

Using modelling to determine baseline diversion limit

There were many similar themes and commonly asked questions during the recent call for submissions relating to amended long-term diversion limit equivalence (LTDLE) CAP factors. The responses below are provided in relation to the issues raised.

What is a BDL model?

The baseline diversion limit (BDL) model is one of a number of hydrologic river models used to inform decisions on how water is shared and what rules should be in place. The models do this by showing how those rules would have performed over the last 120 years of climate records.

The most common technique for using the models is called a two-model, long-term comparison. An existing model is configured to represent a reference case or condition, and the results are collected. The model is then reconfigured to represent a change of rule or policy, and run again. By comparing the results, modellers can look at the **relative** difference in outcomes from the two scenarios. This will show if a proposed change is likely to make things better or worse, compared to the desired outcome.

The models aren't able to provide **absolute** data on the exact volumes of flows—for example they would not be able to give the exact amount of water at a given point on 3 June 1904. However, experience has shown that a two-model comparison can give an accurate indication of how much higher or lower a particular day's flow might be with a different rule in place.

The Basin Plan uses a reference case called a baseline diversion limit (BDL), as defined by Schedule 3 of the Basin Plan. It represents the actual historical conditions up until 2009, and was developed by the MDBA based on hydrologic models provided by each of the states. This reference model was also used to assess how much consumptive water needed to be recovered to achieve a sustainable level of diversions.

The MDBA's report on their BDL models can be found at mdba.gov.au/publications/mdba-reports/baseline-diversion-limit-reports

Why use a BDL model?

NSW Department of Industry has used the BDL models in calculating LTDLE factors to be sure that the factors produced are consistent with the methods the MDBA used to calculate the required 2750 gigalitres recovery volume.

The department considered using other alternatives, including a:

- 'current conditions' scenario, where a model is configured to represent our best approximation of today's conditions
- 'full development conditions' scenario, which would estimate how water might be used at a points in the future. For example, it would estimate water use in 2029, 10 years after the Basin Plan is implemented, or some point where all available allocations are fully utilised.

Many people have proposed that the full development conditions scenario should be used to ensure that there is never less than 2750 gigalitres of water available to the Commonwealth Environmental Water Holder.

However, the NSW Government believes the use of anything but the BDL is inconsistent with the assumptions in the Basin Plan. It would also be very likely to skew the balance the MDBA has struck between environmental, social and productive outcomes from water in the Basin.

Why are we using this version of the BDL?

NSW has developed new BDL model scenarios. They were used as part of the consultation process with stakeholder advisory panels for the development of water resource plans.

Under the Basin Plan, new BDL model scenarios may be developed at any time, due to the requirement to use the 'best available information'. NSW Department of Industry has given the MDBA its proposed new BDL scenario models and technical supporting material. The department is working closely with the MDBA to review the new model scenarios, to be sure that the proposed BDL scenario is a more accurate representation of the BDL condition, as described by schedule 3 of the Basin Plan.

NSW has decided that only the BDL scenario currently recognised as the best available information by the MDBA will be used to calculate LTDLE factors at any point. As with the choice to use the BDL model, this is intended to maintain consistency with the assumptions in the Basin Plan.

When would we change to a newer BDL scenario?

NSW intends to update the factors after the MDBA provides either a confirmation that our proposed new BDL scenarios are an improvement on the previous scenario, or it becomes clear that there are no known remaining issues identified in the technical review being undertaken and the recognition of 'best available information' has moved into a procedural activity.

Will changing to a newer version alter the factors?

Changing the BDL scenario will change the factors. However, advance trials with results from the proposed new BDL scenarios strongly suggest the changes will be small and, in most cases, immaterial. Most of the difference between the 2011 factors and the 2018 factors was related to moving the calculation onto a methodology that is consistent with the Basin Plan assumptions.

Testing and experience during the development work have also found altering the relative activation of entitlements within a BDL has only small effects on the overall recovery outcome because the environment 'owns' a wide range of entitlement products and if the value of one kind goes down, the value of another will go up. This tends to balance out, resulting in no material net change.