

Extraction limits

In New South Wales, all water sharing plans include long-term average annual extraction limits (LTAAELs). Any NSW water sharing plan for a water source within the Murray Darling Basin will also include a [sustainable diversion limit \(SDL\)](#), as set by the *Basin Plan 2012*. This document includes information on how the two limits work, how they differ and why we have two separate limits.

What are the differences between LTAAEL and SDL for surface water and how do we assess compliance?

LTAAEL compliance methods are different for regulated and unregulated water sharing plans (WSPs). The following describes the LTAAEL compliance method for inland surface water regulated river water sharing plans and the Barwon-Darling Unregulated River water sharing plan. Further detail for other unregulated plans and coastal plans will be described later as part of a new series of reports describing how water sharing plans are being implemented.

The SDL and LTAAEL have different purposes and consequently are designed and applied in different ways. The method for assessing compliance with each limit is also different. The overall process is similar however; and follows these three steps:

1. Calculate limits as described in the relevant water sharing plan and the Basin Plan.
2. Assess compliance with the limit, i.e. if there has been growth in water use and this growth exceeds the specified triggers then this is non-compliance.
3. Take action if there is non-compliance.

Water use in the Basin is highly variable. It changes in response to rainfall, trade, individual business decisions and various water sharing plan rules. Both compliance frameworks take this into account and try to detect when there is growth beyond the expected pattern of water use that would occur for differing climatic conditions (Figure 1).

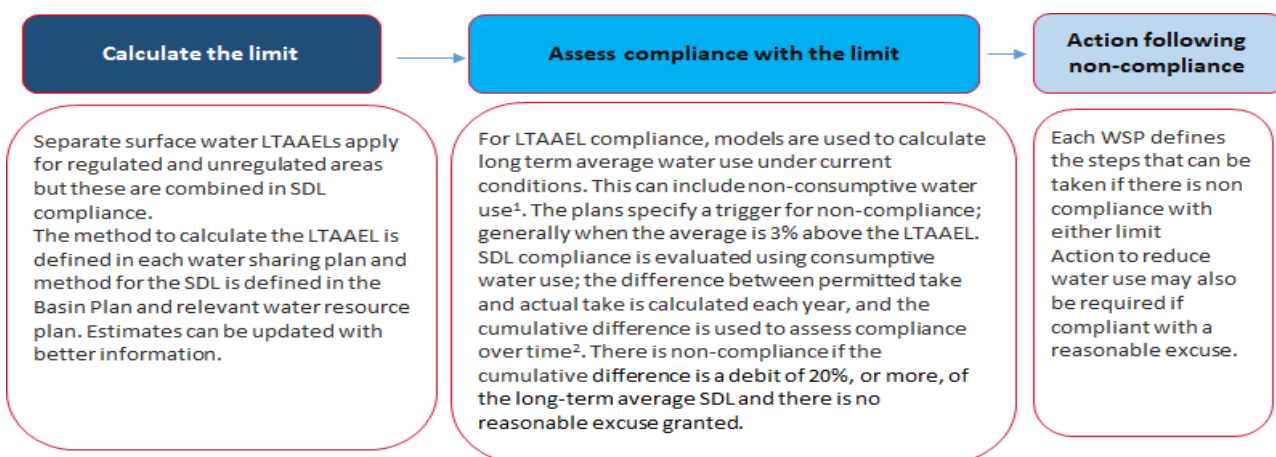


Figure 1: MDB surface water sources: differences in LTAAEL and SDL compliance

¹ Unlike the Basin Plan, LTAAELs do not differentiate between water used for consumptive purposes and water for the environment unless the water for the environment meets the definition of 'licensed environmental water' as specified in s.8 (1) (b) of the *Water Management Act 2000*. To date the Commonwealth has requested NSW not formally recognise the licences it holds as licensed environmental water.

² The cumulative difference also has some adjustments for trade between the consumptive and environmental water pools and incomplete recovery of HEW relative to the recovery target set in the Basin Plan.

LTAEL compliance assessment method

The LTAEL is a definition, rather than a fixed number, in inland surface water regulated river water sharing plans and the Barwon-Darling Unregulated River water sharing plan. The definition specifies operating rules and a level of development and we use models to test what would have happened if these things were in place over a long period of climate.

The numerical estimate might change over time if we use a longer period of climate, or if we improve the models with better data or methods. The key steps involved in the compliance assessment are:

- We make a numerical estimate of the limit using the best available LTAEL model.
- We develop a separate model which estimates what the long-term extractions would be under current conditions. This includes things like current development, operating rules and contemporary water use behaviour.
- We run the two models over the same period of climate and compare the long-term average extractions.

LTAEL assessment considers causes for changed water extraction and assesses how it might be affected over the long-term. There might be increases or decreases in water extraction compared to water availability, due to infrastructure growth, water sharing plan rule changes or behaviour change. See Table 1 for further information on LTAELs.

SDL compliance assessment method

The SDL compliance process uses a shorter time period to assess compliance. Rather than comparing long-term outcomes from two models, the SDL compliance process compares a model to actual extractions. The key steps are:

- We use a model to demonstrate that the water sharing plan rules, combined with the infrastructure currently in place and assumptions about behaviour, will meet the SDL over a repeat of the historical climate sequence.
- The same model is then applied from 2019 onwards to determine the annual permitted take for each year – that is what the SDL compliant extractions for a given year would have been, given the water availability in that year.
- This yearly estimate of the SDL (the annual permitted take) is then compared to actual diversions (annual actual take) in that year.
- The cumulative difference between modelled expectation and observed diversions are tracked over time and compared to the SDL compliance trigger of 20%.

The MDBA also [monitor trends](#) by comparing long-term model outcomes, however; this is supporting material and not part of the formal SDL compliance assessment. See Table 1 for further information on SDLs.

Key differences between the LTAEL and SDL methods

The key differences between the two limits and compliance methods are summarised below and further in Table 1.

- The SDL is reported and assessed by the MDBA at a different scale. Water sharing plans specify the SDL separately in regulated and unregulated water sharing plans, however; the MDBA combine these in the compliance assessment for each valley. The LTAEL is

calculated separately for each water sharing plan, with the rules for LTAAEL calculation set out in each water sharing plan.

- LTAAEL compliance is assessed using long term model comparisons. SDL compliance uses single year comparisons between modelled permitted take and actual diversion volume and then tracks the cumulative difference of these over time.
- Both LTAAEL and SDL compliance include a buffer to allow for model uncertainty and unusual real-world circumstances each year. However, the buffer is defined differently for each limit.
- Compliance assessment for SDL does not include water extraction associated with licences for held environmental water (HEW). LTAAEL compliance assessment includes HEW, unless it meets the definition of licensed environmental water under the *Water Management Act 2000*.

Table 1: Comparison of the key features of LTAAEL and SDL surface water compliance and reporting

Key feature	LTAAEL	SDL
Relevant statute	Water sharing plans (WSPs) made under the NSW <i>Water Management Act 2000</i>	Water resource plans – WRPs - (and associated water sharing plans) made under the <i>Water Act 2007</i> (Cth) and must meet requirements in the Basin Plan 2012 (Commonwealth)
Long-term limit	<p>In inland regulated river surface water WSPs, the LTAAELs are the lesser of long-term annual extractions under (1) Cap¹ conditions which generally reflects irrigation development, operation and management rules as at 93/94, or (2) irrigation development, management rules and environmental flow rules as at the early 2000s.</p> <p>The plans define the method to calculate the limit, not a fixed number. The method requires the use of scenario models. These test what the long-term outcomes would be if the specified level of development and rules were in place over a long period of historic climate.</p>	<p>The SDL is the baseline diversion limit (BDL) minus water recovery targets set in the Basin Plan. Both are calculated using the period 1895–2009 for consistency and comparability across the basin.</p> <p>The BDL is an estimate of the long-term average water use limits in place (or water used) for consumptive purposes in a valley, before the Basin Plan was introduced. The BDLs are defined in the Basin Plan (Schedule 3), they are not a fixed number. The Basin Plan in 2012 also included initial BDL estimates, however; estimates need to consider the best available information, and may adjust as new information comes to hand.</p> <p>Schedule 3 of the Basin Plan states that the NSW BDL is generally the state water management law in mid-2009, for surface water regulated river and floodplain harvesting take. In NSW, state water management law in mid-2009 were LTAAELs in WSPs. This means that the SDL is linked to the LTAAEL.</p> <p>If we revise the LTAAEL model and subsequently submit a new BDL model to MDBA, this will be reviewed by MDBA as part of</p>

Extraction limits



How the extraction limits work and differences

Key feature	LTADEL	SDL
		re-accreditation of the WRP (see MDBA website).
Type of water use affected and areas covered.	<p>LTADELs are specified separately in each plan and are separate limits for groundwater, surface water regulated and surface water unregulated areas.</p> <p>LTADEL compliance assessment method monitors all water access licence water use, regardless of purpose, except those that meet the definition for licensed environmental water as specified in s.8 (1) (b) of the <i>Water Management Act 2000</i>. Other non-licensed categories of water use are also included in the LTADEL, as specified in each WSP</p>	<p>MDBA's reporting on SDL compliance combines surface water regulated and unregulated areas in each valley (SDL resource unit). SDL also includes additional estimates, largely relevant for unregulated areas such as runoff dams and net take by commercial plantations². This is why the SDL estimate is bigger than the regulated river LTADEL estimates.</p> <p>SDL compliance assessment method is for consumptive water use only. Water use associated with licences held for environmental water (HEW) use are monitored under a different part of the Basin Plan (matter 12), but not included in the SDL compliance assessment framework.</p>
Models / methods	<p>LTADEL compliance requires two models; one to represent the limit and one to represent current conditions. Both are to be approved by the department / Minister.</p> <p>The current conditions model needs to be updated as development, rules or water use patterns change</p>	<p>SDL compliance requires two models; one to represent the BDL (which is linked to the LTADEL) and the Annual Permitted Take (APT) Model³. Both models are reviewed by MDBA as part of WRP accreditation.</p> <ul style="list-style-type: none"> The APT model contains current behaviour and management rules and is used to calculate how much water was expected to be used under the SDL, based on the climate of that water year. The BDL model is used to ensure that the APT results are used in a way that is SDL compliant over the long term. The APT models currently do not represent full environmental recovery as separate to irrigation water use and so the results of the model are scaled down to ensure long term the results are SDL compliant. The BDL model is used to determine what scaling is required. <p>The method is set out in the APT report attached to each WRP. The report also includes the estimate for some categories of water use that are not modelled.</p>

Key feature	LTADEL	SDL
Compliance approach	<p>LTADEL compliance compares long term results from the model that represents the limit and the model that represents current conditions. The percentage difference between the long-term average extraction produced by the current conditions model and the LTADEL is calculated. Both averages are calculated using the same model period.</p> <p>Some plans specify additional steps for including non-modelled components.</p> <p>Non-compliance occurs if the difference is greater than the triggers set out in the WSP; typically 3% but some plans include additional triggers⁴.</p>	<p>SDL compliance uses single year comparisons between modelled permitted use and actual use and tracks the cumulative difference. The compliance method is set out in the Basin Plan, and further guidance is given in the Sustainable Diversion Limit Reporting and Compliance Framework (MDBA, 2018).</p> <p>Each year, the actual take is subtracted from the annual permitted take calculated for that year. Annual debits or credits are added each year to give a cumulative balance. Other adjustments are also made for trade between HEW and consumptive licence holders and also for under-recovery of HEW compared to the required recovery.</p> <p>If the cumulative balance becomes less than -20% of the long-term average SDL, then there is non-compliance unless there is a reasonable excuse⁴. Action to reduce water use may also be required if compliant with a reasonable excuse.</p>

¹ CAP compliance reporting will remain in force until it is repealed by the Ministerial Council. When it is repealed, the LTADEL will still need to be less than or equal to the CAP. The repeal just means that annual CAP compliance reporting to the MDBA will no longer be required.

² CAP also required these estimates where they were significant and could be quantified. www.mdba.gov.au/sites/default/files/pubs/diversion-formula-register-v6.pdf

³ Annual permitted take is different to how much water individuals are legally entitled to use; they can use all the water allocated to them by their state government. The annual permitted take is used to check whether adjustments to water management rules (such as the allocation process) are required to manage growth in use.

⁴ The 3% and 20% triggers used in LTADEL and SDL compliance (respectively) provide a buffer for model uncertainty and unusual real-world circumstances each year. Models are less reliable for predicting water use in any one year, which is why a larger trigger is used in SDL compliance.

What are the differences between LTADEL and SDL for groundwater and how do we assess compliance?

While in many cases the SDL and LTADEL limits for groundwater are the same, there are differences in how compliance is assessed for each limit as shown in Figure 2. Further information on groundwater limits and compliance assessments can be found on the [website](#) and in [this fact sheet](#).

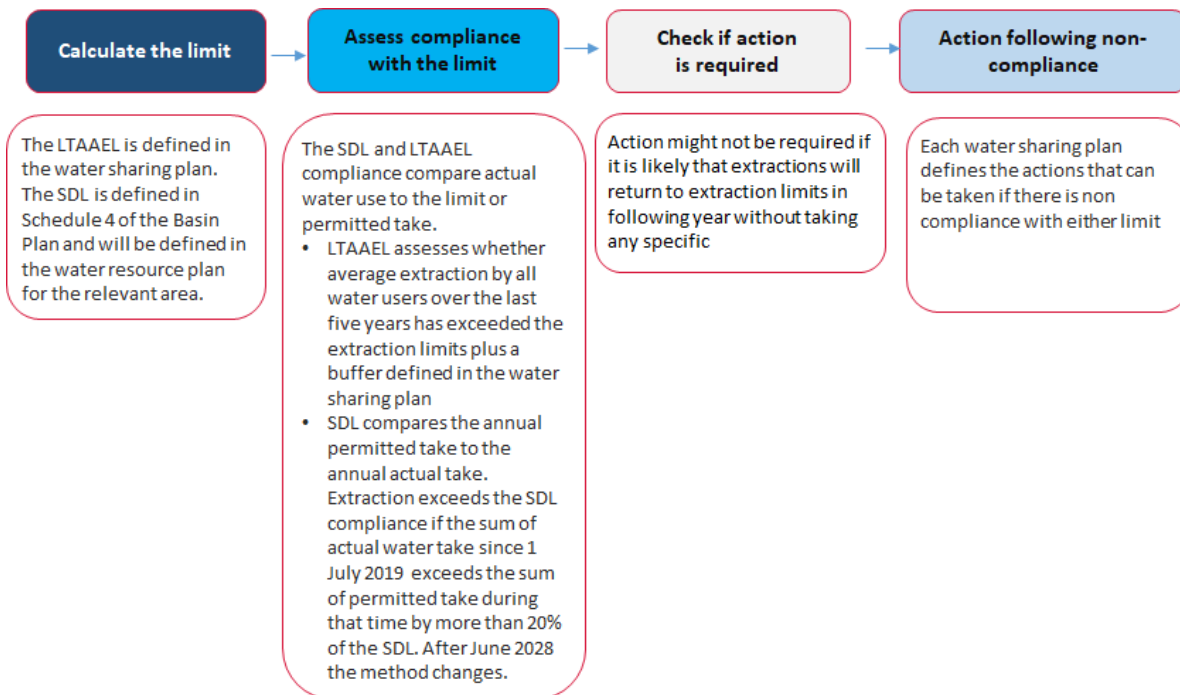


Figure 2: Differences in LTAAEL and SDL compliance for inland groundwater sources

Why aren't SDL and LTAAEL compliance outcomes always the same?

There are several differences in how compliance with SDL and LTAAELs are assessed as described above. This may result in one limit being exceeded while the other is not. The key points are:

- Groundwater SDL and LTAAEL assessments have different triggers for non-compliance that use different methods and periods of time to assess compliance.
- Surface water SDL and LTAAEL assessments also use different periods of time and triggers, are reported at different spatial scales and include different types of water use. One of the key differences is that LTAAEL compliance is assessed using long term model comparisons while SDL compliance compares modelled permitted extraction to actual extraction over a shorter period of time.

Why have both SDL and LTAAEL compliance?

The department is legally obliged to assess SDL compliance under the Murray Darling Basin Plan (commonwealth law) and LTAAEL compliance as specified in water sharing plans made under the *Water Management Act 2000* (state law).

NSW started defining LTAAELs when water sharing plans commenced under the NSW *Water Management Act 2000*. In some areas this was as early as 2003.

SDLs were defined in 2007 under the Commonwealth *Water Act 2007*. The Australian Government's Basin Plan 2012 defines sustainable diversion limits for the amount of water that all users can extract from an SDL resource unit – which could be equivalent to a NSW water source or a group of water sources in the Murray-Darling Basin.

However, there are benefits of having two compliance assessment frameworks. The two frameworks provide different lines of evidence for monitoring growth in extractions. Also, for surface water (regulated and Barwon-Darling), updates to current condition models made for LTAAEL purposes, may be useful to complete the actions required under the Basin Plan. For example:

- The work may be useful as a further test to assess whether growth is occurring or whether refinements are required to the annual permitted take model. This informs the reasonable excuse process (e.g. random model error or a rule change that has changed the pattern of use but is still SDL compliant over the long term).
- The current conditions model can be used to determine the action required if there is growth (for compliance, or 'make good' steps).
- A contemporary current conditions model is a useful basis for developing the Annual Permitted Take methodology should we need to re-accredit the method.

LTAAEL compliance also enables management of growth in use of access licenses held for environmental water purposes, where they don't meet the definition for licensed environmental water.

What do we do if SDL or LTAAEL has been exceeded?

Each water sharing plan sets out actions the department may take if there is non-compliance with either the SDL or the LTAAEL. These actions might also apply if the SDL outcomes are "compliant with a reasonable excuse".

Action is not always required if water use exceeds the limits:

- The plans include a definition for when non-compliance has occurred. If water use exceeds the limits this might not mean that there is non-compliance if the exceedance is less than the trigger, or buffer, defined in the plans.
- For groundwater, action may also not be required if take in the following year is not likely to exceed the limit.
- Under the Basin Plan, a Basin state may claim a reasonable excuse for exceedance of the SDL (e.g. random model error or a rule change that has changed the pattern of use but is still SDL compliant over the long term). As the regulator, the MDBA will determine whether or not a reasonable excuse should be accepted (the role of regulator and this function will move from the MDBA to the Inspector General of Water Compliance in August 2021).

For most inland regulated river water sharing plans, the first compliance action is to reduce the maximum available water determination made for supplementary water access licences. This will reduce the amount of water credited to supplementary water licence accounts and thereby limit the total amount of water that can be extracted under this category of licence.

For groundwater plans, the action can either be to reduce the amount of water going into accounts or the amount of water that can be taken or traded from accounts. The water sharing plans outline what methods are available in each groundwater source. While historically we have only reduced the amount of water going into accounts, we recently [consulted with stakeholders](#) in high priority areas most likely to exceed limits on their views on the two methods available.

The objective of any compliance action is to bring total water use back to the required limit.

References

MDBA (2018) Sustainable Diversion Limit Reporting and Compliance Framework, <https://www.mdba.gov.au/sites/default/files/pubs/SDL-Reporting-Compliance-Framework-Summary-Nov-18.PDF>