

## Baseline diversion limits model outputs

*There were many similar themes and commonly asked questions during the recent call for submissions relating to amended cap factors. The responses below are provided in relation to the issues raised.*

### We don't have direct representation of diversions by entitlement type.

Most of the current generation of hydrologic models were designed and built approximately 20-years ago. They were designed to represent the volume of water being extracted from a regulated river. While they have been updated and recalibrated since they were first built, this continues to be their core focus.

All of the models use nodes to represent a point at which water is extracted. These nodes represent a group of entitlements whose account water is associated with a particular node. However, the calculated extraction is assigned only to the node, and is not linked back to the entitlement that provided the account volume to begin with.

For the original purpose of the models, the details around what water was associated with which entitlement was not a critical factor, and this information wasn't built into the models. The entitlements were only relevant because they created an account balance that the irrigation node could draw from.

### Grouped diversion points

Most models don't represent individual farms, but group them together based on similarities between how they operate, and geographical locations. In part, this is to manage computing workloads, but it is also simpler and typically more accurate to represent the average behaviour of a group of decision makers.

For example, typically all annual croppers between two river gauges will be represented by a single demand calculation. This means there could be a range of different entitlement types being represented at this single diversion point in the model, including stock and domestic, high-security, and general-security licences. So the model can't be used to directly inform the calculation of the LTDLE factors.

### I have seen use by entitlement figures quoted from models in the past?

Figures were provided in the past, but these were always informed estimates. There is no standardised way to divide grouped diversions into discrete parcels that can be attributed to specific entitlement types.

NSW models are typically more advanced, and some models can directly produce an estimated diversion by entitlement class. Most of the models can make, at a minimum, a distinction between general security, supplementary, and the high-security types of entitlement. But this distinction isn't detailed enough to give a breakdown across all types of entitlement.

With this information, NSW Department of industry can make valley-specific assumptions that give a breakdown of the figures for each entitlement type. In the past, the department has provided this estimated breakdown, when requested by stakeholders.

However, when calculating LTDLE factors, there are cases where there are so few licences for some entitlement types that making these assumptions would mean directly selecting the final factor. It was decided this was neither transparent nor defensible.

Due to the strength of the models, the department has proposed to adopt an LTDLE design principle where models are used to describe the overall long-term diversion that is occurring. However, where possible, more detailed water accounting data will be used to divide the total diversion figure across entitlements.