

Loch Garry to the River Murray

At a glance

The flow footprints constraints work is investigating are 25–40,000 megalitres/day (ML/d) between Loch Garry and the River Murray (e.g. 8.7–9.6 m at McCoy Bridge, gauging station 405232, around the minor flood level). Flow footprints higher than 40,000 ML/d are not being investigated (e.g. flows greater than 9.6 m at McCoy Bridge, gauging station 405232). The overbank flows that constraints work is looking at occurred more frequently in the past.

Feedback from local councils and landholders was that the flow footprint maps looked about right, although perhaps a little overstated at flows of 25–30,000 ML/d.

Initial feedback from landholders suggests that flow footprints up to 30,000 ML/d may be a tolerable level of inconvenience flooding. This is subject to suitable mitigation measures being in place (e.g. regulators on levee outlets to control nuisance flooding outside the levee network, reliable level of rural levee protection, and improved roads and drainage). The flow footprint of flows 25–30,000 ML/d, around minor flood level, could be created by releases from Eildon and/or Goulburn Weir in combination with tributary flows.

Reach characteristics

This subreach flows from Loch Garry near Bunbartha to meet the River Murray (Figure 44). There are no tributaries along this stretch of the Goulburn (that contribute flows to the river), but there are a number of effluent creeks (that take flows away from the river) and significant wetlands. Effluent creeks include the Bunbartha–Deep–Sheepwash–Skeleton Creek complex and Wakiti Creek.

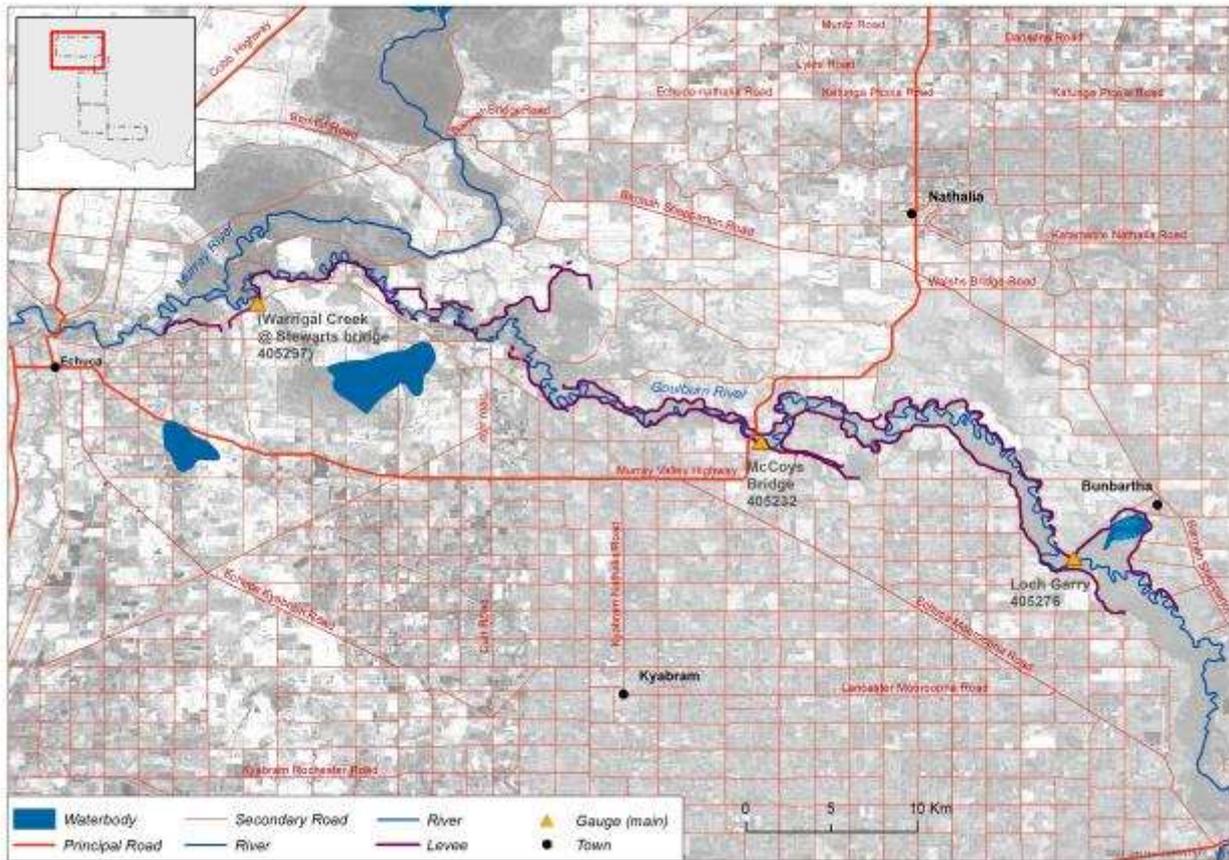
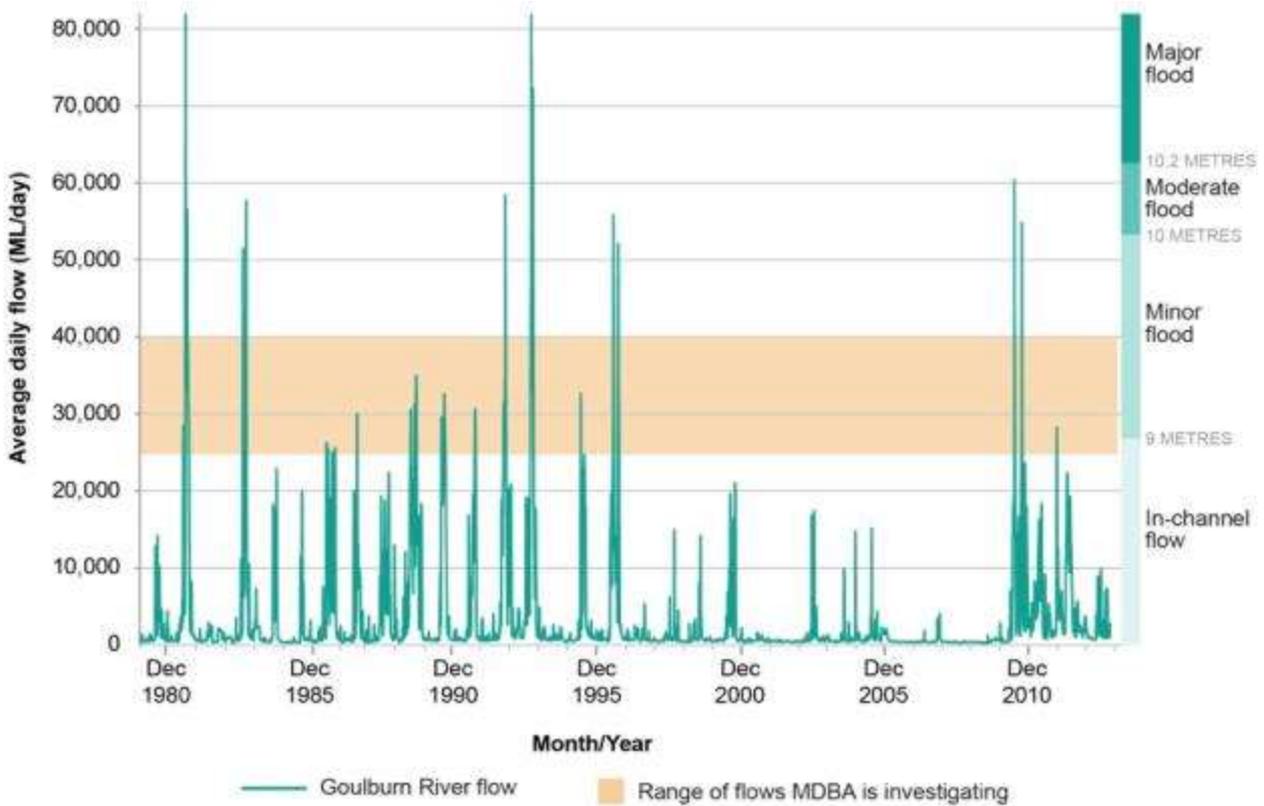


Figure 44 Loch Garry to River Murray subreach

There is one flood gauge in this subreach (at McCoy Bridge) that is used by the Bureau of Meteorology for flood forecasting purposes. The river flows recorded at the Goulburn River gauge at McCoy Bridge between 1979 and 2013 can be seen in Figure 45.



MDBA = Murray-Darling Basin Authority; ML = megalitre

Note: The shaded box outlines the range of flows that MDBA is investigating (25–40,000 ML/day).

The flood categories (minor, moderate and major floods) are as defined by the Bureau of Meteorology, noting that flood categories are linked to specific gauges. As you move away from the gauge, the river situation can be quite different from what is being recorded at the gauge.

Figure 45 Flows in the Goulburn River at the McCoy Bridge gauge, 1979–2013

Previous major floods at McCoy Bridge occurred in 2010, 1993, 1981 and 1974, with flows well above 100,000 ML/d. As can be seen from Figure 45, moderate flooding at McCoy Bridge has occurred six times since 1979, with the most recent event being December 2010. This historical data are presented in Table 14, together with other examples of moderate and minor flood events. A range of flows has been provided as background context for the river levels that people have experienced first-hand. Many are far larger and more damaging than the flows constraints work is investigating; they are not the aim of this Strategy. Some of the smaller historical events are also included in Table 14 that are in the range of the managed overbank flows being investigated. This is so people can think about the types of effects that have occurred at flows of these sizes.

Table 14 Example recorded flows for Goulburn River at McCoy Bridge (gauging station 405232)

Flood class	Date	Gauge height (m)	Flow (megalitres/day)	Is constraints work considering these sorts of flows?
Major	19 May 1974	>11.10	167,523	No
Major	27 July 1981	11.02	113,620	No
Major	8 October 1993	11.01	112,929	No
Major	10 September 2010	10.23	63,051	No
Moderate	22 October 1992	10.19	61,206	No
Moderate	14 December 2010	10.09	56,461	No
Minor	6 October 1989	9.42	35,205	Yes
Minor	17 June 1995	9.30	32,977	Yes
Minor	29 August 1990	9.29	32,871	Yes

What flows are being considered

Constraints work is investigating flow rates of between 25,000 and 40,000 ML/d (e.g. 8.7–9.6 m at the McCoy Bridge gauge station 405232) (Table 15 and as indicated by the shaded box on Figure 45).

These would be overbank flows up to around the minor flood level range. At below minor flood level, river levels are not high enough to trigger emergency management or flood warnings from the Bureau of Meteorology. At minor flood level, there is some inconvenience. Low-lying areas next to rivers and creeks start to get wet, requiring the removal of stock and equipment. Minor roads may be closed and low-level bridges submerged (see also ‘What is the Constraints Management Strategy?’).

Constraints work is **not** considering flows at moderate or major flood levels. Flows significantly higher than the minor flood level are damaging and disruptive, and outside the bounds of active river management. Constraints work is collecting information about what effects river flows have at different places along the Goulburn River, but only around the minor flood level category.

Table 15 Comparison of flows footprints for the Loch Garry to River Murray subreach and flood categories at the McCoy Bridge gauge

Measure	Flow footprints being looked at for the Loch Garry to River Murray subreach (that include the flow contribution of tributaries)			McCoy Bridge, Minor flood level ¹	McCoy Bridge, Moderate flood level ¹	McCoy Bridge, Major flood level ¹
	25,000	30,000	40,000			
Flow rate (megalitres/day)	25,000	30,000	40,000	28,333	52,115	61,743
e.g. Gauge height (m) at McCoy Bridge	8.7	9.1	9.6	9.0	10.0	10.2

¹ Bureau of Meteorology, noting that flood categories are linked to specific gauges. As you move away from the gauge, the river situation can be quite different from what is being recorded at the gauge.

The flows that constraints work is looking at have occurred in the past. The hydrographic record shows that flows around the minor flood level have happened more than 10 times since 1979. They are therefore not an unusual type of flow. People in the region are already managing through flow events of this size at least every few years when not in drought.

What these flows look like

Linking a gauge reading at McCoy Bridge with the actual flow downstream is not always accurate, because of the effect of tributaries inflows and localised rainfall run-off. To assist MDBA to understand how landholders and community assets could be affected by different flows, flow footprint maps were developed to help visualise the flows.

Flow footprint maps were created using hydraulic models to show how flows of different sizes move down the river and spread across the landscape. Flow footprint maps let you look at what is likely to get wet for different-sized river flows.

When interpreting the maps, it is important to bear in mind that they are from a model of a generalised event, not a real event. Therefore, some caution should be used when interpreting the 'typical flow' footprints presented in this report. They are not intended to mimic real flow events, but be an initial representation of what could get wet for a flow of a particular size.

Figure 46 shows a flow footprint map for 25,000, 30,000 and 40,000 ML/d flows between Bunbartha (Loch Garry) and the River Murray and the protective rural levee network.

The map shows wetlands and floodplain within the protective levee network, but also water flowing down a number of effluent creek systems. This includes public lands (national park around Stuarts Bridge) and some private land, especially around Yambuna forest and downstream. Many landholders in this region already have levees in place to protect their land from nuisance flows, but protective levees may not have been picked up at the scale the modelling was undertaken. There would also be some inundation of land in New South Wales near the Goulburn–Murray confluence, but not much.

Feedback from local councils and landholders was that the flow footprint maps looked about right, although perhaps a little overstated. In particular, local council engineers were surprised at the number of roads that would be affected at the 25,000 ML/d flow. It was questioned whether so many roads would really be inundated, as the number of roads affected appears too extensive for a relatively small flow that already occurs quite often. Further validation and calibration is needed.

The accuracy of the maps is currently limited by the amount of data available to calibrate the hydraulic model. The maps should therefore be viewed as a first estimate, with more accurate mapping required if constraints work is to proceed further.

What could be affected by these flows

The following information about what might happen at different river levels is a guide only. Information has been sourced from community feedback, local flood guides and council reports, where available.

Below minor flood level — examples of areas affected by overbank flows below minor flood level include:

- localised flooding in some low-lying rural paddocks
- Yambuna Bridge Road closed due to flooding along a 3 to 4-km stretch
- Stewarts Bridge Road closed in parts due to flooding.

Minor flood level — examples of areas affected by overbank flows around minor flood level include:

- localised flooding in rural paddocks
- Yambuna Bridge Road, Stewarts Bridge Road and a number of other floodplain roads closed, especially tracks through the Lower Goulburn National Park
- access roads and stock crossings through the Deep-Sheepwash-Skeleton Creek complex outside the levee network could be affected.

What the community thinks about the suggested flows

Initial feedback from landholders suggests that flows up to **30,000 ML/d** may be a tolerable level of inconvenience flooding. This is subject to suitable mitigation measures being in place (e.g. regulators on levee outlets to control nuisance flooding, easement payments, improved roads and drainage).

Flows of 30,000 ML/d, nearing minor flood level, could be created by releases from Eildon in combination with tributary flows. Tributary flows passing down the river could also be topped up by temporarily stopping the transfer of water into Waranga Basin and allowing it to continue to move downstream of Goulburn Weir (noting that this would be outside of the irrigation season and that environmental water entitlements held in Eildon Dam would still be debited for any water used this way).

Local councils and landholders in this region provided a number of other key points in relation to considering any change to regulated river flows.

Effects

Gauge heights were provided (at Shepparton) of when the Wakiti Creek starts to flow due to water coming through Hancocks pipes (6.5–7.1 m), when the Yambuna Bridge Road first gets cut (7.3–7.5 m) and when access is completely restricted (9.5 m).

It takes flows about two days to get from Hancocks pipes to Yambuna forest. However when Wakiti Lagoon is dry it can take longer as the lagoon has to fill up. Once Wakiti Lagoon is full it doesn't take much to get up onto the Yambuna Bridge Road.

Local farmers and residents are concerned about insufficient 'risk buffer' associated with a 40,000 ML/d flow — unexpected rainfall or additional unregulated tributary flow could turn these kinds of flows into a damaging flood.

All flows coming down the Goulburn River need to pass through gaps in the Bama sandhills. There are only a few routes that water can take.

High Goulburn River flows and Murray flows interact and can cause backing-up issues along the Goulburn and the Deep Creek system. This can affect access for some landholders (e.g. closing the Deep Creek alternative access route). Generally, this occurs whenever the water level in Shepparton is 10–11 m.

The Goulburn can stop the Murray back to Barmah if high flows clash.

September to November is critical for crops as well as a popular time for visitors to the region taking spring breaks.

Some residents raised possible health concerns about the potential for an increase in mosquitoes and mosquito-borne diseases (Ross River, etc.).

Access

High river flows close the Yambuna Bridge Road due to flows coming through Hancocks pipes (which means a 60-km detour to get around to Echuca). 'Hancocks pipes' are 3 or 4 large open pipe drains through the levee bank, which are often blocked by branches.

There are 3 or 4 places where the Yambuna Bridge Road is regularly cut and would require re-engineering — improving drainage and road surface.

Access to the forest for visitors is important for several regionally important tourism businesses in the lower Goulburn.

Management

Hancocks pipes is an inadequate levee outlet structure that has been recommended for upgrade in a number of studies dating back to at least the mid-1980s. A regulator was suggested to control heights at when and for how long water flows into the Wakiti Creek, so that high flows at Shepparton don't cut Yambuna Bridge Road for extended periods of time.

Better communication during flows is needed — not enough at the moment. Communities need to be able to get information in real time as the event unfolds.



Every time a levee bank gets wet, it potentially weakens. Levee maintenance is very important.

Heavy vegetation loads in creeks and distributor channels can affect how flows spread across the landscape.



