

Environment Victoria submission on the Draft Long-Term Water Resource Assessment for Southern Victoria

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Department of Environment, Land, Water and Planning

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Overview

Environment Victoria warmly welcomes the opportunity to comment on the draft Long-Term Water Resource Assessment for Southern Victoria (LTWRA) which is a critical step in assessing the sustainability of water use in Victoria. We commend DELWP for the effort made to develop a suitable methodology and synthesise appropriate data to make the assessment, which is the first of its kind, but there remains significant opportunity for refinement and improvement before the LTWRA is finalised.

The LTWRA clearly demonstrates that both surface and ground water availability has decreased across southern Victoria by a significant amount, and that this decline has fallen disproportionately on the environment's share of available water. This disproportionate impact is particularly obvious in catchments where demand for water is high. A review of water sharing arrangements in these catchments is urgently required.

The Victorian government must take the findings of the LTWRA seriously and act accordingly to protect our precious rivers and their environmental values. Reform of the Victorian Water Act to give greater protection to the environment's share of water may be necessary. If action is not taken, the ecological processes on which life depends will come under increasing threat.

We believe the methodology used in the draft LTWRA is likely to underestimate the decline in water availability and the impacts of climate change on water resources in southern Victoria. If this is the case, then the disproportionate impact on the environment's share of available water identified in the LTWRA is also likely to be an underestimate. These are serious concerns which would undermine the ability of the LTWRA to provide a sound basis for future water planning – in particular, through the upcoming Central and Gippsland Region Sustainable Water Strategy.

The LTWRA highlights many issues that will need to be resolved through the Sustainable Water Strategy process – for example, accounting for interception activities and the impact of groundwater extraction on stream flows in some catchments. With respect to the LTWRA itself, we make the following recommendations:

1. That the same, appropriate time period be used to describe current climate for all sections of the LTWRA and that this be compared with the same baseline, for example 1960-90.
2. That the methodology for the LTWRA be reviewed by a body with appropriate expertise, for example the Bureau of Meteorology or CSIRO, and any recommendations followed before the LTWRA is finalised. Any review should be required to determine whether or not the data used in the draft assessment was the best data available.¹
3. That the LTWRA has regard to extremes in climate and stream flows, in addition to average conditions over the relevant time periods.
4. That methodological, indicator selection and data collection problems be resolved before the next LTWRA for Northern Victoria is undertaken in 2024.

The reasoning behind these recommendations is given in the body of this submission.

Part A: Long-Term Water Availability

1. Surface water availability

The Victorian Water Act sets out the requirements for a LTWRA, which must take place at 15-year intervals.² The first requirement is to identify 'whether or not there has been any decline in the long-term availability of surface water or groundwater'. The Act does not spell out what long-term means, or set out any methodology for estimating water availability. It says only that the methodology and data used in the assessment should be reviewed by the Environment Protection Authority (EPA).³

The definition of 'long-term availability' is central to the findings of a LTWRA. For surface water, DELWP has chosen to use a 40-year period, 1975-2017, to represent our current climate and has averaged water availability across the period. It then compares this period with the long-term record that was used as a baseline in the Sustainable Water Strategies published between 2006 and 2011. The methodology shows a decline in water availability in all river basins in southern Victoria, from 4% in the Otways to 21% in the Corangamite basin.⁴ This is a serious decline.

There are a number of problems with DELWP's approach that may lead to an underestimate of the decline. DELWP's choice of time period is based on the work of the Victorian Climate Initiative (VicCI). Rainfall in Victoria is extremely variable and time periods chosen for comparative purposes can produce radically different results, as this table illustrates.⁵

¹ Water Act 1989 s22N(2)(b)

² Water Act 1989 s22L

³ Water Act 1989 s 22N

⁴ Draft LTWRA – Overview Report p49

⁵ Taken from Potter NJ, Chiew FHS, Zheng H, Ekstrom M and Zhang L (2016) Hydroclimate projections for Victoria at 2040 and 2065. CSIRO Australia.

Table 2 Mean annual rainfall for Victoria for different time periods (taken from Bureau of Meteorology climate data)

DESCRIPTION	TIME PERIOD	MEAN ANNUAL RAINFALL(MM)	RELATIVE DIFFERENCE FROM LONG-TERM MEAN ANNUAL RAINFALL (%)
Millennium drought	1997–2009	561.3	-13%
MDBSY* calibration period	1975–2006	630.4	-3%
IPCC AR5 climate baseline extended	1986–2014	630.9	-3%
MDBSY extended	1975–2014	632.3	-2%
IPCC AR5 climate baseline	1986–2005	640.4	-1%
IPCC AR4 climate baseline extended	1961–2014	643.5	-1%
Entire BoM record	1900–2014	647.9	0%
Post-1950s	1950–2014	656.9	1%
IPCC AR4 climate baseline	1961–1990	660.2	2%
Negative IPO phase	1950–1985	677.9	5%
Post-Millennium drought	2010–2014	691.7	7%

* Murray-Darling Basin Sustainable Yields project (CSIRO, 2008; Chiew et al., 2008, 2009c).

As a result of this variability, VicCI recommends using the 40-year period 1975-2015 as the baseline for assessing *future* changes in climate, rainfall and runoff. This is a different purpose from that of the LTWRA which compares current climate with the long term record. Other agencies, such as BoM, have used the period 1961-1990 as a baseline to compare current variations and anomalies against.⁶ This could be a more appropriate methodology for the LTWRA.

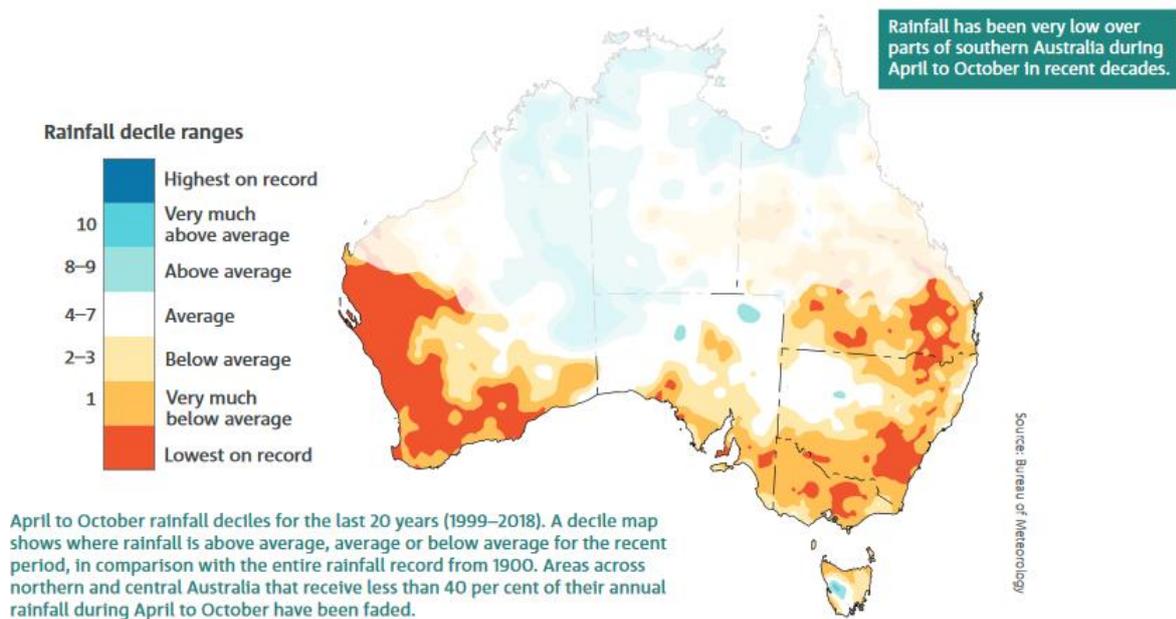
One problem with DELWP's methodology for the LTWRA is the variation between river basins in the extent of long-term records. Only 6 of the 19 river basins have records that go back beyond the 1950s. Four of these basins (Moorabool, Maribyrnong, Werribee and Yarra) show declines in long-term surface water availability of more than 15% and are in the top 5 for declines in the entire region. This is perhaps not surprising as records in some of the other catchments, for example the Otways, only extend to the 1970s, giving a poor basis for comparison with current conditions. Using a baseline period such as that utilised by BoM might give a more consistent picture across catchments.

Even more concerning is the apparent downward trend in water resources in the last 20 years. The LTWRA itself shows that average water availability is considerably lower in every basin in the period 1997 to present than in the 40-year period chosen to represent current conditions.⁷ This finding reflects the downward trend in cool season rainfall identified by BoM.⁸

⁶ See for example CSIRO and BoM State of the Climate 2018 <http://www.bom.gov.au/state-of-the-climate/index.shtml>

⁷ Draft LTWRA – Basin-By-Basin Results

⁸ State of the Climate 2018



We appreciate the need for caution in interpreting climate and rainfall data, but we believe that DELWP is running the risk of underestimating climate driven decline in water availability. For example the Yarra catchment has had only 2 years (10%) of above average water availability in the last 20 years as opposed to 12 years (30%) in the last 40 years.⁹ This kind of change is too big to be ignored and must be acknowledged in the LTWRA. Either we need a change in methodology or the inclusion of both 40 year and 20 year time periods in the final assessment.

The legislated designation of EPA as the reviewer of the LTWRA is also problematic. The EPA is Victoria’s environmental regulator whose major role is to ‘prevent and reduce the harmful effects of pollution and waste on Victorians and their environment’.¹⁰ It is not expert in water resources or climate variability. The Bureau of Meteorology or CSIRO would be a more appropriate reviewer for the content of a LTWRA.

2. Groundwater Availability

Lack of long term data has forced DELWP to use a different methodology to measure groundwater availability. It has used the period 1997-2016 to represent current conditions and compared that to a baseline period of 1975-1997. This change in methodology makes comparison with surface water results difficult and also makes the assessment of the impact of changes in groundwater levels on surface water availability difficult.

The LTWRA results show a decline in groundwater levels in the water table aquifer and in confined aquifers throughout southern Victoria.¹¹

⁹ Draft LTWRA – Overview Report p45

¹⁰ <https://www.epa.vic.gov.au/about-epa>

¹¹ Draft LTWRA – Overview Report p 56

The largest declines in groundwater levels have been in the deeper aquifers in central Gippsland and in the Barwon catchment. These declines are in areas where there has been significant extraction for coal mining and off-shore oil and gas in Gippsland and for Geelong's water supply in the Barwon. The aquifers are deep and confined so less responsive to short-term changes in rainfall and recharge.

The environmental impacts of this extraction are the subject of a remediation order in the Barwon and Barwon Water must not extract any more water until the remediation is complete. This may take many years. The environmental impacts of the decline in groundwater in Gippsland are currently unknown but likely to be significant, particularly for the Gippsland Lakes.

It is unfortunate that DELWP has not been able to determine if there has been a disproportionate impact of the decline in groundwater levels on users or the environment. It is important that a suitable methodology is developed and data collected before the next iteration of the LTWRA is due.

3. Factors contributing to changes in long-term water availability

a. Groundwater Extraction

The LTWRA concludes that licenced groundwater use is having little impact on surface water availability, less than 2%.¹² While this may be true as an average, the impact of groundwater use on stream flows in particular locations or at particular times may be severe. For example, groundwater pumping during low flow periods reduces streamflow in the Werribee River by 20% and in Boundary Creek by 100%.¹³ The impacts of these reductions on both the environment and users may be far more extreme than the averages reveal.

The use of averages is a problem throughout the LTWRA as they are a poor indicator of outcomes in highly variable systems such as the region's rivers. Impacts of reduced water availability are much more obvious in times of low rainfall and low flows but these extremes are only rarely discussed. Our water planning framework endeavours to provide adequate water supplies for both users and the environment under the full range of climate conditions.¹⁴ The LTWRA must cover extremes as well as averages.

b. Interception Activities

The LTWRA notes the importance of interception activities such as stock and domestic dams and changes in land use on long-term water availability, but has been unable to quantify the impacts. This is an extraordinary situation given Victoria's commitments under the National Water Initiative agreed between the states and Commonwealth in 2004. The agreement makes specific reference to interception activities and states that by 2011:

¹² Draft LTWRA – Overview Report p62

¹³ Draft LTWRA – Overview Report p63-64

¹⁴ DELWP (2016) Water for Victoria

‘in water systems that are fully allocated, overallocated, or approaching full allocation:

- a) interception activities that are assessed as being significant should be recorded (for example, through a licensing system);
- b) any proposals for additional interception activities above an agreed threshold size, will require a water access entitlement:
- c) robust compliance monitoring regime will be implemented;¹⁵

The catchments identified in the LTWRA as being most likely to be affected by increases in interception, the Moorabool, Barwon and Bunyip, are all fully allocated and should be covered by the NWI commitment. As inflows decline, a greater proportion are captured by stock and domestic dams or by water thirsty vegetation. The Victorian government must urgently address the problem and include stock and domestic use in the licensing framework. Only then will we know the true extent of the water use and be able to achieve equity between different categories of users and the environment and fair sharing of the available water.

4. Sharing of changes in long-term water availability

The second legal requirement of a LTWRA is to determine whether any decline in long-term water availability ‘has fallen disproportionately on the environmental water reserve or on the allocation of water for consumptive purposes’.¹⁶ We commend DELWP for developing a methodology to demonstrate disproportionate impacts and for demonstrating that the environment has been subject to a reduction in its share of the available water in many river basins. These findings are very concerning and a review must be conducted in catchments where a decline in the environment’s share has been identified. The review should consider if current levels of water use are sustainable and if there is a need to establish as ‘sustainable baseflow’ or ‘environmentally sustainable level of take’ in stressed catchments. Legal reform may be necessary to address the disproportionate impact.¹⁷

We offer the following observations:

- The environment’s share of available water has not increased in any Basin (fig 49).
- Even after rule changes and environmental water recovery, the environment’s share of available water has not increased by more than 1% in any basin, and has declined in 14 out of 19 basins (fig 50).
- The catchments that show the largest decline in the environment’s share of water (Latrobe, Werribee, Barwon, Moorabool and Yarra) are those with the highest level of consumptive use. We strongly support the recommendation for a review of water sharing rules in these catchments as actions to date have been inadequate to halt the decline in the environment’s share.
- The creation of an environmental entitlement for the Thomson and changes to rules in the Maribyrnong have averted a major decline in the environment’s share in these catchments to date. Given the overall decline in water availability in these catchments an examination of whether current arrangements are adequate to

¹⁵ National Water Initiative s57

¹⁶ Water Act 1989 s 22L

¹⁷ See Environment Victoria (2015) *Aquaprint: A community vision for water reform in Victoria* p22 for details

prevent an environmental decline is warranted and they should be included in the ministerial review.

- The LTWRA reinforces the importance of passing flows as a component of the environmental water reserve, particularly in dry years (Fig43). It does not mention that in times drought and water shortage passing flows are often qualified by the Water Minister and redirected to other uses. At the height of the Millennium Drought between September 2006 and June 2010, the Minister for Water reallocated surface water to meet critical needs 65 times. Of these changes, 42 involved restricting environmental water rights.¹⁸ Qualification of rights should be a last resort even as a temporary measure, and the environment's share of water should be given greater protection from qualification under the Water Act. The Act could be amended to prioritise critical human and environmental needs over other consumptive uses.
- The LTWRA is required by law to consider the impact of reduced water availability on the environmental water reserve (EWR). The LTWRA includes a package of water called 'Water for the environment' which is **not** part of the EWR in its assessment (p79 and Fig 31). This new category of water is not quantified, is not protected in any way and has no legal basis for being considered as part of the EWR. To include it as part of the environment's share is at best misleading and at worst an attempt to reduce the disproportionate impact. This water must be excluded from the environment's share in the final LTWRA.
- The LTWRA acknowledges that how water is shared between consumptive users and the environment can change dramatically between wet and dry periods.¹⁹ The consumptive share is much less impacted by dry conditions and is generally more reliable and secure than the environmental share. Legislative reform may be required to increase the security of the environment's share.
- This lack of security for the environment's share increases our concern about the potential underestimate of overall decline in water availability outlined above. Given that the environment's share is more heavily impacted by reduced availability, the disproportionate impact is likely to be greater than calculated in the LTWRA.

Part B: Waterway Health – Long-Term and In Relation to Flow

The final legislative requirement of a LTWRA is to identify whether 'there has been any deterioration in waterway health for reasons related to flow'. This LTWRA 'has not clearly identified overall deterioration in waterway health for reasons related to flow over the time period for which suitable data were available (1990-2018). Available datasets show that some indicators of waterway health have improved due to changes in flow, while other indicators have deteriorated, and yet others show no discernible trend, sometimes in the same waterway over the same period of time'.²⁰

We support this conclusion. If the data is not adequate or appropriate to show changes in waterway health for reasons related to flow, then the conclusion is warranted. The response should be to select indicators and design an appropriate monitoring program that can provide evidence for the northern Victoria LTWRA in 2024 and for the next southern Victoria LTWRA in 15 years' time. Breaking down the data into shorter time periods, in some cases

¹⁸ Victorian Auditor General (2010) *Restricting Environmental Flows during Water Shortages*.

¹⁹ Draft LTWRA – Overview Report p114-115

²⁰ Draft LTWRA – Overview Report p140

less than 10 years, (as in section 6.2.5) to attempt to show changes in response to drought and subsequent increase in flows is not appropriate. The arguments DELWP uses for a long-time period in Part A should equally apply here, and the same time periods used for all sections of the LTWRA. Better to say 'we don't know' than to try to manipulate the data to provide an unsubstantiated answer.

Nevertheless, this section of the LTWRA should be updated to assess and quantify whether and how the EWR meets or fails to meet the EWR objective. The Sustainable Water Strategy will require the identification of 'ways to improve and set priorities for improving the maintenance of the environmental water reserve in accordance with the environmental water reserve objective'.²¹ In order to develop adequate priorities, it is essential that the LTWRA evaluates the capacity of the environmental water reserve to 'preserve the environmental values and health of water ecosystems, including their biodiversity, ecological functioning and quality of water and the other uses that depend on environmental condition'.²² The LTWRA fails to evaluate the EWR objective in its present form.

This section of the LTWRA could also make greater use of hydrological data to assess waterway health. It considers whether there have been changes to flow regime in terms of magnitude (for example, are low flow events of lower volume than before?) but not changes in frequency or duration (for example, have low flow events occurred more/less frequently and for longer/shorter duration?). The results of the hydrological analysis are alarming enough (s6.5.2), with an increase in low- and no-flow indicators, but a comprehensive analysis would most likely reveal a more dramatic impact. As in other sections of the LTWRA, the identified impacts of reduced flows on waterway health are likely to be an underestimate.

Regards,



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²¹ Water Act 1989 s22C(c)

²² Water Act 1989 s4B