Inception Meeting

Date:	14 July 2026
Project name:	Birrarung FLOWS Review 2026
Prepared by:	Jacqui Brooks
Location:	MS Teams and 452 Flinders Street, Melbourne (Jacobs)
Participants:	Stuart Lovejoy, Lisa Duncan, James Frazer, Sarah Gaskill (MW) Charlotte Hilbig (WWCHAC) Simon Treadwell, Jacqui Brooks (Jacobs) External members of PAG

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Agenda

- Acknowledgement of Country
- Wurundjeri involvement – Wurundjeri Woi-wurrung Cultural Heritage Aboriginal Corporation
- Why are we doing the Birrarung Flows Study Review – MW
- What is the Project Advisory Group – MW
- The Birrarung Flows Study – Jacobs
- Discussion on condition and site access
- Next steps and actions

Meeting notes

Refer to end of notes for meeting slides.

Agenda Item 1 – Welcome and Acknowledgement of Country (Slide 2)

Agenda Item 2 – Wurundjeri involvement – Wurundjeri Woi-wurrung Cultural Heritage Aboriginal Corporation

See slides 4, 5, 6 (below)

- Acknowledged the elders within the Wurundjeri Water Program – the Wurundjeri Water Knowledge holders, Aunty Di, Uncle Dave and Uncle Andrew.
- Also acknowledged the Birrarung Ranges and Narrap team.
- Noted WWCHAC is working on thousands of projects across Wurundjeri country and that work involves governments, councils and community groups and people like the PAG.
- Acknowledged NAIDOC week, which celebrated 50 years of deadly.
- Noted the importance of Birrarung and her status as a living entity.
- Noted involvement of WWCHAC from the beginning of the project. This doesn't always happen and WWCHAC are very pleased that it has.
- Noted broad involvement from WWCHAC on multiple aspects of the project, including strategic involvement from the Elders.
- Baanj Assessments - have developed this method and planning to use it in Birrarung in line with the FLOWS study

Agenda Item 3 – Why are we doing the Birrarung Flows Study Review – MW

See slides 7, 8, 9 (below)

- Explained what a FLOWS study is and what it informs (Environmental Entitlements and Seasonal Watering Plans).

- Covered what a FLOWS study does not do (i.e., make management decisions about how best to use available environmental water, secure water for the environment, guarantee that the best-case aspirational objectives and recommendations within the FLOWS study can be met and determine broader policy, funding or water recovery decisions required to deliver recommended flows).
- Explained why the 2026 review is needed – Previous studies in 2005, 2012, 2018; since then, there have been changes to policy, science, recognition of the importance of collaborating with WWCHAC and broader engagement.

Agenda Item 4 – What is the Project Advisory Group - MW

See slide 10 (below)

- Explained who is on a PAG.
- Explained the purpose and role of the PAG – to ensure the FLOWS review uses all available local, on-ground knowledge, to complement the scientific work completed by the technical panel.
- Noted the PAG will provide input through meetings and by reviewing flow recommendations and reports.
- Stressed the importance of local input – the PAG makes sure the review uses all available on-ground knowledge.
- Note what a PAG is not responsible for.

Agenda Items 5 and 6 – The Birrarung Flows Study (Jacobs) and Discussion (all))

See slides 12-17 (below)

- Study reaches include
    - Reaches 1 to 6
    - Reach 8
    - Little Yarra and Don rivers
    - Olinda Creek
    - Stringybark Creek
    - Steel, Pauls, Dixon creeks
    - Woori Yallock Creek
- Introduced the project team and Environmental FLOWS Technical Panel members (see Slide 13)
- Summarised the project approach (see Slide 14) and project schedule (see Slide 15)
- Noted we have been planning for upcoming site visits on 30 July and 5 August (see Slide 16)
- Reiterated how the PAG's feedback will help and explained the timing for consultation (Slide 17)

See slides 18-24 (below)

Environmental FLOWS assessment approach

- Environmental flow recommendations aim to replicate key aspects of a natural flow regime, including:
    - Low flows to maintain habitat for fish, platypus and other aquatic species.
    - Higher flows to mobilise sediment, refresh riffles, maintain channel form and support riparian vegetation.
- Recommendations are developed for representative sites within river reaches and then applied across the broader reach.
- Flow requirements increase downstream as tributary inflows contribute additional water.

Reach and site selection

- River reaches are defined by major geomorphic features, tributary junctions and regulation points such as:
    - Upper Yarra Dam.
    - Yering Gorge/Sugarloaf Reservoir extraction point.
- Existing sites have been reviewed repeatedly since the original 2005 study.
- Over the coming weeks, the project team will:
    - Revisit all existing sites.
    - Assess whether site characteristics have changed.
    - Evaluate whether additional sites should be added based on stakeholder feedback.

Mainstem Yarra/Birrarung reaches

- Reach characteristics have been outlined from Upper Yarra Dam downstream to the estuary.
- Key flow-related concerns include:
    - Reduced flows below Upper Yarra Dam.
    - Sediment accumulation in pools and habitats.
    - Reduced floodplain and billabong inundation frequency.
    - Increasing impacts of urbanisation and stormwater runoff in lower catchments.
    - Flashy flows causing erosion and channel instability.

Outcomes below Upper Yarra Dam

- Environmental flow releases introduced since around 2012 have:
    - Reduced sediment accumulation.
    - Improved habitat conditions.
    - Supported river blackfish and platypus populations.
- Recent operational changes may be causing increased vegetation scour and will be investigated further.

Mid and lower river reaches

- Areas of interest include:
    - Tarrawarra Abbey reach
    - Spadoni's Reserve and Billabong
    - Yering Gorge/Warrandyte reach
    - Bolin Billabong and Banyule Billabong.
- Existing and proposed billabong reconnection projects will be reviewed to ensure flow recommendations appropriately support inundation requirements.

Impacts of urbanisation

- Increasing urban development is contributing to:
    - More frequent and intense stormwater-driven peak flows.
    - Erosion and channel instability.
- The review will consider potential "upper flow limits" and acceptable durations of high flows to help guide stormwater management and reduce erosion risks.

Water quality considerations

- Water quality is considered where it is influenced by flow, including:

    - Salinity
    - Dissolved oxygen.
- Non-flow-related water quality issues may be addressed through complementary management actions such as sewer upgrades and catchment management initiatives.

Tributary stream reviews

- Hoddles Creek (not included in this study)
    - Existing recommendations remain appropriate.
    - High confidence in current flow requirements.
- The tributaries of concern to this FLOWS review require a targeted review.
- Little Yarra River and Don River
    - Review fresh flow frequency.
    - Update recommendations to reflect improved understanding of platypus flow requirements.
- Olinda Creek and Stringybark Creek
    - Assess impacts of ongoing urban development.
    - Consider flow thresholds associated with stormwater-driven erosion.
    - Update for current platypus knowledge.
- Pauls Creek and Dixons Creek
    - Significant updates are required for existing flow recommendations (these are outdated).
    - Currently accepted flow assessment methods were not used in original studies.
    - A comprehensive review is planned through the current study.
- Woori Yallock Creek
    - Reassess existing recommendations and determine whether updates are needed.

Key points

- Existing reaches and sites will be revisited and reviewed.
- Stakeholder suggestions for additional sites and issues will be considered during field investigations.
- Billabong connectivity and urbanisation impacts will be important focus areas in the review.
- Tributary assessments will vary depending on the currency and confidence of existing flow recommendations.

Agenda Item 7 – Next steps and actions

- Field inspections and site reviews will occur over the next several weeks.
- Stakeholders are encouraged to submit additional feedback through the survey or via email at Birrarung (Yarra River) Flows Study Review | Melbourne Water.
- Further consultation opportunities will be provided through field visits and upcoming online meetings.

Questions and discussion

Andrew Lees (Friends of Yarra Flats Park) highlighted:

- The importance of overbank flows and billabong connectivity.
- The need to balance erosion management with the high-flow events required to inundate billabongs.

Response:

- Existing studies have mapped billabong inlet levels and inundation requirements.
- High flows remain essential for maintaining river and floodplain ecology.
- The focus is on identifying acceptable flow duration thresholds that provide ecological benefits without causing excessive erosion.

Additional areas of interest – see below for further discussion of these points in the Teams chat:

- The confluence of the Plenty River with Birrarung.
- Impacts of pumping operations at Yering Gorge.
- Urbanised tributaries and stormwater impacts.
- Long-term management of billabong connections.

Comments (& responses) in Teams chat

Janet Bolitho
How is the cycle for the flow reviews determined? A question arising from the comment 'it's been a while since the review in 2018'.
Stuart Lovejoy – there's no statutory requirement. the decision is based on when we think there's been substantial changes to either policy, scientific knowledge, or stakeholder needs.

Naylor, Kathryn
Is this project purely focused on volumes and flow regimes, or does it bring in quality considerations as well?

Simon Treadwell
> Naylor, Kathryn
> Is this project purely focused on volumes and flow regimes, or does it bring in quality considerations as well?

We consider water quality in so far as it is influenced by flow. For example, making sure that low flows are sufficient to maintain dissolved oxygen conditions

Lisa Duncan
Hi Janet Bolitho, there's no specific guidance in the FLOWS method about how often the flows studies should be updated. It depends more on need e.g. new information available or policy change etc. I think Stu was referring to how much has changed in the Birrarung since 2018

Kent Feng
Any consideration of erosion control in assessing the amount of Environmental Flow is needed for each reach? some of the headwater streams are threatened by erosion, would the increased flow worse the situation?

Rebekah Henry
Within the water quality is HHERA being conducted? Or is the focus on the broader environmental values?

Kathryn Naylor
Re Simon's question on issues: Yarra Valley Water has 4 sewage treatment plants that discharge into the Birrarung, including a 7.5ML plant into Olinda creek which I see is a focus area. We would like to understand how we could better contribute to the health of the Birrarung through our management of these discharges and understand any opportunities to adjust flows or quality (e.g., via wetlands) to support this work.

Stuart Lovejoy
> Kent Feng
> Any consideration of erosion control in assessing the amount of Environmental Flow is needed for each reach? some of the headwater streams are threatened by erosion, would the increased flow worse the

Hi, Kent - I think Simon will touch on this, but one of the things the Review will be looking at is what impact high flows in the upper reaches have on the stream condition.

Stuart Lovejoy
> Rebekah Henry
> Within the water quality is HHERA being conducted? Or is the focus on the broader environmental values?

Hi, Rebekah - it's the latter. The focus is on broader environmental values so the Flows study will not go to the level of a Human Health Ecological Risk Assessment

Sharyne
re: Site 4 - the urbanisation is not the issue.... tributaries (Steels creek, Pauls creek and others upstream around Healesville) provide water flow to the Yarra, not the other way around. The better the tributaries flow, or don't flow (backflow) is the predominant impact

Rebekah Henry
Will part of the WQ update consider sewer upgrades in the Yarr Ranges, that is likely to affect the WQ within the tribs?

Lisa Duncan
Hi Sharyne, that's right, the urbanised areas affected by stormwater are further downstream. Lack of inflow from unregulated tributaries is a challenge under climate change and other pressures that the team will need to consider.

Janet Bolitho
interested in whether the Plenty confluence with the River is a site or potential site?

Sharyne
Please don't conflate the issues of Site 4 and Sites 5/6.
Urbanisation may be an issue for 5 & 6, but it is not a contributing factor at Site 4

Sarah Gaskill
We do have a lot of the connecting flows to billabongs that will be available for the project team.

Andrew Kelly
Impact of the Yering Gorge pumps on environmental flows. VEWH can ask but not guaranteed to suspend pumping. Impacts of the environmental flows not reaching the lower river. Also, the impact of the daily timing of the pumping on the levels of the river in a 24-hour period? Impact on in-water recreation of extraction by the pumps?

Stuart Lovejoy
Here's a link to the survey if you prefer to input your issues here
Birrarung (Yarra River) Flows Study Review | Melbourne Water
Have your say on the Birrarung (Yarra River) Flows Study and help shape the future of river health and water management. Consultation closes 28 July 2026.

Sarah Gaskill
> Andrew Kelly
> Impact of the Yering Gorge pumps on environmental flows. VEWH can ask but not guaranteed to suspend pumping. Impacts of the environmental flows not reaching the lower river. Also the impact of the da…

This is considered as part of delivery of flow releases.

Carina Watson
Why not include lower tributaries like Merri and Darebin where lots of urban development is occurring in their catchments?

Andrew Kelly
> Sarah Gaskill
> This is considered as part of delivery of flow releases.

do you mean whether MW is able/willing to turn off the pumps contributes to decision to release environmental flow, Sarah?

Sharyne
With regards to Steels, Pauls and Dixons - a great deal flows through private land.

Andrew Kelly
Sarah, Are any of the environmental flows released and then pumped out at Yering Gorge?

James Frazer
> Andrew Kelly
> Sarah, Are any of the environmental flows released and then pumped out at Yering Gorge?

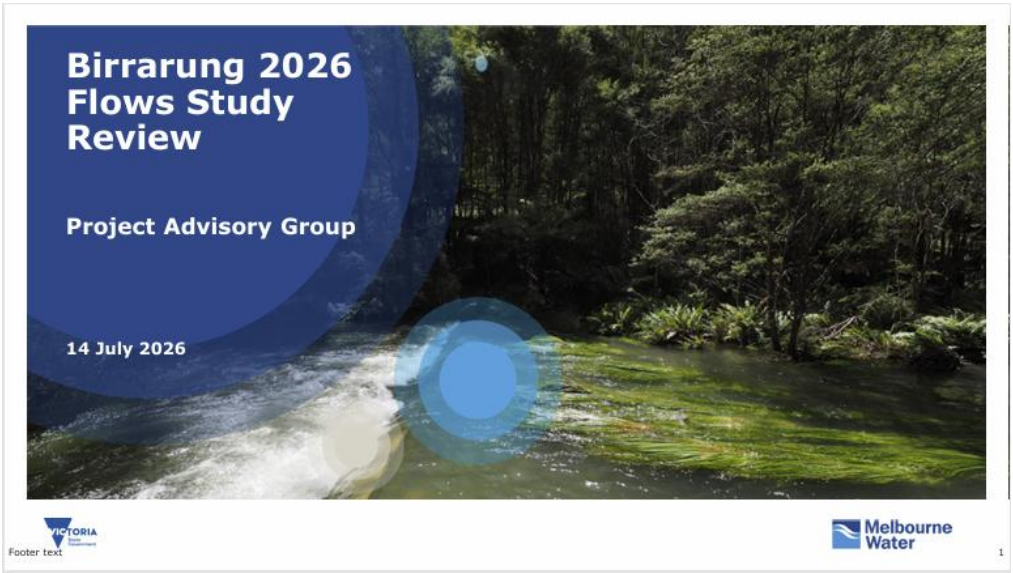
No. Ewater releases of Yarra EE are passed at Yering Gorge

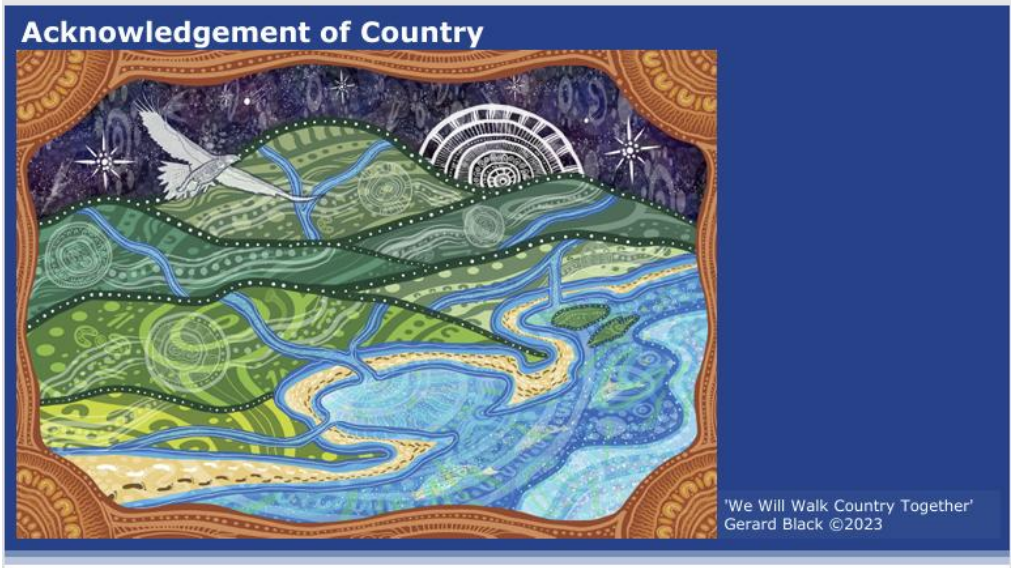
Andrew Kelly
Simon, Does the study look at the adequacy of the coverage by gauging stations? Known unknown v unknown unknowns

Lisa Duncan
Hi Carina - we have existing environmental flows studies for Merri Creek and many other waterways. It's a challenge to get the balance right of getting the most out of the project but also needing to manage budget/scope. Flows studies are also not the only tool for looking at impacts of stormwater in urban areas and we can do specific risk assessments if needed.

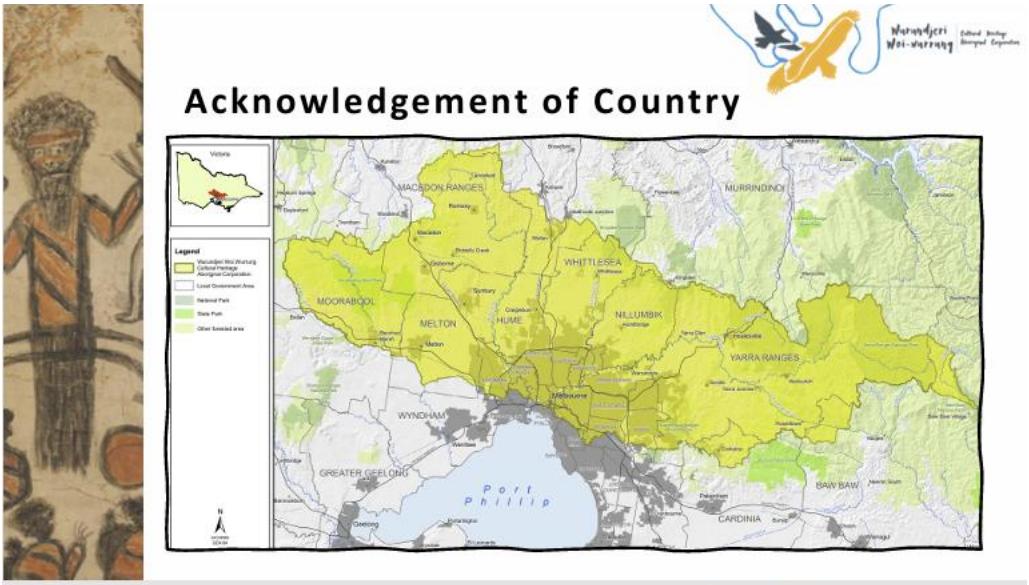
Sharyne
Without further governance and partnership between YRC, Birrarung Council and Melbourne Water it is difficult to protect the flow at Yarra Glen and the Billabongs - both of which have become very degraded

Meeting slides

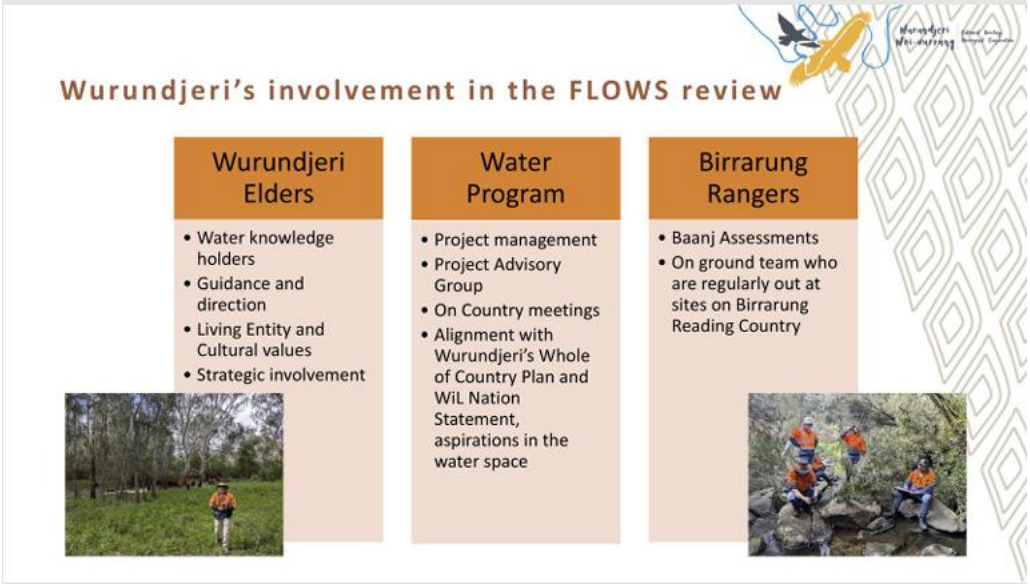







Acknowledgement of Country
MACEDON RANGES
MURRINDINDI
WHITTLESEA
MOORABOOL
MELTON
HUME
NILLUMBIK
YARRA RANGES
WYNDHAM
GREATER GEELONG
Port Phillip
BAW BAW
GARDINIA


Birrarung is the lifeblood of our mother
Burndap Birrarung, Burndap Umarkoo. What is good for Birrarung is good for all.


Wurundjeri's involvement in the FLOWS review
Wurundjeri Elders
• Water knowledge holders
• Guidance and direction
• Living Entity and Cultural values
• Strategic involvement
Water Program
• Project management
• Project Advisory Group
• On Country meetings
• Alignment with Wurundjeri's Whole of Country Plan and WiL Nation Statement, aspirations in the water space
Birrarung Rangers
• Baanj Assessments
• On ground team who are regularly out at sites on Birrarung Reading Country

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What is a flows study

Purpose of Flows Studies

- Tell us what water is needed and when

to achieve environmental objectives

at a given location within a river reach





Flow studies are NOT designed to:

- Be a management plan
- Define source of water
- Take into account management and delivery considerations (e.g. system operation requirements, constraints)

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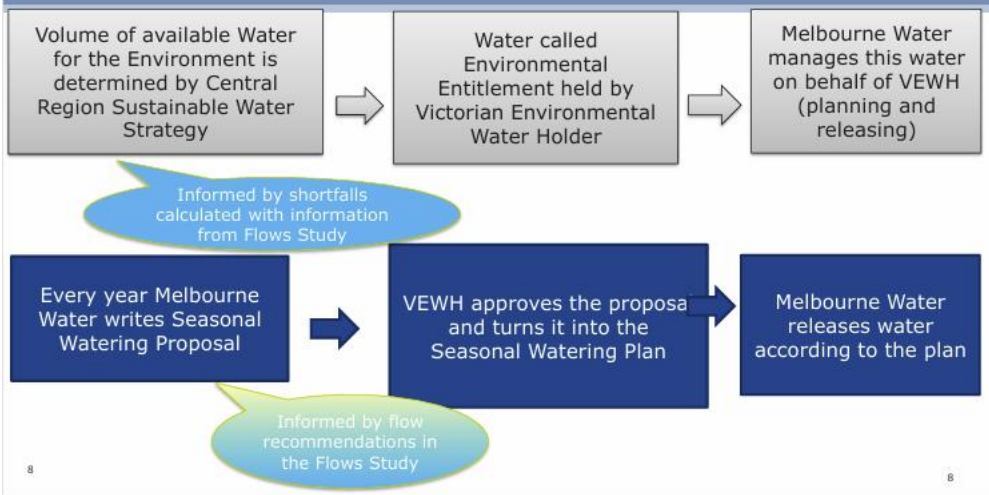
Why do we need a flows study?



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Birrarung Flows Review – why a review

Time for a refresh

- First study done in 2005
- Reviews done in 2012 and 2018



Changes since last review

- Policy
- Science
- Engagement



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Project Advisory Group

Who

- Local people and businesses, community groups, Traditional Owners government agencies

What it does

- Help us understand what matters most to the community and understand river health issues
- Check draft recommendation and reports using local knowledge

What it doesn't do

- set final flow numbers
- decide where water comes from or change water licences
- change how dams or rivers are operated
- replace scientific or legal requirements.



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Over to Jacqui!





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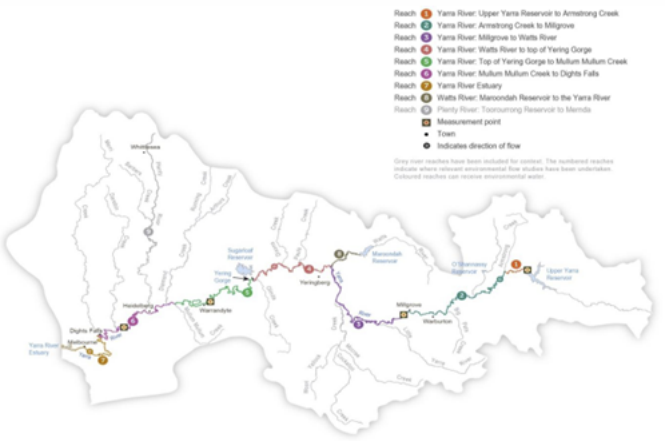
Study includes…

- Reaches 1 to 6
- Reach 8
- Little Yarra and Don rivers
- Olinda Creek
- Stringybark Creek
- Steel, Pauls, Dixon creeks
- Woori Yallock Creek



Review and update recommendation from previous studies (2005, 2012, 2018)



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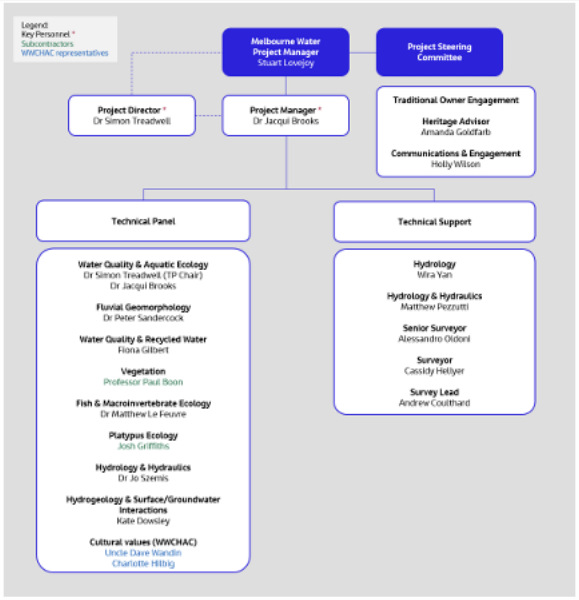
Project team and Environmental FLOWS Technical Panel



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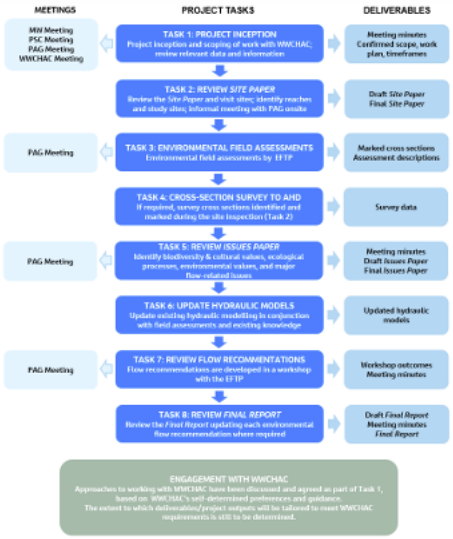
Approach – standard FLOWS study method



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Project schedule

Milestone	Date
Award Date	End March 2026
Project Inception Meetings	April-May 2026
Site Paper ▪ Information on the physical characteristics, ecological features, and any relevant issues related to selected reaches and sites within Birrarung's catchment	End August 2026
Issues Paper ▪ In-depth examination of environmental, ecological, cultural and hydrological concerns, issues and challenges within the waterways of Birrarung's catchment	End December 2026
Review environmental flow recommendations	End March 2027
Final Report ▪ A conclusive document presenting recommendations, findings, and proposed solutions based on the data, assessments, and input gathered throughout the project ▪ Integration of environmental flow recommendations, hydraulic modelling results, and other pertinent information	June-July 2027

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Site visit planning…

Study includes…
- Reaches 1 to 6
- Reach 8
- Little Yarra and Don rivers
- Olinda Creek
- Stringybark Creek
- Steel, Pauls, Dixon creeks
- Woori Yallock Creek



Site reconnaissance visits booked

Visit 1: 30 July – Jacobs

Visit 2: 5 August – MW, WWCHAC, Jacobs

PAG role – provide input on issues and changes to sites to guide planning

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Your feedback will help us *better understand what matters to the community.*

Your feedback will also help us:

- Select sites for investigation (Meeting 1, Project inception)
- Shape the values and objectives used in the study (Meeting 2 – On Country Environmental Assessment, October 2026)
- Identify concerns and issues with river condition (Meeting 3 – Review Issues Paper, December 2026)
- Check draft recommendations and reports using local knowledge (Meeting 4 – Review flow recommendations, March 2027)

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Reaches and sites

- Flows recommendations are developed on a reach basis that collectively contributes to a flow regime for the whole system
- Reaches are determined based on key river features, such as gorge or floodplain sections, sections between important tributaries or points of regulation, or areas of particular significance.
- Within each reach sites are selected that exhibit characteristics that are representative of the reach are choses for more detailed assessment. These sites contain features that are flow dependant and used to identify the flow requirements that form the recommendations.
- When determining flow recommendations for a site and reach, the interactions with upstream and downstream reaches are also considered.

- For the Yarra and tributary streams reaches and sites have been previously determined in earlier studies
- This current step is to review those reaches and sites, check if they are still appropriate, if anything has changed at these sites and if there are any new sites that should be considered

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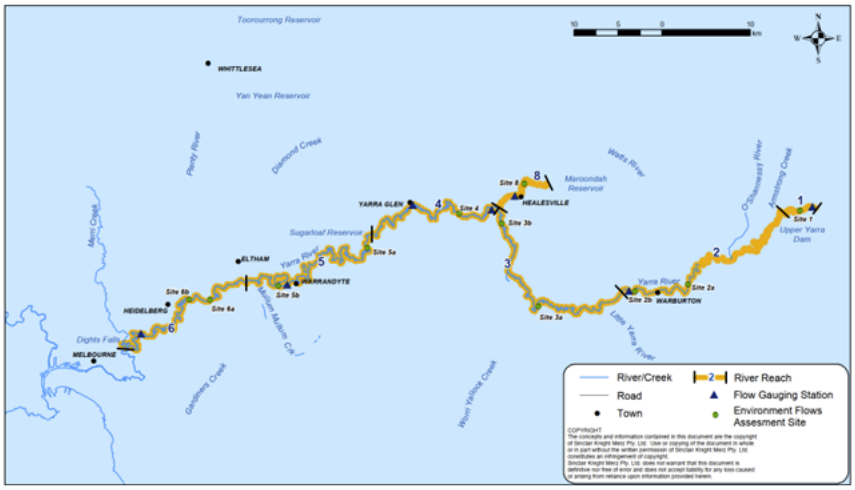
Birrarung main stem reaches



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Yarra River reaches used in previous FLOWS studies (from 2005, 2012 and 2018 – shaded green). Blue shading = new sites for 2026

Reach & Location		Site	2005 assessment site
1	Upper Yarra Reservoir to Armstrong Creek junction	1	Downstream of Upper Yarra Reservoir, Reefton
2	Armstrong Creek to Millgrove	2	Warburton East (downstream of major tributary harvesting operations)
3	Millgrove to Watts River junction	3a	Immediately upstream of Healesville-Woori Yallock Rd
		3b	Everard Park, upstream of Maroondah Highway.
4	Watts River to top of Yering Gorge	4a	Tarrawarra Abbey, Yarra Glen
		4b	Spadonis Reserve - downstream of Yarra Glen
5	Top of Yering Gorge to Mullum Mullum Creek	5a	Immediately downstream of Yering Gorge pumping station
		5b	Everard Drive, Warrandyte
		5c	Pound Bend / Mullum Mullum Creek
6	Mullum Mullum Creek to Dights Falls	6a	Finns Reserve
		6b	Banyule Flats, downstream of Plenty River
		6c	Bolin Bolin
8	Watts River from Maroondah Reservoir to Yarra River confluence	8	Coronation Park (River St) downstream of confluence with Grace Burn

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	Reach & Location	
1	Upper Yarra Reservoir to Armstrong Creek junction • Downstream Upper Yarra Reservoir • Reduced flows • Sedimentation & vegetation encroachment • Introduction of improved environmental flows (~2012) • Recent delivery of some higher flows • Good river blackfish populations • Consider channel & ecological response to flows	 Downstream Upper Yarra Reservoir
2	Armstrong Creek to Millgrove • Flows increase due to tributary in flows, but low flows still impacted by Upper Yarra Reservoir • Some vegetation encroachment on channel • Consider response to improved environmental flows and whether low flow recommendations are appropriate	 Yarra River at Warburton East
3	Millgrove to Watts River junction • Floodplain reach • Some sediment accumulation in channel • Possible reduction in frequency of inundation of billabongs • Consider flushing flows	 Yarra River at Everard Park

Upper Yarra Reaches

- We'll be assessing any changes in channel and vegetation characteristics from implementation of environmental flows over the past decade
- Consider if anything has changed and if the flows are appropriate or need revision
- Is there anything else we should look at in this section between Upper Yarra Dam and Healesville?

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	Reach & Location	
4	Watts River to top of Yering Gorge – Tarrawarra Abby • Floodplain reach • Additional tributary inflows • Some sediment accumulation in channel • Livestock grazing • Possible reduction in frequency of inundation of billabongs • Consider flushing flows	 Tarrawarra Abby
5	Top of Yering Gorge to Mullum Mullum Creek – Yering Gorge and Warrandyte • Flow extraction for water supply • Gorge reach, rocky bars and deeper pools • Consider flows to maintain water quality in pools, fish/eel passage over rock bars and spawning cues, and habitat for platypus	 Downstream Yering Gorge pump station
6	Mullum Mullum Creek to Dights Falls – Banyule flats • Floodplain reach • Urban impacts / stormwater runoff • Water quality and flashy flows • Reduction in frequency of inundation of billabongs • Consider flows to maintain water quality, fish passage and spawning cues, platypus, and impacts on banks and riparian vegetation	 Banyule flats

Mid and lower Yarra Reaches

- We'll be assessing any changes from implementation of environmental flows over the past decade
- We'll also be looking at some additional sites at Spadonis Reserve, Eltham/Research and Bolin Bolin Billabong to check that existing sites are representative
- Consider if anything has changed and if the flows and sites are appropriate or need revision, especially with respect to impacts of stormwater in urban reaches
- Is there anything else we should look at in this section between Healesville and Dights Falls?

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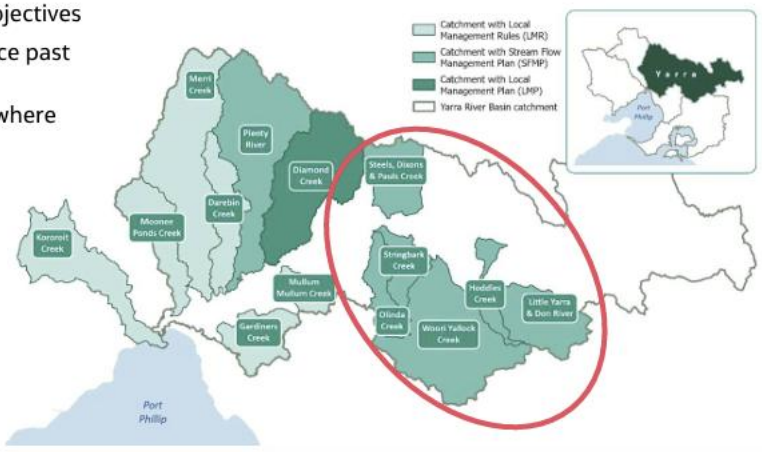
Tributary streams

- Focus on mid Yarra tributaries
- Review existing sites and objectives
- Consider if any changes since past assessments
- Update recommendations where relevant



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Tributary streams - issues and considerations

Hoddles Creek	Little Yarra and Don Rivers	Olinda Creek	Stringybark Creek	Steeles, Pauls and Dixon Creeks	Woori Yallock Creek
No real need to update flow recommendations High confidence/low uncertainty in ability of latest flow recommendations to support current objectives and values.	Minor flow recommendation update likely required Current fresh recommendations for Don River may be too infrequent. Align flows with updated understanding of platypus flow requirements	Minor flow recommendation update likely required. Upper flow limits in response to future urban development Align flows with updated understanding of platypus flow requirements	Minor flow recommendation update likely required. Upper flow limits in response to future urban development Align flows with updated understanding of platypus flow requirements	Flow recommendation update required as old method used and flow recommendations are likely outdated Consider if flow recommendations for platypus are required Consider impacts of farm dams	Flow recommendation update required as flow recommendations are likely outdated Incorporate flow recommendations for platypus. Consider impacts of urban development (upper flow limits)

- Is there anything else we should look at in these tributaries, specific site locations etc

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Next steps for Project Advisory Group

- On-Country meeting
- Online workshop
- Online or in-person presentation (TBC)

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Additional slides – not shown during the meeting

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How are flow recommendations determined

- Develop objectives for flow dependent values (geomorphology, fish, platypus, vegetation, water quality, cultural values, social values)
- Site assessment by flows technical panel
- Use hydraulic modelling to determine flows needed to:
  - Reach certain parts of the channel/banks
  - Provide suitable depth in pools or over riffles
  - Provide suitable velocity to flush sediments, freshen water quality

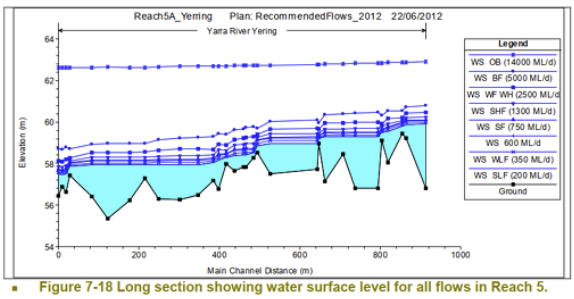

Figure 7-18 Long section showing water surface level for all flows in Reach 5.

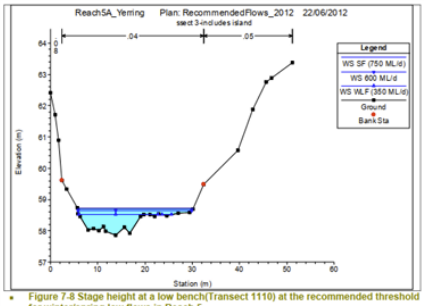

Figure 7.8 Stage height at a low bench(Transect 1110) at the recommended threshold for winter/spring low flows in Reach 5.

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Example objectives

Table A.6 : Reach 6– Mullum Mullum Creek to Dights Falls ecological objectives.

Asset	Objective	No.	Function	Flow component	Timing	Expected response	Response time	Description of changes
Geomorphology	Maintain channel dimensions and form	G6-1	Maintain existing channel dimensions and minimise bed and bank erosion Limit frequency and duration of flows above scouring thresholds	High / bankfull flow	Winter / Spring	• Maintain channel features	Medium to long	Current and future stormwater runoff may be contributing to flashier flows that scour the channel boundary. Revised wording of 'Functions' to include reference to 'limit frequency and duration of flows above scouring thresholds'.
		G6-2	Protect existing substrates Limit frequency and duration of flows above scouring thresholds	Freshes	Throughout year	• Prevent any further increase in frequency of flows above scouring thresholds	Medium to long	Increased stormwater runoff from impervious areas may exacerbate bank stability. Revised wording of 'Functions' to 'protect existing substrates' and 'limit frequency and duration of flows above scouring thresholds'.
	Rehabilitate lateral connectivity with billabongs connected around bankfull	G6-3	Form and maintain billabongs and meander train	Bankfull / overbank flow	Spring	• Increased frequency of inundation of billabongs & meander train	Short	No change from SKM (2012)
Macroinvertebrates	Rehabilitate macroinvertebrate community to comply with Yarra SEPP Schedule F7 objectives	M6-1	Access to and area of LWD, riffles & edge habitats (Seasonal variation to inundate additional habitat area in Winter/Spring)	Low flow	Summer / Winter	• Achieve maximum possible macroinvertebrate score to the extent possible given level of urban impact	Short to medium	Modified low flow objective and related 'Functions' and 'Expected responses' so as to capture assumed changes in Summer / Autumn and Winter / Spring macroinvertebrate biomass linked to inundation of habitat areas.
		M6-2		Low flow	Winter / Spring			
		M6-3	Disturbance to scour biofilm & sediment from riffles & LWD	Freshes	Throughout year			
Fish	Maintain or improve populations of native indigenous fish (river blackfish, Australian smelt, ornate galaxias, Australian grayling, short-finned eel, short-headed lamprey, pouched lamprey, tupong, broad-finned galaxias, spotted galaxias & common galaxias), and native non- indigenous fish (Macquarie perch and Murray cod), and comply with Yarra SEPP Schedule F7 objectives.	F6-1	Maintain hydraulic habitat (i.e. pool, riffle, run) and passage for local movement	Low flow	Summer / Autumn	• Maintenance of hydraulic habitat; Localised movements	Short to medium	Rewritten objectives and revised list of fish species. No longer include mountain galaxias as they have not recently been surveyed in this reach. Split low flow objective to distinguish Summer / Autumn and Winter / Spring low flow components.
		F6-2		Low flow	Winter / Spring			
		F6-3	Flush accumulated fine sediments to maintain or improve quality and availability of habitats, including Macquarie perch spawning habitats.	Freshes / High flow	Winter / Spring	• Accumulated fine sediments scoured from the river bed	Short to medium	Revised objective so that it is more explicit to Macquarie Perch and timing. For Macquarie perch, minimize large flow releases and change in flows during November and December which have been shown to negatively influence recruitment. In warmer years extend this period from mid-October to December (Tonkin et al. 2015).
		F6-4	Facilitate upstream immigration of juvenile catadromous (short-finned eel, common galaxias, tupong) and amphidromous (Australian grayling, broad-finned galaxias, spotted galaxias) and adult anadromous (short-headed lamprey, pouched lamprey) fishes from downstream river reaches	Freshes / High flow	Spring / early Summer	• Upstream immigration from the sea	Short	Changed objective so that is it more explicit as to the species and timing of migration. Upstream movement of diadromous fishes occurs over a broad time frame (e.g. August to February), with greatest richness of species migrating around September-November (McDowall & Eldon. 1980, Sloane 1984, Zampatti et al. 2003)
		F6-5	Cue upstream spawning migration by short-headed lamprey from the sea	Freshes / High flow	Late Winter to Spring	• Upstream immigration from the sea	Short	

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Example flow recomendation

Table C.6 : Flow recommendations for Reach 6. Flow components have been colour coded to highlight those that are managed (blue) from those that are natural (green).

Stream	Yarra River			Reach	Mullum Mullum Creek to Dights Fall Weir			
Compliance point	Chandler Highway			Gauge No.	229143			
Season	Flow	Objective (refer to objectives tables for id reference)	Wet/Avg/Dry	Volume	Frequency and when	Duration	Rise/Fall	Description of changes
Summer / Autumn (Dec-May)	Low flow	Maintain access to habitat for bugs, native indigenous fish (river blackfish, Australian smelt, ornate galaxias, Australian grayling, short-finned eel, short-headed lamprey, pouched lamprey, tupong, broad-finned galaxias, spotted galaxias & common galaxias), native non- indigenous fish (Macquarie perch and Murray cod) platypus, birds and frogs, drying period for bank vegetation, minimise risk of low DO conditions (M6-1, F6-1, V6-1, W6-1, P6-1, P6-2, BFA6-1)	Wet/Avg/Dry	Minimum recommendation of 300 ML/day to minimise risk of low DO in pools upstream of Chandler Highway. Minimum recommendation of 450 ML/day in December to February if considered necessary to maintain mixed conditions in the Dights Falls Weir Pool, downstream of Chandler Highway. Higher magnitude flows are acceptable.				Revised objective, includes explicit reference to native fish species in this reach, platypus, birds and frogs. No change in recommended volume from SKM (2012).
	Fresh (Dec-Apr)	Maintain suitable riffle habitat by periodically scouring sediment & biofilms, maintain flood-tolerant vegetation on banks, provide occasional fish passage for larger bodied fish and cue downstream migration of eels. (G6-2, M6-3, F6-9, V6-3, P6-3, BFA6-2)	Wet/Avg	Minimum of 750 ML/day, tributary inflows provide variation during average and wet years. Higher magnitude and longer duration flows are acceptable and beneficial in average and wet years.	Minimum 3 events + additional events provided by tributaries.	Min 2 day at peak, additional duration provided by tributaries. Longer duration flows acceptable in average and wet years.	2.0/0.8	Minor changes to the wording of objective, noting that freshes also cue downstream migration of eels. Updated wording of recommended volume, frequency and duration so that it is consistent with what is written for Reach 4 and 5. Revised rise/fall from 1.4/0.85 to 2.0/0.8. These still lie within the 50-80th percentile and are considered conservative. This event can potentially be delivered as a result of tributary flows plus top up flow release.
			Dry	750 ML/day	3	2		
	High (Apr-May)	Trigger downstream migration and spawning by Australian Grayling and transport larvae to sea. Cue downstream migration of eels. May facilitate juvenile platypus dispersal. (G6-1, F6-7, F6-9, BFA6-3)	Wet/Avg/Dry	1300 ML/day minimum flow, all events with a magnitude greater than this should be protected. This event will be higher and last longer in average and wet years.	1 (April/May), every year. Must occur 2 in 3 years.	Min 7 day at peak. Longer duration flows acceptable in average and wet years.	2.0/0.8	Minor changes to the wording of objective, noting that high flow also cue for downstream migration of eels and may facilitate juvenile platypus dispersal. No change in recommended volume, frequency and duration from SKM (2012). Event required 2 in 3 years to trigger downstream spawning migration of Australian Grayling, prioritise this. Note: In relation to Grayling, median travel speed 7-8 km per day, so flow duration needs to be sufficient to allow for long-distance, e.g. if fish travelling 80 km, need 10 day rising flows. Prefer flow event to be continuous so as to not disrupt cue. There's little data available of flows associated with spawning of grayling in the Yarra. The average flow (Fairfield) when grayling spawning detected was about 1500 ML/day. Revised rise/fall from 1.4/0.85 to 2.0/0.8. These still lie within the 50-80th percentile and are considered conservative.

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