

INTERACTIVE MAP INSTRUCTIONS

The interactive mapping can be accessed from the following link:

[Link to maps](#)

The map will open up with coloured areas overlaying an aerial photograph background. The coloured areas are the extent of inundation for the particular flood being displayed.

Areas of interest can be zoomed into by rolling your mouse and the map clicked on and dragged around to better see areas of interest.

The legend and other boxes can similarly be dragged around or closed by clicking on the 'X' to clear the view.

There are 4 coloured circles at the bottom of the screen. Click on them as follows:

1. **Blue Circle** – This enables you to change the flood being displayed. If more than one is ticked, the map will display the larger of the ticked events. These maps include the modelled 1993 and 2022 events.
2. **Green Circle** – This displays the legend showing the depths of inundation associated with the map colours.
3. **Orange Circle** – This enables the underlying base map to be changed from the aerial photo to an aerial photo with some feature labels or a road map.
4. **Brown Circle** – Not active.

Horizontal Paper Clip adjacent title bar at top of map: This activates a Youtube animation of two flood events being the 1% AEP flood and the 2022 flood as modelled. (please ignore the advert at the start).

The animation shows the flood development as the river fills and spills filling Lake Kanyapella.

The arrows show the direction of flow and the arrow length the relative velocity of water flow.

Note how water spills out of the Murray River to the north inside the Barmah sandhills eventually crossing the railway line near Barnes before heading south toward Moama and re-entering the Murray River at Chanter Street, Moama.

Also note the time it takes for Lake Kanyapella to fill.

Some Comments on the Mapping:

The key features that are quite clear on the 1% AEP map are:

1. The abrupt end to the area of inundation at Barmah. This is the boundary of the model and mapping. Inundation continues to the north over the darker shaded areas which are the Barmah Lakes and National Park.
2. The Cadell Fault line (15m land uplift that blocked the original course of the Murray River) that forms the western perimeter of the flood water,
3. The Barmah sand hills and the Madowla Park sand hills that form the northern and eastern perimeter of the flooded area. (These are the sand dunes that formed on the shores of Lake Kanyapella when the Cadell Fault blocked the Murray River).

4. The Murray River flowing south through the Barmah Lakes to where it penetrates the sand hills between Morning Glory Resort and Madowla Park. The Murray River's capacity is severely to no more than about 40,000 ML/Day at this choke point. Flows in the Murray River in excess of that pond in the Barmah National Park area and leave via the Edward River to flood Deniliquin. This aspect is beyond the flood mapping but evident by the dark coloured forested area.
5. The Goulburn River flood plain is very broad with flows also constrained by the sand hills where it penetrates south of Madowla Park. There are enormous break away flows from the Goulburn River to the north west in the Lock Gary area. These flows are locked out from getting to Echuca Moama by the sandhills and create additional ponding in the Barmah Lakes / Barmah National Park area.
6. The Goulburn River possesses the largest gap in the sandhills. As the unrestricted Campaspe flows are much lower, the Goulburn River is the primary contributor to flooding of Echuca Moama.
7. The large Kanyapella Lake bounded by the Cadell fault and the sandhills acts as a very large retarding basin. Flood levels in it between the gap in the sandhills and east Moama are very similar. They drop away relatively quickly downstream of east Moama where the flows return to the narrower flood plain. Consequently, flooding of Echuca Moama is driven by the volume of water that can get into that 'basin' to raise its level rather than flows in excess of the river channel capacity raising the river level.

The 2022 Mapping and Surveyed Flood Levels:

The 1993 extents of flooding in the Echuca Village / Bay of Biscay area appear greater than in 2022 even though the 2022 level was 0.23m higher. The extents of the 2022 event are accurately known in this area. Additionally, in 2022, a regulator on the Warrugal Ck breached and was repaired and a large breach occurred in the north side lower Goulburn levees near Lock Garry both of which limited the amount of water spilling into this area. It is not accurately known what occurred in that area in 1993. Aerial photography is inconclusive. The 1993 modelling assumed water escaped via Warrugal Creek into that area. This issue is not critical to the flood study as in the 1% AEP event, the levees in that area are well overtopped.