

Fact Sheet:

Environmental equivalence test (for SDL adjustment assessment)

The Murray–Darling Basin Plan sets a limit on the amount of water that can be taken from the Basin’s rivers. The Basin Plan also provides an opportunity to change this limit up or down, if better outcomes can be achieved for communities, industries and the environment. This is referred to as the Sustainable Diversion Limit (SDL) adjustment. If projects can be found by Basin states to achieve equivalent environmental outcomes in the Basin Plan, but using less water, then the SDL can be increased. To ensure these projects still meet the environmental outcomes of the Basin Plan they will need to undergo scientific testing. This is referred to as the environmental equivalence test.

What is environmental equivalence?

Projects being developed by Basin governments that could lead to the SDL going up are called supply measures. These are projects in the river system that change the way the river system is managed. These projects allow more targeted watering of the environment, reduce evaporation and loss, or improve river management practices. These projects must achieve environmental outcomes equivalent to those in the Basin Plan. The environmental equivalence test allows the full package of projects to be assessed to ensure that they achieve equivalent environmental outcomes to the Basin Plan.

Boals regulator Photo: Keith Ward



What are examples of supply measures?

Supply measures are river systems improvement projects which allow environmental outcomes to be achieved using less water. Examples include:

- environmental works (like installation of regulators or building levee banks on floodplains) that allow flow to be diverted into wetlands – see figure 1
- changes to rules regarding the way the storages and rivers in the Basin are operated to provide flow rates or timing better suited to the environment
- reconfiguring lakes or storage systems to reduce evaporation.

Basin states are responsible for developing supply measure projects.

How is environmental equivalence decided?

The equivalence test is based upon the same hydrological models that underpinned the Basin Plan. A method has been developed for scoring the environmental outcome of different flow regimes. The method was developed by a CSIRO-led consortium in consultation with Basin governments and has been reviewed by an independent panel of eminent scientists.

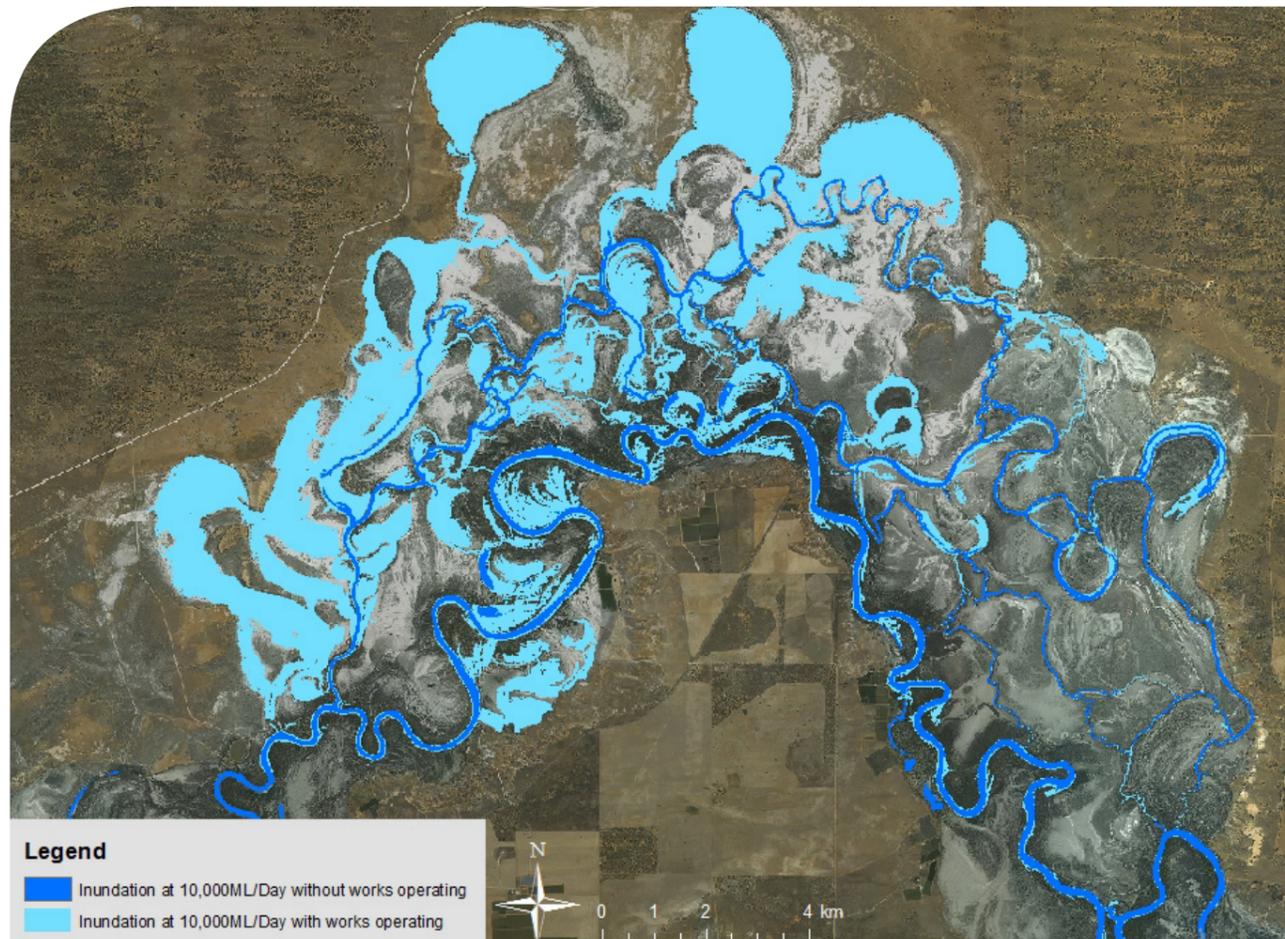


Figure 1: Increased Riverland-Chowilla floodplain inundation extent using environmental works. Image: produced by MDBA.



Above: purple-spotted gudgeon
Left: rainbow fish

The environmental equivalence test, which is currently in a trial implementation phase, compares regional environmental outcome scores for two hydrological modelling scenarios:

- the reduction in diversions under the Basin Plan (an average of 2750 GL/yr, called the 'Benchmark')
- a package of supply measures and a lower amount of water recovery for the environment (increased SDL).

Environmental outcomes are scored for waterbirds, vegetation and fish (see Table 1). Within these ecological classes, twelve ecological elements are used to represent ecosystem responses to changes in flow.

The SDL adjustment can only go ahead if the 'package' of proposed supply measures produces at least the same environmental outcome score as the Benchmark (and all other safeguards are met). While regional environmental outcome scores must be maintained, the test does allow for tradeoffs between selected environmental outcomes.

This can be tradeoffs within and/or between river reaches (for example improved outcomes in one of the nine reaches in the Southern Basin region and decreased outcomes in another reach), or a tradeoff between different ecological classes and elements (for example improved outcomes for plants and decreased outcomes for fish).

Are there other tests in the SDL adjustment?

In addition to an environmental equivalence test, the Basin Plan sets other safeguards that a SDL adjustment must meet. These include:

- limits on the overall scale of change to the Basin wide SDL (no more than 5%)
- no change to reliability of supply for consumptive users
- limits on changes to selected Basin Plan environmental outcomes.

Ecological Class	Ecological element
Waterbirds	Breeding - colonial nesting species
	Breeding - other waterbirds
	General health - wetland bird species (bitterns, crakes & rails)
	General health and abundance - all species
Vegetation	Benthic Herblands (macrophytes, reeds)
	Tall Grasslands, Sedgelands & Rushlands
	Shrublands
	River red gum forests
	River red gum woodlands
	Black box forests and woodlands
Fish	Short-lived small bodied species
	Long-lived large bodied species

Table 1: Ecological classes and elements used to score environmental outcomes

Known data about the way the environment generally responds to both wet and dry conditions underpins the environmental equivalence test. This information is used to calculate environmental outcome scores, which reflects their average condition over the 114 year modelling period.

For example, short-lived, small-bodied fish (like rainbow fish and olive perchlet) in wetlands:

- *tend to live around 4 – 8 years*
- *are habitat generalists that live in both wetlands and the river*
- *are opportunistic, breeding rapidly and improving in health when there are suitable conditions (eg water in a wetland)*

The relationship between hydrology and environmental condition has been developed by the CSIRO team in the form of 'preference curves'. The expectations for these species are:

- *their condition will gradually fall (lower scores) during times when flow conditions are poor (during extended dry spells)*
- *their condition will improve quickly (high scores) when flow conditions are good (during wet periods)*

Has the environmental equivalence test been trialled?

The test was initially trialled by CSIRO using The Living Murray (TLM) environmental works at Riverland-Chowilla Floodplain (South Australia, River Murray lower reach) and Gunbower-Koondrook-Perricoota Forest (NSW and Victoria, River Murray upper central reach). The MDBA is conducting further trials across the Southern Basin region, which may identify refinements required to the test, and will be discussed with Basin governments and scientists in coming months.

What's next ?

Basin governments are responsible for developing the proposals for potential SDL adjustment and delivering the projects for smarter river management. All basin governments and the Commonwealth need to agree a package of proposals and have agreed to finalise this in 2016. MDBA will then assess the package using the method set out in the Basin Plan to determine whether there should be a one off adjustment to the SDLs. The MDBA will provide a recommendation to the Commonwealth Minister but not before consulting with the public on any proposed adjustment to the SDL.



*Left: carp gudgeon
Below: olive perchlet*



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More information on the method (including testing and its results) can be found in CSIRO's report, or for other Murray-Darling Basin topics, visit our website.

