

Water for the Environment

Speakers:

Beth Ashworth, Co-CEO (VEWH)

**Keith Chalmers, Team Leader Environmental
Water Delivery (VEWH)**

Simon Casanelia, Goulburn Broken CMA

**Dr Mark Bailey, Manager Water Resources
(GMW)**



Water for the environment

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The VEWH, Goulburn-Murray Water and North Central Catchment Management Authority proudly acknowledge Victoria's Aboriginal communities and their rich culture and pay respect to their Elders past and present.

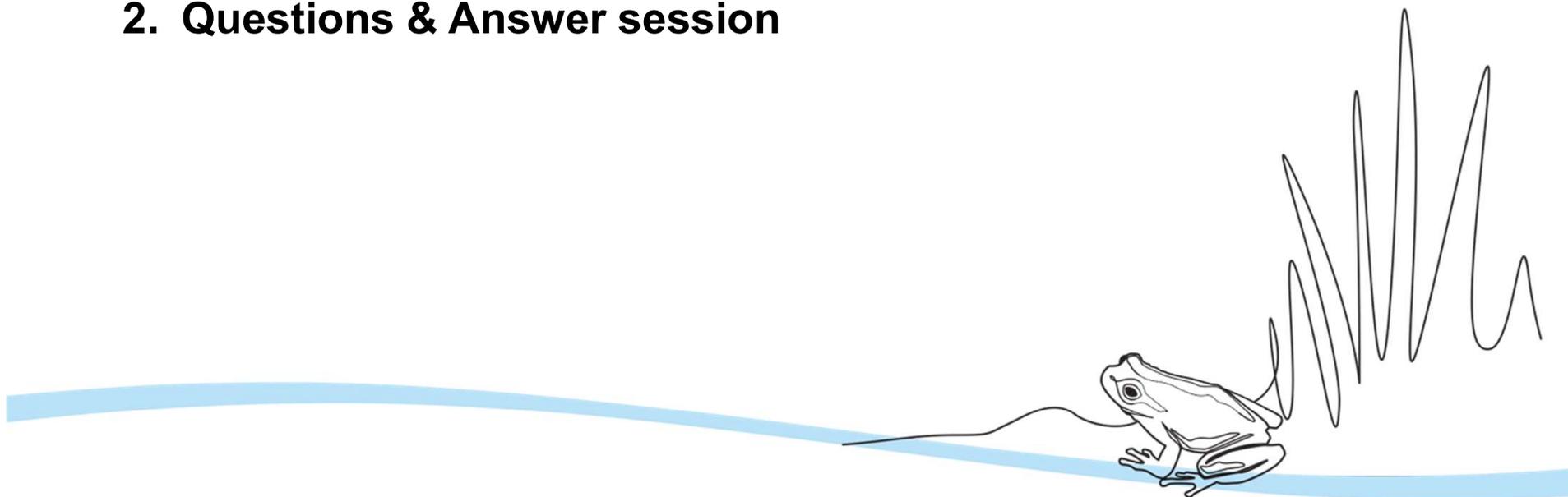
We acknowledge Aboriginal people as Australia's first peoples and as Traditional Owners and custodians of the land and water on which we rely. We recognise the intrinsic connection of Traditional Owners to Country, and we value their ongoing contribution that Aboriginal people are making to planning and managing water for the environment and the benefits that result from these partnerships. We also recognise and value the contribution of Aboriginal people and communities to Victorian life and how this enriches us.



Water for the environment

Overview

1. Top 10 questions about Water for the Environment
2. Questions & Answer session



1. Who's involved in environmental watering?



Water for the environment

It's a team effort...

Waterway managers



Traditional Owners



Land managers

River operators



Environmental water holders



Scientists



Communities

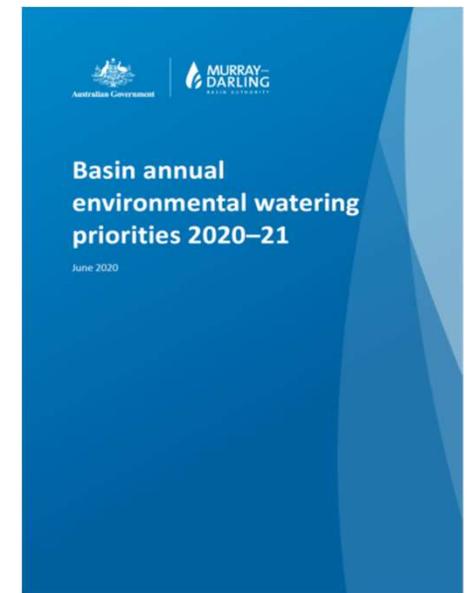
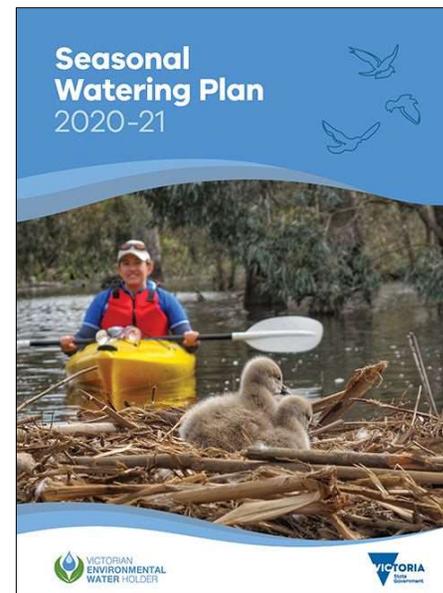
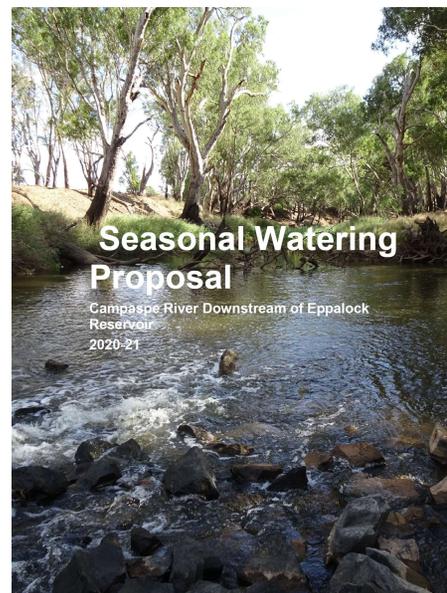


Each organisation brings essential skills and expertise to the program:

- **Waterway managers** are responsible for local planning, consultation, monitoring and reporting.
- **Traditional Owners** are consulted by, and work with, waterway managers on environmental water planning, delivery and monitoring
- **River and storage operators** (including GMW) provide input to water planning and physically deliver water to the site where the flow will take place
- **Environmental water holders** make decisions about committing water to sites, and about carryover and trade.
 - The MDBA does not actually hold any environmental water itself, however it does have a coordination role on behalf of all the states involved in and holding water for The Living Murray program.
 - The Victorian Environmental Water Holder (VEWH) has a close working relationship with the Commonwealth Environmental Water Holder (CEWH) and the MDBA. Any environmental water that is being delivered to Victorian sites is transferred to the VEWH, who coordinate the delivery and avoid the risk of conflicting targets in different sites.
- **Infrastructure operators** physically deliver water to particular wetlands
- **Land managers** provide input to planning and consent to public land being inundated.
- **Scientists** and **communities** provide critical knowledge that informs our planning and reporting.

All of these partners provide input to a well-structured planning process

- Catchment Management Authorities (CMAs) coordinate local planning through seasonal watering proposals
- The VEWH integrates these proposals into state-wide planning through the seasonal watering plan
- VEWH then feeds this into Basin-wide planning.



2. Why do we need environmental water?



Environmental watering: A short history

- Many of our rivers and wetlands have been modified as the population has grown to provide water for towns, industry and food production.
- As a result, these waterways are not able to function as they would naturally. This means it is necessary to actively manage how water flows through them

The government responded to the decline in river and wetland health...



They first capped water entitlements (All water is now fully allocated)

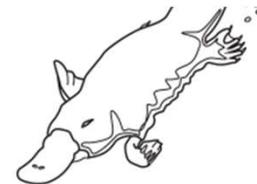


They then progressively invested money to recover water for the environment



Environmental watering is a public policy response because:

- Most people value healthy waterways, for a variety of reasons
- The need to meet Victorian, national and international legal obligations



Why do we need environmental water?

- Environmental watering is a critical component of healthy waterways, which native plants and animals depend on.



In planning for environmental flows, the primary purpose is to optimise environmental benefits, but by improving the health of rivers, wetlands and floodplains environmental flows also provide benefits to communities

Examples of shared benefits include:

- Healthy Country for Aboriginal Victorians
- Giving anglers access to more fish
- Supporting migratory species that are valued by bird watchers
- Supporting healthy forests, which support healthy bee populations which support crop pollination
- Improving amenity, tourism and community mental health and wellbeing
- Mitigating climate change by supporting healthy floodplains that store carbon

All of this has significant economic benefits for regional communities.



3. Does environmental watering work?



Does environmental watering work?

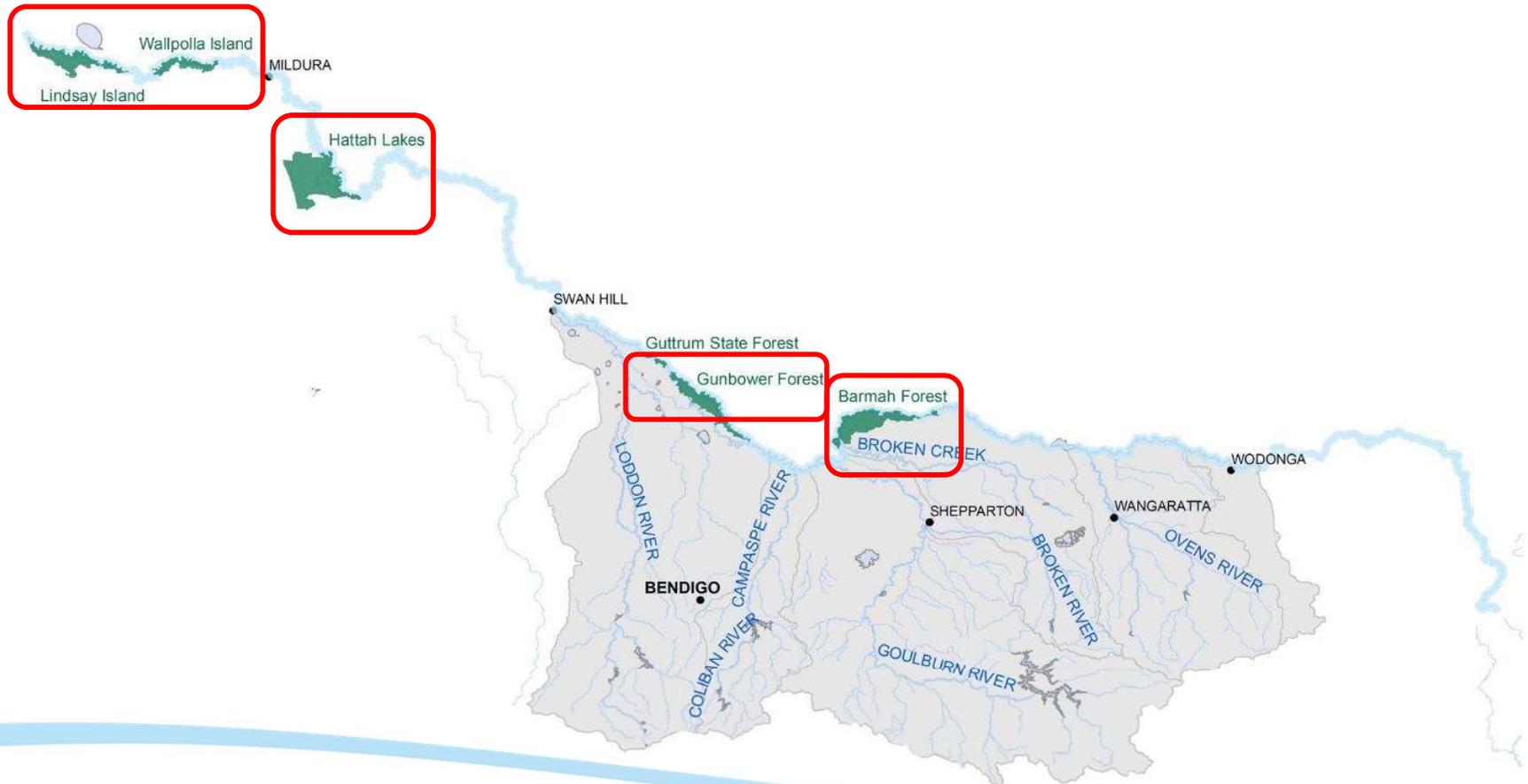
Yes, it does! Key achievements so far include...

- Preventing the extinction of species at the local, regional and state level
- Sustaining hundreds of critical drought refuges
- Helping rivers and wetlands recover from droughts and bushfires
- Safeguarding internationally-recognised habitats for migratory birds
- At least 70 species benefited from environmental watering in 2019-20, including 28 threatened species.



Case study: the Living Murray program

- Part of four out of six Living Murray Icon sites are in Victoria
- We have over 10 years of long-term monitoring data from these icon sites



- This table summarises the results of this monitoring in a report card style
- While there is variation from year to year, overall condition is improving at the sites where we are able to regularly provide water for the environment.

	Barmah-Millewa	Gunbower Forest	Koondrook-Perricoota Forest	Hattah Lakes	Lindsay, Mulcra and Wallpolla Islands	Chowilla Floodplain	Lower Lakes, Coorong and Murray Mouth
2016/17	A	B	C	A	B	B	B
2015/16	B	B	D	A	B	C	C
2014/15	B	B	D	A	-	C	B
2013/14	C	B	D	B	C	C	B
2012/13	C	B	D	C	D	C	B
2011/12	C	C	D	B	C	C	B
2010/11	B	B	D	C	C	C	D
2009/10	C	C	D	D	D	C	D
2008/09	D	C	D	D	D	C	D
2007/08	D	D	D	D	D	N/A	D
2006/07	D	-	N/A	-	-	N/A	C



A

Most (75 -100%) of ecological objectives have been met



B

More than half (50 -74%) of ecological objectives have been met



C

Fewer than half (25 -49%) of ecological objectives have been met



D

Few (0 -24%) ecological objectives have been met



-

Data not available

- Gunbower Forest is a good example of the benefits of environmental flows.
- Before environmental watering the condition fluctuated between a B and a D-grade.
- Since strategic watering began in 2014 we have achieved a consistent B-grade

	Barmah-Millewa	Gunbower Forest	Koondrook-Perricoota Forest	Hattah Lakes	Lindsay, Mulcra and Wallpolla Islands	Chowilla Floodplain	Lower Lakes, Coorong and Murray Mouth
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2015/16	B	B	D	A	B	C	C
2014/15	B	B	D	A	-	C	B
2013/14	C	B	D	B	C	C	B
2012/13	C	B	D	C	D	C	B
2011/12	C	C	D	B	C	C	B
2010/11	B	B	D	C	C	C	D
2009/10	C	C	D	D	D	C	D
2008/09	D	C	D	D	D	C	D
2007/08	D	D	D	D	D	N/A	D
2006/07	D	-	N/A	-	-	N/A	C



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- Koondrook – Pericoota Forest is just across the Murray from Gunbower.
- It was not able to receive environmental water during the monitoring period, and as a result its environmental condition did not improve.

	Barmah-Millewa	Gunbower Forest	Koondrook-Perricoota Forest	Hattah Lakes	Lindsay, Mulcra and Wallpolla Islands	Chowilla Floodplain	Lower Lakes, Coorong and Murray Mouth
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2014/15	B	B	D	A	-	C	B
2013/14	C	B	D	B	C	C	B
2012/13	C	B	D	C	D	C	B
2011/12	C	C	D	B	C	C	B
2010/11	B	B	D	C	C	C	D
2009/10	C	C	D	D	D	C	D
2008/09	D	C	D	D	D	C	D
2007/08	D	D	D	D	D	N/A	D
2006/07	D	-	N/A	-	-	N/A	C



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Data not available

4. How do we *know* environmental watering works?





Flow Component	Ecological Value	Ecological Objectives	Nested Ecological Objectives	Season
Baseflow	Macroinvertebrates Vegetation Native fish	Wet and maintain riffles for macroinvertebrates and small bodied fish, maintain wetted perimeter and aquatic vegetation	<ul style="list-style-type: none"> scour fine sediment from gravel bed and riffle substrate maintain existing beds of in channel vegetation 	All
Baseflow	Native fish	Provide suitable in channel habitat for all life stages.	Provide slow shallow habitat required for larvae/juvenile recruitment and adult habitat for small bodied fish	All
			Provide deep water habitat for large bodied fish (depth of 2m)	All

- Environmental water planning and decision making is based on the best available science, complimented by local knowledge.
- Ecological objectives are established for waterways that receive environmental water, which guide environmental water planning, delivery and monitoring. These often focus on protecting or improving vegetation communities and fauna populations such as native fish, frogs and birds.



- Plants and animals have different needs at different times of year. The flow or water depth requirements of vegetation communities and fauna can change throughout the year depending on their life cycles.
- Environmental water is delivered in patterns that reflect these requirements.

For instance:

- In the lower Goulburn River, Goulburn Broken CMA uses environmental water to maintain a base flow of 500-1000 ML/day (0.5-1.5m) all year to provide large bodies native fish such as Murray cod sufficient water depth to move up and down stream to access habitat and food resources.
- Goulburn Broken CMA delivers a fresh in late spring and early summer to stimulate golden perch movement and spawning. Golden perch are stimulated to move and spawn by increases in flow and when water temperatures exceed 18⁰C, which generally occurs in late spring or early summer.



This is also true for wetlands. For example:

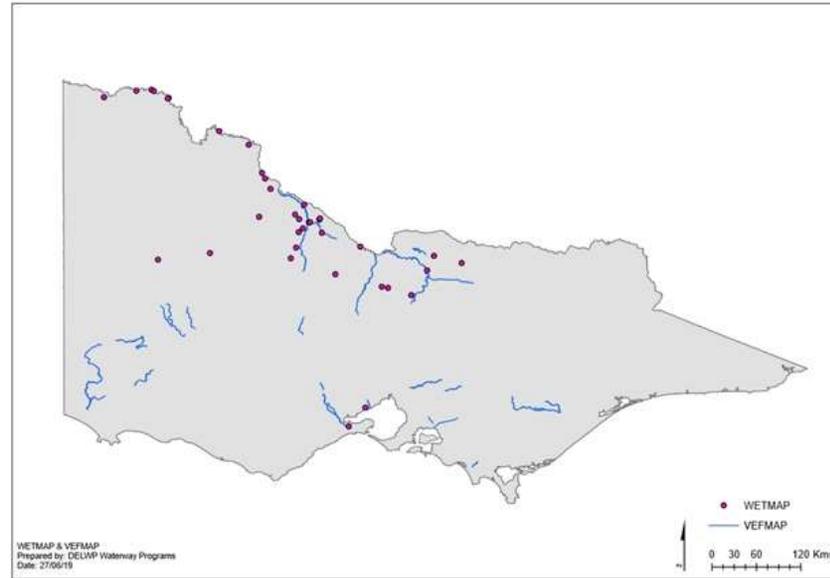
- Environmental water is delivered to Moodie Swamp in autumn to stimulate the growth of wetland plants such as cane grass, and to provide nesting habitat for waterbirds such as Brolga, which begin searching for areas to breed at this time.
- We also deliver environmental water adaptively in response to seasonal conditions or plant and animal triggers. For instance, if water birds are nesting at a wetland and water levels are dropping quickly, we may deliver water to the site so the waterbirds do not abandon their nests. We may also extend the delivery of water to a wetland to ensure wetland plants flower and set seed.



- We don't just walk away once we have delivered water to a site – we carefully monitor the outcomes of the actions we have taken.
- We adapt our planning and delivery methods based on what we'd learned.
- We've only been delivering water at this scale for a decade, and there is still much to learn.
- Monitoring is undertaken on a long-term basis as it can take several years of ongoing management to realise many of the benefits of environmental watering, and these outcomes can be difficult to detect and measure over short time frames.

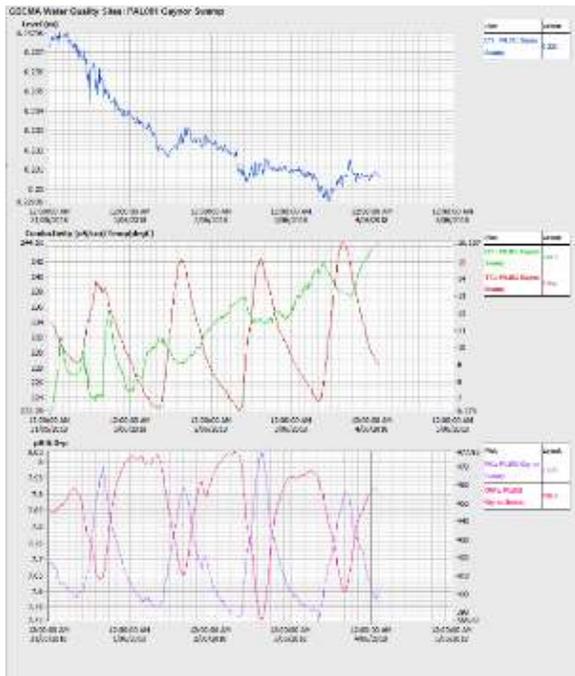
Monitoring allows us to:

- Determine if we are achieving the desired ecological outcomes from environmental water management.
- Adjust environmental water management to achieve the desired ecological outcomes more effectively and efficiently.
- Communicate and report on the outcomes of environmental water management.



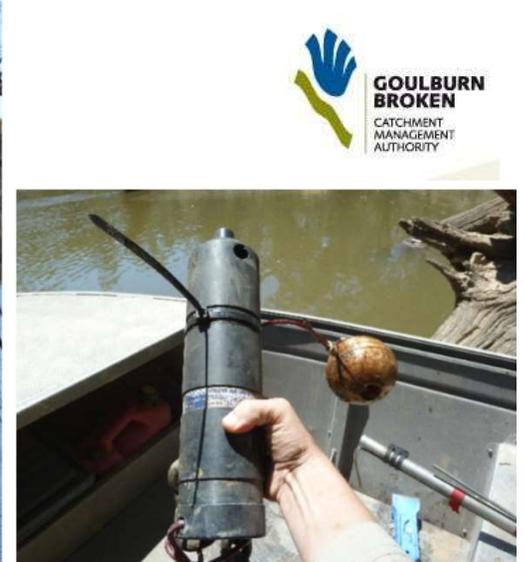
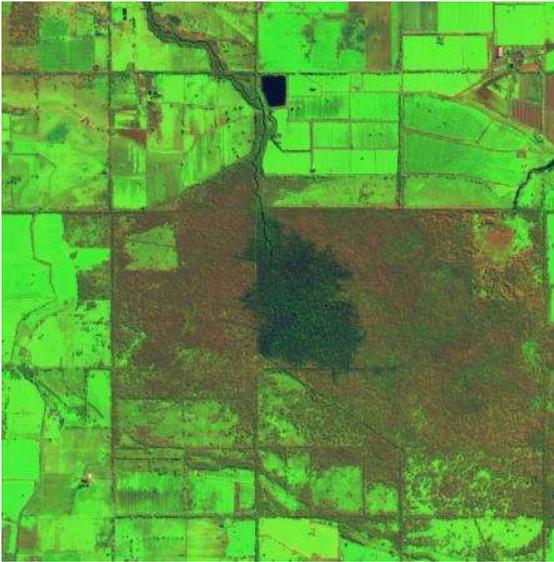
There are a number of state and Commonwealth funded monitoring programs that involve scientific experts from leading research institutes and universities, and which assess ecological responses to environmental water at rivers and wetlands across the state and the Murray Darling Basin. These programs include:

- Commonwealth research and monitoring programs, such as the Murray-Darling Basin Environmental Water Knowledge and Research (MDB EWKR) project, the Commonwealth Environmental Water Holder's Long-Term Intervention Monitoring (LTIM) program and monitoring undertaken for The Living Murray (TLM) program.
- The Victorian Environmental Flows Monitoring Assessment Program (VEFMAP) and the Wetland Monitoring Assessment Program (WetMAP), which are funded by the Department of Environment, Land, Water and Planning to monitor and help plan our environmental watering efforts.



These programs are complemented by small scale, site-specific monitoring carried out by Goulburn Broken CMA staff and community-based citizen science monitoring programs. Examples of these programs include:

- Platypus monitoring coordinated by the Australian Platypus Conservancy.
- Frog and waterbird monitoring coordinated by the Arthur Rylah Institute for Environmental Research (ARI) and Bird Life Australia.



Monitoring methods include

- Fish surveys that detect movement, spawning and population changes
- Quadrat monitoring of vegetation to detect changes in the cover and abundance of plants
- Acoustic monitoring to detect the presence of birds and frogs
- Near real time flow and water quality monitoring
- Analysis of aerial and satellite imagery
- Field inspections

5. How does the community input to these decisions?





- CMAs work with their local communities each year when developing watering proposals, and again when watering takes place.
- Local knowledge is incorporated into our decision making. Community members participate in advisory groups and provide local knowledge to help waterway managers identify values and determine environmental objectives that can be achieved through use of environmental water.
- Goulburn Broken CMA has three environmental water advisory groups. These provide input into seasonal environmental water planning and include landholders, agency staff and representatives from interested community organisations.



- Community members are also engaged during the development of documents that guide long-term planning. These include:
 - FLOW studies, which are the technical investigations that determine the specific water regimes (magnitude, timing and frequency of flows) that are needed to support native plants and animals and critical ecological processes in particular waterways, and
 - Environmental Water Management Plans, which are 5-10 year plans that describe the environmental objectives for particular waterways, the water regime that is needed to support those objectives, and the outcomes that are likely to be achieved by environmental watering over this 5-10 year period.
- Goulburn Broken CMA also has regular meetings with Traditional Owner groups to discuss and seek feedback on environmental water plans.
- CMA staff also conduct less formal presentations to numerous community groups throughout the year on environmental water management where they seek feedback on our environmental water plans
- And of course we are always happy to respond to questions we receive via phone, email or social media.

6. How do we make sure that every drop counts?



How do we make sure that every drop counts?

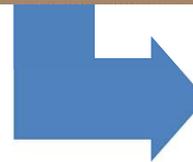
- One release of water can contribute to or achieve several environmental targets in different locations
- 82% of environmental water used multiple times in 2019-20



*Goulburn River at Hurricane Bend,
Photo: Keith Ward*

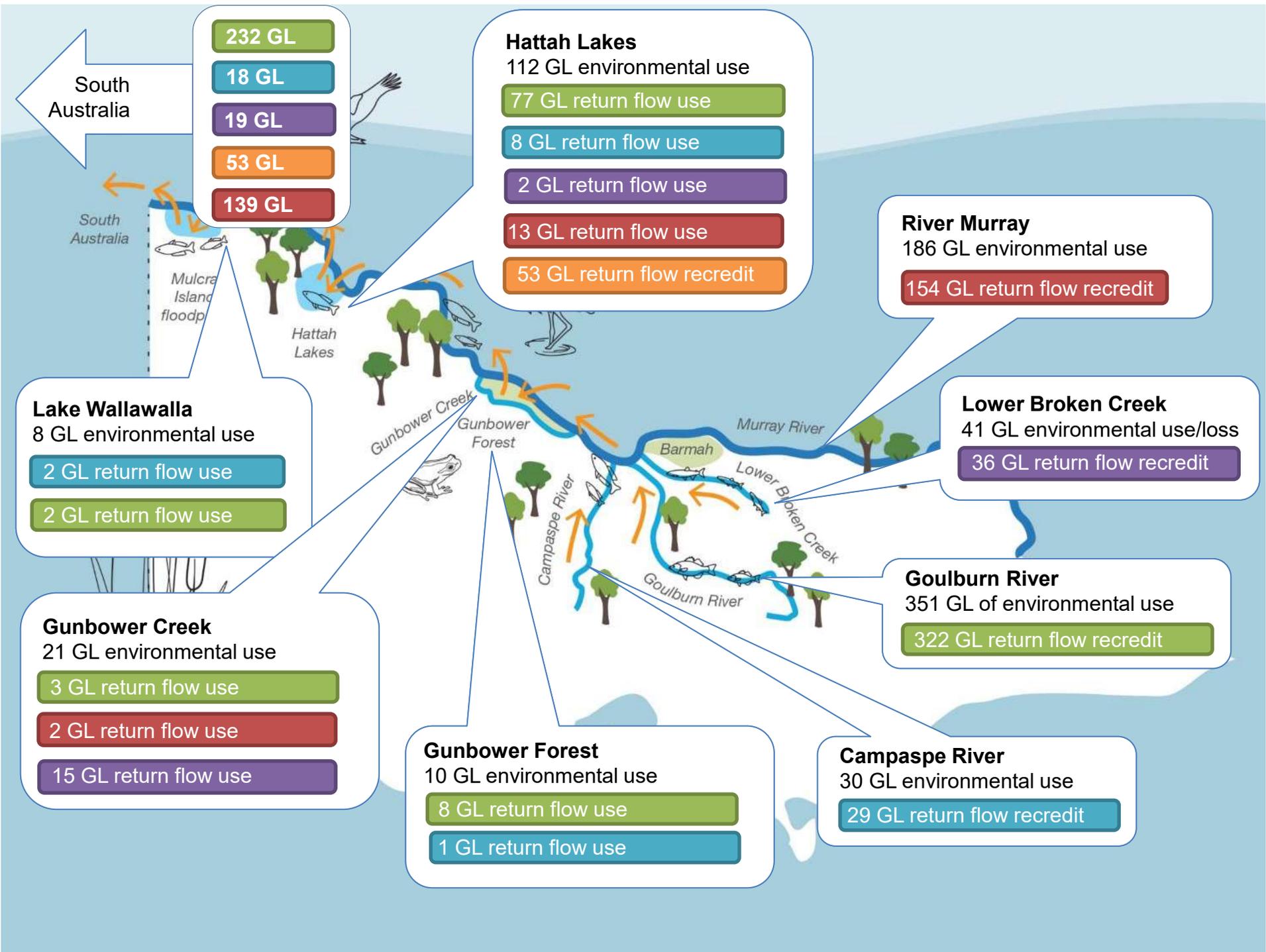


Hattah Lakes, Photo Mallee CMA



*Lower Lakes, Coorong and
Murray Mouth*





South Australia

- 232 GL
- 18 GL
- 19 GL
- 53 GL
- 139 GL

Hattah Lakes
 112 GL environmental use

- 77 GL return flow use
- 8 GL return flow use
- 2 GL return flow use
- 13 GL return flow use
- 53 GL return flow recredit

River Murray
 186 GL environmental use

- 154 GL return flow recredit

Lake Wallawalla
 8 GL environmental use

- 2 GL return flow use
- 2 GL return flow use

Lower Broken Creek
 41 GL environmental use/loss

- 36 GL return flow recredit

Gunbower Creek
 21 GL environmental use

- 3 GL return flow use
- 2 GL return flow use
- 15 GL return flow use

Goulburn River
 351 GL of environmental use

- 322 GL return flow recredit

Gunbower Forest
 10 GL environmental use

- 8 GL return flow use
- 1 GL return flow use

Campaspe River
 30 GL environmental use

- 29 GL return flow recredit

7. How and why do we carryover environmental water?



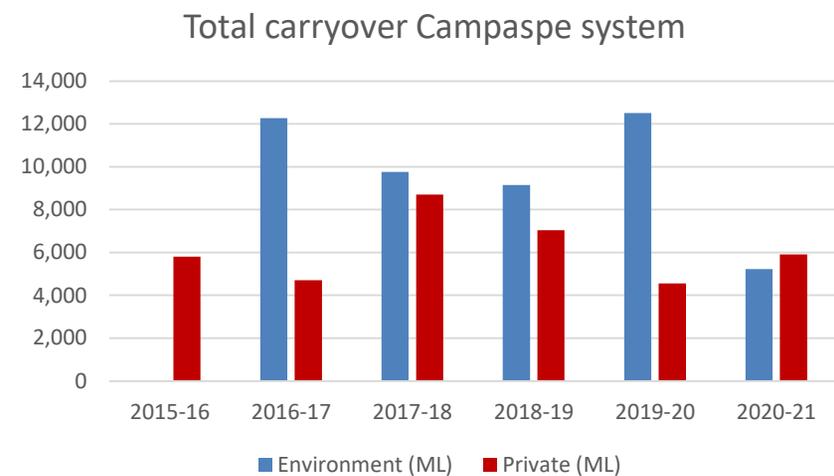
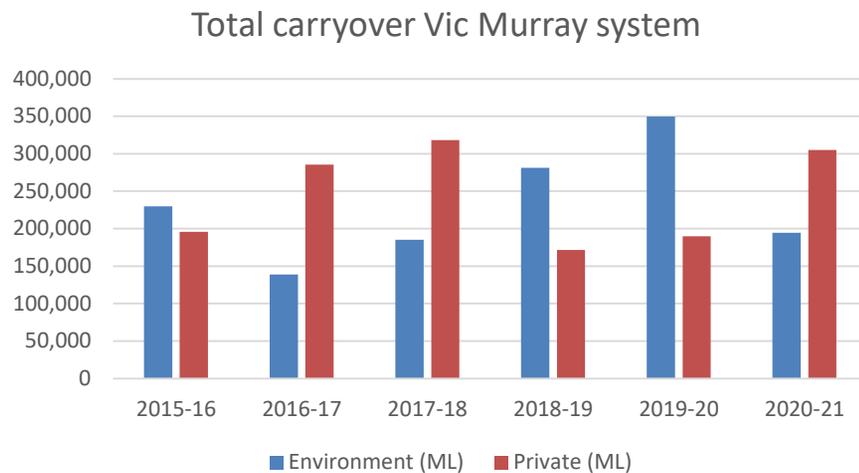
Why do environmental water holders carry over?

- To manage water availability risks - much like irrigators do
- Carryover can help meet critical needs in drought
- Our highest demands are in winter and spring – different to irrigators



How much do environmental water holders carry over?

- Carryover is highly variable – both for the VEWH and for other water users.



8. Do we pay charges for environmental water?



Do environmental water holders pay charges?

- **Yes, we do.**
- In 2019-20, VEWH alone paid about **\$3 million** on headworks, carryover and delivery charges in northern Victoria
- In 2019-20, environmental water holders (VEWH, CEWO, MDBA) collectively paid **about \$12 million**



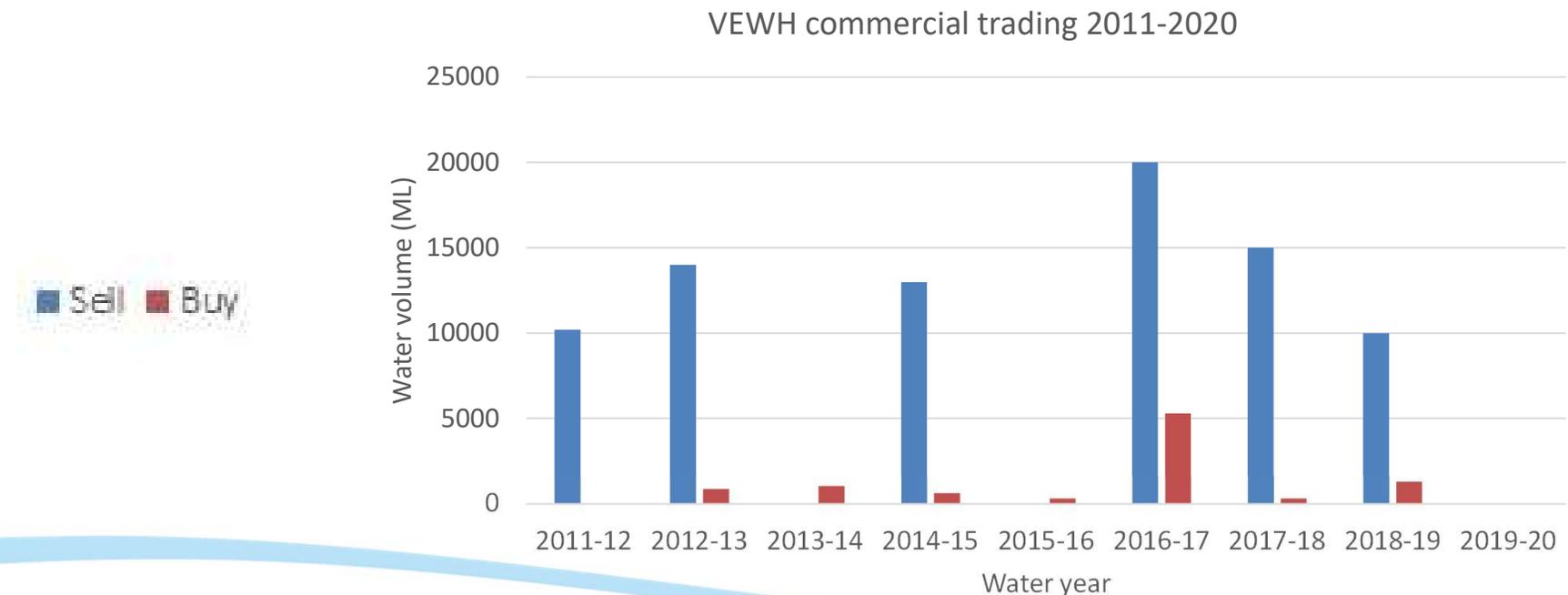
9. How do we use trade?



How does the VEWH trade allocation?

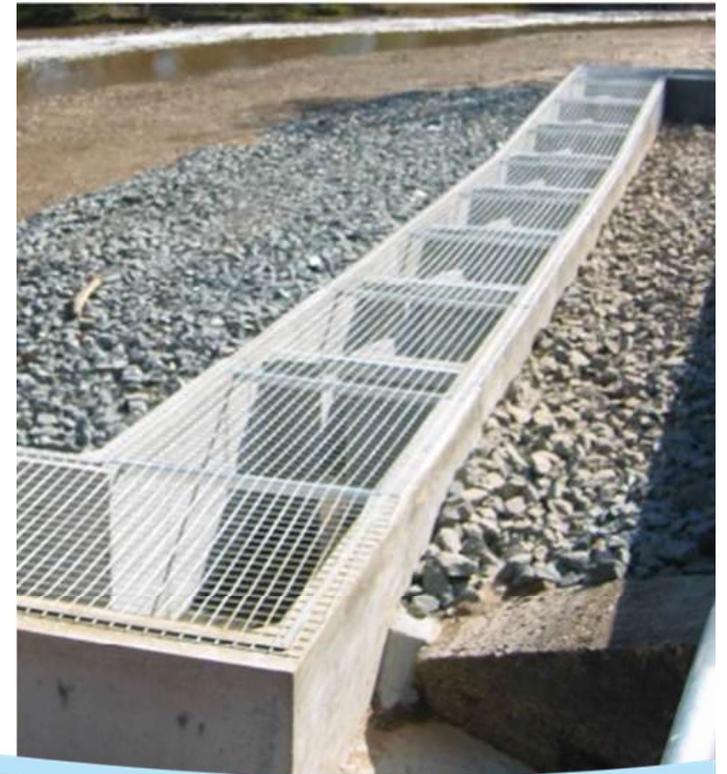
This graph shows VEWH's state-wide commercial allocation trading in Victoria.

- We sell more allocation than we buy.
- We've only sold allocation in northern Victoria to date
- Most of our purchases are in western and southern Victoria . We have only purchased water once in northern Victoria.



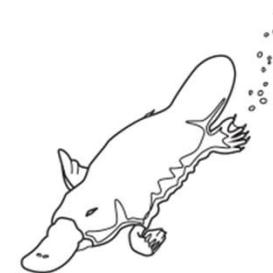
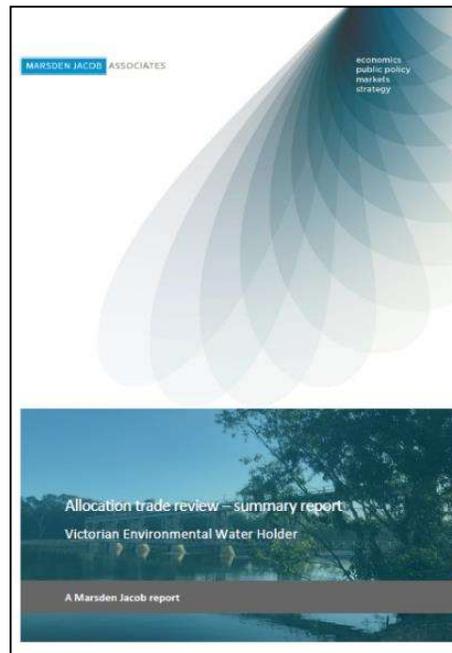
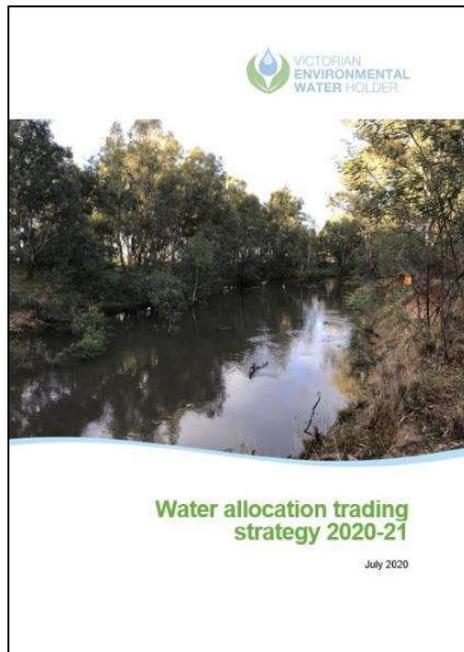
How does the VEWH trade?

- Any funds we raise are used to support environmental watering outcomes
- This can include:
 - Purchasing water where it is needed
 - Investing in adaptive management
 - Funding structural works



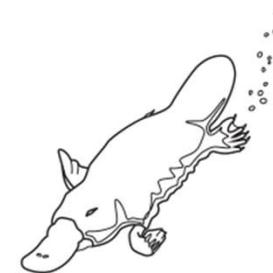
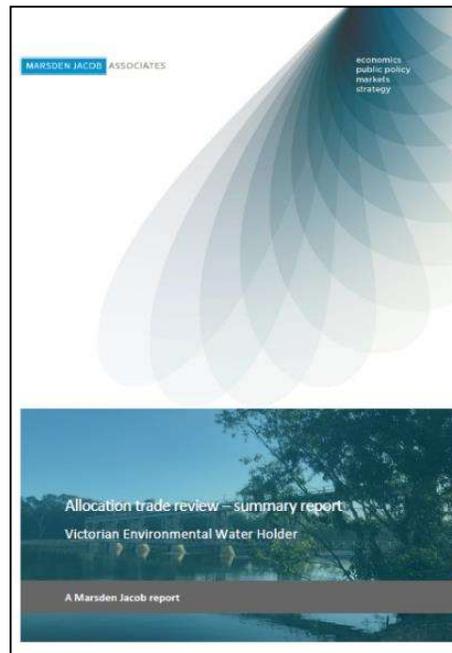
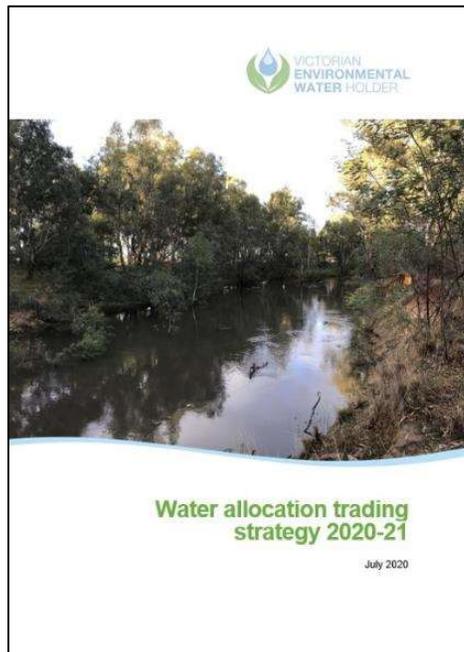
How does the VEWH use trade?

- The VEWH has used a mixture of brokers and web-based water exchanges.
- We only use brokers who are members of the Australian Water Brokers Association.
- The VEWH always seeks to ensure it is operating in the public interest and is not causing impacts to market participants.



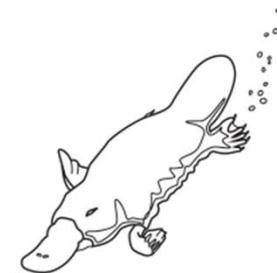
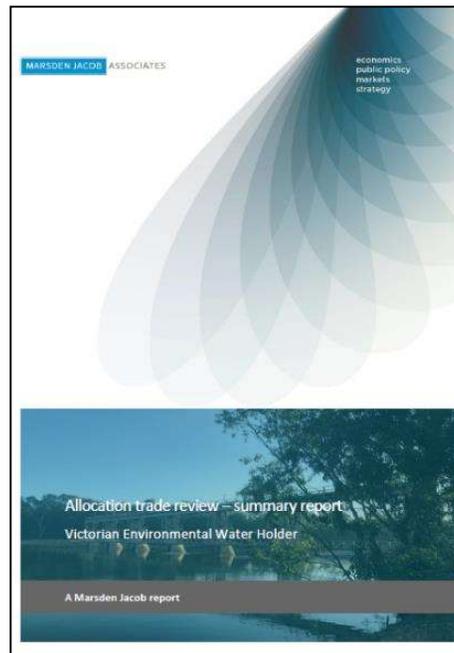
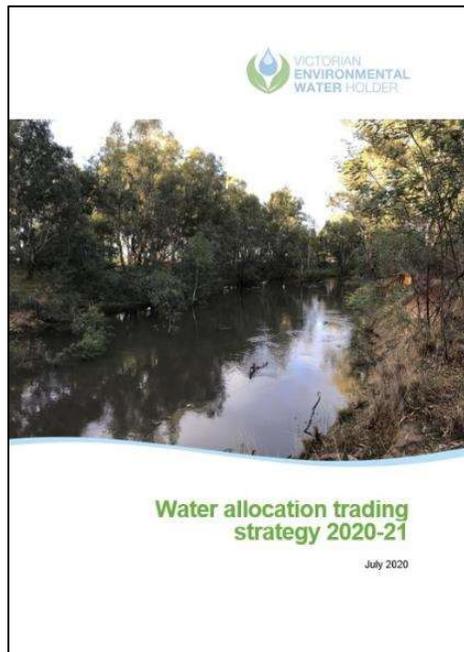
How does the VEWH use trade?

- Each year the VEWH prepares a water allocation trading strategy (see picture on the left below).
- This publicly advises on the VEWH's trading plans for the year ahead, both for administrative and commercial trades..



How does the VEWH use trade?

- In 2019 independent auditors, Marsden Jacobs, conducted a review of the VEWH's trading practices (see picture on the right below)
- This found the VEWH has not impacted water market prices, transparently signals its trading intentions to market participants, and effectively avoids market distortion and adverse impacts on other parties.



10. What might we expect in the next few months?



Low oxygen blackwater?

- There is a high chance of a blackwater event this summer if flooding occurs.
- Environmental watering has been helping to reduce this risk by gradually flushing debris from the floodplain into the river over time, but the risk is still there as large areas of the floodplain are outside the reach of environmental flows.



Low oxygen blackwater?

- Environmental flows can also assist species that are impacted by blackwater events.
- The image below shows the confluence of the Murray and Goulburn Rivers in 2016, when the Murray was experiencing a blackwater event. Native fish such as Murray cod were able to use the Goulburn as a refuge, and return to the Murray once the event had finished.



Environmental flows mitigating erosion

- Over the past few years the Goulburn River has been used for large inter-valley transfers (IVTs), to provide water for consumptive demands in the Murray.
- These stable high summer-autumn flows cause erosion and notching of the river banks, as well as the drowning of bank vegetation which is adapted to low flows during this time of year.
- Bank erosion is a significant concern in places such as the Barmah choke, Edward-Wakool system and in the lower Goulburn River.
- Environmental water authorities and river operators are working together to address these issues.



Environmental flows mitigating erosion

- Environmental flows are helping to address these impacts by delivering environmental flows in winter and spring to create variable levels in the river.
- These flows bring sediment and seed that are draped on the bank, ready for germination and growth. This bank vegetation has an important role in preventing erosion as it stabilises the bank, making it less susceptible to erosion, and also helps catch more sediment and seeds.
- Environmental water managers and river operators are also working together to make operational water deliveries more environmentally friendly. This includes making the IVTs more variable, to more closely mimic natural flows and help counter the drowning of native vegetation.



Upcoming watering actions

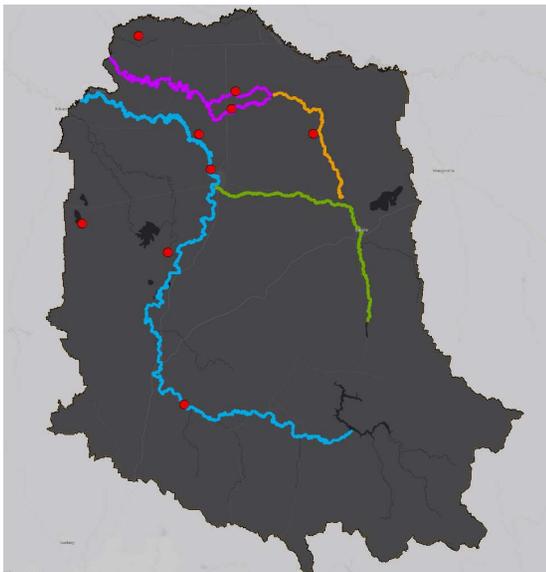
- A major flow is being planned for the Murray River. This will be a large event, reaching from the Hume Dam to the end of the system.
- The flow will pass through Barmah-Millewa Forest, achieving multiple outcomes at multiple sites
- One of the key objectives of the flow event is to support native fish spawning and recruitment for Murray cod, yellow belly and silver perch.



Upcoming watering actions



- Environmental water will be used to maintain base flows in the Broken River, upper Broken Creek,, lower Broken Creek and lower Goulburn River over summer and autumn. A base flow is a relatively stable, sustained and low flow in a river, generally being its minimum natural level.
- If needed, environmental water will be delivered to selected wetlands in Barmah Forest to maintain water levels that support waterbird breeding.
- Water will be delivered to Reedy Swamp and Loch Garry in autumn or winter 2021 if they have been dry for the desired length of time, to promote plant growth and provide food and habitat for waterbirds.



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Summary

- The environmental watering program strives to:
 - be as efficient as possible, based on evolving best available science
 - continuously improve
 - listen and adapt to community input

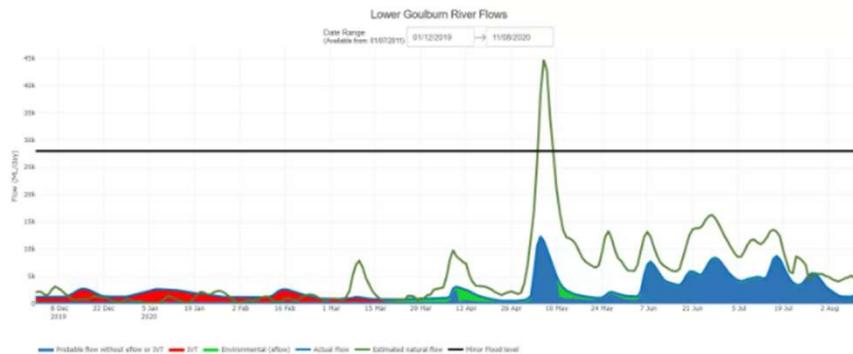


Q&As and links for more information

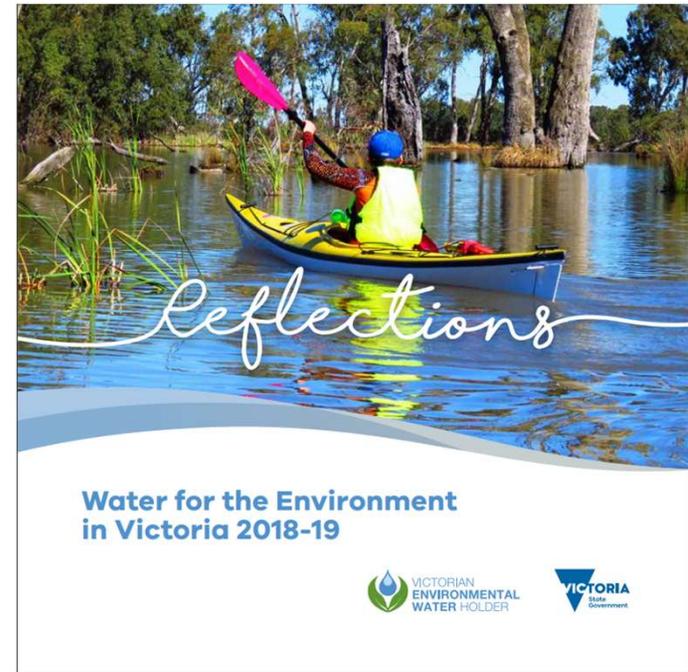
Goulburn River flows

Check out the type and volume of flow in the lower Goulburn River each week.

Click on the image below to view the hydrograph showing flows in the lower Goulburn River as measured at McCoy's Bridge.



www.gbcma.vic.gov.au



www.vewh.vic.gov.au



Water for the environment