomes, with intermediate outcomes having been achieved. In addition, the core projects of environmental water, riparian management, citizen science and co-ordination are delivering their planned activities and in a lot of cases exceeding the expected results for the investment. Having said that there is strong evidence to ensure the role of the coordinator is appropriately resourced to improve integration going forward. A key part of integration is to test the appetite with key delivery partners to re-invigorate a governance group and develop an outward facing plan on the long-term management intent for the Living Moorabool to achieve the vision. This is all currently stated in a MEL Plan.

Furthermore, we are now at a phase where we have information and new knowledge for the Moorabool but not in a form that stakeholders and topic experts can easily interrogate or present a report card of catchment condition and progress.

Project Implementation

How effective has project governance been?

This question considers three key elements of governance for the Flagship:

- How it was running as an integrated program including the co-ordination of communication and engagement
- Implementation of MEL and adaptive management practices
- Engaging with key delivery partners, including governance arrangement of the Flagship

To be able to make a judgement on effective governance, criteria were established. These can be found in Appendix 7 and the table below presents the findings. In summary:

- Integration moving from below expectation to satisfactory is primarily associated with having a coordinator to facilitate integration in a diverse and complex Flagship.
- Implementation of MEL is considered satisfactory because a plan exists with defined targets, has been updated to reflect Flagship changes, and MEL processes have been implemented. It could be improved in areas such as creating broader ownership for the MEL, ensuring outcome monitoring is well established and outwardly communicating what has been achieved.
- Engagement of key delivery partners in governance has been defined as between below expectation and satisfactory and is tied to the availability of a coordinator. A small governance group commenced in 2018/19 but could not be fully supported without a coordinator and with other competing demands for resources at the time (e.g. renewal of the Regional Catchment Strategy). Meanwhile, individual projects under the Flagship have engaged well with key delivery partners.

Component	Rating	Findings
Integration	Below expectation to satisfactory	Numerous comments that the Barwon Flagship feels more collaborative than Living Moorabool. Interview responses indicated a lack of understanding of the Flagship and/or what it has achieved so far. A more integrated approach will help promote and deliver the Flagship overall. Staff currently on the project were not involved in its development and therefore some of its early history as a Flagship is not known or understood, or there is not a sense of ownership. The evaluation report provides the opportunity to capture some of the project history within one place for future reference. Individual projects are often not badging their work as part of the Living Moorabool when engaging or communicating about the project. Having a coordinator has helped with the organisation of monthly meetings. The coordinator has ensured collaboration on Flagship communications. Communication and engagement plan established jointly with CMA staff. More regular newsletter to share information about the Flagship from both CMA projects and delivery partners
MEL	Satisfactory	There is an existing MEL Plan but components of it have been worked on by staff in isolation not as a collective; initial staff involved in its development are no longer involved in Flagship implementation. For segments of the plan, this is not necessarily a negative as it made best use of people's time. Targets for the life of the plan have been identified in some cases with project teams and in other cases based on existing investment plans. Monitoring systems for activities and outputs is mature. Outcome monitoring is still not fully resourced and some of the available information is not in a readily accessible form. This will make future effectiveness and impact evaluations difficult, and they will be more reliant on indirect sources of evidence and assumptions. Processes have been established to address current knowledge gaps.

Component	Rating	Findings
		During EC5 the CMA implemented mid-term reviews of progress for all EC5 projects including the Living Moorabool Flagship. Actions from this review were implemented that have further enhanced integration. There is a lack of ownership of the MEL by the broader delivery partners for MEL and this needs to be worked on going forward.
Engaging external partners	Below expectation to satisfactory	During the planning day at Meredith in 2018, project partners worked collectively to develop a common vision for what the Living Moorabool means (Healthy environment, Healthy people and Healthy culture). This was further developed by a small group that formed from the planning day to define what is reflected in the Outcome hierarchy (Figure 2). An overarching governance group that included the CMA and delivery partners had to be put on hold as it could not be supported due to resourcing issues at the Corangamite CMA. The timeline in Appendix 3 highlights some of the resourcing issues. This decision was made as it was known that the funded projects would continue and engage as required with key delivery partners and members of the community. Interview responses indicated there was a limited awareness of what the Flagship is and/or what it has achieved so far. It is thought that re-instigating a multi-partner governance group would help to address awareness with delivery partners. At various times across the life of the MEL Plan different elements have been worked on in collaboration with internals and some externals (for example a re-working of the Healthy pillar intervention logic) yet the Corangamite CMA doesn't feel that there is a general awareness of the plan. Different projects under the Flagship have engaged with delivery partners to problem solve, plan, and implement but it is felt that these are sometimes identified as individual projects and not seen within the context of the Flagship.

To what extent is good practice being applied?

The review of the application of good practices to the Flagship included technical related guidance to inform project activities and the application of Corangamite CMA project governance procedures. This was undertaken to help understand if there may be issues that will impact on the achievement of outcomes as well as determine if we are good stewards of the resources allocated to the Flagship. The sources of evidence for this evaluation drew from existing documents (project documentation, internal audit, interviews as required).

Based on the review of material it can be concluded that Corangamite CMA applied guidance material to their projects and applied CMA procedures as required.

How well has the project delivered on the planned activities and outputs?

A review of past investor reports (Corangamite CMA, 2020; Corangamite CMA, 2020a; Corangamite CMA, 2020b; Corangamite CMA, 2020c; Corangamite CMA, 2023) across the two funding tranches (EC4 and EC5) indicates that the Flagship delivered against its activities in EC4 and is on track to deliver at the end of EC5 (June 2024). Covid impacted the beginning of EC5, delayed some activities across all projects plus resource constraints in the coordination project appears to have had an impact across the Flagship. These implications are discussed elsewhere. Highlights include:

- More effort was placed on improving the internal integration and expanding external communications during EC5.
- All of the planning and consultation to ensure Seasonal Watering Proposals[1] (SWP) were delivered to the Victorian Environmental Water Holder (VEWH) by due dates over the life of the Living Moorabool
- The CMA has continued to design and deliver activities to partner with Landcare, promote funding, and deliver riparian works. A key difference between EC4 (2016- 2020) and EC5 (2020-2024) was that the focus area within the Flagship footprint narrowed during EC5.
- Since the Living Moorabool has commenced the CMA has been able to leverage funding from outside of specific Flagship budget to support investigative work and on-ground works
- Citizen science has continued to support the citizen science volunteers but also over EC5 supported WTOAC in a citizen science program that focused on environmental watering supporting cultural values.
- There are a number of strategies outside of the CMA's remit that will need further work with delivery partners to identify ways in which they can be delivered.

It should be noted that there are broader Living Moorabool expectations beyond the core DEECA EC-funded projects of environmental water, riparian management, citizen science and governance/co-ordination. Work is recommended to determine how best to progress some of these other strategies and is further discussed in the main body of the report.

Overall targets for outputs have been achieved or are due to be achieved (or exceeded). Where there has been an under achievement it might be due to external factors. For example, wet conditions may result in no need to deliver environmental water over a period of time, or a target originally set is not significant as factors in the field are different (e.g. riparian fencing).

Outputs for the Living Moorabool Flagship across EC4 and EC5 funding tranches are presented in the table below. Performance expectations are sourced from the MEL Plan (Corangamite CMA, 2023) and actual outputs sourced from the CMA's Outputs Reporting system. The colour coding in the table is to draw the reader's attention to currently under the performance expectation (orange) or above the performance expectation (green). Please note that the output

[1] Seasonal Watering Proposal is prepared by the region and submitted to the VEWH for review and inclusion in their statewide Seasonal Watering Plan

performance expectations are for June 2024 and the data extracted was until August 2023. The outputs in bold have multiple sub-measurements that are presented in full in Table 6: Outputs delivered against performance expectations (as identified within the 2023 MEL Plan) are within the main body of the report.

Output	Measure	Output Performance Expectation to June 2024	Total Actual Outputs (2016/17 to Aug 2023)	Actual Outputs 2020/21 to August 2023[2]	Actual Outputs 2016/17 to 2019/20
Water storage - Trough	Number	6	6	0	6
Monitoring Structure - Measuring Station	Number	13	22	3	19
Fence - Fence	Km	18.9	5.8	1	4.8
Collective ha for riparian Veg Management	**ha**	**11.2**	**328.7**	**50**	**278.7**
Water- Environmental Water-Holdings	Number	44	36	36	
Water - River Reach (no longer used in Standard outputs)	Number	N/A	41		41
Management agreement - Binding non-perpetual	Number	20	**30**	14	16
Management Agreement - Binding perpetual	Number	-	1	-	1
Assessments	**Number**	**141**	**148**	**101**	**47**
Engagement events	**Participants**	**621**	**1033**	**538**	**495**
Partnerships	**Number**	**119**	**108**	**66**	**42**
Publications	**Number**	**25**	**33**	**19**	**14**
Information management system - Database	Number	3	**5**	2	3

[2] 2020/21 – 2023/24 equates to EC5 funding round and 2016/17 – 2019/20 equates to EC4 funding round

What major factors impacted the effectiveness of project implementation, either positively or negatively?

It is evident that the Flagship project is delivering for the investment received. This is apparent within the core projects (environmental water, riparian and citizen science), exceptions being associated with external factors such as flooding or Covid-19. The coordination role has been a somewhat "stop and start" role, pending the availability of a staff resource. The second half of EC5 has experienced greater stability in this role noting that the integration, knowledge sharing and communications is more evident when a coordinator is in place. The external factors have either delayed, cancelled or changed some activities but significant impact to outputs is not evident from these factors.

The table below highlights factors (positive or negative) that were identified and their relevance to the Flagship.

Factor	Positive impact	Negative impact	Relevance to Flagship
Having a Moorabool Flagship	Long-term commitment		Demonstrates that the CMA and the Government have a long-term commitment to achieving environmental, social, and cultural outcomes for the Moorabool.
Coordinator	When in place the benefits are evident	Can barely manage the expectations for the Flagship when role isn't resourced	Flagships are promoted as integrated projects. The LM is complex with outcomes across environmental, social, and cultural pillars that require co-ordination and facilitation that are not achieved through an individual core project. When the role was vacant for a period, the impact on internal coordination associated with newsletters, events, integration, and external awareness for the program became evident. When there is stability in the role it is evident in terms of the regularity of newsletters and meetings etc. There are avenues to ask questions, resolve issues collaboratively and share knowledge.
Loss of Flagship knowledge		As staff have changed over time there is a loss of awareness and understanding for the integrated Flagship	Evident that awareness of the history associated with Flagship start-up decisions and ownership for some of the earlier work undertaken has been lost due to staff turnover. There are currently no staff working on the Flagship that were involved in its early design phase. While it is healthy to have new ideas come to a significant project it is also important for people to be aware of the context of how the Flagship has evolved and therefore to ensure the "corporate" knowledge is not lost. This is also relevant to how the CMA works with its partners in maintaining Flagship knowledge over time.
Relationships	Strong relationships with Landcare, agencies, community groups		When riparian team have worked with Landcare there has been an improving relationship between Landcare and Citizen Science. The relationship with WTOAC has strengthened over time across all facets of the project. There is a strong working relationship with both Central Highlands Water and Barwon Water. Barwon Water has provided funding towards supporting LM activities.

Factor	Positive impact	Negative impact	Relevance to Flagship
	and WTOAC strengthen delivery opportunities through partnerships		Moorabool Stakeholder Advisory Committee has been a long-standing agency, community and industry group supporting environmental watering planning.
Covid-19	Learnt different skills and how to engage remotely	Primarily had negative impact on engagement and led to delays in project implementation	Covid-19 limited engagement and the CMA managed to find alternative ways to engage with volunteers, but there were some implications for maintaining volunteer interest through remote channels. Delays to implementing some planned activities but significant work undertaken to catch up (e.g. on-ground work assessments and inspections).
Flooding	Natural high flows delivering benefits that a limited environmental water entitlement couldn't	Impacted volunteer activities and some damage to past riparian works	Provided opportunity to drown out barriers and scour some pools, and re-connect river to floodplain; but also damaged some prior riparian works and added some further delays to volunteers being able to monitor.
Attracting funding to manage in-stream barriers		Delays to the management of priority barriers	The inability to attract government investment to manage priority barriers for fish passage has resulted in delays in this space and for the Moorabool it is the missing piece that connects the good work of environmental water and riparian works to achieve healthy waterway outcomes. Instead, the Flagship has used funds leveraged from Barwon Water to jointly support PhD research related to the role of barriers and fish passage (Deakin University). In combination with knowledge from the current FLOWS study and an investigation to prioritise barriers, then there is an opportunity to identify some more current strategies to manage barriers. It is likely to still require funding for infrastructure works at some barriers.

Were there unintended outcomes from project delivery?

Unintended outcomes are the unintentional or unforeseen results from an intervention, and they may have a positive or negative impact on the Flagship.

While the table below captures only some highlights of positive and negative unintended outcomes, the full listing can be found in Table 8: Unintended outcomes identified through implementation of the Flagship"

There was a common theme that came through the interviews that relates to the Living Moorabool Flagship not having a sense of being a “Flagship” or that some of the externals interviewed did not know much about the Flagship and what it had achieved. While the projects within the Flagship are delivering and engaging, it has become more evident that the coordinator role is crucial to facilitating the integration and promotion of the Flagship. This arose as it has been difficult to maintain a resource in the role, and at the beginning of EC5 the CMA had competing timebound priorities that the resource was also funded against.

Factor	Relevance to Flagship
Positive	
Leverage funding from Barwon Water	The additional funding from Barwon Water has enabled investment beyond traditional support for riparian management or citizen science. The funding has been used to address some knowledge gaps and this information will be used to inform on-going planning
Strong relationships with WTOAC on Flagship projects	Has increased and will continue to increase the cultural competency within the CMA
Knowledge now gained on Moorabool is informing broader planning and Strategy	The knowledge pool and experience on the Moorabool has been used to inform external processes with the aim of also improving waterway health for the Moorabool. For example, CHW and Barwon IWM forums, IWM planning for Batesford Quarry and the Central and Gippsland SWS
Negative	
The need to strategically reduce resources in the coordination role	This has resulted in reduced communications about the Flagship, what it was doing and what it had delivered.
The original footprint for the Living Moorabool Flagship	Initially focused on the Moorabool West Branch from Lal Lal to the confluence of the Barwon as it is a priority waterway; had an e-water entitlement that – along with riparian management, addressing priority barriers and engagement of volunteers in water monitoring – would contribute to water health outcomes. The Statewide aim of Flagships was to be more strategically focused on priority systems rather than spread too thin. There are now questions being asked about why the whole catchment was not selected as the Flagship given the emerging focus on the East Branch.
Kitjarra-dja-bul Bullarto langi-ut and the Flagship	There has been some confusion regarding the Flagship and the Masterplan and whether the Masterplan was replacing the Flagship. This has required some discussions to explain the differences and opportunities for both to leverage off one another. A lot of the environmental values identified in the Masterplan will be delivered, maintained, and enhanced through projects within the Flagship but there is also the opportunity for the waterway amenity values (including those related to naturalness) to be delivered via the Masterplan. Ongoing discussion of the two initiatives would continually highlight the leverage opportunities and address any confusion.

What has been put in place to address knowledge gaps?

There has been a reasonable amount of work undertaken to date regarding knowledge gaps with all current gaps either addressed or initial processes put in place. There is now an opportunity to synthesise some of this new knowledge to enable us to inform priorities going forward. The table below provides information on progress against the current knowledge gaps. The interviews have also identified some new knowledge gaps that have been listed in Section 3.8 of the main body of the report but will mention a common theme that reflects the uncertainty of the impacts of climate change for the system and how it is able to respond. Related to this is:

- The impact of farm dams and continuing this work
- Impact on in-flow and critical refuges.
- Plantings and planting success
- Managing urban water supplies under growing population pressures

Identified Knowledge gaps	Finding statements	Relevance to Flagship
1. Whether fish outcomes will be delivered without the need for removal of additional fish barriers	Work is progressing and results from PhD sponsored investigation will provide further insights when complete. The PhD investigation looking at barrier drowning and connectivity. These results are due to be available at the end of 2024. In addition, a barrier prioritisation study was undertaken in 2016 (Marsden, et al., 2016). Since 2017/18 there have been 13 barrier drown outs at recommended level at correct time of year based on the summer autumn freshes delivered. Please note that natural flows / over bank flows due to wet weather are not included in this. Conditions have been significantly wet in recent years providing high and flood flows that have likely increased the opportunity for drowning out of barriers. On ecological response monitoring for fish: ARI conducted the first survey in 2019 and one other survey since. Have only done 3-4 sites.	There is a need to synthesise and then analyse what information we will have on barriers, fish movement and management strategies going forward. This will not only inform the upcoming FLOWS study but provide greater focus on infrastructure versus how best to use the entitlement to create connectivity up and down the river.

Identified Knowledge gaps	Finding statements	Relevance to Flagship
2. Whether water quality observations and waterbug surveys demonstrate benefits of environmental water delivery	Work is on track and citizen science data is being used to inform e-water but continued review of data for wet and dry years is required. Initial Alluvium report (2020) showed that dissolved oxygen and salinity were the parameters most sensitive to environmental water events, however the occurrence of the millennium drought confounded long-term responses. It also found that if macroinvertebrate sampling could be modified to provide a condition measure, co-ordinated and event-based sampling could start to provide a better picture of how a river responds in the short and longer term and could be useful in informing management.	The opportunity to further develop the citizen science project to inform management decisions and outcomes.
3. Whether water recovery targets will be met and recovered water volumes are capable of being delivered to meet FLOW recommendations	Central and Gippsland SWS was released in 2022 and identifies water recovery targets for the Moorabool West Branch (current flagship footprint) and East branch.	Continue to work in partnership with WTOAC, DEECA, CHW and Barwon Water to implement relevant Central and Gippsland SWS actions for the Moorabool (note progress in 2023 SWS Implementation report). Updated FLOWS study will be due towards end of EC6 and monitoring and e-water knowledge gaps should be well established to inform this
4. The reach and impact of the awareness campaign for waterway amenity	Some initial work has been undertaken that can inform this knowledge gap: • Waterway amenity mapping baseline developed in 2022 through a project funded through the Rivers of the Barwon Action Plan • Pathogen Risk assessment report that identified some risks at river reserves to amenity.	More work needs to be undertaken to inform a campaign and investigate some monitoring opportunities (e.g. mobile phone data can be used to identify most frequented river reserves as well as length of use and time of year).

How have we addressed assumptions?

Some work has been implemented to investigate assumptions and this will be advanced further through a synthesis of current and new knowledge for the Moorabool. Only medium and low confidence assumptions were considered in the evaluation as these will have the greatest impact on outcomes if they are wrong. The numbering associated with each assumption relates to the assumptions on the relevant theories of change and the causal relationships that the assumptions may influence. The theories of change are in Appendix 2.

Assumption	Finding statements	Relevance to Flagship
A1: Investment in amenity improvements will result in sustainable recreation use	This assumption is focused on the use of river reserves in a sustainable way and is related to the healthy people theme.	Need to better understand the values that recreational users place on the river and what behavioural drivers and "nudges" may exist for using the river in a sustainable way. This will enable more cost-effective investment in relevant activities to address sustainable recreational use. Further collaborative work to be undertaken with delivery partners.
A3: Participation and awareness will change attitudes and practice	This assumption is based on the theory that people who volunteer will increase their knowledge and awareness and change practice. There are research lines of evidence from citizen scientists in the UK that support this. The evaluation of Corangamite citizen scientists by First Person Consulting in 2019 presented a key finding was that they wanted to see the data collected used in decision making. This implies an existing strong environmental value within the volunteers that was supported by some of the motivations in the survey. A question around stewardship indicated that volunteers increased their knowledge and skills and have taken actions to promote waterway health. This assumption should also be extended to landholders that participate in the Flagship under the Healthy environment pillar	This is a watching brief for the citizen science program, but consideration also needs to be given to how new citizen scientists are attracted to volunteer programs. The Riparian Works Review (RWR) provides an opportunity to gain some longitudinal information about landholders' participation in the Flagship and practice change (or barriers).
A5: The flow regime and improved riparian vegetation will improve fish and platypus abundance	Work to continue with this statement as more information is collected and analysed regarding flow outcomes and riparian outcomes but sufficient research exists external to the Moorabool that confirms the relationship (Melbourne Water, 2024). The available e-water is below all FLOW 2015 recommendations and therefore needs to be targeted to the following priorities that aim to achieve environmental objectives related to fish, vegetation, macro-invertebrates and platypus (specific objectives vary with the priority): • Provision of low flows (base flows) • Provision of summer/autumn freshes in priority order • Provision of winter/spring freshes in priority order The e-DNA results released for the Great Australian Platypus Search indicate platypus in the Moorabool are widespread. (Griffiths, et al., 2022)	A synthesis of current knowledge, including the information on flows, fish, platypus and riparian vegetation condition and extent would enable the status of this assumption to be better understood.

Assumption	Finding statements	Relevance to Flagship
A7: Grant recipients maintain sites	Prior evaluation studies outside of the region and the first Riparian Works Review (RWR) Report prepared for the region highlighted that a lot of landholders can struggle to maintain sites. Also noted is that research identifies various reasons that influence landholder behaviour change. (Behaviour Works Australia, 2021; Fielding, et al., 2005 are just two examples). Eligible landholders can receive support for maintenance at their sites following a RWR assessment.	As more past sites are visited in the Moorabool for RWR it would be good to gain a greater a handle on this assumption, and if it is an issue, how best to address it. It would therefore be worthwhile to do an assessment of all RWRs undertaken within the Flagship.
A10: Environmental watering actions achieve FLOWS Study recommendations	The available e-water is below all FLOWS 2015 recommendations and therefore needs to be targeted to the following priorities that aim to achieve environmental objectives related to fish, vegetation, macro-invertebrates and platypus (specific objectives vary with the priority): • Provision of low flows (base flows) • Provision of summer/autumn freshes in priority order • Provision of winter/spring freshes in priority order The Moorabool Environmental Water Management Plan prioritised ecological response monitoring recommendations. Accessing and then maintaining long-term longitudinal monitoring for Flagships has been difficult even though there is some monitoring in place. For example, the rapid assessment for vegetation undertaken by ARI in the Moorabool cannot be supported as the CMA has been advised there are currently no plans for ongoing VEFMAP vegetation monitoring.	There has now been some monitoring undertaken by ARI on several occasions for vegetation and fish. This should be assessed with flow information to determine if relationships can be determined or if more monitoring is required. It is assumed that this exercise would help inform the renewal of the FLOWS study
A8: Assumptions in 2015 FLOWS study are based on best available information and regularly updated with new information	This is interpreted to mean the planning and delivery decisions are updated based on new information, and any new information associated with investigations and outcome monitoring will be used to inform a new FLOWS study when it is due. Currently new information is used in the following way: New information is reviewed with each year in SWP development and incorporated into future planning. If that information goes against the FLOWS study then the CMA would justify that with VEWH. There hasn't been anything significant that has changed the CMA's outlook or planning that the CMA has been able to implement. A good example is changing the scenario planning for a dry year in Summer/Autumn from 5ML/d to 10ML/d as per the Lower Moorabool Habitat Refuge study and Lower Moorabool Groundwater FLOWS study to account for the losses at Batesford quarry. This could only be delivered if the available supply in the environmental entitlement is sufficient and would be unlikely if several dry years in a row.	The CMA will collate key studies to include in the new FLOWS study within the next two years, with a new FLOWS study due in approximately 2026. It is hoped that this situation will improve with water recovery through the Sustainable Water Strategy process over time.

Assumption	Finding statements	Relevance to Flagship
A9: Landholders within the targeted areas are willing to engage in riparian projects	There were different approaches to funding riparian works between EC4 and EC5. EC4 had EOIs open across the whole Moorabool, but the CMA was requested by DEECA to firstly narrow our focus in EC5. Feedback for EC5 was that some projects in the target area did not proceed; however there were potential projects within the footprint but outside of the target area that could have been addressed with contract variations if time allowed. Look at how we build off past works, engage with landholders and provide some flexibility to work across the Flagship footprint while still being strategic – that is what is our ability to scale up or down, depending on funding.	This assumption may need further investigation (and will be ongoing over the life of the project as target areas may change). Behavioural research outside the Flagship area highlights the barriers to engagement and practice change. The CMA could review this research and, in collaboration with Landcare, compare it with local knowledge of the Moorabool to determine approaches that need to change.

Flagship outcomes

This section summarises detailed findings to address evaluation questions relating to progress towards stated project outcomes.

What measurable progress has been made towards the stated project outcomes?

All outcomes for the Living Moorabool Flagship have been evaluated except for the Cultural values pillar as there is a body of work to be undertaken with WTOAC first.

As presented below, and with more detail in the main body of the report, the management and intermediate outcomes are on track across the Healthy people and healthy environment pillars. For some of the strategies, such as waterway amenity, urban water communities and connectivity, the foundational work has been undertaken and there is additional work to be developed with delivery partners.

Theme: Healthy people – waterway enhanced through people's connection to the river

The healthy people pillar is underpinned by a theory that if people value the river, then they will take action, directly or indirectly to look after it. Based on the planning day in 2018 the areas of focus included:

- Increasing community awareness – directly via volunteers and indirectly via urban drinking water users' awareness of their source water
- Sustainable and responsible recreational use of the river

Management outcome findings for volunteers

The management outcomes and intermediate outcomes as highlighted in the table below have been achieved. The contribution of these towards the longer-term outcome is further explained as follows:

- Citizen science is one of the top three contact points for the Corangamite CMA to engage with the community, and research has demonstrated that participation in citizen science can result in increased awareness, practice change and sometimes lobbying or influence of others.
- Prior work commissioned by the CMA is consistent with this finding, noting that monitoring their local waterway is a reason given for continuing participation in such a program.
- Volunteer feedback indicates a desire to see their information used to inform decision making. The CMA has responded through an investigation of citizen science collected data and its relation to environmental flows, with the aim of using the long-term water quality monitoring to support environmental water management long-term

Desired Flagship outcome	Intermediate outcome performance expectation for 2016-2024	Management outcome performance expectation for 2016-2024	Key findings	Evidence quality rating	Assessment of progress (contribution) towards longer term outcomes
Waterway enhanced through people's connection to the river	By June 2020 CS volunteers feel value in the work they undertake	By June 2020 CCMA will have worked with partners to sustain water quality monitoring with citizen scientists at 8 long-term monitoring sites	Eight sites for citizen science water quality monitoring are being maintained. CCMA partners with Barwon Water, CHW, Landcare and WTOAC to deliver citizen science for the Flagship. A case study on long-term Waterwatch monitoring in the Moorabool can be found here.	Strong	While there is evidence of intermediate outcomes being achieved, an earlier regional evaluation of citizen science volunteers indicated that there may be factors that could influence retention within the Moorabool over time. There are volunteers that have been engaged in Waterwatch on the Moorabool for a long time. The extent of data that has been collected over time has been analysed to see how useful it might be to assess the effectiveness of environmental water delivery. An independent evaluation of citizen science volunteers across the region identified that they felt valued if their data was being used for management decisions and this helps maintain their interest. This evaluation also identified that being able to monitor your local waterway kept you connected with the program. This finding adds evidence to support the assumption of volunteers' connectedness to the river this finding has also been extended to the Moorabool. There are other lines of evidence external to the region that point to awareness, behaviour change, and confidence to influence others. This evidence to indicate the current effort is contributing to the longer-term outcome is counterbalanced by evidence of decreasing
	By June 2022, Regional Citizen Science Officers will have partnered with WTOAC to plan and deliver training at 1 Wadawurrung-led events on the	By June 2024 CCMA will have worked with partners to sustain water quality monitoring with citizen	The management outcome is also due to be met at the end of EC5 as at least 8 sites are currently monitored. Citizen science partnered with WTOAC to undertake monitoring	Strong	

Desired Flagship outcome	Intermediate outcome performance expectation for 2016-2024	Management outcome performance expectation for 2016-2024	Key findings	Evidence quality rating	Assessment of progress (contribution) towards longer term outcomes
	Moorabool River to increase Traditional Owner skills and knowledge in water science	scientists at 8 long-term monitoring sites	pre and post environmental water releases in the Moorabool and this partnership culminated in the joint production of the inaugural WTOAC Water Quality Report that was published in June 2022 here.		volunteer numbers across the region. Reasons given for stepping away have been provided in an evaluation of regional citizen science. The CMA commenced an internal process in late 2023 to consider how best to manage citizen science work going forward to ensure relevance, involvement and retention in volunteer programs.

Management outcome finding for waterway amenity

The management outcome for waterway amenity has been achieved and the intermediate outcome isn't due until 2028. This will require more work with partners to develop an awareness program drawing on research that links to the theory underpinning the Flagship: that people's positive values for the river – associated with recreational experiences – result in them using the site or river in a more sustainable way (e.g. litter removal). The table below highlights both evidence of people valuing the river and evidence of low use.

Desired outcome	Intermediate outcome performance expectation for 2016-2024	Management outcome performance expectation for 2016-2024	Key findings	Evidence quality rating	Assessment of progress (contribution) towards longer term outcomes
Waterway enhanced through people's connection to the river.	By 2028 community awareness of the waterway amenity of the Moorabool has increased.	By June 2022 waterway amenity baseline for the Moorabool has been completed.	The waterway amenity baseline was completed following receipt of separate funding from the Flagship at the beginning in 2021. The work resulted in a baseline developed through the CMA's GIS system and a technical note to support it. Waterway amenity conceptual models were further developed from those provided by DEECA and Melbourne Water in 2021. The Annual Seasonal Watering Proposal for the Moorabool has highlighted the amenity value placed on the area by some users (Corangamite CMA, 2023) Billington and Deere (2022) identified some waterway access points that were not well used.	Strong	More work with partners to be completed to identify other management outcomes and associated interventions to improve progress towards the intermediate and longer-term outcome.

Management outcome findings for urban water community understanding

A management outcome to 2024 was not defined for this strategy and the intermediate outcome is not due until 2026. The Central and Gippsland Sustainable Water Strategy (C&G SWS) that was released in 2022 provides an excellent platform from which Corangamite CMA can work with Barwon Water and Central Highlands Water to identify their programs of relevance to the Moorabool and revisit the outcomes.

Desired outcome	Intermediate outcome performance expectation 2016-2024	Key findings	Evidence quality rating	Assessment of progress (contribution) towards longer term outcomes
Waterway enhanced through people's connection to the river.	By 2026 there is an increasing trajectory of urban drinking water consumers' knowledge of where their drinking water is sourced from and confidence in the use of manufactured water	Work has been undertaken by both Water Authorities and the Corangamite CMA to inform the SWS policy and action statements that will influence the Moorabool River. This was undertaken in a collaborative manner that involved WTOAC for water recovery targets and complementary measures. In addition, the SWS addresses actions associated with urban water efficiency (Chapter 2) and transitioning to manufactured water (Chapter 3) as well as reducing the reliance on extraction from surface water (Chapter 4.1). Corangamite CMA participates in the relevant IWM forums to lobby for water savings to be returned to the river. More work needs to be undertaken with Water Authorities to confirm outcomes for the Flagship and then relevant interventions and effectiveness monitoring.	Satisfactory	The SWS provides a strong platform to explore specific interventions relating to the urban water communities serviced by the Moorabool River. Work with Barwon Water and CHW to further develop.

Theme – Healthy environment

The healthy environment pillar focusses on the following three areas, noting that all three are critical to improve the diversity and resilience of the ecological values identified for the waterway.

- Improved flow regime through environmental water
- Extent and condition of riparian land improved through riparian management
- Instream habitat and connectivity enhanced

A significant amount of research identifies the benefits of managed riparian land to water quality, aquatic habitat, and in-stream primary production (Lovett & Price, 1999). Published evidence supports the relationship between flow regime and the vegetation, water quality and animals reliant on appropriate regimes (GHD, 2012; Jacobs Australia, 2015; Melbourne Water, 2018).

Management outcome findings for environmental water

Management outcomes associated with development of the annual seasonal watering plans have been developed in line with the targets. The intermediate outcome for delivery of 2.5GL/annum has also been met. The current 2.5GL per annum rolling average is delivered for the Moorabool - and has been since the Living Moorabool commenced in 2017. In two years, there was some additional water due to accidently delivering more in 2017/18 and a temporary trade in 2019/20. In the more recent, wetter seasons, natural flows achieve the relevant objectives of the FLOWS study. In progress towards an additional entitlement, collaborative work was undertaken to inform a revised recovery target for the Moorabool out of Lal Lal (Department of Environment, Land, Water and Planning, 2022). The table below provides more detail on progress towards the longer-term outcome.

Desired Flagship outcome	Intermediate outcome performance expectation 2016-2024	Management outcome performance expectations 2016-2024	Key findings	Evidence quality rating	Assessment of progress (contribution) towards longer term outcomes
Improved flow regime: Up to 5.14GL[3] /annum of environmental water entitlement is capable of being delivered annually. By 2040 an additional 10GL[4] storage has been allocated to the environmental entitlement based on	By 2024, 2.5GL / annum of environmental water is capable of being delivered as part of existing entitlement.	By June 2024, three annual seasonal watering plans will have been delivered, in consultation with the Moorabool Surface Water Advisory Committee and submitted to VEWH consistent with their requirements and timeframes to support the planning and water delivery for the Moorabool. By June 2020, three annual seasonal watering plans will have been delivered, in	Annually since 2016/17 to date, the CMA has produced a Moorabool Seasonal Watering proposal that has met the VEWH's requirements to produce such documents. They have been reviewed by the Moorabool Surface Water Advisory Committee and in more recent years advice and input sought from WTOAC. The proposals draw from the FLOWS study, forecast weather conditions and any new knowledge to inform the next watering year. They present compliance in e-water delivery. Based on priority flow requirements, as there isn't enough entitlement to meet all FLOWS requirements, e-water delivered should be contributing to support of fish, platypus, in-stream vegetation and macro-invertebrates. As monitoring against these objectives improves and is resourced, these outcomes can be demonstrated. It should be noted that annual Seasonal Watering Plans commenced for the Moorabool prior to the Flagship commencement in 2016/17. A 2.5GL per annum rolling average is delivered for the Moorabool and has been delivered since the Living Moorabool commenced in 2017. In two years, there was	Strong	The 2015 FLOWS report (Jacobs Australia, 2015) recommended that the volume of the Environmental Entitlement be increased. 15 GL over three years, with an average of 5 GL in each year would only contribute to the minimum flow recommendations documented in the 2015 FLOWS update. This roughly equates to the volume of water required to meet the minimum flow recommendations in a dry year. To achieve the aspirational flow recommendations, a more significant increase would be required – in the volume of the Environmental Entitlement, upwards of 20 to 30 GL over three years.

[3] includes the additional negotiated 1.5GL and 1.14 GL for environmental values from the 2022 SWS
[4] depending on timelines of 2032 SWS actions

Desired Flagship outcome	Intermediate outcome performance expectation 2016-2024	Management outcome performance expectations 2016-2024	Key findings	Evidence quality rating	Assessment of progress (contribution) towards longer term outcomes
updated 2032 SWS actions.		consultation with the Moorabool Surface Water Advisory Committee and submitted to VEWH consistent with their requirements and timeframes to support the planning and water delivery for the Moorabool.	some additional water, due to accidently delivering more in 2017/18 and a temporary trade in 2019-20. Progressive increases in entitlement form part of the target for the Living Moorabool.		So, while the current entitlement has been planned for and delivered annually, acquiring more water for the river to deliver some of the FLOWS objectives related to water quality, in-stream habitat, and connectivity for platypus, fish and eels is essential. The 2022 SWS has enabled some water recovery for the West (and East Branch). Another SWS is due to be developed in 2032 with an aim to recover additional water as part of the Living Moorabool's longer term target of delivering 5,140ML per annum from Lal Lal in a dry year.
		By 2022 an additional 3GL/annum to be shared between environmental and cultural values has been confirmed in the 2022 Central and Gippsland Sustainable water Strategy	The Central and Gippsland Sustainable Water Strategy (Department of Environment, Land, Water and Planning, 2022) identified environmental water recovery for the Moorabool River under Policy 8-1: the return of up to 6.5GL to the Moorabool Yulluk (Moorabool River) west branch to improve waterway health by maintaining water quality and preventing fish deaths. This policy is being delivered through Action 4-3 and 4-4 in the SWS. The latest progress report (DEECA, 2023) documents that both actions have commenced.	Strong	

Management outcome findings for riparian management

Management targets are on track to be met through the Riparian Works Review assessments and support for additional maintenance as well as contracting new sites for riparian works. For the intermediate target, 165.6ha of management agreements have been established which is above the 110ha desired by the end of 2024. The table below provides information against the outcomes and there is more information in Section 4.2.

Desired Flagship outcome	Intermediate outcome performance expectation 2016-2024	Management outcome performance expectations 2016-2020	Key findings	Evidence quality rating	Assessment of progress (contribution) towards longer term outcomes
Native canopy cover increased from 2016 baseline (348ha riparian area without native vegetation). Woody weeds decreased (willows 5ha and woody weeds 20ha) within and upstream of project area	By June 2020 the CMA with MCLG and GLN will have established and maintained management agreements with landholders to improve 50ha of riparian vegetation along priority reaches of the Moorabool River By June 2024 the CMA with MCLG and GLN will have established and maintained management agreements with landholders to improve an additional 60ha of riparian vegetation along priority reaches of the Moorabool River	By June 2024 management agreements will have been inspected under riparian works review and 35ha additional works to maintain riparian land.	The Riparian Works Review process for Victoria did not commence until 2019. The CMA produced an initial report on a small regional sample size in 2021 (Kaartinen-Price, 2021). During 2019-2021, 77 properties were assessed across the region, including the Moorabool. On track for June 2024 with a total of 17 inspections to date under EC5 and organising contractor procurement for sites eligible for maintenance.	Strong	Management and intermediate outcomes indicate progress towards longer term outcomes. Revisiting past sites using the RWR process (with some additional CMA parameters) is important to help sustain riparian works in the longer term. Most importantly, it re-engages CMA staff with landholders so that we can understand issues they may be experiencing with existing sites and gauge interest in further work. From the data collected through RWR inspections and other site visits, the CMA will investigate whether there is an issue emerging with survival rates of plantings. Pending the outcome of this investigation, further work may be required
		By June 2024 landholders with agreement will have completed works to improve an additional 30ha riparian vegetation	On track, 12 sites contracted and works are underway. Some sites have large buffers and good remnant vegetation and the total contracted under EC5 is 85ha. Assessment of Flagship data to June 2023 highlight that: • 165.6ha of management agreements have been established which is above the 110ha desired by the end of 2024. • 49.6ha of native vegetation established • 76.6 ha of weed control (9ha of willow) which is ahead of the desired outcome	Strong	

Management outcome findings for instream habitat and connectivity

The table below highlights a lot of the foundational work undertaken or established to better understand the most appropriate strategies to manage for connectivity. Despite having information on priority barriers, the CMA has struggled to attract infrastructure funding to address identified issues. Once a strategy for barriers has been developed off the back of some current research, the outcomes in the MEL should also be revisited.

Desired Flagship outcome	Intermediate outcome performance expectation 2016-2024	Management outcome performance expectations 2016-2024	Key findings	Evidence quality rating	Assessment of progress (contribution) towards longer term outcomes
Instream habitat and connectivity enhanced through barrier management to enable fish, eel and platypus movement	By 2025, strategies to manage connectivity can be implemented due to increased understanding of barrier management options	By 2017, investigation into fish passage prioritisation for the Barwon and Moorabool completed	This independent report was completed into fish barrier prioritisation for the Barwon and Moorabool Rivers in 2016. Migration barriers within these systems have negative impacts on the fish communities and the impact of individual barriers varies depending on how they are constructed and their mode of operation. Environmental watering objectives in the Moorabool River system include protecting and boosting native fish populations (including Australian grayling, southern pygmy perch, spotted galaxias, tupong and short-finned eel) by providing flows for fish to move upstream and downstream and encouraging fish to spawn. It also ensures fish and other water animals have a range of habitat pools and places to shelter. Environmental watering is also used to improve water quality. Barriers can be drowned out by flows at specific times to enable connectivity or they can be modified. The prioritisation report combined with more recent information and the future PhD thesis will support future work to address improved connectivity.	Strong	The delivery of e-water has successfully delivered 13 summer/autumn freshes at recommended levels and appropriate time of year to drown out barriers to promote fish and platypus movement and trigger downstream spawning migration of adult short-finned eel and grayling. It has successfully delivered seven winter/spring freshes at recommended levels and appropriate time of year to drown out barriers to promote fish and platypus movement and trigger downstream spawning migration of adult tupong; and upstream migration of juvenile galaxias, tupong, short-finned eel, and grayling. More work is needed to look at the combined benefits of delivering e-water, riparian management, and barrier management for connectivity.
		By 2022 the Central and Gippsland SWS identifies the need to investigate Moorabool River at Batesford Quarry	The SWS (2022) has identified an action (action 8-1) to investigate and restore the Moorabool at Batesford quarry. The 2016 barrier prioritisation report identified this site as challenging. Under low to no flow conditions, fish have been stranded in drying pools and following recent floods there is evidence of more deterioration of the concrete channel. A collaborative project has commenced with WTOAC, DEECA and CCMA to implement action 8-1 in the SWS.	Strong	

Reflections and future directions or recommendations

Do the approaches remain appropriate to the delivery of longer-term outcomes?

This question focused on any changes to the operating environment outside of the Flagship that would have an impact on the Flagship and how the Flagship should respond. This information was sourced with delivery partners during a sense-making workshop. More detail can be found in Section 5.1 in the main body of the report and some key highlights have been included in the table below.

Operating Environment changes external to Flagship (Highlights)	How Flagship should respond (Highlights)
Organisations	Ensure that corporate knowledge associated with the Flagship is maintained, accessible and shared. Generally improved communication and engagement across key organisations. Living Moorabool governance group is very important, based on early experience in the Flagship and there is a need to re-invigorate this group. For WTOAC to be able to participate as partners, there needs to be specific budget to support their participation and consultation. Need to ensure representatives into other forums are well briefed on the Living Moorabool. Improve engagement with other groups from a Flagship perspective. Population growth also provides opportunities. On-going need to leverage off other relevant projects and knowledge. May need to undertake a specific social analysis given changing demographics. Can't rely on existing government funding alone and need to improve leveraging (funding, in-kind, knowledge.)
Natural change of key staff across all organisations that impact on corporate knowledge and relationships. WTOAC is experiencing pressure from all sectors and staff changes. CCMA and delivery partners have touch points into other forums that could influence Living Moorabool vision.	
Landscapes / environment	
The role of climate change into the future and the role of farm dams – how resilient will the system be in the next drought given the extended wet weather period? Land use change in the Lower Moorabool (Western Growth area including Batesford Quarry remediation) as well as farm holdings changing to smaller/lifestyle lots. Geographic footprint for the Moorabool given new entitlements and broadening interests in the East Branch.	
Socio-political	
Traditional investment (state and federal) is reducing compared to increasing costs to do work. New policies and strategies (Victorian Waterway Management Strategy, Water is Life) plus State documents that make specific mention of the Moorabool (C&G SWS, Rivers of the Barwon Action Plan.) Community members and groups that are active, passionate advocates for the river	

Based on our learnings what do we want to adapt or significantly change?

The components exist for a strong Flagship for the Living Moorabool, but there is a need to:

- enhance some existing elements (e.g. project integration and communications)
- re-invigorate past aspects (e.g. governance group to oversight the Flagship)
- establish missing components (e.g., outwardly communicating what is being achieved and not just what activities have been undertaken)

Existing strengths and enablers could be used to support the Flagship and the implementation of recommendations. For example: existing partnerships, long-term commitment, relationship with WTOAC.

The recommendations arose from the specific evaluation findings and the sense-making workshop with delivery partners. They can be clustered under three core headings: governance, leverage, and knowledge. The recommendations are listed below; additional explanation of each recommendation can be found in Section 5.2 of the main body of the report.

It should be noted that achieving all the recommendations will be resource dependent and some may become obsolete as external circumstances change. Therefore, a process is required to prioritise the recommendations and track their need over time.

Governance	Leverage	Knowledge
1. Maintain the Flagship Coordinator role Ensure sufficient funding to maintain and strengthen the coordinator role.	**6. Recognise that the Living Moorabool is more than the core funded activities that the CMA undertakes** Facilitate opportunities with delivery partners to deliver against the other pillars for the Flagship	**12. Synthesis and analysis of current information for the Moorabool** There is a need to synthesise all the new information for the Moorabool and have a summit to better understand any new threats, knowledge gaps and intervention opportunities
2. Reform a governance group with key delivery partners Reform a governance group that has strategic oversight of the Flagship and drive delivery across all pillars.	**7. Strengthen how strategies that are beyond traditional Environmental Contribution funds are addressed** Work with delivery partners and other relevant stakeholders to better define interventions that address strategies where the CMA is not the lead.	**13. Prioritising knowledge gaps and investment** Once recommendation 12 is completed, there is an opportunity to prioritise these knowledge gaps and embark on a process of addressing the priority knowledge gaps
3. Revisit the geographic footprint for the Living Moorabool Work with delivery partners to review the current geographic footprint, given their interests and leverage capacity.	**8. Define how we address those threats that don't have a strategy** Consider how farm dams will be incorporated into the Flagship. This should be reflected in recommendation 4.	**14. Addressing outcome monitoring gaps** As the MEL Plan is updated, any gaps in the outcome monitoring needs to be addressed and a detailed monitoring plan addended to the MEL Plan
4. Explore the need for an outward facing delivery plan for the Moorabool Develop with key delivery partners a strategic plan that more easily communicates the needs and management strategies for the Flagship area.	**9. Attracting other funding sources** Incorporate within recommendation 4 an appropriate plan to attract new funding sources, considering broadening the partnerships.	**15. Communicate progress and achievements** Proceed with the Flagship as a pilot to develop on-line report cards for communicating progress towards outcomes
5. Update the MEL Plan to reflect changes to the Living Moorabool The implementation of the recommendations may change aspects of the Flagship and where relevant, these should be reflected in the MEL Plan.	**10. Coordinated communication and engagement** Look to strengthen the opportunities for coordinated communications within the CMA and across stakeholder groups.	**16. Maintain tacit knowledge related to the Flagship** It will be critical to ensure the ongoing documentation of explicit knowledge, but a process should be established to capture tacit knowledge (often associated with a person's experience).
	11. Support WTOAC to develop the healthy culture pillar Funding support has been accessed to enable WTOAC to work at their own pace to define the Healthy Culture pillar.	**17. Evaluation processes** Ensure evaluation processes are well established to enable efficiency and maintain the mid-investment cycle review of progress.

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Acronyms

Acronym	Description
ARI	Arthur Rylah Institute
C&G SWS	Central and Gippsland Sustainable Water Strategy
CHW	Central Highlands Water
CMAs	All Victorian Catchment Management Authorities
CMA	Corangamite Catchment Management Authority
Corangamite CMA / CCMA	Corangamite Catchment Management Authority
DEECA	Department of Environment, Energy and Climate Change Action (formerly DELWP)
DELWP	Department of Environment, Land, Water and Planning
EC	Environmental Contribution
EC4	Environmental Contribution tranche 4 (2016-2020)
EC5	Environmental Contribution tranche 5 (2020-2024)
EoI	Expression of Interest
e-water	Environmental water
GIS	Geographic Information System
GL	Gigalitres
GLN	Geelong Landcare Network
IWM	Integrated Water Management
KEQs	Key Evaluation Questions
LM	The Living Moorabool
MCLG	Moorabool Catchment Landcare Group
MEL	Monitoring, evaluation, reporting and learning
MoU	Memorandum of Understanding
MSAC	Moorabool Stakeholder Advisory Committee
NRM	Natural Resource Management
PaLM	People for a Living Moorabool
RCS	Regional Catchment Strategy
RWR	Riparian Works Review
SEQ	Specific evaluation question
SRW	Southern Rural Water
SWP	Seasonal Watering Proposal
VEWH	Victorian Environmental Water Holder
WTOAC	Wadawurrung Traditional Owner Aboriginal Corporation

1. The Living Moorabool Flagship

1.1 Establishment under Water for Victoria

Water for Victoria (DELWP, 2016b) was launched in August 2016. It acknowledged the need to plan and manage the State's water resources for climate change and a growing population. One of the initiatives within the plan was to invest in long-term large scale projects, recognising that the benefits of this investment may not be seen for a long time. Of the 36 waterways identified across the State, the Living Moorabool Flagship was identified as one of nine pilot Flagships to be implemented from 2016.

The Flagship area (refer to Figure 1) was chosen as one of the first pilots based on:

- The reaches were priority waterways within the Corangamite Waterways Strategy (CWS, 2014)
- Waterway restoration had commenced in the Moorabool and Sutherlands Creek so there was an opportunity to build from this work
- There were opportunities to improve in-stream habitat to support fish species (including threated Yarra pygmy perch), Australian grayling and platypus
- The Moorabool River Environmental Entitlement, implemented in 2010, is held In Lal Lal Reservoir and can be used to deliver environmental flows for the reaches below Lal Lal Reservoir
- There was a strong community interest and engagement in the Moorabool River. For example it was a strong focus for People for a Living Moorabool (PALM) as Victoria's most stressed waterway and the Corangamite CMA had maintained a long-term Waterwatch volunteer base (and therefore database) within the catchment.
- The catchment also had strong interest and support from Wadawurrung Traditional Owners and other key stakeholders such as Barwon Water (who wanted to co-invest).

The catchment had more than one management intervention (e.g. environmental flows, riparian restoration, instream habitat and community engagement) and therefore lent itself to improve delivery against outcomes by applying an integrated catchment management approach that incorporated each of the interventions. Corangamite Catchment Management Authority (CCMA) initially defined the focus of the Flagship to be:

- Improving riverbank vegetation: increasing native vegetation extent, width and continuity increased and removing willows and other woody weeds.
- Flow regimes and connectivity: recovering additional water for the environment to improve river flow components and enhance instream habitat connectivity.
- Aquatic flora and fauna: enhanced instream habitat connectivity through barrier removal.
- Water quality: improving downstream water quality to protect the values of the Barwon River through Geelong and the Ramsar-listed Lake Connewarre wetland complex.
- Community participation: increasing community and landholder awareness and appropriate use and access of the river corridor.

Figure 1 presents the footprint for interventions that occur under the banner of the Living Moorabool from commencement in 2016 until the end of the current tranche of State funding in 2024. The figure lists the priority reaches from Lal Lal reservoir to the confluence with the Barwon (reaches 32-5, 32-4-32-3, 32-2 and 32-1) and Sutherlands Creek (32-7).

Figure 1: The area of focus for the Living Moorabool Flagship from 2017–2024.

1.2 Evolution of the Living Moorabool

In 2018, the Corangamite CMA held a planning meeting with delivery partners, traditional owner representatives and community groups and individuals. The purpose of the planning day in Meredith was to collaboratively explore the definition of a Living Moorabool vision beyond what had been initially planned by the CMA in 2016/17. This was particularly important with Wadawurrung Traditional Owner Aboriginal Corporation (WTOAC) representatives as the partnership between the two organisations had strengthened and WTOAC's capacity to engage in natural resource management had increased.

The day and a follow-up session with a subset of people who attended Meredith expanded on the environmental and community engagement themes originally designed by Corangamite CMA and reflected in the outcomes hierarchy presented within Figure 2.

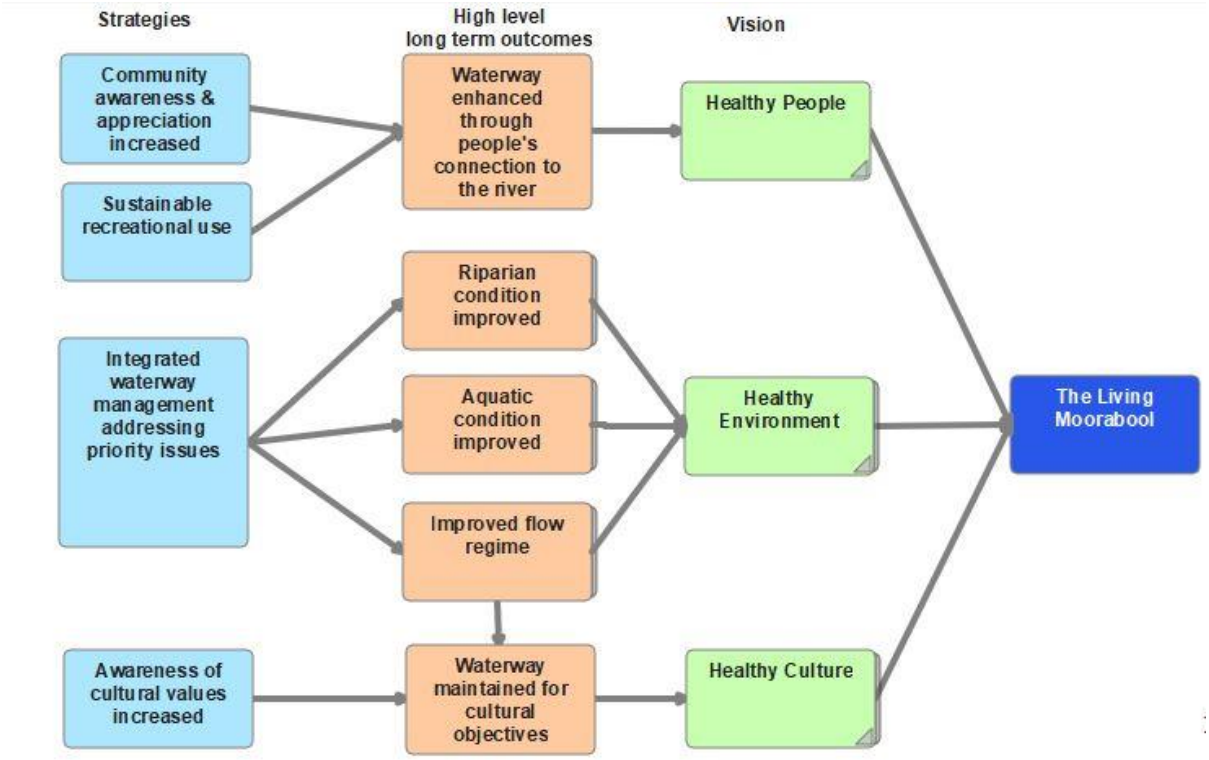


Figure 2: Outcome hierarchy for the Living Moorabool

Figure 2 is typically read from left to right with the overarching theory being that if the strategies are achieved they should contribute to the high level, long-term outcomes; if the high level long-term outcomes are achieved they will contribute to the vision. The strategies themselves are made up of numerous interventions as presented in more detailed cause-effect diagrams within Appendix 2. The more detailed models (sometimes called intervention logics or theories of change) are used for planning and evaluation purposes.

From the planning meeting, the strategies and long-term outcomes for healthy environment were consistent with the outcomes defined by Corangamite CMA when the Flagship concept was being developed (refer to Section 1.1 above). The healthy people pillar was expanded from engaging with the community within the catchment to:

- Increasing the urban drinking water supply community's awareness of where their drinking water is sourced
- Ensuring that recreational use and ways people engage with the river is sustainable (i.e. amenity values, litter and environmental awareness opportunities)

A healthy culture pillar was added that was about ensuring the river is managed to sustain cultural values of Wadawurrung Traditional Owners. Corangamite CMA is partnering with WTOAC to further develop this pillar.

The monitoring, evaluation and learning (MEL) plan for the Living Moorabool was updated to reflect the additional outcomes. All the current outcomes are listed in Table 1. The purpose of the performance expectations across the life of the project is to provide stepping stones to enable the performance of the Flagship to be tracked over time, given it is a long-term project.

Table 1: Flagship outcomes and performance expectations across the life of the Flagship (sourced from Corangamite CMA, 2023)

Pillar	Project outcomes	Performance expectations across the life of the project			
		By 2020 (LTD = 3 years)	By 2024 (LTD = 7 years)	By 2032 (LTD = 15 years)	By 2039 (LTD = 22 years)
Healthy people	Waterway enhanced through people's connection to the river	By June 2020 CS volunteers feel value in the work they undertake	By June 2022, Regional Citizen Science Officers will have partnered with WTOAC to plan and deliver training at one Wadawurrung-led event on the Moorabool River to increase Traditional Owner skills and knowledge in water science.	By June 2032, CS volunteers' data is still contributing to management decisions for the Moorabool	
				By 2026, there is an increasing trajectory of urban drinking water consumers' knowledge of where their drinking water is sourced from and confidence in the use of manufactured water	
				By 2028, community awareness of the waterway amenity of the Moorabool has increased	By 2039, waterway amenity has improved compared to 2022 baseline
Healthy environment	5.14GL of environmental water entitlement from Lal Lal reservoir is being delivered By 2040 an additional 10GL[5]	2.5G /annum of environmental water is capable of being delivered as part of existing entitlement	2.5GL/annum of environmental water is capable of being delivered as part of existing entitlement	Up to 3.5GL/annum of environmental water entitlement is capable of being delivered.	Up to 5.14 GL [6] /annum of environmental water entitlement is capable of being delivered annually

[5] depending on timelines of 2032 SWS actions
[6] includes the additional negotiated 1.5GL and 1.14GL for environmental values from the 2022 SWS

Pillar	Project outcomes	Performance expectations across the life of the project			
		By 2020 (LTD = 3 years)	By 2024 (LTD = 7 years)	By 2032 (LTD = 15 years)	By 2039 (LTD = 22 years)
	storage has been allocated to the environmental entitlement based on updated 2032 SWS actions				
	Native canopy cover increased from 2016 baseline (348ha riparian area without native vegetation). Woody weeds decreased (willows 5 ha and woody weeds 20ha) within and upstream of project area	By June 2020, CCMA with MCLG and GLN will have established and maintained management agreements with landholders to improve 50ha of riparian vegetation along priority reaches of the Moorabool River	By June 2024, CCMA with MCLG and GLN will have established and maintained management agreements with landholders to improve an additional 60ha of riparian vegetation along priority reaches of the Moorabool River	By June 2032, CCMA with partners will have established and maintained management agreements with landholders to improve an additional 120ha of riparian vegetation along priority reaches	By June 2039, CCMA with partners will have established and maintained management agreements with landholders to improve an additional 60ha of riparian vegetation along priority reaches
	Instream habitat connectivity enhanced through barrier management to enable fish, eel, and platypus movement		By 2025, strategies to manage connectivity can be implemented due to increased understanding of barrier management	Increased environmental flow allocation can be delivered annually as planned without upstream infrastructure impediments By June 2028, 12 native fish species will have an additional one kilometre of up-stream fish passage and an additional 33 kilometres of downstream fish passage for migration on the Lower Moorabool/ Lower Barwon River system	
Cultural values	Waterway maintained for cultural objectives	*Working with WTOAC to complete*			

The majority of the interventions within the Flagship are currently funded from State Government through the Environmental Contribution, a levy placed on Victorian water authorities to enable rehabilitation of waterways. The Environmental Contribution Tranche 5 (EC5), that commenced in July 2020, provided an opportunity to introduce structural changes to how the Flagship was delivered

with the aim of strengthening integration – particularly in areas of knowledge sharing, communications, and engagement – and looking for opportunities to coordinate monitoring evaluation and reporting activities. This enabled the interventions for coordination, environmental water, riparian management, and citizen science to come under one place-based administered program for the Flagship, whereas previously they had been delivered independently as region-wide or basin-wide projects. A timeline highlighting key moments both within and from outside the Flagship that had influence on its delivery is presented in Appendix 3.

2. Approach to the Evaluation

This section outlines how the Corangamite CMA approached this evaluation.

2.1 Purpose of the evaluation

The Living Moorabool Flagship was launched in 2016/17 and Corangamite CMA had planned for an evaluation to be implemented during 2023/24 to ensure the Flagship could be adapted based on evidence from Flagship implementation and progress towards longer term outcomes. As the primary funder, the Department of Energy, Environment and Climate Action (DEECA) required an evaluation to be undertaken before the end of June 2024 (end of EC5 funding tranche).

Table 2 summarises how Corangamite CMA and DEECA will use the findings.

Table 2: Purpose and use of Flagship evaluation for DEECA and Corangamite CMA

Proposed purpose and use of Flagship evaluation	DEECA	CMA
ACCOUNTABILITY: As a funding requirement and input to DEECA's evaluation of EC5	✓	✓
LEARNING and OUTCOMES: Understand progress towards outcomes and impacts of external factors	✓	✓
FORMATIVE: Inform the development/assessment of EC6 funding proposals	✓	✓
LEARNING: Building capacity and knowledge for future evaluation		✓
LEARNING: Understand if MEL activities are allowing CMAs to readily track and assess change	✓	✓

2.2 Monitoring, evaluation and learning (MEL) Plan

A Monitoring Evaluation and Learning (MEL) Plan was originally developed by a consultant when the Flagship was first introduced. The purpose of the MEL Plan is to guide the evaluation processes including evidence requirements. The MEL Plan has evolved over time with the Flagship. The current version (Corangamite CMA, 2023) informed this evaluation, and is based on new MEL requirements from DEECA.

2.3 Governance for the evaluation

A governance structure was established for the evaluation. Table 3 captures the various roles and responsibilities for the management of this evaluation.

Table 3: Various functions for each of the Management Functions

Group	Function	Who
Evaluation Project Control Group (PCG)	Management advisory and strategic contributions Participate in sense-making workshop Review of Draft	Corangamite CMA General Manager, Manager Strategy and Flagship Coordinator

Group	Function	Who
Lead Evaluator	Evaluation design and implementation Primary responsibility for completing evaluation and submission to DEECA Liaison with DEECA	Evaluation and Impact Lead, Corangamite CMA
Evaluation support	Support evidence gathering and analysis Review	Flagship Coordinator
Evidence support	Assistance with spatial information and knowledge base, evidence collation	Information analysts
Specific evidence leads	Assist with sourcing specific information (qualitative and quantitative) from within the CMA, identification of relevant delivery partners, participate in sense-making workshop	Corangamite CMA team leaders
Communications and Summary document	Advice on communicating findings etc	Communications team
Key delivery partners	Contribute evidence where relevant Participate in sense-making workshop Review	Water authorities, Local Government, Landcare, WTOAC

Community representatives also participated in interviews as part of the evidence gathering.

Key audiences

The key audiences of this report are the:

- Corangamite CMA Flagship team and delivery partners – to assess what may need to be adapted or knowledge gaps to address
- DEECA – for accountability and informing how Flagship implementation at a policy level can be enhanced
- other community groups and members of the community who have been involved in the Flagship or interested in the Flagship – to gain an appreciation of what is being undertaken to improve the health of the Moorabool River system.

2.4 Scope for the evaluation

The scope for the evaluation of the Flagship includes the whole spatial footprint for the Living Moorabool (refer to Figure 1) over the timeframe of July 2016 until December 2023 (note some of the data from the CMA's spatial system is up to August 2023).

The only pillar, as presented in the outcome hierarchy in Figure 2, to not be considered is the cultural values as this is still to be developed with WTOAC.

2.5 Key evaluation questions and evaluation process

Theory of how Flagship interventions will deliver outcomes

As mentioned before, Appendix 2 contains the conceptual models based on theory and specific knowledge of the Moorabool and the region. Based on current, best available evidence, the conceptual models reflect how the results of an intervention should contribute to an intermediate

outcome, and how the intermediate outcomes contribute to a longer-term outcome One purpose of evaluations over time is to interrogate the assumptions informing some of the causal linkages. New evidence can either strengthen those causal links, providing confidence that the Flagship is on the right track – or it may result in modifying aspects of the Flagship. The assumptions for this evaluation are specifically addressed in Section 3.9 and are also discussed in Section 4.

Key evaluation questions

The key evaluation questions (KEQs) are higher level questions from which more specific questions can be derived. The KEQs are presented in Figure 3 against a simple theoretical hierarchy. This illustrates how the evaluative information at the foundational and implementation level of the Flagship will naturally influence how we will track towards outcomes and what may need to be adapted as we learn more.

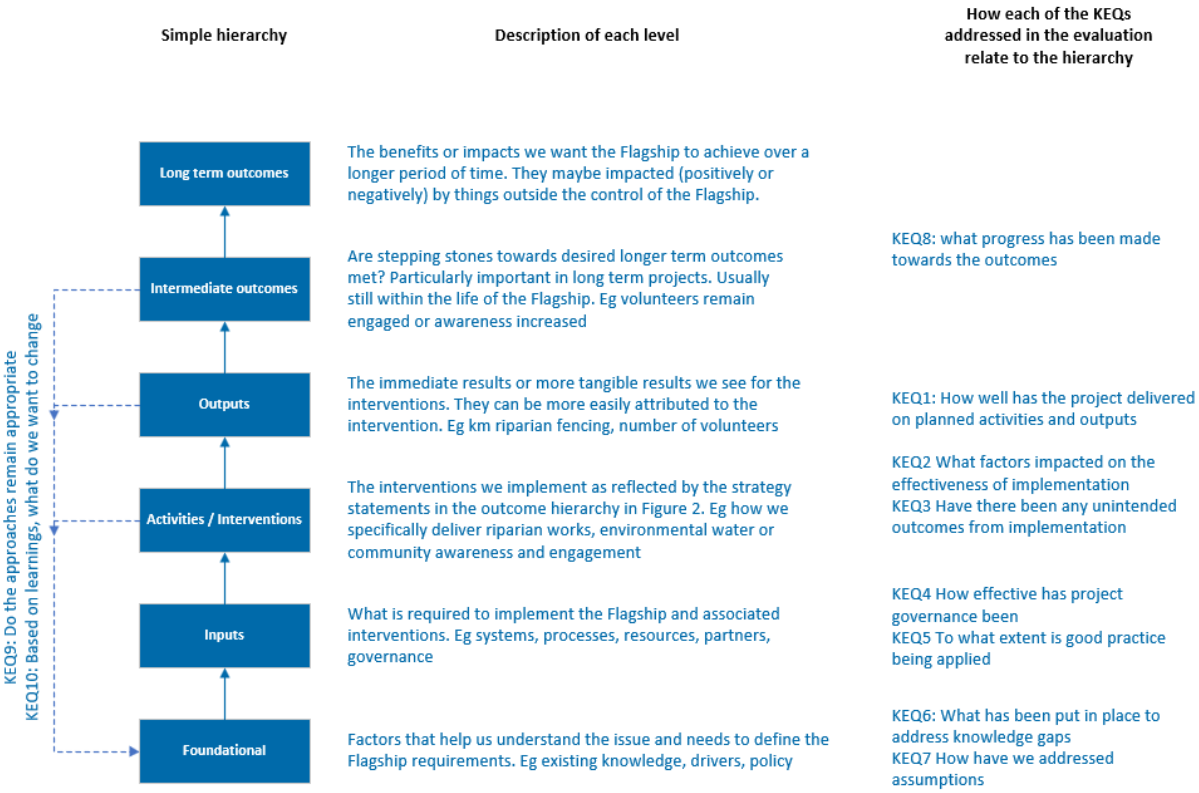


Figure 3: Simple hierarchy and levels that the evaluation questions address

Appendix 4 lists the evidence sources identified to address each of the evaluation questions and is adapted from the current MEL Plan for the Flagship. Section 3 of the report provides the evaluation findings for KEQs 1-7; Section 4 of the report provides the evaluation findings for KEQ8 and Section 5 addresses KEQ 9 and 10.

Evaluation process

A relatively standard approach was applied to the evaluation with evidence across multiple sources being collated for each of the evaluation questions and then summaries of findings for each of the

questions being considered at a sense-making workshop along with an exploration of key learnings and future directions (Figure 4). One line of evidence derived from interviews conducted with key staff, delivery partners and community group representatives, following documented interview protocols. Interview questions varied slightly depending on the audience and the interviews were semi-structured – open questions and an opportunity to ask additional explanatory questions. Some questions were consistent across different audiences. The interview questions can be found in Appendix 5.

A consultant was engaged to conduct most interviews as well as facilitate the sense-making workshop.

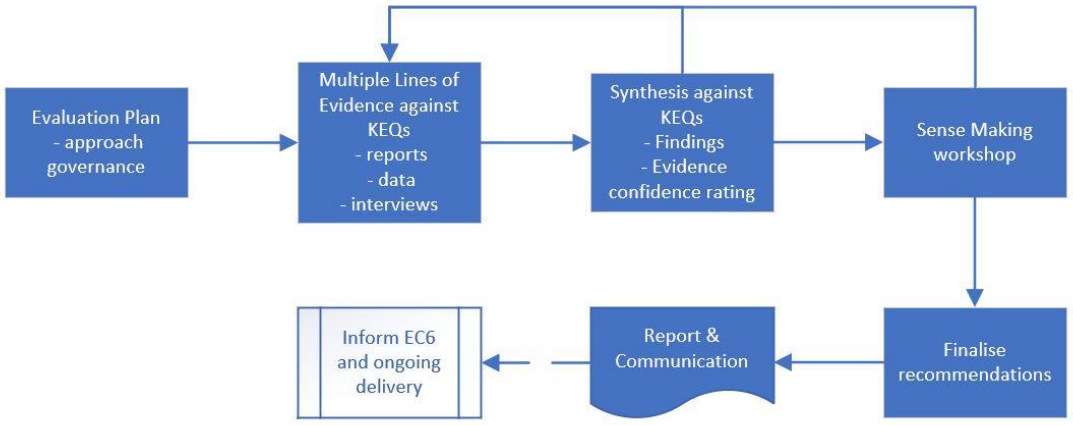


Figure 4: Summary of Evaluation Process

As part of evaluation planning, criteria were defined for strength of evidence collected against each of the evaluation questions and for what effective governance would look like. The strength of evidence was included with the summary of findings document sent to workshop participants and the criteria for these can be found in Appendix 6. The criteria for effective governance can be found in Appendix 7.

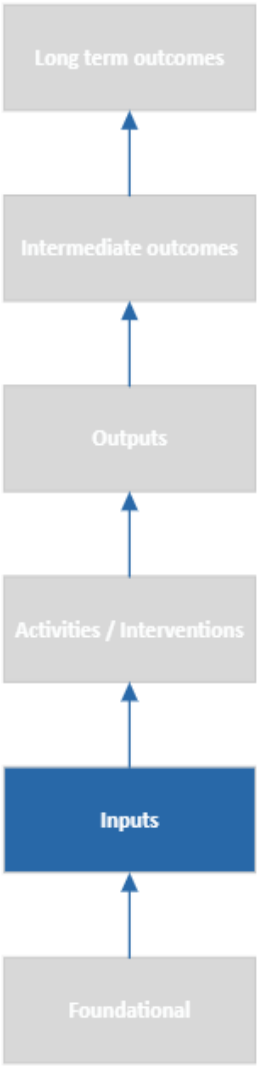
The sense-making workshop involved Corangamite CMA staff associated with the Flagship and key delivery partners such as Barwon Water, Golden Plains Shire, and Landcare. WTOAC was invited but unable to participate on this occasion. The attendees at the independently facilitated sense-making workshop explored topics of change that would influence the Flagship and what changes the Flagship needs to put in place. The collation from this workshop is captured in Section 5 and the agenda that guided workshop discussion can be found in Appendix 8.

Verification and limitations

Best available evidence was collected to address each of the evaluation questions. For outcomes this often includes multiple lines of evidence, some of which is geographically removed from the Moorabool catchment, but in combination with other evidence is still quite relevant. To ensure the process was rigorous within the evaluation constraints, a triangulation approach was applied.

Triangulation is the process of looking at something from different perspectives and looking for patterns and diversity of views (Patton, 2002). The triangulation approaches included:

- Sources – using different sources of evidence including studies, peer reviewed literature, investor reports, GIS collected information and interviews
- Interviews – using a variety of interviewees from within the CMA and external to the CMA
- Sense-making workshop – diversity of delivery agents from within the CMA and external to the CMA
- Multiple reviewers – the draft evaluation report was made available to delivery agents within the CMA and externally.



3. Flagship implementation

The purpose of this section is to present findings against the evaluation questions associated with delivery of the Flagship. Implementation will obviously influence the achievement of outcomes and therefore it is important to any successes, limitations, or learnings within the context of progress towards the Flagship outcomes. In addition, the Corangamite CMA and the delivery partners for the Flagship have more control over implementation and therefore any adaptive actions can greatly influence achievement of outcomes.

The discussion in 3.1 and 3.2 are significant inputs to enable Flagship implementation, where 3.1 considers the overarching governance for the Flagship and section 3.2 considers whether good practices are applied to project delivery across each of the projects that make up the Flagship.

3.1 How effective has Flagship governance been?

Governance within the context of the Living Moorabool Flagship is the process of overseeing the whole Flagship. This includes:

- How it was running as an integrated program including the co-ordination of communication and engagement
- Implementation of MEL and adaptive management practices
- Engaging with key delivery partners, including the governance arrangements of the Flagship

For the evaluation to capture judgements on how effective the governance has been, a set of criteria were defined for categories of below expectation, satisfactory and above expectation. The criteria can be found in Appendix 7.

Integration

Based on the criteria for governance, the running as an integrated project for the Living Moorabool is starting to move from below expectation to satisfactory. A lot of the interviews and the sense-making workshop identified the importance of the Flagship coordinator for strengthening integration.

Reasons for below expectation include:

- Numerous comments that the Barwon Flagship feels more collaborative than Moorabool
- Interview responses indicated a lack of knowledge of the Flagship and/or what it has achieved so far. A more integrated approach will help promote the Flagship overall.
- Staff currently on the project were not involved in its development and therefore some of its early history as a Flagship is not known or understood, or there is not a sense of ownership. The

evaluation report provides the opportunity to capture some of the project history within one place for future reference.

- Individual projects are often not badging their work as part of the Living Moorabool when engaging or communicating about the project.

Responses that indicate integration was moving towards satisfactory include:

- Having a coordinator has helped with the organisation of monthly meetings.
- The coordinator has ensured collaboration on Flagship communications.
- Communication and engagement plan established jointly with CMA staff.
- More regular newsletters to share information about the Flagship from both CMA projects and delivery partners.

Implementation of MEL

Based on the criteria listed in Appendix 7, the Flagship would be sitting just in the satisfactory criteria based on:

- There is an existing MEL Plan but components of it have been worked on by staff in isolation, not as a collective. Initial staff involved in its development are no longer involved in Flagship implementation. For segments of the plan, this is not necessarily a negative as it made best use of people's time.
- Targets for the life of the plan have been identified in some cases with project teams and in other cases based on existing investment plans.
- Monitoring systems for activities and outputs is mature.
- Outcome monitoring is still not fully resourced and some of the available information is not in a readily accessible form.
- Processes have been established to address current knowledge gaps.
- During EC5, the CMA implemented mid-term reviews of progress for all EC5 projects including the Living Moorabool Flagship. Actions implemented from this review were to have further enhanced integration (e.g. more regular Flagship team meetings).
- Delivery partners' shared ownership of the MEL Plan needs to be worked on.

Recommendations from this evaluation are likely to create several opportunities to gain greater ownership and awareness of the MEL Plan.

For example:

- It is likely that the intervention logic models will be reviewed and updated as required, particularly under the healthy people pillar.
- Outcome monitoring requirements currently identified in the intervention logic models should be reviewed in line with the rest of the plan and then made more explicit within the plan.

Engagement of key delivery partners in Flagship governance

Based on the rubric for engagement of delivery partners, the Flagship would be sitting between below expectation and satisfactory criteria based on the following evidence:

- During the planning day at Meredith in 2018, Corangamite CMA worked collectively to develop a common vision for what the Living Moorabool means (Healthy environment, Healthy people and Healthy culture). This was further developed by a small group formed from the planning day to define what is reflected in the Outcome hierarchy (Figure 2).
- An overarching governance group including the CMA and delivery partners was put on hold as it could not be supported due to resourcing issues at the Corangamite CMA. The timeline in Appendix 3 highlights some of the resourcing issues. This decision was made with the knowledge that the funded projects would continue and would engage as required with key delivery partners and members of the community.
- At various times across the life of the MEL Plan, different elements have been worked on in collaboration with internals and some externals (for example a re-working of the Healthy pillar intervention logic) yet the Corangamite CMA doesn't feel that there is a general awareness of the plan.

Different projects under the Flagship have engaged with delivery partners to problem solve, plan, and implement but it is felt that these are probably identified as individual projects and not seen within the context of the Flagship. It should also be acknowledged that there are other projects delivered outside of those funded under the Living Moorabool Flagship that will contribute to Flagship outcomes. For example, Small Blocks Big Dreams workshops hosted by Moorabool Landcare Network will contribute to the Healthy people pillar. Similarly, other organisations or individuals are undertaking work that will contribute to the Living Moorabool vision. While there are opportunities for these to be recognised and – where feasible – data shared, the evaluation process will consider activities external to the Flagship that will have a positive or negative impact on the Flagship outcomes.

Interview responses have indicated a lack of understanding of the Flagship and/or what it has achieved so far. While this is not just a governance responsibility, a multi-representative group is likely to be able to disseminate knowledge through a broader network.

3.2 To what extent is good practice being applied to Flagship delivery?

We reviewed the application of good practices to the Flagship. This included technical guidance to inform project activities or the application of Corangamite CMA project governance procedures. This was included as part of a review of efficiency (maximizing results for the resources applied). The application of procedures or guidelines can inform both understanding of issues that may impact on the achievement of outcomes, and judgement of our stewardship of allocated resources. Application of procedures or guidelines can help understand if are issues that will impact on the achievement of outcomes and understand if we are good stewards of the resources allocated to the Flagship. Review of the evidence drawn from existing documents (project documentation, internal audit, interviews as required) demonstrates that where relevant, Corangamite CMA applied guidance material to their projects and applied Corangamite CMA procedures as outlined below.

Application of guidance, good practice and specific procedures being applied by project managers

Understanding the application of guidance, good practice, or specific procedures relevant to individual projects may help to inform any variance in standard outputs and ensure consistent application. This is particularly so when different staff become involved in a project; their work will influence the achievement of outcomes, including whether outcomes are sustainable or have a negative impact on other projects. For example, if training, quality control (QC) and quality assurance (QA) procedures were not applied to the Waterwatch program, inferior or unreliable water quality monitoring results could lead to poor management decisions or incorrect reporting of condition.

Table 4 captures the guidelines, technical information or standard procedures that influence the technical decision making for the Flagship projects. Technical decisions to maximise results are also informed through investigations, peer reviewed articles or books, and experiential evidence in the field. Guidance information has been updated as new knowledge has become available (for example updating the riparian works review assessment to include additional information relevant to the region). Similarly, the review of knowledge gaps and how best to address them as described in Section 3.8 may also inform guidance material.

Table 4: Guidance, good practice and specific procedures applied by the Flagship for technical decisions

Project	Guidance document	How applied
Citizen Science	Training of volunteers and QA, QC procedures DELWP Standard Outputs V3 (2021)	Ensures the quality of sampling can be applied to decision making. Consistent application through documented approaches, training, and handover to new staff.
Environmental Water	Annual VEWH requirements for Seasonal Watering Proposals (SWP) FLOWS study DELWP Standard Outputs V3 (2021)	Apply VEWH requirements to SWPs reviewed and approved by VEWH; Report compliance for delivery of e-water to VEWH annually as part of SWP. Use FLOWS study as a guiding document to inform SWP and delivery. Consistent application through documented approaches, training, and handover to new staff.
Riparian Management	Riparian Works Review (RWR) – Survey 123 Procedure, Works Review Standards Handbook (DELWP, 2021) and Data Management Standards (DELWP, 2021). Project Officer Guidelines (CCMA) guides staff on how to conduct waterways (riparian) incentives projects. Numerous Templates (e.g. Landholder agreements, Management Plan, Maintenance works) Protocol for Conversion of Crown Land Frontage Licence to Riparian Licence (DELWP, 2019) Managing platypus risk: Use of Heavy Machinery where relevant for the Living Moorabool DELWP Standard Outputs V3 (2021)	Increased transparency with strong probity processes. Consistent application through documented approaches, training, and handover to new staff.

Project	Guidance document	How applied
Governance	DEECA's guidance notes, templates and investment requirements for Flagships DELWP Standard Outputs V3 (2021)	Ensures that meeting some investor accountability issues. Guides critical practices relevant to the whole Flagship (e.g. MEL.) Consistent application through documented approaches, training and handover to new staff.

Extent the Flagship has applied Corangamite CMA procedures to ensure good governance of Flagship resources

Internal systems and procedures had been updated at the time the Living Moorabool was implemented (beginning of EC4.) These internal systems have progressively and positively evolved over time and are still evolving to ensure the CMA meets its risk profile, audit requirements and improves efficiency. This has included relevant procedures related to project management, procurement, and the introduction of a new project reporting system to enable closer tracking of projects – all supplemented by staff training.

Internal audits, conducted by the Corangamite CMA's auditors and overseen by the Board's Audit and Risk Committee provides the organisation an independent view of what is working well and where there are opportunities to improve, thus ensuring the CMA's processes remain current. Relevant to the Flagship were audits of procedures related to the project management system, community engagement, procurement, and risk management. All found that the procedures were adequate, accessible to staff and that relevant staff were aware of requirements. The auditors also made recommendations that added value to Corangamite CMA processes.

In addition to procedures enhancing good governance across Corangamite CMA, specific structural changes were made to the Flagship at the beginning of 2020/21 to coincide with the new funding tranche (EC5).

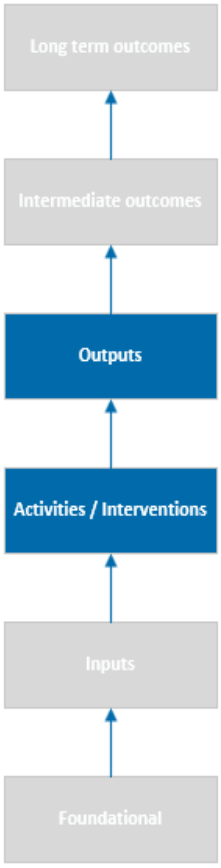
When the Flagship first commenced in 2016/17, projects addressing citizen science, environmental watering and riparian management were being delivered as regional projects. This allowed data extraction from our spatial information system to report on Flagship activity location and outputs achieved. Estimates were then required to report on spending from the allocated project budget, and the labour allocation. While this estimate could be undertaken, it was an inefficient process. For example, riparian management works for the Moorabool were part of a larger regional project that included on-ground works within the Barwon, Leigh, and Moorabool catchments. Revenue and expenditure could be easily managed and reported for this regional project, but to specifically detail income and expenditure for the Moorabool Flagship required several additional steps: identifying on-ground works undertaken as part of the Flagship, extracting data to tally landholder contract values, assessing Landcare Service Level agreement budgets, then estimating the value of Corangamite CMA labour that had been used to manage these works.

Therefore, a variety of reasons for the structural changes for the management of the Flagship from 2020/21 were provided by the Corangamite CMA, including:

- Improve efficiency in reporting the Flagship as a collective of projects
- Provide for stronger integration across the projects within the Flagship for collaborative planning and knowledge sharing.
- Provide more easily for an outward presentation of a focal body of work for the CMA.
- Provide the responsible CMA staff with an easier oversight rather than regularly requesting individual project leads to extract information.
- Improve the opportunity to leverage funding, other skills and knowledge to enhance the Living Moorabool Flagship delivery, support other projects relevant to the Moorabool and lobby for better outcomes for the river.
- More efficiently and effectively deliver against Water for Victoria action for Flagships and respond to requests for information on Flagships from DEECA.

With these structural changes, the Flagship now presents as a single project with easier oversight of Flagship budget, activities, risk management, opportunities, progress against milestones and results (reported as State Standard outputs) while still providing the individual project teams with detail within their projects.

The activities implemented for each of the Flagship projects, their results or outputs and issues that may have impacted implementation or resulted in unintended outcomes are discussed in Sections 3.3-3.6.



3.3 How well has the Flagship delivered on planned activities?

A review of past investor reports (Corangamite CMA, 2020; Corangamite CMA, 2020a; Corangamite CMA, 2020b; Corangamite CMA, 2020c; Corangamite CMA, 2023) across the two funding tranches (EC4 and EC5) indicates that the Flagship delivered against its activities in EC4 and is on track to deliver at the end of EC5 (June 2024). From the beginning of EC5, Covid delayed some activities across all projects, and resource constraints in the coordination project appears to have had an impact across the Flagship.

Project coordination / Governance

EC4 activities focused on planning and establishing an integrated program and the governance to support it. There were no specific requirements for governance from DEECA under EC4 compared with EC5.

The original Flagship was designed by the CMA in the lead in to EC4 funding that commenced in 2016/17. Therefore, as an additional activity, the CMA organised a planning day in late 2018 for the Moorabool Flagship to seek stakeholders' input into the longer-term desires for the Flagship.

A MEL Plan had already been drafted by a consultant in May 2017 and has been progressively updated as required. For example, following the planning day with the broadened Flagship scope, and when a new template for MEL was released by DEECA in 2022. Two forums were held to share new knowledge across organisations, including WTOAC, agencies, and community groups and individuals. A newsletter commenced in EC4. The original plan to release four editions annually was reduced to two, to ensure dissemination of quality information and for resourcing purposes. The coordinator during EC4, did not have a natural resource management (NRM) background and was supported by the General Manager Strategy and Planning (Flagship Director).

During EC5 more effort has been placed on improving the internal integration and expanding external communications about what was happening in the Flagship. The coordinator and Flagship Director have also liaised with our delivery partners; for example, negotiating with Barwon Water regarding their desired outcomes for the funding they contributed to projects in the Moorabool. This was used to support riparian works as well as investigations (intervention assessment and a pathogen risk assessment).

Establishment of a governance group to oversee the Flagship was not a requirement from DEECA under EC4 as it was under EC5.

At the time of this evaluation, milestones will all have been completed by the end of EC5 but may have been delivered a little later than planned (e.g. Knowledge Forum delayed due to Covid or changing the number of newsletters to two per annum to ensure quality over quantity).

Further discussion under the governance KEQ highlights some of the specific issues when the coordinator role is not resourced as compared to when it is.

Environmental Water

All planning and consultation to ensure Seasonal Watering Proposals[7] (SWP) were delivered to VEWH by due dates over the life of the Living Moorabool.

Processes were put in place to monitor the delivery of environmental water (e-water) consistent with the VEWH's Seasonal Watering Plan and compliance against planned delivery.

Corangamite CMA and WTOAC have engaged on environmental water activities in the Moorabool since the Flagship commenced. This relationship has evolved over time from opportunities to increase capacity and understanding in the processes used to define environmental water needs, to WTOAC providing a technical panel representative on a FLOWS study, collaboration on cultural flow opportunities to now the CMA being invited to sit on project steering committees led by WTOAC. The regular engagement with WTOAC that previously occurred has further increased and became more formalised over EC5. The CMA noted that there has been a movement from just consulting with

[7] Seasonal Watering Proposal is prepared by the region and submitted to the VEWH for review and inclusion in their statewide Seasonal Watering Plan

WTOAC on their aspirations alone to addressing issues and conducting projects jointly. Staff also indicated that this may have become more possible through the increasing investment in traditional owner group capacity influenced through the Central and Gippsland Sustainable Water Strategy (SWS) (Department of Environment, Land, Water and Planning, 2022) as well as Water is Life (Department of Environment, Land, Water and Planning, 2022). Examples of more recent activities that both organisations have engaged and partnered with include:

- Dollys Creek Road: a two-year joint effort through the provision of letters to Moorabool council; meetings with council with WTOAC and WTOAC / Corangamite CMA to discuss strategies to address the impediment created by the road to higher planned releases.
- Batesford Quarry Rehabilitation Project: an action of the SWS, led by WTOAC – the CMA took up the invitation to be a member of WTOAC's steering committee.
- The environmental water team meets online with WTOAC monthly to chat e-water. This has recently expanded to include coastal issues. These are casual updates but effective updates, attributable to the relationship built.
- Two or three times a year, the two organisations meet for more formal and strategic environmental water discussions that go beyond the regular information exchange, or annual planning for the SWP.
- Other SWS activities: program to establish more gauges on the Moorabool including East Branch, WTOAC's entitlement and the coordination of a temporary water transfer.

The Moorabool Stakeholder Community Advisory Group (MSAC) was established by Corangamite CMA to provide feedback on water management planning in the Moorabool River from a whole of community perspective. Activities to enable this engagement, primarily for feedback on the drafted SWP and to provide updates on environmental water delivery, have been implemented, but the CMA wanted to engage with MSAC more broadly, and more often.

The CMA has also leveraged from knowledge gained through monitoring and investigations to inform other processes external to the Moorabool Flagship but with an influence on Flagship outcomes. For example:

- Providing information for the Long-Term Water Resource Assessment (Department of Environment, Land, Water and Planning, 2020)
- Providing content for the Barwon Ministerial Advisory Committee.
- Contributing to Central Highlands Water (CHW) and Barwon Integrated Water Management (IWM) forums.
- Specifically commenting on the IWM planning associated with Batesford Quarry.
- Facilitating and informing modelling and planning associated with the Central and Gippsland SWS, specifically in terms of recovery targets and complementary activities.

Riparian Works

The CMA has continued to design and deliver activities to partner with Landcare, promote funding, and deliver riparian works. A key difference between EC4 (2016 - 2020) and EC5 (2020 – 2024) was that the focus area within the Flagship footprint narrowed during EC5. During EC4, Expressions of

Interest (EOI) in riparian funding opportunities were open to landholders within the whole Flagship footprint. At DEECA's request, for EC5 they were more focused in specific reaches within the footprint to try to increase connectivity and build on past investments. Also, during EC4, additional funding was available through the implementation of the Riparian Action Plan. The CMA continues to deliver the project in collaboration with Landcare who assist with promotion and delivery. There were delays in delivering the project at the beginning of EC4 but all funds were fully committed by the end of EC4 with an improved assessment process creating efficiencies. As reported to DEECA (Corangamite CMA, 2023), twelve contracts were executed for riparian projects in June 2023 and are on track to be completed by the end of 2024 with some works delayed due to flooding in October-November 2022. This followed the EOI, assessment and contracting process over the prior years of EC5. CMA staff noted that some of the contracted sites have large buffers and good remnant vegetation. The CMA partners with both Geelong Landcare Group and the Moorabool Catchment Landcare Group for riparian works within the Flagship.

The CMA has applied the State's Riparian Works Review (RWR) approach since it was introduced in 2019 to past on-ground investment. RWR enables sites that require follow up maintenance to be assessed and creates an opportunity to re-engage with landholders. From the fourteen inspections completed during 2022/23 to date, seven were identified for follow-up maintenance including willow re-treatments.

Corangamite CMA's relationship with WTOAC continued to strengthen. In conjunction with WTOAC's NRM Officer, the CMA facilitated access to country for Traditional Owners on two of the three sites in 2022/23 with an additional site planned during 2023/24. Opportunities are staggered across financial years to not overburden Traditional Owners. This collaboration between WTOAC, landholders and the CMA has enabled access to country for Traditional Owners and education for landholders.

Since the Living Moorabool has commenced the CMA has been able to leverage funding from outside of specific Flagship budget to support work undertaken. For example, from Barwon Water's commitment to the Living Moorabool, additional funding for riparian works has been undertaken that builds on the work funded from the Flagship. The variance to this was some willow work undertaken during 2022/23 at Bolwarra Weir in the East Branch of the Moorabool.

Citizen Science

The Citizen Science project continued to support Waterwatch volunteers within the Moorabool through a variety of activities including training, engagement events, quality control and assurance maintained the Waterwatch portal for results to be uploaded and accessed. One monitoring site sits outside of the Living Moorabool footprint but is important for inclusion due to its "control function" for the WTOAC monitoring program and environmental water. River Detectives was funded from the State Government during EC4, and by philanthropic sources during EC5. Over both EC4 and EC5, the CMA leveraged additional funding from Central Highlands Water and Barwon Water. As

discussed later, Covid-19 restrictions impacted activities at the end of EC4 and early EC5, requiring the organisation to take a different approach to keeping volunteers engaged.

Alluvium (Alluvium, 2020) reviewed historical Waterwatch data on the Moorabool to evaluate water quality parameter response to environmental flow releases. This information, combined with an evaluation of volunteer involvement (First Person Consulting, 2019) resulted in more effort to demonstrate the use and value of this data in management decisions.

In 2019, WTOAC and the CMA identified four sites on the West Moorabool at which WTOAC would investigate the impact of environmental watering on Cultural values. After being equipped and trained, WTOAC staff conducted water testing at the four identified sites before and after environmental water releases throughout 2021-2023. WTOAC staff were also trained in Agreed Level Taxonomy for aquatic macroinvertebrate surveys in spring and autumn. A summary of their WaterWatch activities was compiled in the WTOAC Water Quality Report 2021, which they used to inform their community and speak to agencies about WTOACs aspirations for their waterways.

WTOAC also wanted to collect baseline water quality data from the East branch of the Moorabool system, so the Living Moorabool WTOAC WaterWatch program was extended to include three sites on the Moorabool River East Branch in 2021. In response to WTOAC staffing changes, many WTOAC personnel have registered and trained with WaterWatch. WTOAC staff are now looking to recruit Wadawurrung community members to train with WaterWatch and undertake monitoring processes – this will free up WTOAC staff time.

Strategies that require further implementation focus

The above discussion has focused on those activities that were funded under the Flagship project by DEECA. As highlighted in the outcome's hierarchy and discussion of the Flagship strategies in Section 1.2, other strategies not yet commenced require coordination and facilitation of opportunities with delivery partners. Table 5 is illustrative only and highlights the gaps where further discussions are needed with delivery partners and within the CMA.

Table 5: Flagship opportunities to progress strategies not commenced or unfunded

Pillar	Strategy	Flagship opportunity
Healthy people	Community awareness and appreciation (for the river) is increased	CMA liaise with by Barwon Water and Central Highlands Water to encourage demand management strategies including awareness campaigns of the Moorabool as a drinking water source. CMA work with Barwon and Barwon Water and Central Highlands Water to determine a means to monitor change awareness.
	Sustainable recreational use	CMA promote amenity opportunities with Kitjarra-dja-bul Bullarto Langi-ut suitable for different segments of the Moorabool. CMA liaise with Crown land managers with access points to the Moorabool to improve environmental awareness.
Healthy environment	Integrated water management addressing priority issues	CMA and delivery partners use the knowledge gained regarding barriers to devise appropriate strategies linked to updated FLOWS study.
Healthy culture	Awareness of cultural values	To be led by WTOAC and assisted by CMA where requested by WTOAC

In addition to the issues identified at the planning day in 2018, it is now difficult to ignore strategies that consider the role of farm dams in the Moorabool catchment. The Long-term Water Resource Assessment (Department of Environment, Land, Water and Planning, 2020) stated surface water availability across southern Victoria has declined by up to 21% as a result of drier conditions and questioned the role of interception for water storage. As a result, the Central and Gippsland Sustainable Water Strategy (Department of Environment, Land, Water and Planning, 2022) identified an action to investigate farm dams in the Moorabool. People for a Living Moorabool (PALM) also undertook their own investigation into farm dams in the catchment and a CMA sponsored PhD student is looking at the impact of farm dams on stream flow in the catchment.

The future Flagship should consider how it works with Southern Rural Water (SRW) and other agencies to better understand implications and management of farm dams and their impact on inflows.

3.4 How well has the Flagship delivered on planned outputs?

Overall targets for outputs have been achieved or are due to be achieved (or exceeded). Where there has been an under achievement it might be due to external factors. For example, wet conditions may result in no need to deliver environmental water over a period or it may delay on-ground works. There is further discussion on impacts to delivery in Section 3.5.

Table 6 highlights outputs for the Living Moorabool Flagship across EC4 and EC5. Performance expectations are sourced from the MEL Plan (Corangamite CMA, 2023). Actual outputs are sourced from the CMA's NRM Outputs Reporting Dashboard, from which outputs for the relevant projects within the footprint of the Flagship could be extracted. The colour coding in the table for actual outputs is simply to draw the reader's attention to currently under the performance expectation (orange) or above the performance expectation (green). The output performance expectations are for June 2024, and the data extracted was until August 2023 in line with the evaluation scope.

The outputs recorded are based on the DELWP Output Data Standard (Department of Environment, Land and Water, 2020) to ensure a consistent approach across Victoria for recording results of investment. As evident in the table, there were some changes to how outputs were defined between EC4 and EC5.

The determination of targets for specific standard outputs are made at the beginning of a four-year funding tranche; circumstances may occur over the life of the project to alter these. An example of this is the expectation of the need to invest in riparian fencing; a target is set, then specific field assessments indicate that fencing may not be required for a variety of reasons (fencing already established or no stock).

Table 6: Outputs delivered against performance expectations (as identified within the 2023 MEL Plan)

Output	Measure	Output Targets June 2024	Total Actual Outputs	Actual Outputs July 2020 - Aug 2023[8]	Actual Outputs July 2016 - June 2020
Water storage - Trough	**Number**	**6**	**6**	**0**	**6**
Monitoring Structure - Measuring Station	**Number**	**13**	**16**	**3**	**13**
Fence - Fence	**km**	**18.9**	**5.8**	**1**	**4.8**
Riparian Veg Management	**ha**	**11.2**	**330**	**50**	**280**
Vegetation - native indigenous	ha	-	39	4	35
Weed control - non-woody	ha	-	44	6	38
Weed control - woody	ha	-	187	40	147
Pest animal control - Herbivore	ha	-	39	0	39
Grazing - Species control	ha	-	21	0	21
Water	Number	**44**	**36**	**36**	**-**
Environmental Water-Holdings	Number	-	36	36	-
River Reach (EC4 only)	Number	-	41	-	41
Management agreement	**Number**	**20**	**33**	**14**	**19**
Binding non-perpetual	Number	-	32	14	18
Binding perpetual	Number	-	1	-	1
Assessments	**Number**	**141**	**152**	**101**	**51**
Cultural	Number	-	2	2	-
Ecological	Number	-	74	42	32
Property	Number	-	19	18	1
Surface water	Number	-	57	39	18
Engagement events	**Participants**	**621**	**1033**	**538**	**495**
Field day	Participants	-	204	113	91
Meeting	Participants	-	421	219	202
Presentation	Participants	-	135	35	100
Training	Participants	-	208	136	72
Workshop	Participants	-	65	35	30
Partnerships	**Number**	**119**	**108**	**66**	**42**
Agency	Number	-	42	16	26
Community groups	Number	-	34	18	16
Corporate (EC4 output)	Number	-	4	4	-
Mixed	Number	-	28	28	-
Plan - Management	**Number**	**26**	**25**	**3**	**22**
Publications	**Number**	**25**	**33**	**19**	**14**
Visual	Number	-	15	3	12

[8] 2020/21 – 2023/24 equates to EC5 funding round and 2016/17 – 2019/20 equates to EC4 funding round

Output	Measure	Output Targets June 2024	Total Actual Outputs	Actual Outputs July 2020 - Aug 2023[8]	Actual Outputs July 2016 - June 2020
Written	Number	-	18	16	2
Information management system - database	**Number**	**3**	**5**	**2**	**3**

3.5 What major factors impacted the effectiveness of project implementation?

This question addresses both the factors that had a positive or negative influence on delivery.

The Flagship could be described as having three core CMA funded projects (environmental water, riparian works and citizen science) and an underpinning project with the aim of coordinating integration (Coordination). As evident in the outcome hierarchy, the achievement of all the pillar outcomes is also reliant on working with other CMA projects (e.g. Kitjarra-dja-bul Bullarto Langi-ut) and other organisations (e.g. Water Authorities and urban community awareness of source water).

From the results and discussion in Section 3.2 (Good practice) to Section 3.3 (Delivering activities) to Section 3.4 (Outputs achieved), it is evident that the Flagship project is delivering for the investment received. This is apparent within the core projects, exceptions being associated with external factors such as flooding or Covid-19. The coordination role has been somewhat stop and start, pending the availability of a resource. The second half of EC5 has seen greater stability in this role and governance activity delivery, despite a Flagship structure that didn't easily create an integrated Flagship or a way of delivering integrated projects. This has evolved over the life of the Flagship to date and is greatly supported when a Coordinator is in place. The external factors have either delayed, cancelled or changed some activities but significant impact to outputs is not evident from these factors.

The Flagship commenced with broader stakeholder input and was building momentum, lost early in EC5 due to resourcing impacts for the coordinator to lead integration, governance, communication and engagement as well as MEL. The CMA decided to ensure core projects (riparian works, environmental water and citizen science) were maintained and provided a lighter touch to coordination when a coordinator was in the role. Therefore, this has probably had a significant negative impact on creating a sense of a collaborative, integrated Flagship and the benefits that flow from that even though results are still being delivered for the Moorabool.

Table 7 collates from the external and internal interviews, as well as investor reports, any positive or negative impacts to delivery and the relevance of that to the Flagship.

Table 7: Impact on the effectiveness of Flagship implementation

Factor	Positive impact	Negative impact	Relevance to Flagship
Having a Moorabool Flagship	Long-term commitment	Unrealistic community expectations	Demonstrates that the CMA and the Government have a long-term commitment to achieving environmental, social and cultural outcomes for the Moorabool
Coordinator	When in place the benefits are evident	Can barely manage the expectations for the Flagship when role isn't resourced	Flagships are promoted as integrated projects. The LM is complex with outcomes across environmental, social and cultural pillars that require co-ordination and facilitation that is not achieved through an individual core project. When the role was vacant for a period of time, the impact on internal coordination associated with newsletters, events, integration and external awareness for the program has become evident. When there is stability in the role it is evident in terms of the regularity of newsletters and meetings etc. There are avenues to ask questions, resolve issues collaboratively and share knowledge.
Loss of Flagship knowledge		As staff have changed over time understanding and awareness of the integrated Flagship declines	Evident that awareness of the history associated with Flagship start up decisions and ownership for some of the earlier work undertaken has been lost due to lack of funding or staff turn over. No staff currently working on the Flagship were involved in its early design phase. While it is healthy to have new ideas come to a significant project it is also important for people to be aware of the context of how the Flagship has evolved and to ensure the corporate knowledge is not lost. This is also relevant to how the CMA works with its partners in maintaining Flagship knowledge over time.
Relationships	Strong relationships with Landcare, agencies, community groups and WTOAC strengthen delivery opportunities through partnerships	Some individuals not involved with Landcare may be missed	While riparian team have worked with Landcare there has been an improving relationship between Landcare and Citizen Science. The relationship with WTOAC has strengthened over time across all facets of the project. There is a strong working relationship with both Central Highlands Water and Barwon Water. Barwon Water have provided funding towards LM activities. Moorabool Stakeholder Advisory Committee has been a long standing agency, community and industry group supporting environmental watering planning.

Factor	Positive impact	Negative impact	Relevance to Flagship
Covid-19	Learnt different skills and how to engage remotely	Primarily had negative impact on engagement and led to delays in project implementation	Covid-19 limited engagement; the CMA managed to find alternative ways to engage with volunteers but there were some implications for maintaining volunteer interest through remote channels. Delays to implementing some planned activities, but significant work undertaken to catch up (e.g. on-ground work assessments and inspections)
Flooding	Natural high flows delivering benefits that a limited environmental water entitlement couldn't	Impacted volunteer activities and some damage to past riparian works	Provided opportunity to drown out barriers, scour some pools and re-connect river to floodplain but also damaged some prior riparian works and added further delays to volunteers being able to monitor and connect with the river.
Attracting funding to manage in-stream barriers		Delays to the management of priority barriers	The inability to attract government investment to manage priority barriers for fish passage has resulted in delays in this space. For the Moorabool it is the missing piece that connects the good work of environmental water and riparian works to achieve healthy waterway outcomes. Instead, the Flagship has used funds leveraged from Barwon Water to jointly support PhD research related to the role of barriers and fish passage (Deakin University). In combination with knowledge from the current FLOWS study and an investigation to prioritise barriers there is an opportunity to identify some more current strategies to manage barriers. It is likely to still require funding for infrastructure works at some barriers.

3.6 Unintended outcomes from project delivery

Unintended outcomes are the unintentional or unforeseen results from an intervention which may have a positive or negative impact on the Flagship. It is important to identify during planning what potential unintended outcomes may occur, particularly negative, and track these.

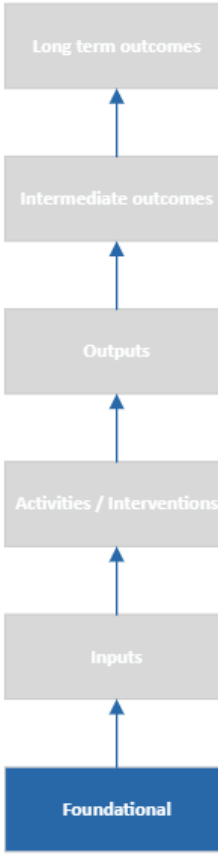
Table 8 presents some of the unintended outcomes identified during the interviews and document review – it is worth focusing on one that emerged from the interviews. Corangamite CMA staff interviews highlighted the lack of a sense of an integrated Flagship; some external participants (who participated in individual projects) commented that they did not know a lot about the Flagship or what the Flagship was achieving. Interviewees drew comparisons with the Barwon Flagship: when the Flagship Coordinator role was active it focused on the startup of the Barwon Flagship, thus the focus

on awareness and integration for the Moorabool Flagship reduced, creating a negative impact. This focus on the Barwon was a management decision compelled by the availability of resources and competing priorities for Corangamite CMA.

Table 8: Unintended outcomes identified through implementation of the Flagship

Factor	Relevance to Flagship
Positive	
Impacts of millennium drought	More investment appeared to be focused on the Moorabool following the millennium drought; this has probably resulted in the catchment being identified as one of the Statewide Flagships
Leverage funding from Barwon Water	The additional funding from Barwon Water has enabled investment beyond traditional support for riparian management or citizen science. The funding has been used to address some knowledge gaps and this information will be used to inform on-going planning
Strong relationships with WTOAC on Flagship projects	Has increased and will continue to increase cultural competency within the CMA
Other organisations have leveraged from the existence of Moorabool Flagship	Other organisations within the catchment have been able to draw from the existence of the Flagship to support funding bids
Leverage from other projects within the catchment	CCMA has been able to leverage from other projects to make broader gains for the Moorabool catchment. For instance Victorian Volcanic Plains, Kitjarra-dja-bul Bullarto Langi-ut and Our Catchments Our Communities projects
Knowledge gained on Moorabool is informing broader planning and Strategy	The knowledge pool and experience on the Moorabool has informed external processes with the aim of also improving waterway health for the Moorabool. For example, Central Highlands and Barwon IWM forums, IWM planning for Batesford Quarry and the Central and Gippsland SWS
Application of the Riparian Works Review	The application of RWR in the Moorabool has gone beyond just capturing some information of riparian works for DEECA. It has enabled a reconnection between CCMA staff and landholders who have undertaken past projects. This rebuilds a relationship, and helps the CMA to gain a better appreciation of common barriers to management that landholders may experience
Longevity of volunteers	With the longevity of citizen science volunteers on the Moorabool comes an extensive quality assured data set that can be used to inform other planning and management such as environmental watering.
Negative	
The original footprint for the Living Moorabool Flagship	Initially focused on the Moorabool West Branch from Lal Lal to the confluence of the Barwon as it is a priority waterway under the Corangamite Waterway Strategy (CWS), had an e-water entitlement that, along with riparian management, addressed priority barriers and engagement of volunteers in water monitoring - all of which would contribute to water health outcomes. The statewide aim of Flagships was to be strategically focused on priority systems rather than spread too thin. There are questions now about why the whole catchment was not selected as the Flagship given the emerging focus on the East Branch.
Kitjarra-dja-bul Bullarto langi-ut and the Flagship	There has been some confusion regarding the Flagship and the Masterplan, and whether the Masterplan was replacing the Flagship. This has required some discussions to explain the differences and opportunities for each to leverage off the other. A lot of the environmental values identified in the Masterplan will be delivered, maintained and enhanced through projects within the Flagship but there is also the opportunity for the waterway amenity values (including those related to naturalness) to be delivered via the Masterplan

Factor	Relevance to Flagship
The need to strategically reduce resources in the coordination role	As discussed above, this has resulted in reduced communications and external to the CMA governance arrangements about the Flagship, what it was doing and what it had delivered.
DEECA's request to narrow the focus for riparian investment during EC5	During EC4, the CMA would invest in riparian management within the footprint of the Flagship (see Figure 1) but for EC5 were requested to focus riparian investment only in a contained area that covered reaches 32-5, -4, the top half of 32-3 to Slate Quarry Road and 32-2. This provided very little agility to fund other previously assessed projects within the broader footprint when a landholder decided not to proceed with works at the last minute. Funding was then often diverted to maintenance works if there were no other eligible projects within the more contained area.
Planting survival success rate	Some questions raised over variance in planting success rates need to be further investigated to better understand if it is an issue and if so, is it process orientated, or climate impacted.



Knowledge and assumptions about the results that should be achieved for the interventions are foundational to the planning process for the Flagship. That is, they inform how best to implement activities and any significant knowledge gaps that should be addressed to inform delivery. The assumptions and knowledge gaps assessed as part of this evaluation cycle are documented within the current MEL Plan (Corangamite CMA, 2023).

The conceptualisation of the Living Moorabool's desired outcomes and the strategies to achieve those outcomes are based on knowledge of the system and application of past interventions, either in the Moorabool or other like catchments. Therefore, the process of checking what knowledge has emerged as we address known knowledge gaps, what new knowledge gaps have emerged and how they might impact on delivery has been applied to this evaluation cycle for the Flagship.

Assumptions are those elements within our theory of how implementation activities will lead to desired outcomes, i.e. cause and effect relationships. In some situations there is less evidence to support the anticipated relationship (and the relevant assumptions). The latter have also been reviewed within this evaluation cycle.

3.8 What has been put in place to address identified knowledge gaps?

Table 9 summarises how the currently identified knowledge gaps are being addressed.

The planning phase that the Flagship is about to enter, as part of EC6 and off the back of this evaluation, provides an opportunity to synthesise and critique work undertaken to date regarding knowledge gaps, and use it to inform priorities for future Flagship investment.

Table 9: Progress in addressing knowledge gaps

Knowledge gaps	Finding statements	Relevance to Flagship
1. Whether fish outcomes will be delivered without the need for removal of additional fish barriers	Work is progressing on a PhD investigation looking at barrier drowning and connectivity; results due at the end of 2024 will provide further insights when complete. The. In addition, a barrier prioritisation study was undertaken in 2016 (Marsden, et al., 2016) Since 2017/18 there have been 13 barrier drown outs at recommended level at correct time of year based on the summer autumn freshes delivered. Please note that natural flows / over bank flows due to wet weather are not included in this. Conditions have been significantly wet in recent years providing high and flood flows that have likely increased the opportunity for drowning out of barriers. In terms of ecological response monitoring for fish, ARI conducted the first survey in 2019 and one other survey since, at only three or four sites.	There is a need to synthesise and analyse what information we will have on barriers, fish movement and management strategies to inform the upcoming FLOWS study and provide greater focus on infrastructure versus how best to use the entitlement.
2. Whether water quality observations and waterbug surveys demonstrate benefits of environmental water delivery	Work is on track and citizen science data is being used to inform e-water, but continued review of data for wet and dry years is required. Initial Alluvium report (2020) showed that dissolved oxygen and salinity were the parameters most sensitive to environmental water events, however the occurrence of the millennium drought confounded long-term responses. It also found that if macroinvertebrate sampling could be modified to provide a condition measure, coordinated and event-based sampling could start to provide a better picture of how a river responds in the short and longer term, and could be useful in informing management.	The opportunity to further develop the citizen science project to inform management decisions and outcomes.
3. Whether water recovery targets will be met and recovered water volumes are capable of being delivered to meet FLOW recommendations	Central and Gippsland SWS was released in 2022; it identifies water recovery targets for the Moorabool West Branch (current flagship footprint) and East branch	Continue to work in partnership with WTOAC, DEECA, CHW and Barwon Water to implement relevant Central and Gippsland SWS actions for the Moorabool (note progress in 2023 SWS Implementation report) Updated FLOWS study will be due towards the end of EC6. Understanding of monitoring and e-water knowledge gaps should be well established to inform this

Knowledge gaps	Finding statements	Relevance to Flagship
4. The reach and impact of the awareness campaign for waterway amenity	Some initial work has been undertaken that can inform this knowledge gap: • Waterway amenity mapping baseline developed in 2022 through a project funded through the Rivers of the Barwon Action Plan • Pathogen Risk assessment report that identified some risks at river reserves to amenity.	More work needs to be undertaken to inform a campaign and investigate some monitoring opportunities (e.g. mobile phone data can be used to identify most frequented river reserves as well as length of use and time of year.)

New knowledge gaps

During interviews some new knowledge gaps were identified – this is not intended to be a complete list. Specific work as part of EC6 design for the Moorabool may need to look at new knowledge gaps and how they should be addressed. The following list summarises what has surfaced to date:

- Better understanding of the various audiences for the Living Moorabool and then the best ways to reach them from a communication and engagement perspective
- A better understanding of the role of e-DNA in the Flagship monitoring program
- Better understanding of the Traditional Owner cultural values and how "western" management can be improved to work complementary to these values
- What do we now know based on all the knowledge we have gained across the Moorabool and how can this better support planning and management, and inform outcome monitoring
- Impact of climate change on the Moorabool in terms of in-flows; plantings and planting success; critical refuges; continuing the work that has commenced re farm dam impacts.

3.9 How have we addressed our assumptions?

Some assumptions have been investigated and this work will be advanced through a synthesis of current and new knowledge for the Moorabool. Table 10 provides information on work undertaken to inform priority assumptions to date and where there are gaps.

Table 10: Medium and low confidence assumptions and how they have been progressed

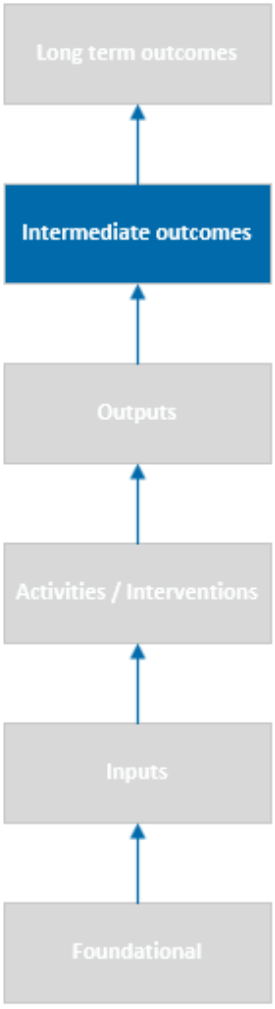
Assumption	Finding statements	Relevance to Flagship
A19: Investment in amenity improvements will result in sustainable recreation use	This assumption is focused on the use of river reserves in a sustainable way and is related to the healthy people theme. The knowledge gaps work will contribute further to this (see Table 9 above)	Need to better understand the values that recreational users place on the river and what behavioural drivers and nudges may exist for using the river in a sustainable way. This will enable more cost-effective investment in relevant activities to address sustainable recreational use. Further collaborative work to be undertaken with delivery partners.
A3: Participation and awareness will change attitudes and practice	This assumption is based on the theory that people who volunteer will increase their knowledge and awareness and change practice. There are research lines of evidence from citizen scientists in the UK that support this. The evaluation of Corangamite citizen scientists by First Person Consulting in 2019 presented a key finding that they wanted to see the data collected used in decision making. This implies an existing strong environmental value within the volunteers that was supported by some of the motivations in the survey. A question around stewardship indicated that volunteers increased their knowledge and skills and have taken actions to promote waterway health. This assumption should also be extended to landholders that participate in the Flagship under the Healthy environment theme	This is a watching brief for the citizen science program but consideration needs to be given to how new citizen scientists are also attracted to volunteer programs. The RWR provides an opportunity to gain some longitudinal information about landholder participation in the Flagship and practice change (or barriers).
A5: The flow regime and improved riparian vegetation will improve fish and platypus abundance	Work to continue with this statement as more information is collected and analysed regarding flow outcomes and riparian outcomes but sufficient research exists external to the Moorabool that confirms the relationship (Melbourne Water, 2024). The available e-water is below all FLOW 2015 recommendations and therefore needs to be targeted to the following priorities that aim to achieve environmental objectives related to fish, vegetation, macro-invertebrates and platypus (specific objectives vary with the priority): • Provision of low flows (base flows) • Provision of summer/autumn freshes in priority order • Provision of winter/spring freshes in priority order Some questions have been raised regarding some revegetation not surviving (see new knowledge gaps). This needs to be investigated further so that outcomes can be sustained. The e-DNA results released for the Great Australian Platypus Search indicate platypus in the Moorabool is widespread. (Griffiths, et al., 2022)	As commented under knowledge gaps and synthesis of current knowledge, including the information on flows, fish, platypus and riparian vegetation condition and extent would enable the status of this assumption to be better understood

[9] This numbering relates to assumptions on the relevant theories of change and the causal relationships that the assumptions may influence

Assumption	Finding statements	Relevance to Flagship
A7: Grant recipients maintain sites	Prior evaluation studies outside of the region and first Riparian Works Review (RWR) Report prepared for the region highlighted that a lot of landholders can struggle to maintain sites. Also noted is that there are various reasons why this is the case. Eligible landholders can receive support for maintenance at their sites following a RWR assessment.	There is an opportunity to gain a greater appreciation of this assumption by undertaking a specific assessment of the information gained from the RWR inspections in the Moorabool.
A10: Environmental watering actions achieve FLOWS Study recommendations	The available e-water is below all FLOWS 2015 recommendations and therefore needs to be targeted to the following priorities that aim to achieve environmental objectives related to fish, vegetation, macro-invertebrates and platypus (specific objectives vary with the priority): • Provision of low flows (base flows) • Provision of summer/autumn freshes in priority order • Provision of winter/spring freshes in priority order The Moorabool Environmental Water Management Plan prioritised ecological response monitoring recommendations. This highlights difficulty in attracting funding to support outcomes and the work required to develop a funded outcome monitoring program.	There has now been some monitoring undertaken by ARI on several occasions for vegetation and fish. This should be assessed with flow information to determine if relationships can be determined or if more monitoring is required. It is assumed that this exercise would help inform the renewal of the FLOWS study
A8: Assumptions in 2016 FLOWS study are based on best available information and regularly updated with new information	This is interpreted as the planning and delivery decisions are updated based on new information and any new information associated with investigations and outcome monitoring will be used to inform a new FLOWS study when it is due. Currently new information is used in the following way: New information is reviewed with each year in SWP development and incorporated into future planning. If that information goes against the FLOWS study then the CMA would justify that with VEWH. There hasn't been anything groundbreaking that's changed our outlook or planning that we have been able to implement. A good example is changing the scenario planning for a dry year in Summer/Autumn from 5ML/d to 10ML/d as per the Lower Moorabool Habitat Refuge study and Lower Moorabool Groundwater FLOWS study to account for the losses at Batesford quarry.	The CMA will collate key studies to include in the new FLOWS study, within the next two years, with a new FLOWS study due in approximately 2026.
A9: Landholders within the targeted areas are willing to engage in riparian projects	There were different approaches to funding riparian works between EC4 and EC5; EC4 had EoIs open across the whole Moorabool but the CMA was requested by DEECA to firstly narrow our focus in EC5. Feedback for EC5 was that some projects in the target area didn't proceed but there were some potential projects within the footprint (but outside of the target area) that could have been addressed with contract variations if time allowed. Look at how we build off past works, engage with landholders and provide some flexibility to work across the Flagship footprint while still being strategic.	This assumption may need further investigation (and will be ongoing over the life of the project as target areas may change).

Assumption	Finding statements	Relevance to Flagship
	That is what is our ability to scale up or down pending on funding.	

4. Flagship outcomes



This section addresses the question of what measurable progress has been made towards the stated Flagship outcomes across each of the Flagship pillars. As this is a long-term project the management outcomes (i.e. stepping stones towards longer term outcomes) are reported and a narrative provided on the likely contribution of the intermediate outcomes to long-term outcomes based on Flagship implementation. The contribution is strengthened by considering each of the prior steps that were put in place (foundational through to outputs discussed in Section 3).

4.1 Healthy people

The healthy people pillar is underpinned by a theory that if people value the river, then they will take action, directly or indirectly to look after it. Based on the planning day in 2018 the areas of focus included:

- Increasing community awareness - directly via volunteers and indirectly via urban drinking water users
- Sustainable and responsible recreational use of the river

Volunteers

The underlying theory associated with Citizen Science programs is that by recruitment and retention of volunteers, the volunteers could (Seymour & Haklay, 2017: Fraisl, et al., 2023):

- Increase their awareness of environmental matters
- Through confidence in their knowledge they feel empowered to take action
- Due to their new knowledge and increased confidence, they may change their practice or influence others to change practice.

Therefore, for the Citizen Science project within the Living Moorabool Flagship it has been important to recruit and then retain Citizen Scientists. This is lead primarily through the Waterwatch program that has been more recently expanded to include specific WTOAC partnered activity. A summary of the progressive contribution towards the longer term outcome is provided in Table 11 and then some additional narrative follows.

Table 11: Management outcome findings for volunteers

Desired Flagship outcome	Intermediate outcome performance expectation for 2016-2024	Management outcome performance expectation for 2016-2024	Key findings	Evidence quality rating	Assessment of progress (contribution) towards longer term outcomes
Waterway enhanced through people's connection to the river	By June 2020 CS volunteers feel value in the work they undertake	By June 2020 CCMA will have worked with partners to sustain water quality monitoring with citizen scientists at eight long-term monitoring sites	Eight sites for citizen science water quality monitoring are being maintained. The CMA partners with Barwon Water, Central Highlands Water, Landcare and WTOAC to deliver citizen science for the Flagship. A case study on long-term Waterwatch monitoring in the Moorabool can be found in the link: https://mailchi.mp/ccma/living-moorabool-flagship-13803754?e=32c698456b#mctoc3	Strong	While there is evidence of intermediate outcomes being achieved, an earlier regional evaluation of citizen science volunteers indicated that there may be factors that could influence retention within the Moorabool over time. There are volunteers that have been engaged in Waterwatch on the Moorabool for a long time. The extent of data that has been collected over time has been analysed to see how useful it might be to assess the effectiveness of environmental water delivery. An independent evaluation of citizen science volunteers in the region identified that they felt valued if their data was being used for management decisions and this helped maintained their interest. This evaluation also identified that being able to monitor your local waterway kept you connected with the program. This finding adds evidence to support the assumption of volunteers connectedness to the river and by assumption, has been extended to the Moorabool. There are other lines of evidence external to the region that point to awareness, behaviour change, confidence to influence others. This evidence to indicate the current effort is contributing to the longer term outcome is
	By June 2022, Regional Citizen Science Officers will have partnered with WTOAC to plan and deliver training at 1 Wadawurrung-led event on the Moorabool River to increase Traditional Owner skills and knowledge in water science	By June 2024 CCMA will have worked with partners to sustain water quality monitoring with citizen scientists at 8 long-term monitoring sites	The management outcome is also due to be met at the end of EC5 as at least 8 sites are currently monitored. Citizen science partnered with WTOAC to undertake monitoring pre and post environmental water releases in the Moorabool and this partnership culminated in the joint production of the inaugural WTOAC Water Quality Report that was published in June 2022: https://mailchi.mp/ccma/reminder-barwon-flagship-community-drop-in-session-13733326#mctoc2	Strong	

Desired Flagship outcome	Intermediate outcome performance expectation for 2016-2024	Management outcome performance expectation for 2016-2024	Key findings	Evidence quality rating	Assessment of progress (contribution) towards longer term outcomes
					counterbalanced by evidence of decreasing volunteer numbers across the region. Reasons given for stepping away have been provided in an evaluation of regional citizen scienceThe CMA commenced an internal process in late 2023 to consider how best to manage citizen science work going forward to ensure relevance, involvement and retainment in volunteer programs.

Citizen science is one of the top three contact points for Corangamite CMA to engage with the community. Research demonstrates that participation in programs such as citizen science can result in increased awareness, practice change and sometimes lobbying or influence of others. Prior work commissioned by the CMA is consistent with this finding and the CMA has responded to volunteer feedback on wanting to see their information used to inform decision making. On the Moorabool, long-term water quality monitoring is being used to support environmental water management.

While the citizen science work at Corangamite CMA has evolved and broadened over the years (for example e-DNA, River Detectives), Waterwatch remains the core of the program within the Living Moorabool.

There were significant interruptions associated with Covid 19 that commenced in early 2020. While different approaches were developed during COVID to try to retain volunteers (virtual events, regular chat rooms), staff indicated this type of engagement was not popular and many volunteers in the region dropped out of the program during this time. There was frustration expressed by many volunteers who felt they should have been allowed to continue their work. Once restrictions eased and regular monitoring recommenced, volunteer numbers showed signs of slowly building.

The evaluation of citizen science in the region (First Person Consulting, 2019) indicates a decline in volunteer numbers prior to Covid and there might be a variety of other reasons that have also impacted on numbers and retention. Some specific responses by the volunteers surveyed in 2019 (First Person Consulting) identified reasons why they would or wouldn't continue in the program (as captured in Table 12).

Table 12: Reasons provided by volunteers as to why they would or would not continue in the program

Reasons for continuing	Reasons for not continuing
Saw value in the program and obtaining long-term data	No longer lived in the region
Friendships	Age constraints
Enjoyment	Time constraints
Monitoring their local waterway	Had been volunteering already for a long time
Ease of being involved and the staff	

The findings from the First Person report are consistent with recent research of citizen science programs. This external research also found that a variety of characteristics will influence recruitment and retention (West & Pateman, 2016). For example:

- motivation
- awareness of the opportunity
- demographic characteristics (such as age, income, education and time).

First Person Consulting (2019) reported that the volunteers surveyed (current and prior) had identified as:

- Increasing skills and knowledge since beginning volunteering with Waterwatch and EstuaryWatch
- Volunteers have reported large increases in stewardship and have taken actions to promote waterway and estuary health, such as talking to friends, family and acquaintances, joining other environmental groups and lobbying to relevant ministers.

An underlying assumption for Citizen Science volunteers is that the waterway will be enhanced due to people's connection to the river from their involvement in Citizen Science activities. Investigations undertaken within the region imply this but the theory that involvement increases awareness and then influences behavioural change wasn't tested specifically in the Moorabool.

Waterway amenity

There is a growing recognition of a link between nature and people's wellbeing (Bowler, et al., 2010; Ministry for the Environment, 2022). Social research commissioned in 2022 into Victorian's connection to waterways (Quantum Market Research, 2022) found that 94% of respondents to a statewide survey said that waterways nurture their wellbeing and many stated the need for healthy waterways. In that survey most respondents identified rubbish and pollution as key problems for waterways.

Based on Melbourne Water's Healthy Waterway Strategy (Melbourne Water, 2018), Corangamite CMA identified two interdependent parameters that waterway amenity comprise of:

- Naturalness: Defined as the natural features of a given river segment and associated floodplain including (but not limited to): canopy cover, native vegetation water quality, flow and channel modification
- Use/Facilities/Access: Defined as the built infrastructure and recreational uses to maximise the user's experience of the river's naturalness.

The critical aspect is that amenity in a more natural environment such as the majority of the Living Moorabool will consist of more naturalness and limited man-made facilities and therefore be very different to amenity in a more urban environment. That is, the visitor experience in the more natural sections of the Moorabool River would be facilitated by a more natural experience with minimal man-made facilities and with recreational activities more passive.

The theory applied to the Flagship therefore is that people's values for the river – associated with the recreational experiences at the accessible sites – mean that they will use the site in a more sustainable way (e.g. litter removal). This is illustrated by the intervention logic for Healthy people in Appendix 2 and is based on evidence that people who connect with nature are more likely to protect it (Arthur Rylah Institute, 2022). The threats to water quality and other people's experiences were illustrated in a study jointly commissioned by Corangamite CMA and Barwon Water. Billington and

Deere (2022) documented the use of bush toilets for those that recreated near the river and a media article on use of river reserves and rubbish (Spotlight cast on health of Moorabool River after human faeces spotted in waters | The Courier | Ballarat, VIC) as providing a risk to water quality in the Moorabool.

Table 13 summarises the initial work that has been undertaken, but further effort is required to develop this body of work further.

Corangamite CMA is not the land manager for these public sites and is therefore not funded to maintain them, but will need to consider how it can work in partnership to help facilitate opportunities to improve waterway amenity and sustainable recreational use. Some of the work in the lower Moorabool may be able to leverage off other joint projects such as the implementation of the Kitjarra-dja-bul Bullarto Langi-ut Masterplan (Kitjarra-dja-bul Bullarto langi-ut - Corangamite Catchment Management Authority (ccma.vic.gov.au)) and the work to implement the masterplan for the Moorabool River Reserve at Batesford (Council Welcomes Funding for Moorabool River Reserve | Golden Plains Shire Council.)

The baseline that has been developed is important as it will help identify priorities and, along with repeat assessments, identify improvement in waterway amenity and prioritise sites where further work is required. This work will also need to consider the knowledge gaps and assumptions identified for amenity. In particular, the assumption that investment in amenity improvements[10] will, mostly, result in sustainable use of these spaces.

[10] Investment in amenity improvements may include vegetation or signage and does not reflect only hard structures.

Table 13: Management outcome findings for waterway amenity

Desired outcome	Intermediate outcome performance expectation for 2016-2024	Management outcome performance expectation for 2016-2024	Key findings	Evidence quality rating	Assessment of progress (contribution) towards longer term outcomes
Waterway enhanced through people's connection to the river	By 2028 community awareness of the waterway amenity of the Moorabool has increased	By June 2022 waterway amenity baseline for the Moorabool has been completed	The waterway amenity baseline was completed following receipt of separate funding to the Flagship at the beginning in 2021. The work resulted in a baseline developed through the CMA's GIS system and a technical note to support it. Waterway amenity conceptual models were further developed from the ones provided by DEECA and Melbourne Water in 2021. The Annual Seasonal Watering Proposal for the Moorabool has highlighted the amenity value placed on the area by some users (Corangamite CMA, 2023) Billington and Deere (2022) identified some waterway access points that were not well used.	Strong	More work with partners to be completed to identify other management outcomes and associated interventions to improve progress towards the intermediate and longer term outcome.

Urban water community understanding

The theory as expressed in the intervention logic for Healthy people in Appendix 2 is that increasing people's awareness of the values of the Moorabool River and where their urban water is sourced from will moderate their consumption and change their attitudes to the use of manufactured water, with the intention that in the longer term this would take pressure off extraction from the Moorabool River. The Central and Gippsland Sustainable Water Strategy (C&G SWS) (Department of Environment, Land, Water and Planning, 2022), identified a number of policy and action statements that will help support this approach for the Moorabool. These are associated with changing behaviours at home, building community confidence in recycled water and stormwater.

The extensive consultation undertaken by Barwon Water for their Urban Water Strategy 2022: Water for our Future (Barwon Water, 2022) broader community recognition of the need to protect the natural environment and make more use of alternative water sources.

Table 14 provides a summary of some of the background work that informed the C&G SWS and with that platform now set, there is an opportunity for Corangamite CMA to discuss opportunities for public awareness campaigns with DEECA, Barwon Water and Central Highlands Water.

Monitoring will be critical to understanding awareness, behavioural and attitudinal change and therefore the effectiveness of the campaign.

Table 14: Management outcome findings for urban water community understanding

Desired outcome	Intermediate outcome performance expectation 2016-2024	Management outcome performance expectations 2016-2024	Key findings	Evidence quality rating	Assessment of progress (contribution) towards longer term outcomes
Waterway enhanced through people's connection to the river	By 2026 there is an increasing trajectory of urban drinking water consumers' knowledge of where their drinking water is sourced from and confidence in the use of manufactured water		Work has been undertaken by both Water Authorities and Corangamite CMA to inform the SWS policy and action statements that will influence the Moorabool River. This was undertaken in a collaborative manner that involved WTOAC for water recovery targets and complementary measures. In addition, the SWS addresses actions associated with urban water efficiency (Chapter 2), transitioning to manufactured water (Chapter 3) and reducing the reliance on extraction from surface water (Chapter 4.1). Corangamite CMA participates in the relevant IWM forums to lobby for water savings to be returned to the river. More work needs to be undertaken with Water Authorities to confirm outcomes for the Flagship,relevant interventions and effectiveness monitoring.	Satisfactory	The SWS provides a strong platform to explore specific interventions relative to the urban water communities serviced by the Moorabool River. Work with Barwon Water and Central Highlands Water to further develop.

4.2 Healthy environment

The healthy environment pillar is underpinned by broader research, and by specific knowledge of the issues and appropriate interventions for the Moorabool River. The Corangamite Waterway Strategy (Corangamite CMA, 2014) documented no stream reaches were in good or excellent condition; all were in moderate to very poor condition (based on 2010 Index of Stream Condition assessment). The Waterway Strategy highlights the flow stress associated with inflows and in-stream barriers as well as land use impacts on riparian vegetation in some reaches. A significant amount of research identifies the benefits of managed riparian land to water quality, aquatic habitat and in-stream primary production (Lovett & Price, 1999). There is also published evidence to support the relationship between flow regime and the vegetation, water quality and animals reliant on appropriate regimes (GHD, 2012; Jacobs Australia, 2015; Melbourne Water, 2018).

Therefore the healthy environment pillar focuses on three areas; all three are critical to improve the diversity and resilience of the ecological values identified for the waterway.

- Improved flow regime through environmental water
- Extent and condition of riparian land improved through riparian management
- Instream habitat and connectivity enhanced

Environmental water

The current entitlement for the Moorabool River held in Lal Lal reservoir is less than required to meet the ecological objectives identified (Jacobs Australia, 2015), thus the focus for this objective is to ultimately increase the environmental entitlement, while planning for and delivering the current available entitlement to meet priority watering actions.

By June 2024, the management outcomes (see Table 15) will have been met and progress has been made on determining how the additional entitlement would be delivered. Table 15 highlights the findings for progress towards each desired outcome and the other requirements to enable the outcome to be achieved.

From a waterway health perspective, environmental water is delivered to enhance instream habitat, including water quality, and connectivity for fish, eel and platypus movement. As expressed in Section 3.8 (Knowledge gaps), work is generally in place but the results of this work need to be assessed for how they are incorporated into the ongoing delivery of the Flagship. Section 3.9 (Assumptions) highlights that long-term monitoring associated with the FLOWS outcomes needs to be either maintained or resourced.

Table 15: Management outcome findings for environmental water

Desired Flagship outcome	Intermediate outcome performance expectation 2016-2024	Management outcome performance expectations 2016 -2024	Key findings	Evidence quality rating	Assessment of progress (contribution) towards longer term outcomes
Improved flow regime: Up to 5.14GL[11] /annum of environmental water entitlement is capable of being delivered annually By 2040 an additional 10 GL[12] storage has been allocated to the environmental entitlement based on updated 2032 SWS actions	By 2024 2.5GL /annum of environmental water is capable of being delivered as part of existing entitlement	By June 2024, three annual seasonal watering plans will have been delivered, in consultation with the Moorabool Surface Water Advisory Committee, and submitted to VEWH consistent with their requirements and timeframes to support the planning and water delivery for the Moorabool By June 2020, three annual seasonal watering plans will have been delivered, in consultation with the Moorabool Surface Water Advisory Committee, and submitted to	Annually since 2016/17 to date, the CMA has produced a Moorabool Seasonal Watering proposal that has met the VEWH's requirements to produce such documents. They have been reviewed by the Moorabool Surface Water Advisory Committee; in more recent years advice and input was sought from WTOAC. The proposals draw from the FLOWS study, forecast weather conditions and any new knowledge to inform the next watering year. In addition, they present compliance in e-water delivery. Based on priority flow requirements, as there is insufficient entitlement to meet all FLOWS requirements, e-water delivered should be contributing to supporting fish, platypus, in-stream vegetation and macro-invertebrates. As monitoring against these objectives improves and is resourced, these outcomes can be demonstrated. Annual Seasonal Watering Plans commenced for the Moorabool prior to the Flagship commencement in 2016/17. A 2.5GL per annum rolling average is delivered for the Moorabool, and has been since the Living Moorabool commenced in 2017. In two years there was some additional water, due to accidently delivering more in 2017/18 and a temporary trade in 2019/20. Progressive increases in entitlement form part of the Target for the Living Moorabool.	Strong	It was recommended in the 2015 FLOWS report (Jacobs Australia, 2015) that the volume of the Environmental Entitlement should be increased. 15GL over three years, with an average of 5GL in each year would only contribute to the minimum flow recommendations documented in the 2015 FLOWS update. This roughly equates to the volume of water required to meet the minimum flow recommendations in a dry year. In order to achieve the aspirational flow recommendations, a more significant increase in the volume of the Environmental Entitlement would be required, upwards of 20 to 30GL over three years. So while the current entitlement has been planned for and delivered annually, acquiring more water for the river to deliver some of the FLOWS objectives related to water quality, in-stream habitat, and connectivity for platypus, fish and eels is essential. The 2022 SWS has enabled some water recovery for the West (and East Branch). Another SWS is due to be developed in 2032 with an aim to recover additional water as part of the Living Moorabool's longer term target of delivering 5,140ML per annum from Lal Lal in a dry year.

[11] includes the additional negotiated 1.5GL and 1.14GL for environmental values from the 2022 SWS
[12] depending on timelines of 2032 SWS actions

Desired Flagship outcome	Intermediate outcome performance expectation 2016-2024	Management outcome performance expectations 2016 -2024	Key findings	Evidence quality rating	Assessment of progress (contribution) towards longer term outcomes
		VEWH consistent with their requirements and timeframes to support the planning and water delivery for the Moorabool			
		By 2022, an additional 3GL /annum to be shared between environmental and cultural values has been confirmed in the 2022 Central and Gippsland Sustainable water Strategy	The Central and Gippsland Sustainable Water Strategy (Department of Environment, Land, Water and Planning, 2022) identified environmental water recovery for the Moorabool River under Policy 8-1: the return of up to 6.5 GL to the Moorabool Yulluk (Moorabool River) west branch to improve waterway health by maintaining water quality and preventing fish deaths. This policy is being delivered through Action 4-3 and 4-4 in the SWS. The latest progress report (DEECA, 2023) documents that both actions have commenced.	Strong	

Riparian management

The theory associated with riparian management in the Flagship is that the riparian project would result in an increase of riparian extent and improvement in condition to support native vegetation and in-stream fauna. A significant amount of expertise, supported by publications and cases correspond with this (Bowler, et al., 2012; GHD, 2012; Hansen, et al., 2010; Lovett & Price, 1999; Melbourne Water, 2018). Naturally the variations will be associated with socio-ecological factors such as landholder interest and sustaining results.

Table 16 presents the analysis of spatial data for the riparian long-term outcomes by reach and Table 17 highlights progress towards the longer-term outcomes indicated by results on ground. See Figure 5 (a-d) for spatial descriptions of reaches, and where there are management agreements plus works completed for vegetation and weed control.

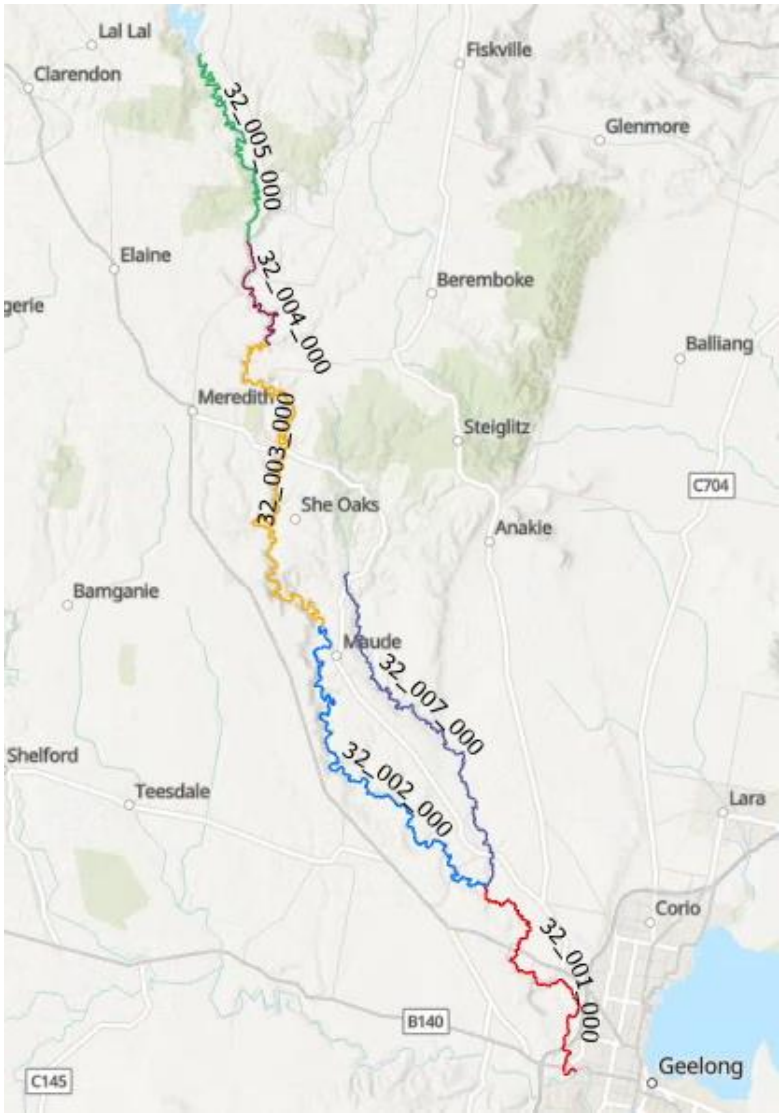
Table 16: Riparian outcomes per reach for the Flagship (July 2017 – June 2023)

Reach	Management Agreements (no.)	Management Agreements (ha)	Vegetation (ha)	Weed Control (ha)[13]	Weed Control - willow (ha)
32-1	0	0	2.05	0.51	0.00
32-2	14	65.07	8.79	23.25	3.98
32-3	4	43.33	22.45	43.09	0.00
32-4	6	51.58	5.05	8.59	5.05
32-5	1	5.64	11.27	1.13	0.00
32-7	0	0.00	0.00	0.00	0.00
	25	**165.62**	**49.60**	**76.57**	**9.03**

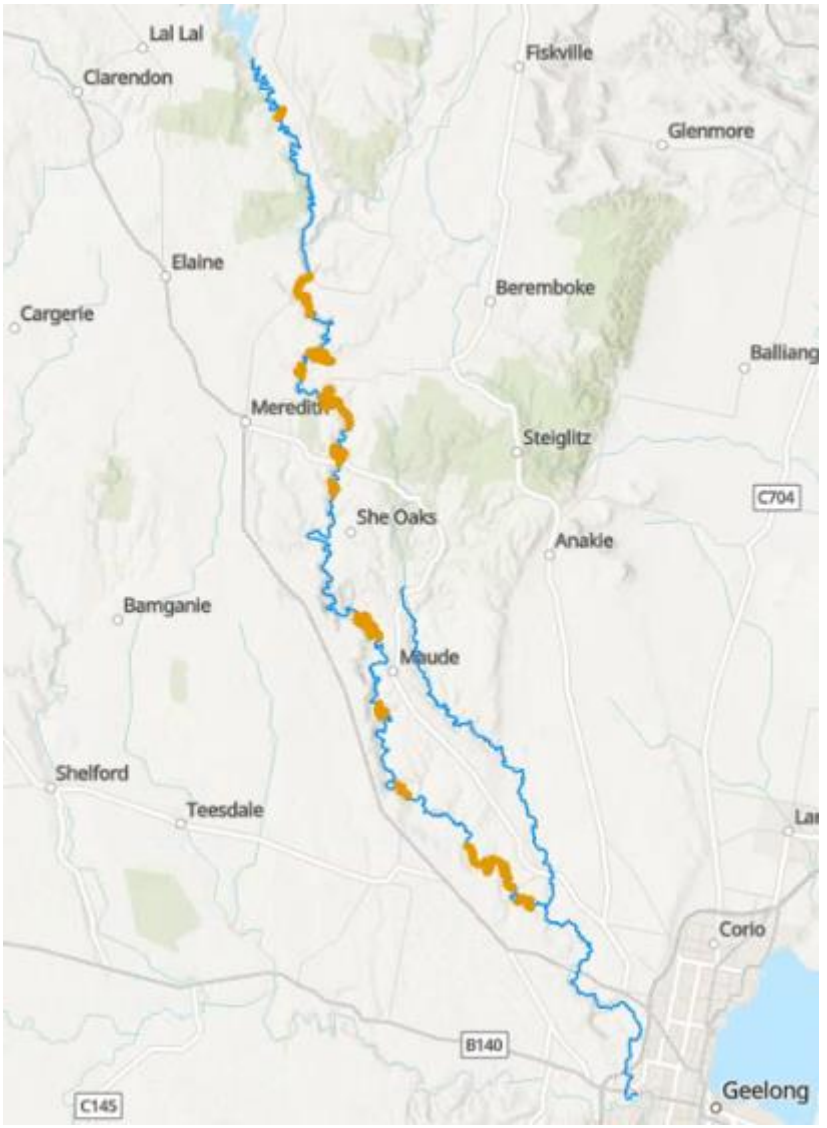
[13] Weed control is based on percentage coverage of all weeds and estimated percentage coverage of crack willow

Table 17: Management outcome findings for riparian management

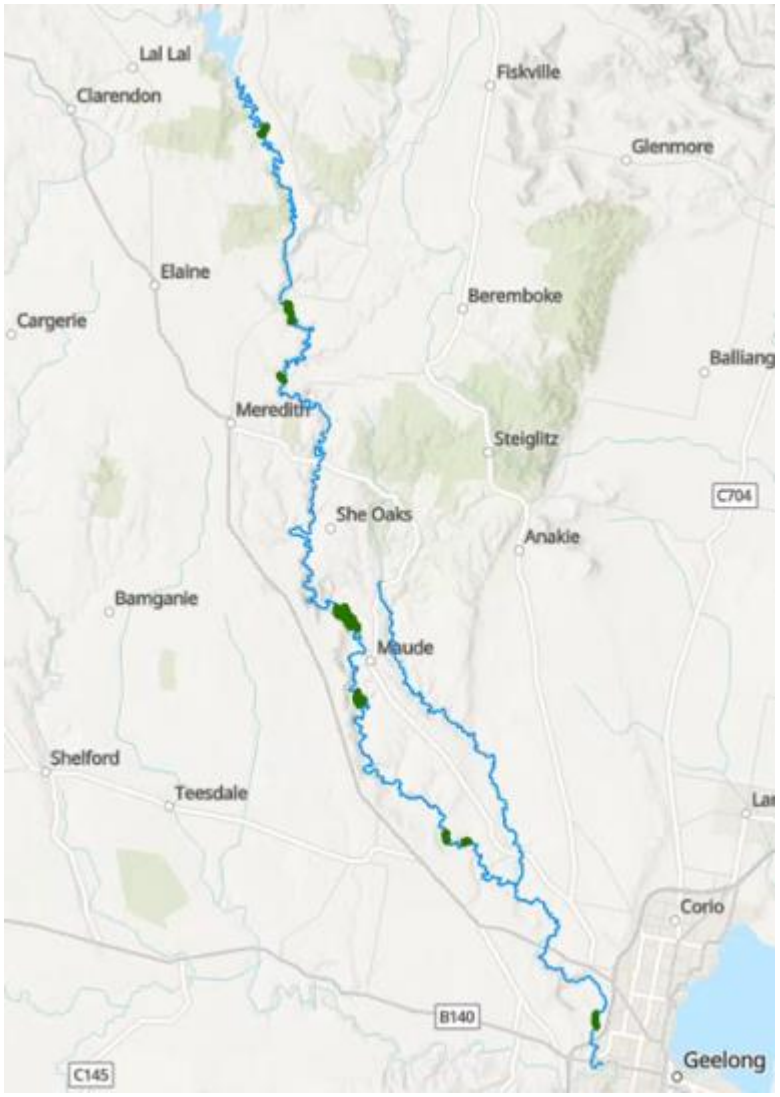
Desired Flagship outcome	Intermediate outcome performance expectation 2016-2024	Management outcome performance expectations 2016-2020	Key findings	Evidence quality rating	Assessment of progress (contribution) towards longer term outcomes
Native canopy cover increased from 2016 baseline (348ha riparian area without native vegetation). Woody weeds decreased (willows 5ha and woody weeds 20ha) within and upstream of project area	By June 2020, the CMA with MCLG and GLN will have established and maintained management agreements with landholders to improve 50ha of riparian vegetation along priority reaches of the Moorabool River By June 2024, the CMA with MCLG and GLN will have established and maintained management agreements with landholders to improve an additional 60ha of riparian vegetation along priority reaches of the Moorabool River	By June 2024, management agreements will have been inspected under riparian works review and 35ha additional works to maintain riparian land.	The Riparian Works Review process for Victoria did not commence until 2019. The CMA produced an initial report on a small regional sample size in 2021 (Kaartinen-Price, 2021). During 2019 – 2021 77 properties were assessed region wide and including the Moorabool. On track for June 2024 with a total of 17 inspections to date under EC5 and organising contractor procurement for sites eligible for maintenance.		Management and intermediate outcomes indicate progress towards longer term outcomes. Revisiting past sites using the RWR process (with some CMA additional parameters) is important to help sustain riparian works in the longer term. Most importantly, it re-engages CMA staff with landholders so that we can understand issues they may be experiencing with existing sites and gauge interest in further work. From the data collected through RWR inspections and other site visits, the CMA will investigate whether there is an issue emerging with survival rates of plantings. Pending the outcome of this investigation, further work maybe required
		By June 2024 landholders with agreement will have completed works to improve an additional 30ha riparian vegetation	On track; 12 sites contracted and works are underway. Some sites have large buffers and good remnant vegetation and the total contracted under EC5 is 85ha. Assessment of Flagship data to June 2023 highlight that: • 165.6ha of management agreements have been established which is above the 110ha desired by the end of 2024. • 49.6ha of native vegetation established • 76.6ha of weed control (9ha of willow) which is ahead of the desired outcome		



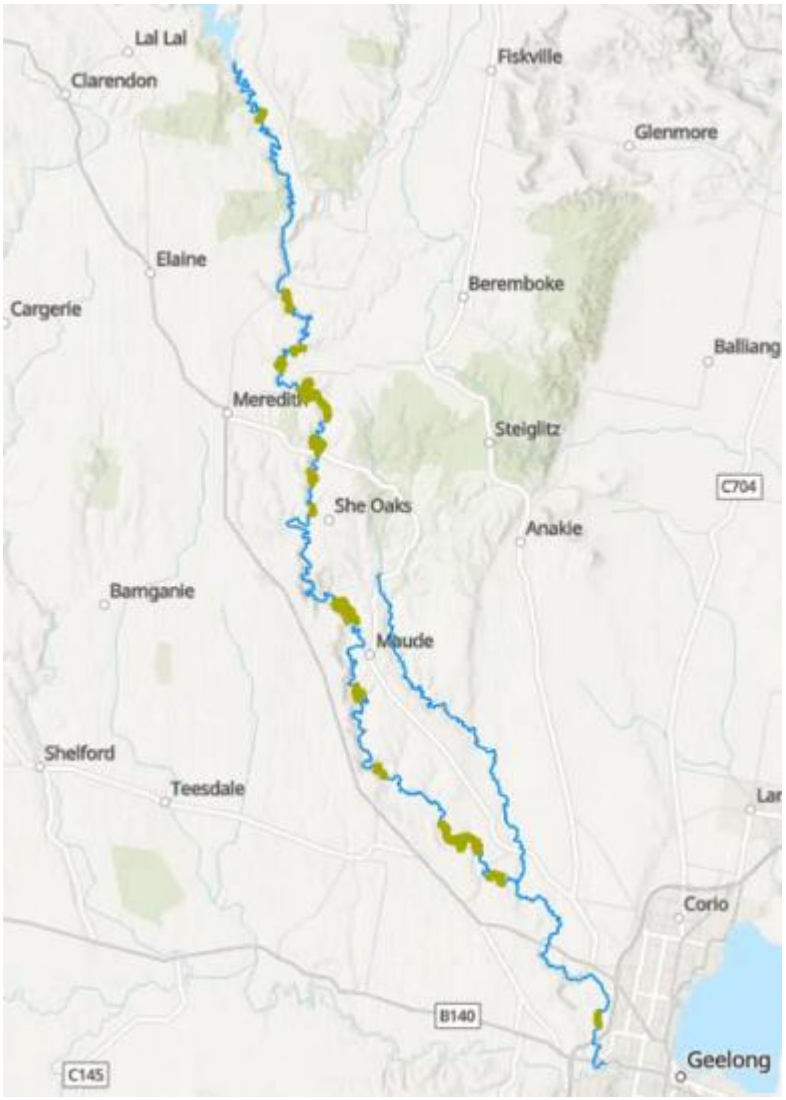
(a): River reaches



(b): Management agreements



(c): Vegetation



(d): Weed control

Figure 5: Spatial representation of where agreements exist and works have been undertaken within the Flagship

The original design for the Living Moorabool Flagship established an outcome associated with an additional improved canopy cover in priority reaches. Discussion between the CMA and DEECA identified some opportunities to improve the metrics associated with this from EC6 and beyond. Appendix 9 summarises the results of this discussion.

Planting success did not emerge as an issue from the Riparian Works Review, but it was raised in some interview responses, for various reasons (see Case Study below). Planting success is a key element to achievement of the outcomes. This matter has been identified as a new knowledge gap to be addressed (Section 3.8).

Other critical assumptions related to riparian management are associated with landholder uptake in priority areas and their ability to maintain sites. Landholder uptake for grant funding is a body of work that needs to be constantly reviewed, especially as the pool of more willing landholders may diminish in a catchment over time and different tactics may be required to address priority riparian sites. The ability of landholders to maintain their sites varies from landholder to landholder. Site visits under the riparian works review enable a follow up with landholders to provide advice or gain an understanding of what impediments to maintenance they may have. Corangamite CMA provides funding for maintenance at eligible sites.

The riparian works review has many benefits for the CMA as it complements spatial information. A case study of the riparian works review in the Moorabool is presented below. The specific landholder case is only one example of what a landholder may experience and not representative of all.

Riparian Works Review Case Study

This case presents the benefits of the CCMA following up with landholders over time to gain a greater appreciation of issues and support where feasible maintenance funding.

DEECA worked with CMAs to introduce the Riparian Works Reviews (RWRs) in 2019. The reviews involve a site visit and landholder survey at all new sites (pre- and post-works) and then a selection of sites at three and eight years post-works. The purpose of the RWRs include :

- Confirm that site condition is improving and riparian management agreements are being observed
- support landholders by providing management advice
- check whether there are emerging threats that need to be managed and where eligible provide maintenance funds to assist
- check landholder satisfaction with the project and any emerging barriers or opportunities
- provide useful feedback to DEECA about how riparian management works are being implemented

Table 18 lists the number of RWRs in the whole Moorabool catchment since 2020, including the Living Moorabool Flagship.

Table 18: Riparian works review assessments in the Moorabool catchment

	2020 / 21	2021 /22	2022 / 23	2023 / 24
Pre Works	0	0	13	0
Completion of Works	6	0	0	12
Year 3	0	0	7	5 to date
Year 8	0	1	7	1 to date

Without a detailed analysis of results yet, the RWRs completed have not observed issues in revegetation survival even though some sites have been impacted by floods, low rainfall or native animal browsing. Weed control success has been negatively affected by high rainfall in some areas and increasing herbicide prices across the board. This makes it more challenging for landholders to keep up with maintenance. The two photos below are of the same property on the Moorabool, in reach 32-2 below She Oaks Weir. The photo on the left was taken in May 2017, prior to any works being undertaken.

The photo on the right was taken in 2024, showing supplementary planting that took place in 2023 with funding made available from the maintenance pool. This was required after revegetation failure was reported by the landholder in 2021 because of wallaby browsing. This planting used taller wallaby-resistant guards which are holding up against native animal grazers, but many shrubs and ground covers have still dried out. The landholder has had great success with deep-ripping on other parts of their property, but this was not undertaken at this site due to cultural heritage sensitivity. The smaller plants may not have been able to penetrate the soil compacted by generations of livestock camping under the remnant trees and vehicles driving the outskirts of the paddock. If the same revegetation was attempted again, a consultation with traditional owners would be undertaken.

Figure 6: Photo points of a property in reach 32-2, following RWR inspections

Instream habitat and connectivity

The theory for the instream habitat is based on increasing good riparian management to improve shading, instream habitat and improved water quality combined with the benefits of increased environmental entitlement to improve connectivity and water quality. Along with physical management of barriers, these interventions enhance water quality and food sources to support fish and platypus and allow for their movement. (Corangamite CMA, nd). This is reflected by the intervention logics in Appendix 2. These logic models were developed when the Flagship was originally designed (Corangamite CMA and Riverness, 2017). This evaluation will focus just on connectivity targets as expressed in the current version of the MEL Plan (Corangamite CMA, 2023), but it is recommended that targets are reviewed once the strategy for connectivity is completed.

The work to date in this theme, highlighted in Table 19, demonstrates that a lot of the foundational activities have either been completed or are in progress. The increase in knowledge on the most cost-effective approaches to managing barriers to achieve desired connectivity and resilient habitat refugia is important. One reason for this is that to date it has proven difficult for Corangamite CMA to receive capital funding to address barriers and fish passage issues (Corangamite CMA, 2021) and it may take several cycles of applying for funding.

Key sources of information that should inform future strategy includes:

1. The completion in 2016 of the priority barriers (Marsden, et al., 2016)
2. A collaborative project with Barwon Water has funded a research investigation that will consider the relationship between environmental flows and barrier drown outs. The PhD research through Deakin University is due to be completed at the end of 2024.

3. The Moorabool FLOWS update (Jacobs Australia, 2015) recommended that one of the barriers should not be modified as it supports a critical refugia during dry or drought conditions.
4. Review of systemic constraints that limit the ability to deliver environmental flows, for example Dolly's Creek Crossing (Corangamite CMA, 2023)

Figure 7 illustrates the barriers in the Moorabool West branch from She-Oaks weir downstream and Table 20 highlights the ability to drown out the barriers since the Flagship commenced using the delivery of the current environmental entitlement.

The barrier issue is illustrated in Figure 8. The photo on the left illustrates the stranding of fish at Batesford Quarry channel in 2020; the photo on the right was taken at Batesford Quarry channel in 2023.

Table 19: Management outcome findings for instream habitat and connectivity

Desired Flagship outcome	Intermediate outcome performance expectation 2016-2024	Management outcome performance expectations 2016-2024	Key findings	Evidence quality rating	Assessment of progress (contribution) towards longer term outcomes
Instream habitat and connectivity enhanced through barrier management to enable fish, eel and platypus movement	By 2025, strategies to manage connectivity can be implemented due to increased understanding of barrier management options	By 2017, investigation into fish passage prioritisation for the Barwon and Moorabool completed	This independent report was completed into fish barrier prioritisation for the Barwon and Moorabool Rivers in 2016. Migration barriers within these systems have negative impacts on the fish communities and the impact of individual barriers varies depending on how they are constructed and their mode of operation. Environmental watering objectives in the Moorabool River system include protecting and boosting native fish populations (including Australian grayling, southern pygmy perch, spotted galaxias, tupong and short-finned eel) by providing flows for fish to move upstream and downstream and encouraging fish to spawn. It also ensures fish and other water animals have a range of habitat pools and places to shelter. Environmental watering is also used to improve water quality. Barriers can be drowned out by flows at specific times to enable connectivity or they can be modified. The prioritisation report combined with more recent information and the future PhD thesis will support future work to address improved connectivity.	Strong	The delivery of e-water has been successful at delivering 13 summer / autumn freshes at recommended levels and appropriate time of year to drown out barriers to promote fish and platypus movement and trigger downstream spawning migration of adult short-finned eel and grayling. It has been successful at delivering seven winter/spring freshes at recommended levels and appropriate time of year to drown out barriers to promote fish and platypus movement and trigger downstream spawning migration of adult tupong; and upstream migration of juvenile galaxias, tupong, short-finned eel, and grayling. More work is needed to look at the combined benefits of delivering e-water, riparian management, and barrier management for connectivity.
		By 2022, the Central and Gippsland SWS identifies the need to investigate Moorabool River at Batesford Quarry	The SWS (2022) has identified an action (action 8-1) to investigate and restore the Moorabool at Batesford quarry. The 2016 barrier prioritisation report identified this site as challenging. Under low to no flow conditions fish have been stranded in drying pools and following recent floods there is evidence of more deterioration of the concrete channel. A collaborative project has commenced with WTOAC, DEECA and the CMA to implement action 8-1 in the SWS.	Strong	

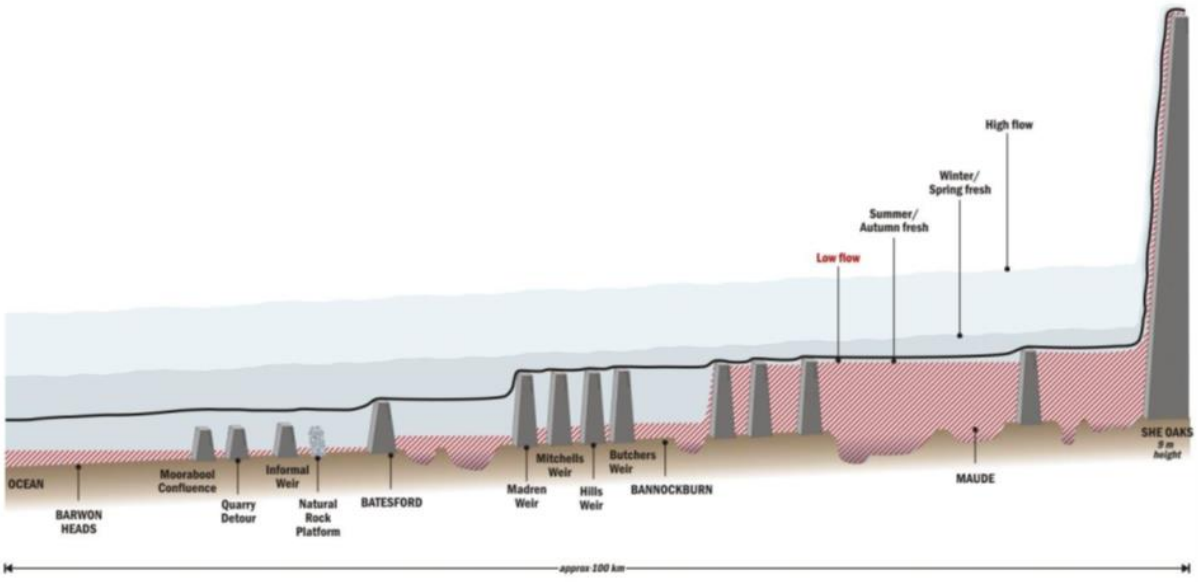


Figure 7: Weirs along the Moorabool River from She Oaks

Corangamite CMA investigated the number of times the relevant freshes (fresh water releases) recommended in the FLOWS study would have drowned out barriers. A summary is provided in Table 20.

Table 20: Moorabool River barrier drown outs

Water Year	No. of summer/autumn freshes	No. of winter/spring freshes
FLOWS: response to fresh	Flush silt, and scour biofilms and algae from streambed (M1). Water fringing marginal zone vegetation (V2, V3). Allow fish and platypus movement through the reach and maintain access to habitat (F1, F2). Trigger downstream spawning migration of adult short-finned eel and grayling (F1).	Allow fish and platypus movement through the reach and maintain access to habitat (F1, F2). Trigger downstream spawning migration of adult tupong. Upstream migration of juvenile galaxias, tupong, short-finned eel and grayling (F1). Flush silt, and scour biofilms and algae from streambed (M1) and transport of organic matter (W2). Promote growth and Wet/Average 162ML/Day.
What is drowned out	Barriers below Batesford	Barriers below She Oaks
2016-2017	1 for 5days	1 for 3 days,
2017-2018	1 for 5days	1 for 4 days, 1 for 5days
2018-2019	2 for 5 days	1 for 5 days
2019-2020	2 for 5 days, 1 a bit low for 5 days	2 for 5 days
2020-2021	2 for 5days	1 for 3 days
Total drown outs	8 times at recommended level at correct time of year	6 times at recommended level at correct time of year

Figure 8: Batesford channel during no flow (left) in 2020 and flow of approximately 32ML/d in 2023

Monitoring information for a variety of parameters will help inform this longer term outcome. For example (but not limited to):

1. The Great Australian Platypus Search Results (Griffiths, et al., 2022)
2. Various Environmental Flows monitoring reports that either include the Moorabool directly or is assumed to be representative of the Moorabool (Arthur Rylah Institute, 2017; Tonkin, et al., 2020; Jones & Backstrom, 2023; ARI VEFMAP Stage 7 Long-term fish condition monitoring; ARI VEFMAP Stage 7 Vegetation Theme)
3. Streamflow information over time and environmental water releases
4. Riparian extent
5. Water quality from gauge data and/or citizen scientists

The main issue is that the information is not currently structured in a way that enables the collective teams working on the Living Moorabool to interrogate the information to better understand priority issues for planning purposes, emerging knowledge gaps and reporting progress against a long-term outcome.

5. Reflections and future directions

This section starts to consider the findings from the evaluation and what may need to be adapted to enhance achievement of outcomes going forward. This narrative has been sourced from a sense-making workshop held with key delivery partners and the analysis of specific evaluation findings.

5.1 Do the approaches remain appropriate?

This question focused on whether the external operating environment that could impact on the Moorabool was changing and therefore, how the Flagship delivery should respond to these.

Table 21 summarises the information from the workshop with key delivery partners and the information from how the Flagship should respond is combined with the other Flagship evaluation findings to inform the recommendations in the next section. The highlights in the table below reflect the workshop identification of the key matters to which the Flagship should respond.

Table 21: Identification of any changes to the operating environment that will impact on the Flagship

Operating environment changes	How the Flagship should respond
Organisations	Ensure that the corporate knowledge associated with the Flagship and how it has evolved over time is maintained, accessible and shared. Generally improved communication and engagement across key organisations.
Natural roll over of key staff in all organisations and there is a need to not lose Flagship related knowledge or relationships.	Living Moorabool governance group is very important, based on early experience in the Flagship and other significant regional integrated projects. Need to re-invigorate this group to include key partners outside of the CMA. A coordinator is critical to the success of this group.
Greater trust between some community based organisations and organisations in the Moorabool and this is critical to stronger partnerships.	A governance group could provide oversight on the MEL implementation; progress towards targets; and strategies to address progress.
WTOAC are experiencing pressure from all sectors and staff changes.	Allow WTOAC to grow at their own pace and decide their priorities.
Barwon Water have an increasing focus on waterway health and finding ways in which they are less reliant on surface water.	For WTOAC to be able to participate as partners there needs to be a specific budget for WTOAC to support their participation and consultation.
CCMA has numerous touch points into multiple forums that will influence outcomes for the Living Moorabool (e.g. Barwon and CHW IWM Forums, Committee that oversights implementation of SWS).	Need to ensure that the Moorabool remains a focus into the other critical forums and representatives remain briefed on the Flagship.
Growing relationship with Deakin University.	Need to ensure we engage with other key groups such as PALM and better communicate what is being achieved on the Moorabool, not just what is happening.
Working more closely with Landcare on various fronts within the Flagship.	Landcare funded for ongoing delivery.
Landscapes / environment	All the relevant organisations need to ensure they are contributing to the planning processes at critical times through their statutory roles. Opportunity for key delivery partners for the Flagship to outline collective requirements for the Moorabool and meet with CoGG.
Western Growth area and what impact this will have on the Lower Moorabool from landscape, urban water supply, water quality and amenity perspectives.	Population growth also provides opportunities to create awareness and advocates for the river and
Batesford quarry remediation and ultimately where the water will come from.	
Landuse change to smaller holdings / lifestyle usage with off-farm income.	
Farm dams and amenity dams – awareness has increased following the work of PALM and there is also an action within the SWS to investigate. The current PhD on the Moorabool is also modelling impact.	

Operating environment changes	How the Flagship should respond
There has been an extended wet period since the Flagship started; need to better understand how resilient the system will be during an extended dry / drought period. More consideration needs to be given to broadening the Flagship footprint – particularly the East Branch. Recognition of a cultural landscape.	broader environmental values. Opportunity to think outside the box with how the broader collective engages with the population. Greater opportunity to link with other relevant programs for lifestylers (eg Small Blocks Big Dreams). Changing land use and demographics may result in the need for a specific social analysis of values and aspirations for urban, lifestylers and farmers. Newly formed governance group need to consider the role of farm dams and how the Flagship can best work with responsible authorities (e.g. Southern Rural Water) to address.
Socio-political	
PALM are respected advocates for the river. There is strength and motivation in community groups. Covid-19 changed meeting habits and impacted governance and coordination. Emerging environmental markets – are they a tool? Citizen Science is a significant touch point to community for CCMA and is important to Landcare and Friends of Groups. Note volunteering has dropped across Victoria since Covid. Traditional investment (State and Federal) is reducing. Influence of upcoming new Victorian Waterway Management Strategy and renewal of Regional Waterway Strategy. Stronger Climate policy statements and concept of three pathways for a river system – resilient; transitioning and transformed. Water is Life, TO program and Country Plan – respect and self-determination. State documents that make specific mention of Moorabool including new SWS and the Rivers of Barwon Action Plan. Covid increased communities use of waterways for recreation and amenity.	Need to better understand what the current knowledge is telling us about the Moorabool and capitalise on this information (e.g. PhD study and others) and research partnerships. Need to ensure long-term monitoring of outcomes and catchment state and to publish results more broadly and in an easily accessible form. Work closely with the CMA's Sustainable Agricultural Facilitator to connect landholders to information and advice including emerging environmental markets. Demonstrate how Citizen Science information is being used for the Flagship. Can't rely on existing government funding alone. Need to be better at leveraging ($, resources and knowledge) as well as using simple outward reporting of catchment condition etc to attract new funding sources. Also need to leverage off State related documents that make specific mention of Moorabool. Also need to leverage / compliment other projects (e.g. Kitjarra-dja-bul Bullarto Langi-ut; Small Blocks Big Dreams etc). Flagship footprint now and into future needs to be considered.

5.2 Based on our learnings what do we want to adapt or significantly change?

It was identified that the components exist for a strong Flagship for the Living Moorabool but there is a need to:

- enhance some existing elements (e.g. project integration and communications)
- re-invigorate past aspects (e.g. governance group to oversee the Flagship)
- establish missing components (e.g. outwardly communicating what is being achieved and not just what activities have been undertaken)

The workshop participants identified some strengths from the existing Flagship that will be foundational to strengthening it in the future:

- Excellent existing partnerships at project scale

- As a Flagship there is a long-term commitment to the Living Moorabool
- Need to maintain and enhance the coordinator role for the Flagship
- Active community for advocacy and involvement, including long-term citizen science volunteers
- Relationships with WTOAC are strong
- Have an increased environmental water entitlement through the SWS process but it is recognised that it is still not enough to achieve objectives and there is still the need to manage delivery constrictions
- Have the basis for continuous communications in place through regular newsletters and use of other platforms but can still do more work to strengthen the integration, acknowledgement of work being part of the Flagship and sharing more on the bigger picture of the Living Moorabool.

Recommendations

The recommendations can be clustered under three core headings as presented below. It should be noted that achieving all the recommendations will be resource dependent and some may become obsolete as external circumstances change. Therefore, a process is required to prioritise the recommendations and track their need over time.

Governance

1. Maintain the Flagship Coordinator role

Ensure sufficient funding to maintain and strengthen the coordinator role as experience with this and the Barwon Flagship demonstrates that the role improves integration across projects, facilitates knowledge sharing and coordinated engagement. In addition, they coordinate the implementation of the Flagship's strategic plans, including MEL, with all parties.

2. Reform a governance group with key delivery partners

The CMA should determine with key delivery partners if there is an appetite to reform a governance group that has strategic oversight for the implementation of MEL, communication of achievements and other projects that will contribute to the outcomes for the Flagship. A similar group exists for the Barwon Flagship and the benefits of the group have been expressed through the evaluation of the Barwon Flagship.

3. Revisit the geographic footprint for the Living Moorabool

Work with delivery partners to review the current geographic footprint, given delivery partner interests across the whole catchment and the opportunity this provides to leverage capacity for broader catchment management benefits. Extending the focus upstream (east and west branch) addresses a new but small entitlement on the east branch, riparian management issues, and the opportunity to leverage from Water Authorities due to greater inclusion of water supply catchments. In addition, the East Branch of the Moorabool has increasing interest for WTOAC.

Any consideration to the extension of the geographic footprint would need all partners to consider implications such as extending the coordinator role and evaluation requirements and how these would be funded.

4. Explore the need for an outward facing delivery plan for the Moorabool

With key delivery partners, develop a plan for implementation that more easily communicates the needs and management strategies for the Flagship area.

It would be anticipated that this builds from the planning work undertaken in 2018 that defined the vision, strategies and in most cases longer term outcomes. Unfortunately, this information is not easily accessible to a broader audience as it is documented within the MEL Plan. Such a plan cannot be considered in isolation of some of the other recommendations if they progress. For example, the geographic footprint, establishment of governance group, updating of the MEL Plan and the development of a report card.

5. Update the MEL Plan to reflect changes to the Living Moorabool

The implementation of the recommendations may change aspects of the Flagship and where relevant, these should be reflected in an updated MEL Plan. It is important to do this as a collective (delivery partners and CMA staff) to ensure broader ownership following staff turnover since 2017 and identification of complementary evidence sources.

Leverage

Within the context of the following recommendations, leverage is being considered as an opportunity to use the knowledge, skills and results of the Living Moorabool to gain other complementary knowledge, obtain additional funding or resourcing input.

The outcome expectations as expressed in Figure 2 go beyond the traditional environmental contribution funding that the CMA receives and some of the tasks are beyond Corangamite CMA's responsibility. So, it is worthwhile considering the breadth of the Living Moorabool Flagship like a core and satellite delivery model, as expressed in Figure 9. This makes it quite clear what is EC-sourced funding and what other leveraging techniques may need to be used for different satellites.

Figure 9: Core and satellite model for the Living Moorabool

6. Recognise that the Living Moorabool is more than the core funded activities that the CMA undertakes

Use the core and satellite model to determine how best to deliver broader strategies and outcomes for the Living Moorabool. For example:

- the CMA to discuss with Barwon Water and Central Highlands Water their plans for delivery against the C&G SWS demand management action (Action 2-1 Changing behaviours at home) and the opportunities for increasing awareness of where urban water users' water is sourced.
- To collectively identify priority knowledge gaps and how these could be addressed through the research partnership with Deakin University

Therefore, there is the need for the Flagship coordination role to facilitate or promote opportunities with delivery partners to deliver strategies relevant to the other pillars for the Flagship. While two examples are given within this recommendation, it is closely linked to recommendation 7 and 8 below.

7. Strengthen how we address strategies that are beyond traditional EC funds

While considering the core and satellite model, also be conscious that there are numerous strategies yet to be planned and implemented within the context of Living Moorabool outcomes and some of these may use several leveraging tactics. Sustainable recreational use is a key one under the Healthy people pillar. Develop a collective approach to promote and manage a more sustainable use of priority sites along the river with all the Crown Land managers that uses a mix of:

- existing information (e.g. completed study on Pathogen Risk Assessment (Billington & Deere, 2022)) that highlights some issues at sites and opportunities (e.g. linkage with funding opportunities through Kitjarra-dja bull Bullarto Langi-ut Masterplan)
- new information from de-identified mobile phone data to better understand the more popular sites and whether they are visited by locals or those from further away

This work will be complemented by implementation of the Kitjarra-dja bull Bullarto Langi-ut Masterplan and "business as usual activities" of Land Managers for the River Reserves along the Moorabool.

8. Defining how we address those threats that don't have a defined strategy

Farm dams have been identified as a threat to catchment inflows into the Moorabool and the role of farm dams in the catchment should be considered within the Flagship project. A PhD due to be finished at the end of 2024 is modelling farm dam impacts; these findings can be interrogated with the findings from the work undertaken by People for a Living Moorabool (PALM) as well as Action 4-17 in the C&GR SWS. There is an opportunity to work more proactively with Southern Rural Water to address these findings.

Furthermore, the impact of a drying climate on the Moorabool as expressed in LTWRA (Department of Environment, Land, Water and Planning, 2020) requires a climate change planning lens over the Moorabool.

9. Attracting other funding sources

Incorporate within recommendation 4 an appropriate plan to attract new funding sources. This would also consider how we broaden partnerships for example:

- Maintain and strengthen existing partnerships for the active management of citizen science programs such as the philanthropic investment for River Detectives, MoUs with Water Authorities, and partnership approaches with Landcare and WTOAC.
- Corangamite CMA has a good working partnership with VRFish and together with the Victorian Fisheries Authority could look at complimentary projects that support all pillars of the Flagship.

10. Co-ordinated Communication and Engagement

Look to strengthen the opportunities for coordinated communications within the CMA and across stakeholder groups. Currently, Corangamite CMA provides opportunities for delivery partners to contribute to the Living Moorabool newsletter published twice per annum, or to present at knowledge forums held every two years. There is an opportunity to strengthen these ties, including common messaging for the Moorabool catchment.

11. Support WTOAC to develop the healthy culture pillar

Funding support has been accessed to enable WTOAC to work at their own pace to define the Healthy culture pillar. This will build from WTOAC's contribution to the planning day in 2017 and all partners will support WTOAC through this process.

Knowledge

12. Synthesis and analysis of current information for the Moorabool

There is a need to synthesise all the new information for the Moorabool and have a summit to better understand any new threats, knowledge gaps and intervention opportunities.

The issue to date with the new information is that it has not been presented in a way that enables a collective analysis to occur. It would be ideal if this occurred once the Deakin University PhD studies were completed in late 2024.

An example of this is how to better manage barriers in the Moorabool with the information on fish populations, flows over time and barrier drown outs, study of priority barriers and the Deakin University PhD due at the end of the year.

13. Prioritising knowledge gaps and investment

Once a synthesis and critique of current knowledge is completed there is the opportunity to prioritise these knowledge gaps and embark on a process of addressing the priority knowledge gaps. This recommendation is also related to how we can leverage to deliver against outcomes for the Flagship.

14. Addressing outcome monitoring gaps

As the MEL Plan is updated, any gaps in the outcome monitoring need to be addressed and a detailed monitoring plan appended to the MEL Plan.

15. Communicate progress and achievements

Corangamite CMA is currently designing a report card approach to better communicate condition and achievements in our priority catchments. The Living Moorabool Flagship is being recommended as a pilot. It is probable that some of the information required to support the report card will be under a data sharing agreement with other organisations.

16. Maintain tacit knowledge related to the Flagship

The Flagship project is a long-term project (40 years) and naturally over that time there will be a turnover of staff across the organisations involved in implementing it. Explicit knowledge is readily documented and stored but a process should be established to capture the tacit knowledge. This is information that is not obviously captured and usually associated with a person's experience in the catchment. For example, during this evaluation the person who devised the Living Moorabool and no longer works at the CMA was contacted about the reasons for the current spatial footprint as no CMA staff working on the Flagship now were involved in its initial design. There are many different ways to capture this information, de-briefs, interviews, project journals are just a few examples.

17. Evaluation processes

From the end of EC6, there may be a requirement from DEECA to evaluate both the regional Flagships every four years. How this is resourced needs to be considered at the beginning of the funding round because to do them properly requires reasonable lead time and appropriate

resources to lead internally, procure services or a combination of both. Related to this is the ongoing process of ensuring the evidence sources are in an easily accessible form so the evaluation process is more efficient.

It is also recommended to maintain the mid-term reviews for the Flagship as introduced in EC5 as this provided an opportunity to collectively reflect on progress and adapt implementation as required.

Appendices

Appendix 1: Documents cited

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Appendix 2: Current MEL theories of change

The following theories of change should be read from bottom to top (desired outcomes at the top) and ideally follow one intervention pathway from bottom to top.

(Note for draft the logics are provided separately but will be incorporated into the Appendix in Final Report)

Appendix 3: Timeline of events related to the Living Moorabool Flagship

External to Flagship		Within Flagship
EC4 Funding from DEECA	**2016**	Flagship commences as one of first of nine pilots around state. Assessments of Flagship environmental targets as part of planning phase. e-water, citizen science and riparian works commence with EC4 funding.
	2017	Ministerial launch on the Moorabool. Static web page developed . MEL Plan developed by consultant.
Flagship coordination sits within newly formed Strategy and Planning Services Group. Strategy and Planning Service General Manager commences (Jan.) Strategy project officer commences (and takes on coordination role) (Mar/Apr) in part-time capacity. Manager of Strategy (manages project officer) position remains vacant	**2018**	Coordination for EC4 funded from Caretaker Waterway Health in absence of other funding. Stronger internal recognition that Flagship needs to better integrate riparian, e-water and citizen science as ICM project. e-water, citizen science and riparian works continue with EC4 funding. Community and stakeholder planning day held at Meredith to better define “the Living Moorabool” (November.)
Manager Strategy commenced in May 2019. DEECA trial as a one-off a reporting format for Flagships state-wide.	**2019**	EC4 Communications & Engagement Plan developed (February). A small consultative group from planning day forms to do further work to define objectives and vision– these are reflected in an updated MEL Plan and illustrated in outcome hierarchy. e-water, citizen science and riparian works continue as per their EC4 funding bid. MEL Plan updated to try and simplify from consultant’s version. 1st e-newsletter distributed (possibly September). 1st Knowledge Forum (November) held at Bannockburn with presentations and field trip
March 2020 Covid impacts on work commence. EC5 project development commences with guidelines from DEECA highlighting added specific requirements for Flagships. EC4 tranche finishes in June 2020.	**2020**	EC5 Flagship project submitted as one integrated project funded from different EC5 funding streams to ensure greater integration across projects. e-water, citizen science and riparian works with EC4 funding are finalised in June as per EC4 funding bid.

External to Flagship		Within Flagship
DEECA funds CMA to implement a new Barwon Flagship following completion of Barwon Ministerial Advisory Committee Report. Work on renewal of Regional Catchment Strategy (RCS) commences and is lead by Manager Strategy and supported by Strategy project officer (Flagship coordinator)		Flagship commences under EC5 as more integrated project delivering e-water, riparian and citizen science projects under a single reporting platform to DEECA. DEECA requires stronger governance with MEL Plan in a revised format, Comms and Engagement Plan and project governance for all Flagships
First Strategy project officer (Flagship coordinator) leaves early February 2021. Second Strategy project officer (Flagship coordinator) commences mid July 2021 in part-time capacity. Additional communication and engagement officer at CMA commences December 2021; they provide some C&E support for both Flagships. Platforms for project management (DEECA) and file management (CMA) change. EC5 funding agreement signed off and due to Covid, supply bill funding had been provided to all CMAs to support staff retention and commence delivery of EC5 projects.	**2021**	New webpage developed on Corangamite CMA website following whole of website re-development. Flagship continues under EC5 as more integrated project delivering e-water, riparian and citizen science projects. Due to resource constraints and the requirement to focus on RCS renewal, final evaluation of Corangamite Waterway Strategy (CWS 2014) and establishment of new complex Barwon Flagship, GM Strategy and Planning decides to limit support to coordination role for Flagship. Coordinator is a project officer in the Strategy Team to support RCS, CWS and Barwon Flagship in their part-time capacity.
Final evaluation of Corangamite Waterway Strategy commenced and lead by GM Strategy and Planning with support from Strategy Team project officer (Flagship coordinator). Second Strategy project officer (Flagship co-ordinator) left late Sept 2022. RCS Renewal completed.	**2022**	Quarterly catch up of Flagship team commences. Summer 2021/22 e-newsletters become more regular (twice per year.) Mid term EC5 reviews progress and any actions to be taken in the second half of EC5. EC5 Comms. & Engagement Plan developed and finalised in December. Its review and renewal are on-going. Flagship continues under EC5 as more integrated project delivering e-water, riparian and citizen science projects.
Third Strategy project officer (Flagship coordinator) commences in March part-time. CWS Final Evaluation completed. GM Strategy and Planning steps down in July from role. They operated as Project Director for Flagship while GM. New acting GM in July; incorporates role as Project Director for Flagship. Guidance received from DEECA end Oct on their Flagship evaluation requirements.	**2023**	Second Knowledge Forum held (March.) Project Team shifts from quarterly catch ups to monthly short roundtables (April.) Existing MEL Plan updated to new DEECA format. Flagship continues under EC5 as more integrated project delivering e-water, riparian and citizen science projects. EC4-EC5 evaluation of Flagship commenced in November 2023 and is due to finish February 2024.

Appendix 4: Evaluation questions and evidence sources

The following table is based on a specific evidence table developed for the EC4-EC5 Living Moorabool evaluation and is drawn from the overarching MEL Plan (Corangamite CMA, 2023).

Key evaluation question for EC4 - EC5	Specific Evaluation Question	Evidence sources	Responsibility for collection and collation	Evaluation approach
1. How well has the project delivered on the planned activities and outputs?	1.1 How well has the project delivered on project activities / milestones compared to planned? Riparian, e-water, CS, and Governance and planning	Investor reports and bi-monthly reports Contract and variations Interviews	Project coordinator and evaluation lead	Comparative analysis (planned vs actual)
	1.2 How well has the project delivered on project outputs compared to planned? Individual activities and total outputs overall	Investor reports and bi-monthly reports Contract and variations GIS extract of outputs against contract activities. Initially draw on Oct 2023 outputs and update for Dec 2023 outputs	Project coordinator and evaluation lead with support from GIS Team	Comparative analysis (planned vs actual)
2. What factors impacted on the effectiveness of project implementation either positively or negatively	2.1 What factors associated with project delivery had positive or negative impact on effectiveness of project implementation?	KEQ1 information Project manager interviews regarding reasons for variation Other evidence project managers may refer to in interviews	Consultants will undertake interviews Evaluation lead draft interview protocol Evaluation lead will undertake some interviews	Narrative regarding variation with KEQ1
	2.2 To what extent were there unintended outcomes associated with project implementation?	Project manager and key stakeholder interviews regarding unexpected results or outcomes	Consultant will undertake interviews Evaluation lead will undertake some interviews	Narrative regarding variation with KEQ1
3. How effective has the Flagship governance been?	3.1 Running as an integrated project including communication and engagement	C&E Plan Evidence of use of plan based on C&E activities Interviews with C&E Co-ordinator and project Team	Project co-ordinator, Evaluation lead and Communications Team Consultant will undertake interviews	Narrative supported by evidence of use compared to rubric

Key evaluation question for EC4 - EC5	Specific Evaluation Question	Evidence sources	Responsibility for collection and collation	Evaluation approach
	3.2 Implementation of MEL and adaptive management practices to date	MEL Plan Interviews and documents that provide: Evidence that supports use and awareness – staff and governance group Evidence of MEL plan adaption and any project adaptation based on MEL findings Monitoring to support outcomes going forward	Coordinator Consultant will undertake interviews Project coordinator and Evaluation lead	Narrative supported by evidence of use compared to rubric
	3.3 Engaging key delivery partners, including governance arrangements of the project	Interviews and documents that support: Evidence of governance arrangements Evidence of work with WTOAC on the project Levels of satisfaction	Consultant will undertake interviews Evaluation lead will undertake some interviews Project coordinator and Evaluation lead	Narrative supported by evidence of use compared to rubric
4. To what extent is good practice being applied to Flagship delivery	To what extent are guidance, good practice and specific procedures being applied by project managers?	Procedures and evidence of approaches applied related to: Grant governance and riparian procedures Project governance VWPIF guidelines and DEECA guidance VEWH guidance and SWPs	CCMA project managers collate procedural information and application Interviews with Project Managers and Business & Governance group Evaluation lead re-desktop review of audit reports and relevant procedures	Comparative analysis Synthesis Triangulation
	To what extent is the Flagship applying CCMA procedures to ensure good governance of Flagship funding	Procedures and evidence of approaches applied related to: Procurement PMS Grant governance Financial statements and use of funding Process for requesting any financial variations		

Key evaluation question for EC4 - EC5	Specific Evaluation Question	Evidence sources	Responsibility for collection and collation	Evaluation approach
5. What has been put in place to address knowledge gaps? Have new knowledge gaps emerged and how will they impact on outcomes? (Section 3.3 of overarching MEL Plan)	1. Whether fish outcomes will be delivered without the need for removal of additional fish barriers	Barrier prioritisation report complete PhD investigation looking at barrier drowning and fish movement Outcome monitoring for e-water Fish surveys	Coordinator and Evaluation lead collate with project managers	Synthesis and narrative
	2. Whether water quality observations and waterbug surveys demonstrate benefits of environmental water delivery	Initial Alluvium report – complete Continued review of data for wet and dry years	Co-ordinator and Evaluation lead collate with project managers.	Synthesis and narrative
	3. Whether water recovery targets will be met and recovered water volumes are capable of being delivered to meet FLOW recommendations	Continue to work in partnership with WTOAC, DEECA, CHW and Barwon Water to implement relevant SWS actions Updated FLOWS study	Project managers collate	Synthesis and narrative
	4. The reach and impact of the awareness campaign for waterway amenity	Waterway amenity mapping change based on 2022 Baseline Pathogen risk assessment report to help focus attention Surveys & recreational site usage	CCMA with input from Delivery partners and community Completed with BW and consultants Surveys not available for this evaluation	Synthesis and narrative
6. How are we proceeding with addressing medium and low confidence assumptions? Have new assumptions emerged? Based on assumptions in overarching MEL Plan (section 3.2)	A1: Investment in amenity improvements will result in sustainable recreation use A3: Participation and awareness will change attitudes and practice A5: The flow regime and improved riparian vegetation will improve fish and platypus abundance A7: Grant recipients maintain sites A10: Environmental watering actions achieve FLOWS Study recommendations A8: Assumptions in 2016 FLOWS study are based on best available information and regularly updated with new information	Collate evidence sources identified in the overarching MEL Plan Workshop with staff and partners to identify any new evidence that increases confidence	Coordinator and Evaluation lead collate with project managers	Synthesis and analysis against theory of change

Key evaluation question for EC4 - EC5	Specific Evaluation Question	Evidence sources	Responsibility for collection and collation	Evaluation approach
	A9: Landholders within the targeted areas are willing to engage in riparian projects			
7. What measurable progress has been made towards the stated outcomes and did the project activities contribute to these. This is reflected in the performance expectations in the overarching MEL Plan	By June 2020 CCMA will have worked with partners to sustain water quality monitoring with citizen scientists at eight long-term monitoring sites By June 2022, Regional Citizen Science Officers will have partnered with WTOAC to plan and deliver training at one Wadawurrung-led event on the Moorabool River to increase Traditional Owner skills and knowledge in water science. By June 2024 CCMA will have worked with partners to sustain water quality monitoring with citizen scientists at eight long-term monitoring sites	Number of volunteers Number of regular sites monitored Partnerships Unintended outcomes Externalities Assumptions Interviews Other relevant research	Evaluation lead with project managers responding to follow-up questions	Synthesis, comparative analysis and analysis against theory of change
	By June 2022 waterway amenity baseline for the Moorabool has been completed	Report and baseline results Interview with staff	Evaluation lead with project managers responding to follow-up questions	Synthesis, narrative, analysis against theory of change
	By June 2020, three annual seasonal watering plans will have been delivered, in consultation with the Moorabool Surface Water Advisory Committee, and submitted to VEWH consistent with their requirements and timeframes to support the planning and water delivery for the Moorabool	Role of WTOAC Evidence of engagement with advisory committee on SWP Acceptance of SWP by VEWH Standard outputs Reported compliance against delivery	Evaluation lead with project managers responding to follow-up questions	Synthesis, comparative analysis and analysis against theory of change

Key evaluation question for EC4 - EC5	Specific Evaluation Question	Evidence sources	Responsibility for collection and collation	Evaluation approach
	By 2022 an additional 3GL /annum to be shared between environmental and cultural values has been confirmed in the 2022 Central and Gippsland Sustainable water Strategy By June 2024, three annual seasonal watering plans will have been delivered, in consultation with the Moorabool Surface Water Advisory Committee, and submitted to VEWH consistent with their requirements and timeframes to support the planning and water delivery for the Moorabool	Documented action in SWS Role of WTOAC Evidence of engagement with advisory committee on SWP Acceptance of SWP by VEWH Standard outputs Reported compliance against delivery	Evaluation lead with project managers responding to follow-up questions	Synthesis, comparative analysis and analysis against theory of change
	By June 2024 management agreements will have been inspected under riparian works review and 35ha additional works to maintain riparian land By June 2024 landholders with agreement will have completed works to improve an additional 30ha riparian vegetation	Standard outputs associated with riparian works Results from Riparian Works Review including landholder responses Standard outputs associated with new works contracted GIS analysis	Evaluation lead with project managers responding to follow-up questions	Synthesis, comparative analysis and analysis against theory of change
	By 2017 investigation into fish passage prioritisation for the Barwon and Moorabool completed By 2022 the Central and Gippsland SWS identifies the need to investigate Moorabool River at Batesford Quarry	Existence of completed documents	Evaluation lead with project managers responding to follow-up questions	Synthesis, comparative analysis and analysis against theory of change
8. Do the approaches remain appropriate to deliver longer term outcomes	Is the approach still relevant to the need of the landscape system: ICM approach Project focus areas Specific delivery approaches to address the outcomes Management phase The outcomes Does our understanding of assumptions or new evidence require change to delivery approach?	Documented reports Interviews Sense-making workshop	Evaluation lead	Comparative analysis Synthesis Triangulation Sense-making workshop (as part of other KEQ evaluative process)

Key evaluation question for EC4 - EC5	Specific Evaluation Question	Evidence sources	Responsibility for collection and collation	Evaluation approach
9. Based on our learnings what do we want to adapt or significantly change	For EC6 and longer term With MEL	Evaluation Findings Sense-making workshop	Evaluation lead	Narrative

Appendix 5: Semi-structured interview questions

Note the following questions varied depending on the interview participant and their association with the Flagship. As a semi-structured interview approach, additional questions could also be asked of the participant.

The first series of questions relate specifically to your specific project within the Flagship:

1. Can you please confirm how you been involved in the Living Moorabool Flagship?
2. For the work you have been involved in, can you provide an overview of how your project may have changed since 2017 and any reasons for why it may have changed over time?
3. Can you reflect on any impacts your project has had to date based on what has been delivered?
4. a. Is there anything over time that may have had a positive or negative influence on your ability to deliver your project or impacted on project outcomes? Considering your project, would you like to reflect on anything that stands out to you?
5. If you were starting again would you do anything differently your project, why?
6. Do you think there are new and emerging knowledge gaps for your project based on what you know now
7. What do you think your project's approach or focus should be for EC6?
8. Is there anything else about your project that you would like to add that you don't feel we have covered?

The next series of questions relate to the Flagship overall:

9. Overall, what do you think has worked well for the Flagship over time and why?
10. What do you think we could do differently going forward to achieve the Flagship outcomes (as described in the Monitoring, Evaluation and Learning Plan)?
11. Looking at the Flagship overall, would you like to reflect on anything that stands out to you about it?
12. Is there anything that you think we should do differently to deliver the Flagship?
13. Is there anything else about this Flagship that you would like to add that you don't feel we have covered?

1. Why are you and / or your organisation interested in the Moorabool Flagship Project?
2. How have you / your organisation been involved in the project to date, please outline how?
    a. In your or your organisations involvement with the Flagship, can you identify anything that has had a positive impact on delivery of any aspect of the Flagship project?
    b. or negative impact on delivery of any aspect of the Flagship project?
3. Are there ways you / your organisation currently contribute to achieving the Flagship outcomes?
4. Can you identify any future opportunities where you / your organisation could work more closely with the CMA to achieve Flagship outcomes?
5. What is working well in delivering the Living Moorabool project and why?
6. What do you think could be improved to deliver the project in the longer term and why?
7. Is there anything else about the Living Moorabool Flagship that you would like to add that you don't feel we have covered?

Appendix 6: Criteria for the strengths of evidence

Evaluations are about being able to make informed and transparent judgements. Table 22 is a rubric developed to judge the strength of evidence that has been presented for some of the evaluation findings.

Table 22: Strength of evidence categorisation

Strength of Evidence Category	Criteria – (note do not need to justify all criteria)
Strong	Supporting program evidence exists Program evidence is consistent with existing theory and research Program evidence is consistent with other similar scenarios Using multiple sources of evidence that can be triangulated Demonstrated best practice Program evidence has been reviewed (internally and/or externally)
Sufficient	Supporting program evidence exists There are multiple sources of evidence Program evidence has been reviewed (internally and/or externally) Documented theory/research exists but difficult to transfer these findings to the program
Weak	Observational findings only Verbal (interview) findings only Minimal documented evidence Can not be triangulated across multiple lines of evidence Program evidence is inconsistent with existing relevant theory/research Existing evidence is contradictory Can not verify the source of the evidence Documented theory/research exists but difficult to transfer these findings to the program
Insufficient	Insufficient evidence to answer the evaluation question Too many knowledge gaps to make conclusions

Appendix 7: Criteria for effective governance

Table 23 presents the rubric that was used in the evaluation to make judgements on how effective the governance for the Flagship has been. Not all criteria need to be justified within each category.

Table 23: Criteria used to define effective governance

Category	Criteria – Integrated Project incl Communication and Engagement	Criteria – Implementation of MEL and Adaptive Management	Criteria – Engagement of Key delivery partners incl governance arrangements
Above expectations	As for satisfactory plus: C&E Plan that is adaptively managed by Flagship Teams Teams identifying opportunities for joint engagement events Flagship Team and other projects and stakeholders provide articles to promote independently of e-newsletter call for articles Regular integrated Team meetings with 100% attendance and all actively participate – whether organised by coordinator or not. Over time independent seeking of other Team collaboration (e.g., discussions, knowledge exchange, activity support.)	As for satisfactory plus: Self-organise to collaboratively work together to solve emerging issues. Individual Teams reference the MEL Plan and it is not driven by the coordinator MEL is seen as the responsibility of all involved in the Flagship and not the coordinators	As for satisfactory plus: On-going leverage for Flagship with key delivery partners Co-design for Flagship funding and spin off projects through other funding opportunities The Flagship clearly contributes to other partners' business/ strategic outcomes Key delivery partners are branding under Living Moorabool Living Moorabool is not just seen as a CCMA project
Satisfactory	C&E Plan that has been collaboratively worked on by Flagship Team Flagship branding across all activities for C&E C&E is being used in a collaborative way by Teams. Flagship Team and other projects and stakeholders respond in a timely manner to call for e-newsletter articles Joint engagement events being held - but often organised or opportunity identified through coordinator Recognition of a collective vision – all working towards a common problem to resolve Regular integrated Team meetings with regular attendance and all attendees participate	MEL Plan that has been worked on by Flagship Team (internal and external). Project outcomes have established targets for the life of the project Appropriate monitoring activities for project outcomes have been identified and implemented by those responsible MEL is being used in a collaborative way by Teams. Coordinator organises Teams to work on emerging issues Knowledge gaps have been identified and activities to address them are taking place The MEL is updated by Flagship Team (internal and external) with emerging knowledge gaps Adoption of learning and improvement processes	Regular governance group meetings with regular attendance and all attendees participate Recognition of a collective vision – all working towards a common problem to resolve Collaboratively work together with partners to solve emerging issues C&E Plan that has been worked on by Flagship Team (internal and external) MEL Plan that has been worked on by Flagship Team (internal and external) Collaboration on planning and delivery of projects with partners C&E opportunities are shared with partners

Category	Criteria – Integrated Project incl Communication and Engagement	Criteria – Implementation of MEL and Adaptive Management	Criteria – Engagement of Key delivery partners incl governance arrangements
		Teams have their data and information organised so that it is easily accessible for evaluations	
Below expectations	Activities remain siloed and without Flagship branding or sharing of information C&E Plan is not being used by project Teams e-newsletter articles are needed to be chased up and in some cases e-newsletters may not be produced twice per year Irregular team meetings, irregular attendance, limited contribution	MEL Plan that has not been worked on by all members of the Flagship Team (internal and external) No ownership for MEL Plan or its implementation by Flagship Team There are project outcomes without established targets for the life of the project There are project outcomes without monitoring activities identified and implemented MEL is not being used in a collaborative way by Teams. MEL is not updated MEL is not implemented Hard to find and access data and information to undertake evaluations There is no evidence of adaptive management of Flagship	Difficult to establish governance group, hold regular meetings or have regular attendance Can't agree/establish a common vision No collaboration with C&E activities and/or MEL CCMA and delivery partners keep working siloed and in own patch Delivery partners see it as a CCMA problem/issue
Insufficient evidence	No evidence to support any criterion	No evidence to support any criterion	No evidence to support any criterion

Appendix 8: Sense-making workshop agenda

AGENDA

Purpose: To collectively make sense of the findings from evaluation interviews and other collated data, to identify where there are gaps and what needs to be adapted or significantly changed for EC6.

Time	Item	Topic	Lead
9:30	Welcome and Meeting Introduction		Helen Watts Jen Lilburn
9:40	The Findings Summary	Q1. Is there anything wrong (or misinterpreted) in the Findings Summary? Q2. Has anything been missed?	Jen
10:05	Knowledge Gaps	Q3. What critical knowledge gaps will impact on the delivery of outcomes?	Jen
10:30	Morning Tea		
10:45	The External Operating Environment (Organisations, Landscapes, Sociopolitical/policy)	Q4. Is the Flagship's operating environment changing? How? Q5 Should the Flagship respond to these themes? If so, how?	Jen
11:25	Implications	Q6. What strengths/enablers should we keep? Q7. What needs to be done differently or better? Q8. What new approaches or information should we introduce?	Jen
11:50	Final Reflections, Meeting Evaluation, Wrap up		Jen Helen
12:00	Meeting Close and Lunch		

Appendix 9: Monitoring recommendations for canopy cover

The purpose of this Appendix is to capture thoughts on how the measurement for canopy cover could be improved. It is related to the outcome evaluation question:

Has there been an additional 290ha of banks in priority reaches with improved canopy cover as a result of the riparian program?

Details from *Stream Change Assessment - detecting change in riparian woody vegetation using LiDAR derived data - April 2022*

Reference: stream-change-assessment-detecting-change-in-riparian-woody-vegetation-using-lidar-derived-data.pdf (water.vic.gov.au)

1. The current LM evaluation question - 'Has there been an additional 290ha of banks in priority reaches with improved canopy cover as a result of the riparian program? – could be more defined based on the metrics that were provided by DEECA Stream Change Assessment (SCA) and by taking into consideration any mapping of woody weed removal that is based on our projects. This definition can go beyond just 'improved canopy cover' to include:
    - Canopy cover based on native revegetation explicitly
    - Amount of willow removal and then, by definition, exclude willows from canopy cover that is captured in the metrics
2. We could use a one or more of the available SCA metrics (see details at right) with 2018 data being used as the baseline for EC4 works.
   The next SCA could be done after 5 to 8 years - most likely around 2026 based on new LiDAR and imagery
3. 2018 LiDAR/SCA Canopy cover data does not distinguish vegetation type and no willow data was captured and so we would need to capture our own weed (willow removal) data unless it is to be captured as part of a future LiDAR/SCA project.
4. Be mindful of using the appropriate scale to give a better sense of what is going on:
    - Summaries by 'reach only' hides a lot of the variation that we might only see at a greater level of detail
    - Data is presented in 100m segments and so we can exclude those segments where we have no need to undertake any work anyway and so can refine results based on selecting only those appropriate segments within reaches
5. Note that the 'Streamside' summary score loses the detail that we may want to work with and so we can use one or more of the metrics that are available based on a more detailed approach to measuring change (see metric descriptions on the next page):
    - Fractional canopy cover
    - Vegetation width (can assume increased cover will increase width)
    - Fragmentation
    - Canopy height
6. Define what a good version of success will look like using the above points:
    - use 100m segments or percentile
    - remove data such as national parks and landholders that wouldn't uptake.
    - e.g., we want 70% of segments to look like this 20% in this condition or we want to improve the reaches that score the lowest in this metric to a defined score.
    - Riparian team would be best to work through these
7. Could base a SEQ around whether we have appropriate monitoring in place. With a min. of 8 years between monitoring, required steps and process should be written up to ensure it can take place and knowledge is not lost with any staff changes.
8. We need to develop long-term monitoring processes that we can adopt as an organisation that can be adapted to fit in with specific projects but are part of an organisational approach that can be used irrespective of staff turnover and loss of knowledge/resources that might be tied to projects

9 Undertake weed mapping that indicates work done since 2010 since this data has not been captured in 2018. DEECA can use this to supplement (and verify) a statewide approach whereby Standard Outputs data that captures woody weed control can be use where no explicit willow mapping has been done. Paul has been in touch with Kelly on this in the past and it would be good to follow up on where this is all at. Note that DEECA have funding that could be used to assist with the mapping process. Note that CCMA has access to historical detailed Nearmap imagery

Metric	Brief description of methods and spatial resolution
Fractional canopy cover (FCC)	• Measures the average density of vegetation in each riparian assessment area using the LiDAR FCC raster (Figure 4)
Canopy height (m)	• Measures the average canopy height in each riparian assessment area using the LiDAR CHM raster (Figure 4)
Vegetation width (m)	• Defined as the distance from the toe of the bank to where the overall FCC is less than 20% or the riparian vegetation edge is met • Measured perpendicular to the stream channel every 25m along the centreline and up to a maximum distance of 200m (Figure 10) Each 100m section on the left and right bank is assigned the mean length of the vegetation width transects that originate in that section (nominally 4 transects but may be less on the inside of sharp bends)
Fragmentation (%)	• Represents gaps in vegetation cover • Defined as any areas where Overall FCC is less than 20% for an area of least 10m x 10m (essentially the white-space in Figure 10) • Measured in each 100m section as the proportion of the assessment area that is classified as gap
Overhang (%)	• Represents shading of the river bed • Calculated as the proportion of the toe of bank line that is overlapped by woody vegetation with FCC > 20%
Large Trees (%)	• The canopy area of large trees is mapped by recording contiguous areas of vegetation with FCC > 20% with minimum crown height and diameter determined from EVC benchmarks (lookup table in Fugro 2013) • Calculated as the proportion of the section that is defined as "Large Tree Canopy" (Figure 11)
Structure 1 (Trees and Shrubs)	• Uses the vegetation FCC in two height classes. • Shrubs are defined as the vegetation < 5m in height • Trees are the vegetation >5m in height • Calculated as the average FCC for each height class within each 100m section
Structure 2	• A structure 2 raster layer is created where each 2m x 2m pixel represents a count of the number of strata layers with FCC > 20% • Stratum layers are defined in 5m increments as <5m, 5-10m, 10-15m, 15-20m, 20-25m, 25m-99m • Calculated as the average Structure 2 pixel value within each 100m section (Figure 12)
Weeds (Willows and Hawthorn)	• Woody weeds were mapped for the 2010 ISC as line features representing the longest width of the weed patch. • The weeds metric is the mapped length of weeds as a proportion of the 100m section length