

# South Australian Government Science Analysis of Additional Basin Plan Modelling

## Background

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On 29 June 2012, the Murray-Darling Basin Ministerial Council requested that the Murray-Darling Basin Authority (MDBA) model and assess the benefits of recovering 3200 GL of water for the environment when key constraints on delivering overbank flows to environmental sites are relaxed.

Constraints include rules about releases from dams, like Hume Dam, and restrictions on flow through narrower sections of the river that prevent delivery of higher flows due to the potential for flooding. The constraints relaxed in the modelling could be addressed through infrastructure works or purchase of flood easements.

South Australian Government scientists have analysed the MDBA's new modelling and compared outcomes for key environmental and water quality indicators against the draft Basin Plan scenario of 2750 GL. The analysis focused on the South Australian River Murray floodplain (including the Riverland-Chowilla Floodplain Ramsar site) and the Coorong, Lower Lakes and Murray Mouth Ramsar site.

The comparative analysis was peer reviewed by experts from the Goyder Institute for Water Research which found that the analysis and interpretation by the South Australian Government scientists were fit-for-purpose and scientifically robust.

The MDBA's modelling represents one way additional environmental water can be delivered and actual outcomes will depend on how environmental water delivery is managed under the Basin Plan.

## Key findings

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Analysis of the MDBA modelling indicates that recovering 3200 GL of water and relaxing key constraints results in considerable environmental benefits for the River Murray compared to the current draft Basin Plan 2750 GL scenario, not only in South Australia but also in Victoria and New South Wales.

### *River Murray Floodplains*

The floodplains of the River Murray support diverse native vegetation and are important fish and bird nurseries as well as food sources for the river environment. For example, the Riverland-Chowilla Ramsar site provides important breeding grounds for Murray cod.

The modelling indicates that recovering more water together with relaxing of key constraints provides the greatest opportunity to improve the health of floodplain environments along the length of the River Murray in South Australia and upstream. By relaxing key constraints, the benefits of recovering additional water are maximised, enabling more mid and high flows to be delivered to a greater area of floodplain.

For floodplains along the River Murray, the recovery of 3200 GL and relaxing constraints achieves 17 of 18 (94%) of the MDBA's environmental water requirements, compared to just 11 of 18 (61%) achieved under the draft Basin Plan 2750 GL scenario. Recovering 3200 GL without relaxing constraints achieves 13 of 18 (72%) of the MDBA's environmental water requirements.

In South Australia, water recovery of 3200 GL and relaxing constraints is the only scenario that achieves the MDBA's 80 000 ML/day environmental water requirement. Flows of this size over 30 days are important for fish and bird breeding and to support red gum forests and lignum shrub lands.

Under this scenario, three out of 20 of South Australia's more comprehensive environmental water requirements are fully met and there were improved outcomes for an additional 15 requirements. This means it is possible to improve flow regimes to support a greater area of habitat in the 40 000 – 80 000 ML/day range compared to the draft Basin Plan 2750 GL scenario.

While these improvements are significant, further improvements could be achieved if additional environmental works and measures were undertaken on the floodplain and if flows were prioritised to these sites.

Overall, recovering more water and addressing constraints greatly improves the ability to support red gum forests, lignum shrub lands, temporary wetlands, and water bird, fish and frog habitats. It improves the connection between the main river channel and the floodplain, providing more diverse habitat and food sources for native fish and other fauna in the river, including Murray cod, golden perch and silver perch.

## *Coorong, Lower Lakes and Murray Mouth*

The recovery of 3200 GL additional environmental water provides many ecological benefits for the Coorong, Lower Lakes and Murray Mouth. Water levels, salinity, Murray Mouth openness and barrage releases are all improved compared to the draft Basin Plan 2750 GL scenario.

Additional water recovery of 3200 GL and relaxing constraints:

- Keeps the Murray Mouth open at greater depths during drought, reducing the risk of the Murray Mouth needing to be dredged to remain open
- Supports the export of a long-term average of 2 million tonnes of salt. This is not achieved under the draft Basin Plan 2750 GL scenario
- Prevents water levels in the Lower Lakes from falling below a minimum of 0.4 metres Australian Height Datum (AHD ) (about 0.4 metres above sea level), for 96 percent of the time (as advised by the MDBA). This helps maintain flows through the barrages to the Coorong, prevents acidification occurring in the Lower Lakes, decreases the risk of acidic water draining back into the river and riverbank collapse below Lock 1
- Reduces the risk of salinity levels in Lake Alexandrina and Lake Albert not being suitable for watering stock and irrigation
- Reduces the risk of very high salinity levels that significantly affect the health of plants and animals in Lake Alexandrina and in Lake Albert
- Prevents average salinity in the Coorong exceeding levels that are lethal for fish, insects, and plants that form important parts of the food chain
- Increases the number of years where water levels in the South Lagoon support healthy aquatic plants that are important food sources for the Coorong ecosystem
- Improves flows through the barrages reducing the number of times that critical fish migrations do not occur, maintaining healthier Coorong salinity and water levels and allowing salt to be exported.

The recovery of additional water reduces the risk of repeating the loss of plants and animals experienced during the recent drought. Some risk remains, but this could potentially be managed by prioritising environmental water delivery to this site in low flow years.

Importantly the science analysis indicates that how and when water is delivered to the Coorong, Lower Lakes and Murray Mouth affects environmental outcomes. This must be considered by the MDBA and environmental water holders in making future sustainable diversion limit and environmental watering decisions for the River Murray.

### **Next Steps**

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The South Australian Government has provided the outcomes of this science analysis to the Hon Tony Burke MP, Commonwealth Minister for Sustainability, Environment, Water, Population and Communities, for consideration in his suggestions to the MDBA and making his final decision on the Basin Plan.

The South Australian Government will use the findings to inform further input and finalise its views on the draft Basin Plan. The Basin reforms must address a range of other matters, including:

- a commitment to remove constraints, including funding
- strong safety nets to secure the health of the Coorong, Lower Lakes and Murray Mouth including salinity and water level management targets
- funding for environmental projects to maximise the benefits of flows to SA floodplains
- interim arrangements and an environmental watering plan to optimise water delivery to priority sites
- recognition of South Australia's responsible water management through funding for water recovery projects including support for the Water Industry Alliance proposal to recover up to 40 gigalitres of water
- funding to support regional development and economic diversification opportunities.

The MDBA has released its report on this additional modelling which can be downloaded from its website at <http://www.mdba.gov.au/>

### **Science analysis and peer review reports**

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The Goyder Institute for Water Research peer review report is available at <http://goyderinstitute.org/>

The science analysis technical reports are available on the Department of Environment, Water and Natural Resource's website at <http://www.waterforgood.sa.gov.au/>