

## Goyder Science Review of the Guide to the proposed Basin Plan

### The Importance for South Australia of the Murray-Darling Basin and a Basin Plan

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South Australia is supportive of the Murray-Darling Basin Authority (MDBA) as an independent body that can manage the river based on sound science rather than parochial state interests.

Its principal aim must be to ensure a long-term productive and environmentally sustainable future for the Murray-Darling Basin. It is in the interests of all users of the River Murray system that this is achieved.

South Australia is seeking sufficient and secure environmental flows to restore and maintain healthy river, estuarine and floodplain environments in the South Australian River Murray.

This includes an end-of-system flow regime that ensures the health of the Coorong, Lower Lakes and Murray Mouth, including a freshwater future for the Lower Lakes and an open Murray Mouth without the need for dredging, as has been the case for the past decade under extreme low flow conditions.

South Australia is looking for a fair and equitable approach to determining sustainable diversion limits that addresses over-allocation across the Basin and recognises responsible behaviour and management practices.

The MDBA released the Guide to the Proposed Basin Plan on 8 October 2010 – the first stage of a three-stage process. The next stage will be the expected release of the proposed Basin Plan in mid-2011, initiating a 16-week consultation process. The final stage will be the adoption of the final Basin Plan in 2012.

This is a once-in-a-lifetime opportunity to rebalance the system, address over-allocation and prioritise the health of the river for the future, for the benefit of all Australians.

The quality and security of future water supplies can only be met from a healthy river.

### About the Goyder Institute

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The \$50 million Goyder Institute for Water Research was established in July 2010.

It brings together leading scientists and researchers from across Australia to enhance the South Australian Government's capacity to develop and deliver science-based policy solutions in water management.

It is a collaboration between the State Government through the Department for Water, the CSIRO as Australia's national research institution, and South Australia's three universities – Flinders University, the University of Adelaide and the University of South Australia.

The Institute will help improve the State Government's ability to forecast threats to water security and develop an integrated approach to water management challenges.

## About the Science Review

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The Goyder Institute for Water Research conducted a high-level scientific review of implications for South Australia of the Guide to the proposed Basin Plan.

The review was carried out by the CSIRO as a member of the Goyder Institute, in collaboration with scientists, technical and policy staff from the Institute's partners.

While recognising that the work of the Murray-Darling Basin Authority has evolved since the publication of the Guide, the Institute is confident that the science review will provide a sound basis to assist the South Australian Government to interpret and respond to the proposed Basin Plan.

## Science Review Scope and Method

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The review was confined to the South Australian portion of the River Murray and considered the objectives and associated environmental water requirements for two internationally recognised environmental assets: the Riverland–Chowilla Floodplain and the Coorong, Lower Lakes and Murray Mouth. These are key indicator sites: if their environmental water requirements are met, those of other river and floodplain environments in South Australia are also likely to be met.

Through peer-reviewed and critical scientific assessment, the Goyder Institute investigated:

- Whether the environmental water requirements of these two assets, both as identified in the Guide and as determined by the South Australian Government, could be delivered under the three proposed Guide scenarios (3000 GL, 3500 GL and 4000 GL average annual reductions in total Basin water diversions);
- Whether the MDBA and South Australian water quality and salinity targets could be met under the proposed Guide scenarios;
- How best to manage river flows to meet the South Australian Government's environmental water requirements; and
- The socio-economic risks and benefits of the proposed Guide scenarios within South Australia.

The review was based on information in the Guide and the hydrological models that the MDBA developed to underpin it. Although the MDBA has since been reviewing its modelling and analysis, the Goyder science review has developed additional skills and tools that will make it easier to assess the scenarios contained in the proposed Basin Plan when it is released.

The modelling period covers 114 years, including the recent millennium drought, and provides adequate climatic variability to consider the effect of the Guide scenarios under extreme wet and dry conditions.

However, the analysis did not consider the consequences of future climate change, nor did the analysis determine what impact partially meeting environmental water requirements would have on ecosystems.

## The Science Review Findings

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### Meeting Environmental Water and Water Quality Requirements

The three scenarios for providing additional environmental water outlined in the Guide (3000 GL, 3500 GL and 4000 GL average annual reductions in Basin water diversions) all provide benefits to

South Australia through increased flow volumes in the lower River Murray. Adverse environmental and water quality impacts associated with extreme low water levels, as experienced in South Australia over the past decade, will potentially be avoided.

The review highlights that the 3500 GL and 4000 GL scenarios are more likely to meet environmental water requirements of South Australia's key environmental assets and increase the likelihood of maintaining or improving the health of the River Murray, estuarine and floodplain environments.

However, the review also found that how and when water is delivered is just as critical for achieving environmental outcomes as providing additional water volumes. Physical constraints on water delivery (e.g. limits on channel capacity) and how the river is operated may, at times, limit delivery of flows of the required size and duration at the right time of year.

The review found that all three scenarios could support a permanent fresh water future for the Lower Lakes and improve the health of the Coorong while also keeping the Murray Mouth open more frequently than is currently the case. To achieve this outcome, it will be necessary to deliver environmental water to this site in low flow years.

For the Riverland-Chowilla floodplain, there are potentially sufficient average annual volumes to meet the site's environmental water requirements under the 3500 and 4000 GL scenarios. However, sufficient water cannot always be provided at the right time or the duration or magnitude needed by all floodplain ecosystems. Meeting the flow regime required for this site will require changes to the current operation of the river.

Water quality in the South Australian River Murray is expected to improve under all three scenarios. In particular, the Basin Salinity Target of 800EC at Morgan would be met and the risk of not meeting drinking water quality standards at other sites is reduced.

The review indicates that the MDBA salt load export target of two million tonnes per year on a 10-year rolling average is not met under any scenario. The 4000 GL scenario provides the best outcome for establishing flows to the sea that export salt from the River Murray system.

### **Socio-economic Risks and Benefits**

Overall, the socio-economic risks and benefits for major water users in South Australia would be similar under all three scenarios.

If reductions in water use in South Australia were borne solely by irrigators, the annual direct economic costs could be between four and six per cent of average annual gross value of irrigated agricultural production, or \$27.1 million to \$43.9 million. However, these economic impacts could be reduced through adaptation, investment in new water supply infrastructure and water buyback. Water buyback and investment in infrastructure would also generate new economic activity in the region.

The likelihood of the state facing significant drought-related expenditure, such as the \$790 million cost of mitigation measures (e.g. dredging) plus foregone income (e.g. tourism and agricultural losses) between 2000 and 2009, would be reduced.

### **Next Steps**

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The South Australian Government will provide the outcomes of the science review to the MDBA to inform the development of the proposed Basin Plan.

The South Australian Government will also use the report to feed into a wider policy response to the development of the Basin Plan and the potential impacts of water reform in South Australia. The review has also developed useful skills and tools that will make it easier to assess the implications of the proposed Basin Plan.

Further work through the Goyder Institute will help interpret the proposed Basin Plan when it is released. The South Australian Government will continue to engage with other partner governments and the MDBA to explore how physical and operational constraints to water delivery for environmental assets in South Australia could be addressed.

## The Science Review Reports

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The Synthesis Report of the Science Review is now being provided to the MDBA to inform the finalisation of the Basin Plan, due to be released in mid-2011.

There are a number of detailed, supporting technical documents outlining the methods and findings of the review which address:

- an independent peer review of the science underpinning the environmental water requirements of the Coorong, Lower Lakes and Murray Mouth;
- an analysis of the South Australian Government's environmental water and water quality requirements;
- a report on the socio-economic implications of the Guide to the proposed Basin Plan; and
- a compilation of papers supporting a socio-economic review of the Guide.

## Availability of Reports

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The Synthesis Report is available on the Goyder Institute for Water Research website <http://www.goyderinstitute.org>.

The supporting technical documents are still undergoing a final review process and are anticipated to be available on the website by July 2011.

## More Information about the Science Review

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Information about the Goyder Institute Science Review of the Guide to the proposed Basin Plan, including the Synthesis Report, is available on the Goyder website: <http://www.goyderinstitute.org/publications/2011/synthesis-science-review-Basin-plan.pdf> or email [goyder@csiro.au](mailto:goyder@csiro.au)

## Key definitions

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**Environmental water requirements:** the water regime needed to enable ecological communities, plants and animals to survive and reproduce.

**Gigalitre (GL):** one billion litres; represents a volume of water one square kilometre by one metre deep.